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MINERALOGICAL NOTES.

A Probably New Nickel Arsenide.

(Preliminary Notice.)

By E. WALLER and A. J. MOSES.

Last April Mr. E. M. Hand, of Silver City, New Mexico, sent to the School of Mines several samples of silver ore composed in part of native silver but intermixed with a gray metallic mineral of granular structure, which was known to contain a considerable percentage of nickel and arsenic and some cobalt.

The ore is found at a mine eighteen miles west of Silver City, in the Bullard's Peak Mining District, Grant County, New Mexico, and was said to run 300 to 500 ounces of silver per ton and 25 to 35 per cent. of nickel. According to the analysis herein recorded, however, this estimate of nickel was considerably too high. The description of the deposit given by Mr. Hand is as follows: "The mine from which this ore comes has been worked to a depth of 690 feet by shaft and very extensive drifts. On the surface the ore is pure native silver, and the nickel or gray-looking mineral does not put in an appearance until a depth of over 100 feet has been reached. The vein occurs in a syenite and is crossed in several places by huge porphyry dykes. Rich ore-bodies are invariably found as the drifts or levels approach these dykes. The strike of the vein is east and west, and it dips to the north at an angle of about 20° from the perpendicular. All the ore is of exceedingly high grade in silver and carries a heavy percentage of nickel."

The native silver is crystalline, and surrounded by the gray mineral, and on polishing an arborescent structure is revealed somewhat like that of the mineral huntilite. The gangue is chiefly carbonate of iron. As it was impossible to obtain lumps of the nickel mineral or to separate it from the silver and siderite by any hand-picking, the following mechanical method was resorted to: The mineral was crushed roughly in a steel mortar and the lumps most free from silver carefully picked out; these were then rubbed down in an agate mortar and put through a hundred mesh sieve by which the malleable silver was very largely

held back as scales, and the brittle nickel mineral and siderite passed through. The powder was then heated in dilute hydrochloric acid by which all the siderite was dissolved. A little of the nickel mineral was also dissolved, but the Ni obtained from the solution amounted to only about $\frac{2}{10}$ per cent., and this would affect the analysis of the mineral only in so far as there should be a solution of this constituent without a proportionate solution of the other constituents. It was thought that the complete solution of the siderite would not be assured without treatment for a considerable time. It is not at all probable that all the native silver was by this method separated, and it is our purpose to make a further and more careful examination later.

The characters of the granular (nickel) mineral as far as obtained were:

Hardness about 5; lustre, metallic; color, gray, sometimes iridescent; streak, black; granular. On charcoal before the blowpipe blackens, fuses, yields arsenical odor, and becomes magnetic. In closed tube gives a ring of metallic arsenic. With borax, yields a cloudy blue bead; successive portions of salt of phosphorus, after removal of arsenic and iron, were colored blue (Co), violet (CoNi), brown hot, yellow cold (Ni), brown hot, opalescent cold (NiAg). A sulphur test was obtained, apparently due to some admixture.

Analysis of a sample prepared as described above yielded:

SiO_2,	4.56
Pb,	trace.
Ag,	8.38
As,	67.37
Ni,	11.12
Co,	5.13
Fe,	2.64
	99.20

If the SiO_2 is assumed to be present as quartz and the Ag as native silver, we have, by recalculation:

					Approx. ratio.
As,	78.10	÷ 75	1.0413		21
Ni,	12.89	÷ 58.7	.2195	.3749	4
Co,	5.95	÷ 59.	.1008		2
Fe,	3.06	÷ 56.	.0546		1
	100.00				

This corresponds approximately to a composition RAs_3 in which $R = \frac{4}{7}Ni\ \frac{2}{7}Co\ \frac{1}{7}Fe$.

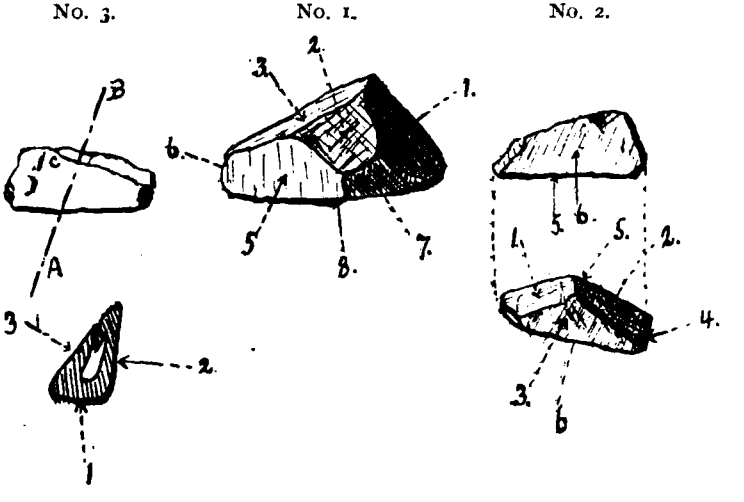
This would be a mineral of the type of skutterudite $CoAs_3$. A mineral with the assumed ratio would have the composition:

As,	78.67
Ni,	12.25
Co,	6.16
Fe,	2.92
	100.00

If further analysis confirms these results, the name NICKEL-SKUTTERUDITE is suggested.

GRAPHITE PRESSURE PSEUDOMORPHS.—BY A. J. MOSES.

The crystallization of graphite is generally conceded to be hexagonal, though the Ersby and Störgard graphite was considered monoclinic by Nordenskiöld. Three specimens of Ceylon graphite sent me by Mr. W. F. Downs of the Joseph Dixon Crucible Co., Jersey City, are polyhedral, and have a certain repetition of angle suggestive of crystallization, yet their lack of symmetry seems to place them with those pseudomorphs which owe their polyhedral



shape to intersecting plates of other minerals, *i.e.*, "pseudomorphous after interstices. One of the specimens (No. 3) was evidently produced by forcing a plate-like fragment into a polyhedral cavity, for it is somewhat hollow and shows the line of the