

U. S.  
INDIAN  
IRRIGATION  
SERVICE  
DISTRICT  
NO. 5

ANNUAL  
REPORT  
1922

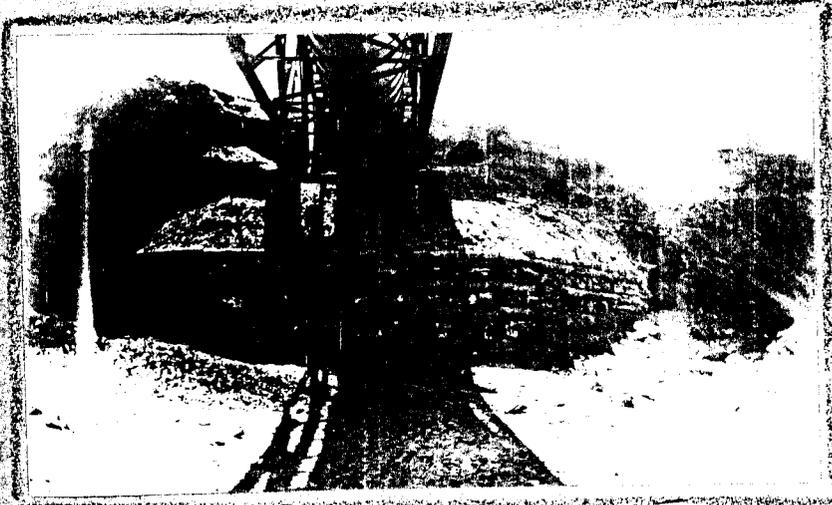
H. F. ROBERTS  
Supervising  
Engineer.

GANADO.

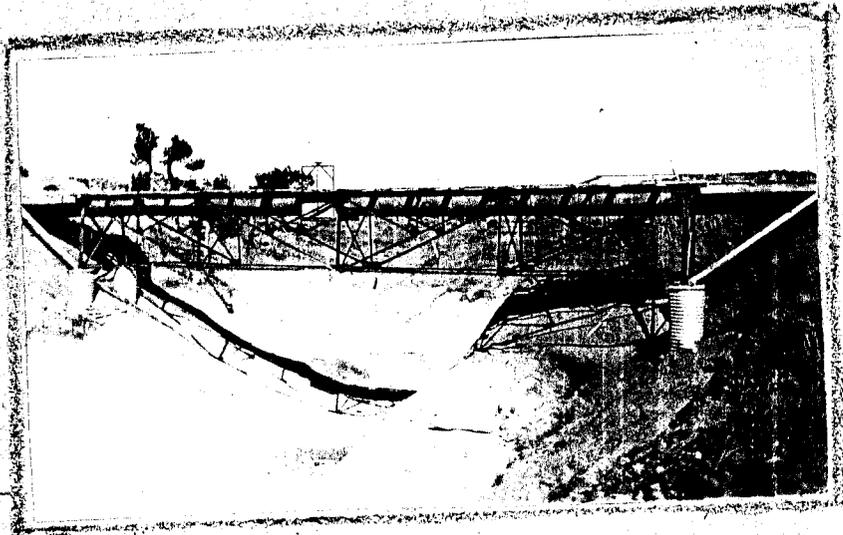
Heavy rains during July and August of 1921 caused cutting of a number of arroyas crossed by the South Side Ditch and especially at the large arroya crossed by flume 4. The irrigating season was finished without the flume going out, but it was left in such condition that repairs were necessary before water could be turned into ditches for 1922 irrigation. This flume is a truss and the wooden supports at the ends were replaced by concrete piers, using corrugated culverts on end, sunk and concrete filled. Rock filled cribs were built around these piers, being further protected from undermining by sheet piling driven eight feet into the bed of the arroya. This may seem like unnecessary work in a dry wash, but this particular one drains a considerable area and the material is a loose aluvial deposit, largely sand. This is the third flume that has been built here.

The ditch leading to and from the flume was lined with concrete for a distance of about 75 feet to prevent any possibility of the ditch breaking and flowing back into the arroya and eroding around the piers. This concrete was reinforced with old rods from flume No. 5 upon its reconstruction.

Flume No. 5, which was a wooden truss, was replaced with a steel one during the year, and during



Ganado  
Flood Protection  
East Pier Flume #4



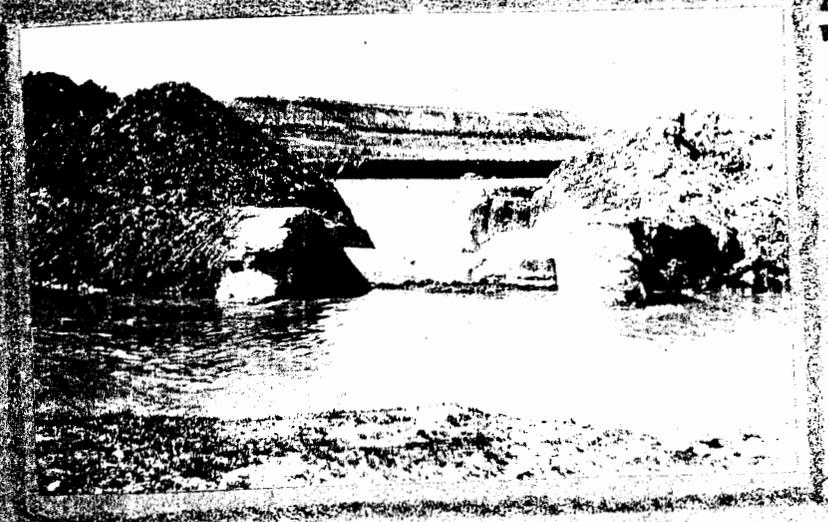
Ganado  
New Flume #5  
Steel Truss re-  
placing old wooden  
structure.

its building, on account of heavy rains, the false work was washed out twice, making the cost rather high.

Some protective work was done on the jettys above the diversion dam. A plentiful supply of clear water for the reservoir came down the Rio Pueblo Colorado, making it unnecessary to divert any considerable quantity of the heavily silt laden flood water. Water was furnished for irrigating 110 days during the year.

The Indians are settling up the project more rapidly now, and there is an increasing demand for lands under the North Side Ditch. This ditch has not been quite completed, as there are two or three flumes yet to be built and provision should be made within the next year to give us the necessary funds for this construction. The Indians are settling up the land under the South Side Ditch, but of course they are anxious to get under the North Side Ditch as there will be less work in preparing the land for cultivation, but by holding up the construction another year we will probably be able to get some of them to settle on the other side of the river.

Canado  
Protective Spill-  
way above Flume 4



Concrete Lining  
to protect bank  
East End Flume 4

MOENCOPI WASH

The Moencopi Wash which flows through the Western Navajo Reservation a short distance from Tuba, furnishes water through a ditch built many years ago, to about 626 acres of land. 322 acres of this is used for school and agency farms and the balance is used by the Navajo Indians. Some years ago a new heading was made for this ditch some 1800 feet further up stream than the original heading and a concrete dam and headgate were built, and last year a spillway of concrete was placed in the ditch about the location of the old headgate.

It was found necessary to do some protection work on the ditch, as it runs very close to the top of a forty foot bank composed entirely of alluvial deposit. Authority was received from you to build a jetty in the stream to keep the stream from cutting further into this earth bluff and to line the ditch with concrete along the top of the bank. During the year this work was done, which consisted of lining the ditch for a lineal distance of 875 feet and the protection built in the stream was 20 feet high by 16 feet square. In addition to this the ditch between the sluiceway and the headgate was cleaned of mud, which had been de-

posited by the largest flood known in Moencopi  
Wash for twenty years. •

This work was completed in August 1921.



Fort Defiance  
Dam under construction. Looking  
up canyon.

UNDERGROUND WATER DEVELOPMENT, NAVAJO AND HOPI.

Two well rigs have been in operation during the year and well rig number 7 has drilled fourteen holes, three of which have been deep wells. The newly discovered artesian belt in First Mesa Wash was developed further and two good flowing wells obtained, one of which flows 2800 gallons per hour. This seemed to cover the limit of this small artesian belt. From there, several other wells were developed in the Hopi country, and later in the year, the rig was moved into the Navajo land, about half way between Keams Canon and Ganado, where there was great need of water supply. As heretofore no water had been developed in this region, it was largely a matter of exploration. Eight holes contained some water, but it was in such fine material that it was impossible to develop it. Finally near the end of the fiscal year, one good well was developed, which will be of great benefit to the Indians in that section, and another well started which we hope will prove equally as good.

Well rig number 16 has been working in the eastern part of the Navajo Country, and upon authority from the Indian Office was loaned to the Crownpoint School to put down a well or wells at the school farm; all ex-



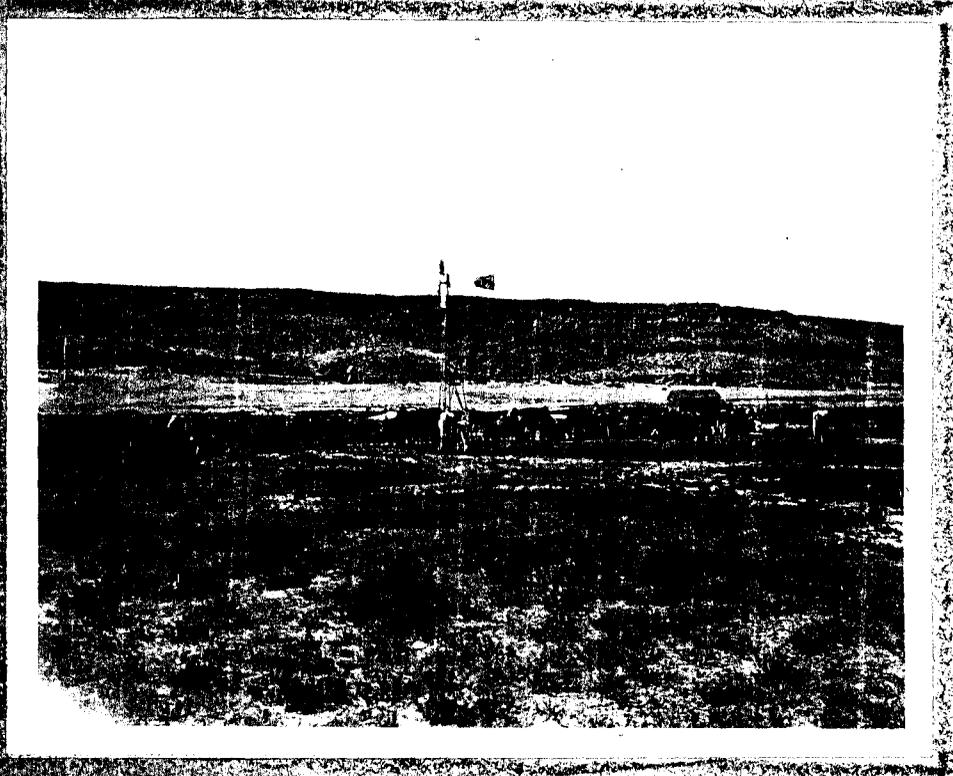
Wall No. 715-2800 Gal. Capacity.

penses being paid from a separate fund, the money being disbursed by the superintendent. They have been working on a deep artesian well, and at the end of the fiscal year, had practically reached the limit of the rig at a depth of about 1200 feet.

Two wells were drilled on the reservation before commencing at the Crownpoint School farm, both of which were successful wells with an ample supply of water.

Two maintenance outfits have been in the field the entire year, one with headquarters at Chin Lee, and one at Polacca. All windmill maintenance has been kept up, each well being visited at frequent intervals, at least once a month, and all necessary repair work made promptly. Troughs and tanks have been placed at six new wells and several windmills erected. The building of surface reservoirs for storage of water during the rainy season for stock use has been done at various places on the reservation. Foreman Womack has made several exploratory trips into new country and there are new lands that may be opened up to the use of Indians by further well drilling. But most places where water can be secured at shallow depth have been worked out and much of the future work will be in country where the holes will have to be deeper and consequently the work will be slower.

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No. 472 at Polacca.

SEMPER PARATI THE NATIONAL ARCHIVES

The development of artisian water near the First Mesa opened up new prospects for the Hopi Indians of that vicinity. The well is down by the wash and about three fourths of a mile from the foot of the Mesa proper.

The main water supply for the Hopi Villages is in what is known as Ishpi Spring, which lies a few hundred yards from the quarters of the field matron, those of the Irrigation Service, and the Church and Mission. When this water was struck, and the quality found so much superior to anything in the entire Hopi Country, both the Agency and the Mission saw that there was a chance for considerable help for these Indians. The Agency had practically no money available for any development at this place, but had some supplies. The Mission had some \$2000 that they could use, and it was decided to put a large reservoir at the well, install a pump and run a pipe line to the Agency and Mission buildings on the side of the hill, and place another reservoir at a point above the buildings.

The idea was to get this good water as near the village as possible, with a reasonable amount of pumping, and to have a good quality of water at the Mission and field matron's quarters in order to allow the establishment of a laundry open to all the women of the village.



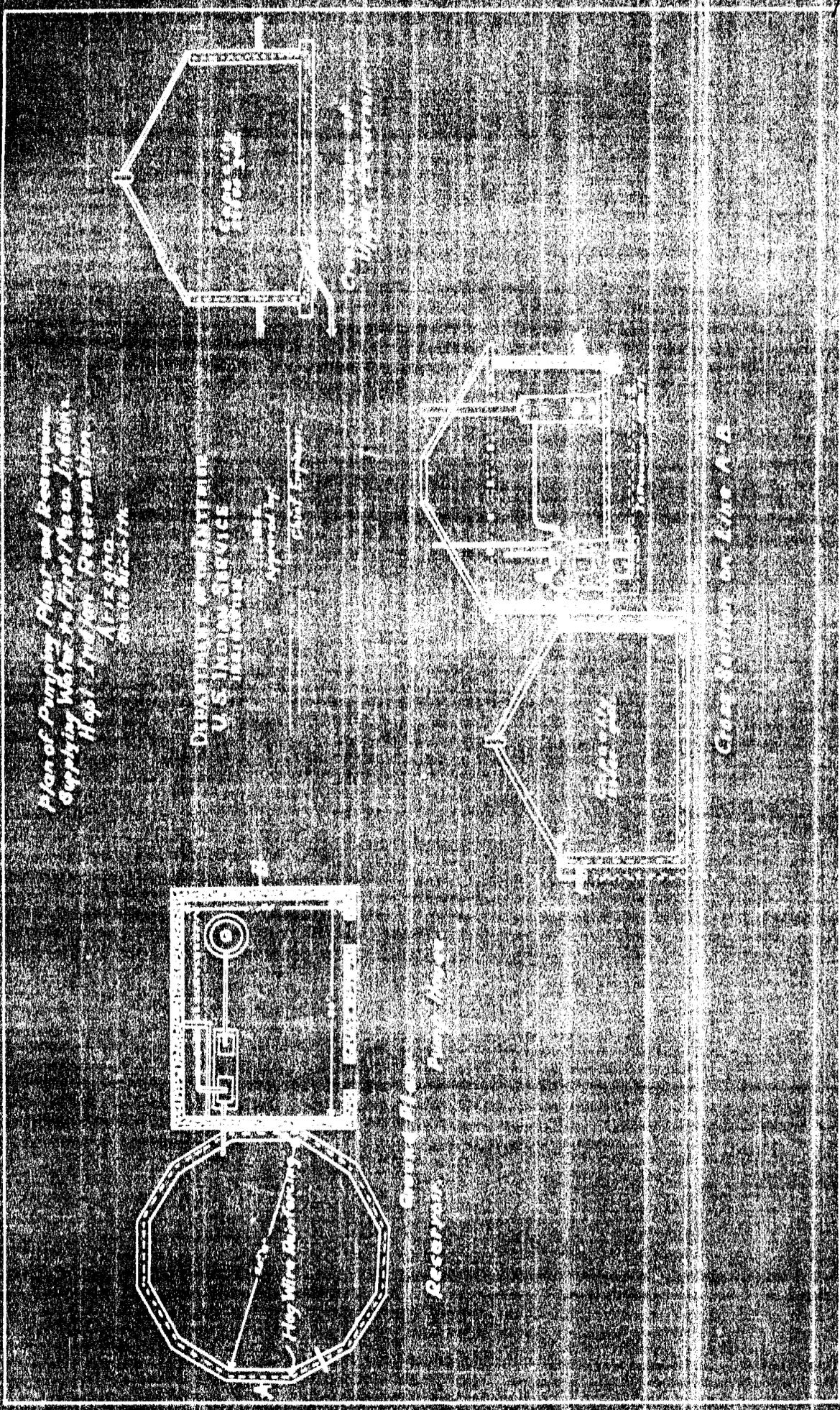
Well No. 602.  
Near the Hogan of  
Charley Jesus.

and bath houses for the use of all the Indians.

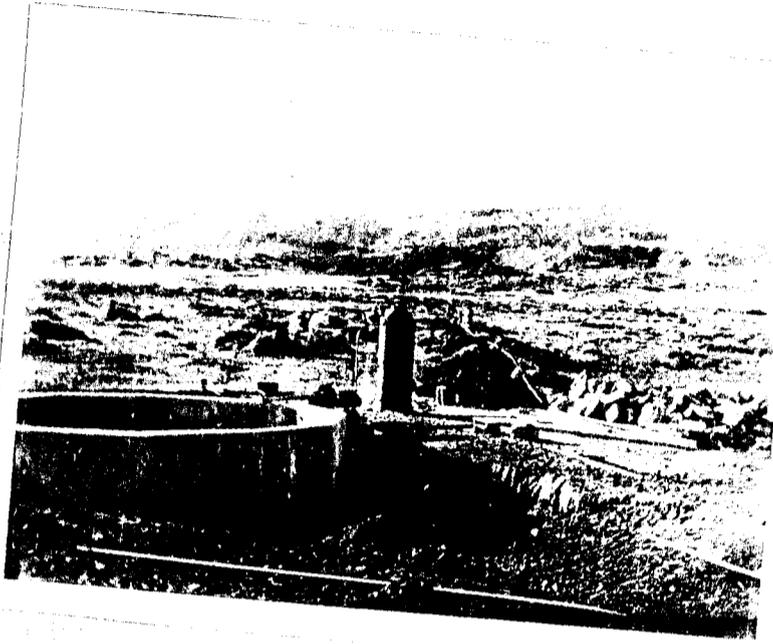
The Indians were interested in the work and agreed to donate a large portion of the labor. The Mission furnished most of the pipe and are installing laundry and both rooms, and I believe the Agency will do the same. The cement, pump and boiler were furnished from the Agency and the Irrigation Service furnished the plans, the supervision, two old boilers that may be used for water heaters for the laundry and bath houses, and a small amount of incidental material used in construction. The Indians donated labor which if paid at regular rates would have amounted to something over \$1700.

A pipe line was also run from the upper reservoir to a point where water will run into barrels carried on wagons, so the Indians may haul water from the top of the mesa in teams, where heretofore it was carried on the backs of women from springs which were inaccessible to wagons.

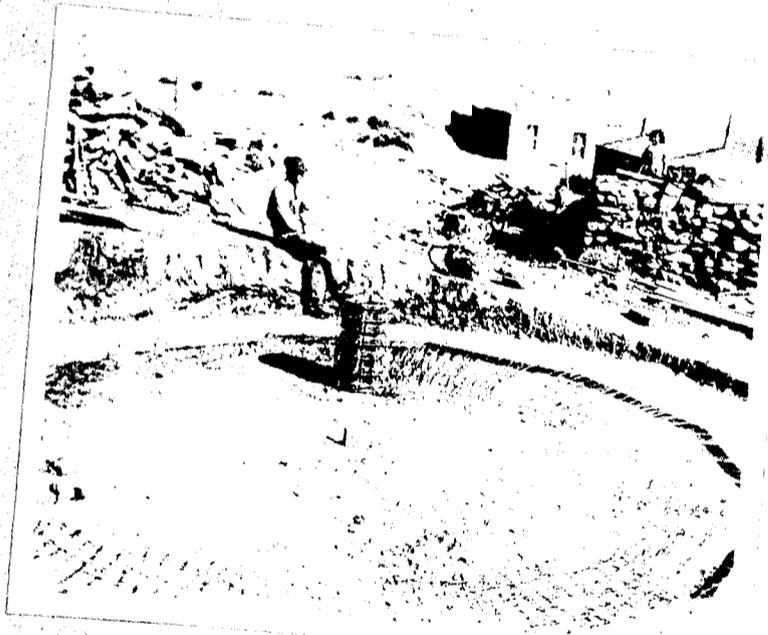
Plans of the reservoir and pump house accompany this, together with a number of construction photographs which will give a good idea of what has been done.



Domestic Water  
at Polacca



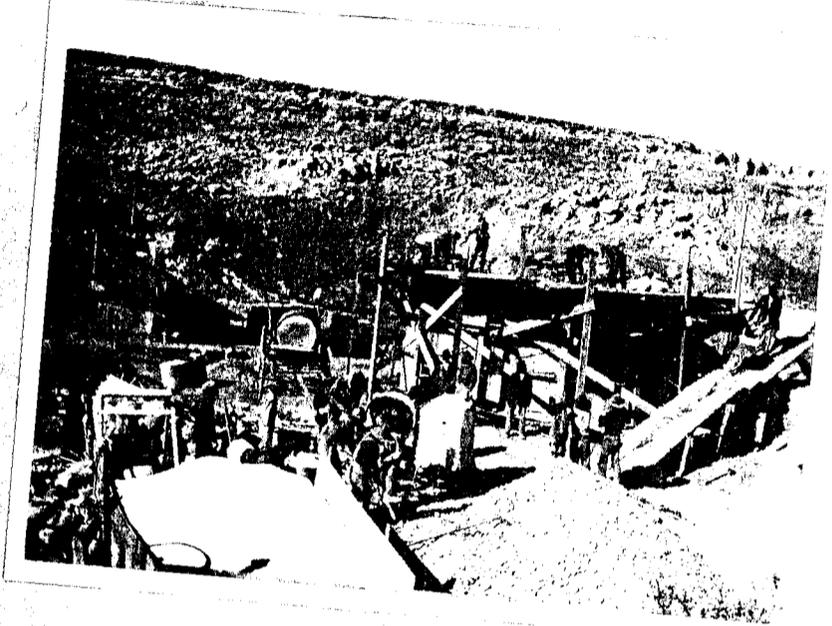
Reservoir at Well and beginning  
of pipe line.



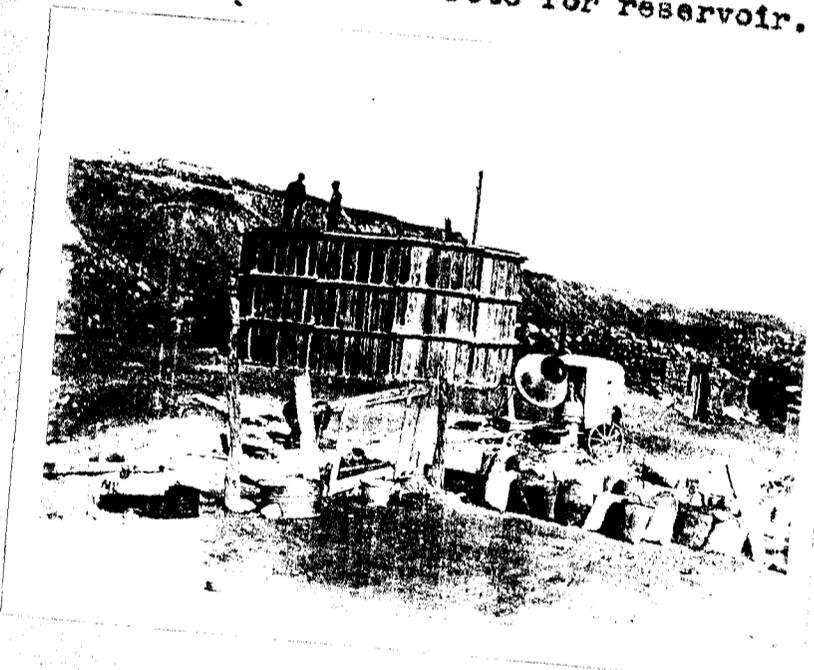
Foundation tank on hill  
showing reinforcement.

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141

Domestic Water  
at Polacca.



Mixing concrete for reservoir.



Reservoir on hill, Concrete all  
poured.

PHOTOGRAPHED AT THE NATIONAL ARCHIVES

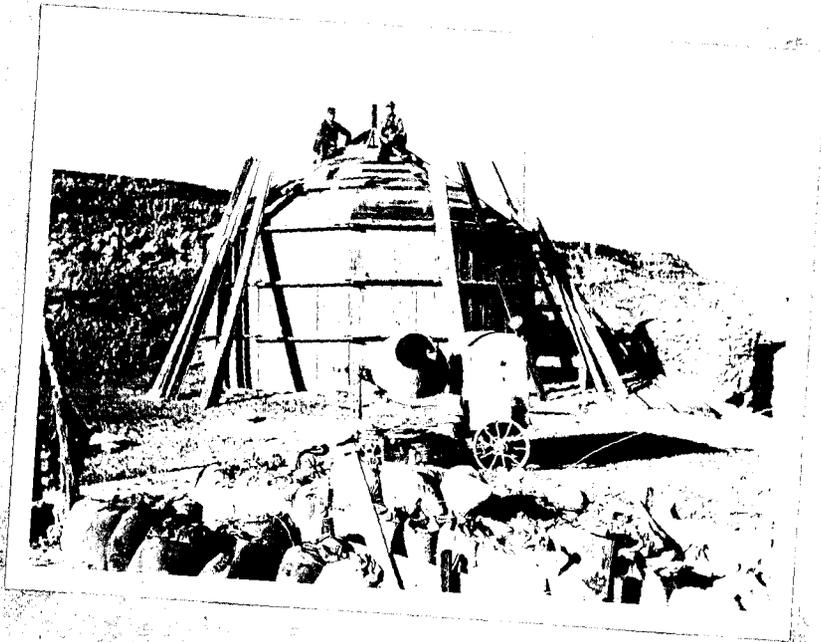
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Domestic Water.  
at Polacca



Indians working on reservoir  
at night to get it finished quickly.  
All labor donated.



Reservoir on hill nearly completed.  
Putting on roof.

SEARCHED INDEXED SERIALIZED

WELL RIG NO. 7

<u>No.</u>	<u>Location</u>	<u>Diam.</u>	<u>Depth</u>	<u>Water</u>	<u>Dry Hole?</u>
715	6 Miles N E Polacca	3½	694	Gals.Hr. 2800	
716	16 Miles N E Polacca	3½	570	Artesian 200	
717	Kah ga ta Valley	3½	130		Yes
718	20 Mi.E. of Oraibi	4½	190	400	
719	7 Mi.N of Wepo	3½	213	450	
720	Steamboat Canon	6"	210		Yes
721	" "	6"	190		Yes
722	" "	6"	150		Yes
723	" "	6"	115		Yes
724	" "	6"	138		Yes
725	" "	6"	137		Yes
726	" "	6"	124		Yes
727	Mouth of Steamboat Canon	6"	107		Yes
728	Toh-gay Wash, New Steamboat Canon	6"	<u>521</u> 3489	200	

(In all of these some  
(water found in quick-  
(sand but could not be  
(developed.