Historic Maps in K-12 Classrooms Environmental History - Map 8 Mining in South Dakota, 1878

Rigby's Report

In *Caledonia Gold Mining Company – Reports of Mining Engineers*. San Francisco, CA, 1879. Newberry Library call number: Graff 4936

CENTRAL CITY, 3rd April, 1879.

J. W. GASHWILER, ESQ.:

Dear Sir: I have the pleasure to comply herewith with your request for a detailed description of the property of the Caledonia Mining Company.

The works of the Caledonia Company, as you are aware, are situated in Whitewood Mining District, Lawrence county, Dakota. The location of this mine is of the usual size-300 feet in width by 1500 feet in length. This mine was the original purchase of the present Company, but, upon development, it was found that the line of the main ore body turned in a more southeasterly direction than had been anticipated by the discoverers, and it was apparent that the adjoining mines on the east would be an important acquisition to insure the success of the Caledonia Company. I therefore advised the purchase of the same, which advice was approved of, and in February the Queen of the Hills (a location of 300 feet by 1500 feet), and the Grand Prize (a location 300 by 1200 feet) was purchased, thereby consolidating the largest territory of mining ground in the Black Hills belonging to one company.

The property of the Company consists of the above named mines, together with an an [sic] adjoining piece of ground for a mill site, as shown in the map which I made some time since and forwarded to the office of the Secretary in San Francisco.

The Company also own a twenty-stamp mill at Central City, a distance of three-quarters of a mile from the mine, with roads, etc., leading thereto. The value of the property consists:

1st. Of the Discovery lode, a vein six to eight feet in width, upon which is the location of the shaft as shown in map. We have also cut the same vein in the Grand Prize tunnel. From this vein we milled about 300 tons of ore, which yielded five dollars per ton.

2nd. After passing through this vein the G. P. Tunnel cut a blind lode, a vein fourteen feet in thickness, from which about 200 tons of ore was milled, yielding six dollars per ton.

3d. And the most important. The main lode, the workings of which is shown on the enclosed supplementary map, which shows work done since the original map was made.

Since the purchase of the Caledonia Mine in September, 1878, and its incorporation a month later, I have had charge as Superintendent of the Company and am familiar with all its works in detail, having given personal directions to all the developments and extraction of ores.

At the time work was commenced by myself for the present Company, only a small portion of the lode had been exposed by what we termed surface workings. These consisted of an open cut some fifty feet, running in a northerly direction to the croppings (where considerable ore had been extracted), and following along the line of the vein next to the foot wall for a distance of some 30 feet, to where the croppings raised by the slope of the hill to a height of about 30 feet, where a tunnel was run a few feet. At or near the commencement of this tunnel an incline winze was started and sunk a depth of 30 feet. The commencement of our work was at these points as left by former owners. Since that time the drift was run and followed by stopes a distance of fifty feet through to the east wall of the lode. By the maps on which the surface work is projected, you will observe that the vein turned more westerly, so much so that the course of our tunnel was cross-cutting, hence the finding the wall nearly at right angles with our drift or the course of N. 52O W. We also run drift along the wall both easterly and westerly a distance of 70 feet, as shown by the map.

All the ore taken from this portion of the vein, together with that raised from the incline winze, was milled and returns are shown in Schedule.

In the meantime, as work was progressing as above described, two tunnels were commenced to develop the mine at a greater depth. Work was commenced in the Grand Prize Tunnel and prosecuted with eight hour shifts for a distance of two hundred and fifty feet, cutting the vein at a depth of 70 feet below the surface workings, connection being made with the incline winze, giving excellent air for working the mine for an indefinite time. Since this connection was made all the ore extracted has been upon this level, as work can be prosecuted, and ore transported through the tunnel more advantageously than upon the surface level.

Since the opening into the ore body through the Grand Prize tunnel work of development has been diligently prosecuted in both a northerly and southerly direction, as shown on the map, making an aggregate distance of 313 feet on the line of the vein, and under the croppings on the north end a depth of 110 feet, while on the south end a depth of I 40 feet has been attained, for as we advanced in either direction the hill raises, thereby increasing the height of reserves. The main ore chamber as at present worked is opposite the incline winze and entered by the tunnel, giving access to all parts of the level by tramway.

In extracting the ore on this level a chamber has been made, 50 feet in width in a line opposite the tunnel, 44 feet in width on a line opposite the incline winze. The chamber is stoped to a height varying from eight to sixteen feet, and on a line as shown about 100 feet, all of which is high grade ore, and if milled separately would yield not less than twelve dollars per ton; but in working the ore from this chamber we have not separated it from the low grade ore, preferring to work all together as it comes from the drifts, some of which have been run through nearly barren spots for a few feet, but such ore has on an average prospected from five to six dollars per ton.

In the south end of the works you will observe an enlargement, where we have just opened into a very fine body of ore nine feet in thickness at present working, and increasing in width as we advance, following the west wall. At this point we have a vertical depth from the surface of 140 feet, and on the dip of the vein or wall not less than 180 feet, giving a large reserve over the present floor. In the north end the drift has run along the west wall, taking a sharp angle at a point 120 feet from where the tunnel enters the lode, and at a distance of 41 feet from the point of angle a crosscut is being run in the direction of the east wall, this crosscut is now in forty feet revealing no indication of wall.

At a distance of eighteen feet from the west wall in this crosscut, we have a body of fine ore nine feet in width. None of this ore has been milled, but by prospecting tests I estimate its value at eight dollars per ton. From the character of this ore I judge it to be a continuation of the eastern portion of the great ore body already developed on this level, as it will probably be found that the east wall takes a more direct line than has been revealed by the west or foot wall, which has curved as represented on the diagram.

We have no data from which to estimate the width of the lode, beyond the actual work already done. You will observe in the southern end in line with the arrows we have developed 50 feet in width. In the chamber we have also 50 feet, and in the north end we have 40 feet,

and in no place have we any indication of being across the lode. Therefore, the unexplored portion in width should be considered sufficient to offset any contingency relating to the estimate of reserves upon this level.

All the low grade ore, or at least a large portion as developed in the drift south of the chamber, is a mixture of decomposed iron stone and quartz, and in the recent strike of good ore at the end of our drift, the ore is almost the same material. In the portion designated as the chamber or main ore body the composition is chloritic slate, brown slate and quartz, all of which carries gold.

In the northern portion of the works the ore is of the same material as the south end. The annexed schedule shows the results of milling these ores since the mine came into the possession of the present company:

MONTH	YEAR	TONS MILLED	BUILLION RETURNS	REBATE	SHORTAGE	REMARKS
September	1878	350	\$3,316	\$117.000		Half month
October	دد	650	5,850		\$897.000	
November	"	609	4,590		66.00	Caused by copper plate
December	دد	570	3,927	39.000		oreaning in outlery
January	1879	1,380	11,029	122.00		
February	"	680	5,253	187.00		
March	"	900	6,100			
TOTAL		5,139	\$40,065	\$465.00	\$963.00	TOTAL \$39,567.00

Making an average per ton of \$7.70 nearly. I would remark that a portion of the ore worked as above was milled in a mill having a much smaller crushing capacity than the one now owned by the company. On the Grand Prize location a tunnel has been run a distance of sixty feet in an easterly direction (all the way in ore) near the end of which a shaft has been sunk a depth of twenty-five feet, also in ore which prospects well; but not sufficient work has been done to determine the course of this vein, though I am of the opinion, judging from the nature of the ground, and a knowledge of the line of stratified formation that the course must be with, that of our works below and in all probability belongs' to the same lode as the Caledonia, in that case forming a lode of immense magnitude.

The lower or Caledonia tunnel referred to above is being run to strike the lode under our present works about thirty feet north of the incline winze, and is now within 130 feet of reaching the lode at that point. This tunnel will develop an ore body one hundred feet in depth below our present level.

From data as above I estimate the present reserves already developed above the floor of the Grand Prize tunnel, say fifty feet in width, three hundred feet in length and one hundred feet in depth, making 1,500,000 cubic feet reduced to tons by twelve cubic feet per ton of rock in place gives us one hundred and twenty-five thousand tons. It is safe to say that the unexplored portion in width of the lode will more than compensate for any contingency that may occur in extracting the ore. It will also be understood that we are continually developing good ground in line of the lode with increasing height by the slope of the hill. Also, that in my calculation I only estimate one hundred feet in height, while at the south end we have one hundred and eighty feet and at the north end one hundred and forty feet. We have every reason to believe that the Caledonia tunnel will open much larger reserves than above estimated, and judging from the character of the ore as brought to light as we gain in depth, the ore between the present and

lower levels will be of much higher grade, and we have evidence of the large body of slate ores as referred to above gains in length as depth is attained, as is plainly shown by a winze now being sunk at a point opposite and near the main incline shaft, as shown on diagram and marked "winze." It is now down twenty feet in high grade ore as ascertained by repeated prospects.

The mill belonging to the company is what is termed here a Colorado mill of very light stamps. Its capacity is from 700 to 900 tons per month, according to the texture of the rock reduced. The cost of milling and transportation of ores at present is very much in excess of the cost if reduced in a proper mill of 60 to 80 stamps, located at or near the mine, as will be seen by the following schedule:

Lights, lubricants, etc	\$900.00
Labor pay roll per month	60.00
65 cords of wood @ \$5.00	325.00
Repairs	50.00
Contingent	40.00
Transportation of 900 tons @ 75 cts	675.00
Repairs on road, etc.	25.00

Making a cost of \$2,175 per month for milling and transporting 900 tons of ore, making an average per ton of \$2.05 nearly.

Cost of milling in a sixty-stamp mill at the mine:				
Pay roll per month	\$1,140.00			
175 cords wood at \$5	875.00			
Repairs castings, etc.	350.00			
Contingent	150.00			
Water rent	500.00			
Oil and lights	100.00			

Making a total cost of \$3,115 for milling 3,600 tons in ane month, or an average of \$86.50 per ton, making a difference in favor of a mill at the mine of \$118 per ton nearly.

The cost of mining as now conducted, viz: (the greater portion of the ore extracted is taken from drifts being run for developing reserves and prospecting running tunnels,

etc.) is also greatly in excess of the actual cost after the levels are prepared for regular stopeing. It is estimated by managers of mines here who have already commenced such work to cost about two dollars per ton delivered in the mill. By the above you will see that at a cost of \$2.86 for mining and milling, that you will have a good margin even on five dollar ore. I would, however, make allowance for contingent expenses, as salaries, office, etc., setting down the total cost at \$3 per ton, leaving a margin of two dollars on each ton of five dollar ore, and ore of higher grade will yield a proportionately greater cost. I would further state that the cost of milling in the De Smet eighty-stamp mill does not exceed sixty cents per ton.

In view of the above facts and figures I am of the opinion that the Caledonia Mine is destined to rank second to none of the properties of the Black Hills.

Very respectfully yours, H. J. RIGBY.