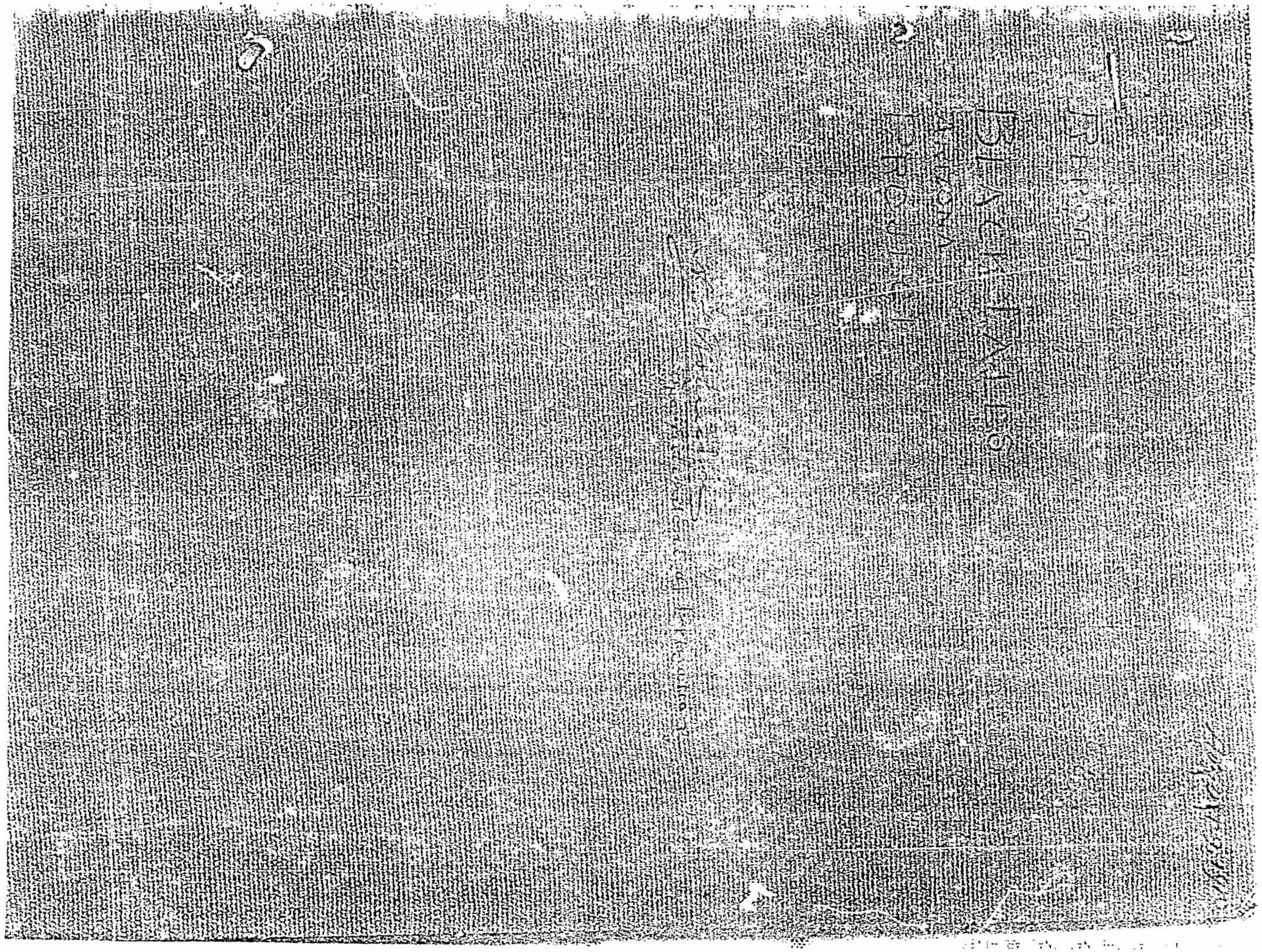

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NN00791 7

Report.
Black Falls
survey.

DEPARTMENT OF THE INTERIOR

UNITED STATES INDIAN IRRIGATION SERVICE

SUPERINTENDENT OF IRRIGATION

Albuquerque, N. M., August 9, 1910.

Mr. W. H. Code, Chief Engineer,
522 Bumiller Building,
Los Angeles, Cal.

Dear Sir:

Over a year ago a proposition was brought before the Indian Office by Mrs. P. G. Gates, then of Tolchaco, and now of Flagstaff Arizona, to construct an irrigation system at Black Falls, 24 miles below Tolchaco and 33 miled from Leupp, on the Little Colorado River. Mrs. Gates' plan was to irrigate certain lands from this stream, the land to be used for colonizing returned Indian students, and as an object lesson to them in right farming and civilized living, each alternate tract was to have a family of whites, and as I have been informed she has certain Menonites which she wishes to place there.

In April, 1909, I went down there and made an examination of the proposed project, and made you a report on April 22d, and I would refer you to the same to be used in connection with this report.

Later, I had orders from you to make a detailed survey of the tract and of the proposed ditch and to make a full report concerning it. As I have had so many different projects, I was unable to have the survey made until the past month.

Mr. Sears has made the required survey, and has made a map showing the country and the possible ditch line.

According to this survey, there can be brought under the

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ditch 973 acres of land, not so much as I thought at first, for the first flat cannot be covered a high as contemplated, and there is even more waste land than supposed.

To cover this amount of land will need a main ditch 43,000 feet long, with a grade of 5.28 per mile, and a high line ditch with one half that grade 18,000 feet long.

We have estimated the size of the ditch as follows: from Sta. 0 to 120, 3 feet on the bottom; Sta. 120 to Sta. 430 at 2½ on the bottom, and the high line lateral 2 feet on the bottom. The amount of water is estimated at 8 second feet for the land under the main ditch and 3½ second feet under the high line lateral.

In the first 20 stations, there is so little ground between the river and the lava flow that the excavation would either be in the solid rock, or a wall would have to be built on the river side of the ditch to retain the water. The first 77 stations also runs through sand drifts which would be blown into the ditch with every storm, and during the past months of June and July these wind storms averaged two a week!

After we leave Sta. 77, the ditch work would not be heavy, but as the ditch is long, the yardage mounts up. Between Stas. 50 and 90 we cross a wide sand wash, and protective work would be necessary. Until the first flat is crossed it is hard to select a location for the ditch between the lava flow on the one side and the high water line on the other

After locating the line as shown, it was found that at one or more places below the heading selected, the grade of the river was higher than the grade of the ditch line. There is no good place for a heading along here, but the difficulties and cost of

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heading in the rock above might exceed the building of a concrete head at this point. This is between Stations 78 and 83. This would probably be preferable, as the first 85 stations contain 57,231 cu yds of material, and considerable of it rock.

The yardage for the excavation is as follows:

From Sta. 0 to Sta. 83	57,231.8
" " 83 to " 120	22,964.3
" " 120 to " 224	12,226.0
" " 224 to " 430	6,921.6
High line lateral	4,200.00
	103,543.7

If we put the heading at Station 83, the yardage will then be 46, 311.9 cu yds not including that for the heading. Of this amount, most of it will be sand and earth, but there will be some small amount of rock, say 8%.

The estimate made is rather rough, and is as follows:

42,607 cu yds earth @ 25¢	10,651.75
3,705 cu yds rock @ 1.00	3,705.
Headgates estimated,	1,000.
Lateral head and check,	250.
6 lateral headgates	600.
10 cross drainage structures	1,500.
	27,706.75
Engineering and contingencies 20%	5,541.
Approximate cost,	$ 33,248.75

Acreage under ditch,	973 acres	
Cost per acre,	34.16	for ditch construction.

The land under this ditch is fair. On the first flat it is a very sandy soil overlying the lava flow, and in many places the soil is very shallow. On the second flat we have a long narrow strip of good soil, with the exception of two small patches of alkali.

As shown on the map, between this shoestring of good land and the river is a large bed of lava, covered in some places by sand drifts, which is approximately 2,000 feet wide and 20,000 feet

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long, and is worthless.

As you are aware, the difficulties of construction and the amount of land is not such a bar to construction there, as is the lack of water. The Little Colorado River is an intermittant stream, and is often dry for weeks at a time.

Mr. Sears secured the following statements regarding the time no water could be expected:

"Mr. Ward, the Indian trader at Tolchaco states that from two to three months out of each year, the river is entirely dry, and that this dry season is during the months of May, June and July".

"Mr. Johnson, a Missionary (who has been at Tolchaco eight or nine years) states that the dry season lasts from two to four months each year, and that includes a part of the months of May, June July and August. He says that the water will come down during these months for a day or two at a time, but that there is so much silt in it, that it would be no good for irrigation purposes."

A Mr. Walker, who has been in that part of the country for several years says that the river is dry from six weeks to three months. The months are May, June and July."

"Mr. Krause (the clerk at Tuba), has been keeping tab on the Indian mail carriers who cross the river three times each week (this is 30 miles below Black Falls, N. F. R.), says that the river is practically dry five months out of each year, from the middle of March to the middle of July or the first of August."

"Nearly every one I have talked to in that section of the country laugh at the proposition of the Black Falls project, and want to know where the water is coming from with which to irrigate the land."

As per my other report, you will note that it was thought that underground water could be secured here and a pumping plant installed. Mrs. Cates has stated that if the Government would build the ditch that she could secure the money to put in the pumping plant, but has not made any guarantee of this. As to the possibility of securing water by pumping: Black Falls is made

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by a reef of lava, and it is supposed that any water which may be following the river channel underground will be forced to the surface. At Station 0 when the river bed was dry, water was found by digging 2 feet. Opposite Station 60 it was found at a depth of 3 feet. Opposite Station 90 it was at a depth of 7 feet and only one foot opposite Station 200.

A pumping plant might be practical, but there is no fuel within reasonable distance, and all of it would have to be brought in on the railroad. Angell is the nearest point, 35 miles, and no road. Canyon Diable is 45 miles, with a fair road. The cost of installing the plant would be rather high, and the maintenance charges would also be high.

It certainly would not pay the government to put in about $35 per acre for the ditch system and not less than $25 per acre for a pumping plant, for land whose value is problematical, and in a section of the country where there are no Navajos living because the conditions of feed and water are so poor.

If Mrs. Gates will put in the pumping plant, it should either be put in first, or some assurance in the shape of a bond should be required that after the government would expend the $33,000 the pumping plant would be installed.

If the conditions as to water and land were first class, there is still another drawback to the situation.

This land lies within the limits of the old Atlantic and Pacific land grant, and all of the odd numbered sections belongs to the railroad, and it would be necessary to first secure this land before any work could be done.

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A table on the map shows by sections where this land lies and what part belongs to the government and the part which belongs to the railroad.

The land is unsurveyed, but some time ago Allotting Agent Geo. A. Keepers, ran some lines on the south side of the river. Mr. Sears found some of the corners, which were marked as to the sections, but not as to Township and Range.

Mr. Keepers was seen, and stated that he did not know the township and range himself. The surveying done by him was only indifferently done. The lines of the section projected on the map are based on Mr. Keeper's corners, and are only approximate.

I believe that the bulk of the land lies in Township 25 north Range 11 east, but it may be an adjoining township.

As a summary of this and my former report I would say:

The area is limited to less than one thousand acres.

The land is very badly obstructed in part by a lava flow, and the soil is largely sand and a very sandy loam.

Each alternate section, the odd numbered ones, belong to the railroad.

The quantity of water available is limited in the summer months by the river being dry for from six weeks as a minimum to three months each year.

An additional amount of water might be secured by pumping, but that has not been demonstrated.

It might be possible to secure some winter crops by depending on the river flow, but such a plant would be of limited value, and settlers should not be induced to go there under such conditions.

The construction of the canal and the diversion works present no unusual difficulties. Cement, tools and all materials of construction will have to be hauled in from the railroad, and the nearest station with wagon road connection between the Falls and the railroad is Canyon Diable, 47 miles.

There is no possibility of increasing the amount of water by storage in reservoirs, as no reservoir sites have been found.

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Should the project go through, there is no immediate market for anything that might be raised. The nearest town is Flagstaff and the market there would be very limited.

Mrs. Gates' proposition to me was that the government build the ditch and she would raise the money to put in the pumping plant Some surety should be given before the government does anything, provided the other objections were overcome.

The cost for the gravity plant will be $35 per acre, and roughly estimating, the pumping plant would cost $25 per acre, a total of $60 per acre.

The cost of maintenance both of the ditch and the pumping plant must also be considered. The proposed settlers with practically no market will be in no shape to pay for the running of a pumping plant with the fuel used, coal, being hauled a long distance on the railroad, with a 45 mile wagon haul at the end, and maintain a gravity ditch system built in a very sandy country subject to fierce sand storms.

Finally- I believe that the project is without merit, and the cost of the surveys is practically money wasted, and if built I consider the project as an example of what not to do.

I know the needs of the Indians for water, and the value of irrigation in that country, but I certainly would not recommend the construction of this work for the purpose proposed - viz. the location of returned Indian Students and white foreigh born Menonites.

I attach herewith map of the proposed system, profile of the ditch line and a series of photographs taken by Mr. Sears to show the land to be covered by the ditch etc.

Very truly,

A. F. Robinson

Superintendent of Irrigation.

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