

OCHOCO IRRIGATION DISTRICT

(By R. W. Rea, Project Engineer)

The Ochoco Irrigation Project, organized under the irrigation district laws of the State of Oregon, comprises about 22,000 acres of very rich, fertile bottom and bench land surrounding the city of Prineville. The area of the District as now organized is about 35,000 acres. The area included under the canals is approximately 26,000 acres, of which about 4,000 acres is waste, non-irrigable, or exempted. The average elevation above sea level of the lands of the project is about 2900 feet.

The project has been reported on in its entirety by the United States Reclamation Service in co-operation with the State of Oregon; by the writer, for the District; by Mr. A. J. Wiley, Consulting Hydraulic Engineer, of Boise, Idaho, for Clark-Kendall & Co.; and in a preliminary way, by Mr. Joseph Jacobs, for the United States Reclamation Service. A preliminary report has also been made to the District on the feasibility of, and sufficiency of the designs for, the Ochoco Dam, by Mr. J. M. Howells, Consulting Hydraulic Engineer, of San Francisco, California.

Probably the predominant feature of the project, aside from its agricultural characteristics, which makes it so attractive, both from an investment and an operating point of view, is its compactness. The lands to be watered lay in a single, large area and commence immediately at the lower toe of the dam. This unusual feature eliminates the necessity of constructing and maintaining the customary long canal leading from the storage reservoir to the main body of irrigable lands.

The fundamentals upon which any irrigation project depends for its permanent success may be summed up as follows:

- First—An ample water supply;
- Second—Soil fertility;
- Third—Moderate climatic conditions;
- Fourth—Private ownership, preferably in small tracts, of a majority of the irrigable lands in the project;
- Fifth—Conservative financing;
- Sixth—Well designed and substantially built storage, distribution and drainage works;
- Seventh—Accessibility to markets.

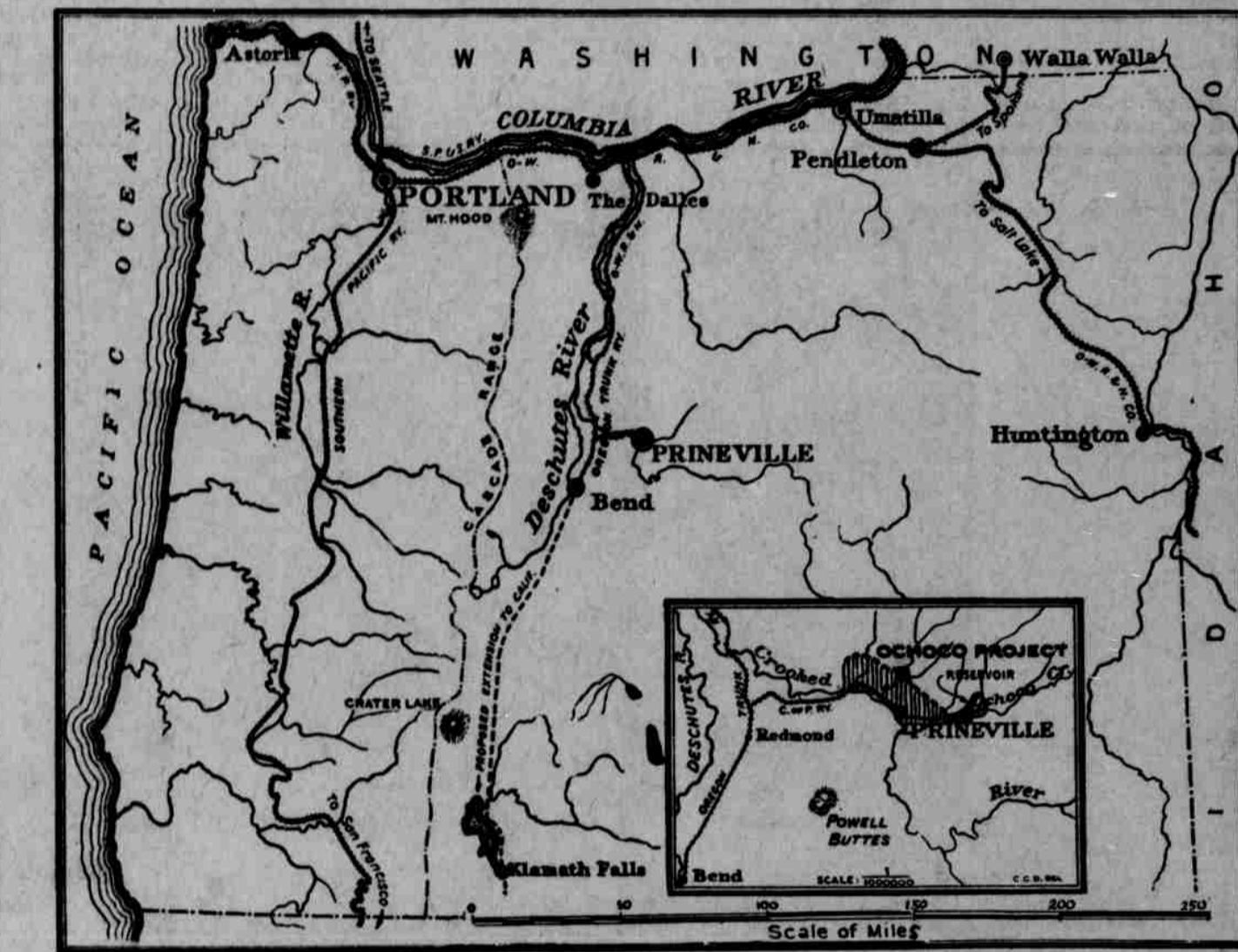
The water supply of the Ochoco Project is to be taken from two watersheds drained respectively by Ochoco and McKay Creeks. The former has an area, above the Ochoco Dam, of 300 square miles, of which approximately 52 per cent is located within the boundaries of the Ochoco National Forest Reserve. The McKay storage has an area of 40 square miles above the proposed dam site, of which approximately 82.5 per cent lies in the forest reserve.

The records of stream flow on Ochoco Creek, kept by the U. S. Geological Survey, show that, for the six years for which records exist, including part of 1917, the average yield of the Ochoco water shed at dam site is 54,600 acre feet, not including water used on lands in reservoir site. Over a period of 14 years, the Geological Survey estimates that the average flow will be 54,900 acre feet, the minimum being 22,800 and the maximum 92,000 acre feet.

The flow of McKay Creek, as shown by one full year's records, amounted to 16,760 acre feet during the season of 1916. This water will be admitted to the main canal at the crossing of McKay Creek, the canal being designed with ample capacity in order that as much of the flow of this water shed may be utilized during the flood period as is practicable. Use of this water conserves an equal quantity in Ochoco Reservoir.

Records show that the combined yield of the two water sheds is sufficient to assure an ample supply of water at the land throughout the growing season, in addition to all seepage and other transmission losses. A duty of 1.91 feet per acre per season at the land is used in all calculations for water supply.

Many years of successful crop raising, both with and without irrigation water, have served to give



Map of Oregon Showing Location of The Ochoco Irrigation District

the soils of the project "the acid test" as to fertility and productiveness. The alfalfa-fed steers of the Ochoco Valley seem to fatten quicker and on a proportionately smaller ration of the local alfalfa, than do steers fed on the alfalfa hay grown in other localities. This has been proven by actual test.

Much of the bench land within the district is now "dry" farmed and, except in seasons of slight or no rainfall, very satisfactory crops of wheat, oats, barley and rye are raised.

Climatic conditions in the Prineville Valley are nearly ideal for the full maturing of hay, grasses, grains and root crops. The average annual temperature as shown by U. S. Weather Bureau records for 1906, was 48.0. The average range of temperature is from about 0 degrees in winter to 100 degrees in summer. Frosts are no more severe nor erratic than in other agri-

cultural districts in the Northwest of equal altitude.

At this time all lands within the District (under the canals) are held in private ownerships. The acreage in individual tracts ranges from 40 acres, upward, a considerable portion of the raw lands being owned by the Oregon and Western Colonization Co. It is a fact, now universally recognized, that the real security behind the bonds of an irrigation project is the high class of settlers who occupy the lands of the project—for no matter how much water may be at hand, no matter how good the soil is, no matter how good every other feature of the project may be, if the man on the land isn't intelligent, hard working, progressive and solid, the project is doomed to failure.

The Ochoco project is singularly fortunate in that practically two-thirds of its area is settled and tilled by a class of farmers who have

been successful heretofore and who, with the full benefit of the stored water to aid them, will insure the highest success for themselves and the project.

The financing of the project is being carried on through a contract with Clark-Kendall & Co., of Portland, Oregon, who have undertaken to employ a contractor, of wide reputation for financial strength and constructive ability, to build the Ochoco dam and the first 15 1/2 miles of the main canal and take bonds of the district, at par, in payment. Clark-Kendall & Co. also undertakes to assist in financing the balance of the bond issue, which must be sold for cash, no construction work being commenced until this latter feature is satisfactorily accomplished. The contract is eminently fair to both the District and the bonding company named, inasmuch as the construction company employed to do the work, and

its surety bond, must both be satisfactory to the District. This arrangement insures that practically 95 cents of every dollar represented by the bond issue will go into actual construction work or purchase of reservoir lands.

The preliminary investigations and designs have been very complete and comprehensive, with a view to the early construction of the project along the latest and most permanent lines. To this end all structures are designed with a view to their hydraulic efficiency, long life and minimum cost of maintenance, rather than minimum first cost and probable reconstruction before the present bond issue matures.

Upon the completion of the city of Prineville Railway, the markets of the world will be open to all that can be raised in the Prineville Valley—whether it be sheep, steers, hogs, hay, grains, spuds, sugar beets, or what not. The valley is

considered to be one of the finest winter feeding centers, for beef cattle, in the Northwest and, with the Portland market only a day's trip distant, the advantage in this connection is many fold.

A few of the striking facts concerning the project are listed below:

Ochoco Reservoir
 Area water surface at elevation of crest of dam, about 1180 acres.
 Length of reservoir, 3.38 miles.
 Average width of reservoir, one-half mile.
 Length of shore line, 10 miles.
 Storage capacity, 47,000 acre feet.

Ochoco Dam
 Maximum height above river bed, 125 feet.
 Volume, about 506,000 cubic yards.
 Length along crest, 1000 feet.
 Width of top, 20 feet.
 Thickness at base, up and down stream, 600 feet.

Spillway capacity, 10,000 cubic feet per second, normal, 20,000 cubic feet per second, extreme emergency.
 Greatest recorded flood flow Ochoco Creek, 1050 cubic feet per second.

Main Canal
 Capacity, from 200 to 25 second feet.
 Length, about 22 miles.
 Length concrete lined canal, 2 miles.
 Length earth canal, 17 1/2 miles.
 Length flume, one mile.
 Length tunnel, 2000 feet.

Main Laterals
 Capacity, from 2 to 20 second feet.
 Length, about 150 miles.
Drainage System
 Area, approximately 2000 acres.
Pumping Segregation
 Area, about 1500 acres.
 Maximum height pumped to, 100 feet above main canal.

BOND SALE AUTHORIZED FOR AUGUST 6

Since the article on this page by Mr. Rea was written, the sale of a half million dollars worth of bonds for the Ochoco Irrigation District was authorized by the board, and the time set for August 6.

A successful sale of these bonds will mean almost immediate work on the construction of the project that will provide water for the 35,000 acres of land embraced in the project, which are now suffering for the want of irrigation.

It is estimated by different men on the land that water for irrigating these lands this year would be worth more than 25 per cent of the entire cost of the project.

The bonds will be issued in denominations of \$1000.00 each, will commence to mature in eleven years from date of issuance and will all mature at the end of 22 years.

This bond sale is a result of the contract entered into between the board of directors and Clark, Kendall & Company, as was reported in a recent issue of The Journal.

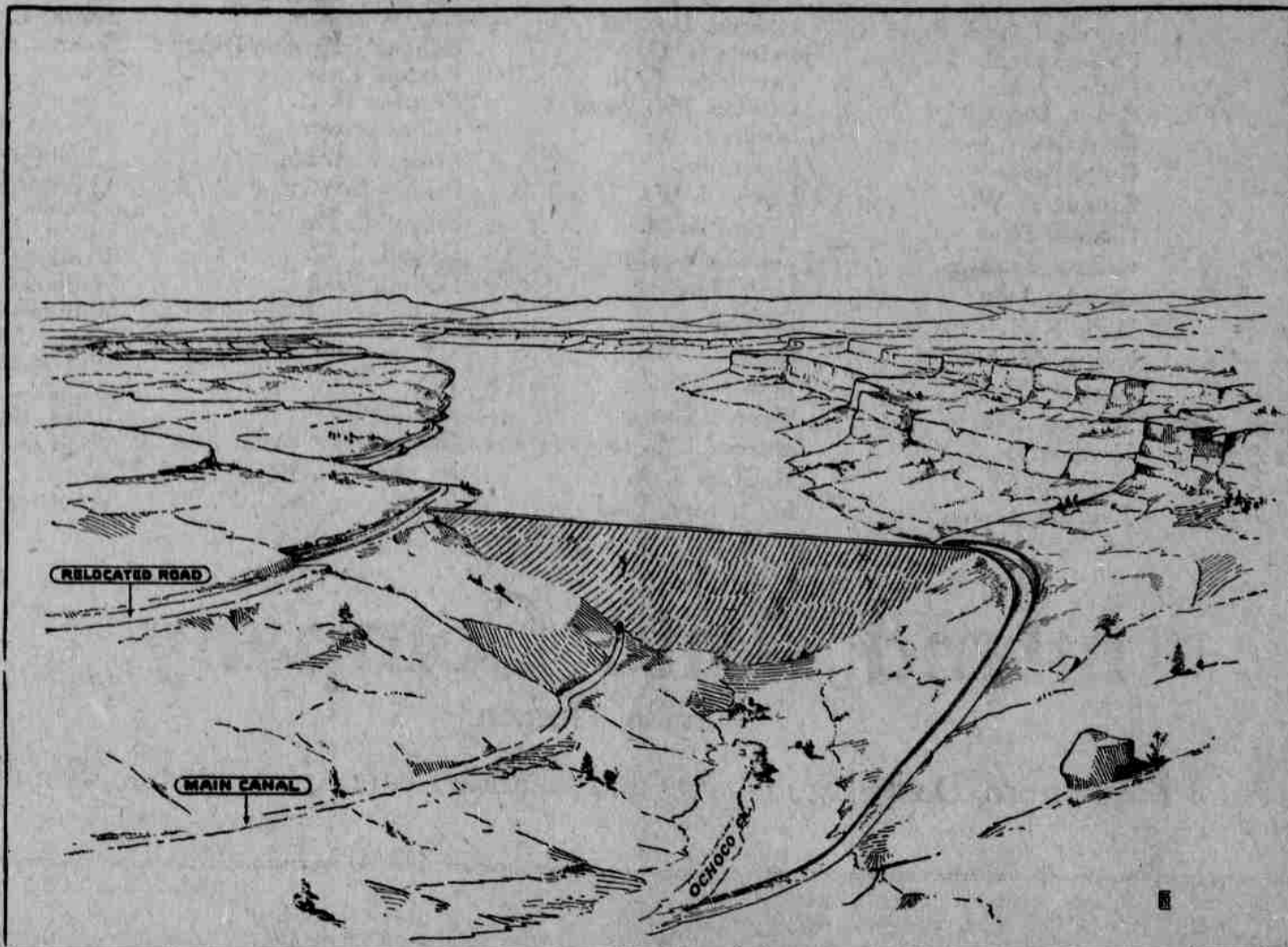
Should there be no difficulties encountered in the sale of these bonds, we are told that it will be possible to have at least flood waters for the district lands next year, and the following season will find the reservoir completed and filled with water.

MCGEE NAMED TO SUCCEED PLUMMER

O. M. Plummer has resigned as secretary-treasurer of the Portland Union Stockyards Company. The resignation took effect July 1, but public announcement has just been made.

L. R. McGee has been elected secretary-treasurer to succeed Plummer. Mr. McGee has been connected with the stockyards company since its organization in 1909 and for years he has been acting as assistant secretary. Mr. McGee assumed his new duties Monday morning.

The explanation given for Plummer's resignation is that he intends engaging in another business. His final severance of connections at the yards, it is said, will be the first of the year, and while not connected with the industry, he will visit the yards from time to time until that date.



The Big Dam as it Will Appear When Completed