

Irrigation

Irrigation in the Pacific Northwest is almost entirely confined to the Indian Empire.

A large part of this region is arid, but its soil is exceedingly rich and deep and the tributaries of the Columbia river provide an inexhaustible supply of water. The Columbia itself is scarcely anywhere available for the purposes of irrigation as its course is largely through deep cuts.

The Indians of this region, unlike the natives of Arizona and New Mexico did not practice irrigation until they were taught to do so by the missionaries. Marcus Whitman seems to have been the pioneer in the introduction of irrigation. Whitman planted an orchard and a garden and dug a ditch to bring water to them. The Indians noted that Whitman's garden did better than theirs and asked him to let them draw water from his ditch. When he refused they dug ditches of their own and stopped up his. The difficulty was solved when he succeeded in convincing them that there was enough water for every one.

Spalding used irrigation at Lapwai and instructed the Nez Perce chief Red Wolf in planting his land at the mouth of the Alpowa. When Governor Stevens and his party passed Red Wolf's place in 1855 they found that the two chiefs, Red Wolf and Timothy, had thirty acres well cultivated and arranged for irrigation and now planted in corn which looks well. When Fathers Pandosy and D'Herbonnez built the Antanum mission in 1852 they planted a garden which was necessarily irrigated, as otherwise nothing could be raised there. A.J. O'Don Long tells of seeing a ditch about a quarter of a mile long which irrigated the garden of Chief Kamiakin. The water was taken from the Antanum. This project is evidence of instruction by the missionaries.

In the sixties many settlers had adopted irrigation. About 1860 Hiram

Smith, commonly known as Okanogan Smith, who had been in the placer mines on the Similkameen located a trading post on Osoyoos lake at the mouth of Nine Mile creek and put in a few fruit trees and a garden under irrigation. Other retired miners practiced irrigation in the fifteen-mile strip of land between the international line and the Moses reservation. The Indian neighbors followed their example.

In the Wenatchee valley, the Miller ditch grew from a little stream of water diverted from Squillchuck creek in 1870 to irrigate an acre of garden. The first irrigation ditch of any considerable size in Kittitas county was the Manastash canal built about 1874. The temem ditch, nine miles long, a big undertaking at the time, was built in 1873.

The Union canal in the Yakima country began with a small ditch, the intake of which was a mile above the mouth of the Naches river. A company of farmers built the original ditch in 1868. Before the Union canal became of much importance the Shanno brothers build a ditch eighteen miles long in the early seventies from the Naches river which brought water to Oldtown or Yakima City in 1875.

The canal of the Ellensburg Water Company was commenced in 1885. By 1890 seventeen miles had been completed, irrigating 2,000 acres. The canal was later enlarged sufficiently to supply 15,000 acres. The West Side irrigation canal, fourteen miles long, was built to irrigate 30,000 acres in 1889. The Fowler ditch, later known as the

Lombard and Horseley ditch was built between 1884 and 1889. It derived its water from the Yakima river running eight miles to the east side into the Moxee valley and irrigating 15,000 acres. The Antanum and Wide Hollow ditch was 10 miles long by 1889. The Moxee ~~Lowell~~ company's ditch was built in 1888-89, crossing the valley and irrigating 20,000 acres. The Selah Valley Ditch company built a large canal in 1889 from the Naches river, to irrigate 20,000 acres above North Yakima and there were many lesser enterprises

in this period.

When the Okanogan country was opened by the removal of the Indians from the Moses reservation many settlers used irrigation in raising alfalfa. Commencing about 1904 the fruit lands were exploited and there was consequently a great expansion of irrigation. In Stevens county water was taken from a small stream flowing into the Columbia to irrigate the terraces along its banks. There were early experiments in Spokane and Lincoln counties as well as in the "alla" alla country.

The settlers indulged in extensive experiments with artesian wells in the eighties. This effort to get water for irrigation did not meet with much success. In Douglas county wells were sunk to a depth of 225 feet without reaching water. The Washington legislature appropriated \$6,000 to sink wells in Franklin and Adams counties. The federal government was induced to make a survey to determine the feasibility of artesian wells and Israel C. Russell began this work April 1, 1892 under the direction of the Geological survey. He found only one or two sections of eastern Washington where the formation was favorable to artesian wells. One of the most expensive experiments was a well authorized by the legislature in the Horse Heaven country. This well cost \$3,400. It was 630 feet deep, passing through several hundred feet of basalt. It yielded 5,000 gallons a day. The formation which Russell described as favorable existed in the Moxee valley in a territory limited to six square miles and here thirty successful wells were sunk, providing water for a large area.

The largest private enterprise of the nineties was the Sunnyside canal. The survey had been made between 1885 and 1889. The Yakima Canal and Land Company was organized in the latter year with Walter M. Granger as president and with a capital of \$1,000,000. The

intake was located near the mouth of the Naches river and ninety-eight miles of canal were planned. The Northern Pacific Railroad took two-thirds of the stock and a new company was formed, known as the Northern Pacific Yakima and Kittitas Irrigation company. This company proposed to build reservoirs in the mountains. Work was begun in the early part of 1891 in the lower Sunnyside canal the intake of which was just below Union Gap.

The Spokane Valley Land and Water company began work in 1900 on a canal four miles long from Liberty lake to water 600 acres. The canal was next extended to a length of 22 miles. The Fish Lake canal, seven miles long, was completed in 1902 distributing to 5,000 acres between Hauser Junction and Rathdrum. The Cascade Canal company was organized in 1902 and opened a canal in 1904, forty-two miles long, irrigating 14,000 acres. The intake is from the Yakima river near Thorpe and a storage dam was built at Lake Kachess.

The Wenatchee High Line project was opened in 1903. The water is taken from the north side of the Wenatchee river near Leavenworth and a pipe line crosses the river to serve the lands around the city. In 1906 a pipe line 12,000 feet long was put across the Columbia to reach 6,000 acres in Douglas county. In the Walla Walla country the Burbank project started about 1900 and at first built a long dam below Walla Walla. This was abandoned for a pumping system, taking water from the Snake which flows through a fifteen mile canal to irrigate 12,000 acres. Several companies were interested in the project and when difficulties arose the management was turned over to three commissioners appointed by the county board. The Gardena project was launched in 1905; water was taken to 7,000 acres from the Walla Walla river through a twenty-one mile canal. Some of the land is in Oregon.

As the original settlers improved their land by irrigation and were observed to have prospered irrigation companies were developed with outside capital for the purpose of selling water to the farmers. Some companies took options on land and sold it with water rights included to newcomers. At the same time land speculators flourished who had no desire to avail themselves of water rights or to work on their properties.

To correct some of the evils of the period Congress passed the Carey act in 1894. The Secretary of the Interior was authorized, with the approval of the President, to donate to each of the states containing federal desert lands as much of these lands under 1,000,000 acres as the State should apply for on condition that the State reclaim the lands by irrigation and settlement to the extent of not less than twenty acres of each 160 acre tract within ten years. No individual could receive more than 160 acres. Various defects were discovered in the act when an attempt was made to put it into operation. The state of Washington never took advantage of it. Oregon took 432,203 acres under the act, mostly in the basin of the Umpqua Deschutes river. Idaho had 20 Carey act projects in 1926, including a total of 833,567 acres.

Congress passed the Reclamation act in 1902. This created a reclamation fund from the proceeds of the sale of public lands. The fund amounted to \$100,000,000 by 1915. The purpose of the fund was to provide means for the construction of irrigation works, the land reclaimed by this plan to be opened to homestead entries and the entrymen to pay the cost of reclamation in ten annual installments without interest.

Under the Reclamation act the Umatilla project was authorized in 1905 to bring water from the Umatilla river to lands in Umatilla and Morrow counties in Oregon. The project is in two divisions. The older division of 17,000 acres lies east of the Umatilla river and a

western division of 11,000 acres extends from the mouth of the Umatilla river for about twenty miles along the Columbia. Cold Springs and McKay dams provide reservoirs which are of ample capacity to supply water for all the project lands and for 28,000 acres of privately owned land besides.

Three federal reclamation projects were authorized in Idaho. The Boise project was begun in 1911. About 150,000 acres are in the project. The greater part of this land is now under cultivation. The chief engineering feature is the Arrowrock dam, about twenty two miles from Boise, 349 feet high. The cost of this dam was \$4,232,382. The other Idaho projects are King Hill and Minidoka. The former was authorized in 1904 and is located in the southwest part of Idaho along the Snake river. Water is obtained from the Malaga river and is conveyed through a main canal about fifty miles long which crosses the Snake twice by means of wood stave siphons on steel bridges. The gravity system supplies 16,314 acres and 574 acres are supplied by pumps. The Minidoka ~~canal, and south central Idaho~~ project is in Cassia and Minidoka counties in south central Idaho. The source of water supply is the Snake river, supplemented by storage at Jackson lake, Wyoming and Lake Walcott at the upper end of the project. On the north side of the river, 65,000 acres are irrigated by gravity and water for 56,000 acres on the south side is furnished by electrically driven pumps with three lifts, 7,500 acres on the south side are reached by the gravity system. The American falls reservoir was completed in 1926. It assures an unfailing supply of water, even in years of greatest drought for about 500,000 acres. The Minidoka area was a sage brush desert in 1904 and it now yields an annual gross production of \$4,000,000.

Two projects were started in Washington under the reclamation act soon after its passage. The Okanogan project is located on the west side of the Okanogan river about fifty miles south of the boundary and embraces

7,650 acres. The source of water supply is Salmon creek with storage in Condonully and Salmon Lake reservoirs. To supplement the gravity flow from the reservoirs, water is pumped from the Okanogan river by the Robinson flat pumping plant, from Truck lake and from the government wells. The pumping plant is also operated at Salmon Lake during dry years to pump water from the lake below the level of gravity flow. The Okanogan project has suffered a shortage of water almost continuously since 1917. All possible sources for an adequate supply have been investigated and engineer's reports in 1926 recommended a canal from the Methow river, four miles above Twisp with a length of eighty-eight miles to Salmon creek.

The Yakima valley contains about 600,000 acres of land which may eventually be irrigated. The Reclamation Service acquired the Sunnyside canal from the Washington Irrigation company in 1905. The water supply comes from the Yakima river and its tributaries, supplemented by storage in Keechelus, Kachess, Cle Elum, Dumping, Tieton and Clear creek reservoirs.

The project falls into a number of natural divisions--Sunnyside, Tieton, Kittitas, Moxee, Roza and Kennewick of which the Tieton, 32,000 acres and the Sunnyside, 107,600 acres have been constructed. The main canal of the Tieton unit runs from the diversion dam on the Tieton about fifteen miles above its junction with the Naches along the south side of Tieton canon for twelve miles. At a point where it is 500 feet above the river it passes through the rim of the canon by a tunnel. There are two units in the distribution system.

The Yakima project provides for the ultimate irrigation of 70,287 acres in the Kittitas division with diversion from the Yakima at Easton; 58,350 acres in the Roza division diverting about 10 miles above Yakima; 35,000 in the Kennewick division diverting at Prosser and 36,750 acres in the Moxee division diverting from the

the station about five miles above its mouth. The Kittitas unit is to be finished in three sections in 1929, 1930 and 1931. The main canal runs on the south side of the Yakima river about twenty-seven miles and the north branch crosses the river and runs around the north and east side of the valley, reaching the river again six miles south of Ellensburg. This branch is fifty miles long. A south branch canal extends fourteen miles from the end of the main canal. There will be seven siphons and one tunnel, 1010 feet long on the main canal. The Yakima river is crossed by a siphon 5,158 feet long and twelve feet in diameter. The north branch canal will have four tunnels, 1,795 feet, 1600 feet, 1,995 feet and 2,670 feet long and six siphons. The south branch has two siphons and one tunnel. The estimated cost of the Kittitas project is \$8,125,000.

Irrigation began at an early date on the Yakima Indian reservation after a decision regarding water rights by the Secretary of the Interior, in 1906 which was exceedingly unjust to the Indians and was protested by the Superintendent of the reservation, a commission was created by congress to investigate the feasibility of impounding water for the use of the Indians. The controversy was ended when the government by taking over the Sunnyside canal, itself became the other party to the dispute. The Wapato Indian project, now being constructed by the United States Indian service, diverts water from the west side of the Yakima river at Union Gap for the irrigation of 120,000 on the reservation.

(63rd Cong 2nd session Sen doc No. 337, 1913 3rd session House document No 1472--1915.)

In general irrigation is associated with the idea of reclamation but in the Kootenai valley the problem is to prevent stream flow at flood time from inundating fertile agricultural lands. Here a large ~~large~~ area is protected by a system of dikes and in the same valley above the international boundary an equal area is susceptible to the

to the same reclamation method. The farmers of the valley, in Idaho, organized by units into nine drainage districts, including 29,000 acres of land. These districts have been bonded for the construction of dikes and drains. The State of Idaho has certified bonds and drains. The State of Idaho has certified bonds of the various districts to the amount of \$266,000.

The future holds possibilities of an enormous extension of irrigation in the Inland Empire. In Oregon, the Harney and Deschutes projects have been investigated. The distribution system in the former is unusually simple and storage will be the principal feature of the required works. An ample water supply is available to irrigate 80,000 acres in the Deschutes project. A study has been made of projects at Umatilla rapids, particularly with regard to the possible use of the power which would be produced at the proposed dam in excess of irrigation pumping requirements.

In Idaho several investigations are in progress mostly in the southern part of the State. In that part of Montana which comes within the Inland Empire--the basin of the Clark fork--274,223 acres are under irrigation, and it is estimated that water may be profitably put on an additional 425,000 acres. These figures include the Flathead Indian reservation project with 34,453 acres now irrigated and 100,000 acres as a possible addition. The greatest of all irrigation projects lies in Washington and remains to be described (Report on the Uses of the Upper Columbia River ~~Revised~~ Revised ed. Federal Power Commission, Washington, 1925.)

Of all the sources of wealth in the Inland Empire the greatest in its promise to the future is the vast uncultivated area of the Columbia basin which awaits irrigation coupled with the abundant supply of water available. The Columbia Basin Irrigation Project is larger than all other federal irrigation projects put together. The construction cost will run into hundreds of millions but the taxable

values created will be more than twice the cost and the annual production from the land will nearly equal the expenses of reclaiming it. The project is likely to bring another million people to the Pacific Northwest and it will be of immense commercial benefit to the entire country.

When the public lands in the Palouse country had been taken up, homeseekers moved westward where they found what was apparently the same quality of soil as in the Palouse. In the year or two following, practically all of the country between Pasco and Ephrat in the bend of the Columbia was occupied. The settlers invested a considerable amount of money in clearing and fencing the land and building homes. It is estimated that \$45,000,000 was put into these improvements. Churches and school houses were built, roads were made and a great deal of other developments took place.

The settlers failed to accord sufficient importance to the difference in rainfall. In the Palouse country the annual rainfall is from 16 to 24 inches, an ample quantity for raising wheat, but the rainfall in the basin district is only seven ~~and~~ to 10 inches. After the brush was removed and the surface of the ground was stirred for a year or two, the moisture which had been accumulated for centuries quickly evaporated from the soil. The land would not produce wheat in paying quantities. In the first years the settlers raised from thirty to forty bushels an acre, but in seven years of occupancy the land went back to such an extent that it yielded only two to five bushels an acre. As a consequence the settlers had to quit. Those who put in their own money lost it all. Those who had borrowed money turned the land over to the loan companies and left the country. The region is now a waste of sage brush, dotted with abandoned homes.

In Governor Ernest Lister's administration E.F. Blaine of Yakima was chairman of the Washington State Railroad commission. Blaine travelled over the Columbia Basin many times and the picture of desolation and loss

was constantly in his thought. He speculated for a number of years on the possibility of getting water from the Columbia river to irrigate the basin area. The I.W.W.'s stirred up trouble in Spokane and the citizens after a mass meeting sent Goodland to Governor Lister for help. The Governor detailed Blaine to investigate the situation.

While he was in Spokane trouble broke out at Newport and Blaine went there. At Newport he saw the Pend d'Oreille river for the first time and realized that there was water in ample quantity to irrigate all of the Columbia basin if it would could be brought to the lands. He went to Washington and asked that the Reclamation bureau of the department of the Interior detail engineers to assist him in making a preliminary survey. The engineer found that water could be taken by gravity from the Pend d'Oreille river to the lands in question at a reasonable charge per acre.

On returning to Olympia Blaine laid his plan before Governor Lister. In January 1919 Governor Lister, in his message to the legislature, recommended that measures be taken to determine the merit of this project. A bill was passed creating the Columbia Basin survey commission and providing \$100,000 for the expense of investigations. The original commission consisted of the following: Chairman Marvin Case, state hydraulic engineer; Secretary O.L. Waller, head of the department of civil engineering, state College of Washington; O.O. Benson, state commissioner of agriculture; Peter McGregor, director, Spokane Federal Reserve bank and Arthur D. Jones of Spokane. (The Columbia Basin Irrigation Project, a Report by Columbia Basin Survey Commission, State of Washington, Olympia 1920.)

The report submitted by this commission was entirely favorable. At this period, the Spokane Chamber of Commerce appointed a Columbia Basin Project committee and as a result of the Columbia Basin Irrigation League, composed of voluntary members residing in the States of Montana, Idaho, Oregon and Washington was organized at Pasco in June,

1920.

The first president of the League was Charles B. Hurley of Tacoma and the Secretary was Fred A. Adams of Spokane. The first chairman of the Executive committee was Charles Hebbard of Spokane.

Immediately following the organization of the League a fund was raised and General George W. Goethals, builder of the Panama canal was engaged to come to Washington and review and report on the feasibility of the construction plans. General Goethals in his report dated April 7, 1922, pronounced the project ~~sound and feasible~~ feasible and said: "The Columbia Basin Project is as much a national one as were the Panama Canal and the Alaskan Railways and will, if completed, add much more to the national wealth than either of the others mentioned. The work should be provided for and carried out as were these other two national projects--by direct appropriations. (Columbia Basin Irrigation Project, a report by George W. Goethals & Co. Inc. Olympia 1922.)

About this time Hurley was succeeded by Hervey Lindley of Seattle as President of the League, and Roy G. Gill of Spokane became Chairman of the Executive Committee as well as Chairman of the Spokane Chamber of Commerce committee on Columbia Basin. A vigorous campaign was started to bring the project to the attention of the Department of the Interior and the Reclamation Bureau as well as to keep it before the people. Numerous appropriations were secured from Congress to conduct investigations as to the fertility of the land and to secure information that might be called for at any time by these departments. The State of Washington aided this work very generously and the project at all times had the services of Ross K. Tiffany, State Supervisor of Hydraulics in the department of conservation and development.

In December, 1927, at the opening of the 70th Congress, Senators Wesley L. Jones and Clarence C. Dill of Washington introduced a bill

a duplicate of which was introduced in the House at the same time by Congressman John W. Summers, asking that the Columbia Basin be adopted as a federal project and that appropriations for its construction under the direction of the Department of the Interior be authorized from the national treasury.

The Columbia Basin Project is the largest continuous body of the land in the United States which can be irrigated, as well as the largest project of any kind in this country. The area includes 2,942 square miles, over 3,000,000 acres. Of this land 1,883,000 acres are to be irrigated. The remaining section can be used for grazing stock. The land slopes from the northeast to the southwest from an altitude of 1,700 feet to 400 feet at the Columbia. This region was part of the bed of Lake Lewis in the Glacial age. The soil is the sandy loam or silt loam deposited by the waters, through many centuries and in some places it is 100 feet deep.

There are two possible sources of water supply, the Pend Oreille river at Albion falls and the Columbia river at the Grand Coulee. The water from the Columbia would have to be raised by pumps to the entrance of the coulee, which is over 500 feet above the river. The plan includes a dam at this point, probably 200 feet high which would provide power for the pumps and a surplus of over 650,000 horse power for commercial purposes. This would raise the level of the Columbia about fifty feet at the mouth of the Spokane. A lake twenty-eight miles long would be formed in the Grand Coulee and the water would be taken from a canal and a tunnel to Bacon lake, the starting point of the main supply canals. The distance from the Columbia river to Bacon lake is thirty-eight miles.

The proposed diversion of water at Albion falls is a gravity project, and has been adopted as preferable by General Goethals in 1922

the Bureau of reclamation in 1924 and the Reviewing Board of President Harding's fact finding commission in 1925. A diversion dam would be built at "Ibeni falls and twin horseshoe tunnels thirty-three feet in diameter and over five miles long would discharge into the Chain lakes canal, six miles long leading to a four-mile lake formed by the proposed Camden dam. The plan contemplates a canal line from this point to Dry creek dam, six miles from which twin tunnels extend four miles and canal and lake five miles to Deepcreek dam; then Deadman creek tunnel, one and one-half miles and four and a half miles of lake to Deadman creek dam; four miles of canal and three miles of Pleasant prairie twin tunnels to the Spokane river aqueduct.

At the Spokane river a spillway would permit the discharge of the full flow of the canal. A times the flow of the river would be greatly increased by the waste from the canal. From the river crossing five miles of canal three miles of Manito twin tunnels under the city terminate at Latah creek dam and lake eleven miles long from which twin tunnels nearly sixteen miles long lead to Bonnie and Rock lakes totalling 15 miles in length and united by Rock lake dam. The next section includes over nineteen miles of canals, lakes and a siphon to the Patterson tunnel, three-quarters of a mile long; then sixteen miles of canal and a siphon to Hillcrest. To summarize the main supply system is over 130 miles long and includes approximately 34 miles of tunnels, forty miles of lakes and sixty miles of open canals. The main canal is planned to be forty-seven feet wide at the bottom over ninety at the top and to carry a body of water twenty-one feet deep. At Hillcrest a system of canals would distribute the water to the lands.

Amples of storage of water is provided by Flathead Pond and Oreille and Priest Lakes and the proposed Hungry Horse reservoir in Montana above Flathead lake, on the South fork of the Flathead

river, where a dam 365 feet high is projected. This reservoir would serve to irrigate the Kalispell valley, develop power and reduce the flood levels of the lower lakes. There are opportunities for power development at various dams on the main canal and at a number of drops in the distribution system on the project itself.

The financial plan calls for a loan of \$120,000,000 from the government to build the main canal to be repaid within fifty years. Construction of the canal will take about eighty years and give employment to upwards of 8,000 men continuously. As it nears completion \$30,000,000 additional will be required to build laterals and to prepare the first unit of the project settlement.

It is intended to develop the project in four units of about 450,000 acres each. The first unit will probably be settled about fifteen years after construction begins and the completion of the project lies thirty years in the future. At the present increase in population, in only twenty years, the United States will have 40,000,000 more people to feed.

An interesting feature of the project is that the area included was once largely occupied by settlers and embraces many towns. It includes four county governments. There are good roads, telephones and power lines and four transcontinental railways cross the region. The Columbia river is navigable from Pasco to the sea at all seasons, providing cheap transportation in heavy commodities and numerous automobile stage lines penetrate to all parts of the territory.

Calculations made by the Department of the Interior grant a minimum of 25,500 farm homes on the Columbia basin land and it is estimated that the taxable values of the farms thus created will be more than \$600,000,000. Basing the estimates on the production in the Yakima district for the past 10 years--soil, climate and growing conditions being identical or in favor of the Columbia

asin, it is claimed that the crops produced on the new project when in full cultivation will be worth \$200,000,000 a year. Using the purchasing power of the people of the Yakima district for the comparison, it is estimated that the future population of the Columbia Basin will purchase a minimum of \$180,000,000 in Eastern manufactured products annually--Fuller, George W.- The Island Empire of the Pacific Northwest, a History.. 1928.