

its position as the outer layer of the arborescent masses it appears to be the last formed of the nickel-cobalt minerals.

Calcite fills in the spaces between the arborescent masses of breithauptite, niccolite and cobaltite, and hence is next in order of deposition after cobaltite. It appears to be the ordinary white variety with good cleavage in places and effervesces readily with cold dilute hydrochloric acid. Some portions are more dolomitic, however, as may be seen by reference to Fig. 9, where the calcite next the cobaltite has been etched deeper than the central parts. A few small grains of quartz occur with the calcite. Minute slender prisms of ruby silver were seen embedded in the calcite between the nickel-cobalt minerals. They were too small for measurement or analysis.

Veinlets of native silver fill irregular cracks that at times penetrate all the nickel-cobalt minerals as well as the calcite (Figs. 11, 151. Occasionally silver may be seen filling cleavage cracks in the calcite, a good example of which is shown in



Fig. 12.



Fig. 13.

Fig. 12. Two skeleton-like areas of light-coloured breithauptite set in a dark ground mass of porous niccolite. (x 50).

Fig. 13. Cubes of cobaltite in bright relief included in a ground mass of dark, somewhat porous niccolite. The darkest spots represent cavities in the niccolite. (x 50).

Fig. 16. These structures would seem to indicate that subsequent to the deposition of calcite there was a slight movement which caused more or less fracturing in all the minerals and developed cleavage cracks in the calcite. In these fractures and cleavage cracks the native silver was deposited.

*Summary:* From the structural evidence, it appears that breithauptite was the first mineral deposited accompanied by relatively small amounts of niccolite as microscopic included grains. After the precipitation of breithauptite had ceased the niccolite continued to come down and formed a thin layer over the arborescent breithauptite. On the niccolite was deposited a thin coating of cobaltite with the outer surfaces partly crystallized. Thus both niccolite and cobaltite were moulded upon the breithauptite. The deposition of the nickel-cobalt minerals then ceased and the spaces between the arborescent masses were filled with calcite. Then came a period of movement with a slight fracturing of the minerals, and finally native silver was deposited in the cracks thus formed.