ANNUAL REPORT
FISCAL YEAR
1913.

M F Robinson
Superintendent of Irrigation
Albuquerque, N.M.

JULY 1913

I N D E X .

Area, in territory covered,		5
combined, of reservations,		2
Animas Valley, Drainage of,		26
Artesian water, see Well Drilling,		
Acoma, cost data,		36
Automatic Spillway,		9
Cochiti, Cost Data,		36
construction,		22 - 27
Diagrams,		
Distribution of Expenditure,	following page	6
Logs of wells,		58 to69
Dolores River, Drainage of,		28
Drainage, see name of river or valley,		
Dulce, see Jicarilla Apache,		
Employees, List of,		2
Acknowlegement,		28
Force, List of regular,		2
Fort Defiance,		10
Cost data,		37
Ganado Project,		10
Cost Data,		48 - 32
Hogback Canal Project,		8
Cost Data,		34 - 45
Hopi, Spring Development,		38
See Underground Water.		
Hydrography,		25
Indian Labor,		5
Isleta,		22- 27
Cost data,		36
Illustrations.		
Automatic Spillway, (2 sheets),	Following	11
Hogback Canal, Flume No. 1,	"	22
Headgate,	"	7
Wasteway,	"	8
Flume No. 4	"	9
Hopi People,	"	2
Hopi man spinning,	"	3
Hopi Indians in Council,	"	5
Navajo Camp.	Frontispiece.	
Ganado	Before p.	10
Ganado Headworks,	Following	25
Ganado Gates,	"	26
Ganado Structures,	"	27
San Ildefonso Ditch,	"	23
Navajo Sheep,	"	21
Southern Ute, Drops and Flumes,	"	10

V-6417-201

NN012662

Illustrations, Continued,		
Toreva Spring, before repairs,	before	16
" "	following	16
" "	"	17
after repairs,	"	18
Toreva Day School and spring,	"	19
Zuni, Spillway,	"	12
Structures,	"	13
Spillway,	"	14
Spillway,	"	15
Jemez, (see Pueblos), Cost Data,		36
Jicarilla Apache,		7
Cost Data,		37
La Plata Valley, Drainage,		26
Labor Conditions		5
Indian,		5
Maps.		
Territory covered,	following	1
Zuni,		51
Laguna,		52
Black Creek (Ft. Defiance),		53
Hogback Project,		54
San Dia,		55
Santa Ana,		56
San Felipe,		57
Mescalero Apache,		7
Water,		28
Cost data,		37
Mesita, (Laguna) Cost data,		36
Navajo, See Hogback Canal,		8
See Ganado Project,		10
See Underground Water,		16
Miscallaneous, Cost Data,		37
Piedra Valley, Drainage,		26
Pine River Valley, (See Southern Ute),		11
Drainage,		25
Pueblo, Well Drilling,		24
Cost Data,		43
Pueblo Bonito, Cost Data,		37
Rio Grande Drainage,		26
Rio Puerco Drainage,		27
Rio San Jose Drainage,		28
Rio Tularosa, Drainage,		28
River Protection Work,		24
Santa Ana,	23 -	27
Cost Data,		36
Santa Clara,		27
San Dia,	23-	27
Santo Domingo,		27
San Felipe,	23 -	27

V-6417-201

NN012663

San Ildefonso, 23 - 27
Cost Data, 36
San Juan Pueblo, 27
San Juan Project, See Hogback Project.
San Juan River protection work, 24
Drainage, 25 - 26
Spillway, Automatic, 9
Spring Development, Moki, 16
Southern Ute, Pine River Valley, 11
Cost Data, 35
Diminished Reservation. 12
Cost Data 37
Drainage, Pine River Valley, 25
Taos, Streams and drainage, 26
Tables,
Well Drilling, 22
Annual Cost Data sheets, by projects, 30
" " " " by months, Headquarters, 31
Ganado, 32 - 48
Zuni 33 - 49
Hogback, 34 - 45
So. Ute, 35 - 44
Pueblo, 36 - 46
Misc. Surveys, 37 - 47
Spring Develop't. 38
Wells 39 to 43
Navajo & Moki 50
Travel necessary, 4
Territory covered, 1
Umatilla Water Case, 6
Underground Water Development 16
Navajo and Moki, Springs, 16
Wells, 19
Cost Data 38
San Ildefonso, 23
Well Drilling, Navajo and Moki, 19
Cost Data, 39 to 42
Pueblos, 24
Cost Data, 43
For artesian water 20
Logs of wells, 58 to 69
Work done on various projects, 3
Nature of, 4
Zia, 23
Cost Data, 36
Zuni, 13
Cost Data, 33 - 49

Annual Report
Fiscal Year 1913
H.F. Robinson
Supt. of Irrigation

5-1143

DEPARTMENT OF THE INTERIOR

UNITED STATES INDIAN IRRIGATION SERVICE

SUPERINTENDENT OF IRRIGATION

July 21, 1913.

Mr. W. M. Reed,

Chief Engineer,

Washington, D. C.

Sir:

I herewith submit my annual report for the fiscal year 1913.

TERRITORY.

The territory, the operations in which are included in this report and which is under my jurisdiction, is known as District No. 5 and comprises northern Arizona, New Mexico, that portion of Utah containing part of the Navajo Reservation and the Ute lands in Colorado, and includes the following reservations and pueblos.

Reservations.	Pueblos.
Navajo	Taos
Moqui	Picuris
Zuni	San Juan
Supai	Santa Clara
Mescalero Apache	San Ildefonso
Jicarilla Apache	Nambe
Southern Ute Allotted	Tesuque
Southern Ute Diminished Res.	Cochiti
Navajo Allotted (Pueblo Bonito)	Santo Domingo
	San Felipe
	Sandia
	Santa Ana
	Zia
	Jemez
	Isleta
	Laguna
	Acoma

of the water adjudicated to these Indians for their lands, about 115 acres of this can be supplied with water from the river, leaving 100 acres to be supplied with water from other sources.

A plan has been proposed to develop water for this additional area by means of artesian wells near the Agency. A test well having been put down, the result would indicate that sufficient water can be developed in this manner for the land to be irrigated. A special report was made on this project dated March 31, 1915.

10. Hogback Canal.

In July, a very heavy local storm occurred in the San Juan Valley, damaging the canal to a considerable extent, washing out a considerable section between Laterals 3 and 4. The main camp is situated on the upper side of the canal near Lateral 2. The flood waters from the rain submerged it, there being about 8 inches of water on the floor of the mess-house and 2 to 4 inches on the floors of the other rooms. Practically all of the bridges and culverts on the main road to Shiprock were washed out and considerable other local damage was done.

The work on the canal for the past year is as follows:

On the head section the headgates were completed, the high banks between the headgate and the wastegate were filled to grade and a concrete wasteway and stop structure

CV-6417-201

NN012667

built across the canal, as shown in the accompanying photographs.

The excavation of the canal has been completed to the end, excepting the finishing work which will not be attempted until the last thing.

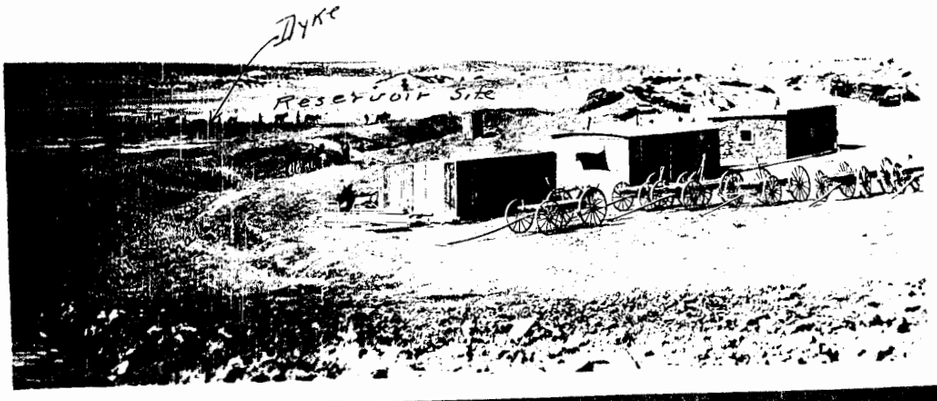
Flume No. 1 has been rebuilt with metal substructure and a combined sand trap and spillway. The entire force is now working on the structures, there being a number of long flumes yet incompleted.

The general land office will re-survey all of the land under the canal, dividing it into ten acre tracts, excepting such pieces as lie along the canal roads or river which will be divided into smaller tracts.

No lateral headgates will be placed below those already supplying land with water in the first 3 miles until this sub-division is done that the structures may be placed on land lines and the principal laterals built along roads and land lines, where they will do the least damage to the individual allotments.

An automatic spillway has been placed at Sta. 149 to automatically care for these tremendous floods coming down the side drainage which has done so much damage in the past.

The gate has not yet been tested out thoroughly but the partial tests would indicate that it will probably



NN012669

do everything claimed for it by the makers and it will undoubtedly save many dollars of damage to the lower canal. If it proves to be what is expected, it might be wise to install not less than two or three further down the canal.

DO PROJECT.

This project, for which a special appropriation of $60,100 has been made, was commenced in December but as it was necessary to build quarters, construct a road and do various other preliminary things, no construction work was done until February. Heavy storms and extreme cold weather preventing very much being done then. This bad weather lasted until the middle of March. Since that date, the diversion works have been practically completed, the diversion dam having been finished.

The concrete sipllway is done, excepting the flash board supports; the concrete headgates are completed, excepting installing the gate lifts and the diversion canal is about 90% done.

On the reservoir, a puddle trench has been excavated and a few thousand yards of earth have been placed in the reservoir dam. No work, however, has been done on the distributing system, excepting to make a few surveys.

[illegible]NCE.

No use has been made of the lands lying immediately under the Red Lake Project, about 13 miles north of Ft. [illegible]nce, but the water stored therein has been turned down

Black Creek and used at various points by the Indians.

It being possible to put considerable area of land under cultivation near Ft. Defiance, Supt. Paquette requested that this Department make the necessary surveys for a small ditch for the Agency use to divert water from Black Creek to cover lands east of the school, depending upon waters let down from Red Lake during most of the year.

These surveys were made and plans and estimates completed which were turned over to Supt. Paquette.

This work is proposed to be done by Agency employees and Mr. Paquette has not asked for any assistance from this service other than to lay out the work.

SOUTHERN UTE. Pine River Valley.

The system to furnish lands to Indian allotments on the east side of Pine River and in Spring Creek Valley has been practically completed, the main ditches and laterals having been constructed during the past year.

None of these ditches take their water direct from the river but secure it through the Pine River Canal, the Government owning the right to 40 sec. ft. of water through the ditch which the Pine River Canal Co. have to maintain at their own expense. The lands which will be supplied from this system will need more water than the 40 sec. ft. and when that time arrives, it will be necessary for the Government to enlarge this ditch to carry the additional water required. As the amount of land being cultivated

AVAJO AND HOPI. Underground Water Development.

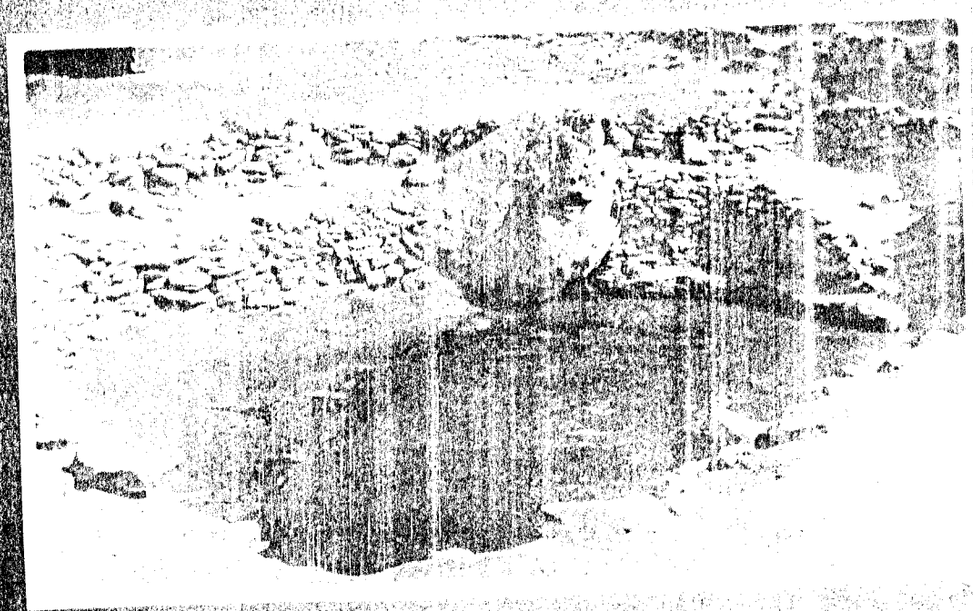
All of the Hopi country and most of the Navajo country is known as the Painted Desert region and is absolutely arid country. There is practically no running water in any of these regions excepting a few small streams in the mountains and streams which have a flow after rainfall. The only considerable streams in the entire district are the San Juan River along the northern boundary which has plenty of water the year around, and the Little Colorado, along the southwestern boundary, which is dry about 25% of the time.

The rainfall being very scanty, with practically no precipitation at all from the first of April until into July, makes any agricultural pursuit almost impossible.

Both the Navajos and the Hopis have large flocks of sheep and other domestic stock and one of the great problems of their life is to find water for this stock near grazing grounds. At points where there is permanent water, the country is entirely grazed out. Other places where there is fair grazing ground, there is no water or at best, water holes which exist only in the spring and after seasons of rainfall.

For several years, work has been carried on in the Hopi country in the development of springs, and 4 drill drilling outfits have been at work, endeavoring to secure at least sufficient water for domestic and stock

Hopi



Toreva Spring, the supply for an entire village – before improvement.

REPRODUCED AT THE NATIONAL ARCHIVES

CV-6417-201 NN012674

purposes, especially in regions where, if not absolutely without water, the water was in such limited quantities and at such distances from the grazing land that the Indians were unable to use the country.

All of the spring work that has been done, was on the Hopi Reservation, the need for this work seeming to be greater there than elsewhere. Within the limited space of this report, a detailed statement can scarcely be made of each one of the springs but the following will serve as an outline of the work done during the year.

Northwest of Oraibi, about 6 miles, is a group of springs known as the Lolami Springs. Three of these springs were excavated, walled up with stone and the water piped from the springs some distance to troughs so that the stock could get water without polluting the springs.

Burro Springs lie some 8 miles south of the Second Mesa, near what is known as the Giant's Chair. There is a considerable area of ground that is wet the year around and is very boggy and has proved a veritable death-trap for animals. At the most promising point where there was always standing water, a considerable excavation was made, developing a good flow. The excavation was made about 6 feet deep and 7 pieces of 8 inch casing was sunk to a greater depth, the water rising through the casing formed a reservoir, 6 feet square and 6 feet deep which was walled with rock. The water was piped a distance of about 400

Hopi

The Toreva Spring was a reeking mass of filth, but was the entire water supply of a village, the water being carried by the women to the top of the mesa.

NATIONAL ARCHIVES

feet to troughs and the spring and bog hole fneced to prevent animals getting into the soft ground and polluting the spring. In excavating for this ground, great masses of bones were found of all the domestic animals and some wild animals of that part of the country.

Another spring nearby was developed and walled up for domestic purposes. It is reported that quite a number of families intend leaving Oraibi and settling at this point.

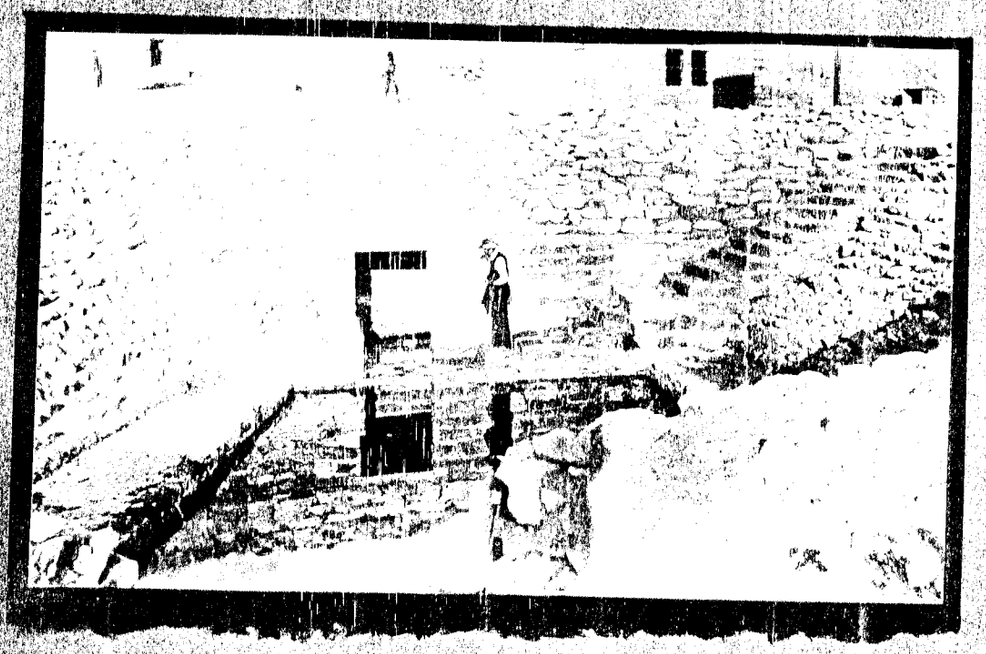
North of the First Mesa, some 6 miles, on the east side of the mesa, a spring known as Sheep Spring was excavated to form a reservoir, walled up and piped out to troughs.

15 miles southeast of the First Mesa, among what are known as the Moqui Buttes, Cornfields Spring was excavated, walled up, and protected with a stone wall, the water being piped out to troughs.

7 miles Spring is located 25 miles southeast of the First Mesa. This spring was treated similar to the one above.

In what is known as Peepsa Canon, located 9 miles southeast of the First Mesa, there was a comparatively large flow of water at the head of the canon. Owing to the peculiar location, it was practically impossible to do any development work with the spring proper, and it was located at a point almost inaccessible to cattle, so a trail was built down the sides of the canon to allow stock to reach

NN012677



The Toreva Spring as improved

The spring is through doorway. The pool is the overflow.

DIGITIZED BY THE NATIONAL ARCHIVES

this spring. In this same canon two other springs were developed, several reservoirs built to store the water which can be used for the irrigation of some small garden patches. The springs were also protected against flood water by laying up some stone walls.

Todetsi Spring is located about 12 miles northeast of First Mesa; was excavated to from a reservoir, walled up with stone laid in cement and piped to troughs.

Two other springs, known as the East Side Spring and the Cheskeza Spring were developed in about the same manner and trails made so that the stock could reach the water.

Chendeeto, 15 miles northeast of the First Mesa, Ts-ho-not-a about 11 miles northeast, Pevait 6 miles east were all developed in similar manner by excavating around the spring to form a small reservoir, conducting the water through pipes to troughs at a sufficient distance to prevent the stock getting into the springs.

A number of minor springs were also improved and in addition to all this spring work, the same outfit looked after all the wells which had been drilled in this section of the country, making repairs to the wind mills, building tanks and troughs at all new wells that were brought in during the year.

L DRILLING.

In the well drilling operations, Rig No. 1

Teresa May School, spring and walled garden patches.

CV-6417-201 NN012680

continued on the deep well at Keams Canon during July and August. It was then found necessary to order some special tools and smaller casing if the well was to be put any deeper. They were ordered and considerable delay was experienced before the supplies were received.

In the meantime, the driller overhauled and put the rig in good shape, repainted, and after completing this work, Rig No. 2 was partly overhauled and the driller from Rig No. 1 worked with that rig for some weeks.

Work was resumed in January and the well carried to a depth of 1309 feet. Constant communication was kept with Prof. H. E. Gregory of Yale, under whose advice this well was put down, giving him full information regarding the progress of the work and sending him samples of the material encountered. He finally decided that it was useless to go deeper and the work was suspended in April as the funds were getting low for this work and the outfit was laid off until the first of the next fiscal year. A full report has been made concerning this well.

It is proposed to move the rig and try for artesian water east of Tohatchi where there is every indication of water in quantities sufficient for irrigation. Wells have been developed within 20 miles of this valley.

Rig No. 2 continued its work in the Hopi country and during the year put down 21 wells, six of which proved

V-6417-201

NN012681

good wells, the balance were either dry holes or had an insufficient quantity of water to develop.

Rig No. 3 worked in the Navajo country, southwest of Ganado and Cornfields and northeast on what is known as Beautiful Valley. 12 wells were put down, 7 of which proved to be good wells.

Rig No. 4, working in Chin Lee Valley, put down 12 holes and developed 10 wells.

None of these rigs worked the entire year as funds ran short and they were shut down in April and May.

Rigs 2, 3 and 4, in addition to putting in the new wells, did considerable maintenance work. Nearly all of the wells in this section develop the water in very fine sand and although the wells are screened, the sand works in until the cylinder becomes full and the mill is stopped. It is necessary then to pull the pipe and cylinder out, clean it and pump for a day or more to get out the fine sand when the well will probably work several months without further attention. Some of the wells had the cylinders pulled and pumping done three and four times. It is hoped that after awhile the fine sand will finally be all pumped out and no more trouble of this kind will occur.

The following is a statement of the work done by the drilling rigs.

The sheep are the wealth of the Navajo.
and the problem of their life is to find
feed and water for them.

Rig No.	Time of operation	Good wells Holes	Ft.drilled	Dry holes or bad water. Holes	Ft.Drilled	
2	Fiscal year 1912	8	708	18	1169	
	" " 1913	6	533	15	1097	
	Total	14	1241	33	2266	(242)
3	Fiscal year 1912	12	924	1	90	
	" " 1913	7	516	5	637	
	Total	19	1440	6	727	(326)
4	Fiscal year 1912	3	352	1	116	
	" " 1913	10	410	2	68	
	Total	13	762	3	184	(417)
	Grand Total	46	3442	42	3177	

PUEBLOS. Cochiti.

A new heading was built for the West Side Cochiti Ditch during August and September, 1912. The old heading that the Indians had was so located that at low stages of the river, it was almost impossible to get water into the ditch. The new heading was put some distnace up the river in solid rock and a substantial headgate built.

Isleta.

The main canal for these Indians headed in a sand bar and it was extremely difficult to maintain it at any stage of the river. A new heading was put in some 500 feet further up the river and where it was necessary to make a deep cut, and wooden headgates were built there in a substantial manner. This will enable the Indians to get water into their ditch at almost any season of the year. A highway bridge was also built across the canal a few hundred

CV-6417-201 NN012684