

The order of succession of the minerals studied would seem to indicate broadly three periods of deposition as follows:—

- I. Period of deposition of nickel and cobalt minerals, the nickel minerals being first.
 1. Breithauptite with minor amounts of niccolite as inclusions.
 2. Niccolite.
 3. Cobalt.
- II. Calcite with perhaps a little ruby silver. Period of slight movement and fracturing.
- III. Native silver.

Separation of the Minerals for Analysis

It became evident from microscopic examinations after etching that the nickel and cobalt minerals were so intimately associated as to render of doubtful value any analysis of merely hand-selected material. The separation of the minute niccolite inclusions from the breithauptite and of the breithauptite and cobaltite from the

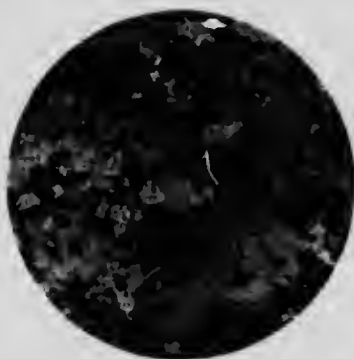


Fig. 14.



Fig. 15.

Fig. 14. A veinlet of scratched native silver is shown cutting through two masses of the nickel-cobalt minerals and the calcite which fills the space between them, proving conclusively that it was the last mineral deposited. The light granular mineral in high relief is niccolite, the dark spots intermingled with the niccolite represent breithauptite. Cobaltite, as usual, fringes the niccolite as the fine-grained, light gray mineral next the black calcite. Some of the best examples of this structure were too large to photograph. (x 60).

Fig. 15. Another example of a silver veinlet cutting the light-colored nickel-cobalt minerals at the top and bottom, and dark calcite to the right and left. (x 60).

sions from the niccolite was manifestly impossible by any mechanical means. In this connection the following paragraph from Campbell and Knight is here particularly applicable:

From the above (a photomicrograph showing microscopic inclusions in smaltite) it is seen how an apparently homogeneous mineral varies from the centre to the outside and also contains other minerals as impurities so finely distributed through it that complete mechanical separation would be impossible. We can also understand how in this way analyses would vary as recorded by Dana.¹⁵

An attempted separation by means of the electro-magnetic concentrator proved unsuccessful, and since mechanical separation was out of the question, it occurred

¹⁵ Microscopic examinations on kaming—Economic Geology, Septen

ber-Nickel arsenides and Silver deposits of Temis October, 1906.