

The Columbia Basin Project

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TWISTING and winding its way southward through Western and Central Washington, the Columbia River, after pursuing a southeasterly course for 50 miles or more, bends sharply to the west and heads for the Pacific Ocean. On the northern edge of this bend, the Columbia is joined by the Snake River, a stream with an equally tortuous career which originates in Yellowstone Park, flows southerly in Eastern Idaho, westerly across the state, and then northerly between Oregon and Idaho until it leaves Idaho at Lewiston. In the triangular area immediately north of the junction of these two premier streams of the Pacific Northwest, lies an immense acreage of fertile land, now almost destitute of inhabitants, although many deserted homesteads indicate the passing of a more prosperous day. This is the site of the proposed Columbia Basin irrigation project.

In 1919, by an act of the Washington state legislature, an organization known as the Columbia Basin Survey Commission was created and given \$100,000 to expend upon an investigation of the feasibility of irrigating this region. The Commission, with these funds and others, after several years of labor, accumulated what General George W. Goethals termed, "the most complete mass of information that I have ever seen collected by anybody for any project." Following the issuance of this report in 1920, by the Columbia Basin Survey Commission, George W. Goethals and Company, Incorporated, was employed in 1921 to report on the feasibility and cost of the engineering structures. The fruits of these researches were presented to the Sixty-seventh Congress, with the result that \$100,000 was appropriated to check and continue the studies made by the state.

In March, 1924, Homer J. Gault of the Bureau of Reclamation, who had been detailed on this subject, submitted a report to the chief engineer of the Bureau. His work was reviewed for the Bureau by a board of three engineers a short time later. August of this same year witnessed the creation of a larger board of engineers outside of the Bureau of Reclamation, six members in all, for the purpose of reviewing the Gault report and independently investigating the project. The board's report was rendered in February, 1925. Throughout the remainder of this article, when "the Board" is referred to, it designates this larger organization.

As the west and southwest winds from the Pacific Coast pass over the Cascade Mountains, the moisture contained in them is deposited because of the cooling effect produced by these elevations. As a direct result of this natural phenomenon, a large area of land exists east of the mountains within which is included the Columbia Basin, and over which the normal precipitation is scanty, varying from 6 to 7 inches annually in the lower portions to 10 or 12 inches over the more elevated areas.

The soils of this proposed project have been classified by the United States Bureau of Soils as silt loam and fine sandy loam and, generally speaking, they are similar to the soils of the rich Yakima region on the west of the Columbia River. The growing season averages one hundred and seventy-six days per year, or approximately two weeks longer than that of the Yakima District. Various investigators have agreed that the duty of water, on the land, will be 33 inches. Some crops and soils will require more, others less; 33 inches is a general figure. Differing from many of the projects constructed by the federal government in the past, the lands are largely owned by private individuals.

Methods of Solution

Several different methods of irrigating the project have been considered, with the result that the acreage to be reclaimed varies with each different solution of the problem. The solutions are based upon a gravity supply, a pumpage supply, and combinations of these two.

The board of engineers, appointed in August, 1925, considered five different plans of watering the project. Under the first plan, water is to be conveyed by gravity from the Pend Oreille and Spokane Rivers to the land where 1,883,000 acres are to be irrigated, and of this number 233,000 acres would be watered by pumping against a lift of 100 feet. The second plan is also a gravity project. Its adoption would bring an area of 1,054,000 acres under cultivation, without the use of pumps. The third plan, a gravity project with a small pumpage area of 170,000 acres, would reclaim 1,224,000 acres. Plan four considers the Columbia River at the Grand Coulee as the source of supply, the water to be lifted onto 1,532,000 acres of land by pumps. The fifth plan is similar to the fourth except that the area to be covered is smaller—1,037,000 acres in this case. The construction cost per acre, including drainage, is estimated at \$157 for the first, \$163 for the second, \$158 for the third, \$153 for the fourth, and \$157 for the fifth plan.

The board favored the third plan, the total estimated cost of which would amount to \$193,360,000, or \$158 per acre, exclusive of the cost of buying the land from those who now own it. This plan is based upon the procurement of water by diversion from Clark Fork River, locally known as the Pend Oreille River, at Albany Falls, and diversion to a minor extent from the Spokane River. It is not necessary to take water from this latter source so far as amount is concerned, but the total cost of the project may be reduced by diverting some water from here as the conduit above this point may be then reduced in size.

From the dam at Albany Falls, which will be both a diversion and storage dam as it will raise the

level of Pend Oreille Lake, the main conduit extends a distance of 130 miles to the northeast edge of the area at Hill Crest, Washington. Of this total distance, 47.06 per cent will consist of canal, 25.80 per cent of tunnels, 26.39 per cent of artificial lakes and .75 per cent of siphons.

The tunnels vary from 32.3 to 37.0 feet in diameter, from 4,400 feet to 16 miles in length, and are designed to carry 13,715 second feet of water.

Storage sites for the water are not lacking but, unfortunately, they are located in neighboring states, and not in the one where the land lies. Flat-head Lake in Montana, and Pend Oreille and Priest Lakes in Idaho, are the basins available. Coeur d'Alene Lake has been suggested for this purpose also, but the inhabitants of the region have protested so vigorously that the proposal seems to have been dropped. Undoubtedly, before any of these storage sites can be utilized, or water diverted, there must be an agreement between the states in interest.

Both pumping projects are based upon the same water supply, the Columbia River in the vicinity of the head of the Grand Coulee, a former bed of this stream. At this point in the river, a concrete dam would be employed to create a head of approximately 210 feet which would generate power to lift water onto the land. It will be necessary to lift the

requirements. In fact, there will be water for irrigation, water to create power to pump water onto the lands, and water to create power for sale. A complication exists, however, in connection with this plan of supply. The Columbia is an international river and in a treaty with Great Britain we have agreed to keep the stream open for navigation. This difficulty could be surmounted.

Economics

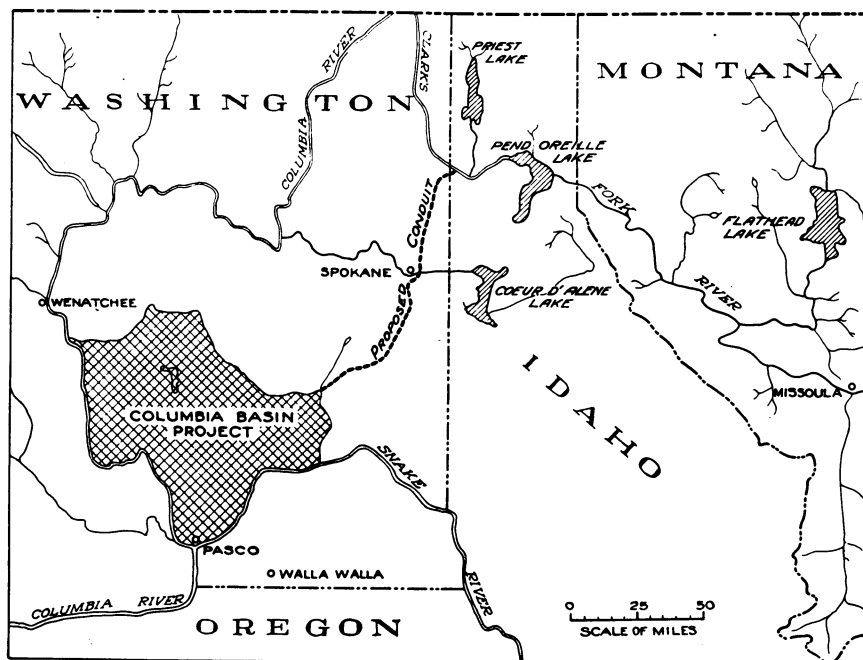
The land comprising the project is suited to the production of numerous kinds of crops, such as alfalfa, grasses, corn, wheat, barley, oats, potatoes, and sugar beets. Also, apples, pears, prunes, cherries, peaches, and apricots will flourish in this area, together with many varieties of vegetables.

The Board, after an extensive study of farm economics, arrived at the conclusion that farmers would be able to pay out on this project if granted certain initial conditions. Two types of farms are assumed in this study, each consisting of 80 acres of ground, but one of slightly better land and more economical to operate than the other. It is assumed that the farmer on the first type of farm has an initial capital of \$2,500 and that, in the second case, there is \$4,500 or credit to that amount with which to begin. Then, if "the government provides the land, water, does the necessary clearing and leveling, constructs the necessary flumes, or ditches, and provides a house, domestic water, and a barn, with no payments for five years, after which time payments are to be made on an amortization plan," the owners of the farms will be able to pay off the cost of the land and these improvements by their labor and the products of the land. Under this amortization scheme, assuming an interest rate of 3 per cent, and a yearly payment of \$1,300, a farm costing a total of \$19,340.72 could be paid for in twenty years. The figures apply to the better type unit. Assuming the same interest rate, 3 per cent, and a yearly payment of \$1,000, the second type, costing a total of \$14,877.47, could be amortized in twenty years.

It has been stated that the project could be built in a period of six years. Advocates of the undertaking say that it should be developed gradually over a

considerable period of years; the board estimates a period of twenty-five years as the time necessary to settle and bring the entire area under cultivation. One of the major problems, perhaps the greatest of all, will be that of colonization. Undoubtedly, with the expected increase in population, there will come a demand from competent farmers for more land; but it is impossible to estimate that demand far in advance.

The problem of the Columbia Basin is the problem of the Pacific Northwest especially, and of the nation generally.



Map of Area Involved in Columbia Basin Project

water some 400 feet to a canal in the Grand Coulee from whence it will be led out upon the land by gravity. In the case of the fourth plan, a small proportion of the project, some 231,000 acres out of a total of 1,532,000, would be irrigated by repumping water against a lift of 100 feet.

The fifth plan contemplates the watering of 1,037,000 acres without the necessity of any lift except the initial one from the river to the Grand Coulee.

The dam on the Columbia is not required for storage purposes, since the ordinary flow of the river at this point much more than meets irrigation