# THE ORE BODIES OF THE YERINGTON DISTRICT, NEVADA

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Geology 461
Makeup Report

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The ore bodies of the Yerington District, with the exception of the Empire-Nevada Mine, are contact metasomatic deposits in altered Triassic limestones. Three periods of intrusives are associated with the ore deposits. The first intrusive was a granodiorite. The second intrusive, a quartz monzonite, brought in large quantities of ferroferric iron, silica, and alumina. Large masses of limestone were altered to garnetites and pyroxine-rich hornfels. The garnet is a grossularite variety, and the pyroxine is about half-way between diopside and hedenbergite.

In the period following the third intrusion, a quartz monzonite porphyry, more iron, silica, and alumina were introduced, altering more of the limestones to garnetites. This garnet is andradite. The ore minerals, chalcopyrite and pyrite, were introduced at this time.

There is very little supergene enrichment of ores in the district.

## LOCATION:

The Yerington Mining District is located in the Singatse Range, Lyon County, Nevada, just west of the town of Yerington. It is accessible by numerous unimproved roads from the towns of Yerington on the east, Wabuska on the north, and Ludwig on the west.

## ORE BODIES:

The majority of the ore bodies of the district are in a series of altered and unaltered Triassic limestones. In the areas of ore, these limestones are very highly altered, some of them have been completely altered to garnet, pyroxine, and epidote. The zones of alteration seems to follow faults and fractures, and this undoubtedly accounts for the existance of

* Adolf Knopf, Professional Paper 114, U.S.G.S., 1918.

ore at great distances from any intrusive cantact,

It is evident that large quantites of iron and silica were introduced and large quantities of calcium were removed. This exchange took place on a volumn for volumn basis as was shown by the discovery of a fossil, determined as Halobia, that, while completely altered to garnet, was undistorted.

The garnet rocks of the district fall into two distinct groups. One group is composed essentially of fine-grained grossularite. It is associated with and has the some origin as the pyroxine-rich hornfels. Replacement ~~Alteration~~ of calcite by grossularite and pyroxine followed the first intrusion of quartz monzonite. The other garnet rock is composed essentially of a coarse-grained andradite nad is genetically related to the intrusions of the quartz monzonite porphyry dikes. During this period of alteration, some of the pyroxine hornfels were altered to an epidote-rich rock. At one place, the Casting Copper Mine, an earlier grossularite garnet breccia has been cemented by the later andradite garnet. It is this second period of mineralization that brought in the copper in the form of chalcopyrite.

There are only two primary ore minerals in the district, pyrite and chalcopyrite. The ratio between the twe varies widely. In the Mason Valley Mine, there is approximately twice as much pyrite as chalcopyrite, whereas in the Douglas Hill Mine, pyrite is found only in traces.

There is very little supergene enrichment of ores , due, perhaps, to the low water table and the semi-arid climatic conditions in the district. The two secondary minerals of the district are covelite and chalcocite. Both were produced at the expence of the chalcopyrite. Some of the chalcopyrite altered directly to chalcocite, other chalcocite was deposited by the replacement by copper, of the iron in pyrite. The covelite was deposited from solution upon chalcopyrite

In the oxidized zones of the outcrops, chrysocolla, malachite, cuprite, chalcanthite, and brochantite are present. These ares have been relatively unimportant except in the bluestone Mine, where chalcanthite was mined for the

amalgamation mills of the Comstock Lode, and in the Empire-Nevada Mine where the ore consists of stringers of cuprite in a quartz monzonite porphyry dike.

In general, the ores of the district are primary ores of the contact metasomatic type. They are found near the surface. The ore minerals, chiefly chalcopyrite, are enclosed in a gangue composed mainly of garnet, pyroxine, and/or epidote. The ores were deposited along fault fractures at distances ranging up to 2500 feet from the intrusive parent. It is evident that these fault fractures played an important part in the control of ore deposition. The presence of minute amounts of tourmaline, and zircon and the large amounts of garnet, pyroxine, and epidote coupled with the fact that the replacement took place with almost no change in volumn, indicates that the solutions were rich in iron, and silica and were poor in calcium. They also contained some boron, sodium, and chlorine and were probably aquatic. Deposition took place at no greater a temperature than 600 C. and probably took place around 370 C.

DISCUSSION:

Some of the conclusions reached by Knopf do not agree with Lingren's classification of ore deposits.* Knopf mentions one ore body, the Casting Copper Mine, where the ore and its accompanying andradite filled the interstices and recemented an earlier garnetite breccia. There was no alteration of the earlier garnetite. The report also mentions the control of faults upon one deposition, particularly in the Empire-Nevada Mine, where the ore was deposited as fissure fillings in a faulted quartz monzonite porphyry dike. The report further states that the ore was deposited by aquatic solutions at a temperature of not more than 600 C. and more probably around 370 C. From this evidence, it would seem that the ores grade from contact metasomatic deposits at or near the intrusive contact to hypothermal deposits at distances up to 2500 feet from the contact.

*Alan M. Bateman, ECONOMIC ORE DEPOSITS, Johm Wiley & Sons, Inc., 1950, pp 361-363.