

PRELIMINARY REPORT OF CONCLUSIONS FROM THE EXAMINATION OF THE  
AURORA-PRINCESSA MINES, ALAMO, BAJA CALIFORNIA, MEXICO.

The final report on the examination of the Aurora-Princessa mines will be submitted after the accompanying maps have drafted and after the receipt of the assay returns from the samples collected during the examination.

The examination at the mines was carried on from October 31 to November 15th inclusive, and a complete microscopic examination of the ores and rocks have been made in my laboratories.

The results of this work make it possible to summarize the conclusions as to the possibilities of the properties in advance of the final report which will contain the data on which these conclusions are founded and also recommendations as to future developments.

The data gathered by Mr. MacBoyle shows that ores is unusual richness have been taken from the property, and that \$2,000,000 has been from near the surface by the former owners and by Mexican leasers. A series of a half dozen main veins with minor branch veins extend across the property for a length of about a mile and a half, and rich ore has been taken from shallow workings along the entire outcrop.

The chief questions presented to me in regard to the property were: (1) Will the ore go down? (2) Are there difficulties in finding and mining the ore bodies, out as they are by dikes which will prevent successful exploitation? To these questions I can answer as follows: (1) The ores are of a deep seated type and will be found at depth. (2) The ore occurs as pitching shoots between the dikes. The latter do not dislocate the veins seriously, and properly directed mining operation should not experience serious difficulty in following and developing the ore bodies.

More in detail the results of the main lines of investigation are as follows:

RESULTS OF THE MICROSCOPIC STUDY OF THE ORES.

The microscopic examination of the samples submitted by Mr. MacBoyle was carried on before making the mine examinations, and on the return from the mines samples taken by myself were studied. Two types of gold were recognized: (1) the original or primary gold occurring as specks, crystalline grains and veinlets. (2) secondary leaf gold which has been concentrated in cracks by the processes of oxidation near the surface. The latter is very minor in amount, and even in the oxidized ores there is no considerable concentration of the gold due to oxidization. The ores are of a deep seated variety resembling the Grass Valley ores in type. Much free gold is found in the

sulphide ores and no difficulty should be encountered in treating the ores.

The richness of the ores therefore shows no relation to the surface. Suggestions as to the depth to which primary ores of this character will extend can best be obtained from the geological field examination.

#### RESULTS OF THE GEOLOGICAL STUDY AND MAPPING OF THE VEIN SYSTEMS.

The properties contain a series of half a dozen main veins in addition to minor branch veins. The veins are cut by numerous dikes. In spite of the fact that the dikes cut across the veins, the latter are not seriously dislocated, but are found holding their courses beyond the dikes.

The main veins were traced the length of the group of claims for a distance of nearly one and one half miles. The main Aurora-Princessa vein, for example, is called the Arbol de Oro in the northerly portion of the claims. Mapping the outcrops of the veins leaves no doubt that the main set of veins continue across the property. Veins which can be traced continuously for this distance and which show primary gold values along their entire length are not likely to be superficial.

The group of veins on this property contain by far the most continuous attractive and richest ore bodies of the district with the possible exception of the Viznaga mine. Practically all the placer gold came from the erosion of these veins (except the Viznaga gulch placers) and is not found in the gulches above them.

The property is a large one. At the southern end are the Conote, Barraccho, Crudo, Pegleg-Colundrina, Aurora-Princessa and the Iron veins from all of which rich ore has been mined.

The central section of the vein system will be mined from the San David claim. Mr. Cota, foreman at the Alamo mines since the mines have been worked, informed me that there was five to six feet of "low grade ore" averaging a little over one ounce per ton. This central portion of the property is very attractive and should be developed simultaneously with the richer but smaller shoots of the Aurora-Princessa section, in order to assure a steady supply of ore.

In the northern portion of the claims, the Arbol de Oro and the Grano de Oro are pronounced veins of the narrow rich type. The former has been stoped from the water level to the surface. The Ullyses vein is large, five feet of ore showing at the surface. This end of the property is almost as attractive as the Aurora-Princessa section.

In addition to the main system of veins there are two strong veins in the Grande claim, showing massive sheared quartz at the surface, but presumably of low grade, as the quartz has been left on the dump. If these large veins assay on development \$5.00 or more per ton, they will supply a steady tonnage which will be "sweetened" by the richer ores of the other veins.

As mentioned above, diabase dikes cut the veins but do not dislocate them. A great dike, 100' wide in places, cuts through the Ulysses vein, and the latter is formed on either side of the dike. Ore shoots therefor occur between dikes, and the largest shoots occur (1) where the dikes and veins become nearly parallel, and (2) where the dikes are least numerous and small. The probably location of the ore shoots is discussed in the final report.

#### VALUE OF THE ORE MINED.

No additional information to that compiled by Mr. MacBoyle as to the value of the ore formerly mined was obtained by the writer. However, all data suggest that the ore milled was of high grade. An old Mexican lease told me that they could not make money on less than two ounce ore. There is practically no quarter ore left on any of the dumps except at the Ulysses and the Grande properties, and the tailing dumps and old stopes show that much ore has been mined. Hence it seems certain that the ore mined was of good grade.

The report that \$600,000 was taken from the Aurora shoot between the 150' level and the surface is said by Mr. MacBoyle to be obtained from the Mexican Custom records and is probably authentic. The report of the value of the ore milled by Mr. Johnstone is taken from his records and is also authentic. In brief, it may be concluded that the ore mined has been of unusually high grade and promises successful results for future development.

#### RESULTS OF UNDERGROUND MAPPING.

Although it was unfortunate that the mine was not in condition to permit the examination of all the workings enough of the workings were mapped to show where the ore shoots which are shown at the surface and also which are developed in the mine, are to be looked for. These details will be brought out in the final report.

The underground examination also shows that the ore is not bottomed but that the intersections of the dikes with the veins gave trouble. Of course the Mexican leasers could not afford to work below water level and do barren development work to find the ores beyond the dikes.

In brief the underground workings of the Aurora-Princessa mine have a length of 600'. In this distance three shoots have been opened up: (1) the Aurora shoot which produced \$600,000 between the 150' level and the surface, (2) the east Princessa shoot which is reported to have assayed 5 ounces gold (authority Abel Cota) and was stoped from the 220' level, and (3) the west Princessa shoot (reported to have produced as high as 15 ounce ore, Abel Cota) which was mined to the 360' level and underhand stoped below that level.

In addition a rich small vein, east of the Princessa vein, has been mined from the 100' and 200' levels. Cota, who mined

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some of this ore, reports it as assaying 18 ounces gold, and his report is verified by Mr. Johnstone who milled the ore.

That this amount of ore should have been developed in workings exploring only 600' of length along the Princessa vein is the most encouraging feature brought out by the underground sampling, and mapping.

There are good prospects not only for the development at greater depths of the three ore shoots mentioned above, but also the Borracho vein can be reached from the 220' level in about 150'. The important "Iron Vein" which is so strongly developed in the San David claim, and has produced rich ore in surface cuts on the Princessa claim, and has produced rich ore in surface cuts on the Princessa claim should also be explored from the Princessa mine workings. These developments followed as soon as possible by those mentioned above on the San David property and later by the development of the veins in the Ulyses section, and then by the development of the veins in the Grande section, are thoroughly justified by the present showings.

The project as a whole is the best development proposition that has been called to my attention for the last ten years and is recommended by me.

STANFORD UNIVERSITY  
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Respectfully submitted  
(signed) C.F. Tolman, Jr.