

ART. XXI.—*Contributions from the Sheffield Laboratory of Yale College.*—III. *On Amblygonite from Hebron in Maine*; by GEORGE J. BRUSH.

A FEW weeks since Mr. John M. Blake, Ph.B., late assistant in this Laboratory, called my attention to a peculiar feldspathic looking mineral associated with the *lepidolite* from Hebron, Maine. Mr. Blake found on blowpipe examination that the mineral was extremely fusible, and that it gave a strong reaction for lithia, coloring the flame beautifully crimson. A further examination has shown it to be a phosphate of alumina and lithia, with a considerable amount of fluorine and some water. This composition, together with its physical properties, have led me to refer it to the rare species *amblygonite*.

Lepidolite occurs at Hebron in large masses in a coarse granite, and the *amblygonite* is found imbedded in this lepidolite, associated with albite, quartz, red, green and black tourmaline, and more rarely with cassiterite, and a peculiar compact variety of apatite containing minute prismatic crystals of a hair-brown mineral, which I have not yet been able to obtain in sufficient quantity to determine fully its characters.

The Hebron amblygonite is translucent, and has a white color, sometimes with a tinge of gray or brown. Cleavage equal, and perfect in two directions meeting at an angle of 73° – 74° or 106° – 107° . Lustre, on cleavage surfaces vitreous to sub-adamantine, and on the uneven fractured surfaces faintly greasy. Specific gravity 3.046. Hardness = 6. A small fragment held in the flame of an ordinary stearine candle fuses readily to an opaque white enamel; fusibility = 2 on v. Kobell's scale. Heated in a closed tube, the mineral decrepitates slightly, and gives off traces of moisture; when the flame of a blowpipe is directed on the assay it fuses and acts upon the glass tube, producing a deposit of silica, just above the assay, and at the same time giving off water, which reacts acid, and etches the tube. In the forceps it imparts to the blowpipe flame a pure lithia red color without any traces of yellow; when the assay is moistened with sulphuric acid the flame is colored green on the edges, indicating phosphoric acid. The presence of this last substance was confirmed, by fusing a fragment of the mineral in a closed tube with metallic sodium, forming phosphid of sodium, which on treatment with water, evolved copious fumes, with the characteristic odor of phosphureted hydrogen. With salt of phosphorus it dissolves with effervescence to a clear colorless bead showing the absence of silica. With borax gives a transparent colorless bead in both oxydizing and reducing flame. With soda effervesces, and forms a difficultly fusible mass, which, even after addition of nitre, shows no trace of manganese. Heated with nitrate of cobalt it gives the blue color characteristic of alumina. It is only slightly acted upon by chlorhydric acid, but is readily dissolved by sulphuric acid with evolution of hydrofluoric acid; the solution gives reactions for alumina and phosphoric acid. These characters and reactions are sufficient to prove the identity of the mineral with Breithaupt's amblygonite. The only difference between the Hebron mineral, and the amblygonite from Penig in Saxony, is that the former contains so little soda that it imparts a pure lithia-red color to the flame, while the latter gives a flame tinged with yellow. As soon as I can obtain enough of the mineral for the purpose, I hope to examine the alkalies more minutely, with especial reference to rubidium and cæsium. These two new alkaline metals have been found in comparative abundance in the Hebron Lepidolite by Messrs. O. D. Allen and J. M. Blake of this Laboratory.

It is an exceedingly interesting circumstance that the Hebron mineral should occur associated with other minerals in a manner so perfectly analogous to the Saxon amblygonite, the latter being also found in a coarse granite and frequently imbedded in lepidolite containing quartz and tourmaline. The Hebron amblygonite occurs in irregular masses which in some specimens ap-

pear to be rough prisms of from half an inch to an inch in diameter. One of these gave an angle of 106° to $106^{\circ} 30'$.

Since writing the above, I have discovered amblygonite in specimens of lepidolite from the tourmaline locality at Paris, eight miles from the Hebron locality.

Sheffield Laboratory, Yale College, June 25, 1862.