

PORTLAND'S WATER IS GREAT ASSET

Source at Bull Run Lake Rigidly Protected—Mains Total 740 Miles—System Costs \$12,410,900



One of City Reservoirs.

In 1845 a committee of citizens, 15 in number, was named by the State Legislature to acquire a municipal water supply for the city of Portland. Colonel Isaac W. Smith, one of the most competent engineers of the West, was engaged as chief engineer, and under his direction surveys and investigations were instituted for supplying the city with water from the Cascade Mountains to the east of the city. In 1852 Talbot & Cunningham, two old-time residents of Portland, had obtained water rights and lands along the Bull Run River about seven miles above its junction with the Sandy River, with the intention of entering the Portland market with a pure mountain water supply. After a thorough investigation of the streams available, the committee purchased the Talbot & Cunningham rights, and the headworks was located on the Bull Run River about 30 miles east of the city at an elevation of 717 feet above city datum.

Bull Run Watershed Protected.
The Bull Run River above the diversion has a watershed 192 square miles in area. The main branch of the stream heads in the Bull Run Lake—a beautiful body of water 800 feet long by 400 feet wide, lying at an elevation of 3200 feet. The lake is fed by numerous springs heading in the snow banks, which lie in the timber, well into the end of the summer. There is one fork of the west branch of Hood River lying between the lake and Mount Hood, and no water from the glaciers of the mountain enter the Bull Run River. The water is pure and undisturbed. No treatment or filtration is resorted to and with proper protection of the forests and streams above the diversion none will be necessary. The flow of water in the Bull Run River for a yearly period will average 600,000,000 gallons a day and the development of possible storage in Bull Run Lake will give a minimum flow sufficient to supply 1,000,000 people. In 1892 construction work was begun on the headworks and conduit for the water supply of the city, the water committee in the meantime having purchased the plant of the Portland Water Company, which had been supplying water to the city for more than 25 years. This company pumped the water from the Willamette at the old Palatine Hill pumping station. The purchase price of the Portland Water Company's plant was \$44,551, and included about 27 miles of mains, nearly all of which was 4-inch cast iron pipe.

Purest Water is Cheap.
In 1887 the water rate was \$24 a year for the average house, including toilet and bath, as against \$7.20 a year in 1917. Bull Run conduit No. 1, as built by Colonel Smith in 1874, has a capacity of 22,000,000 gallons daily. It consists of 10 miles of 42-inch, 8 miles of 36-inch, and six miles of 30-inch riveted steel pipe, the total cost being \$1,051,475. At this time four distributing reservoirs were constructed: Nos. 1 and 2 at Mount Tabor and Nos. 2 and 4 at the City Park, the total capacity of these reservoirs being 64,500,000 gallons. The rapid growth of the city necessitating additional supply mains and reservoirs, Bull Run conduit No. 2 was designed and built by D. Clarke as chief engineer in 1910-11 at a cost of \$1,234,181. This line is lock-bar steel pipe, the first 10 miles being 52 inches in diameter and the last 14 miles 44

inches in diameter. It has a capacity of 45,000,000 gallons a day. During 1909 and 1910 two additional reservoirs, Nos. 5 and 6, were constructed at Mount Tabor. They have a combined capacity of 125,000,000 gallons and cost \$223,350. The city of Portland, due to its topography, is served by supply systems of five different elevations. On the West Side are two gravity and five pumping systems, and on the East Side two gravity and one pumping system. All Parts of City Well Served. The water from the headworks on Bull Run is received into reservoirs Nos. 1 and 5 at an elevation of 414.6 feet. The low gravity service on the East Side is supplied from reservoir No. 2 at an elevation of 320 feet. At reservoir No. 2 the supply water from reservoirs Nos. 1 and 5 is used to pump the supply for the Mount Tabor high service. Reservoir No. 1 supplies the high gravity district of Montavilla and Peninsula, and reservoir No. 6 (elevation 355) supplies the intermediate gravity district. Water is delivered to reservoir No. 3 at an elevation of 300 in the City Park for the west side of the river through two submerged pipes, 24 inches and 30 inches in diameter, which cross the Willamette River just south of the Madison-street bridge. This reservoir supplies the high gravity on the West Side, and reservoir No. 4 (elevation 230) supplies the business section. At the City Park pumping station, water is pumped to Portland Heights, Willamette Heights and South Portland. The pumping equipment at this station consists of two Hoidler pumps, capacity 500,000 and 1,000,000 gallons a day, and one Goulds pump, capacity 500,000 gallons a day. In addition to the six large reservoirs, the city has 11 minor reservoirs, three tanks and three standpipes. Some of these reservoirs, at high elevations, are supplied by automatic, electrically operated pumps. Portland, with a population of 300,000, has spread over an area of approximately 65 square miles, and the work of furnishing an adequate supply of water to the people has been no little task. To accomplish this 740 miles of distribution mains—varying in diameter from one inch to 36 inches—have been laid. Even so, the system to date represents a total expenditure of only \$12,410,900, \$7,219,000 of which is bonded indebtedness.

PORTLAND NATION'S HEALTHIEST CITY

Climate, Pure Water and Milk, Sanitation Are Factors for Highest Standard
By Dr. George Parrish, City Health Officer
PORTLAND is keeping up its well won position as the healthiest city in the United States. This is susceptible of ample proof and full demonstration in the record attained in the year 1916 and during the past summer and fall. Those seasons have passed without a break in the record of keeping fully abreast, if not always ahead, of every advance in the prevention of disease and the promotion and conservation of health. The most definite index of Portland's health history is found in her death records, figures published by the

Government for 1916 show that no city of commensurate size had fewer deaths among children under one year of age during that period, while its total mortality was only a fraction over eight to each 1000 inhabitants. There was not a single death of a child under one year for the week ending November 11, 1917. Striking, indeed, is the fact that the leading cause in Portland's death list, heart disease excepted, is tuberculosis, a preventable disease, while the next most fatal is pneumonia—a to a certain extent preventable. But even in deaths from these two diseases, Portland suffers nothing by comparison with the Government statistics issued by Director Samuel L. Rogers, of the bureau of census, Department of Commerce. Whereas the total deaths from tuberculosis in its various forms in 1916, taken from an area containing approximately 70 per cent of the population of the United States, numbered 141.6 per 100,000, that of this city for the same disease was only 54.5 per 100,000, based on a population of 275,000; while pneumonia, our next most dreaded enemy, carried off only 69 persons for every 100,000 population, as against 137 deaths per 100,000 in the registered area. Surely no citizen of this community has cause for complaint. This wonderful record is attributable to a number of factors, each of which plays its part. Climate, water, milk, food supply, sewer system, sanitation and inspection all contribute to the maintenance of the high standard. The relation between impure water supply and a high death rate from typhoid fever and other intestinal diseases is well known and a considerable body of evidence has been collected which tends to show that impure water may even cause other diseases formerly thought outside the range of its influence. Repeated analyses made by the city bacteriologist, Professor Pernot, in 1916 show that Portland's drinking water contained only four bacteria per c.c.—almost absolutely pure. Unquestionably Bull Run water is the safest drinking water in the world. To count the tally of a city's disease and death record is not a negative value, but should lay the foundation of constructive action. With but a negligible number of the seasonal diseases the year has been marked by a dearth of anything fearsome or especially significant in the type or number of ailments that have fallen to the city's lot. Thanks to the well organized system and painstaking methods so long in vogue in the conduct of the city's Health Bureau, there have been no alarming outbreaks of contagious or infectious diseases. Indeed, no contingency arising during my incumbency that could not and has not been easily and effectively disposed of under the admirable plan of procedure put in use by my predecessors. The schools and other public institutions have been the subject of constant thought and daily care and in consequence no vexatious problems, either in sanitation or preservation of health, have arisen to weaken their efficiency or lessen their potency for good. The community is to be congratulated on its almost total immunity from any of the scourges that beset other and less fortunate localities. It is within reasonable bounds to say that there is little fear that the famed Rose City will not maintain its long-held stand among those favored cities where disease has no terrors for those who by study, practice and experience have learned to combat it successfully.

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