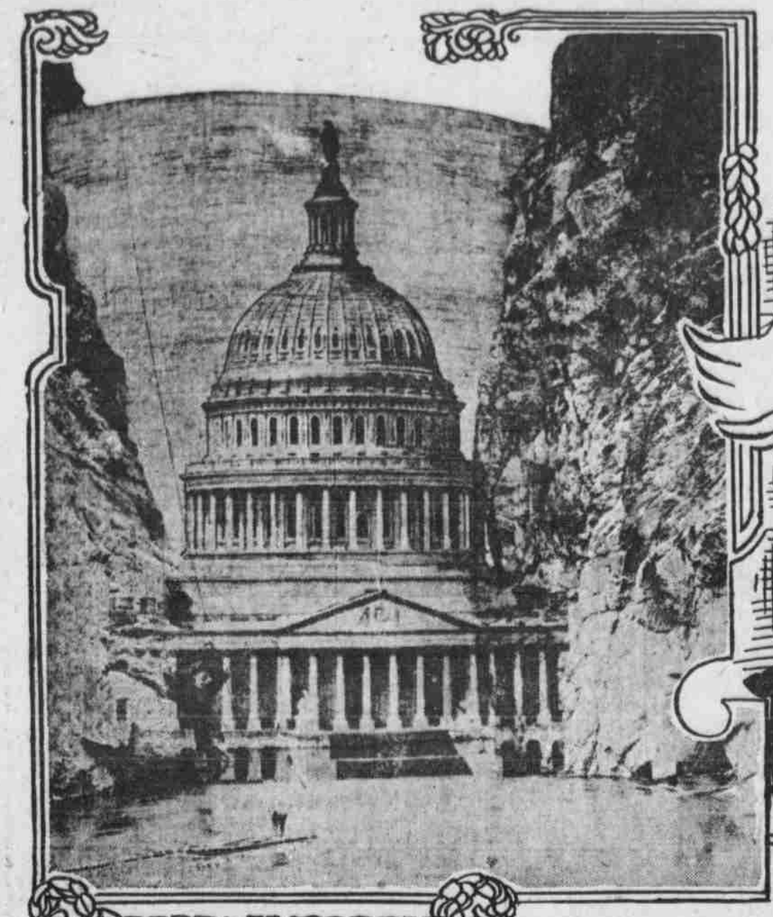
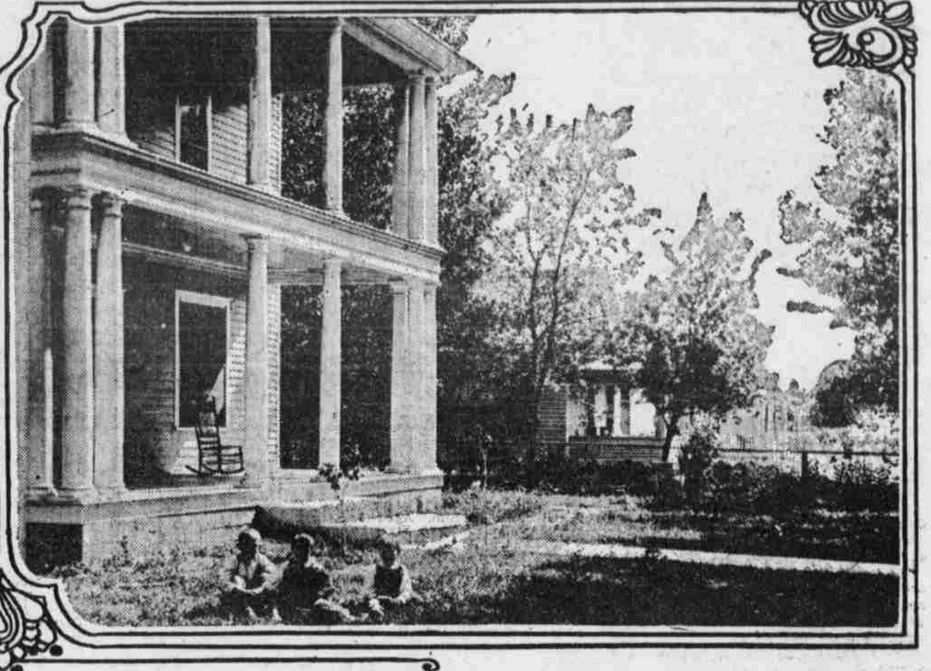
Mighty Dams of the Arid West to Make an Empire Fecund



SHOSHONE DAM, BIGGEST ON EARTH U.S. CAPITOL IN COMPARISON

THE GREAT AMERICAN DESERT SHOWING SAGE BRUSH

SALT RIVER PROJECT - APACHE INDIANS IN GOVERNMENT WORK



HOME OF SETTLER IN MITCHELL - NORTH PLATTE PROJECT

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WASHINGTON, D. C.—The Great American Desert is a thing of the past. Like Moses of old in the wilderness of Sinai, Uncle Sam, patrarch, has struck its rocks with his magic rod and the water has gushed forth, creating oases richer than the valley of the Nile or the Ganges. He has piled up tens of millions to reclaim the bare lands and has an army of engineers and laborers at work turning them into farms for his people. Last year he had 14,000 men digging, blasting and damming. He has already built so many canals that if they were laid end to end they would reach from New York to San Francisco and back to New Orleans, or, if measured upon the Pacific, would extend from California to China. Some of these canals carry whole rivers. He has built about 500 miles of wagon roads, has excavated more than twenty miles of tunnels and altogether has taken out enough earth to equal a ditch three feet wide and three feet deep running clear around the world at the Equator, and in addition to equal a hole three feet square run through the globe from one side to the other, and a similar tunnel dug at right angles to this from pole to pole.

Where the Oases Are.

This is the work of the reclamation service, which is backed by a capital of about $90,000,000, and of which $60,000,000 are already invested. There are $10,000,000 left of the reclamation fund, and in addition $20,000,000 more which have been appropriated by congress and are at the command of the service. This great work is headed by some of the ablest organizers and most skilled engineers of Uncle Sam's scientific army. I have spent this week at their office building in Washington; it has a large number of clerks, although the actual constructive operations are scattered all over the west. The Washington bureau has photographs of every stage of the work; it receives daily reports of what is being done, and one can get a bird's-eye view of the mighty undertakings which are now under way. The government scientists have made maps of the country, testing every slope, hill and valley. They have measured the water in the air overhead, and with diamond drills have tested the beds of the canyons beneath in sinking the foundations for dams which will store up the rainfall; they have done so much drilling that if the holes could be placed end to end they would reach more than ten miles down into the rocky heart of old Mother Earth.

In company with Dr. F. H. Newell, the director, and one of the engineers, Mr. C. J. Blanchard, I have gone over the maps showing where the various reclamation projects are situated. Broadly speaking, they cover the whole arid west extending from the great plains to the Pacific. Those of the great plains are in a country which has been largely devoted to grazing and which had enough rainfall to produce food for the millions of buffaloes which once wandered over it. These projects are in the western parts of Kansas, Nebraska and the Dakotas.

Another division is situated on the great plateau which lies between the Rocky mountains and the Sierra Nevadas and Cascades, while others are on the Pacific slope still farther west. There are in all thirty-four of them, in each of which work is now going on, and in many of which water is already flowing over the lands.

Uncle Sam's Big Dams.

Every one of these oases contains wonders enough for a letter, and some are so remarkable that they cannot be passed without notice; they are all watered by dams which have created reservoirs in the mountains, and some of these dams are of enormous extent. Take the Shoshone river in northern Wyoming, on the borders of Yellowstone park; that dam is a wedge of solid concrete higher than the dome of the national capitol at Washington, and it holds back a beautiful lake, 100 feet deep, covering more than 6,000 square acres. The dam is eighty-five feet long at the bottom and it rises up to a distance of 328 feet between nearly perpendicular cliffs measuring about 200 feet wide at the top; it is the highest of all masonry dams and it will reclaim 132,000 acres of some of the richest land upon earth. Of this 123,000 acres are public property ,and they will be opened to settlement by the secretary of the interior when the works are completed.

Just below this dam is another which diverts the stream into a tunnel over three miles in length, carrying the waters into a broad canal and thence out to the farm lands. Thousands of acres of that tract have already been settled. Hundreds of families are established and towns are springing to being.

Another great dam is the Pathfinder, named after General John C. Fremont, the noted explorer. General Fremont nearly lost his life while attempting to cross in a boat. The structure will be 215 feet high and will store enough water to cover a million acres to the depth of a foot. In connection with the dam and the reservoir the government has built a canal ninety-five miles in length to carry the water on to the lands of Wyoming and Nebraska. This canal is lined for miles with cement, and in places the water is carried over the country on viaducts made of concrete. This is in what is known as the North Platte Project; it is located about 100 miles north of Cheyenne, being tributary to three differnt railroads. About 80,000 acres of land have already been taken up and they will soon be covered with farms.

The Roosevelt Dam.

The largest dam of all, however, is the Roosevelt dam, the completion of which was celebrated last spring, and whose water is now flowing over thousands of acres, which, a short time ago, were as thirsty and dry as the heart of Sahara. This is situated in the Salt river valley in southern Arizona, not far from Phoenix, in a region so arid that it has been nicknamed "The Land That God Forgt." Nevertheless, it was irrigated to some extent in ancient times, and the white man has irrigated farms there for over forty years. Apache Indians here aided in the government work.

The dam will hold back a million and a quarter acre feet of water and it will make 240,000 acres a very Garden of Eden. The country there is so hot that a vast deal of water will be needed to keep the lands moist. As much as four feet can be used to advantage, so that if the water used in a year should stay on the land it would cover it to the height of one's chest.

In the Yuma project, which is still farther south, at the junction of the Gila and Colorado rivers, the climate is still hotter and the land can drink up five and a half feet of water per annum, so much that, if left, it would drown out all the girls under five feet six who will soon be living upon it.

The Roosevelt dam is made of sandstone and cement; it is as high as any office building of twenty-one stories and its length at the top is equal to two city blocks; it is, in fact, over 1,000 feet long; it is 170 feet thick at the bottom and over a third of a million barrels of cement were used in its construction. This was made by the government at works created for the purpose, resulting in a saving of $600,000 on that item alone. This dam will furnish electric power, which will be used for pumping water from underground in the Salt river valley, adding something like a thousand more farms to the cultivated area.

Uncle Sam's Irrigated Farms.

These dams and the others connected with them now being made by the reclamation service will add enormously to our national fruit and bread basket. The lands reclaimed are naturally the richest of the world; they are made up of the earth washings of the mountains, whose fertilizing materials have not been carried away by the rains. The soil is as hot as that of a hotbed. In most places it surpasses that of the Nile valley, and altogether there is so much of it that it will add more than seven Egypts to Uncle Sam's farms. All the land now cultivated in Egypt is a little more than 6,000,000 acres. When our reclamation projects are completed they will reclaim 45,000,000 or 50,000,000 acres, and if the land should support proportionately as many people as does the valley of the Nile they will feed something like 77,000,000.

This means results which are far in the future and somewhat beyond what the engineers now claim. Mr. Blanchard tells me that there will undoubtedly be enough land for 1,000,000 families, and in this he estimates the farms at thirty or forty acres each. One acre of any of these oases is easily equal to five or ten acres of Illinois or Iowa, and it is said that a family can be supported on a five or ten-acre patch. About 1,000,000 acres have already been covered with water and homes by the hundreds are being cut out of the sand. On many of the oases towns have already gone up, street railroads have been built, school houses and other public buildings constructed and social and political communities are well under way.

What Has Been Done.

Let me run over some of the projects and tell you a little of what has been done. Take Yuma, on the Colorado river, on the southeastern boundaries of Arizona and California. There is a dam there almost a mile long, that is as high as a two-story house, which will eventually irrigate about 97,000 acres of land. The dam was completed about two years ago and a distribution system of 187 miles of canals has been laid out and is well under way. The lands here are partly in California and partly in Arizona. The total area redeemed will be about 100,000 acres, of which 80,000 will be in Arizona. About 5,000 acres of land are already under irrigation on the California side of the river and other lands are open to settlement.

The country never has frost and its hot tropical sun fits it for the cultivation of oranges, lemons, grapefruit, dates, etc. It is an ideal region for ostriches and it will vie with South Africa in the raising of feathers for our American market.

Jumping to the extreme north, where the Shoshone river has now been turned on the lands, a number of towns have been laid out and some are fast growing. Cody, which was named after "Buffalo Bill," has a population of 2,500, with three banks, stores, lumber yards and hotels. An electric plant furnishes the town with light and power and it has a sulphur plant, a brickyard and a flour mill, which grinds 125 barrels every day. Garland, another town, has about 500 people, and Powell and Ralston are other settlements out to settlers in tracts of forty acres and eighty acres each. The most of the farmers think forty acres enough to yield a good income and say that is all the land one man can comfortably handle. They tell, however, of extraordinary yields of vegetables, sugar beets, fruits and grain, and are making good in every possible way. The town of Huntley is fast growing and it has churches, banks and hotels. Osborn is another town which has sprung up, and near it is Ballantine, which has five stores and a postoffice, while Warden and Newton are also fast growing.

The irrigation here was practically completed in 1907 and hundreds of families are now on the lands. Many are raising alfalfa, which they sell for $8 a ton, and not a few have diversified crops from which they are getting from $800 to $2,000 per annum on forty-acre farms. Nevertheless, the soil had not been scratched by the plow before the government took hold of it. Uncle Sam had to spend $1,000,000 be- which are rapidly growing. Here the soil is a rich, sandy loam, fitted for alfalfa, grain and deciduous fruits. There is a grazing country about and the irrigated lands are well fitted for sheep.

The Work in Montana.

From Shoshone let us go north into Montana and take a look at Huntley, which lies at the junction of the Northern Pacific and Chicago, Burlington & Quincy railroads, on the south bank of the Yellowstone river. Here lie about 29,000 acres upon which Uncle Sam has put water, and which he is now giving fore it was ready for settlement, but the lands are now being paid for and every cent of the money will eventually come back into the treasury.

Where Apple is King.

Going westward into Oregon and Washington, we reach the fruit lands where the chances are even greater than in the irrigated sections farther east. Here are the Yakima projects in a region where full bearing apple orchards produce crops worth from $300 to $1,200 per acre, and where peaches do quite as well. Yakima county is shipping hundreds of thousands of boxes of apples each year, and millions of young trees are now growing. Alfalfa hay brings there $5 a ton in the stack, and in one year the valley where this project is situated sold its hay crop for $2,000,000. This is a country of towns, newspapers and up-to-date people. There are many private irrigation works under way, and the products of the valley are so well known that they command a ready market. It is a land of banks, schools and churches, and one where the social conditions are already established. The government estimates that by proper storage sufficient water can be saved to irrigate 460,000 acres, and a large area is now under water. Dams have been put up, canals dug, and the farmers are tilling the soil. The cost of the land on the ten-year installment plan is $52 per acre, and the maintenance charge is 95 cents per acre per annum. This seems rather high for one who does not understand the conditions, but when it is remembered that orchards are worth from $500 to several thousand dollars per acre, when they have once come into bearing, the possible profits are plain.

Another fruit project in Washington is the Okanogan, which will redeem 10,000 acres of high-grade fruit lands. This is completed.

Going south we come to the Umatilla irrigation works on the edge of Washington, in northern Oregon. Here an earthen embankment a half mile long and 100 feet high will hold back the floods. The soil is porous and many of the canals have been lined with cement on that account. Several towns have grown up in this region, of which Hermiston has 1,000 or more population.

California Works.

Still farther south is the Klamath project on the boundary of Oregon and California, which will reclaim 190,000 acres. Of this about 30,000 acres are already under water, and about 40 per cent of the work has been completed. A storage dam has been built which makes Clear lake a reservoir and there are other storage projects which will ultimately irrigate this vast tract of land.

The Orland project in northern California is also progressing. About 77 per cent of the work is completed, and the East Park dam there will store water for about 14,000 acres. The dam is 130 feet high and it has a reservoir capacity of 45,000 acre feet. This lies about ninety miles north of Sacramento on the Southern Pacific railroad. The greater part of it will be opened this year.

The Heart of the Rockies.

Some of the biggest schemes which the government has now under way lie in the heart of the Rockies, or, rather, on the great western plateau. In Utah we have the strawberry valley project, which will redeem 60,000 acres. It is now 45 per cent completed. In Nevada is the Truckee-Carson project which involves more than 600 miles of canals, and 50,000 feet of dykes and dams. This when finished will irrigate 260,000 acres, and the first unit is now ready.

In Colorado the Gunnison river has been carried under a mountain 2,000 feet high by a tunnel six miles in length into the Uncompahgre valley. This is a part of a scheme which eventually will irrigate 140,000 acres, and the engineering connected with it is most remarkable. The tunnel was made in eight-hour shifts, the work being kept up day and night, and it was competed in the shortest time upon record. In one month 823 feet were made, and one gang of laborers dug out 7,500 feet in one year.

Some Operations in Texas and Nebraska.

I have already written of the Pathfinder dam. This is connected with the Nebraska project on the North Platte river, and it includes a diversion dam 600 feet long and twenty feet high which has been built across that river near the station of Whalen. An interstate canal carries the waters stored in the Pathfinder reservoir through this dam over the lands of Wyoming and Nebraska. This project is about three-fourths completed. The canal has been dug to a length of 100 miles, supplying about 80,000 acres of land, and the men are now at work upon reservoirs which are to be filled during the non-irrigating seasons. The watered lands are being settled and are yielding abundant crops.

An interesting situation is that of the Rio Grande project, which is just across the river from Mexico, and as to which Mexico objected, as it diverts the waters of the river which forms the boundary of the two countries. This matter has been settled by the reclamation service placing its dam near the station of Engle on the Santa Fe system, and agreeing to give the republic of Mexico an annual supply of 60,000 acre feet of water. The reservoir which will be made will have a capacity of about 2,500,000 acre feet, and it will irrigate 180,000 acres. The work is already in progress there. A railroad has been built from Engle to the dam site.

Some Pumping Projects.

In North Dakota the government proposes to pump the water from floating barges in the Missouri river, using the cheap lignite coal which is found everywhere in that region. By this means it will irrigate the bench lands in the vicinity of Williston and Trenton, ultimately reclaiming perhaps 20,000 acres. During the last year about 2,400 acres have been irrigated in this way.

In South Dakota the Belle Fourche project has been 83 per cent completed. This is an important system, including a storage reservoir, an enormous storage dam and a large canal. Thee project will water 100,000 acres of land of which about half is already completed.

FRANK G. CARPENTER.