THE MUNICIPAL WATER SYSTEM

OF

PORTLAND, OREGON

ILLUSTRATED
HISTORICAL
DESCRIPTIVE
STATISTICAL

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PREFACE

In order that the residents of Portland and vicinity, as well as the people living in other cities, may become better informed regarding Portland's great public utility -- its municipal water system -- which in the past thirty years has grown from a small private pumping system, costing $464,551.81 and supplying only a portion of the West side, to an immense gravity system costing nearly $13,000,000, and which is now furnishing water to the entire business and residential sections of the City, as well as to the cities of Gresham, Milwaukie, Capitol Hill and Multnomah, prompts the writer to compile, as a permanent record, certain information and data now contained in, and distributed in various books, records and vaults about the City Hall.

From all parts of the United States and from some cities in Canada, Alaska, Hawaiian Islands and Foreign Countries come requests for information regarding the Bull Run water supply. Libraries especially, the Country over, are continually seeking information regarding the supply; whether the water is filtered; whether chemicals such as sulphate of alumina or liquid chlorine are used in the purification of the water; whether settling reservoirs are used and the area of the Bull Run water shed, are among the questions asked. Physicians, Civil Engineers, Water Works men, and the Faculty and Students of Universities, Colleges and High Schools throughout the world, have come to a realization of the fact that Cities or congested farm-

ing districts cannot hope to maintain a low death rate unless every precaution is taken to properly protect or purify a water supply before serving it for domestic purposes to an unsuspecting public. To such as these and others, the information contained herein will no doubt be of value.

For the successful manner in which the Water Department has been conducted in the past thirty years and for the enormous reduction in rates from time to time, credit is due the Water Committees, the Water Boards and the Commissioners of Public Utilities.

The writer deems it a privilege to be permitted to express at this time, to all employes who have rendered faithful and efficient service to the City in positions of trust in the Bureau of Water Works, his heartfelt appreciation for such services and for their loyal support, without which it would be impossible for anyone to successfully manage, under the direction of the Commissioner of Public Utilities and the Council the affairs of so great a public utility for mutual benefit of its owners, namely, the Citizens of Portland.

L. S. K.

PORTLAND'S FIRST WATER SYSTEM.

The first water works system operated in Portland was owned by Finice Caruthers and Stephen Coffin. The water was piped from Caruthers Creek, located in the Southwestern part of the City on the Caruthers' donation land claim to the town. Mr. Dan Kelly was superintendent of the plant. The information regarding the water works system mentioned above was obtained from Mr. Kelly only a few months before his demise at the advanced age of eighty years. Mr. Kelly, for over thirty years, conducted a plumbing business in Portland under the firm name of Kelly & Hannaford.

In 1859 Caruthers and Coffin disposed of their interests in the water system to Robert Pentland. Mr. Pentland was born in England, November 20th, 1820. He came to Oregon in 1845, locating at Dallas, Polk County. Ten years later he moved to Portland, then a struggling village.

In 1862 Mr. Pentland's mill, located at Milwaukie, Oregon, was washed away by extreme high water from the Willamette River. He lost not only the building and machinery, but his entire stock of flour and grain. Being in need of cash, he sold the water works which included log pipes, reservoir, rights of way, etc., to H. D. Green and H. C. Leonard for a consideration of $5,400.00. He also sold to Leonard and Green, Lots 3 and 4 in Block 150, City of Portland, which property was

later used for a reservoir site, for a consideration of $600.00. This property being located on the Northwest corner of Fourth and Market Streets, is now used by the City as a garage, meter shop and residences for water works employes.

PORTLAND WATER COMPANY

On September 18th, 1862, the Portland Water Company was incorporated. Supplementary Articles of Incorporation were filed with the Secretary of State on October 23rd, 1862, with a capital stock of Fifty Thousand Dollars ($50,000.00). Shares were $500.00 each. Incorporators, H. D. Green, John Green and H. C. Leonard. An office was opened for the transaction of business on the East Side of First Street between Yamhill and Taylor Streets.

SOURCE OF SUPPLY.

In addition to the supply from Caruthers Creek, the Company supplied water from a well at the foot of Market Street, pumping to a reservoir at the Northwest corner of Fourth and Market Streets. At this well, the Company set up a pump of a capacity of 300,000 gallons per day. Shortly after the installation of the pumping plant at the foot of Market Street, the newly organized Company secured an additional supply of water from Balch

Creek. The water from Caruthers Creek was piped to the reservoir at the corner of Fourth and Market Streets. Thus the pump at the foot of Market Street and the Caruthers Creek supply formed the "Low Service System" supplying the business section of the City along Front and First Streets, in addition to supplying water to the dwellings East of Fourth Street and as far North as G Street (now Glisan Street).

Water from Balch Creek was secured by constructing a wooden dam across the stream about a mile upstream from what is now Willamette Heights. Water was conveyed to a large wooden tank located at Pacific and Alder Streets (now Lownsdale and Alder Streets) through a riveted steel pipe six inches in diameter. This supply was known as the "High Service System", supplying the district West of Fourth Street. As the City extended Westward and Southward, a small reservoir was built at the head of South Tenth Street, which was fed by a small stream from the hills (now Portland Heights). This reservoir supplied water to quite a number of residents on the higher elevations, but on account of a shortage of water was later abandoned and the property sold.

Many of the early settlers of Portland, who were too far removed from the supply mains or who could not afford to pay for water, secured an ample supply from private wells and springs about the town, which were utilized for domestic use. Below the surface of the ground on which Portland is located and that of

much of the surrounding country, at depths varying from twenty to one hundred feet, are heavy deposits of gravel through which water is constantly seeping in sufficient quantities to insure a permanent supply in any well sunk to these gravel beds

Until the water was rendered unfit for domestic use by the drainage from the many houses of a well settled town, the well water of Portland and vicinity was clear, cold and wholesome.

In 1868, the Portland Water Company commenced the erection of a new pumping station on the river bank at the foot of Lincoln Street. This station was completed the following year. It was supplied with a new pump and other machinery well adapted to the demands to be made upon it in connection with forcing water from the Willamette River through the mains of the City. The pump was constructed and installed by the Oregon Iron Works. It had a capacity of 800,000 gallons per day. In 1871, a new Worthington pump was added to this station, which increased the pumping capacity to 1,800,000 gallons per day (twenty four hours).

In 1876, the Company erected a brick building at the foot of Lincoln Street and it was for many years known as the "Round-house Station". During the same year that this building was completed the Company added another Worthington pump to the plant and the old pump made by the Oregon Iron Works was removed. The capacity of the new pump was 3,000,000 gallons per day (twenty-four hours) thus making the combined capacity of the pumping station 4,000,000 gallons per day.

The old pumping station at the foot of Market Street was then torn down and the old pump disposed of; there being no further need for this station.

For a number of years after the erection of the pumping station at the foot of Lincoln Street, Balch and Caruthers Creeks continued to furnish a limited supply of water for domestic use in Portland, but as the City grew and the timber was removed, the water supply of these streams gradually decreased and their flows finally became so contaminated from the drainage of the settlement that they were no longer available as sources of supply for pure water.

PALATINE HILL PUMPING STATION.

In 1884 the erection of the fine water plant known as the Palatine Hill Pumping Station was commenced. The land occupied by this plant covers an area of 21.24 acres, which is located on the West Side of the Willamette River about five miles due South of Portland.

In the new station were placed two Worthington compound condensing engines, which, when run to their full capacity, will pump 16,000,000 gallons of water a day to the 2,000,000 gallon reservoir at Sixth and Lincoln Streets. This is one of the most complete pumping stations in the West. The brick building is yet an attractive piece of architecture and is ornamented with castellated towers at the corners. This station and its surrounding grounds form one of the principal landmarks along the Willamette River between Portland and Oregon City, and the beautiful location is favorably

commented on by tourists, who often take the river ride from "Oregon's Metropolis" to the "City by the Falls" of the Willamette. The Palatine Hill Pumping Station was first used on October 21st, 1884. When water from the Bull Run river was turned into the mains (January 2nd, 1895) the pumps at this station were shut down. The pumps, boilers and machinery at the plant are constantly inspected and kept in good working order in case of a serious break in the Bull Run conduits, in which case, water from the Willamette River could be pumped into the mains within three or four hours.

It is the desire of the Commissioner of Public Utilities, Honorable John M. Mann, to construct a number of storage reservoirs on the West Side, in the near future. On completion of these immense reservoirs, and perhaps another submerged pipe line located well up stream, the usefulness of Portland's once famous pumping station will be at an end.

HISTORICAL

The following extracts from the early records of the Department, taken in chronological order from 1885 to 1891, will be found to contain many interesting facts relating to the growth of the City and the development of its water supply system.

By an Act, approved November 25th, 1885, amending the Charter of the City of Portland, the Legislature of the State of Oregon authorized the City to construct or purchase, keep, conduct and maintain water works sufficient to furnish the City and the inhabitants thereof

as well as places and people along the line of pipes, with an abundance of good pure and wholesome water, and for such purpose to issue and dispose of bonds of the City not to exceed $700,000.00, payable in thirty years and bearing 5 per cent interest per annum, payable half-yearly.

MEMBERS OF THE WATER COMMITTEE

The Act also specified that the power thus given to the City should be exercised by the following named residents - viz:

John Gates	F. C. Smith	C. H. Lewis
Henry Failing	W. S. Ladd	Frank Dekum
L. Fleischner	H. W. Corbett	W. K. Smith
L. Loewenberg	S. G. Reed	R. B. Knapp
L. Therkelsen	T. M. Richardson	A. H. Johnson

who were styled, collectively, "The Water Committee".

FIRST MEETING OF THE WATER COMMITTEE

This committee met in the City of Portland on December 8th, 1885, and organized by the election of Henry Failing, Chairman; C. H. Lewis, Treasurer; and Phillip C. Schuyler, Clerk. The Treasurer was required to give bond for $250,000.00. The Clerk was the only one to receive any compensation and he was to be paid $100.00 per month.

At its second meeting, the Water Committee authorized the publication at once for three successive days in each of the daily papers of the City, a notice to the effect that the Water Committee had completed

its organization and was

> "Ready to receive and consider propositions from any individuals or corporations owning or controlling any water source or supply, and also propositions to construct water works or dispose of all or any portion of the plant or works furnishing an existing supply."

ENGINEER EMPLOYED

On December 22nd, 1885, the Water Committee appointed Isaac W. Smith as its Engineer at a salary of $400.00 per month.

BULL RUN WATER AND POWER COMPANY OFFER TO DISPOSE OF RIGHTS TO BULL RUN RIVER.

At a special meeting of the committee held on January 25th, 1886, sealed communications were opened and read as follows:

From A. G. Cunningham, President of the Bull Run Water & Power Company, offering to dispose of the rights to the flowage of Bull Run river for $125,000.00.

CRYSTAL SPRINGS WATER COMPANY OFFERS PLANT.

From the Crystal Springs Water Company, describing their ownership of the flowage from Stephens Springs near East Portland, and other sources, and proposing to erect suitable pumping machinery on their ground and to deliver the water to the extent of 8,000,000 gallons in each twenty-four hours for $300,000.

From the Portland Water Company, stating that

"Whenever the time arrives and it is deemed best for the interest of Portland to own and control its water supply, and whenever such conclusion is decided upon this Company stands ready and is willing to sell to the City its entire works and properties for a fair valuation."

NEW DISTRIBUTION SYSTEM PLANNED.

At the same meeting a plan for laying thirty-six miles of mains for the distribution of water throughout the City, with estimates of cost, was submitted by the Engineer of the Committee, Isaac W. Smith.

PORTLAND WATER COMPANY OFFERS TO DISPOSE OF ITS SYSTEM.

At a special meeting of the Committee on February 22nd, 1886, a proposition was received from the Portland Water Company to sell its entire plant, complete, reserving certain real estate not used or necessary, for $700,000.00, payable in bonds.

ENGINEER SUBMITS REPORT.

The Engineer submitted a lengthy report giving further facts, opinions and estimates upon the question of supply from Bull Run river, Crystal Springs, Eagle Creek and the Clackamas River, and his estimate of the value of the Portland Water Company's plant which he placed at $478,471.00 including real estate necessary for reservoirs and pumping stations.

ENGINEER DIRECTED TO MAKE SURVEY

The Engineer was directed to make a survey of the line from Bull Run river and prepare plans and specifications for a water supply from that stream.

At the regular monthly meeting held by the Committee on April 6th. 1886. the Engineer reported on the survey of a line from Bull Run river and was directed to survey another line from the same stream and also a line from Eagle Creek.

ANALYSIS MADE OF BULL RUN WATER

A quantitative analysis of water from Bull Run River. made by H. C. Bourng, Analytical Chemist was received. which showed that it was of a very superior quality.

CONSULTING ENGINEER SCHUSSLER AND ENGINEER SMITH MAKE REPORT.

On June 8th. 1886. at a special meeting. the Committee received reports. specifications and estimates. prepared by Isaac W. Smith. Engineer of the Water Committee, and H. Schussler. Engineer of the Spring Valley Water Company of San Francisco. who had been temporarily employed as Consulting Engineer which showed that from a point on Bull Run river thirty miles from Portland and seven hundred and twenty feet above the City base, a pipe of wrought iron from twenty-two inches to twenty-six inches in diameter. according to hydraulic grades. would

furnish a daily supply of six and two-thirds million gallons of water and that this pipe line, with submerged pipes across the Willamette River, and a reservoir in the City Park complete would cost $567,650.

BULL RUN RIVER SELECTED AS BEST SOURCE OF SUPPLY.

After due deliberation, the Committee decided that the Bull Run river was the best source of supply and as the cost of the works according to these estimates was within the means at its disposal, the plans and specifications should be adopted and that action be taken in accordance therewith.

At the regular meeting on July 6th, 1886, the Engineer was directed to obtain bonds or agreements for the necessary rights of way and riparian rights and the proposition of the Portland Water Company to sell its plant, at a price to be determined by referees, was declined.

PORTLAND WATER COMPANY SUBMITS TWO PROPOSITIONS

On August 3rd, 1886, at the regular monthly meeting, two propositions were received from the Portland Water Company, viz.

No. 1. Proposing to sell its system of water works and certain real estate therein described for $600.000; and

No. 2. Renewing the former proposition for an arbitration of the price to be paid for its property, with the modification that the price should not exceed $650,000.00 or any less sum named by the arbitrators would be accepted.

The Committee declined to accept either proposition and offered $450,000.00 which offer the Portland Water Company refused.

A. G. CUNNINGHAM'S OFFER DECLINED.

On August 10th, 1886, the Committee voted to decline the offer of A. G. Cunningham to sell to the City his claims to the ownership of lands and water rights on Bull Run river. It also voted to vigorously and effectively prosecute the work at and near the initial point on that stream and also to direct the Engineer to prepare plans and specifications for the entire work of a supply of six and two-thirds millions gallons of water per day from Bull Run river, and to invite bids for the construction of same.

CONSTRUCTION OF HEADWORKS AUTHORIZED.

On August 20th, 1886, the Committee authorized an advertisement for bids for constructing headworks on Bull Run river, consisting of clearing and making a road and constructing a wall of masonry and a canal at the point where the water is to be taken from the stream.

ATTEMPT MADE TO PREVENT CITY FROM ISSUING BONDS.

At this meeting the Chairman gave notice that he had been served with a summons in the suit of J. B. David, et al, plaintiffs, versus the City of Portland,

to restrain and enjoin the said City and the Water Committee from issuing or disposing of any bonds for the purpose of constructing water works.

To defend this suit, the Water Committee employed as its attorneys, Messrs. Williams, Asch & Wood.

CITY OF PORTLAND WINS SUIT.

An early decision in this case was reached, the Supreme Court of the State of Oregon having decided the case in favor of the City and the Water Committee, on November 13th, 1886.

WATER COMMITTEE ADOPTS ENGINEER'S REPORT.

On August 31st, 1886, the Committee adopted by unanimous vote the plans and specifications for the entire water works which had been prepared by the Engineer and revised by the sub-committee on construction.

WATER COMMITTEE AWARDS CONTRACTS

At a special meeting on September 2nd, 1886, the Committee opened the bids for the construction of headworks on Bull Run river and awarded the contracts to the lowest bidders, as follows: viz:

The Oregon Paving & Contract Company for clearing and road	$1,990.00
Patrick O'Neill, masonry for conduit	4,100.00

ADVERTISEMENTS FOR PROPOSALS AUTHORIZED

On October 8th, 1886, advertisements for proposals for the construction of the entire work were

authorized to be published in the Portland Dailies and in the "Engineering and Mining Journal" and the "Iron Age" of New York, bids to be received until 12 o'clock noon, December 15th 1886.

WATER COMMITTEE ADOPTS RESOLUTION

At a special meeting of the Water Committee held on November 22nd, 1886, the following resolution was adopted:

> "WHEREAS, It is desirable that the Water Committee should provide a supply of water to the City and its inhabitants at the earliest time possible, and
>
> "WHEREAS, Pumping works are necessary as an auxiliary to the proposed supply from Bull Run,
>
> "BE IT RESOLVED, That we proceed at once to pipe the City upon a plan adapted to the present supply of 60,000 and the future supply of 100,000 population from a suitable place on or near the bank of the river (Willamette).
>
> "RESOLVED, That the Engineer be and he hereby is instructed to immediately prepare such further plans and specifications as may be necessary to carry into effect the object expressed in the foregoing resolution."

At this meeting a form of bond was adopted which contains the following provision:

> "and the principal and interest thereof are by the terms of said act exempt from taxation by or under the State, County of Municipal authority."

PORTLAND WATER COMPANY'S PLANT PURCHASED.

At a regular monthly meeting held December 7th, 1886, a letter was received from the Portland Water Company dated December 3rd, 1886, in which it offered to

sell its entire system of Water Works, including all its conduits, mains, tools, machinery, pumping stations, reservoir sites, riparian rights, and rights of way, for $450,000.00 in addition to the net cost of extension made since its former offer and the estimate of the Engineer. The following resolutions were then unanimously adopted:

> "RESOLVED, That the proposition of the Portland Water Company, as contained in their letter dated December 3rd, 1886, be accepted, subject to mutual agreement as to the details of the transfer of the property therein named to the Water Committee, it being understood that the Water Company shall furnish a complete inventory of the property proposed for sale and that the property should be turned over to the Water Committee on the first day of January, 1887, or as soon thereafter as the transfer can be reasonably made; and the payment for same shall be made on that date, or as soon thereafter as may be mutually agreed upon.
>
> "RESOLVED, That the Chairman Pro tem, and Clerk are hereby authorized and instructed to arrange in consultation with counsel the formalities necessary for carrying into effect the preceding resolution."

At a special meeting held on December 13th, 1886, further action was taken in arranging the details for the transfer of the property of the Portland Water Company and the payment for same, and also fixing the compensation to be paid the Portland Water Company for the operation of the property for the Water Committee until February 1st, 1887; the sum named as compensation for operating, maintaining and collecting being $2,500.

BULL RUN WATER AND POWER COMPANY SUBMITS NEW PROPOSITION.

A communication from the Bull Run Water & Power Company, dated December 9th, 1886, was also read. It proposed, to avoid litigation, that all questions be-

tween said Company and the Committee in regard to Bull Run Water rights be referred to a Board of Arbitration consisting of Honorable M. P. Deady, Honorable E. D. Shattuck and Honorable John Catlin. The matter was referred to a special committee with instructions to consult counsel and report to the Committee.

BIDS RECEIVED FOR CONSTRUCTION OF PIPE LINE

December 15th, 1886, bids were opened for the construction of a pipe line from Bull Run to supply six and two-thirds million gallons of water each twenty-four hours, including the manufacture and laying of a wrought iron pipe, submerged pipe across the Willamette, clearing and roads, reservoirs and three iron bridges.

The lowest aggregate of bids amounted to $598,178.84

The next lowest 655,197.85

At a special meeting held on December 29th, 1886, it was voted that a bill be presented to the Legislature authorizing a further issue of $500,000.00 in bonds in addition to $700,000.00 authorized by the Act of November 25th, 1885.

BIDS RECEIVED FOR BONDS

Bids for bonds were opened at a special meeting held December 31st, 1886 and awards made as follows:

Portland Water Company,	$130,000.00	at 108-3/4
W. S. Ladd, Agent	100,000.00	at 108-3/4
W. S. Ladd Agent	100,000.00	at 107-1/2
First Nat'l Bank, Agt.	100,000.00	at 107-1/8

First Nat'l Bank, Agt. 70,000.00 at 106-1/2

Total . . . . . 500,000.00 at 107.86

PORTLAND WATER COMPANY TRANSFERS PROPERTY TO CITY.

At a regular monthly meeting held on January 4th, 1887, the Clerk reported that the money for the $500,000.00 of City bonds and the premiums thereon, according to the awards of the last meeting amounting in all to $539,300.00 was received on December 31st and deposited with the Treasurer.

The Chairman announced that the formal transfer of the property of the Portland Water Company to the City of Portland was made on January 1st, 1887, and that the payment for the same, $464,551.81, had been made in accordance with the instructions and that the Portland Water Company was operating the works for the Water Committee until February 1st, according to agreement.

ENGINEER SUBMITS REPORT

Under date of January 6th, 1887, the Engineer submitted a report estimating the annual cost directly pertaining to pumping water from the Willamette River to the City to be $26,700.00 and the cost of maintaining the pipe line to supply water from the Bull Run river at $6,300.00. He stated that in addition to the $20,400.00 thus saved there might be added $12,000.00 which the Fire Department would save because of the increase in the quantity and pressure of the water supplied by gravity.

SUPERINTENDENT APPOINTED

At a regular monthly meeting held on February 1st. 1887, the Engineer, Isaac W. Smith was directed to assume the superintendency and full working control of the City Water Works and to prepare a plan for the needed enlargement of the distribution system.

ACCOUNTANT APPOINTED

Mr. T. T. Struble was appointed accountant to take charge of the office of the City Water Works at a salary of $150.00 per month. He was required to furnish a bond for $10,000.00.

GOVERNOR VETOS BILL AUTHORIZING ISSUING OF BONDS

On February 12th, 1887, the Clerk by order of the Committee returned by mail to the San Francisco Bridge Company their bid for the Bull Run pipe line and certified check for $25,000.00 and wrote them that the failure of the Legislature to pass the Bill authorizing the issue of more water bonds over the Governor's veto will prevent the Committee from carrying out its plans at present.

MONTHLY WATER RATES ESTABLISHED BY THE BOARD OF DIRECTORS, PORTLAND WATER COMPANY. September 1st, 1885.

On all private dwelling houses occupied by one family, as follows:

(No rates less than . . . . $1.50)

Private families of five persons or less $1.50
(See sections 15 and 16)

Each additional person 25

Additional rates for baths, water closets and hose.

BAKERIES

According to daily use of flour . . . $2.00 and upwards

BATH ROOMS

For families of five or less one tub (hot or cold water) $1.00

Each additional person 25

Public Bath Rooms, each tub 2.00

Bath tubs in boarding houses, when used by the boarders, for each five persons 2.00

Each additional person 25

BARBER SHOPS

First chair 2.00

Each additional chair 25

BUTCHER SHOPS

According to business . . . . . $3.00 and upwards.

BUILDING PURPOSES

Each one thousand brick wetting 25

Lime, per bbl., wetting 25

Stone, per perch, wetting 10

Cement, per bbl., wetting 25

BLACKSMITH SHOPS

One fire 2.00

Each additional fire 50

BOOK BINDERIES

Employing five workmen, or less 2.00

Each additional workman 25

FILLING CISTERNS

By special contract at the office of the Water Company.

GARDEN HOSE

For each 250 square yards, or less watered . . . $2.50

All over 250 square yards, one cent per square yard (See Rules Sec. 7,17 and 19) .

FOUNTAINS

Special rates

HOTELS AND BOARDING HOUSES

According to business . . . . . $5.00 to $25.00
When by meter, 50¢ per 1,000 gallons

Offices $1.00

PRINTING OFFICES

For each power press . . . . . $5.00 and upwards

For each hand press $1.00

For each person employed 25

STORES

Drug Stores . . . . . $2.00 to $10.00

Grocery Stores 2.00

Liquor Stores (wholesale) . . . . . 4.00 to 10.00

Dry Goods and other Stores 2.00

With families living in same building, $1.50 additional will be charged.

STABLES

For one family horse . . . . . .Free

For one family cow . . . . . .Free

Livery or public stables, including washing of carriages, for each horse . . . . . $ .50
(When not supplied with meter)

SIDEWALK SPRINKLERS

For each 25 feet front or less $1.00

For each 50 feet front 2.00

For each additional 25 feet 1.00
This includes washing windows

RESTAURANTS

According to business . . . . . $2.00 to $15.00

DRINKING SALOONS

According to business - not less than $2.50

URINALS

Private . . . . . Free
Self closing or compression cocks only allowed

WATER CLOSETS

Family of five or less $1.00

Each additional person 25

For public houses or public buildings, each closet 2.00
Self closing or compression cocks only allowed

Hopper closets will not be allowed, with a push valve.

WORK SHOPS

Not over five persons $2.00

For each additional person 25

STEAM ENGINES

Each horse power, ten hours per day, by special contract.

SLEEPING ROOMS

For each person . . . . . $ .25

WATER BY METER

1,000 to 50,000 gallons, 50¢ per 1,000 gallons

The rates for water over 50,000 gallons will be 40¢ per 1,000 gallons.

Water furnished for any purpose not embraced in the

above will be supplied at special rates.
All water rates are due and payable monthly in advance.

WATER RATES REDUCED.

At a special meeting held March 31st, 1887, the sub-committee, which had been appointed March 1st to devise and submit a system of rates, rules and regulations to govern the use of water, made its report which was adopted and a general reduction in the rates was voted. The rate for water for domestic use was reduced from $1.50 to 75 cents per month and for other uses a less, but material reduction was made.

APPOINTMENT OF WATER COMMISSION CONSIDERED

On April 5th, 1887, at the regular monthly meeting, there was received from the City Attorney, to whom the question had been submitted by the Water Committee, an opinion as to the duty of the Committee to, at that time, appoint the Water Commission in accordance with the terms of the Legislative Act of November 25th, 1885. This opinion was to the effect that until the water works were completed according to the plan adopted by the Committees the appointment of the Commission was not obligatory on the Committee but rested solely in its discretion and judgment. When the Committee adjourned it was to April 12th, 1887, and special notice was given to each member that the question of at once appointing the Water Commission would then be considered.

Pursuant to adjournment a meeting was held on the day named (April 12th, 1887) and after due consideration a sub-committee was appointed to consult with counsel and prepare a report, a form of action to be adopted by the Committee before selecting the Commission and on turning over to it the water works as they now stand as well clearly indicate the plans and purposes of the Committee in respect to completed system of water works.

At a special meeting held on May 12th, 1887, the Committee, after considering, amending and adopting a report from the sub-committee decided, by unanimous vote, that notwithstanding its purchase of the Water Works of the Portland Water Company as an auxiliary to a more complete system, the Committee, after thorough investigation, was still determined, as soon as it shall be authorized to make a further issue of bonds to construct a pipe line from Bull Run River to Portland for supplying the City and the inhabitants thereof with " an abundance of good, pure and wholesome water for all uses and purposes necessary for the comfort, convenience and well being of the same",, and meanwhile from the surplus earnings of the works to make such additions and extensions to the distribution system as may be necessary until the final completion of the head-works may be decided upon by the Committee.

In conformity with this plan, the Committee had obtained certain rights of way and riparian rights for so constructing the headworks on Bull Run river. It was, therefore, resolved that the further construction and operationof the water works could be best and most economically carried on by the appointment by the committee

of a superintendent, competent to supervise construction and take charge of the operating department of the water supply; and by dividing the work of construction and operation between separate sub-committees, subject to the approval of the Water Committee.

SALARY OF ENGINEER AND SUPERINTENDENT FIXED.

It was then voted that Isaac W. Smith be appointed at a monthly salary of $250.00, to perform such duties pertaining to both operating the works and to general engineering as may be prescribed by the Water Committee, or the sub-committees, and the following named members were chosen by separate nomination and unanimous vote to form the sub committees:

Sub-committees on Construction: Chairman, Mr. W. S. Ladd, and Messrs Jno. Gates, J. Loewenberg, T. M. Richardson and F. C. Smith; with the Chairman of the Water Committee, Mr. Henry Failing as a member ex-officio thereof.

Sub-committee on Operation of Water Works: Chairman, Mr. Henry Failing and Messrs L. Fleishner and T. M. Richardson.

The compensation to be paid to Mr. P. C. Schuyler for his services as Clerk of the Water Committee was reduced from $100.00 to $50.00 per month.

On August 2nd, 1887, the plans for the enlargement of the distribution system, which the Superintendent had been directed to prepare, were submitted and adopted.

Estimated cost of cast iron mains, with necessary gates, etc., laid complete as follows:

Low Service 12.4 miles $66,474.00

High Service 56,550.00

Additional Pump for the High Service 6,000.00

Total Estimated cost $129,024.00

The Clerk was directed to advertise in each of the three daily papers of the City inviting sealed proposals for furnishing of materials needed.

CONTRACTS FOR PIPE AWARDED

On August 31st, 1887, the contract for the 1,997 tons of pipe was awarded to the Oregon Iron and Steel Company at $42.50 per ton; total $84,872.50. The contract for special castings was awarded to R. Collier & Company of Portland, at 3 1/4 cents per pound, that being the lowest bid.

INVESTIGATION MADE OF BULL RUN WATER AND POWER COMPANY'S HOLDINGS

At a special meeting convened on September 8th, 1887, Mr. Fleischner, Committee on conference with the Bull Run Water and Power Company, reported that after a careful examination of the statements and propositions presented, it seemed probable that that Company had expended the sum of $21,181.89 in obtaining land riparian rights on Bull Run River and rights of way for a pipe line from that stream to Portland. It was voted that the whole subject be again referred to a committee, with instructions to employ competent counsel to make a complete

and exhaustive examination of the title of that Company to said lands and rights, and make a written report on the same which shall state what, if anything, is still required to be done in order to vest in the City of Portland a clear and indisputable title to all the waters of that stream and the right to bring it to the City.

At the regular meeting held on November 1st, 1887, Mr. Fleischner, Committee on conference with the Bull Run Water and Power Company, submitted a report stating that he had employed Mr. A. H. Tanner to make the examinations and prepare an opinion upon the title to land, etc., claimed by that Company. It appeared therefrom, that the Bull Run Water and Power Company had absolute title to the land bordering on the stream and an equitable estate in other lands similarly situated as successors in interest to A.G. Cunningham under his two contracts with the Oregon and California Railroad Company. The opinion also pointed out certain defects in some of the deeds of right of way and riparian rights heretofore obtained and enumerated such as were still unobtained.

It was voted that Mr. Ladd, the Chairman of the sub-committee on construction, cause an exhaustive and complete analysis of the water of the Bull Run River to be made by each of two competent persons residing in the City, and that, pending the result of such analysis, Mr. Fleischner be instructed to obtain from the Bull Run Water and Power Company an extension to December 10th of the bond given by that Company and which had been presented by Mr. Fleischner by which they had agreed to dispose of all their rights for $21,181.89.

ANALYTICAL CHEMIST MAKES REPORT

On December 6th, 1887, Mr. Ladd presented a letter from Mr. William Huntley Hampton, Analytical Chemist, accompanied by his report of his analysis of Bull Run water, which was read and ordered placed on file.

As the other analyses ordered could not be obtained until two weeks later, it was voted to ask the Bull Run Water and Power Company to give a further extension of their bond.

In order to pay the estimate of the cost of operating and extending the Water Works during the ensuing year, also interest on $500,000.00 bonds, it was voted that the existing tariff of rates for water be the rates for the year 1888, subject to certain modifications which the sub-committee was authorized to make in order to adjust the rates for elevators, laundries, etc.

At the regular monthly meeting on January 3rd 1888, the sub-committee on water works presented a recapitulation of monthly reports it had made during the year which showed the following results for the year ending December 31st, 1887.

Cash receipts		$97,502.71
Operating expenses and repairs	$47,000.77	
Fuel, tools, etc. on hand . .	3,277.31	
Interest paid on bonds	25,000.00	75,278.08
Net earnings appropriated for extensions		$22,224.63

The water pumped from the Willamette River at Palatine Pumping Station, five miles above the City,

into the reservoir at Sixth and Lincoln Streets, 173 feet above the base of city grades, (capacity 2,000,000 gallons) averaged 4,700,000 gallons per day.

The cost of pumping averaged $17.48 per million gallons, and estimating the number of water consumers at 25,000, the average daily consumption of water per capita was 188 gallons.

Mr. Ladd presented an analysis of the water of Bull Run River by Falkenau and Reese of the State Assay Office, San Francisco, which was read and ordered filed.

TWO ANALYSES OF BULL RUN WATER

The following report of an analysis by Falkenau and Reese, the State chemists of California, was read.

State Assay Office

San Francisco, December 30, 1887.

W. S. Ladd, Esq., Chairman of the sub-committee Portland Water Works, Portland - Dear Sir: The sample of water received from you for exhaustive analysis gave the following result:

Total of fixed Ingredients.

2.7 parts in 100,000 parts by weight, or 1.80 grains per imperial gallon (of ten pounds avoirdupois) consisting of

	Parts in 100,000	Grains Per Gallon
Silica	.56	.392
Oxides of iron and aluminium	.08	.056
Calcium carbonate	.39	.273
Magnesium carbonate	.27	.189
#Chlorides, sulphates and carbonates of alkali	.40	.200
Organic matter	1.00	.700

#As there was only one gallon of water to work on, these could not be separately determined.

The carbonates of lime and magnesia are in the form of soluble bicarbonates. The organic matter is mostly in the form of suspended vegetable substance and partly in soluble products of their decomposition.

Miscroscopic examination of the sediment and chemical tests of the water show the absence of deleterious organic matter. Only traces of ammonia were found while nitrates and nitrites could not be detected, showing the absence of nitrogenous organic matter.

To sum up, the water ranks among the best on record, and is excellently adapted for domestic use.

Most of the organic matter will settle out in the pipes and reservoirs and what is left will not impair the quality of water. Should you wish for any further information on the subject, we will be pleased to answer all questions. Yours, etc.,

FALKENAU AND REESE.

Following is the report of an analysis by Wm. Huntley Hampton of this city, made at the last monthly meeting:

To the Portland Water Committee--Gentlemen: I have examined the sample of Bull Run Water collected between the 11th and 16th of November, 1887, at the headworks, during or just after a heavy rain, the river having risen about two feet, according to report. The sample was delivered to me at your order by Col. Smith on November 17th. I herewith submit the results of my analysis in grains per imperial gallon and parts per million.

CONSTITUENTS FOUND	GR.	COMBINED	GR
Silica	.462	Silica	.462
Alumina	.280	Alumina	.280
Iron Peroxide	.010	Iron Peroxide	.010
Lime	.035	Carbonate Lime	.062
Magnesia	.062	Carb. magnesia	.061
Potassium	.385	Sulph. magnesia	.100
Sodium	.0905	Chloride sodium	.230
Chlorine	.489	Chloride pottasium	.738
Anhyd sulph.acid	.066		
Carbonic acid	.059	Total	1,943
Loss on ignition organic matter	.089	Organic matter	.089
Nitrites	.000	Total residue	2,032
Nitrates	.Trce		

Parts of Million Parts: Ammonia, free, .08; albuminoid, .09; moist combustion process, oxygen consumed, parts per 1,000,000, 1.234; grains per gallon, .08638, total residue - Direct evaporation, 2.030, loss on ignition, .089; total mineral residue, 1,941.

From the data in the above analysis the water is of a desirable quality for drinking and domestic purposes. It is very pure as far as animal matter is concerned, due to the character of the country rock in which it takes its source and through which it flows. The hardness is inappreciable showing its adaptability for most all economical and commercial purposes.

The organic matter contained in the water in solution, or, otherwise, the oxygen required to consume it, in the moist combustion process, falls within the limits of recognized drinking water. In a general way it is laid

down that the weight of the organic matter contained in a given quantity of water is approximately equal in weight to the oxygen consumed when the sample is subjected to the moist combustion process. In the case of this water (owing to the almost entire absence of nitrates) the loss on ignition of the total residue gives a very close approximation to the total amount of organic matter viz: .089 grains per gallon. The amount of oyxgen consumed in the above named process is 1.234 parts per 1,000,000, equivalent to .08638 grains per gallon. The free and albuminoid ammonia expressed in parts per 1,000,000 is the main criterion of good drinking water, principally depending on the amount of albuminoid ammonia. According to J.A. Wanklyn who is recognized authority on organic contamination of water, water is divided into three classes according to the degree of organic purity as follows:

Class 1. Water of extraordinary organic purity yielding from 0.00 to 0.05 parts of albuminoid ammonia per million. This class comprises the most prepared distilled water and highly filtered waters both natural (i.e. deep spring water) and artificial, i.e. such waters as have passed through a "silicated carbon filter" in good working order. Occasionally a river in its unfiltered condition falls into this class. Water of this class cannot be objected to organically.

Class 2. Comprehends the general drinking water in this country (England). It gives from 0.05 to 0.10 parts of albuminoid ammonia per million. I believe that any water falling fairly into this class, is safe organically.

Class 3. Comprehends the dirty waters, and is characterized by yielding more than 0.10 parts of albuminoid ammonia per million.

I am of the opinion that the sample was collected at a time when the water contains the highest organic contamination. It being just after the first rains of the season, they would reach out and carry fromthe hillsides into the river the soluble organic matter resulting from the decomposition of vegetable substance during the dry season. Very respectfully,

WM. HUNTLEY HAMPTON
Chemist.

Both reports were ordered spread upon the record.

It was also voted to accept the proposition of the Bull Run Water and Power Company and A.G.Cunningham to convey to the City of Portland all their rights, title and interest in all land owned or claimed by them adjacent to Bull Run River, together with all riparian rights pertaining thereto for the sum of $21,181.88.

Mr. Fleischner was appointed a committee to receive, in consultation with Mr. A. H. Tanner as counsel, a sufficient deed for the property and the Clerk was authorized, upon the delivery of such deed, to draw a warrant on the Treasurer for the sum above named in payment for said property.

On February 7th, 1888, Mr. Fleischner reported that the Bull Run Water and Power Company and A.G. Cunningham had executed and delivered the deed and received the price named. The Clerk was directed to notify the Oregon and California Railroad Company that its contracts, numbered respectively 1705 and 1804, to sell 3,200 acres of land adjacent to Bull Run River to A. G. Cunningham,

had been assigned to the City of Portland.

Mr. Fleischner reported that during the recess of the committee, Mr. L. T. Barin, formerly registrar of the Land Office at Oregon City, had brought to his attention the fact that a piece of land consisting of 80 acres, through which Bull Run River flows for about one-half mile and upon which the headworks would probably be located, was still public land; that the securing of this tract being of prime importance to the City and immediate action being necessary, he had, after consultation with the Chairman, proceeded to locate the same by purchase of a soldiers homestead scrip at a cost of $1,600, which amount was advanced by Mr. Henry Failing.

It was voted that the action taken be approved and that a warrant be drawn for the amount advanced.

A statement in detail, as required by law, of the receipts and disbursements by the Committee to December 31st, 1887, and an inventory of property on hand were read, approved, signed by the Chairman and Clerk and ordered filed with the Auditor and Clerk of the City.

At a special meeting on May 16th, 1888, the subcommittee on water works reported that owing to the steadily increased consumption of water, the pumps were unable at times to keep up the supply at the proper pressure. It was voted that the Superintendent be authorized to give public notice, whenever in his judgment it may be necessary, that the water will be shut off at the source of distribution between the hours of 10:00 P.M. and 4:00 A.M.

DEATH OF JOHN GATES

The Chairman announced the death, on April 27th, 1888, of John Gates, a member of the committee, and a committee of three was appointed to prepare resolutions expressive of the sentiments of the Committee in relation to the said event.

CONTRACT AWARDED HOLLY MANUFACTURING COMPANY

On June 5th, 1888, at the regular monthly meeting, after due consideration of the proposals for furnishing an additional pumping engine and pumps for the high service station at Seventh and Lincoln Streets, it was voted that the Holly Manufacturing Company of Lockport, New York, be awarded the contract on their bid by Phillip Buehner, A gent, to furnish the same for $7,400.00.

CLERK T.T. STRUBLE RESIGNS - FRANK T. DODGE APPOINTED.

At the regular monthly meeting held on July 3rd 1888, the sub-committee on water works reported that T.T. Struble had resigned from his position as accountant in the office of the City Water Works and Mr. Frank T. Dodge had been appointed accountant to fill the vacancy on July 1st, 1888. He had furnished the same amount of bond as his predecessor, viz: $10,000.00, with Captain J.C. Ainsworth and Mr. S. G. Reed as bondsmen. The appointment and the bond were, by vote, approved.

On October 2nd, 1888, the Chairman reported that in view of the conflicting reports as to the true source of Bull Run River and the character of its water, and with a view of obtaining positive information concerning the same, he had, after consulting several members of the

Committee, sent to Mr. T. M. Hurlburt, County Surveyor, to follow the stream to its source, and that his report was in the hands of the Clerk. The report was read and it being of a very satisfactory character it was voted that the action of the Chairman be approved and that the Clerk be authorized to draw a warrant on the Treasurer for the amount of Mr. Hurlburt's bill for the exploration, namely, $129.60.

It was voted that the Chairman of the sub-committee on construction be requested to call a meeting of his committee at an early day for the purpose of taking steps to get an estimate of the cost of bringing in from Bull Run a daily supply of 12,000,000 gallons and another estimate for a 15,000,000 gallon supply.

At a meeting held by the committee on November 8th, 1888, the sub-committee on construction reported that after a full discussion of the subject referred to it by the Water Committee, and it appearing probable from past experiences of the operation of the present works, that an expenditure sufficient to bring in a 15,000,000 gallon supply from Bull Run would be warrantable, it was voted that the Superintendent be instructed to prepare and submit an estimate of the cost of bringing in a single pipe line of that capacity. This had been done and the estimate was now submitted to the Committee. The estimate was read and after some discussion laid upon the table. It stated that to convey 15,000,000 gallons of water in twenty four hours a pipe 35 inches in diameter on the low grade, and 28 inches on the steeper grade would be required, and that, taking the price offered by the lowest bidder in 1886 ($654,196.00) for a supply of six and two-thirds millions gallons in twenty-four hours, with a

slight increase added to the making and laying of the pipe, viz: 8 1/2 cents per pound complete, instead of 8.27 cents and adding 10 per cent for superintendence and contingencies would be $1,015,245.00. This estimate did not include the cost of reservoirs, distribution mains, etc.

It was voted that the sub committee on water works prepare an estimate, based on the experience of the past two years, on the interest paying ability of the water works.

This estimate was submitted at the special meeting held on December 17th, 1888.

Mr. Ladd, with the second of Mr. Corbett, moved that the report be accepted and unanimous concurrence given with the entire subject matter of it and the motion was unanimously adopted.

It was voted that the sub committee on water works prepare for presentation to the Legislative Assembly of the State at its approaching session a bill for an Act embodying the suggestions of the above report and granting authority to the City to make a further issue of bonds to the amount of $1,300,000.00.

The Clerk was instructed to give public notice by advertising in the daily papers published in Portland, San Francisco and Chicago, that sealed proposals would be received until 3:00 P.M. on January 15th, 1889, for the purchase of bonds to the par value of $100,000.00, this being a portion of the $700,000.00 of bonds authorized by the Act of the Legislature creating the Committee on November 25th, 1885, $580,000.00 of which was sold on December 31st, 1886.

An estimate of the expense of operating, conducting and extending of water works during the ensuing year being made, the Committee prescribed the existing rates for water as the rates to be charged for water during the year 1889.

At the meeting held on January 10th, 1889, the sub-committee on water works presented its report upon the operation of the works during the year ending December 31st 1888 which showed as follows:

Cash Receipts		$113,692.00
Operating Expenses & Repairs .	$54,792.44	
Increase of property on hand	3,170.03	
Interest paid on bonds	25,000.00	
		$82,962.47
Net earnings appropriated for extensions		$30,729.59

The cost of pumping water from the river during the year was $31,880.00. The quantity averaged 5,900,000 gallons per day and the cost of pumping each million gallons was $11.11. This, compared with $17.48 which was the cost during the preceding year, shows a reduction of $6.37. The reduction was due to the substitution of wood for coal as fuel.

The detailed statement of receipts and disbursements for the year 1888, and the statement of property on hand, were signed by the Chairman and the Clerk and ordered filed with the City Auditor.

The Superintendent presented a report showing the estimated cost of pipes for supplying water from Bull Run River, exclusive of the cost of reservoirs, distribution mains, etc. to be as follows:

16,000,000 gallons per day	$1,099,290.00
18,000,000 " " "	1,242,475.00
20,000,000 " " "	1,266,775.00

The draft of an act for presentation to the Legislature authorizing a further issue of bonds for the purpose of bringing water from Bull Run river was then considered and amended by making the amount of $1,500,000.00 instead of $1,300,000.00. The draft as amended was approved by unanimous vote and Mr. Corbett was requested to present a copy of the draft to the Legislative delegations from Multnomah County, a copy to one member in each House.

At the meeting held on January 17th, 1889, proposals for the purchase of $100,000.00 of water bonds were considered and awards made to the highest bidders, as follows:

The Oregon Fire & Marine Ins. Co. $10,000.00 @ 1.07

L. & I. White, 50,000.00 @ 1.06½

American Fire Ins. Co. of Philadelphia 40,000.00 @ 1.05

On March 5th, 1889, at the regular monthly meeting, Mr. Corbett reported that he had, as instructed, caused the draft to be presented early in the session of both Houses of the Legislature and that it had been twice passed by both Houses, but having also been twice vetoed by the Governor, it had failed to become a law.

As this failure to obtain authority to issue additional bonds would indefinitely postpone active work on the gravity system of water supply from Bull Run River, it was decided to renew the application at the next meeting of the Legislature in January, 1891, and meanwhile from funds on hand and from earnings of the Water Works to increase the present pumping system sufficient to remedy the present deficiency in the quantity of water supply. The Sub committee on construction was instructed to consult with the Superintendent and report a plan for increasing the capacity of the pumping system.

At a meeting held on May 9th, 1889, Mr. Failing having first called Mr. Ladd to the chair, offered the following resolution:

> "WHEREAS, The increased consumption of water consequent upon the rapid growth of the City and a due regard for public safety and convenience demands that this Committee use such means as it has at its command, whether in bonds or prospective revenue from the works, in obtaining a more abundant supply.
>
> "RESOLVED, That this Committee take immediate steps to contract for an additional pump and the construction of an additional pipe from Palatine Pumping Station to the Sixth Street reservoir."

The resolution was unanimously adopted, and it was also voted that the sub-committee on construction be instructed to proceed with all diligence to have the Superintendent prepare and submit his suggestions as to the kind and capacity of pump and size of pipe, with an estimate of cost for the entire work.

The report of the Superintendent was submitted at the regular meeting of the Committee on June 4th, 1889. After stating that the storage capacity of the reservoir is but little more than 1,500,000 gallons, and with a constant demand of 10,000,000 gallons per day, the supply will be interrupted whenever it may be necessary to repair the main, or one of the two pumps, (the maximum capacity of each pipe being five million gallons in twenty-four hours) or to clean out the boiler. He submitted estimates of cost of pumps and pipes of different capacities and recommended the purchase of a high duty pump of a daily capacity of 10,000,000 gallons to be erected in the Palatine Pumping Station estimated to cost, including foundations and erection, $63,000.00 and the laying of a second force main, twenty-four inches in diameter, to be constructed of No. 8 wrought iron, for the four and one-half miles from

Palatine Hill Station to the intersection of Hood and Lincoln Streets, estimated to cost $105,000.00, the pipe to be of cast iron for three-fourths of a mile thence to the intersection of Jefferson and Sixth Streets, estimated cost $27,000.00. Total estimated cost, $195,000.00.

After fully discussing the report, the Committee voted unanimously that the recommendation of the Superintendent be adopted and that he be directed to prepare and report as soon as possible specifications for the entire work.

The specifications were submitted at the meeting held on July 2nd, 1889, and after being amended so as to allow of bids being received for the main to be constructed of wrought iron of 45,000 pounds to 50,000 pounds tensile strength, or of steel of same size and tensile strength, or of cast iron for the entire distance, they were adopted and the Superintendent was directed to have them printed and advertise for proposals for furnishing the pump and main.

On August 6th, 1889, the Committee received a letter from the Board of Fire Commissioners stating that in their opinion

> "it will add very much to the efficiency of our Department if the hydraulic elevator system be connected by a gate with the City main on Front Street, said gate to be opened only in case of emergency."

It was voted that the fire commissioners be allowed to make such connection, but at their expense and under the supervision of the Superintendent; that the gate be under the sole charge of the Chief Engineer of the Fire Department; and that the Water Committee reserve

the right to take it out at any time

Twelve proposals for furnishing force main and two for the pump were received, opened, read and referred to the Superintendent for tabulation

The table of bids was submitted at the adjourned meeting held on August 8th and fully discussed. It was voted that contracts be awarded as follows:

To Wolff and Swicker of Portland, Oregon, for four and one half miles of main, twenty four inches in diameter, of wrought iron of 45,000 pounds tensile strength, complete and laid in the trench at $0.0755 per pound, weight to be taken before coating.

To Shickle Harrison and Howell Iron Company of St. Louis, Missouri, for 430 tons of cast iron pipes, twenty-four inches in diameter, at $45.00 per ton of 2,000 pounds, delivered f.o.b. cars in Portland.

To the Hawley Manufacturing Company of Lockport, New York for a No. 8 compound condensing, horizontal crank and fly-wheel, Gaskell Pumping Engine for $57,475.00, delivered here and set up and tested at Palatine Pumping Station, ready for work by May 1st, 1890

At an adjourned meeting held on October 8th, 1889, the Committee received a report from the sub-committee on construction showing that the following contracts had been awarded and approved by its action thereon.

The Oregon Iron and Steel Company special castings for a new force main 3 1/2 cents per pound for sizes 4 inch to 16 inch, and 4 cents per pound for 24 inch sizes.

The John Barrett Company of Portland for water gates $2,089.00

The only other bid was from Goldsmith and Lowenberg for $2,102.21.

The Pacific Metal Works of Portland for 15,000 pounds of pig lead at $4.80 per cwt.

A letter from F. C. Smith, resigning his position as a member of the Committee was read. On motion it was voted that the resignation be accepted.

Mr. Ladd gave notice that at the next meeting of the Committee, he would move that the two vacancies existing in the membership of the Committee be then filled.

DEATH OF PHILLIP C. SCHUYLER

At the regular monthly meeting held on November 5th, 1889, the Chairman stated that the death of Mr. Phillip C. Schuyler, made vacant the office of Clerk of the Water Committee. On motion of Mr. Ladd, seconded by Mr. Richardson, Mr. Frank T. Dodge was elected Clerk of the Water Committee, at the same rate of compensation ($50.00 per month) as was paid his predecessor in addition to his salary as Accountant.

Mr. Ladd moved that, according to the notice given at the last meeting of the Committee, the Committee now select, by ballot bonafide residents and tax payers, as provided by the Act of the Legislature, to fill the two vacancies in the membership of the Committee, and that the Committee first fill the vacancy made by the death of Mr. John Gates, and next the membership made by the resignation of Mr. F. C. Smith.

The motion was seconded and passed, and the Committee, by ballot, appointed Mr. C. A. Dolph to fill the first of the above described vacancies, and Mr. C. E. Sitton the second.

On motion, the Clerk was directed to notify Messrs. Dolph and Sitton of their appointment.

The sub committee on construction reported that it had received four proposals for making the necessary excavation for the new pump, to be erected in the Palatine Station, and had awarded the contract to the lowest bidder, Mr. S. R. Smith, for $2,924.50, which action was, by vote, approved.

A regular monthly meeting was held by the Committee on December 3rd, 1889. Letters were received from Messrs. Dolph and Sitton, signifying their willingness to serve as members of the Committee.

After estimating, as required by law, the probable expense of conducting the water works during the year, and also the cost of extensions, it was voted that the present water rates be prescribed as the rates for the year 1890, excepting that a slight reduction be made for water used for mixing lime and cement.

It was also voted that the Clerk advertise in Portland, San Francisco, and Chicago papers that proposals will be received until December 31st, 1889, for the purchase of $50,000.00 bonds of the City. This being a portion of the $700,000.00 bonds authorized by the act of the Legislature of which $600,000.00 were heretofore sold. The proceeds of the $50,000.00 bonds are to be used toward the payment for the pump and main.

Proposals eight in number, were received and opened at an adjourned meeting held on December 31st, 1889, the $50,000.00 bonds were awarded to Beckman and Reames of Jacksonville, Oregon, highest bidders, at 9 per cent premium.

At an adjourned meeting held on February 8th, 1890, the statement of receipts and disbursement, with the inventory of property on hand at the close of the year 1889, were approved and ordered signed by the Chairman and

Clerk and filed with the City Auditor as required by law.

The annual report of the sub-committee on Water Works was presented, giving a detailed report on the operation of the works. It showed as follows:

Cash Receipts		$148,106.31
Operating expenses, repairs	$51,407.17	
Increase of property on hand	322.98	
Interest on bonds	30,000.00	81,730.15
Net earnings appropriated for improvements		$66,376.16

At the meeting held on March 5th, 1890, the sub-committee on water works reported that

> "the current expenses are reported as usual, but the expenses incident to the flood, the protection and repair of the pipe line, and extra work at the pumping station, so far as they have been paid are represented by the charge to 'Extraordinary Expenses and Repairs', amounting to $3,535.91."

At the regular meeting on May 6th, 1890, after discussing the necessity of laying larger distribution mains in the City to supply the steadily increasing demand for water, it was voted that the remaining $50,000.00 bonds be sold, and the Clerk was directed to advertise in Portland, San Francisco and Chicago papers that proposals for them would be received until June 3rd, 1890.

On the date named, sixteen proposals were received and opened and it was voted that the $50,000.00 bonds be sold to Ladd and Tilton of Portland, Oregon, Agents, the highest bidders, for the sum of $55,250.00, being 10 1/2 per cent premium.

At the regular monthly meeting on July 1st, 1890, the Superintendent reported that the new Palatine force main, twenty-four inches in diameter and four and one-half

miles long, containing 1,113,153 pounds of wrought iron, rivets, etc., and at the contract price of $0.0755 per pound for manufacturing and laying in the trench, which was excavated and refilled by the employes of the Committee, cost $84,043.05. Of this 80 per cent had been paid and 20 per cent had been retained until the main should be accepted. The main was completed and in good order, and water had been pumped through it for two weeks.

On motion, a warrant was ordered drawn in favor of Wolff and Zwicker, the contractors, for $16,808.60-- the balance due; and another in favor of the Holly Manufacturing Company, the contractors for the new pump, for $40,000.00 -- the first payment due according to contract.

At the regular monthly meeting on September 2nd, 1890, the Superintendent to whom had been referred the petition for residents on Portland Heights for a supply of water received at the last meeting, reported that no water could be spared from the high service pumping station; from 100,000 to 200,000 gallons per diem might be furnished from the low service, but it would have to be pumped to an elevation of about 600 feet, and the cost of the plant would not be less than $20,000.00 besides the cost of land for pump station, reservoirs, etc.

As there were not funds available for any extensions of the water system at present, the matter was laid on the table.

On October 7th, 1890, the Committee, at its regular monthly meeting, received a report from the Superintendent, stating that the new Holly pump at Palatine had been working smoothly and pumping 10,000,000 gallons of water in twenty-four hours, with but 50 per cent of the fuel used for the two Worthington pumps when they were pumping the same quantity, the contract calling for 70

per cent less. It was voted that a warrant be drawn in favor of the Holly Manufacturing Company, the contractors for the pump, for $17,475.00 -- the balance due according to contract.

At an adjourned meeting of the Committee on December 16th, 1890, the Superintendent, as directed, presented his estimate of the cost of the proposed works as follows:

Additional pump and boiler for the high service	$25,000.
Pump, boiler, mains, reservoirs, etc., for Portland Heights	40,000.
Extension of distribution pipes in the City	271,000.
Pipe Line for supplying 24,000,00 gallons of water per day, by gravity, from Bull Run River	1,610,000.
Total	1,946,000.

No estimate was made for the cost of reservoirs.

It was voted that authority should be asked to issue bonds not to exceed $2,500,000.00 instead of $1,500,000 -- the amount named in the bill before the Legislature at its last session.

Although non-taxable water bonds had been sold recently for 10&1/2 per cent premium, while the City Hall bonds, which are taxable, brought at the same time only 2-3/8 per cent premium, it was decided useless to expect that a Bill would be approved if it exempted bonds from taxation. After a considerable discussion as to the date when it should be made payable, and other features of the Bill, it was voted that more time should be taken to consider the subject and the Chairman, Treasurer and Clerk were appointed a committee to prepare a Bill in accordance with the views already expressed by the Committee, and submit it at an adjourned meeting to be held December 30th, 1890.

At an adjourned meeting held on December 30th 1890 the special committee which had been directed at the preceding meeting to prepare and submit to the Water Committee a draft of an Act to be presented to the Legislature when it meets in January 189 to authorize the issue of additional City Water Bonds to enable the Committee to complete the proposed works for supplying Portland with water from Bull Run River submitted a printed copy of "House Bill No. 31" authorizing the issue of bonds for this purpose which passed both Houses at the last session in 1889 but failed to become a law because it had been vetoed by the Governor for the reason that it provided that the bonds like those issued by authority of the Act approved November 25th 1885 should be exempted from taxation.

The Special Committee recommended that a draft of an Act be made by copying said printed Bill excepting that owing to the increase in the plans for the capacity of the works the amount of additional bonds should be limited to $2 500 000.00, instead of $1,500,000.00 and excepting that instead of the provision that the bonds should be exempt from taxation it should be provided that

> "the bonds shall in all respects except as to exemption from taxation and in this Act specially provided, conform to and have the same force and effect as those authorized by said Act of 1885, and shall be designated as the issue of 1891."

The recommendations were approved and the draft of an Act in conformity therewith was ordered made and submitted to the Legislature.

The Chairman called the attention of the Committee to the small amount paid by the City for the supply of

water for protection against fire and other purposes and said that if any change were to be made, now was the time. It had been talked of for two years, but the Council always said no more could be paid for water because they had not levied a tax for that purpose, if they were not notified of an increase in the charges, they could apportion a tax to pay for the water. After the matter had been fully discussed it was voted that the City be charged $2,000.00 per month for water for municipal purposes, other than street sprinkling and City Park, and the Clerk was directed to notify the Council of the increase in the charges.

The estimate of the expenses of operating and improving the Works, having been made, it was voted that the present water rates be prescribed as the rates for the year 1891, excepting that the rates charged to the City be increased as above.

At the regular monthly meeting on January 6th, 1891, the statement, in detail, of the receipt and disbursements of the Committee during the fourth quarter of 1890, and a recapitulation of the same for the entire year, showing a balance due to the Treasurer of $10,180.45 and also an inventory of the property, implements and materials in its possession, together with the conditions and approximate value of these at the close of the year, were presented, approved and ordered signed by the Chairman and Clerk and filed with the City Auditor, as provided by law.

The sub committee on water works submitted its annual report upon the operation of the works during the year ending December 31st, 1890. The following is a

synopsis thereof:

Cash Receipts		$181,310.40
Operating expenses and repairs .	$71,496.85	
Increase of property on hand . .	8,515.49	
Interest paid on bonds	33,750.00	113,762.34
Net earnings devoted to extensions		$ 67,548.06

The increase in the operating expenses and repairs was explained by a statement showing that the expenses and repairs consequent upon the unusual flood in the Willamette River during February amounted to $4,732.00. Replacing the wooden trestles under the old Palatine force main with iron cost $5,000.00; the cost of repairing mains in the City was $8,775.00; and the repairs to the old pumps at Palatine amounted to $3,600.00.

In the annual report of the Superintendent, it was mentioned that the daily average of water pumped from the Willamette River during the year 1890, was 7,056,000 gallons, against 5,900,000 gallons in 1889, and 4,716,000 gallons in 1888.

WATER COMMITTEE CONSIDERS REPORT OF SUPERINTENDENT ON BULL RUN PIPE LINE AND CONDITION OF THE PRESENT WATER SUPPLY

At an adjourned meeting of the Water Committee held at the Ladd and Tilton Bank, September 6th, 1891, the following report was submitted by the Superintendent, Isaac W. Smith.

Gentlemen:

In accordance with the request of one of your members, I submit a statement of the works on the Bull Run pipe line, which should be commenced during the present

year should you decide to prosecute the work in the Spring and Summer of 1892.

From Gresham postoffice on the Section Line road to the Sandy River, a distance of ten miles, the pipe line is through a densely timbered country, without roads or means of access, and this line should be cleared and made suitable for the passage of teams.

About three thousand tons of pipe and material must be subjected to an extra haul of five or six miles over a very rough road unless a bridge is built across the Sandy at the pipe crossing.

At this point a county road has been established, but nothing has been done in clearing or bridging. It is possible that the county might be induced to build the bridge at once should the Committee be willing to contribute a sum proportionated to the advantage to be gained in hauling the pipes.

Beyond the Sandy there are several miles of road to construct and two inexpensive bridges to be built across Bull Run.

Within a half mile of the headworks there are about four thousand cubic yards of rock work to be taken out, and this might be done during the winter. The canal at the headworks has been constructed with a capacity of about 12,000,000 gallons in twenty-four hours, and must be enlarged to a capacity of 30,000,000 or 40,000,000. This can be accomplished by blasting a portion of the adjoining bluff, and a great portion of this could be done during the fall and winter. All of these works it would be well to complete before commencing the work of laying the pipe.

The expense, I estimate as follows:

For clearing roads and bridges	$12,000.00
Rock excavation	5,000.00
Excavation at headworks	5,000.00
Total	$22,000.00

A high and low service reservoir are needed for the economical operation of the works, and to compensate for the varying consumption of water at different portions of the day.

With a low service reservoir of suitable capacity the Holly pump at Palatine Hill could supply 12,000,000 gallons a day, working steadily during the whole twenty four hours, but under present conditions it must be worked to suit the varying demand, at less than half speed during the night and in conjunction with another pump during the hours for irrigation when the consumption is at the rate of 16,000,000 gallons in twenty four hours.

With a high service reservoir, the new pump with occasional assistance from the old pump, could supply the daily demand by running sixteen hours a day, but under the present conditions, it is worked during the day and night, some times at a fourth speed and at others at its full capacity.

The capacity of the pumps must, therefore, be equal to the average consumption for the whole day with reservoirs, and to the maximum rate during portions of the day without reservoirs.

Another great advantage from the construction of reservoirs would be that the water could be shut off from the large mains along the Macadam road for repairs and supplied from the reservoirs to the distribution system in the City. Under present conditions, the Sixth

Street reservoir is used only as a basin from which the supply is pumped to the high service, and, as the Eighth Street reservoir does not afford a pressure of more than thirty-five pounds, the water is pumped to a tank containing 50 000 gallons.

The cost of the two reservoirs, with pipes of sufficient diameter to supply the city mains, would not be less than $225,000.00.

PORTLAND HEIGHTS SECURES CITY WATER

At a meeting of the Water Committee held October 6th, 1891, the Portland Heights Water Company presented a communication stating that they had pipes laid and two reservoirs built and were about ready to commence pumping water from the City main at the cable road power house, and requesting that the Committee fix a price per thousand gallons for the water they might use and expressing a hope that it would be furnished at cost. Mr. Failing said he did not see that the Committee could supply them for any less than other consumers.

After some discussion it was moved by Mr. Ladd that the price be fixed at ten cents per 1000 gallons which motion carried.

On September 30th, 1892, Frank T. Dodge, Clerk of the Water Committee, reported that the road being built by the Water Committee along the Bull Run pipe line from Gresham to the Sandy River, a distance of ten and one-half miles, was practically completed. This includes the difficult portions up the Sandy bluff and Lusted hill where a fine, easy grade has been secured.

On Friday, November 11th, 1892, Judge Maldrum

and County Commissioner Scott of Clackamas County and Frank T. Dodge, Clerk of the Water Committee, met at Pleasant Home and agreed on a site for the proposed pipe bridge across Sandy River.

62d CONGRESS
3rd Session

S. 7944

IN THE SENATE OF THE UNITED STATES

January 4, 1913

Mr. Bourne introduced the following bill, which was read twice and referred to the Committee on Public Lands.

A BILL

To protect the wate of the City of Portland, Oregon.

Whereas, the Bull Run Forest Reserve was created by Act of Congress approved April twenty eighth, nineteen hundred and four for the protection of the water supply of the City of Portland, Oregon: Therefore

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this Act no roads shall be constructed, no settlement shall be permitted, and no timber shall be cut or power or irrigation rights or privileges acquired in the Bull Run Forest Reserve without the express consent of the City council of the City of Portland, Oregon.

C O P Y
(PUBLIC NO. 206)

An Act for the protection of the Bull Run Forest

Reserve and the sources of the water supply of the City of Portland, State of Oregon.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That from and after the date of the passage of this Act, it shall be unlawful for any person or persons, except forest rangers and other persons employed by the United States to protect the forest, and Federal and State officers in the discharge of their duties, and the employes of the water board of the City of Portland State of Oregon, to enter, for the purpose of grazing stock, upon any part of the reserve known as the Bull Run Forest Reserve, in the Cascade Mountains, in the State of Oregon, which reserve was established by proclamation of the President of the United States in eighteen hundred and ninety-two, as provided by section twenty four of an Act of Congress entitled "An Act to repeal timber culture laws, and for other purposes," approved March third, eighteen hundred and ninety one, and which reserve includes within its area the water supply of the City of Portland, State of Oregon, and any person or persons, save those hereinbefore excepted, who shall engage in grazing stock, or who shall permit stock of any kind to graze within said Bull Run Forest Reserve, or who shall knowingly trespass thereon, shall be deemed guilty of a misdemeanor, and on conviction thereof in the District Court of the United States for the District of Oregon shall be fined not to exceed five hundred dollars, in the discretion of the Court, and the Secretary of the Interior is hereby authorized and directed to enforce the provisions of this Act by all proper means at his command, and to exclude from said forest reserve stock of all kinds and all persons, save as

hereinbefore excepted.

Approved, April 28, 1904.

(Timber Land Reserve, Bull Run)

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION.

WHEREAS, it is provided by Section twenty-four of the Act of Congress, approved March third, eighteen hundred and ninety one, entitled "An Act to repeal timber culture laws, and for other purposes, "That the President of the United States, may, from time to time set apart and reserve, in any State or Territory having public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof."

AND WHEREAS, the public lands in the State of Oregon, within the limits hereinafter, are in part covered with timber, and it appears that the public good would be promoted by setting apart and reserving said lands as a public reservation.

NOW, THEREFORE, I, BENJAMIN HARRISON, President of the United States, by virtue of the power in me vested by section twenty-four of the aforesaid Act of Congress, do hereby make known and proclaim that there is hereby reserved from entry or settlement and set apart as a Public Reservation, all those certain tracts, pieces or parcels of land lying and being situate in the State of Oregon, and particularly described as follows, to-wit:

Beginning at the Northwest corner of Section six(6) Township One (1) South, Range six (6) East, Willamette Meridian, thence easterly on the base line between Townships one (1) North and one (1) South, to the southwest corner of Section thirty two (32), Township one (1) North, Range six (6) East, thence northerly on the section line between sections thirty-one (31) and thirty two (32), to the northwest corner of Section thirty-two (32); thence easterly on the section line between Sections twenty-nine (29) and thirty-two (32), to the northeast corner of Section thirty-two (32); thence northerly on the section line between Sections twenty-eight (28) and twenty nine (29) to the northwest corner of Section twenty-eight (28); thence easterly on the Section line between Sections twenty-one (21) and twenty-eight (28) to the northeast corner of Section twenty-eight(28) thence northerly on the section line between Section twenty-one (21) and twenty-two (22) to the northwest corner of Section twenty two (22); thence easterly on the section line between Sections fifteen (15) and twenty-two (22), and fourteen (14) and twenty three (23), to the northeast corner of Section twenty-three (23), thence northerly along the Section line between sections thirteen (13) and fourteen (14) and eleven (11) and twelve(12), to the northwest corner of section twelve (12); thence easterly on the Section line between Sections one (1) and twelve (12), to the northwest corner of section twelve (12), thence northerly on the eastern boundary of section (1) to the northeast corner of section one (1), all of said sections being in Township one (1) North, Range six (6) east, thence easterly to a point for the northeast corner of Township one (1) north from Range seven (7) east; thence southerly

to a point for the southeast corner of section one (1) Township one (1) north, Range seven (7) east; thence easterly to a point for the northeast corner of section eight (8) Twonship one (1) north, Range eight (8) east; thence southerly to a point for the northeast corner of Section thirty-two (32) of said Township and Range; thence easterly to a point for the Northeast corner of Section thirty-three (33) of said Township and Range, thence southerly to the southeast corner of section thirty-three (33) of said Township and Range; thence westerly along the base line to the northwest corner of section four (4), Township one (1) south, Range eight (8) east; thence southerly on the section line between sections four (4) and five (5), and eight (8) and nine (9), to the southeast corner of Section eight (8), thence easterly along the section line between section nine (9) and sixteen (16) to a point for the northeast corner of section sixteen (16); thence southerly along the section line between sections fifteen (15) and sixteen (16) to the southeast corner of section sixteen (16), thence easterly along the section line between sections fifteen (15) and twenty-two (22) to the northeast corner of section twenty-two (22); thence southerly between sections twenty-two (22) and twenty-three (23), twenty-six (26), twenty-seven (27), thirty-four (34) and thirty five (35) to the southeast corner of section thirty four (34), thence easterly along the southern boundary line of section thirty-five (35) to the southeast corner of section thirty-six (36) all of said section being Twonship one (1) south, Range eight (8) east; thence southerly to a point for the southeast corner of Township two (2) south, Range eight(8) east; thence westerly to the southeast corner of Township two (2) south

Range seven (7) east, thence northerly along the eastern boundary line of sections thirty-six (36), twenty-five (25), twenty four (24) and thirteen (13), Township two (2), South, Range seven (7) east, to the southeast corner of Section twelve (12), of said Township and Range; thence westerly along the section line between Sections twelve (12) and thirteen (13), eleven (11) and fourteen (14), ten (10 and fifteen (15), nine (9) and sixteen (16), eight (8), and seventeen (17), and seven (7) and eighteen (18), Township two (2) south Range seven (7) east and Sections twelve (12) and thirteen (13), eleven (11) and fourteen (14), ten (10) and fifteen (15), nine (9) and sixteen (16), eight (8) and seventeen (17) and seven (7) and eighteen (18), Township two (2) south, Range six (6) east to the southwest corner of section seven (7) of said Township and Range; thence northerly along westerly boundary of section seven (7) to the northwest corner of said section Township two (2) south, Range six (6), thence westerly on the section line between sections one (1) and twelve (12), two (2) and eleven (11), three (3) and ten (10) and four (4) and nine (9), to the southwest corner of section four (4), township two (2) South, Range five (5) east, thence northerly on the section line between sections four (4) and five (5), to the northwest corner of section four(4) in said Township and Range; thence easterly on the Township line between Townships one (1) and two (2) South, Range five (5) east to the southwest corner of section thirty-five (35), Township one (1) south, Range five (5) east; thence northerly on the section line between sections thirty-four (34) and thirty-five (35), twenty-six (26), twenty-seven (27), twenty two (22) and twenty-three (23), to the northwest corner of section twenty-three (23)

of said Township and Range, thence easterly on the section line between sections fourteen (14) and twenty-three (23), thirteen (13) and twenty-four (24) to the northeast corner of section twenty-four (24) of said Township and Range; thence northerly along the Range line between Ranges five (5) and six (6) to theplace of beginning.

Excepting from the force and effect of this proclamation all lands which may have been prior to the date hereof, embraced in any legal entry or covered by any lawful filing duly of record in the proper United States Land office, or upon which any valid settlement has been made pursuant to law, and the statutory period within which to make entry of filing of record has not expired and all mining claims duly located and held according to the laws of the United States and rules and regulations not in conflict therewith:

Provided, that this exception shall not continue to apply to any particular tract of land unless the entrymen, settler or claimant continues to comply with the law under which the entry, filing, settlement or location was made.

Warning is hereby expressly given to all persons not to enter or make settlement upon the tract of land reserved by this proclamation.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the City of Washington, this seventeenth (17th) day of June in the year of our Lord, one thousand eight hundred and ninety-two, and of the Independence of the United States the one Hundred and sixteenth.

(SEAL)

By the President: BENJ. HARRISON

WILLIAM F. WHARTON
Acting Secretary of State

SYNOPSIS OF WATER WORKS PURCHASED
AND ACQUIRED BY ANNEXATION.

The following is a synopsis of water works purchased and acquired by annexation by the City of Portland from the time the Water Committee was appointed by the Act of Legislative Assembly of the State of Oregon, November 25, 1885, to the present day.

PORTLAND WATER COMPANY

On January 1, 1887, the entire plant and works of the Portland Water Company was purchased for the sum of $464,551.81 including the following parcels of real estate viz: Lots one and two (land 2) "Palatine Hill" tract, containing 21.24 acres; Tract at foot of Caruthers Street, same being 200 feet on the river by 100 feet deep with right of way 10 feet in width (to intersection of mains at foot of Lincoln Street) for trestle and pipe line; Block 32 on Lincoln between Sixth and Seventh Streets; Block 235 and fractional block south adjoining (near 10th and Clifton Streets), and Lots three and four (3 and 4) Block 150 (Fourth and Market Streets).

EAST SIDE WATER WORKS

Employes:

General Foreman	- Edward J. Gray
Clerk	- Roscoe R. Morrill
Inspector	- N. Bradford Hall

On July 6, 1891, at noon the City of East Portland was annexed to the City of Portland, but the East

Side Water Works was operated by the Council of the City of Portland, entirely independent of the Water Committee until March 1, 1895, at which date the "East Side Water Works" was transferred from the common council of the City of Portland to the Water Committee according to the Act of the Legislature directing the same. Water from Bull Run river was turned into the East Side mains on March 3, 1895, and the engineers of the pumping station were paid off on the 4th. Bonds amounting to $250,000.00 at 6 per cent for thirty years with interest payments, were assumed in taking over the plant. This plant obtained its supply of water from several deep wells located at Milwaukie and Powell Streets.

EAST PORTLAND WATER COMPANY

On January 13, 1897, the plant of the East Portland Water Company, H. P. McGuire, President, was purchased for $45,000.00 and on January 29th, 1897, the pumps at the Hawthorne Springs, located at East Twelfth and Hawthorne Streets, were shut down and the water from the Bull Run gravity system turned into the mains purchased, at four different points. Wm. McGuire, a brother of H. P. McGuire, and Winfield S. Chapman, were stock holders in this Company.

PORTLAND HEIGHTS WATER COMPANY

On September 30, 1899, the plant, property and franchise of the Portland Heights Water Company was purchased for $9,700.00. This Company was composed of Portland Heights residents. Water was pumped from the City's mains at the Portland Cable Company's Powerhouse at Chapman and Mill Streets.

ALBINA LIGHT AND WATER COMPANY

By deed dated January 7, 1902, the plant of the Albina Light and Water Company, George W. Bates, President was purchased for $200,000.00 payable $150,000.00 in cash and $50,000.00 in time payments, viz: $25,000.00 on or before one year after date with interest at five per cent per annum, and $25,000.00 on or before two years after date with like interest, which amounted with interest to $203,470.39. The operating committee of the Water Committee was instructed to take possession of the property and plant described in said deed on February 1, 1902.

An office was opened in the Bates Bank at 163 Russell Street and later moved to the City's new building at 296 Russell Street.

Employes:

Chief Clerk	G. J. Kirkland
Clerk	D. B. Thomas
Inspector	Thomas J. Maupin
Foreman	W. T. Willis

MT. TABOR WATER COMPANY

By deed dated February 28, 1907, the Mt. Tabor Water Company, by J. M. Arthur, President, was turned over to the Water Board for $25,000.00, including all water pipe, tanks, building, franchises, rights of way for pipe lines, easements and all apurtenances connected therewith and owned by said Company, including pumping plant and machinery of said Company and also including one acre of land located in Welch's addition at East 76th and Yamhill Streets.

PIEDMONT WATER PLANT

By deed, dated June 12, 1907, the Investment

Company, by E. Quackenbush, President, was sold to the Water Board for $20,000.00 and interest, total price being $20,101.10, including all rights of way for pipe lines, easements, meters and all appurtenances connected therewith and owned by said Company, hereby excepting from this sale and transfer all of the real estate belonging to the Investment Company, together with all tanks, pumps and other chattels situated thereon.

WOODLAWN WATER PLANT

By deed, dated September 16, 1907, that certain system known as the Woodlawn Water Plant, by H. and T. Kubik, owners, was transferred to the Water Board, including all franchises, rights of way for pipe lines, easements, and all appurtenances connected therewith and owned by said grantors, or either of them, save and except the pumps and pumping plant and the real estate on which the same is situated, all for $4,000.00 and interest, total price being $4,010.11.

WOODMERE WATER WORKS

By deeds and bill of sale, dated June 22, 1911, the Woodmere Water Company, by George W. Brown, President, transferred to the Water Board the Woodmere Water System and certain parcels of real estate, as described in said deeds for a consideration of $50,191.67, free from all liens and incumberances, except the 1911 tax, which was paid by the Water Board August 1, 1912, to the Sheriff of Multnomah County and amounted to $697.50.

WOODSTOCK WATER WORKS

By deed dated January 3 1912, the Water Board acquired title to the Woodstock Water Works, D. D. Black

sole owner for $20,716.35, including all water mains and other pipes as then operated, all connections, appliances and tools pertaining thereto and all franchises, rights of way and other rights and property belonging to or in any wise appertaining, excepting the real estate, pumps and tanks utilized in connection with said works.

METZGER SYSTEM

On June 3, 1912 the Water Board paid Herman Metzger $652.15 for certain pipes in Reservoir Park and Loomis Park, known as the Metzger system.

LINNTON WATER WORKS

On July 7, 1915, the City of Portland took over the town of Linnton by annexation, which town had issued $150,000.00 of 5 1/2 per cent bonds for constructing water works; after annexation these water bonds were automatically made part of the Bureau of Water Works obligations and required to pay interest on same and provide for their retirement at maturity.

ST. JOHNS WATER WORKS AND LIGHTING COMPANY

In March, 1916, the Bureau of Water Works received title to the St. Johns Water Works and Lighting Company by P. H. Edlefsen, President, conveying the entire plant and system to Water Works, including the following real estate: Lots 1, 2, 7 and 8, Block 2, Adams Addition to St. Johns, and Lots 1, 2, 7, and 8, Block 14, James Johns Second Addition to the Town of St. Johns, all for the sum of $108,000.00.

THE MAN WHO BUILT THE NEW BULL RUN WATER WORKS SYSTEM

The construction of the Bull Run Plant has not only given employment to a large number of men, but it has also called for the display of the highest order of skill on the part of those on whom fell the responsibility of directing the men engaged in the active work of construction. It was the directing genius of the engineers who had the entire charge of the work of construction that was primarily responsible for the effective manner in which the work of building the plant progressed, and it was the close application the gentlemen at the head of the construction of this work gave to the project, that resulted in the completion of what is today considered one of the best built water works plants in the United States. The gentlemen who were the leading directing heads of the construction work of the plant are mentioned below:

HENRY FAILING

Born in the City of New York, January 17, 1834.
Died at Portland, Oregon November 8, 1898.

- - - - - - - -

A memorial of the first Chairman of the Water Committee of the City of Portland, Oregon.

- - - - - - - - -

Henry Failing was born in the City of New York on the 17th day of January, 1834, he was the second son of Josiah and Henrietta Ellison Failing, the first having died in infancy. His father, Josiah Failing, was a native of the locality now known as Montgomery County, in the Mohawk Valley, in the state of New York, and was descended on the male side from the German Palatines, who settled that part of the province in the early part of the eighteenth

century. His mother was an English woman with a strain of Welsh blood in her veins, who came to the United States with a brother and sister about the beginning of the present century. Josiah Failing was reared on the farm of his parents and remained at home until grown a young man, going to New York about 1824. Here he was married on the 15th of June 1828 to Miss Henrietta Ellison. Miss Ellison was the daughter of Henry Ellison of York, England and Mary Beck a native of New York. She was born in Charleston S. C. whither her parents had gone shortly after their marriage.

Mr. Ellison died suddenly when his daughter was hardly a month old and the widow with her fatherless infant returned to the home of her parents in New York, where her daughter grew to womanhood. The Becks were descended from the early Dutch settlers of the province, coming over from Holland before the transfer of the colony from the Dutch to the English more than two hundred years ago. Nathaniel Beck the father of Mrs. Ellison and grandfather of Mr. Failing did service in the cause of independence during the Revolutionary war in the Ulster County regiment of New York Militia.

Henry Failing's early boyhood was passed in his native city. He attended a public school in the ninth ward then known as No. 3. The school was then under control of the New York Public School Society, an organization which has long since ceased to exist the management of the schools being now merged into the general system of the board of education. The work of the schools in those days was confined to the more simple branches, but what was taught was thoroughly done; so that when in April, 1846, young Failing at the age of 12 bade farewell to school

and sports he was well grounded in the English branches. He entered the counting house of L. F. de Figarrere and Company, in Platt Street, as an office boy. Mr. de Figarere was a Portuguese, a brother of the Portuguese minister to the United States, and his partner, M. Rosat, a French merchant from Bordeaux. The business of the firm was largely with French dealers in the City, and it was here that Henry Failing acquired such a knowledge of the French language that he was enabled to both write and speak it with facility and correctness. Three years later, having meanwhile become an expert accountant, he became a Junior bookkeeper in the large dry goods jobbing house of Eno, Mahoney and Company, of which concern Amos R. Eno the lately deceased New York millionaire was the head. His knowledge of the importing business and custom house forms and details was such that neither of those two concerns had occasion for the services of a broker during his stay with them. Mr. Eno, with whom Mr. Failing maintained a correspondence until the former's death, told an intimate friend that it was one of the mistakes of his life that he did not make it more of an inducement to Henry Failing to remain with him. As it was, they parted with mutual regret.

The almost meager opportunities for acquirement of knowledge which he possessed were so diligently and wisely used that when, in 1851, a little more than seventeen years old, he made the great move of his life, he was better equipped for his future business career than many of far greater opportunities and educational facilities.

April 15, 1851 in company with his father and a younger brother - the late John W. Failing - he left

New York to establish a new business in Oregon. The journey was by sea to Chagres, on the Isthmus of Panama, thence by boat up Chagres river, and thence to Panama by mule train. From Panama they came to San Francisco by the steamer Tennessee, afterwards lost on the Coast. They reached Portland on the 9th of June, 1851, coming on the old steamer Columbia, which had that year been put on the route by the P. M. S. S. Company. C. H. Lewis, late treasurer of this Committee, was a passenger by the same steamer. For many years Mr. Failing and Mr. Lewis were accustomed to observe the anniversary together.

After a few months of preparation, building, etc., the new firm opened business on Front Street, one door south of Oak; the original sign of J. Failing and Company, can be seen yet on the four-story building that occupies the ground. On this spot Mr. Failing continued to do business many years, retaining his interest until January, 1893. Josiah Failing was from the first prominent in Municipal and educational affairs, being a member of the first City Council in 1852, and Mayor of the City in 1853. In 1864, the elder Failing retired from business and Henry Failing continued it in his own name.

He was married on the 21st of October, 1858, to Miss Emily Phelps Corbett, youngest sister of Honorable H. W. Corbett of this City. Mrs. Failing died in Portland on the 18th day of July, 1870, since which time he has been a widower. He had four daughters, one of whom died in infancy, and the others survive him.

In the year 1869 Mr. Failing, in company with his father, Josiah Failing, and Honorable H.W. Corbett, bought a controlling interest in the First National Bank of Portland from Messrs A. M. and L. M. Starr, who had

with others established it in 1866. Mr. Failing was immediately elected President of the bank, in place of Mr. L. M. Starr, and continued to manage it until his death. Immediately after the change of ownership, the capital of the bank was increased from $100,000.00 to $250,000.00, and in 1888 the capital was doubled, the present capital of the bank being half a million, while the legal surplus and the individual profits amount to more than the capital. In addition to this, dividends far exceeding the original investment, have been made to the shareholders.

In January, 1871, Mr. Failing and Mr. Corbett consolidated their merchantile businesses, forming the firm of Corbett, Failing and Company, the co-partnership continuing twenty-two years, when Mr. Failing's interest terminated by the dissolution of the firm. The name of the concern is perpetuated in the present corporation of Corbett, Failing and Robertson, their successors.

In the political campaigns of 1862, Mr. Failing was chairman of the State Central Committee of the Union Party, a combination of Republicans and war Democrats, who carried Oregon for the Union in those exciting times.

In 1864, at the age of thirty years, he was by popular vote elected mayor of the City of Portland, and during his first term in that office, a new charter for the City was obtained, a system of street improvements adopted, and much good work done. At the expiration of his term of office, he was re-elected, with but five dissenting votes, and served a full term of two years. His administration of the affairs of the City was able, progressive and economical.

He was named in the legislative act of 1885,

as a member of the Water Committe and upon its organization was unanimously chosen chairman of the Committee which position he held until the date of his death.

Upon all political questions he had decided convictions, in accordance with which he invariably acted, but he never engaged in political controversy, nor indulged inpersonalities.

Mr. Failing's career affords encouragement to young men seeking place and power in business affairs. It demonstrates what can be accomplished by patient industry and honest efforts, unaided by the scholastic training afforded by colleges and universities. The counting-house was his schoolroom; but he studied not only men and their affairs, but he read carefully the best authors and became well informed in literature, science and the arts. He appreciated the advantages of a classical education and he contributed liberally to the support and endowment of the educational institutions of this State. At the time of his death he was a regent and the president of the board of regents of the University of Oregon, and was a trustee and the treasurer of the Pacific University, the oldest educational institution in this State. He was a staunch friend and supporter of the religious and charitable institutions of the City and State. The First Baptist Church and the Society of Portland, of which he was many years the president, and the Children's Home of which he was treasurer, were special objects of his solicitude, and he contributed largely to the support of both.

He was, in connection with the late William S. Ladd and H. W. Corbett, active in the project of purchasing and laying out the grounds of River View Cemetery. For many years he was desirous of seeing a suitable piece of

ground laid out andproperly improved for cemetery purposes, and this beautiful spot where his remains now rest, is in no small degree the result of his effort.

To the Portland Library Association, of which he was president, he made large donations in money, and gave much time and thought. The library building, now one of the fairest ornaments of our City, is largely the result of his benevolence and enterprise. He was especially generous and kind to the pioneers of this State, who like him, aided in laying out the foundation of a civilization which is now our common heritage, and his name will be remembered and honored by them and their posterity as long as the history of our State is written or read. In appreciation of his character and of his services to the City and State, his associatesof the Water Committee of the City of Portland direct this tribute to his memory to be entered upon their records.

JAMES DIX SCHUYLER

Consulting Engineer

Theoffice of consulting engineer on the construction of the new water works was one requiring a high order of engineering talent, special skill and experience, combined with well balanced judgement. The Water Committee early realized the difficulty of planning and executing such an enormous amount of work in one short season and no higher recognition of engineering skill could have been shown than in the appointment of Mr. Schuyler of Los Angeles, California, to that responsible position. The special duties to which Mr. Schuyler was assigned, were the design and construction of the reservoirs with their dams, pipe connections and appurtenances, as well as the Portland Heights pumping station. All visiting engineers

from the East who have seen the unusual difficulties which have here been met and overcome, have expressed great admiration of the ingenuity shown by Mr. Schuyler in this work in the way of special adaptations out of the usual order.

Mr. Schuyler was born in New York and was educated there, but practiced his profession exclusively in the Western states and territories. His early career being devoted to railroad construction in Kansas, Colorado, California and old Mexico. For fifteen years, however, he devoted his attentions to his chosen speciality of hydraulics and in the pursuit of that branch attained a national reputation.

He was for several years chief assistant state engineer of California in charge of the irrigation investigation and subsequently designed and constructed the great Sweetwater dam, near San Diego, California, a structure whose massive and graceful lines are admired by thousands of visitors annually. Mr. Schuyler was engineer of the Hemet dam in Riverside County, California, which is considerably higher than the Sweetwater, both of them standing far in advance of all others of their character in Western America. The first secretary of the Water Committee was his brother, the late Phillip C. Schuyler.

COLONEL ISAAC W. SMITH

Chief Engineer

Colonel Smith devoted his entire life to the profession of civil engineering. He was born in Fredericksburg, Spottsylvania County, Virginia. He was a graduate of the Virginia Military Institute located at

Lexington. During Colonel Smith's long career as a successful engineer he handled some very important work. He was assistant engineer and astronomer of the boundary lines between the states of Iowa and Minnesota and between Creek and Cherokee Indian Tribes in the Indian Territory. During the Mexican War, he was Second Lieutenant in the Voltiguer Rifle regiment. He was a Captain in the Engineer Corps of the Confederate Army. After the war he engaged in land surveys of the territory of Washington and he also did much public surveying of lands after Washington was admitted as a State.

Colonel Smith built the light housesfor the Government at Sholawater Bay and at New Dungeness Smith's Island and Tatoosh on the Straits of Fuca. He laid off the City and harbor lines of Tacoma and subsequently platted the gas and water works for the Tacoma Light and Water Company. He was engineer for the Northern Pacific on the surveys for the lines from Vancouver north to Yakima River and up to the Columbia. He had charge of the location and construction of a line from Kalama to Tacoma and he located the line now running from Tacoma across the Cascade mountains to the Yakima and Columbia Rivers by the same company.

On Vancouver Island, B.C., Colonel Smith laid off lands for the Board of Public Works. He also had charge of the exploitation by the Canadian Government for Fraser River in connection with the construction of the Canadian Pacific Railway. He engaged successfully in mining enterprises in the rich Caribou districts and he possessed the most accurate knowledge of the topographical features of the Provinces of British Columbia.

Colonel Smith had charge of some of the most important improvements of Oregon in which State he long resided. He was engineer for the Northern Pacific Railway of the construction and location of a line from Kalama to Portland. He built the complete system of steamboat locks around Williamette Falls and Oregon City. He was chief engineerof the Oregon Pacific Railway Company which runs a line of road from Yaquina Bay east to the summit of the Cascademountains.

On January 1st 1887 Colonel Smith was appointed chief engineer and superintendent of the Portland City Water Works by the Water Committee. He laid and planned the present efficient water works system which is the best planned of the kind on the Coast and as complete as any in the United States. The great pumps, pipes, etc. of this system were all put in under the direction of Colonel Smith. The proposition to convey water from Bull Run River to Portland was first conceived by Messrs Talbot and Cunningham. It was the recommendation of Colonel Smith after he had made a most careful examination of the feasibility of the project to bring this water to Portland, that as the most important feature toward inducing the Water Committee to purchase the rights of Talbot and Cunningham on Bull Run River and the subsequent success of the work of the Bull Run water system as stated above has been largely due to the untiring efforts of Colonel Smith, who devoted nearly seven years of his life to the work of promoting the construction of one of the greatest water work systems ever completed in the Pacific Northwest.

DAVID DEXTER CLARKE

Civil Engineer

Mr. Clarke is of New England birth and education. He came to the Pacific Northwest in early manhood and for many years has been identified with the public works of Oregon and Washington. He made his home in Portland from 1864 to 1873. He was engaged first upon the staff of the City Surveyor and later, during the railroad construction of that period, served as assistant engineer upon both the East and West side roads. After spending three years in Olympia in connection with the work of the United States land surveys, he removed to Tacoma, where he resided from 1876 until 1890. During this period he was almost continuously in the service of the Northern Pacific Railroad Company as assistant engineer the last two years immediately in charge of the terminal improvements made at Tacoma.

During the construction of the Tacoma Water Works in 1884 and 1885 by Colonel Isaac W. Smith, C.E., who later served as Chief Engineer of the water system of this City, Mr. Clarke was his principal assistant. His connection with the Portland Water Works system began in 1893.

Shortly after the death of Colonel Smith, Mr. Clarke was appointed Chief Engineer of the Water Board andheld that position until he resigned on October 1, 1917.

FRANK THOMSON DODGE

Superintendent

Frank Thomson Dodge was born February 3, 1841, at Georgetown, Maryland. As a boy he loved boats and water above everything else and this likeness was destined

to direct his activities throughout life. When in his 'teens he moved to California to take a position at Mare Island Navy Yards, located at Vallejo.

He came to Oregon in 1862. His association with the Water Committee of the City of Portland began July 3, 1888, with the establishment of that body soon after the legislative act of November 25, 1885.

At the time the installation of the Bull Run water was first urged, Sylvester Pennoyer, then Governor of the State, vigorously opposed the project on the grounds that Bull Run Lake was fed by glacier water regarded as unhealthful. Mr. Dodge tramped to the source of the water at Bull Run Lake where he camped out for some time, taking pictures to prove that the water did not originate from glacier sources. Pictures of a large ridge intervening between the Bull Run Lake and the Sandy River convinced Governor Pennoyer of the positive fact that there was no possible avenue for the river water coming from the glacier formation to get into the lake.

Mr. Dodge died February 7th, 1914, at the home of Mrs. M. L. Myrick, 595 Johnson Street. He had been ill less than a week. Death was caused by angina pectori. He served the City from July 3, 1888, to the time of his death. Undoubtedly Mr. Dodge did more than any other person to secure Bull Run water for the citizens of Portland.

Dodge Park, located at the junction of the Bull Run River and the Sandy River, was named in memory of Mr. Dodge, also Dodge Island, a small island in Bull Run Lake was named in honor of Mr. Dodge.

CHARLES E. OLIVER

Assistant Engineer

Charles E. Oliver was born in Marion County, Iowa, March 10th, 1856, and crossed the plains to Oregon by ox team in 1864.

He spent the winter of 1864 and 1865 in Grande Ronde Valley, Union County. In 1866, the family moved to Cedar Mills, Washington County. In 1867, they moved to Portland, where he has since resided. He received his education in the grammar and high schools of this City and also took a course in a business college. He began engineering work as chainman and rodman in the City Engineer's office in 1880, and was later promoted to assistant engineer, in which capacity he served until 1884.

In 1886 Mr. Oliver was engaged by Colonel Isaac W. Smith to assist in the surveys for a new pipe line from Bull Run to Portland. He completed these surveys early in 1887 and owing to Governor Pennoyer vetoing the Water Bond Bill work on the new pipe line was suspended.

During 1887, he was engaged in railroad location work for the Oregon Railway and Navigation Company in Idaho and Washington.

In 1888 and 1889 he was engaged as topographical draftsman in the United States Surveyor General's office. In the fall of 1889 he was again engaged by the Water Department to construct a pipe line from Portland to Palatine Hill pumping station and also to erect pumps and other machinery at the latter place; this work being completed in 1890.

In 1893 he was appointed Assistant Engineer to Colonel Isaac W. Smith and was consigned to work in the construction of reservoirs One and Two at Mount Tabor and reservoirs Three and Four at Washington Park.

On the completion of this work early in 1895, and after the consolidation of the East and West sides, he was sent to the East Side to supervise pipe laying and inspection work. He continued in this work until he was recalled to the West Side office to assist in securing privately owned lands in the Bull Run Reserve.

In 1917 he was appointed assistant engineer and put in charge of development work in the Bull Run Reserve. During 1917 and 1918 he had charge of the work of constructing a new screen house and enlarging the canal and intake at the headworks and the installing of an electric lighting plant. Early in 1918 he was given charge of the development work at Bull Run Lake and vicinity. Under his direction, in addition to other work, a storage reservoir was built, from which the City can in an emergency, withdraw nearly three billion gallons of water.

Among other important work, Mr. Oliver secured most of the rights of way for the two pipe lines now in use. He secured a large portion of the riparian rights on Bull Run River and secured title to numerous parcels of privately owned lands in the Reserve.

His service with the Water Department has extended over a period of thirty six years, and he has watched its growth from a small affair employing one clerk and one inspector, to an institution giving employment to hundreds of people.

BULL RUN RESERVE

Origin of the name "Bull Run"

Among the legendary lore of the Cascade mountains, is an account of a mad stampede of a band of cattle down the Western slope of the range and across the canyon through which flows the stream that now bears the suggestive name of Bull Run. This band was being driven across the range to the cattle market of Western Oregon. In the almost impenetrable fastness of the wild mountain districts, this band was so completely obliterated that for years subsequent the only trace of the once mighty body of cattle was the wild rush of some excited bovine in his efforts to find a safe retreat in the forests bordering the canyon from the presence of some intrepid hunter or trapper who had penetrated to the jungle of the Cascade range. It was from this famous stampede that the suggestive name of Bull Run owes its derivation and in place of the people of Portland being supplied with water from what might have been called "Silver" or "Clear" Creek they are today imbibing the crystal fluid from a stream that offers no suggestion to the visitor to its banks of the prosaic name it bears.

The area of the Bull Run reserve is two hundred and twenty-two (222) square miles or 142,080 acres. The ownership of this land is divided as follows:

Lands owned by U.S. Government	134,459 acres
Lands owned by City of Portland	4,721 "
Timber lands owned by private parties (but not occupied)	2,900 "
Total	142,080 Acres

The area of the watershed is 102 square miles, or 65,280 acres.

The region forming the watershed of the Lake and

river is of volcanic origin. It is a rugged wilderness. There is not a habitation nor pasture on the watershed of the lake and river above the point where the water for the City is taken out, consequently, there is absolutely nothing which can pollute the water.

The Commissioner of Public Utilities, Mr. John M. Mann, through our Senators and Representatives at Washington, has petitioned Congress not to dispose of any land within the reserve formerly owned by the Oregon and California Railway Company but to retain it as Government land not subject to entry; or as a last resort permit the City of Portland to purchase this land at $2.50 per acre (the price allowed the Railway Companies by the United States Government). Mr. Mann has recently succeeded in influencing a number of persons owning land in the reserve to trade their holdings for other land of equal value, owned by the City, outside of the reserve. He is also negotiating with other owners of privately owned lands within the reserve to sell the same to the City, or to trade their interests for similar lands owned by the Government, or the City of Portland, located outside of the reserve. When this is accomplished, he feels that an ample water supply for the inhabitants of the City of Portland and vicinity will be indefinitely assured.

BULL RUN LAKE

The main source of the water supply of Portland is Bull Run Lake situated in the Cascade mountains at an elevation of 3174 feet at the spillway of the dam. The Lake is one and one fourth miles long and three quarters of a mile wide and is about five hundred acres in area. In the center is located a small island comprising less

than an acre of ground known as Dodge Island, named in honor of the late Frank T. Dodge, former superintendent of the Bureau of Water Works. Bull Run Lake is situated about seven miles Northwest from the summit of Mount Hood. The deep canyon of the Sandy River prevents the discolored waters from the g ciers of that mountain from flowing into the lake. Bull Run Lake is supplied entirely from unfailing springs in the steep, rocky slopes surrounding it on all sides fed by water from melting snow and rain.

The natural outlet of the water from the Lake is under an immense mass of shattered basalt which flows into the Bull Run canyon from the Northwest end of the lake. From the base of this natural dam, about three hundred and fifty feet below the surface of the lake, the water gushes forth and forms Bull Run River, a tributary to the Sandy River, which empties into the Columbia River at Troutdale.

The average depth of the lake is fifty feet. The average depth of snow in the winter months at the lake is ten feet and on the mountains surrounding the lake, twelve feet.

The p: cipitation (rain and melted snow) at the lake from January 1 1920 to January 1, 1921 was 144.18 inches as follows.

January	16.33	inches
February	1.19	"
March	23.15	"
April	24.18	"
May	3.45	"
June	4.51	"
July	0.59	"
August	3.22	"
September	14.52	"
October	11.89	"
November	14.65	"
December	26.50	"
Total precipitation one year	114.18	inches

The distance from the headworks on Bull Run River to the lake by the river is twenty miles and by the trail (now being constructed) about twenty-two miles.

BULL RUN RIVER

The maximum flow in Bull Run River at the headworks is 17,400 second feet. The minimum flow at the headworks is 72 second feet. This occurs only during August and September. By opening the gate at the lake, the flow at the headworks can be increased to any desired amount up to 600 second feet in addition to the natural flow of the stream. There are quite a number of other storage sites available in the reserve which, when developed, will store water sufficient to supply several million consumers.

HEADWORKS AND CONDUITS

The elevation of the water in the tank at the present headworks is seven hundred and seventeen feet. When the dam, now being constructed at a cost of nearly a quarter of million dollars, is finished, the elevation of the water will be increased thirty feet or to an elevation of seven hundred and forty seven feet.

Conduit number 1 which is forty-two inches in diameter, has a capacity of 22,500,000 gallons in twenty-four hours. It was laid in 1893 and 1894. Water was first used through this conduit on January 2, 1895. Conduit number 1 is a riveted steel pipe.

The size of Conduit number 2 is fifty-two inches and it has a capacity of 44,500,000 gallons in twenty-four hours. This conduit is one of the lock-bar type and was laid in 1910.

The total capacity of the two conduits is 67,000,000 gallons in twenty-four hours. On completion of the new headworks these conduits will have a capacity of about 72,000,000 gallons in twenty-four hours.

Plans are now being prepared and surveys are being made by the Water Works engineers for a third pipe line. This conduit will be sixty inches in diameter.

COMMISSION FORM OF GOVERNMENT

At the City election held June 2, 1913, the following officers were elected to serve from July 1, 1913:

Mayor — Term of office four years

H. R. Albee

Commissioners — Term of office two years

William L. Brewster
C. A. Bigelow

Commissioners — Term of office four years

Will E. Daly
Robert G. Dieck

Commissioner Daly was assigned the Department of Public Utilities by Mayor Albee and had charge of the Bureau of Water Works during his term of office.

OFFICERS OF THE CITY GOVERNMENT FOR FISCAL YEAR BEGINNING December 1, 1921.

Mayor	George L. Baker
President of Council	C. A. Bigelow
Commissioner	C. A. Bigelow
Commissioner	A. L. Barbur
Commissioner	John M. Mann
Commissioner	S. C. Pier

Auditor . . . . . George R. Funk

City Attorney . . . . . Frank S. Grant

Municipal Judge . . . . . George Rossman

City Engineer . . . . . O. Laurgaard

City Treasurer . . . . . William Adams

Chief of Bureau of Police . . . . . L. V. Jenkins

Chief of Bureau of Fire . . . . . J. E. Young

Supt. of Bureau of Parks . . . . . C. P. Keyser

Supt. of Bureau of Street Cleaning . Alex Donaldson

Supt. of Bureau of Water Works . . . . L. S. Kaiser

Health Officer . . . . . George Parrish

Sealer of Weights and Measures . . . . . E.D. Jones

Engr. of Bureau of Water Works . . . F. M. Randlett

Inspector of Licenses . . . . . Jos. S. Hutchinson

Market Master . . . . . J. A. Eastman

Manager of Auditorium . . . . . H. M. White

Supt. of Garbage Disposal . . . . . W. G. Helber

Secretary Board of Motion Censors . Mrs. E. T. Colwell

DISTRIBUTION OF OFFICIAL BUSINESS

OF THE CITY OF PORTLAND

George L. Baker, Mayor
Commissioner of Public Safety

Bureau of Police:
Uniform Division
Bertillion Division
Women's Protective Division
Jail

Municipal Court

Office of City Attorney

Public Auditorium

Motion Picture Censor

John M. Mann
Commissioner of Public Utilities

Bureau of Water Works

Bureau of Water Revenue

Bureau of Weights and Measures

Bureau of Health
- Medical Division
  - Emergency Hospital
  - Free Dispensaries
  - Bacteriological Laboratory
  - Quarantine Subdivision
- Sanitary Division
  - Milk Subdivision
  - Market Subdivision
  - Chemical and Milk Laboratory
- Main Office
  - Vital Statistics
  - Complaints

Street Lighting

Transportation Utilities and Franchise Matters

Establishment and Maintenance of Street and Sidewalk Fountains

Motor Bus Inspection

Women's Detention Home

A. L. Barbur
Commissioner of Public Works

Office of City Engineer:
- Bureau of Construction
  - Street Improvements
  - Sewer Improvements
  - Sidewalk Construction
  - Construction of Bridges and Structures
  - Street Extensions
  - Tests on Materials of Construction
- Bureau of Maintenance
  - Repair of Sewers
  - Repair of Streets
  - Repair of Bridges and Structures
  - Municipal Asphalt Repair Plant
- Bureau of Standards
  - Physical Laboratory
  - Testing Laboratory
  - Municipal Paving Plant

Bureau of Buildings
Plumbing Division
Electrical Division
Building Division

C. A. BIGELOW
Commissioner of Public Affairs

Bureau of Garbage Disposal

Bureau of Fire

Public Employment Bureau

Public Markets

Bureau of Street Cleaning

Municipal Fish Market

Municipal Repair Shops

S. C. PIER
Commissioner of Finance

Municipal Reference Library

Office of City Treasurer

Bureau of Purchases and Stores
Purchasing Agent
City Store House

Bureau of City Hall

Free Museum

Bureau of Licenses

Bureauof Parks

Municipal Garage

GEO. R. FUNK
Auditor

Auditing Division

Accounting Division

Claims and Documents Division

Special Assessment Division

Open and Bonded Liens Division

Special Tax Purchasing Division

Licensing Division

Elections

Clerk of the Council

Secretary of the Fireman's Relief and Pension Board

Secretary of the Policemen's Relief and Pension Board

CIVIL SERVICE BOARD

John F. Logan, Chairman

Harvey Wells, George C. Mason

Examinations

Efficiency Records

Appeals

DOCK COMMISSION

John H. Burgard, C.C. Hindeman, A. H. Averill,

F. C. Knapp, Ira F. Powers

BOARD OF APPEAL - BUILDING CODE

Dean Vincent

H. A. Whitney J. S. Seed

BOARD OF APPEAL - ELECTRICAL CODE

F. H. Murphy

S. C. Jaggar H. Haybarker

BOARD OF APPEAL - PLUMBING CODE

Robert S. Gillan

D. S. Williams, Robert Strong

PLUMBERS' EXAMINING BOARD

William H. Chambers, D. S. Williams, H. Claussenius

C. J. Kelly, Robert Gillan

BOARD OF EXAMINERS FOR ELECTRICAL DIVISION

E. W. Pierce, W. H. Brust, F. D. Weber

BOARD OF MOTION PICTURE CENSORS

H. W. Metzger Mrs. Alexander Thompson Ralph McAfee

Mrs. E. T. Colwell, Secretary

CITY PLANNING COMMISSION

J. C. Ainsworth, President

A. E. Doyle	A. F. Flegel	Coe A. McKenna
E. B. MacNaughton	Ira F. Powers	B. W. Sleeman
Mayor Baker	Frank S. Grant (City Attorney)	O. Laurgaard (City Engineer)

C.H.Cheney, Consultant Radford R. Shawcross, Sec.

PORTLAND MUNICIPAL BOXING COMMISSION

Frank E. Watkins, Chairman

E. Plowden Stott Edgar S. Higgins Dr. Sam Gellert
Joe Wood

WATER FRONT COMMISSION

G. B. Hegardt, Chief Engineer

H. E. Plummer	O. Laurgaard	W. A. Batchel
M. P. Boardman	Edw. Grenfel	L. E. Latourette

HOUSING CODE ADVISORY BOARD

Will Claussen James L. Quinn Dr. Jonah Wise

OFFICIALS, HEADS OF DIVISIONS, AND OTHER EMPLOYES HOLDING POSITIONS OF TRUST IN THE BUREAU OF WATER WORKS

Honorable John E. Mann Commissioner of Public Utilities
Room 302, City Hall

Lawrence S. Kaiser Superintendent
Room 111, City Hall

Fred M. Randlett Chief Engineer
Room 211, City Hall

Ben S. Morrow Principal Asst. Engineer
Room 211, City Hall

Edward J. Gray General Foreman
Office 123 E. Seventh Street

Chester G. Ehle, Chief Draftsman
Room 211 City Hall

Arthur V. Bauer — Accountant, General Office
Room 111, City Hall

Henry L. German — Chief Clerk, Rev. Division
Room 108, City Hall

Charles E. Oliver — Assistant Engineer
Room 211, City Hall

Thomas J. Maupin — Inspector of Pipe Lines
Bull Run Oregon

Ernest H. McPherson — Chief Inspector
Room 108, City Hall

Andrew Figgins — Asst. Chief Inspector & Meter Foreman
No. 287 Market Street

James A. Leslie, — Plant Engineer
Rivera, Routel, Oswego, Oregon

Patrick H. Mulholland — Plant Engineer
Room 211, City Hall

W A T E R R A T E S

RULES AND REGULATIONS FOR THE SUPPLY AND USE OF WATER

Established by the

COUNCIL

of the

C I T Y O F P O R T L A N D

O R E G O N

1922

DEPARTMENT OF PUBLIC UTILITIES

John M. Mann Comm.

L. S. Kaiser, Superintendent

BUREAU OF WATER WORKS

RULES AND REGULATIONS
for the
MANAGEMENT OF THE WATER WORKS
of the
CITY OF PORTLAND, OREGON

Extracts from Ordinance No. 33692 as amended, pertaining to the use of water.

ARTICLE 111. Regulations for Use of Water.

Section 1. BUREAU'S CONSENT FOR CONNECTIONS. - It shall be unlawful for any person to attach or to detach from any water main or service pipe or other connection through which water is supplied by the City or to interfere in any manner with such pipes or connections, without having first obtained the written consent of the Bureau of Water Works.

SECTION 2. REPORT ON CONNECTIONS. - Every plumber shall make a report in writing of all connections attachments and extensions made by him, within three days after the same shall be done, giving the location of the premises, name of the owner, number of faucets, bathtubs, water closets, fountain, hose and other connections with the mains and pipes of the Bureau of Water Works.

SECTION 3. WASTE - REPORT. - It shall be unlawful for any householder or other consumer of water supplied by the City of Portland, to cause or permit water to run or be discharged through the pipes or faucets in any house, building or lot, owned or occupied by such householder or other consumer of water in excess of the quantity actually necessary for domestic, irrigation or other lawful purposes for which payment is made.

The occupant of any building to which water is supplied by the City of Portland shall immediately report to the Superintendent of the Bureau of Water Works any break or leak in any water fixture or water service pipe in such house, building, lot or property.

SECTION 4. CONNECTION FOR CONSUMER. Whenever any water consumer or person whose pipes are connected with any of the city water mains or pipes, shall desire to have his water pipes detached from or attached to such mains or pipes, he shall notify the Bureau of Water Works, and the Bureau shall give its written consent for such attachment or detachment as required, or shall, within twenty four hours, upon payment of the reasonable expense thereof, proceed to make such attachment or detachment, as the case may be; provided always, that all water rates and charges against the applicant be fully paid.

SECTION 5. SERVICE PIPES LAID BY BUREAU. The laying of service pipes for the distribution of water, connected with the main in the street and extending to a point inside the curb lines of the property to be served, shall be performed by the Bureau of Water Works and it shall be unlawful for any person, firm or corporation to lay or construct such service pipes.

SECTION 6. COST OF LAYING SERVICE PIPES. Service pipes of suitable size will befurnished upon application to the Bureau of Water Works and the pre-payment of the charge therefor, as hereafter provided, and the Bureau of Water Works shall furnish all labor and materials necessary for such construction, including tapping of mains, installation of corporation cocks, curb cocks and connections and such galvanized pipe as may be necessary. All charges for laying such service pipes shall be calculated as if the

water mains were laid in the center of the street in order that uniform charge may be made to the property abutting on opposite side.

SECTION 7. (as amended by Ordinance No. 36071, passed by the Council, October 8, 1919.) RATESCHARGED. The rates to be charged for laying and constructing such service pipes by the Bureau of Water Works shall be as follows:

Size of Pipe	Unpaved Street	Paved Street	Cost of each additional foot in excess of 18 ft. Unpaved Street	Paved Street
½ inch	$20.00	$32.50	$0.25	$0.90
¾ inch	20.00	32.50	0.25	0.90
1 inch	25.00	37.50	0.30	1.00

In case it becomes necessary to cut concrete sidewalks and repair same for the purpose of installing curb cock, an additional payment of $5.00 shall be required.

SECTION 8. (as amended by Ordinance No. 38430, passed by the Council December 8, 1920.) REPAIR OF PAVEMENTS - MAINTENANCE OF PIPES. In addition to the furnishing of all labor and materials to be used in such construction the Bureau of Water Works shall repair or cause to be repaired any cuts or excavations in paved or unpaved street to the satisfaction of the City Engineer, and it shall maintain and keep in repair all service pipes between the main and the curb line, and if there be no curb line then between the main and the property line.

SECTION 9. - It shall be unlawful for any person to cut, alter, change, remove, disconnect or connect with, or in any manner interfere, meddle or tamper with any hydrant owned or used by the City of Portland; provided

however that the provisions of this section shall not apply to the Bureau of Fire of this city; and provided further, that all other departments and bureaus may be allowed to connect on the said hydrants but before doing so must obtain a written permit therefor from the Bureau of Fire and must use a spanner or regulation wrench in connection therewith

SECTION 10. It shall be unlawful for any person being theowner of or having chargeof any vehicle of any kind, to allow or permit the same, or any animal or animals attached thereto, to stand or remain standing except while being loaded or unloaded or while taking on or letting off passengers in any public place within twenty feet of any fire hydrant.

SECTION 11. CHARGES FOR VESSELS IN HABOR. There shall be charged for all water furnished to vessels in the local harbor in the City of Portland, where the services of the Harbor Patrol or the furnishing of any of its equipment for the purposes of delivering water to said vessels is now required, the following rates; $5.00 for the first 5,000 gallons or less and 20 cents for each additional 1,000 gallons. All applications for the purchase of water by vessels must be made at the office of the Harbor Patrol, except as hereinafter provided, and such applications shall be made in writing or in person by the officers of the vessels authorized to purchase supplies. The crew of the vessel purchasing water will be required to handle the hose needed to deliver said water and to coil and return such hose upon dock or wharf. Provided, however, that owners or operators of private or public docks may furnish water to vessels at such docks, providing such water is furnished through a meter that

accurately registers the amount of water passing through same.

SECTION 12. NOTICE FROM HARBOR PATROL. - Except as herein otherwise provided, the Harbor Patrol shall immediately advise the Bureau of Water Works of any water that may be furnished to any vessel, stating therein the amount of water furnished the vessel supplied, the local agency of such vessel and the service from which the supply of water was delivered. Except in case of emergency, the Bureau of Water Works will, upon receipt of the advice of the Harbor Patrol, bill such vessel or their local agency for the amount of water supplied to any vessel. All payments for water furnished to vessels in the local harbor of the City of Portland shall be made to the Bureau of Water Works of the City of Portland.

SECTION 13. WAIVER OF DAMAGES. - Every vessel applying for water under this ordinance shall sign a waiver for all damages to persons or property resulting from the bursting of service pipes or hose.

SECTION 14. - UNAUTHORIZED USE OF WATER BY VESSELS. - It shall be unlawful for any person other than herein authorized to sell, serve or give away water from the city mains to vessels in the local harbor.

SECTION 15. - APPLICATION FOR WATER. - Applications for the use of water must be made on printed forms, signed by the owner, lessee, or agent, to be furnished at the Water Office, and the applicant must state fully and truly all the purposes for which water may be required, and must agree to conform to the ordinances concerning use of water, as a condition for such use.

SECTION 16. - USE BY APPLICANT ONLY. - No person supplied with water from the city mains will be entitled

to use it for any purpose other than stated in his application, or to supply in any way other persons.

SECTION 17. - ADDITIONAL APPLICATIONS. - Should the owner, lessee or agent of the premises desire an additional faucet or fixture, or wish to use the water for a purpose not stated in the original application, a new application must be made and a permit obtained at the Water Office.

SECTION 18. (as amended by Ordinance No. 34876, passed by the Council December 26, 1918.) PERMITS FOR RENEWAL OR CHANGE OF SERVICE. - When permits for renewal or change of service are granted, the old service will be shut off and disconnected at the main by the Bureau of Water Works. The charge for same to be $6.00, on an unpaved street and $15.00 on a paved street.

SECTION 19. - KIND OF SERVICE PIPE. - Service pipes of all sizes, within or without thepremises, whether for domestic, commercial or fire protection purposes, must be of galvanized iron; provided that cast iron or steel pipes when properly dipped may, with the approval of the Bureau of Water Works, be used for fire protection or elevator purposes.

SECTION 20 - INSTALLATION OF SERVICE PIPE FROM MAIN TO CURB. - The installation of all service pipes of more than one inch in diameter from the main to a point inside the curb line shall be made by the Bureau of Water Works and the charge therefor shall be the actual cost of labor and material furnished, together with an additional charge of 10 per cent for overhead expense. An advance payment of the estimated cost of the work shall be made before permit is granted for such installation.

SECTION 21. - STOP COCKS AND GATE VALES.

Twelve inches inside of the street curb, a flatheaded round-way stop-cock of approved pattern and material must beplaced, and protected by means of a suitable box, provided with an iron cover, which will be furnished by the Bureau of Water Works, without charge, upon written application of the owner, lessee or agent of the premises who must keep them in repair, and who shall be liable for any damage caused by the stop-cock box or cover not being inproper place or order. Services of one and one-half inches in diameter and larger must be provided with straight-way gate valves.

The service pipe from the main to the wall of the building must not be less than two feet below the grade of the street and the surface of the ground in the yard.

SECTION 22. - STOP AND WASTE-COCKS. - Just inside the basement wall a stop and waste-cock of approved pattern, protected from frost, must in all cases be placed in a convenient location, by means of which the pipes in the building may be drained at night during freezing weather. If the building is not provided with a basement, stop and waste-cock must be placed near the outside wall thereof.

Additional stop and waste-cocks should also be placed in sags and bends in pipes when they cannot otherwise be drained.

SECTION 23. - (as amended by Ordinance No. 38430, passed by the Council December 8, 1920.) REPAIR AND PROTECTION OF SERVICE PIPES OUTSIDE OF STREET LINES. - All service pipes within the premises of the consumer and from the property line to the curb line, where there is a curb line, must be kept in repair and protected from freezing

at the expense of the owner, lessee or agent, who must be responsible for all damages resulting from leaks or breaks in such service pipes within the premises.

SECTION 24. (as amended by Ordinance No. 38430, passed by the Council December 8, 1920.) LEAKS. - Where there is a leak under the street between the main and the curb cock, the Bureau of Water Works will make all repairs free of charge except when the leak is from an unused service, or one to a vacant lot, then the Bureau of Water Works will excavate and shut off the service at themain, backfill the hole and the Public Works Department will repair the paving cut. The owner of such lot will be obliged to take out a new permit and pay for a new service whenever he wishes water service to this lot; provided, however, that when a service pipe, or pipes, at the proper grade are damaged or destroyed by contractors or others in the performance of street work, or where service pipes are destroyed by electrolysis the person, contractor or company responsible for such damage or destruction shall be billed by the Bureau of Water Works, for the cost of repairing or replacing such service pipe, or pipes, on the basis of the cost to the City in time and material.

SECTION 25. DISCONNECTION OF PARTICULAR FIXTURE. - SHOULD IT BE DESIRED TO DISCONTINUE THE USE OF water for any special purpose, whether for bathtub, water closet, or other fixture, or by hose connection, for yard or sidewalk sprinkling, window or porch washing, stable or any other purpose, the branch pipe supplying water for the fixture or purpose must be disconnected and stopped with a metallic plug, or cap, all the faucets or hose connections removed, sewer connections properly sealed, and notice given in writing at the Water Office, before any

reduction will be made in the rates.

SECTION 26. TEMPORARY DISCONNECTION. - Should it be desired to discontinue the use of all water supplied to the premises for a period of not less than twenty days, notice in writing must be given and payment in full of all arrears (if any therebe), made at the Water Office. The water will then be turned off and turned on again on application without charge; but no remission of rates will be made for a period of less than twenty days, or without the notice prescribed in this section.

SECTION 27. SEPARATE CONTROL OF SERVICE. - The service pipes must be so arranged that the supply to each separate house or premises may be controlled by a separate stop-cock placed twelve inches inside the street curb and one person must pay for all the water used through said service for his own use or for the use of others to whom it may be accessible.

SECTION 28. SERVICE FOR EACH HOUSE. - Hereafter, a separate service direct to the tap in the main will be required for each house that is to be supplied with water; provided, that when there are two houses on an inside lot of ground or less, the service may be divided at the curb, and a separate stop-cock provided for each place to be so supplied.

SECTION 29. JOINT USE. - Where water is now supplied through one service to the several houses, families, or persons the Bureau of Water Works, may at its discretion either decline to furnish water until separate services are provided, or may continue the supply on condition that one person shall pay for all on the same service.

SECTION 30. DISCONTINUANCE ON ACCOUNT OF WASTE. - Water will not be furnished when there are defective or

leaking faucets, closets or other fixtures, or where there are water closets or urinals without self-closing valves, or tanks without self-acting float valves; and when such may be discovered, the supply will be withdrawn.

Water must not be allowed to run to waste through any faucets or fixtures in order to prevent freezing, or kept running at any time longer than necessary in its proper use. When such waste is found to exist, the water will be shut off from the premises.

SECTION 31. OUTSIDE CONNECTIONS. - No faucets will be allowed on the outside of any building excepting hose connections, which must be controlled with separate stop and waste-cock. No hose connections will be allowed on the sidewalks excepting those which have valves inside of the buildings, or which require keys for opening them. They must discharge upwards, so the water can be used for no other purposes than sprinkling.

SECTION 32. - PERMIT REQUIRED FOR CONNECTION WORK. - No plumber or other person will be allowed to make alterations in any conduit, pipe or other fixtures connecting with the city mains, or to connect pipes when they have been disconnected, or to turn water off or on any premises, without permission from the Bureau of Water Works.

SECTION 33. - PLUMBER'S REPORT. - Plumbers doing any work by which water may be drawn from the city mains, must make in writing a true and accurate report of work done, and deliver it at the office of the Plumbing Inspector in the Department of Public Works as soon as completed, or within twenty-four hours thereafter, and must describe the positions of the service pipe within the premises, and stop and waste-cock by reference to street and lot

corners, on blank forms to be furnished at the Water Office. On completion of work the water must in all cases be left shut off, and water will not be furnished until the work has been inspected and passed by the City Plumbing Inspector.

SECTION 34. - PENALTY FOR FAILURE TO REPORT. - Plumbers failing to perform their work, or properly report the same, according to the established rules and regulations or executing their work unskillfully, or the damage of the Bureau of Water Works, may be disbarred from making connection with the city mains.

SECTION 35. - PLUMBERS' BOND. The Bureau of Water Works shall exact a bond of not less than five hundred dollars ($500.00) to be executed by a reliable surety company, from each and every plumber or other person doing plumbing work in the City of Portland, Oregon, whereby water may be drawn from city mains, said bond to be first approved by the Mayor and Commissioner in charge of the Bureau of Water Works.

SECTION 36. - SHUT OFF FOR REPAIRS. - The water may at any time be shut off from the mains, without notice for repairs or other necessary purposes, and the Bureau of Water Works will not be responsible for any consequent damages. Water for steam boilers for power purposes will not be furnished by direct pressure from the city mains; tanks for holding an ample reserve of water shall always be provided by the owners of the boilers. While water is temporarily shut off fromthe mains, the hot water faucets should be kept open by the occupants of the premises, to allow the steam to escape from the water heaters, and should damage result to meter by reason of steam or hot water, the owner shall be charged for repairs.

SECTION 37. ACCESS TO PREMISES FOR INSPECTION. - The Bureau of Water Works shall have free access at proper hours of the day to all parts of the buildings and premises in which water may be delivered from the city mains, for the purpose of inspecting the condition of the pipes and fixtures and the manner in which the water is used.

SECTION 38. GENERAL SERVICE REQUIRED. - Water for bathtub closets, sprinkling elevators, fire protection, etc., will not be supplied to premises where family store or other rate is not also paid.

SECTION 39. SPRINKLING. - All persons intending to use water through hose for sprinkling yards or sidewalks, or for washing porches or windows, at places where water is not metered must file written application in the Water Office at the beginning of each year, or before commencing to so use water. Those who pay for sprinkling yards may sprinkle sidewalks bordering their premises without additional charge.

All rates for the use of water through hose are payable in full with the regular bill for the second or third quarter of the year, at the discretion of the Bureau of Water Works.

The rates prescribed for the use of water through hose, cover the entire fiscal year or any fraction thereof.

SECTION 40. - SPRINKLING STREETS. - The use of water through hose for sprinkling streets is forbidden under any circumstances.

SECTION 41. - APPLICATION. TIME FOR SPRINKLING. - If water is used for sprinkling purposes without first signing an application, as above, the water will be shut off from the premises and not turned on again until such application is signed, the annual charge for sprinkling is paid,

and payment of one dollar ($1.00) additional as turn-on fee is made at the Water Office. The hours for using water for sprinkling purposes shall be from 5 to 8 A. M. and 3 to 11 P. M. Provided, however, that the restrictions contained in this section shall not apply to the use of water for sprinkling purposes through metered service.

SECTION 42. WATER FOR BUILDING PURPOSES. - Water for building purposes will be furnished on the written estimate of the owner, lessee, or agent, or water inspector, of the brick, stone, plastering or other material, for which water is to be used. For material not stated inthe estimate the application must be renewed. Where water is allowed to be taken for building, construction or any other purposes except for street construction, the premises shall be liable for the charges, and water may be shut off from the premises until payment is made.

Water for building purposes may be obtained at meter rates on the following conditions:

(a) If the owner, lessee or agent applies for a permanent service of one inch or less in diameter and the same has been installed, then on application of the owner, a meter will be set and water furnished for building purposes at meter rates.

(b) If the owner, lessee or agent applies for a permanent service of more than one inch in diameter and the same has been installed, the owner, lessee or agent may obtain water for building purposes at meter rates by purchasing a meter as prescribed in Section 49 of this title.

(c) No water will be furnished at meter rates for street, sidewalk or sewer construction, nor will water

be furnished for building purposes at meter rates to other premises than those for which the permanent metered service is intended.

SECTION 43. - FIRE PROTECTION PIPES. - Pipes to be used only in case of fire, will be allowed within buildings on the following conditions. The fire protection pipes must be entirely disconnected from those used for any other purpose. The Bureau of Water Works may require a compound meter of approved pattern to be furnished, installed and maintained by the owner, lessee or agent thereof. The connection with the city main must be made as prescribed in Sections 19 and 20 of this title.

SECTION 44. - SERVICE OUTSIDE OF CITY. - The Bureau of Water Works may furnish water to places outside of the city boundaries which may not effect the city supply, and to charge therefor the rates fixed by ordinance. Such water consumer must install and maintain a water meter of approved pattern at his or her expense.

SECTION 45. - USE OF METERS. - The Bureau of Water Works may at any time attach a meter to, or detach a meter from, the service pipe of such places and of such places only, as they may deem best; and where water is supplied through meter to charge for the quantity of water used or measured at the regular established meter rates. When a meter gets out of order and fails to register accurately, the charge shall be according to the average quantity used daily, as shown by the meter when in order.

SECTION 46. - OWNERSHIP OF METERS. - Meters of more than one inch in diameter will be allowed only by special agreement and must be furnished by the owner, lessee or agent of the premises to be supplied, who must

maintain them in proper order.

All meters, except such as are required to be purchased by the water users shall be and remain the property of the city, and may be removed whenever the Bureau of Water Works may decide to do so.

SECTION 47. - USE OF PRIVATE WATER AND CITY WATER. - Buildings supplied with water other than furnished by the City of Portland, may obtain city water at meter rates, providing that no physical connection shall in any way, directly or indirectly, exist between the private system and the city's water system. When such connection is found to exist, the water will be shut off.

SECTION 48. - TESTING AND CORRECTION OF METERS. - When any consumer whose water supply is metered shall make a complaint that the bill for any particular month or quarter is excessive, the Bureau of Water Works will, upon request, have such meter reread and the service inspected for leaks. Should such consumer then desire that the meter be tested, he or she will be required to make a deposit of two dollars ($2.00) to cover the cost of making such test. The meter will then be tested. Should such meter show an error of over 5 per cent in favor of the Bureau of Water Works, the two dollars deposited will be refunded to the consumer, the meter will be changed and the bill adjusted accordingly. If the test of such meter should show an accurate measurement of the water, or should show an error in favor of the consumer, the two dollars deposited will be retained by the Bureau of Water Works to cover the expense of such test.

SECTION 49. - LARGE USERS. - Water for operating hydraulic elevators, fire protection pipes, and in certain

other cases where large quantities of water are used, to be determined by the Bureau of Water Works, may be required to be measured by meters to be approved by said Bureau.

Said meters to be furnished, installed and maintained by the users thereof, under the supervision of the Bureau of Water Works, and the water used to be charged by meter rates.

SECTION 50. - PENALTY FOR FAILURE TO COMPLY WITH RULES. - On failure to comply with the rules and regulations established herein, as conditioned to the use of water, or to pay the water rates in the time or manner hereafter provided, the water may be shut off until payment is made of the amount due, with one dollar ($1.00) in addition for the expense of turning water off and on.

SECTION 51. - PENALTY FOR TURNING ON WITHOUT AUTHORITY. - After the water has been shut off at the stop-cock at the curb , as provided in the preceding section, if it should be turned on by any person except an employe of the Bureau of Water Works, an excavation will be made in the street, the water shut off at the tap in the main, and not turned on again until the arrears, the cost of replacing the street pavement and five dollars ($5.00) for the expense of shutting the water off and turning it on are paid.

SECTION 52. WATER BILLS - DATES AND PLACES OF PAYMENT. - The bills for water, which will be delivered to all consumers quarterly, except as hereafter noted, will be due and payable on the dates stated below at any of the three City Water Offices.

ALBINA DISTRICT

No. 1. North of center line of Killingsworth Avenue on the first day of January, April, July and October of each year.

No. 2. Between center line of Killingsworth Avenue and north line of Beech Street, on the eleventh day of January, April, July, and October of each year.

No. 3. Between north line of Beech Street and south line of Schuyler Streets (west of East Thirty-seventh Street), on the twenty-first day of January, April, July and October of each year.

EAST PORTLAND DISTRICT.

No. 1. Between south line of Schuyler Street and center line of East Stark Street, and including Rossmere, Rose City Park, Beaumont, etc., on the first day of February, May, August, and November of each year.

No. 2. Between center line of East Stark Street and center line of Holgate Street, on the eleventh day of February, May, August and November of each year.

No. 3. South of center line of Holgate Street on the twenty-first day of February, May, August and November of each year.

WEST PORTLAND DISTRICT.

No. 1. North of center line of Ankeny and Washington Streets, on the first day of March, June, September and December of each year.

No. 2. Between center lines of Ankeny and Washington Streets, and center line of Jefferson Street, on the eleventh day of March, June, September,

and December of each year.

No. 3. South of the center line of Jefferson Street on the twenty-first day of March, June, September and December of each year.

SECTION 53. - WATER CHARGED TO PREMISES. - All charges for furnishing water within the City of Portland shall be chargeable to the premises where water is supplied. Whenever any charge for furnishing water to any premises shall not be paid within ten days after the same becomes due and payable, the Commissioner in charge of the Bureau of Water Works shall discontinue the service of water to such premises, and water shall not again be furnished thereto until all outstanding obligations for water supplied to such premises shall have been paid in full.

SECTION 54. - DATES OF COLLECTION. - All water accounts estimated at less than $20.00 for a period of three months, which estimate shall be based on the rates fixed by the Council, shall be collected quarterly after service, except the rates for sprinkling which shall be collected annually. All other water accounts shall be collected monthly after service.

SECTION 55. - APPLICATION IN WRITING. - Applications for permits to connect premises with the city water system, or request to turn off water, or to turn on water, shall in all cases, be in writing and signed by the owner, lessee or agent of the premises to be served.

ARTICLE IV - Penalty

SECTION 1. - PENALTY. - Any person violating any of theprovisions of this ordinance shall, upon conviction thereof, be punished by a fine not exceeding Five Hundred

Dollars ($500.00) or by imprisonment in the City Jail for a period not exceeding six months, or by both such fine and imprisonment.

Passed by the Council January 9, 1918.

GEORGE L. BAKER
Mayor of the City of Portland.

Attest:

George R. Funk
Auditor of the City of Portland.

ORDINANCE NO. 38380

An ordinance prescribing the rates to be charged for water by the City of Portland during the fiscal year beginning December 1, 1921, providing for the collection of water rates in the City of Portland and declaring an emergency.

The City of Portland does ordain as follows:

SECTION 1. That in pursuance of the estimates of the Commissioner of Public Utilities of the probable expense of maintaining and conducting the Bureau of Water Works during the fiscal year beginning December 1, 1921, and also the cost of contemplated alterations, improvements and extensions thereof, together with one year's interest on bonds and payment into the Sinking Fund, as provided by the Charter to be paid for out of the income from the sale of water, and in accordance with the recommendations of the Commissioner of Public Utilities, the following rates are prescribed as the monthly water rates of the City of Portland for the fiscal year, said rates to be payable after service.

DWELLINGS:

Family of ten persons or less, including all occupants.

Ordinary use of water for drinking or in cooking or washing, including one water closet - - - - - $0.50

Each person exceeding ten - - - - - - - - - - - .10

Bath tub - .10

Each additional bathtub - - - - - - - - - - - - .10

Each additional water closet - - - - - - - - - - .15

Urinal - .25

For water carried from faucet, each family - - - - .50

All services that have water coolers attached or have pipes arranged for cooling purposes, shall be metered.

DWELLINGS OCCUPIED BY MORE THAN ONE FAMILY.

Each family of ten persons or less, including one water closet, each family - - - - - - - - - $0.50

Bath for use by all, each family - - - - - - - - .10

Each additional water closet for use by all, each family - - - - - - - - - - - - - - - - - - .15

Urinal for use by all, each family - - - - - - - .25

Every dwelling equipped with steam or hot water heaters shall have a check valve of a type approved by the Superintendent of the Bureau of Water Works installed in the service pipe in such a way as to intercept any back pressure to the main.

(One person to pay for all water supplied through one service pipe.)

SPRINKLING THROUGH HOSE:

For each dwelling, store or other building, the rates for using water through hose for sprinkling yard or sidewalk, or for washing porches or windows, shall be according to the size of the ground pertaining thereto, including the space occupied by buildings, etc.; provided, that the rate for so using water at each dwelling, store or other building shall be not less than two dollars ($2.00) per annum, or fraction thereof, although there may be ser-

eral dwellings on one lot of ground or less:

1/2 lot or less or fraction thereof - - - $2.00 per annum

Not exceeding 1 lot and more than 1/2 lot, or fraction thereof - - - - - - 3.00 " "

Not exceeding 1 1/2 lot and more than 1 lot or fraction there of - - - - - - - 4.50 " "

Not exceeding 2 lots and more than 1 1/2 lots, or fraction thereof - - - - - 6.00 " "

Not exceeding 2 1/2 lots and more than 2 lots, or fraction thereof - - - - - - 7.50 " "

Not exceeding 3 lots and more than 2 1/2 lots, or fraction thereof - - - - 9.00 " "

For more than 3 lots, each lot or fraction thereof - - - - - - - - - - - 3.00 " "

A lot is fifty by one hundred feet, or 5000 square feet of ground, including the space occupied by the buildings.

APARTMENT HOUSES OR FLATS:

Each suite of apartments or flats, occupied by one family, same rates as a single dwelling occupied by one family.

Hotels, Boarding and Lodging Houses - -

Family rate - - - - - - - - - - - $0.50

Each bedroom for guest - - - - - - .10

Room with more than one bed, each bed - - .10

Bathtub, public, each - - - - - - .60

Bath tub, private, each - - - - - .10

Water closet, public, each - - - .40

Water closet, private, each - - - .15

Urinal - - - - - - - - - - - - - .50

Steam or hot water heater - $.50 to 2.00

Hose connection, see "Fire Protection" and "Sprinkling."

BARBER SHOPS AND BATH HOUSES:

Barber's chair $0.75

Each additional Barber's chair ..... .25

Bath tubs, each ..... .60

Swimming Tanks, see "Meter rates."

Water fixtures not for public use, same as in "Stores".

RESTAURANTS, OYSTER OR LUNCH COUNTERS, AND SIMILAR ESTABLISHMENTS:

Base rate $1.25

Also for each seat or place at table or counter ..... .05

Window jet, 1/8 inch inlet, upright ..... .50

Water fixtures, not for public use, same as in "Stores".

DRINKING OR OTHER WATER FOUNTAINS:

"Meter Rates".

STORES (GROCERY, DRY GOODS, SHOE AND SIMILAR STORES):

Ordinary use of water by six occupants or less ..... $.50

Drug Store ..... $1.00 to $1.75

Meat, poultry or fish store 1.25

Water closet ..... .15

Each additional water closet ..... .15

Urinal ..... .25

Steam or hot water heater ..... $.50 to 2.00

Hose connection, see "Sprinkling"

Window jet, 1/8 inch inlet upright ..... .50

Jet for soda fountain ..... .50

Connection for washing glasses ..... .50

Carbonator 1.00

Each occupant, exceeding six, in any kind of store ..... .10

Family living in same building as the store, same as if in separate building, see "Dwelling".

Small stores or similar shop, connected with a dwelling having access to water fixtures therein $0.25

BAKERIES:

For the average daily use of flour, for each bbl. 0.50

Water fixtures, etc. at same rates as in "Stores".

MANUFACTORIES, SUCH AS:

Sawmills, box, sash and other factories, carpenter, paint, and machine shops, where wateris not used in manufacturing, but only by the occupants:

Six persons or less ..... $.50 to $1.00

Each person exceeding six ..... .10

Steam engine, see "Steam Boilers".

Hose connections, see "Fire Protection".

Water fixtures at same rates as in "Stores".

MANUFACTORIES, SUCH AS:

Breweries, vinegar or soda manufactories, bottling or packing houses, cracker manufacturies and gas works, where water may be used in manufacturing as well as by the occupants:

"Meter Rates".

STEAM BOILERS:

Each horsepower, not exceeding ten $0.50

A ddditional for each horsepower exceeding ten and up to twenty ..... .40

Additional for each horsepower exceeding twenty and up to thirty ..... .30

Additional for each horsepower exceeding thirty ..... .20

STEAM OR HOT WATER HEATERS, OTHER THAN RESIDENCE:

According to the size of the building and the quantity of water used ..... $0.50 to $2.00

BLACKSMITH SHOP:

One forge - - - - - - - - - - - - - - - - -$.75

Each additional forge - - - - - - - - - - .25

Water fixtures at same rate as in "Stores".

GARAGES, HAVING WATER CONNECTIONS:

First car - - - - - - - - - - - - - - - - -$.50

Each additional car - - - - - - - - - - - - .10

STABLES:

One stall or space for stabling one horse or cow - - - - - - - - - - - - - - - - - $0.50

Each additional stall - - - - - - - - - - - .25

Each vehicle exceeding one - - - - - - - - - .10

Water fixtures at same rates as in "Stores".

Stall boarded up in such manner as to show they are not used will not be charged for. Stables without water pipes, but having access to hose connections or faucets of adjacent buildings will be charged full rates.

OFFICES, BANKS:

And like places of business on the ground floor of buildings - - - - - - - - - - - -$0.50

Each occupant exceeding six - - - - - - - - - .10

Water fixtures, if not accessible to the public at the same rate as in "Stores".

Steam or hot water heaters - - - - - - - - $0.50 to $2.00

OFFICE BUILDINGS AND BLOCKS:

Base rate - - - - - - - - - - - - - - - - - -$0.50

Each room above ground floor - - - - - - - - - .10

Water closet, each - - - - - - - - - - - - - .40

Urinal, each - - - - - - - - - - - - - - - - .50

Steam or hot water heaters - - - - - - - - $.50 to $2.00

Hose connection, see "Fire Protection".

CHURCHES

Base rate $0.25

Water closet ..... .05

Each additional water closet ..... .05

Urinal ..... .10

Motor for organ ..... "Meter Rates".

Baptistry ..... "Meter Rates".

MOVING PICTURE THEATRES:

And like places ..... $0.50 to $2.50.

Water fixtures, at same rates as in "Hotels".

BILLIARD AND POOL ROOMS:

According to number of tables ..... $0.50 to $5.00

Water Fixtures, at same rate as in "Hotels".

FEDERAL, STATE AND COUNTY BUILDINGS:

Hospitals, asylums, public schools, colleges, acadamies, boarding schools, medical and private schools, business colleges, kindergartens, theatres, public halls, and buildings, bowling alleys, bicycle rinks, shooting galleries, libraries, swimming baths, motors, laundries, filling cisterns, street railway stations, etc. ..... "Meter Rates"

NUMBER OF OCCUPANTS:

In all stores, manufactories, offices, banks, and other places (except dwellings, hotels, lodgings, schools and buildings, rates according to number of rooms). Where the number of occupants exceeds six persons, the charge for each person in excess of six persons, will be in addition to the schedule rate $0.10

BUILDING AND CONSTRUCTION PURPOSES:

For each 1000 brick laid, including water for mortar $0.10

For wetting each barrel of lime for other purposes than laying brick ..... .10

For wetting each barrel of cement ..... .05

For wood fibre per ton $0.25

For settling earth in ordinary sewer or pipe trench, per 100 cubic feet of earth settled - .05

Minimum charge per block 1.00

For top dressing macadam street, per 1000 sq. yards 2.50

SWILL AND SLOP HOPPERS:

For each slop hopper with outlet or waste pipes two or more inches in diameter, and supplied with water direct from faucets or in any manner other than buckets ..... "Meter Rates"

WATER BY MEASURE (TO BE COMPUTED MONTHLY).

Wherever water is supplied by meter to any premises the minimum rate of any such place shall not be less than $0.50 for any one month, excepting that no less charge than $3.00 per month will be made for an elevator and for all water used in excess of the above amounts, meter rates will be charged.

All services that have water coolers attached or have pipes arranged for cooling purposes, shall be metered.

METER RATES (INSIDE CITY BOUNDARIES):

For the first 20,000 cubic feet of water, 8 cents per 100 cubic feet.

For all over 20,000 cubic feet of water, 6 cents per 100 cubic feet.

For services supplying swimming tanks which are used in common by numbers of persons, where Bull Run water is used exclusively, the rate shall be the regular meter rates provided in this ordinance less a discount of 10 per cent on the total consumption each month. This rate is further conditioned on the operators of such swimming tanks conforming to such rules or ordinances governing the cleansing and frequency of changing water,

in such tanks as may now or hereafter be adopted by the City of Portland. Failure to conform to such rules or ordinances shall prohibit the swimming tank operator from participating in this rate, and in such case the regular meter rates shall apply.

RATES OUTSIDE CITY BOUNDARIES:

For dwellings outside of the city boundaries the rates for bath and water closets shall be $0.25 each, and the minimum rate for each dwelling or other places supplied with water outside of the city boundaries whether by meter or flat rate, one dollar ($1.00) per month.

METER RATES (OUTSIDE CITY BOUNDARIES)

First 600 cu. ft. water	$0.16 2/3	per 100 cu. ft.
Next 20,000 cu.ft. water	.12 1/2	" " " "
All over 20,600 cu. ft. water	.10	" " " "

ELEVATORS -- EMERGENCY RATE

Should the use of water be discontinued and an elevator be operated by steam or electric power, the water pipe may remain in connection, for use in case of accident, by the payment of $2.00 permonth for such service. The gate at the connection of the water pipe will be closed and sealed, but if it is desired to use water at any time, the seal may be broken and the water turned on by the owner or lessee of the building, who shall at once notify the Water Office as to the time when this was done, so that a reading of the meter may be taken. When the use of water is discontinued, notice of the time when it was shut off shall be given promptly in order that another reading of the meter may be taken and the gate again sealed.

For the water so used in any one month, payment must be made according to the meter rates charged for water; provided, however, that if the seal is broken during the month, the additional payment for the water used shall not be less than $3.00 per month.

SECTION 2. The provisions of this ordinance shall be in force and effect from and after the first day of December, 1921.

SECTION 3. Inasmuch as this ordinance is necessary for the immediate preservation of the public health, peace and safety of the City of Portland in this: That it is necessary to provide equitable rates for consumers of water within the City of Portland to be effective at the beginning of the ensuing fiscal year, therefore an emergency is hereby declared and this ordinance shall go into force and effect from and after its passage by the Council.

Passed by the Council, November 29, 1921.

GEORGE L. BAKER

Mayor of the City of Portland

Attest:

GEORGE R. FUNK

Auditor of the City of Portland

RESERVOIRS, STANDPIPES AND TANKS

The following is a list of the various reservoirs, standpipes and tanks located in different parts of the City:

Reservoirs	Elevation	Capacity Gallons	Kind of Construction
1	411.6	12,000,000	Brick
2	229.2	20,500,000	Concrete
3	299.5	16,400,000	"
4	229.5	17,600,000	"
5	411.6	49,000,000	"
6	305.0	75,000,000	"
Standpipes			
Vernon	343.62	1,000,000	
St. Johns	247.1	360,000	
Burlingame	635.0	114,800	
Council Crest	1096.5	60,000	
Tanks			
Kings Heights	465	200,000	
Mt. Tabor	590	200,000	
Portland Hts.	865	600,000	
Willametts Hts.	445	60,000	(All of Concrete Construction)
South Portland	475	60,000	

In addition to the above there are seven small tanks located in the Linnton District.

DISTRIBUTING ZONES

The Low Service District includes all sections of the City at elevations of less than two hundred and

twenty-nine feet above base of city grades. The East Side Low Service district is furnished water by gravity from Reservoir No. 2, located at East Sixtieth and Division Streets, and the West Side Low Service district is furnished by water by gravity from Reservoir No. 4, located at the head of Jefferson Street in Washington Park.

The Intermediate Service district includes that section of the East Side above two hundred and twenty-nine feet and below three hundred and five feet. This district is furnished water from Reservoir No. 6, located at the head of Hawthorne Avenue.

There are two High Service districts. They include those sections of the West Side above two hundred and twenty-nine feet and below two hundred and ninety-nine feet, and those sections of the East Side above three hundred and five feet and below four hundred and eleven feet. On the West Side water is furnished from Reservoir No. 3, located in Washington Park, and on the East Side water is furnished from Reservoirs No. 1 and 5, located on Mt. Tabor.

PUMPING SYSTEM

Water for higher elevations, such as Willamette Heights, King's Heights, St. Francis Hill, Westover Terraces and Portland Heights is supplied by water power and electric pumps, located at the powerhouse between Reservoirs No. 3 and 4 in Washington Park.

Water is supplied to Council Crest standpipe (elevation 1096 feet) by automatic electric pumps located on Talbot Road at Portland Heights tank. Water is supplied to the higher sections of Mt. Tabor by water power and emergency electric pumps located in the gate chamber at Reservoir No. 2 at East Sixtieth and Division Streets.

RECEIPTS AND DISBURSEMENTS

The following information concerning the Bureau of Water Works for the fiscal year ending November 30th, 1921, is herewith submitted:

Available Balance in Water Fund, Nov. 30, 1920 - $40,399.96

RECEIPTS

Net receipts from Water Sold	$999,268.57
Interest on Daily Balances	2,091.94
Transferred from General Fund, Temporary Loan	182,500.00
Sale of Real Estate	8,040.00
Sale of Material	6,308.82
Sale of Liberty Bonds and Interest	75,876.56
Sale of $500,000 Water Bonds and Interest	394,765.54
Prize- Rose Festival Parade	60.00
Received from Water Main Assessments	67.50
Received from Repairs to Mains	2,914.86
Refund of Commission on Bonds	375.00
Received from use of Trucks	105.80
	$1,712,776.55
Material drawn from Stock in excess of this year's purchase	15,150.57
	$1,728,596.13
Repaid to General Fund balance of Temporary Loan amounting to $252,500 plus $7,096.13 interest	259,596.13
	$1,468,554.44

DISBURSEMENTS

Brought forward		$1,468,554.44
Interest on Bonds	$300,845.00	
Transferred to Sinking Fund	135,880.00	
Operation, Maintenance, etc.	340,686.50	
Construction, Extension of mains, Improvements, etc.	615,280.36	
Tools & Equipment purchased	15,634.93	
Meters Purchased	10,324.59	
Refund of Meter Deposits	178.00	
Purchase of Real Property	13,110.00	1,431,939.38
Available balance in Water Fund, Nov.30,1921		36,615.06

PRESENT BONDED INDEBTEDNESS

yable out of Water Fund:

ly 1, 1893	July 1, 1923	5%	Const. of Bull Run System	$2,200,000
n. 1, 1911	Jan. 1, 1936	4%	" " additional pipe line and purchase of property	500,000
r. 1, 1911	Mar. 1, 1936	4%	"	500,000
t. 1, 1911	Oct. 1, 1936	4%	"	500,000
r. 1, 1912	Mar. 1, 1937	4%	"	500,000
v. 1, 1912	Nov. 1, 1937	4%	"	250,000
ne 1, 1913	June 1, 1938	4%	Const. of additional water mains and purchase of property	242,000
g. 1, 1913	Aug. 1, 1938	4%	"	75,000
pt 1, 1913	Sept 1, 1938	4%	"	250,000
v. 1, 1913	Nov. 1, 1938	4%	"	22,000
c. 1, 1913	Dec. 1, 1938	4%	"	285,000
b. 2, 1914	Feb. 2, 1939	4%	"	175,000
c. 1, 1914	Dec. 1, 1939	4%	"	135,000
r. 1, 1915	Apr. 1, 1940	4%	"	460,000
r. 1, 1916	Apr. 1, 1941	4%	"	125,000
r. 1, 1917	Apr. 1, 1942	4%	"	75,000

				Brought forward	$6,294,000
Feb. 1, 1919	Feb. 1	1944	4%	Const. of Additional water mains and purchase of property	100,000
July 1, 1921	July 1	1946	4%	Const. New Vernon Standpipe and New Headworks etc.	500,000
Apr 1, 1913	Apr. 1,	1933	5½%	Const. Linnton Water System	100,000
May 1, 1915	Serial		5½%	"	46,000
					$7,040,000

Payable out of Bonded Indebtedness Interest Fund as per Charter Amendment of June 3, 1907. Amended June 7, 1919 and November 8, 1910.

Jan. 1, 1909	Jan. 1,	1934	4%	Const. additional pipe line and purchase of property	250,000
June 1, 1910	June 1	1935	4%	"	500,000
Sept 1, 1910	Sept 1,	1935	4%	"	500,000
					$8,290,000

($700,000 retired January 1, 1917)
($252,000 retired May 1, 1921)

Ordinance No. 40140 passed October 26th, 1921 authorized the sale of Water Bonds in the amount of $200,000.00, but to date sale has not been consumed.

INVENTORY OF REAL PROPERTY

NAME	LOCATION	AREA IN ACRES	VALUE OF LAND	VALUE OF IMPROVEMENTS
Old Reservoir Site	All of Blk.32 Caruthers Add. Broadway & Lincoln	.92	$100,000	$1,000
Portland Heights Reservoir Site	Blk. "K" Greenway Add.	.51	5,000	11,114
Repair & Meter Shop	SE¼ of Blk 150 Portland 4th and Market Sts.	.25	125,000	1,000
East Side Water Office	Lot 8, Blk 139 E. Portland E. 7th and Alder Sts.	.11	8,500	23,415
Former Pumping Sts.	Tract Ft. Sherman St.	1.55	12,000	
Bull Run Conduits Nos. 1 and 2	Tract Ft. Stevens St.	.60	7,500	
Reservs. No. 3 & 4	Adjoining Washington Park	63.10	189,000	569,000

NAME	LOCATION	AREA IN ACRES	VALUE OF LAND	VALUE OF IMPROVEMENTS
Water Tanks	Willamette Heights	.76	$ 500	$2,500
Albina Warehouse	West 180 Ft. of Blk 73 Albina, Randolph Loring	1.00	40,000	5,000
Albina Water Office Shop and Garage	Part of Blks 25 & 26 Albina, Russell Sts. Between Williams & Rodney	.29	7,000	32,310
Old Highland Tanks Site	Lot 4, Blk 6, Meagly Highland, Union Ave. Bet Wygant & Going Sts.	.10	2,500	
Old Tank Site Brown's System	E. 60th & Foster Road	.08	700	
Old Tank Site Brown's System	Lot 24, Blk 1, Pomona Addition	.08	300	
Old Tank Site Brown's System	Tract adjoining school Park Addition	.01	50	
Old Tank Site Brown's System	Lot 5, Blk 22, Saginaw Heights	.10	300	30
New Vernon Stand pipe	Tract E. 20th and Prescott	1.82	11,000	128,516.77
Palatine Pumping Sta.	Rivera	18.15	60,000	10,000
High Service Reser voir No. 1	Mt. Tabor	5.75	28,000	134,000
Low Service Reser voir No. 2	Mt. Tabor	10.00	50,000	121,000
Resvs. Nos. 5 & 6	Mt. Tabor	45.17	150,000	690,000
Standpipe	Near Lusteds	.50	100	
Headworks	Clackamas & Multnomah Counties	4,697.80	172,561	231,514.44
Standpipe	Council Crest	.16	900	2,200
Pump Station	Old Kinzell Park Pump Sta. E. 76 & Yamhill	1.00	2,000	200
Tract for Water	Ext. 19th St. 100' S. of Spring St. Part Lot 7, Blk. 104 Grovers Add.	.025	500	
Reservoir No. 2	S 60' L 32 & 33 Blk 20 Linnton 1st Addn.	.07	150	2,890
Reservoir No. 3	Lower Whitwood, Linnton	.23	500	2,890
Reservoir No. 4	Upper Whitwood, Linnton	.23	500	3,102

NAME	LOCATION	AREA IN ACRES	VALUE OF LAND	VALUE OF IMPROVEMENTS
eservoir No. 6	Part Lot 8, Blk 28 Willalatin, Linnton	.23	$ 500	$2,890
eservoir No. 7	Lower Willbridge, Linnton	.22	475	3,102
eservoir No. 8	Upper " "	.13	280	1,440
hitwood Court Pump	Lot 1, Blk 24 Whitwood Court, Linnton	.60	1,475	212
t. Johns Pump	Lots 1-2-7-8, Blk 14 James Johns 2nd Addn.	.44	2,500	2,250
t. Johns Tank and Standpipe	Lots 1-2-7-8, Blk 2 Adams Addn. to St. Johns	.44	2,500	29,668.66
ings Hts. Resv.	Lots 1-2 Blk 21, King's Heights		Easement	7,671.
urlingame Standpipe	Lots 3-4 Blk 32 Burlingame		"	16,057
abor Hts. Tank	N. Slope, Mt. Tabor		Owned by Park Bureau	7,105
. Portland Tank	Bancroft & West Sts.		In Street	2,500
. Side Storage Yard	Lots 1-2-7-8 Blk 164 City of East Portland	.46		12,000

SERVICES

At the end of the fiscal year there were 65,635 services connected to Portland's water system. Below is a classification of these connections, showing the number actually using water and the number vacant or under construction on November 30, 1921; also a statement showing the number of services supplied by each subdivision of the distribution system:

CLASSIFICATIONS

	Active	Vacant and under const.
Dwellings (including flats)	54,747	1,906
Dwellings and Stores	790	9
Apartment Houses	371	2
Hotels, Lodging and Rooming Houses	658	14

	Active	Vacant and under const.
Brought forward	56,566	1,931
Stores, Restaurants, etc.	2,728	266
Churches	196	7
Schools (public and private)	139	2
Office Bldgs. and Banks	155	2
Manufactories	320	19
Laundries	51	5
Elevators	171	30
Municipal services exclusive of fire hydrants, drinking fountains, etc.	152	
Fire protection (unmetered)	529	
Garages	330	50
Private water companies	33	
Lawn services and vacant lots	43	55
Miscellaneous	1,640	215
Total	63,053	2,582
Total active, vacant and under construction		65,635

DISTRIBUTION SYSTEM

EAST SIDE

Low Gravity	8,554
Intermediate Gravity	13,006
High Gravity, S. of Division St.	7,264
High Gravity, N. of Division St.	6,916
Vernon Standpipe	16,081
Mt. Tabor Pump	213
Gresham	1
Carried forward	52,035

Brought forward		52,035
WEST SIDE		
Low Gravity	7,817	
High Gravity	4,136	
Intermediate pump S. Of Jefferson St.	407	
Intermediate pump N. of Jefferson St.	285	
Portland Heights Pump	643	
Council Crest Pump	111	
Burlingame Standpipe	125	
Linnton Pump	76	13,600
Total		65,635

The above statements show a net increase during the year of 2535 services. There is reflected also a slight increase in the percentage of occupancy. During the past year connections were made for 3069 new premises. Note that this 534 in excess of the net increase. The difference may be accounted for in abandoned services and the replacing of several small buildings by a larger one supplied by one service.

Of the total number of services to new premises 1857 were installed by the Bureau and 1212 were connected to curb services previously installed.

For the installation of services this Bureau collected during the year, the sum of - - - - - - - $49,024.05.
The cost of installation work amounted to - - - - 38,569.48
$10,454.57

This provides a substantial amount for service maintenance.

PRIVATE WATER COMPANIES

The sale of water to small corporations and municipalities in the vicinity of and tributary to the City of

Portland is rapidly increasing. There are thirty-two Companies now supplied with water by the City, and others are taking the necessary steps to secure water. The Companies are bound by agreements which restrict the use and recognize the prior and superior rights of the citizens of Portland to the water. They are required to pay the regular rates prescribed for users outside of the City boundary. In this manner the City is enabled to add materially to its revenue by disposing of surplus water without obligating itself to continue the Supply should the water be needed by the City. The following is a list of the Companies supplied and the amount paid by each during the past year.

Abernethy Heights Water Company	$827.30
Ardenwald Water Company	329.57
Barwell Park Water Company	286.26
Base Line Water Company	246.80
Bertha Water District	38.81
Capitol Hill Water Company	943.00
East Mt. Tabor Water Company	28.76
Englewood Park Water Company	411.70
East 72nd Street Water Company	31.65
Gilbert Water District	1,254.30
Green Hills Water Company	239.23
Gresham	2,971.87
Hazelwood Mutual Water Company	794.00
Kelly Claim Water Company	214.26
Kendall Water & Improvement Company	453.38
Kilpatrick Collins Water Users Ass'n.	829.30
Luther Place Water Company	203.78
Maplewood Water District	913.80
Milwaukie	4,172.63
Multnomah Co-op. Water Ass'n.	3,346.30
Carried forward	$18,535.30

Brought forward	$18,535.10
Mt. Scott Water Company	104.03
Mutual Water Company	203.88
Prescott Mutual Water Company	14.39
Rose City Water Company	188.59
Russellville Water Company	395.46
Section Line Water Company	493.95
Stanley Mutual Water Company	582.70
Jos. A. Strowbridge Estate Company	34.31
Sylvan Water District	138.40
Van Ness Water Company	32.17
Villa Avenue Base Line Mutual Water Co.	328.69
	$21,051.67

BRANCH OFFICES AND COLLECTION AGENCIES

For the convenience of the consumers this Bureau has established branch offices and pay stations at central points throughout the City. This enables the consumer to pay his bill before it becomes delinquent without spending the time or necessary car fare to come to the main office at the City Hall. That this is a real convenience is evidenced by the number of bills paid at the various stations, as shown in the list below:

	Number of Bills	Amount
East Portland Branch, 123 E. 7 St.	16,262	$42,242.29
Albina Branch, 296 Russell St.	19,045	43,742.14
Branch office total	35,307	$85,984.43

COLLECTION AGENCIES

	Number of Bills	Amount
Piedmont Pharmacy Union Avenue and Alberta Sts.	3,071	$6,886.94
University Drug Company Fiske and Lombard Streets	2,343	5,253.90
The Drug Shop E. 80th and Glisan Streets	3,209	7,981.88
Millard Avenue Drug Store 7140 - 55th Avenue	1,522	3,981.65
Beaver Pharmacy East 13th and Umatilla Streets	4,228	9,887.16
Currins for Drugs 105 Philadelphia Street	5,658	13,974.14
Folger Martin Drug Company Mississippi and Killingsworth Ave.	926	1,863.92
Lents Pharmacy 92 and Foster Road	3,905	9,288.11
Laurelhurst Pharmacy East 39th and Belmont Streets	2,872	6,288.49
Woodstock Pharmacy 4619 Woodstock Avenue	1,155	2,900.65
Rose City Park Pharmacy East 57th and Sandy Road	1,249	3,139.05
M. A. Ernst 1156 Union Avenue, North	2,032	4,756.78
Glisan Street Pharmacy East 28th and Glisan Streets	1,140	2,534.44
A. G. Woolworth 646 Milwaukie Street	230	462.61
Fryer's Pharmacy (Former Agent)	2,678	6,422.99
	36,218	85,622.71
Branch offices as above	35,307	85,984.43
	71,525	$171,607.14

METERS IN SERVICE NOVEMBER 30th 1921

OWNED BY THE CITY

Kind	5/8"	3/4"	1"	1½"	2"	3"	4"	6"	8"	Total
Trident	8038	518	350	14	17					8937
Worthington	5402	156	147							5705
Crown	96	8	4		4					112
Crest				1	2	1	1			5
Nash	83	35	23							141
Hersey	1060			1						1061
Badger	50									50
Buffalo	32									32
Arctic	249									249
Keystone	311	4	1							316
Empire	43	8	6	1						58
Standard	5									5
King	28									28
Watch Dog	2443	20	5							2468
Enarc	2									2
Niagara										
Trident Comp.										
Empire "								1	1	2
Hersey "										
Gem "										
Protectus "										
Dector "								1		1
Watch Dog "										
Totals	17,842	749	536	17	23	1	1	2	1	19,172

OWNED BY CONSUMER

Kind	5/8"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	Total
Trident	312	4	26	63	54	7	1			467
Worthington	58	1	3	4	3					69
Crown					1		2			3
Crest				40	115	18	6	2		181
Nash	1			1						2
Hersey	323	4	9	19	9					364
Badger	43									43
Buffalo										
Arctic										
Keystone										
Empire										
Standard										
King										
Watch Dog	86		2							88
Enarc	13	2	3	5						23
Niagara	3									3
Trident Com.				23	98	45	22	7	2	197
Empire "							1			1
Hersey "					26	22	5	7		60
Gem "						1				1
Proctectus"						1	10	29	1	41
Detector "						1	2	1	1	5
Watch Dog "							1			1
Totals	839	11	43	155	306	95	50	46	4	1,549

TOTAL OF EACH SIZE IN USE

	5/8"	3/4"	1"	1½"	2"	3"	4"	6"	8"	Total
ty	17,842	749	536	17	23	1	1	2	1	19,172
ivate	839	11	43	155	306	95	50	46	4	1 549
otals	18,681	760	579	172	329	96	51	48	5	20,721

COST DATA

	Number	Total Cost	Unit Cost
Installing Meters	1,124	$5,290.81	$4,707.00
Changing Meters	1,070	833.76	779.00
Removing Meters	201	118.47	589.00
Repairing Meters	1,251	2,529.90	2,022.00

Included below is a list of all meters repaired by kind and size, showing the avera e cost per meter. This may be of value in comparing he cost of repairing the various kinds of meters in the s rvice.

ind	5/8"			3/4" and 1"			Over 1"		
	No.	Amt.	Av.	No.	Amt.	Av.	No.	Amt	Av.
rident	423	1,057.19	$2.50	114	$395.27	$3.47	2	$9.40	$4.70
orthington	424	679.41	1.60	30	86.92	2.90			
atch Dog	181	204.38	1.13	3	2.25	.75			
ersey	44	51.95	1.18						
eystone	8	12.45	1.56						
narc	2	4.80	2.40	1	1.00	1.00			
ash	2	1.55	.77	4	7.45	1.86			
rest							1	1.00	1.00
adger	1	.75	.75						
mpire	2	1.25	.62	5	4.65	.93			
retic	3	3.75	1.25						
ing	1	4.48	4.48						

EXTRACTS FROM ANNUAL REPORT OF

CHIEF ENGINEER, BUREAU OF WATER WORKS FOR YEAR ENDING

NOVEMBER 30th, 1921.

x x x x x x

DISTRIBUTION SYSTEM

The tabular statement following shows the water mains extensions completed during the year 1921:

Mains Laid by Department Forces

Size	Miles
1-inch	0.047
2-inch	12.742
4-inch	0.393
6-inch	2.186
8-inch	3.836
12-inch	1.146
16-inch	1.042
Total	21.392

Mains Acquired by Purchase

Size	Miles
8-inch	0.687
16-inch	0.180
Total	0.867

PIPES REMOVED OR ABANDONED DURING THE FISCAL YEAR ENDING NOVEMBER 30th 1921.

Size	Miles
1/2 inch	0.081
3/4 inch	0.606
1 inch	1.406
1¼ inch	0.292
1½ inch	0.309
2 inch	1.977
2½ inch	0.184
3 inch	0.175
4 inch	0.204
6 inch	0.098
14 inch	0.043
16 inch	0.178
Total	5.563

Recapitulation

Total mains laid by Department forces	21.392	Miles
Total mains acquired by purchase	0.867	"
Total	22.259	"
Total mains abandoned or removed	5.563	"
Net increase during year	16.696	"

Summary

	Miles
Total Miles of mains in use less than 4-in. Diameter	181.060
" " " " " " 4-in. Diameter & larger	608.908
TOTAL MILES OF MAINS NOW IN USE	789.968

The above does not include Bull Run Conduits Nos. 1 and 2 from the Headworks to Mt. Tabor to the reservoir, amounting to a total of 56.29 miles ranging from 24 inches

to 52 inches in diameter.

EXTENSIONS PROPOSED FOR YEAR 1922

Due to the fact that cast iron pipe is rapidly approaching pre-war prices, certain necessary improvements to the distribution system which have been held in abeyance during the past few years will come up for consideration. None of these are of great magnitude either as to size or length. The construction of the Vernon Standpipe and the removal of the old Vernon tank to St. Johns have assured a reasonable supply for those districts. The supply to the Sellwood district should be increased either by the erection of a standpipe or the laying of an additional pipe line to this section. This subject will be given attention during the coming year. In other regards the distribution system is in fair condition.

EXTENSIONS PROPOSED BY NATIONAL BOARD OF FIRE UNDERWRITERS

The following table, contained in the 1917 report of the National Board of Fire Underwriters, published in October of that year, shows extensions recommended as follows:

Recommended Mains.

Size Inches	Along	From	To
16	Morrison Street	Front Street	Chapman Street
12	E. 8th & Everett St.	E. Ash Street	E. 7th Street
12	E. Pine Street	E. 28th Street	E. 15th Street
12	E. Alder Street	E. 10th Street	E. 15th Street
12	E. Morrison	Grand Avenue	Union Avenue

Size Inches	Along	From	To
12	E. Salmon Street	E. 10th Street	Grand Avenue
12	E. Lincoln St. Grand Ave and Beacon St.	E. 6th Street	Milwaukie A venue

The first named main is the only one of importance and it is planned to lay this when repairs to the pavement on this street become necessary. The others are reinforcing mains recommended for the purpose of improving the fire protection, which is not extremely bad at present.

x x x x x x x

HIGH PRESSURE FIRE PROTECTION SYSTE

The construction of the High Pressure Fire Mains in the congested business district of the City, for which a bond issue was authorized in 1907, has been held in abeyance. Only $150,000 is available for this purpose by this bond issue, this sum being far inadequate to build a suitable system. The construction of such a system has therefore been postponed until a sufficient sum is available.

PUMPING STATIONS

	Style of Motor	Elevation	Elevation supplied	Gallons per Day Capacity
City Park	Hydraulic	230	445	1,000,000
City Park	"	230	865	500,000
City Park	Electric	230	865	500,000
City Park	"	230	445	1,000,000 #
City Park	"	230	445	1,000,000 #
Council Crest at Greenway Portland Hts.	" (Automatic)	865	1096.5	220,000
do do	" "	865	1096.5	500,000
Fulton	" "	230	635	650,000
Fulton	" "	230	635	500,000
Reservoir No. 2	Hydraulic	230	590	216,000
Linnton	Electric (Aut.)	190	537	108,000
Whitwood	" "	190	565	108,000

(#) These two pumps may also be run in series, pumping one million gallons per day to elevation 865.

VENTURI METERS

The following is a list of the Venturi Meters in the System. These meters are performing very efficient service in showing "peak load" conditions in the various portions of the distribution system throughout the City.

Size	Type	Location				Installed	Dist. Supplied
52"	Venturi	Headworks				1911	Conduit No. 2
44"	"	Mt. Tabor Reservoir			#1	1911	Reservoir No. 5
30"	Premier	"	"	"	#5 June.	1916	Highland Main
24"	"	"	"	"	#1	1907	" "
30"	"	"	"	"	#1 June.	1914	Lents District
30"	"	Reservoir No.	6		July	1911	E. Side Intermt.
24"	"	"	"	2	Jan.	1916	Low Gravity E.Side
6"	"	"	"	2	"	"	Mt. Tabor Heights
24"	"	"	"	4	June.	1915	Low Gravity W.Side
18"	"	"	"	3		1915	High " " "
12"	"	"	"	4	Dec	1915	Portland Heights
12"	"	"	"	4	"	1915	Kings Heights
10"	"	"	"	4	"	"	Willamette Hts.
8"	"	"	"	4	"	"	South Portland
10"	"	Fulton Park			Apr.	1916	Burlingame Stand-pipe
6"	"	Greenway Reservoir			March	1916	Council Crest

REGULATING VALVES.

Owing to the contour of the City it is necessary to regulate the pressure on some of the systems to avoid excessive head for domestic supply.

The following statement shows the size, location

and pressure on both the high and low pressure sides of these regulators:

Location of Regulator	Size	Elev.	High	Low	Kind
E. 38th and Woodstock	8"	206.0	78#	22 25#	Mueller
E. 33rd & Ainsworth	3½"	146.0	82	45	"
E. 13th & Holman	8"	160.8	78	38-40	"
5th & Witham	4"	387.4	105	40	"
Kelly & Kuster	3½"	252.0	95	40	"
17th & Elizabeth	4"	640.0	100	40	"
Myrtle & Chapman	4"	512.0	93	35	"
21st & Clifton	3½"	497.5	100	40	"
Chula Vista & Hermosa	4"	654.8	95	30	"
Macleay & Melinda	4"	506.0	90	30	"
Fairview & Rutland	3½"	492.0	95	40	"
Fairview & Alley	4"	639.7	100	40	"
Davenport & Alpine	1½"	584.7	122	40	"
Mill Street - Whitwood Court	6"		61	30	Ross
Springville Road & Whitwood Court	6"	423.1	52	28	"
Lance Ave. and Abington	2"	199.0	98	48	
Willamette Bvd. end S P & S Bridge	8"	149.5	82	40	Mueller
Glen Ave. and Harbor Blvd.	2"		125	35	"
Lombard St. W. end S P & S Bridge	8"	140.7	86	44	"
Vista Ave & Spring St	6"	597.6	110	47	"
Portland Hts. Resvr	2"	864.6	96	50	"
Waldemere	3"		87	40	
Chesapeak & Melville	2"	771.36		52	
Dosch Road and Sonora Ave.	2"	559.12	140	22	Mueller
Fairmont Blvd. 1050' N. of W. L. Elmonica Street	2"	887.22	92	15	"
Main Street and Vista Ave	4"	251.05	110	40	"
4th & "C" Streets (Linnton)	4"	204.8		35	Ross

These regulators are inspected at least once a week and kept in repair and adjustment.

AUTOMATIC PRESSURE RECORDING GUAGES.

Bristol Recording Pressure Guages are maintained at points indicated in the tabulated statement following. The records from these guages have been of valuable assistance in determining low pressure areas and general pressure conditions of the several systems throughout the City. These records also indicate the exact time of serious breaks, and shut downs, as well as recording the time when the service was restored. The charts are filed as part of the office records.

The following table shows the location of these guages.

Bristol Guages	Elevation	Pressure
Vernon High	251.52	70 lbs.
Vernon Low	251.53	40 "
Russell 297 Sacramento	157.82	64 "
Portland Heights		275 "
N. & S. Portland Pump		125 "
123 E. 7th Street (Alder)	43.24	81 "
Engine No. 31- 67 & 46 Ave.	234.10	75 "
Northern Sub.	148.04	85 "
Engine No. 29 - 13 & Tenino	122.76	47 "
City Hall High	66.00	97 "
City Hall Low	66.00	67 "
St. Johns Shop	156.19	37 "
Engine No. 27- 82nd and Burnside	259.35	66 "
Engine No. 29 E. 8th and Dekum	139.18	49 "

BULL RUN WATERSHED

Table showing "Run-Off" by years - Discharge in Second Feet

	1912			1913			1914			1915			1916		
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
January	10400	160	2090	4610	489	1300	5230	274	1470	2480	285	781	1300	158	397
February	4240	561	1560	2870	359	853	2240	473	1000	1240	376	719	4620	335	1660
March	583	270	416	5980	326	1150	2480	551	1130	1110	407	632	5670	460	1800
April	1070	416	577	1680	711	1260	2480	520	1030	1640	218	576	1740	851	1150
May	1580	494	869	1590	594	1120	541	256	407	1730	182	610	1630	858	1120
June	811	311	477	1000	390	647	853	274	414	655	267	388	1100	602	841
July	444	132	238	760	180	357	260	100	152	865	221	337	2480	265	674
August	1640	92	249	178	107	141	102	72	86.5	215	92	133	300	137	198
September	1220	156	421	847	107	247	841	72	307	115	74	86.5	296	129	165
October	1630	215	630	2800	129	698	2120	281	607	1420	112	419	542	94	126
November	4520	394	1410	3330	288	860	3320	355	903	7920	435	1970	4720	232	1050
December	4270	463	1070	1240	250	439	970	188	366	8830	515	1520	1480	308	810
For year	10400	92	838	5980	107	755	5230	72	656	8830	74	682	5670	94	831

BULL RUN WATERSHED

Table showing "Run-Off" by years - Discharge in Second Feet

(Continued)

	1917			1918			1919			1920			192		
	Max.	Min	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min	Mean.
January	4400	320	1060	3620	690	2000	5060	220	1230	9890	245	1310	11400	459	1610
February	1530	284	795	[illegible]	423	1110	[illegible]680	360	744	750	176	348	8080	711	1920
March	2290	246	635	1580	336	737	4380	485	1060	4280	176	765	7500	570	1660
April	2680	654	1440	1360	485	803	2990	750	1300	4550	668	1190	4910	470	1430
May	2550	872	1290	1270	396	664	1940	548	840	1270	386	690	1800	548	1080
June	2160	980	1450	382	135	234	674	191	388	694	224	415	759	316	460
July	980	201	473	204	101	121	182	95	129	290	120	161	481	137	232
August	191	108	142	140	87	107	97	72	84.5	378	91	119	143	96	114
September	169	99	122	118	69	79.3	743	70	189	2400	93	798	531	85	182
October	118	79	935	1270	68	288	1160	159	348	2280	302	851	2910	114	464
November	2740	85	376	3200	298	785	8240	420	2010	2580	194	859	14,000	213	2470
December	12000	774	3890	3410	294	908	3340	250	1070	6900	536	1550	6010	157	901
For year	12000	79	1051	4700	68	651	8240	70	781	9890	91	756	14000	85	1030

SUMMARY OF WATER MAINS IN USE

NOVEMBER 30th 1921

ze ches	WEST SIDE C. I.	Steel Or W. I.	Total Miles	EAST SIDE C. I.	Steel Or W.I.	Wood	Total Miles
	0.871	4.282	5.153	4.674	1.800		6.474
	2.289	4.630	6.919	7.030	2.481		9.511
	5.143	0.667	5.810	2.116	0.586		2.702
	0.089	0.596	0.685		0.587		0.587
	4.003		4.003	10.904			10.904
	3.142		3.142	3.469			3.469
	14.343	1.088	15.431	18.141		1.785	19.926
	10.625	0.790	11.415	3.942		0.112	4.054
	25.269	0.276	25.545	149.265			149.265
						0.230	0.230
	46.003	1.308	47.311	61.389		1.109	62.498
						0.189	0.189
	16.825	0.290	17.115	16.018	0.145	2.508	18.671
al 4" and over	128.602	13.927	142.529	276.948	5.599	5.933	288.480
					0.052		0.052
	0.567	0.514	1.081		1.659	2.532	4.191
		0.250	0.250		0.696	0.313	1.009
		9.733	9.733		50.221	0.936	51.157
		0.392	0.392		26.074		26.074
		0.127	0.127		7.758		7.758
		0.425	0.425		5.332		5.332
		0.086	0.086		1.953		1.953
		0.061	0.061		0.765		0.765
l r	0.567	11.588	12.155		94.330	3.781	98.111
l	$129.169	25.515	154.684	276.948	99.929	9.714	386.591

SUMMARY OF WATER MAINS IN USE

NOVEMBER 30th 1921

(Continued)

ALBINA				TOTALS			
s es C.	Steel I. Or W.I.	Wood	Total Miles	C.	Steel I. Or W. I.	Wood	Total Miles
2.733			2.733	8.278	6.082		14.360
3.298		1.060	4.358	12.617	7.111	1.060	20.788
1.129			1.129	8.388	1.243		9.641
				0.089	1.183		1.272
4.845			4.845	19.752			19.752
2.281			2.281	8.892			8.892
18.561	0.067		18.628	51.045	1.155	1.785	53.985
1.038	0.050		1.088	15.605	0.840	0.112	16.557
88.976	0.263	0.405	89.644	263.510	0.539	0.405	264.454
						0.230	0. 230
39.334	1.710	0.023	41.067	146.726	3.018	1.132	150.876
						0.189	0. 189
9.236	2.813	0.077	12.126	42.079	3.248	2.585	47.912
l 4" or							
171.431	4.903	1.565	177.899	576.981	24.429	7.498	608.908
					0.052		0.052
	0.794		0.794	0.567	2.967	2.532	6.066
		0.757	0.757		0.946	1.070	2.016
	53.280	0.372	53.652		113.234	1.308	114.542
	3.308		3.308		29.774		29.774
	0.947		0.947		8.652		8.652
	11.329		11.329		17.086		17.086
	0.007		0.007		2.046		2.046
					0.826		0.826
under 4"	69.665	1.129	70.794	0.567	175.583	4.910	181.060
all sizes							
171.431	74.568	2.694	248.693	577.548	200.012	12.408	789.968

APOSTROPHE TO WATER

Henry Ward Beecher pronounced Ingersoll's apostrophe to whiskey to be one of the most beautiful literary gems that that renowned man ever wrote. What could he have said of water? Here follows my apostrophe of water.

I have seen it in its marvelous splendor in the form of a dew drop in the early morning sunshine adorning the petal of a perfect rose. I have seen it in the gentle summer shower, cooling the atmosphere and relieving it of its oppressive humidity. I have seen it in the tropical storm descending in such volume, velocity and violence that I suspected that the great reservoirs of the heavens had been burst by the irresistible assualts hurled against them by the thunder bolts of his majesty Pluvius' heaviest artillery. I have seen it reflected in God's bow of promise, in such gorgeous coloring, perfect symmetry, awe inspiring grandeur, so distinctly dissimilar to any other adornment from nature's studio that it isno wonder that the ancient Sun Worshippers fell prone upon their faces whenever it illuminated the canopy of the clouds. I have seen it in the sunpainted clouds, colored and tinted and blended in such indescribable splendor that for the artist's hand to venture imitation would be monumental sacrilege. I have seen it upon a frosted window pane in such myriads of shapes and shades, of forests and cities, of landscapes with their hills and vales, of rivers and rivulets of meadows and lawns, of mountains and glades, that one is impelled to reverence

the hand of nature's artist. I have seen it emerging from the eternal rock, the brightest, purest, sweetest thing ever distilled in nature's laboratory. I have seen it falling down the precipitous mountain-sides like ropes of silver, augmented at length to rushing brooks, speeding downward to lower levels to creep through fringes of fern and between moss-carpeted banks to confluence with larger streams. I have seen it in the majestic river, surmounting the obstructive battlements with which nature had assayed to impede its way, seething, roaring, as though crazed with anger at the impudent presumption, and then in placid quietness moving triumphantly onward to pay its contribution to and be forever lost in ocean's broad expanse. I have seen it in the turmoil of the mighty deep, the most inspiring and convincing demonstration of the majesty and incomparable power of Almighty God. I have seen it in the inimitable snowflake and in the pure white blankets of the towering mountains, and in the glaciers, their mighty sentinels whose lofty summits penetrate the regions of perpetual ice and snow like giant pyramids of frosted silver. Oh, Water! Thou art the emblem of innocence and purity; the greatest exponent of healthfulness and strength; handmaid of religion; savior and preserver of all human, animal and vegetable life; indispensible, adjunct of the commerce of the world; eloquent advocate of virtue and sobriety; indispensible, richest gift of God to man. Oh, Water! Thou are the first and last necessity of His creation; the most emphatic and perpetual witness of Divine Wisdom and by that wisdom, inexhaustible and free to all. - J. B. Hunting in the St. Johns Review.

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