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Mr. J. E. Kinnison

Tucson, Arizona

Dear Sir:

Herewith is the report of my examination of the Kinnison Group of Mining Claims. Accompanying the report are two maps showing the general geological features of the group and its immediate vicinity.

The fieldwork was done in October and November of 1946. The rock-classification was done by the Arizona Bureau of Mines at the University of Arizona from specimens sent in by me. Many of the surface rocks are so badly altered that their true places in rock nomenclature could not be determined, hence some dikes shown on the maps as Andesite Porphyry may be Monzonite or Trachyte Porphries. For present purposes this is not very important.

This group of claims lies in the Old Hat Mining Dist., Pinal Co., Arizona, and covers parts of Secs. 3,4,5,8,9 and 10 in T. 9S,R16E, Gila and Salt River Meridian.

The objective of the examination was to determine, if possible, if there exists any physical deterrent to a continuation into the Kinnison Group of the copper-ore deposit now being developed with churn-drill holes by the San Manuel Copper Corp.

My conclusions are that if there exists any physical phenomenon which could act as a barrier to the southwesterly continuation of the San Manuel ore-body it is not apparent on the surface. I believe that the Kinnison ground and the San Manuel ground were as one block when the mineralization took place, and that this relationship still continues with the exception of a few minor and unimportant faultings. I deem it quite probable that this mineralized zone will extend onto the conglomerate covered northeastern portion of the Kinnison Group.

REPORT IN GENERAL

The surface of all this region, including the valley of the San Pedro River and at least ten miles westward from the river, is now covered with a bedded deposit of erosional detritus and lavas known as the Gila Conglomerate.

Nothing now remains of these once more-or-less level beds but their north-easterly dipping stubs resting on the old underlying igneous surface. The up-tilted tails of the beds have long since been eroded away.

Here and there the erosion has exposed and left bare small areas of this original surface, and it is with two of these exposures that we are particularly interested in this investigation.

The direction between these two is northeast-southwest and they are separated from each other by from 7,000 to 10,000 feet of conglomerate covered surface.

The one to the Southwest has an area of about a square mile and is on the Kinnison Group of Mining Claims. A thick mantle of Conglomerate covers the 4,500 linear feet intervening between the edge of this exposure and the northeastern boundary of the group.

The one to the northeast has an area of about one and one-half square miles and is owned principally by two mining companies: the northern part whereon are located the Mohawk and Mammoth lode mines, belongs to the Mammoth St. Anthony Ltd; and the southern part to the San Manuel Copper Corporation.

The veins of the Mammoth St. Anthony Ltd. bear northwest-Southeast and have produced, and are producing, much gold, molybdenum, lead, zinc and some copper.

The southeastern tip of the exposure, part of the San Manuel Copper Corp., holdings, is highly mineralized throughout and contains a body of lowgrade copper ore at depth.

This copper ore-body, whose long axis trends northeasterly-southwesterly has been developed in these directions for a distance of 5,000 ft. from tip of the igneous exposure it now extends 3,200 feet southwesterly towards the Kinnison claims and lacks 2,200 unexplored feet of reaching that group.

With the exception of a few hundred linear feet at the point of discovery the ore-body lies under the concealing blanket of Gila Conglomerate which the churn-drill holes must penetrate before entering the igneous rock wherein the ores are contained.

What will happen to this ore body in the 2,200 feet remaining between the most southwesterly drill hole and the edge of the Kinnison property is purely a matter of speculation. It may play out or lose its commercial value. It may change its course and wear to one side, it may meet up with a resistant intrusive body which has tended to seal off the ascending mineralizing solutions. It may encounter a fault which has thrown it up or down or to one side.

But if these obstacles exist their presence is obscurred by the conglomerate covering.

Some post conglomerate faulting has occurred but the resultant dislocations seem to have been relatively slight. Faults in the conglomerate are hard to detect: they leave no escarpment, but are usually traced as calcite filled veins. One of the latter is found on Red Rock No. 21 claim but the amount of the displacement cannot be determined. Another is found on Red Rock No. 15 where it displaces a tuff bed about 80 feet. A third is seen on Red Rock No. 66 where the conglomerate is thrown into contact with the Quartz Monzonite. East of this fault the igneous rock reappears but the amount of displacement cannot be determined. The San Manuel Fault, shown

on the map of the San Manuel area and in cross section A-A, has been described as one that occurred after mineralization of the ore zone but previous to the tilting of this whole area. In that case the displacement by the fault must exceed 3,000 feet as evidenced by the drill holes and the down thrown top portion of the fault block must lie, at least in part, within the Kinnison Group.

It is true that some faulting has occurred along this line of contact between the igneous rocks and the conglomerate beds, but judging from the composition of these beds as exposed in Tucson wash just south of the contact, the steep angle of the old granite land surface was produced probably by an erosion channel during the time of the accumulation of the conglomerate beds.

The conglomerate completely hides the effect of any faulting which may have occurred previous to the deposition of these beds.

That the two now exposed areas of igneous rocks are of common parentage is quite evident. The mother rock of both is a Quartz-Monzonite, Pre-Cambrian rock phase of the Oracle Granite. Both contain Andesite Porphyry and Monzonite Porphyry intrusions of the Quartz-Monzonite. The dike structure on the southeastern part of the Kinnison exposure represents a shear zone roughly parallel to the line of the ore body approaching from the northeast which itself must be following just such a shear zone. Small copper depsoits in weak veins in this area show that the circulating mineral solution did reach this far though not in large quantity.

The source and nature of the mineralizing solutions that produced the San Manuel ore have not been determined, but they do no doubt owe their origin to the period of the intrusions.

In late Cretaceous times this whole region was subjected to an outburst of andesitic volcanic activity closely followed by an outpouring of monzonitic material. Hence the many dikes and intrusive masses of these rocks. Most of our large Western U. S. copper deposits are associated with monzonite porphyry or something closely akin to it. The monzonite porphyry exhibited to view in this area did not originally carry copper; it serves merely to indicate the existence at great depth of a mass of similar material which, cooling slowly, gave off large quantities of mineral well into Tertiary times.

This mineral, reaching for the surface in alkaline sulphide thermal solutions, followed fracture and shear zones, permeated, and was deposited in, even the most minute fractures of the rocks it encountered. Both the Quartz Monzonite and the Monzonite Porphyry have been thus mineralized with quartz, iron, copper, and molybdenum.

The chemical alteration of these rocks on the San Manuel outcrop is pronounced. Whether or not that area was the center of mineralization we do not know, but it is the most highly altered outcrop now visible.

Following the intrusions of the andesite and Monzonite porphries, and the formation of the ore bodies, the land lay quiet for a long time subject to erosion. Then in Pliocene times it began to sink. This whole region for many miles around sank slowly while the conglomerate sediments formed over it.

Perhaps at the beginning the two now exposed islands were hills with a deep valley or basin between them. They did not sink evenly; the Kinnison part of the block sank faster and deeper than the Red Hill part did, but eventually both were covered.

At one time during the subsidence, thick lava flows moved over the area and themselves became covered with the conglomerate.

Then the block rose again until the two hills bore about the same horizontal relationship to each other as they had at the beginning of the subsidence. Erosion has unbared the two exposures, but the intervening and surrounding spaces are still covered with the conglomerate, the stumps of whose beds now lie dipping to the northeast at from 20 to 40 degree angles with the horizon.

It is natural to suppose that a great deal of faulting, or block movement, would result from the intrusion of so much porphyritic material into the mother rock. It is also natural to suppose that if such faulting, or more particularly any post mineral faulting, did occur in the area between the two now visible igneous exposures, the stresses produced by the subsequent tilting of the area would have renewed and continued the slippage along such faults, and that the results would now be manifested in the conglomerate. Lacking such manifestation leads me to believe that there was no large scale faulting between the two exposures.

At the beginning of this report I stated that in all probability the mineralized zone of the San Manuel area will extend onto the Kinnison Group.

I strongly suspect, however, that the trend will not continue to follow its past course indefinitely. It may soon come under the influence of the shear zone on the Kinnison claims. Consequently I would advise delaying any drilling campaign on your property until the drill holes on the San Manuel area more definitely establish this trend.

Respectfully submitted,

L. T. McElvenny

L. T. McELVENNY, E. M.

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The objective of the examination was two fold:

a. To judge the advisibility of prospecting for ore bodies beneath the igneous outcrop on the claims, and

b. To determine, if possible, if there exists any physical deterrent to a continuation into the Kinnison Group of the copper-ore deposit now being developed with churn-drill holes by the San Manuel Copper Corp.

My conclusions are as follows:

a. At many places scattered over the igneous-rock outcrop can be seen short breaks, or veinlets carrying a little copper mineralization. These are not strong veins; they lack quartz and are mineralized principally with iron oxides especially at or near porphyry intrusions. Some of them have (already) been explored with shafts to depths as much as 150 feet. (In my opinion they do not justify further exploration.)

The general alteration of these exposed igneous rocks is due to age and weathering and not to much hypogenetic or hydrothermol activity (such as would be essential to the formation of a large underlying ore body) like that of the San Manuel. (Lacking this surface evidence, I would judge that an ore-body of that nature does not exist below this outcrop.)

b. If there exists any physical phenomenon which could act as a barrier to the southwesterly continuation of the San Manuel ore-body it is not apparent on the surface. I believe that the Kinnison ground and the San Manuel ground were as one block when the mineralization took place, and that this relationship still continues with the exception of a few minor and unimportant faultings. I deem it quite probable that this mineralized zone will extend onto the conglomerate covered northeastern portion of the Kinnison Group.

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This copper ore-body, whose long axis trends northeasterly-southwesterly has been developed in these directions for a distance of 5,000 ft. From tip of the igneous exposure it now extends 3,200 feet southwesterly towards the Kinnison claims and lacks 2,200 unexplored feet of reaching that group.

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Some post conglomerate faulting has occurred but the resultant dislocations seem to have been relatively slight. Faults in the conglomerate are hard to detect: they leave no escarpment, but are usually traced as calcite filled veins. One of the latter is found on Red Rock No. 21 claim but the amount of the displacement cannot be determined. Another is found on Red Rock No. 15 where it displaces a tuff bed about 80 feet. A third is seen on Red Rock No. 66 where the conglomerate is thrown into contact with the Quartz Monzonite. East of this fault the igneous rock reappears but the amount of displacement cannot be determined. The San Manuel Fault, shown on the map of the San Manuel area and in cross section A-A, has been described as one that occurred after mineralization of the ore zone but previous to the tilting of this whole area. In that case the displacement by the fault must exceed 3,000 feet as evidenced by the drill holes and the down thrown top portion of the fault block must lie, at least in part, within the Kinnison Group.

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The source and nature of the mineralizing solutions that produced the San Manuel ore have not been determined, but they no doubt owe their origin to the period of the intrusions.

In late Cretaceous times this whole region was subjected to an outburst of andesitic volcanic activity closely followed by an outpouring of monzonitic material. Hence the many dikes and intrusive masses of these rocks. Most of our large Western U. S. copper deposits are associated with monzonite porphyry or something closely akin to it. The monzonite porphyry exhibited to view in this area did not originally carry copper; it serves merely to indicate the existence at great depth of a mass of similar material which, cooling slowly, gave off large quantities of mineral well into Tertiary times.

This mineral, reaching for the surface is alkaline sulphide thermal solutions, followed fracture and shear zones, permeated, and was deposited in, even the most minute fractures of the rocks it encountered. Both the Quartz Monzonite and the Monzonite Porphyry have been thus mineralized with quartz, iron, copper, and molydbenum.

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L. T. McElvenny

L. T. McELVENNY, E. M.

3-11-83

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