

ART. XL.—*Columbite in the Black Hills of Dakota* ; by  
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COLUMBITE associated with cassiterite, albite and mica occurs in several of the coarsely crystalline granite dikes which traverse the mica schists and sandstones of Pennington County,

Dakota. The most notable localities are at the Etta mining claim and at the Ingersoll, about ten miles east of Harney Peak. At the Ingersoll claim, particularly, a mass of unusual dimensions was found protruding from a matrix of albite and quartz. This mass consisted of nearly pure columbite with here and there inclusions of thin sheets of quartz. It measured, approximately, twenty inches square by twenty-four in length, weighing by calculation, taking the specific gravity at 6, not less than 2000 pounds, or one ton. On blasting it out it broke up generally into tabular fragments without crystalline planes except at the lower or imbedded end where it was enclosed in quartz, into which it penetrated in thin, tabular crystals with brilliant prismatic and terminal planes. At the Etta on the contrary, the best crystals are taken from the albite and are more distinct and separate than at the Ingersoll claim. The habit of the Ingersoll crystals is thin and tabular with acute, wedge-like prismatic edges; the plane  $i\bar{3}$  being nearly obliterated by the extension of the planes  $i\bar{3}$  and  $I$ , while at the Etta these planes are subordinate to the plane  $i\bar{2}$  and  $i\bar{2}$ . The terminal plane  $O$  is generally narrow in the crystals from both localities, and is flanked by a series of bevelling planes like those in the Greenland crystals,  $\frac{1}{2}\bar{2}$  being especially prominent.

In breaking up the large mass I found several cavities filled with a beautiful yellow powder often in pellets and pill-like balls. These prove to be chiefly hydrous uranium oxide without sulphuric or carbonic acid. A similar mineral occurs at the Etta but gives different reactions.

The blow-pipe reactions of the columbite from the Ingersoll claim are peculiar in the amount of manganese indicated. With borax, in O.F. the bead is dark amethystine red, and in R.F. a pale amber yellow. The purity of this reaction for manganese is not impaired by any other metallic reaction. With phosphate of soda and ammonia in O.F. the mineral dissolves to a clear glass, red while hot, yellowish-red while cooling, and when cold clear and nearly colorless, with a pale rose-colored or amethystine tint. In R.F. the bead is beautiful amber-yellow and there is no shade of green or reaction for uranium. On foil the manganese reaction is distinct. Treated with concentrated sulphuric acid and evaporated to dryness the powdered mineral is partially decomposed. With the addition of a second portion of acid the solution gives with zinc the intense sapphire-blue reaction.

Pine Forest Camp, September 25, 1884.