

LOCATION

The property of the Navaho Gold Mining Company, whose principal office is at 460 State Street, Boston, Mass., is situated near Bland, in the Cochiti Mining District, New Mexico.

The village of Bland is about 35 miles west of Santa Fe and fifty miles northwest of Albuquerque.

PROPERTY

The Navaho Company owns four properties. A group of mining claims comprising 90 acres, located about half a mile west of the town of Bland consisting of the Lone Star, Free Trade, Dry Monopole, Uncle Joe, Red Cloud and the Denver Girl lode claims all patented. In this group are all the underground workings of the company.

Second, a group of claims, called the Aledo, Texas Boy and Chance, comprising sixty acres all patented, located in Medio Dia Canon about 1½ miles southeast of the mine. The claims are used for holding the cord wood cut and piled on the first claim and to hold the timber and saw mill buildings on the other two.

Third, a timber claim of 340 acres located in the Medio Dia Canon, about 4 miles north of the saw mill mentioned above. The company holds warranty deed for the timber tract.

Fourth, the water right in the Medio Dia Canon and a pipe line, about 4 miles long, (3 inch pipe), running from a dam on the southern end of the timber claim to a saddle or depression in the mesa which separates Pino and Medio Dia Canons. This saddle is a mile below the mine and is opposite and above the proposed mill site.

GENERAL GEOLOGY OF THE DISTRICT.

In the immediate vicinity of Bland the rocks are all tertiary Colcanica or sedimentary tuffs belonging to this period, and composed partly of ash and partly of silt derived from the erosion of the lavas.

The oldest rock outcropping in the immediate vicinity of the camp is a monzonite or monzonite porphyry, a greenish gray granular rock having plagioclase feldspar as its most important constituent.

Subsequent to the eruption of this rock fractures were formed in it and these became the channels for circulating solutions, probably ascending hot waters, closely connected with the volcanism. The waters were remarkable for intensity of action. The rocks they traversed have been chemically transformed, the chief process being silicification, so that they are now found more or less completely altered to quartz. Along fractures the rocks have been replaced almost entirely by quartz carrying gold and silver, and these constitute the veins by which Bland is known.

There is some evidence that this event was followed by a considerable period of erosion, long enough to bring the veins to the surface. Then another eruption of a similar rock occurred. This later rock differed from the earlier monzonite in that it contained as dark minerals hornblende and

and amphibole, and it also differs in some structural and textural points.

Following probably another period of erosion and volcanic rest eruption was renewed and there were outbreaks at many different points. The lava was rhyolite. This period was long and a number of different flows alternating or mingled. The eruptions were often explosive, as shown by a considerable quantity of pumiceous and fragmental material in the breccias of this period. Even occasional fragments of feldspathic sandstone occur in the breccias. They are pieces which were hurled out from the volcanoes at the time of their eruption. Thus it is shown that at an uncertain depth below the present surface the ascending lavas broke through the rocks of this age.

Before the eruption of the later rhyolite occurred an event of great economic importance, the faulting. A considerable number of important faults have been found in the district. Their age as denoted by their relations to the different formations, seem nearly uniform. All the rocks up to the overlying tuffs have been displaced by the faulting. This faulting might have been initiated by the intrusion of the rhyolite. After this intrusion there was a collapse and a sinking at the various vents. The still liquid lava sank, dragging downward with it the adjacent blocks of rocks. The economic interest in the faulting lies largely in the fact that the veins have been cut and displaced thereby. To complete the geologic history, we have to conceive of a considerable period of erosion which stripped from the surface a great thickness of volcanic material, leaving the resistant volcanic necks, and the silicified veins standing out as hills and strong ridges and laying bare the present surface.

NATURE OF MINERALIZATION:

The most important veins of the district, and all those that have proved of economic importance, occur in the Monzonite, and do not extend into the overlying rocks. Hence when the monzonite is not exposed on the surface, showing strong silicification, the later rocks form a capping to the veins, which capping must be passed through before anything can be known of the presence or nature of the veins beneath. This circumstance shows pretty plainly that the vein deposition took place before the eruption of the rhyolite and immediately after that of the older rocks. Indeed there is every evidence that the veins were formed by ascending hot waters succeeding and connected with the monzonite porphyry, and that these waters became inactive by the time of the rhyolite intrusion.

The mineralization of this period was extraordinary active, as the profound alteration of the monzonite testifies. Among the known veins formed at this period those of the Iron King, Lone Star, Washington, Crown Point, Albemarle, and Pamlico are the most important though certainly there are others which have not yet been discovered. The ore so far developed carries about 2 oz of silver to 1 oz. of gold. The sulphide ores show primary blends of galena, pyrite and occasionally chalcopyrite.

Mineralization subsequent to the rhyolite intrusion has only been noted toward the eastern boundary of the field, where there has been considerable alteration and mineralization, which must be attributed to a cause similar to that which produced the veins in the older monzonite, namely the action of hot ascending waters immediately succeeding and genetically connected with the rhyolite intrusion. This alteration is in the form of silicification and the formation of pyrite, and has acted on the rhyolite, as much as on the intruded rock. Quartz veins have been formed but in this case the veins are relatively small. These veins contain precious metals, but usually very irregularly distributed. High assays, especially on the surface, may

be obtained, but it is likely that some of these are the result of the well known process of increase in value at the surface during oxidation. Specimens of the vein material have a general resemblance to those of the veins in the older rock, therefore it is often difficult to distinguish them from the monzonite veins without a study of the rocks in which they lie.

To sum up at least two distinct periods of mineralization have taken place. Each of these periods was consequent upon a lava intrusion, and the mineralization was the result of a process which is known to accompany and follow volcanic eruption at the present day. Although ascending hot waters are not known to deposit more than traces of metals at the surface, it is supposed that an important precipitation takes place at some depth, so that it may be the case that there are important rich ore bodies in the district that erosion nor development has not yet exposed.

VEIN GROUPS:

The ~~only~~ productive veins ~~thus far discovered~~ are those of the monzonite porphyry. On account of the later rhyolite flows, which cover the underlying rocks in most of the district, these productive veins out crop only on a few strong ridges. ~~Outside of these veins little is known as yet.~~ It is probably, however, as indicated by the great amount of alteration in the monzonite, that the vein formation has been extensive, and the veins known at present are only a small portion of those that will eventually be developed.

*linked*

The veins already discovered belong to the type of <sup>linked</sup> veins. Their physical characteristic is that they branch and reunite in both a horizontal and vertical direction. There is generally in each group a main or mother vein from which the smaller veins branch. ~~These smaller veins again may subdivide and so finally die out.~~

Veins of the monzonite group have been discovered in various mines. Among those developed to some extent may be mentioned the Washington, Lone Star, Iron King, and Crown Point in Pino Canyon; and the Albemarle Pamlico group in Colla Canyon.

The Iron King vein lies near the center between the Colla Canyon group and the Casino Group. The trunk vein of the group may be called the Iron King-Lone Star vein, which crosses Pino Canyon in a north-south direction, showing a very strong outcrop. This outcrop is cut off on the north by the fault of Pino Canyon and on the south by Washington hill. From this vein a succession of branches depart, running chiefly in a southerly direction, the chief of these branches are known as the Washington, Last Chance, and Legal Tender. The more these branch veins run parallel to the main vein, the stronger they are, and the more they diverge from the general strike of the main vein they become weaker. The intersections of the branches with the main vein usually pitch to the east at a moderate angle. These easterly pitching intersections are significant, since they have the same general course as certain ore shoots of especially rich ore in the same vein, and correspond also in direction with some post mineral faulting.

OCCURRENCE OF ORE IN THE VEIN:

The veins are usually strong, straight and well defined, yet they are not fissure veins. They have at first sight all the appearance of fissure veins, but a little close examination shows that they have been formed almost entirely by replacement of the country rock in which they occur. They seem to have originated along zones of especially strong fracturing in the monzonite, formed during a period of movement subsequent to the consolidation of this rock. These zones of maximum fracturing, which are usually 4 to six inches

side, but may be much wider or narrower, became the chief channels of circulation for the mineralizing waters. The monzonite in which the veins occur has almost wholly altered to silica, and the veins themselves seem to be the final stage of alteration. In many cases the ore itself consists simply of a zone of more or less silicified monzonite. This zone is cut by parallel fractures having the same strike and dip as the walls, and the walls are nothing more than stronger fractures of the same kind.

**DEVELOPMENT:**

Raise No. 1 connects the main tunnel level and "A" level. It is in low grade quartz on the tunnel level, but at a point about 132 ft. above the tunnel it is in ore. The vein on the tunnel level, however, is in place, although no pay shoot has yet been found on that level.

I believe the vein of the Iron King, an adjoining claim, to the east, has been cut by crosscut No. 1 east on Level "A", also crosscut No. 4 on level "C", and I also believe that Crosscut No. 1 east on main tunnel level is within a short distance of this vein.

Mention is made of this because much high grade ore has been shipped from the vein on the Iron King lode, and it undoubtedly goes to show that this high grade ore shoot extends into the Star lode.

Another favorable probability I should mention is, that the Star vein d east and the Washington vein lying higher up the mountain, and paralleling the Star vein, dips west, they must intersect at some point below the main tunnel level, which I estimate to be at a depth of 300 ft. below the present tunnel. At this intersection we may confidently look for a fair sized, high grade or shoot.

A winze, now caved nearly to the top, but said to have been 300 ft. deep was sunk from the tunnel level. This winze is nearly all in the foot wall and off the vein.

The original owners opened the mine by six different adit levels, called "A", "B", "C", "D", "E", "F". On "A", "B", "C", "D", are large stopes where shipping ore has been extracted, while "E" and "F" are short adits near the surface. No shipments were made from the upper levels on account of the difficulty getting the ore down the steep hillside to the wagon road.

The Navaho Co. started a long crosscut tunnel on the Uncle Joe lode, in Pino Canon, this tunnel is 10 x 10 in the clear and cut the vein 200 ft. below the "A" level. About 700 ft. from the mouth of the tunnel a quartz vein was cut, which no doubt is the Washington vein, two hundred feet further another quartz vein was encountered which I believe to be the King vein.

There are 7072 ft. of underground workings all told, made up of 1474 f of drifts and crosscuts and the rest upraises and winzes.

From the main tunnel to "A" level	200	feet
" " " " "B"	72	feet
" " "B" to "C"	56	"
" " "C" " " "D"	32	"
" " "D" " " "E"	40	"
" " "E" " " "F"	52	"
	<u>451</u>	

The mine is dry except water was encountered in the big winze on the main tunnel level.

Pet 3  
INFO.  
MAY 10

### SURFACE EQUIPMENT:

At the mouth of the tunnel is a large blacksmith shop, which also serves as a storehouse for mine supplies. It has some tools and supplies of various kinds, enough to start up with.

At the foot of the dump, and about 100 ft. from mouth of tunnel is located the compressor house. In it are a second handed 6 drill compressor (not very good) a 40 HP Tubular boiler, boiler feed pump, tools, etc. Outside under a shed roof are two auxiliary portable 20 H.P. boilers with feed pumps. the boiler could be used again. There is plenty of water supplied by a well located just outside of the compressor house.

On the Chance claim, in Media dia Canon, is a sawmill, having a capacity of 10,000 ft. of lumber per day. This mill could be fixed up ready to run, by taking back the boiler, now located at the power house, without any great expense. There are also some bunk houses for any timber crew that might be needed. Most of the timber on the company's timber claim is red spruce and yellow pine.

### ORE IN SIGHT:

According to a report made by Mr. Percy E. Barber, (for the Navaho Co.) there are 90,000 tons of ore blocked out ready to mine, at an average cost of \$2.00 per ton, having an assay value of \$10.82 per ton. Mr. Barber, recommend the erection of a 100 ton daily capacity mill, which he says will pay a handsome profit.

Three other reports were examined, an epitome of each of which I give here:

Mr. Johnson's report:

Under date of September 25, 1899, Mr. F.M. Johnson says, the vein is exposed -

On "A" level for 570 feet, average assay	\$9.25
"B" 226	9.20
"C" 291	14.68
"D" 197	13.31
"E" 90	16.55
"F" 30	8.75
Average Assay	<u>\$12.01</u>

He estimates that there are 150,000 tons of ore in sight and concludes the Lone Star is an exceptionally good mine and will be one of the best producers in the west. (This report was also made and paid for by the Navaho Co.)

Mr. McVichie's report: Under date of June 16, 1901, Mr. Duncan McVichie reports:

Between "A" and "B" levels	13,114 tons, average value	\$ 7.66
"B" "C"	18,144	9.50
"D" "E"	26,381	6.74
"C" "D"	13,126	7.00
Above "E"	3,850	6.74
	<u>74,616</u>	<u>\$7.69</u>

He finds two points between "A" level and the main tunnel, where a 3 foot pay streak occurs in the vein, showing sensational values some of them considerable over \$100 per ton, and he estimates that there is a possibility here of getting 8220 tons of ore averaging \$8 per ton.

He estimates that 28,000 tons of ore could be mined in the upper level by the open pit method for 71.5¢ per ton, that the balance of the ore above

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"A" level, 46,616 tons could be mined for \$2 per ton; and that the ore below level "A", 8220 tons could be mined for \$3 per ton.

He concludes that while the figures show a profit for treating the ore now blocked out in the Lone Star, "the proposition is not one that would be considered inviting from a mining standpoint."

Mr. Heffron's report:

Under date of December 24, 1903, Mr. H. G. Heffron, found ore reserves:

Between Level "A" and "B"	18,216 tons average value	\$13.93
"B" and "C"	17,226	6.17
"C" and "D"	14,400	10.16
"D" and "E"	13,440	6.58
Above "E"	4,000 estimated	6.46
	<hr/> 67,322	<hr/> \$ 9.06

Mr. Heffron says that he did not go below "A" level, he continues the pay chute so far as the vein is opened, is confined to about 200 ft. of the north end, with a decided rake to the north of the intersection of the big tunnel with the vein on that level. In other words, that the big tunnel cut the vein under the pay shoot on its rake to the north, Level "A" is in better shape with truer walls, and ore of much greater values, than any level above it. I do not believe that such a large vein pinches out, or that values stop at 50 ft. below that level. He estimates the mining cost at \$2.00 per ton.

The ore is siliceous and gives analysis as follows:

Gold .00062	Antimony .19000	Silica 98.10300
Silver .04200	Tellurium .24200	Copper Trace
Iron S .09000	Sulphure .61000	

(The geology in this report is by Statz, who put the report in present shape. Figures and assays given were taken from a report in Mr. Sandoz's possession and I do not know where he got his figures from, but evidently from reports made by competent engineers.)

(Signed) STATE