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Navajo Irrigation
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Report of
W. N. Graves

F. L. ...

22/10/95

SPECIAL

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United States Indian Service,

Crow Indian Agency,

Montana

July 3rd, 1895

28628

To the Honorable Commissioner of Indian Affairs,
Washington, D.C.

Sir:-

~~Complying with your instructions, of the 6th of June, to visit~~
the Navajo Reservation to inspect the irrigation work accomplished
and under way, under the direction and control, of Mr. E.C. Vincent,
I have the honor to report as follows:-

I left the Crow Indian Agency on the 18th of June: arrived at
the Navajo Agency on the 22nd, and began the tour of inspection upon
the following day, in company with Mr. Vincent,

We visited the various ditches, constructed and being con-
structed by him, and several of the springs which he has improved;
and also the site of the proposed Storage Reservoir at Round Rock.

We finished the trip, and I left to return to the Crow Agency on
the 29th of June.

The first piece of work visited was the ditch at the Agency.
This is a small ditch, taking the water from "Bonita" Canon, to the
lands about the Agency. The work was done during the early
Spring months of the present year. The work consists of a dam
made of rocks and logs, about one hundred feet in length by ten
feet in height, at its highest point. From the dam the water is

-2-

28628
28982
conducted along the side of the canon, for some seven or eight hundred feet, in a small flume or wooden box, which is about two feet wide by eight inches in depth. The carrying capacity of the flume is about two cubic feet per second and suffices to carry all of the water furnished by the stream at present. This amount of water would irrigate not to exceed two hundred and fifty acres.

In connection with this ditch there is a storage reservoir site, about one half miles below the Agency that might be utilized by conducting the flood water of the stream to it: but to do this the ditch would have to be overhauled and enlarged throughout most of its length; a new flume built; and some provision made to protect the several drops or chutes that exist in the present line. Mr. Vincent estimates the cost of this work to date, at \$3800.

As to the practicability of enlarging the ditch and completing the reservoir I could not form an idea, as no survey has been made to determine the cost of construction of the dam, and the enlargement of the ditch, or to determine the capacity of the reservoir, or the area of the land that could be reclaimed.

As it is at present the ditch is of little value, except to the land immediately contiguous to the Agency, a comparatively small area— and also the land lying just below the Agency, which is claimed by a "Squaw—man".

It would appear, in view of the limited area that can be reclaimed by this ditch, and that all of it is needed to furnish the gardens, fields, pasturage, etc. for the use of the Agency, that

28628

that the Department could with propriety divest the present claimant of his possession and set it aside for Agency purposes.

Mr. Vincent says the ditch is about 6 ft. wide, 2 ft. deep, and nearly 2 miles in length, but in its present shape it would not safely carry water more than 1 1/2 feet in depth, if the intake were large enough to admit that amount. The water is flowing through the upper end of the ditch as far as the Agency.

I do not believe the dam nor the flume will withstand any severe test, such as is liable to occur at any time when a flood of water may come down the canon.

The next point visited was "Newell Park" about 10 miles north of the Agency. Here a small stream flows from the hills West of the valley of Black Creek, and Mr. Vincent has placed dams in the two branches of the wash and turned the water out to either side. There ^{are} about 500 ft. of ditch on the south side and 200 ft. on the north side. There is water enough in the stream at present to irrigate from 30 to 40 acres. The cost of this work was placed at 100

From this point, we went to Red Lake, which is about 5 miles further North, and some 15 miles from the Agency. This lake is about 1 1/2 miles in length by 3/4 of a mile in width but quite shallow. It is usually dry at this time of year but now contains a fair supply of water. Below this lake Mr. Vincent has constructed an earth dike about 1000 feet in length on top, and about 10 feet high at the highest point. The dike contains about 3500 cubic yards of earth. The water in the Lake has not risen

28628

to a height sufficient to reach the embankment as yet: should it do so, there would be quite a sheet of water back of it, and I apprehend it would not long withstand the washing of the waves unless it should be revetted in some way to protect it. Through the embankment there is a box about 3 feet in width by 1 foot in depth made of 2 inch plank, and from this box a small ditch about 3 ft wide extends down the valley some 3/4 of a mile. As no survey has been made to determine the area of land that could be supplied by the ditch I can only guess at it. As the valley is not over a mile or so in width and is cut across by several deep washes, I would estimate the land available, as the ditch is now constructed not to exceed 500 acres. By fluming the several washes the area could be considerably increased, although the ditch would not carry water for any larger area than is at present covered by it. About 1/2 mile to the East of this point Mr. Vincent has constructed a Diverting Dam, in Black Creek, to turn the water of this Creek into Red Lake. This is made of logs and rock and is the most substantial structure on the work. It is about 160 ft long by 10, or 12 ft, in height. A ditch nearly 1/2 of a mile in length, by 5 feet in width and about 4 feet in depth, carries the water from Black Creek into the Lake. This work was done a few months ago, and as yet has been of no practical use. The cost of the Red Lake and Black Creek work was stated by Mr Vincent to be \$3800.

From Red Lake we went to Cotton Wood Bass Creek, where Mr. Vincent has a camp, and is now constructing a small ditch, which, when completed, will be something over 1/2 mile in length.

28628

It is from 3 to 4 ft. in width, and will carry water a foot or so in depth. Of course these ditches are, in many places, much deeper than one foot, and the excavation will probably average nearly 2 ft. in depth, but there are many shallow and weak places, where the banks would not be secure against a head of water greater than one foot in depth; however, as there is little water to be carried, most of the ditches are large enough to carry all of the water of the streams from which they are taken, except in time of flood.

At the head of Cotton Wood Pass Creek ditch, is a crib dam similar to the other dams and which is about 80 ft. in width and 5 ft. in height. The cost of this ditch was stated to be \$700. There are several hundred acres of land that could be irrigated from it, if the supply of water were sufficient. The stream carries at present not over 2 1/2 cubic feet of water per second.

About 25 miles West of this point is the "Wheatfields" ditch. This is the longest, largest, and best constructed ditch that Mr. Vincent has built. The work was done last fall, and cost about \$2700. It is, Mr. Vincent states, nearly 3 1/2 miles in length.

It is about 6 ft. wide at the head now, although it was constructed 8 ft. in width, but the sides have caved down and reduced the width. It is carrying all the water the stream affords, which is about 5 1/2 or 6 cubic ft. per second. This is enough water, under favorable circumstances, to irrigate from 600 to 700 acres.

Mr. Vincent estimates the area covered by this ditch at 3000 acres, but I cannot see how this is possible, as 3000 acres would constitute an area nearly 5 miles long, by 1 mile in width, and as the ditch is only three and one half miles.

28
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26
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miles in length, and quite tortuous, and at no place that I saw, over
1 1/2 miles distant from the stream, it would seem that his esti-
mate is exaggerated. I should not estimate the area to exceed 1200
acres of irrigable land. At all events there is more land than
there is water to irrigate it.

All of the land under this ditch is claimed by one Indian-
-Yellowman- to the exclusion of all others, and in consequence only
a small proportion of it is in use.

There is also a crib dam at the head of this ditch, which is
about 140 ft. long by 4 ft in height, and a very creditable piece of
work. About 2000 ft from the head, the ditch crosses a wash; and
here Mr. Vincent has built a viaduct, by spanning the wash with a
course of pine logs upon which the earth banks have been built.

Mr. Vincent informs me that this piece of construction has excited
considerable criticism, but I do not see that he could have adopted
any better plan, to correspond with the character of his work.

While it is not permanent in character, it should last at least sev-
eral years, and will last as long as some other portions of the work.

Eight to ten miles North West of the "Wheatfields"
ditch, is the "Tsa-a-lee" ditch, which was built last Fall. It is
about 2 1/2 miles ^{in length} and covers, I should estimate, from 600 to 700
acres of very good land. It is 5 ft. in width and carries 3, 1/2
cubic ft. per second. The first half mile of the ditch, I fear,
will be found difficult to maintain, and will have to be reconstructed

28628

in all probability, if the ditch is used. Mr. Vincent states the cost to be \$1800.

North of the "Tsa-a-lee" about 15 or 16 miles, Mr. Vincent has a force of men now working, clearing out and straightening several Indian ditches. The largest of these he calls the "Corizza" ditch. It is about 1 1/4 miles in length, 4 to 5 ft in width and carries all the water the stream affords, which is not over 2 1/2 to 3 cubic ft per second. . . Enough water to irrigate probably over 300 acres. There is here also a crib dam similar to the others Mr. Vincent estimates the cost to date at \$700 to \$800.

None of these ditches have head-gates or controlling wiers or diverting lateral gates: in fact no structures whatever, except an occasional bridge crossing.

While the water in the stream is at an ordinary stage no regulating ^{Gate} is needed, but as a flood is liable to come down the stream at any time, after a storm, and storms are of frequent occurrence at this season of the year, -there is nothing to prevent the water rushing into the ditch to certain destruction of some portion of it. Already several of these breaks have occurred. Mr. Vincent says he has had no lumber or material, with which to construct the necessary gates and has been compelled to do without them. It appears to me that a controlling gate at the head of a ditch is an indispensable feature.

We visited several of the Springs that had been cleaned out and Mr. Vincent states that they are all about

28628

the same. These are usually seep springs, with small streams trickling away from them for a few hundred feet. The work of cleaning them out is a matter of only a few days labor for one man at the most, and is an insignificant factor in the irrigation work.

The construction of these ditches has all been accomplished by hand labor; no horses at all being used, and as I have never had any experience in such work, I am poorly qualified to pass judgment upon it, or its comparative cost. Usually irrigating ditches that are small enough, to permit of being profitably constructed by hand labor, are, so constructed by the individual owner, and the services of an engineer are not required: hence I have never come in contact with this sort of work in the capacity of an engineer, before, and it would be difficult for me to know just how to proceed under the circumstances with consistent economy. Mr. Vincent says he has accomplished much of the work at a cost of 6 cents per cubic yard of material removed. If such is the case, it shows the Indians to be expert laborers to a remarkable degree, as, it is almost impossible to handle ordinary material in earth work with a team and scraper, for less than eight cents per cubic yard.

Mr. Vincent says he has expended to date between \$13000, and \$15000, and according to his estimate has constructed about 12 miles of ditch, which with the water supply available would irrigate not to exceed 3000 acres, in my judgment.

28628

- 9 -

If I should presume to criticise Mr. Vincent's work I would say, that its chief fault lies in its transient character, - its lack of strength. I fear it will not abide to accomplish any permanent good, and in saying this I appreciate the situation and realize the circumstances under which it has been accomplished.

It is a difficult problem to determine to what extent it is warrantable to expend money when the results hardly justify the expenditure.

The position is one calculated to perplex and confuse a man more familiar with the conditions of the Western Country and its people than Mr. Vincent is. There is so little to work upon and so much is expected of the case, that it is an unusual responsibility and it required a man peculiarly adapted by experience and judgment to have executed such a work successfully. Whether Mr. Vincent has fulfilled the expectations of his friends, who secured this responsible position for him or has failed to do so, it does not lie with me to say.

There is no doubt that Mr. Vincent has many difficulties to contend with, - many of which doubtless could have been avoided had he employed his best judgment and had exercised greater discretion, - had he better understood the country and its people. In some way he has aroused the antagonism and animosity of almost every one about him, nor do I understand why, for he appears to be a pleasant, courteous gentleman, but it is not at all probable that the reason for this antagonism lies altogether outside of himself.

The unfortunate misunderstanding that has arisen be-

28628
tween Agent Williams and Mr. Vincent might have been, in a measure, avoided had Mr. Vincent vacated his present quarters when he discovered that it was objectionable to the Supt. of the school and the Agent, to have him there. The building that he occupied as an office is within 50 or 60 ft. of the rear end of the school building and he was thus brought in immediate contact with the school people. This unfortunate proximity led to unpleasant talk and gossip. Without doubt there was not the least ground for it whatsoever but yet it existed, and so annoyed and exasperated the Agent that he resorted to the unnecessarily harsh measure, of forcing Mr. Vincent to leave the Agency.

I suggested to Mr. Vincent the propriety of withdrawing from the Agency altogether with his office and effects and taking them to his camp where he could better handle his work and avoid further conflict.

I might point out a number of things wherein I would differ with Mr. Vincent, in matters pertaining to the work under his charge but I do not know that my plan, or method, would be better; it would simply be a question of judgment, and I could not for a moment think that Mr. Vincent was not capable of exercising good judgment.

In one respect however, I think Mr. Vincent is unnecessarily burdening himself, and the Department as well, with work and responsibility, and that is, in regard to carrying on a Trading and Commissary Store, or Department. This makes a large amount of extra work, requiring additional men, and materially complicating

28628

the adjusting of the accounts at Washington. Three of the regularly licensed Reservation Traders expressed to me their willingness to conduct a trading post at the Ditch Camp, if the Supt. would encourage them to do so: but they would not go to his camp against his desire, nor without his encouragement, as it would not only be very unpleasant, but would practicably debar them from doing business. Since this difficulty could be so easily overcome it would appear to me essentially desirable to do away with this feature of the work, which has already caused no little trouble and misunderstanding.

Mr. Vincent has just about completed the construction of the Small Ditches, and is soon to move his camp over to the San Juan River, where he expects to construct a ditch, somewhat larger than any he has heretofore undertaken. I urged upon him the necessity of making a detailed survey of the proposed plan before commencing construction, in order that he might be able to inform the Department reliably as to what he planned to do, and what he could do as well, thereby keep himself properly informed in regard to the work. I would suggest that the Department request, that Mr. Vincent furnish them, with such detailed estimates and plans, which would enable them to determine as to the practicability and advisability of his undertaking. Mr. Vincent appears to think, and doubtless with some reason for it, that he enjoys the peculiar privilege of exercising his own judgment solely, in the expenditure of the money placed to his credit for carrying on this

work. I was told that it was the frequent iteration of this idea on the part of Mr. Vincent that caused so much ill-feeling toward him on the part of the leading citizens of that section.

Whether this may be true or not, it is a prevailing belief that an unusually wide latitude of action has been extended Mr. Vincent.

As yet no information has been formulated and I per-
~~haps none~~ collected or prepared, as to what has actually been ac-
~~complished~~, or what may be planned for the future. In addition
to the San Juan River ditch Mr. Vincent has in contemplation the
construction of a Reservoir at a point about 100 miles North West o
of the Agency called Round Rock. We visited the place. If the
work were successfully executed there would be impounded quite a
body of water but whether a sufficient area of land could be re-
claimed to warrant the expenditure is a matter that would have to
be determined by a careful survey. This is a larger and more
responsible work than Mr. Vincent has yet undertaken, whether he
~~can or will~~ handle it successfully in the light of what he has al-
ready accomplished, the Department can better judge than I. I
hope that in plainly stating the case as it appears to me I will
not be considered as being unfair or unjust to Mr. Vincent. My s
short acquaintance has led me to think well of him personally, but
my candid judgment is that he has not handled his work in the way
that would bring to himself the greatest credit or the most satis-
factory results.

I am very respectfully,

Your obedient servant,

Nathan H. Graves