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A Microscopic Examination of
Polished Sections of Ore
from the White Water
Mines, Limited,
B. C.

INTRODUCTION.

The present White Water Mines Limited represents an amalgamation of two former mines known as the White Water and White Water Deep. This merger was incorporation in 1922.

The White Water Deep Mine is an extension of the White Water Mine at depth. That is to say, in the White Water Mines, two distinct ore bodies have been developed, both on the same vein. The ore body nearest the surface extends down to the tenth level and was formerly known as the White Water. The ore body being mined below the tenth level differs in character and was known as the White Water Deep. In the past, the greater part of the tonnage from these mines came from the upper workings, or the Old White Water Mine. However, in 1924 the White Water Deep workings were increased and it is responsible for the major part of the tonnage of the two mines since 1924.

The White Water deposit is located in rocks, which form part of the Slocan series. The rocks containing the ore bodies are mostly slaty, and have large beds of lime stone. All the ore in the Slocan series is located in these slaty rocks, the ore bodies being replacement deposits in the lime stone. The White Water is this type of deposit. The ore minerals combined in the White Water Mines are mainly sphalerite, galena and tetrahedrite. The upper deposit was mainly mined for the silver content, but the lower workings are low grade, and are mined principally for the zinc and lead.

WHITE WATER #1.

The minerals present in this specimen are sphalerite, galena, quartz, tetrahedrite, chalco-pyrite and pyrite. Sphalerite is the most abundant, with galena in almost equal amount. Quartz comes next, and then chalco-pyrite and pyrite. The especially interesting mineral in this specimen is tetrahedrite, which is about as abundant or more so than the chalco-pyrite.

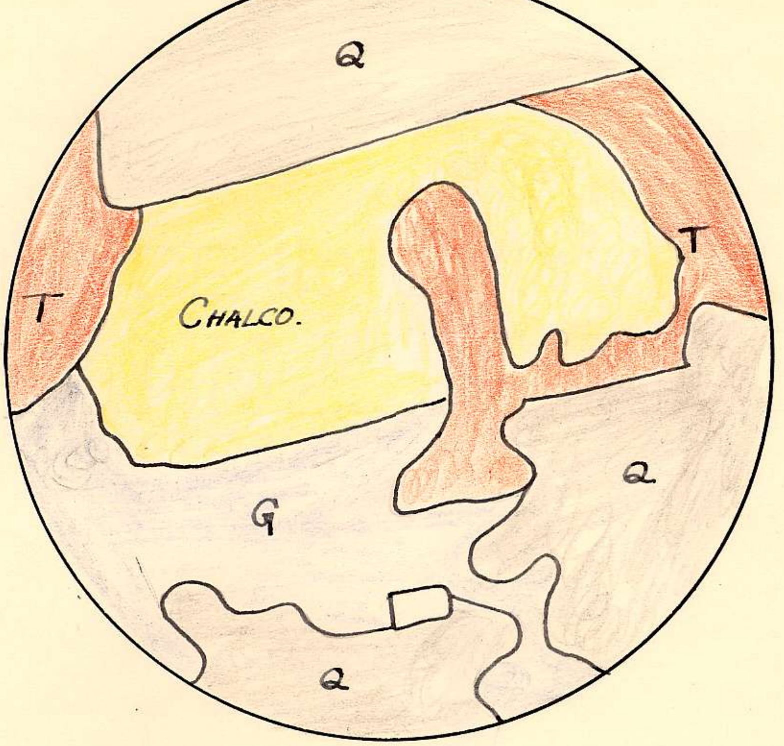
The sphalerite occurs in two ways; the first mode is continuous, and the second is scattered pieces in galena, which is itself continuous. Quartz seems to be present in two varities, one dark and the other light, with about equal amounts of each. Chalco-Pyrite occurs as large, unsupported nuclei in the galena and tetrahedrite. The pyrite and quartz are shattered badly throughout the specimen, and the pyrite occurs as long shattered slender stringers.

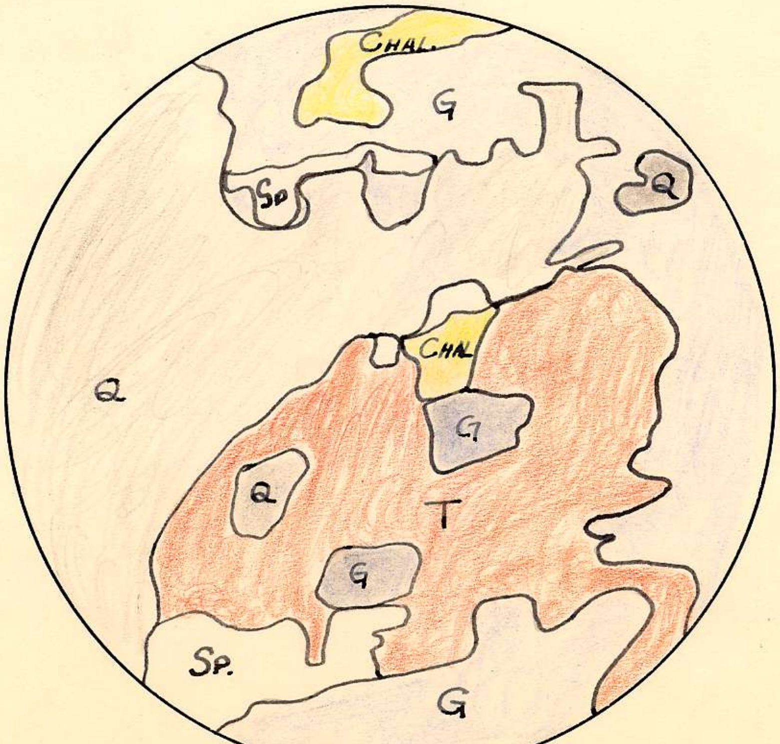
Paragenesis.

The galena and sphalerite occur as secondary minerals as shown by the quartz and pyrite inclusions. The tetrahedrite came in at the same time as the galena, and is obviously associated with it. There are extremely rich portions of tetrahedrite in this specimen, and it is known to run 4,000 oz. in silver. The tetrahedrite, of course, accounts for the high silver content of the ore. Pyrite, calco-pyrite, and quartz are obviously primary in this specimen, as pyrite and quartz occur shattered throughout the sphalerite and galena respectively, while the chalco-pyrites primary origin is indicated by its large unsupported nuclei.

Though some sphalerite is scattered in the galena, it is doubtful whether it has been a primary mineral. There is not sufficient evidence to prove the actual case however. The dark quartz appears to cut the light quartz, and hence it is reasonable to suppose that it came in later.

Whitewater 1





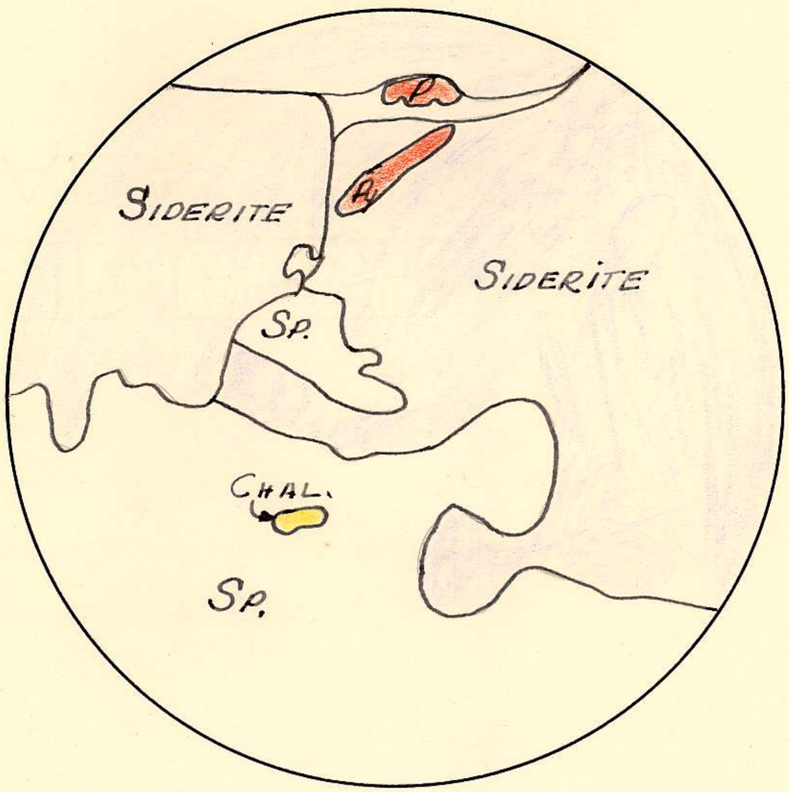
WHITE WATER #4.

This section was largely pure sphalerite. The only other minerals were siderite, pyrite, chalco-pyrite, and quartz. The siderite next to sphalerite is the most abundant mineral, with pyrite and chalco-pyrite following, but in much smaller amount.

The boundaries of the siderite and sphalerite are smooth and show no unsupported nuclei. This is sufficient to show that the two are of simultaneous deposition. The pyrite occurs in long thin stringers in the sphalerite, and also as small nuclei in the siderite and chalco-pyrite is scattered sparsely throughout the sphalerite in small pieces. These minerals are secondary in origin to the siderite and sphalerite.

It is worthy of note that the siderite is quite badly shattered and there is a possibility that it may be secondary. However there is not enough evidence to support this view from the sections examined.

WHITEWATER No. 4



WHITE WATER #6.

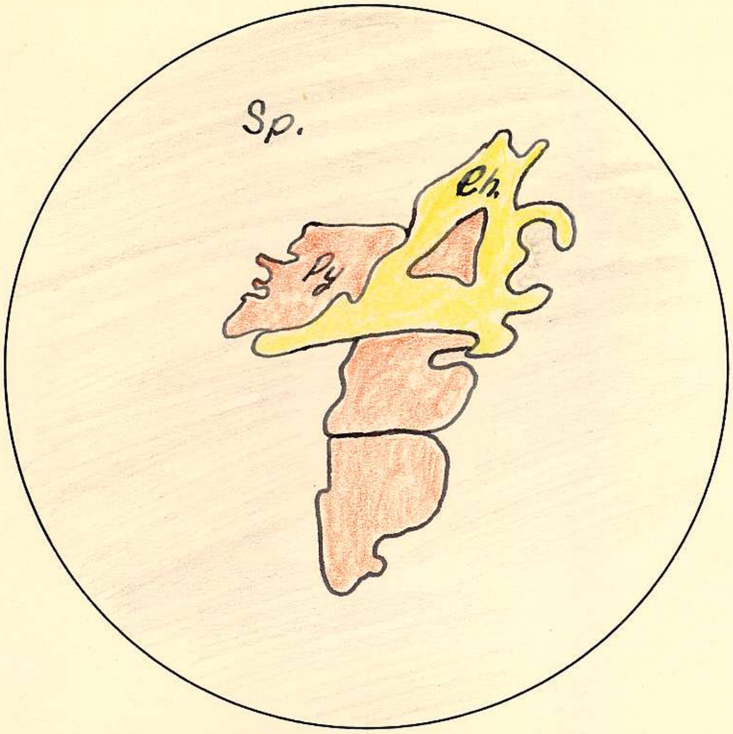
The minerals contained in this section are sphalerite, pyrite, chalcopyrite, and quartz. Sphalerite is by far the biggest proportion of the specimen, with quartz next, and the amount of pyrite and chalco-pyrite being about the same, as closely as can be estimated.

The examination of this specimen gives reasonable assurance that the pyrite and quartz are the primary minerals. Chalco-pyrite very probably came in two later successive generations. The sphalerite came in as a second generation mineral along with the last generation of chalco-pyrite.

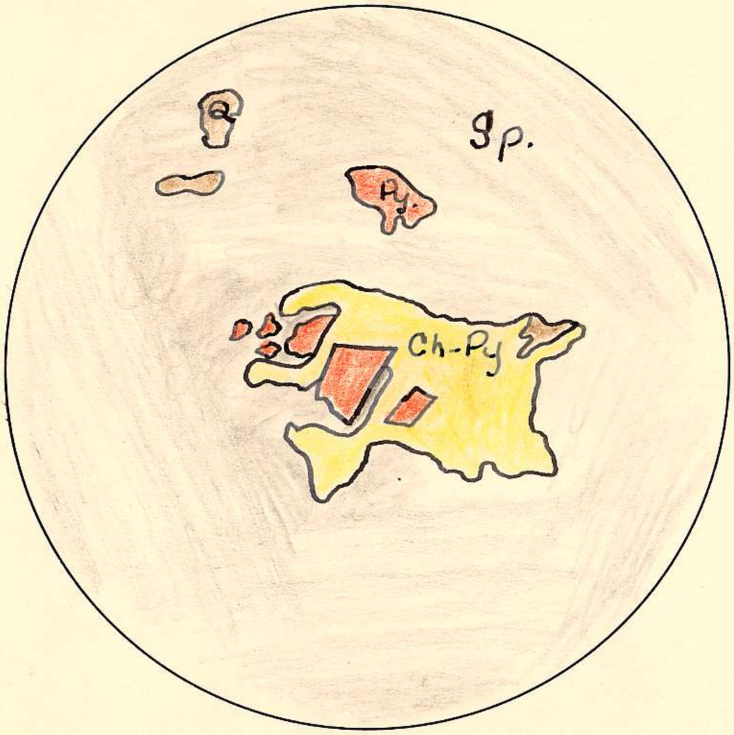
The evidence for supporting these statements will be found in the following drawings.

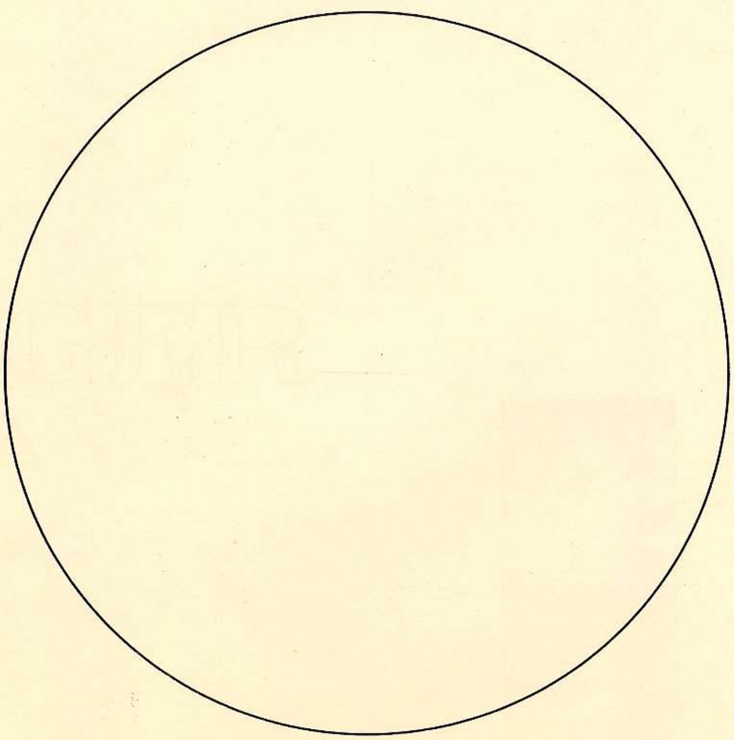
In sketches one and two it is clearly shown that the pyrite is very shattered and is veined by the chalco-pyrite. This indicates that the pyrite was earlier than the chalco-pyrite, which came later and replaced some of the pyrite, giving it a shattered structure. The fact that also throughout the specimen, patches of chalco-pyrite veining the sphalerite, indicates that some of the chalco-pyrite came in at the same time, as the sphalerite. The quartz is very shattered and scattered throughout the specimen and the patches of it show smooth rounded edges usually, and for these reasons it is believed to be earlier than the sphalerite, and hence probably of the same generation as the pyrite. Also, some of the chalco-pyrite occurs in connection with the quartz in the quartz-sphalerite boundaries, and this is very likely the same generation as that which veins the shattered pyrite.

WHITEWATER No.6



WHITEWATER No. 6





WHITE WATER #7.

In this specimen the minerals are galena, sphalerite, tetrahedrite, quartz, and pyrite, with some chalco-pyrite. Galena is by far the most abundant, with sphalerite second in quantity, pyrite and quartz are approximately equal and tetrahedrite is least.

This specimen bears out the information of specimen #6 in that quartz and pyrite are the primary minerals. Galena and sphalerite are the second generation minerals along with tetrahedrite which is in the galena.

Looking to the sketches it is readily seen that the quartz and pyrite are badly shattered, indicating their primary origin. The galena and sphalerite have smooth boundaries with equal penetration, and no unsupported nuclei. Inasmuch as these two minerals envelop the shattered quartz and pyrite, it is clear that they must have been deposited later.

The tetrahedrite occurs always in the galena. Sometimes it is in the galena wholly, but more frequently it is in the galena but bounded on one side by the sphalerite. This tetrahedrite is in good amount in this specimen, and explains the high silver values of the ore.

WHITEWATER No. 7