

ANNUAL REPORT
FISCAL YEAR

1915

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Albuquerque, N. M.

#1

NAVASO. The Ganado Project.

This Project is to construct a reservoir about three miles from Ganado, Arizona, by impounding the waters of the Rio Pueblo Colorado in a reservoir on a flat on the north side of the stream where a small flood water lake has existed for many years, and irrigate the lands along the stream below, from it.

Plans and estimates were made for this Project and Congress appropriated \$60100.00 for its construction. The plans prepared were for a diversion in the stream, the construction of the reservoir, the construction of a distributing ditch for a couple of miles and the enlarging and rebuilding of a ditch, formerly owned by Mr. J. L. Hubble, for several miles further, the Project to cover about 700 acres of land.

After the preparing of the plans and before construction was commenced, the stream shifted its channel from where it formerly ran on rock bottom to a place in deep alluvial soil, and the channel was cut down some fifteen feet below its former level. This made the diversion cost a great deal more than was anticipated. The plans were also changed for the construction of concrete headworks instead of wooden. Heavy floods, both in the stream and from cloudbursts on the side drainage, changed the stream so that larger

flumes were necessary, and one flume was entirely washed out after being constructed. From all of these causes the money appropriated was not sufficient to complete the Project. An estimate was made for completing the original Project and for extensions to bring more land under ditch, and the amount necessary was included in the Indian Appropriation Bill for 1916, which failed of passage. The work therefore has been closed down until Congress gives additional money for this Project.

At present the status of the work is as follows:

The diversion works are completed. The storage reservoir has been completed within eight feet of the height contemplated, and the distribution canal has been completed to a point beyond the Hubble Ranch and within a short distance of the end of the canal as originally proposed.

Mr. J. L. Hubble had diverted water from this stream and had built a canal to his place, planning to build this reservoir at his own expense but found it too expensive to handle alone. Mr. Hubble made a proposition to the Government to give up his water rights and his constructed ditch in exchange for a reservoir right in the proposed reservoir, and the right to convey water to his land through the Government ditch, and he further agreed to guarantee the maintenance of the

ditch indefinitely. This agreement was ratified by the Department May 31, 1913.

Water has been impounded in the reservoir to as great a depth as was safe, and we have been ready to furnish water for irrigation purposes to a limited area of land since May. There are several hundred acres of Indian land that can be watered as well as the lands of Mr. Hubble. Only two of the Indians have made any attempt at cultivation this year, as we would not guarantee that they could have water. These Indians have been furnished water and Mr. Hubble has been given the amount he needed during the latter part of May and all of June, and will be served during the balance of the season.

All construction work has ceased as the funds available are almost exhausted, but location surveys are now under way for the balance of the system, including ditches on both sides of the stream, as we have been informed that the General Land Office are about to commence their survey for the subdivision of this land, and it was necessary to have the canal lines staked on the ground that they might be meandered and the right of way for the ditch not included in any subdivision for allotment.

The Project will be left in the hands of a caretaker for operation, and such work in the way of maintenance as may be necessary will be done.

Mr. Hubble has announced that he will expend four or five hundred dollars in the construction of an interception ditch above the canal at various points to intercept local storm waters, that the operation and maintenance of the ditch may be materially lessened.

As the bulk of the construction work has been completed, when Congress gives us the additional funds asked for it will be a comparatively short job to complete the Project.

Owing to the long distance from the railroad from which all forage and food supplies are freighted, this Project would be of great value in allowing a considerable portion of the forage and no inconsiderable amount of feedstuffs to be raised.

The cost of the Project is estimated at a little over \$16,000.00 or a cost of approximately \$16.00 for each acre irrigated. A full detailed report has been made to the Indian Office under date of June 26, 1918, regarding the possibilities of this Project.

WESTERN HAVAJO. Marsh Pass Project.

About 90 miles north of Tuba is Marsh Pass through which the only wagon road between the Tuba country and the north slopes of the mountains passes. Just below this pass has been located a new boarding school. Surveys, plans and estimates have been made for the construction of an irrigation project diverting water from Laguna creek and covering land below the school.

While there are large floods, in this stream an excessive amount of silt is carried. The normal flow however of between four and five second feet can be depended upon most of the year. With this water it is proposed to irrigate about a thousand acres of land, which would give a couple of hundred acres for the school and some 800 acres for the Indians. Owing to the fact that there is little or no irrigable land in this Reservation, this development would be extremely valuable to the Indians. If these Indians were given five acres of irrigable land for each head of a family approximately 160 families would have sufficient land upon which to raise corn and vegetables which would go a long ways toward their support, and be a large factor in their advancement along the lines of civilization.

NAVAJO. Tes Nos Pos.

Tes Nos Pos, meaning "the place of the round cottonwood," lies on the north slope of the Carriso mountains in the northeast corner of Arizona, and about 50 miles west of Shiprock.

At this point the Indians have had a ditch for a good many years and have been making good use of the water. They have large fields devoted to corn and garden truck, several nice bearing orchards and several good fields of alfalfa.

Flood waters of the past year or two had cut down the bottom of the wash to such an extent that it seemed as though the Indians were unable, with their own efforts, to properly put the water back into the ditch. Authority was requested and granted for the expenditure of \$3000.00 to do the necessary work at this point.

Tentative plans were made by Engineer Ritter, but owing to pressure of other work nothing was done at this point until early in June. When the Engineer reached this place it was found that the Indians, despairing of assistance from the Department in getting water on their crops, had done considerable work and had a head of water flowing in the ditch. The work done however was of such a nature that it is probable

that the first flood would have carried it out. The amount of work that had been done was of such magnitude however, that it was thought desirable to take advantage of it, so the plans were modified. The Indian ditch was originally taken out at the end of a sharp bend in the arroyo and the water was diverted into the canal by a low dam, which was always taken out by the summer floods, depriving the Indians of the use of the water at the most critical season of the year. It had been planned by Mr. Ritter at the time of his first visit, to construct a portion of the head of the ditch anew, lowering it about four feet there being that much surplus fall in the upper section. The work done by the Indians had been to put in a rock and brush dam raising the bed of the Creek to the original grade of the ditch.

The new head consisted of a heavy cut starting from the Wash several hundred feet above the old head with a cut of about eighteen feet for a length of over one hundred feet. This ditch has a bottom width of five feet. A dike composed of rock and brush eight feet high and eight feet thick, founded on a gravel bar eighteen inches below the bed of the Creek and backed by an earthen dam six feet wide on top which was built out of the spoil from the new cut, was constructed to deflect the flood flow against the opposite bank of the

Creek. Through this dike a timber culvert was built with an eighteen by twenty-four slide gate on its upper end. On account of the change in plan there was insufficient lumber to make this properly, and it is proposed some time later in the season to replace this with an eighteen inch American ingot iron culvert with a steel gate, which should make this perfectly safe.

Owing to the changes in plan, and the amount of work done by the Indians without charge, only about one-half of the amount authorized was used in this Project.

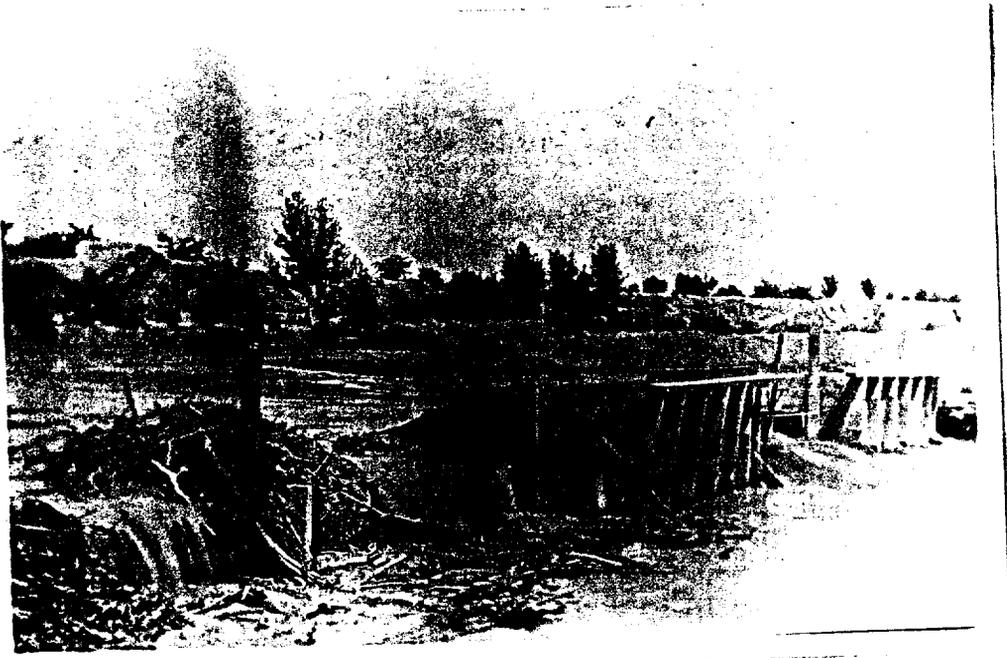
WESTERN NAVAJO.

The Western Navajo Indian Reservation is probably the most arid of any of the Indian Reservations in the United States. Aside from the few small patches that have been developed by the Indians themselves, there is no irrigation or cultivation on the entire reservation excepting at Tuba. The elevation at this point is about 4500 feet and the mean annual rainfall is 6.33 inches. Some years the precipitation is very much less, as in 1899 the total amount was 2.65 inches.

At Tuba numerous springs are found, and it is with this water that the School and Agency Plant is irrigated.

East of the Agency about 4 miles is what is known as Reservoir Canyon, in which three reservoirs have been constructed which are filled by the accumulating water from springs. This water runs down a natural channel and is used for irrigating a small tract of land cultivated by a small band of Hopi Indians, an offshoot from the Pueblo ^{of} Oraibi and known as Moencopi Village.

Keencopi Wash Dam



A receding Flood



Distant view of Dam as flood recedes

Moencopi Wash.

Moencopi Wash lies south of Tuba about a mile. This stream drains a large area and while the normal flow is very small it is subject to very large floods.

Tuba and the surrounding country was purchased by the Government from Mormon settlers who came in there at an early date. These people had diverted water from this Wash over several hundred acres of bottom land which they had in cultivation at the time of the Government's purchase. Almost every year they were obliged to rebuild their diversion dam and after the purchase by the Government the dam was rebuilt quite a number of times in the same general manner and had gone out with each recurrence of floods.

Early in 1909 plans were made for extending the ditch 1800 feet up the stream and constructing a dam. This work was done during 1909 and 1910. A very large flood in 1910 which carried logs and trees brought down from the mountains above, badly damaged this dam, and it was decided to cover the loose rock with slabs of concrete and with a concrete wall above and at the toe of the dam. This was done and at the same time the spillway was lengthened from 100 to 140 feet. This was followed within a short time with an excessive flood which not only filled the channel of

Moencopi Wash Dam



West end of dam finished



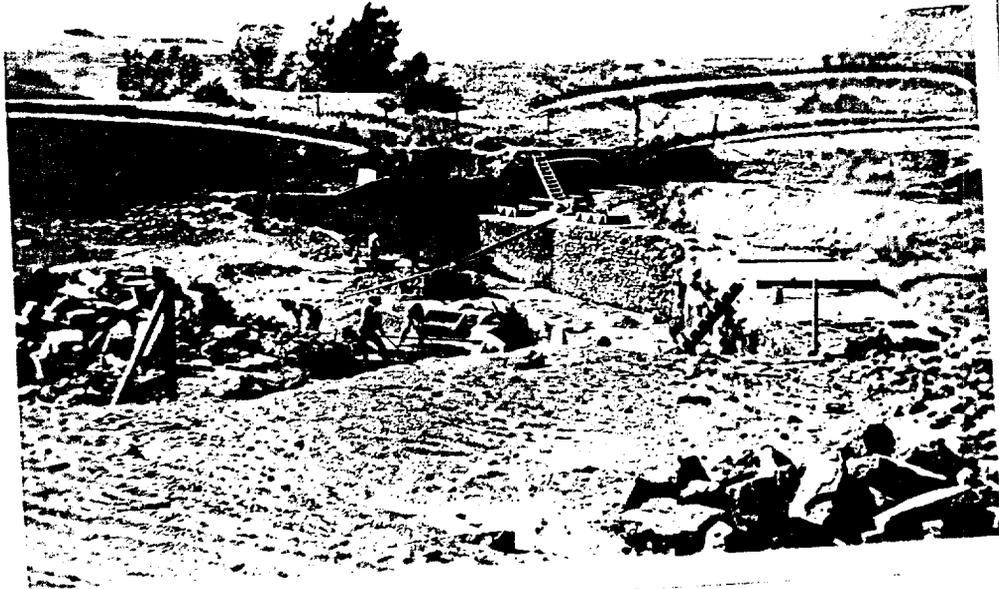
Excavating for water cushion

the stream, but passed over the headgates which are 13 feet above the crest of the dam and about 40 feet of the center of the dam was again destroyed.

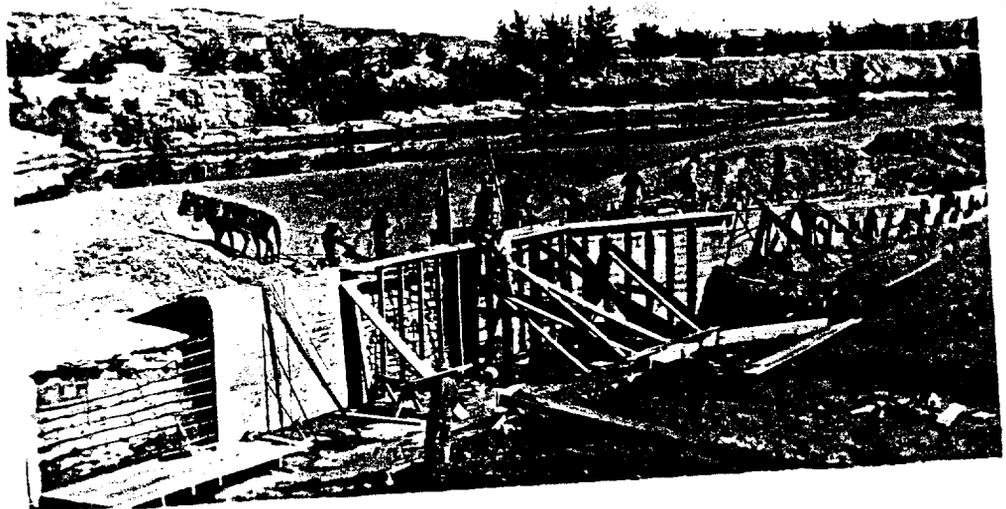
Repairs to this dam were under way at the end of the last fiscal year. It was expected that this dam would be completed during that year, but the summer rains began six weeks earlier than usual and after the work was all opened up and concreting had commenced, floods in the stream brought down great quantities of mud and sand and covered the opened work to a depth of five feet. One flood after another followed during the summertime, and it was the middle of August before work was resumed. On the 3rd of September the largest flood of the season came down again burying the work, but in spite of the drawbacks the concrete was all placed during the month. During October the head section of the ditch was cleaned out and a sandbox and wasteway constructed about 1800 feet below the head, and the work on the Project was completed about the middle of September.

The bedrock at the dam site is a very soft red shale which becomes soft when in contact with water, and it was the disintegration of this shale that caused the center portion of the old dam to wash

Moencopi Wash Dam



West end of dam before building concrete face



Sections finished; placing concrete and showing reinforcement