SUMMARY REPORT

OF THE

GEOLOGICAL SURVEY BRANCH

OF THE

DEPARTMENT OF MINES

FOR THE CALENDAR YEAR

1910

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SECTION OF MINERALOGY.

(Robt. A. A. Johnston.)

The work performed in this section has been of the same general character as that of previous years. Nearly 600 specimens have been received, examined, and reported upon, and in addition, detailed examinations have been made of a number of interesting minerals, the results of which are given hereunder.

HEXAHYDRITE, A NEW MINERAL.

The material which forms the subject of the following note was forwarded to the Geological Survey by Mr. F. Sones, Gold Commissioner at Clinton, British Columbia, with the information that it had been found on the east coast of Bonaparte river, about half-way between Cargill and Scottie creeks, in the district of Lillooet, British Columbia. The sample was made up of two specimens, one of which, measuring 4 inches in length by 2 inches in thickness, consisted of the mineral about to be described along with some scattered remnants of decomposed rock matter; the other specimen, a much larger one, consisted for the most part of decomposed rock matter of a character like that just mentioned. It has a schistose structure, but it has so far decayed that its original composition is completely obscured and little more than a residue of silica remains. It is not at all unlikely, however, that the original of this rock has furnished the basic constituent of the associated mineral.

The mineral occurs in the form of seams and scattered patches in the altered rock matter just described. Some of these seams attain a thickness of nearly half an inch. In general they present a moderately coarse columnar structure; occasionally, however, the mineral is seen to assume a delicately fibrous form. In the material at hand no distinct crystals have been observed, and the cleavage, although clearly prismatic, is not very well defined. The mineral is readily friable, and breaks with a fine, subconchoidal fracture. It has a pearly lustre, and its colour is white, modified by a delicate green tint; it is opaque even on very thin edges, and has a bitter, saline taste.

Before the blowpipe, on charcoal, the mineral swells and emits bubbles of vapour, but does not melt, and ultimately leaves an infusible mass, which has no effect on moistened turmeric paper. When moistened with a solution of cobalt nitrate and reignited the mass becomes pink. In the closed tube it yields a large amount of water which reacts neutral to test papers. It dissolves readily in cold water, yielding a clear solution; after addition of ammonium chloride this solution does not give a precipitate with either ammonia or ammonia carbonate, but when a solution of sodium phosphate is added to the ammoniacal solution a copious white precipitate of ammonium-magnesium phosphate is thrown down. The aqueous solution when acidulated with hydrochloric acid gives, with barium chloride, an abundant white precipitate of barium sulphate.

The specific gravity of the mineral, at 15° 5 C. was found to be 1·757, and an analysis of selected material, which however still contained some included silica, gave the following results:—

Sulphur trioxide	34·52
Magnesia	17·15
Water	46·42
Insoluble matter (silica)	1·78
	99·87

Omitting the included silica it will be found that the composition of the mineral agrees very closely with that required for the hexahydrate of sulphate of magnesium, $MgSO_4.6H_2O$, which hitherto has only been known as a product of the laboratory. The agreement will be made plainly evident by a reference to the following figures, in which column I. represents the composition of the mineral under discussion, and column II that required by theory for the normal hexahydrated salt:—

	I	II
Sulphur trioxide	35·19	35·09
Magnesia	17·48	17·54
Water	47·33	47·37
	100·00	100·00

As this is the first instance in which this salt has been recorded as occurring in a state of nature, this substance is entitled to be regarded as a new mineral, and the name hexahydrite is proposed for it, in allusion to the six molecules of water which enter into its composition.

AWARUITE, ALMANDITE, AND MAGNETITE.

(1.) In the Summary Report of the Geological Survey for 1908, page 168, reference was made to a specimen of nickel-iron alloy found in the sluice boxes of the gold washings of Hoole cañon, Pelly river, Yukon. At the time of writing the report

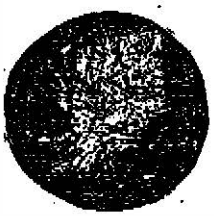

Fig. 1.

Fig. 2.

Fig. 3.

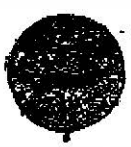

Fig. 4.

Photo by Miss W. E. Bentley.

Fig. 7. Grains of Awaruite from Hoole cañon, Pelly River, Yukon. Magnified 6 diameters.

mentioned, the examination of the specimen was incomplete and the term ferro-nickel was applied to it provisionally. The complete examination now warrants its being placed definitely under the species awaruite. It was found amongst the heavier materials carried down in the sluice boxes of the locality mentioned, and attracted attention by reason of its inertness towards the amalgam plates used for the extraction of the gold. It was thought that it might possibly be platinum.

As received by the writer from Mr. Joseph Keele, of the Geological Survey, who submitted it for examination, it constituted only a fraction of one per cent of the concentrates, which, with the exception of the mineral under consideration and a few quartz grains, consisted of fine grains of magnetite, and a pale reddish garnet, which on close examination has proved to be almandite.