NOTES AND NEWS

PROBERTITE FROM LOS ANGELES COUNTY, CALIFORNIA

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A small specimen sent the writer recently, marked "Lang Borax Mine," proved on examination to be probertite. Since this mineral has been reported only from the Ryan and Kramer districts, in California, advantage was taken of a class field trip to the Lang area, where a good amount of the material was collected, and the occurrence confirmed. Identification was made by optical properties, the indices of refraction corresponding with those of probertite, and chemical tests confirmed these.

The appearance of the mineral is like that described by Foshag[1] for ulexite from this locality. The mineral occurs in lenticular aggregates of groups composed of slender radiating prisms up to 15×.5 mm. in dimensions, these groups themselves being more or less flattened. None of the specimens were found in place, as the material was all collected on the dump, but some with attached shale indicated their occurrence as lenticular nodules in a shale matrix.

This identity of appearance with Foshag's material, and with a similar occurrence of ulexite described from the Suckow mine in the Kramer district,[2] led to the thought that the determination might have been in error, and the mineral really ulexite. However, a careful re-check of the indices, and a determination of the water of crystallization confirmed its identity as probertite. Duplicate water determinations were run, giving values of 25.7% and 25.8% respectively, as compared with the theoretical value of 25.63%. All doubt was definitely cleared up by the discovery, among the specimens, of a few which were clearly different from the others, and were actually ulexite. This ulexite is essentially similar in appearance to the probertite, but is finer textured, much silkier in appearance, and lacking the definitely radial structure of the latter. Under the microscope it shows the normal ulexite indices, and the typical fine texture, and twinning. In further confirmation, two specimens were found showing the two minerals together, with ulexite covering the probertite rosettes, and enclosing residual patches of the latter mineral. The essential structure of the probertite groups was preserved, although not the detail. As a matter of fact, most of the material was unaltered probertite, with a very small number of the specimens showing any ulexite.

[1] Foshag, W. F., The origin of the colemanite deposits of California: *Econ. Geol.*, **16**, 204 (1921).

[2] Murdoch, J., Crystallography of ulexite: *Am. Mineral.*, **25**, 755 (1940).

Since the collection was made at random, this indicates the probable actual proportions of the two minerals in the deposit.

This relationship of ulexite and probertite induced the writer to look again at some specimens from the Kramer district, collected as ulexite. These were found to have been labelled "ulexite with residual kramerite," affording another instance of the same sequence. Foshag,[3] in writing of the Ryan District, suggested that ulexite had been altered to prober-

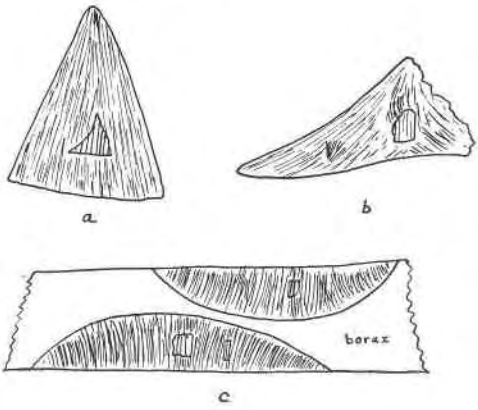

FIG. 1

tite although he did not find the two together anywhere. The basis for this idea was that the denser mineral (probertite) would be more likely to form from ulexite under the influence of pressure generated in the folding of the layers in this area. This does not appear to have been the case in the two cases which the writer has observed, since both at Lang and at Kramer the opposite sequence is clear.

At Kramer there are two examples of this relationship. First, the radiating groups or clusters of probertite described by Schaller[4] under the name kramerite, were found on one of the dumps by the writer as ulexite pseudomorphs, with occasional probertite cores. Second, specimens from the Suckow mine, just west of the other occurrence, show the curious fungus-like growths, and satiny cross-fiber veins mentioned from the kernite deposit,[5] in layers of clay and borax. Most of these are milky white, uniformly fine fibered ulexite, but some show residual patches of probertite, as noted casually at the time of collection. This can be identi-

[3] Foshag, W. F., Probertite from Ryan, Inyo County, California: *Am. Mineral.*, **16,** 340 (1931).

[4] Schaller, W. T., Borate minerals from the Kramer District, Mohave Desert: *U.S.G.S. Prof. Paper* **158,** 139 (1930).

[5] Schaller, W. T., *op. cit.*, p. 139.

fied easily by its glassier luster and coarser appearance, and some of the patches are large enough to provide material for optical determination. It was clearly the original mineral of these occurrences, but has been almost completely replaced. The colemanite produced by the further alteration of the ulexite, as observed by Schaller,[6] was not seen in any of the writer's material.

The relationship of probertite to ulexite in these specimens is illustrated by the accompanying drawings (Fig. 1), which represent the occurrence of the two minerals. There are three types of these, all from Kramer: (a) divergent, cone-shaped masses, usually in solid borax; (b) the fungus like forms, in layers of clay, or of clay and borax crystals; and (c) more or less hemispherical aggregates, occurring in narrow veins of secondary borax which cut the older ore.

The writer wishes to express his thanks to Mr. E. H. Peebles of San Gabriel, California, who sent in the specimen which led to the discovery of this new occurrence of probertite. Mr. M. Vonsen, of Petaluma, California, has informed the writer that he had recognized this material from Lang as probertite, some t'me ago.

[6] Schaller, W. T., *op. cit.*, p. 138.

Dr. Ralph E. Grim, petrographer and head of the Division of Petrography of the Illinois Geological Survey, has been made petrographer and principal geologist in charge of the Geological Resources Section. This section comprises the following divisions: coal, oil and gas, industrial minerals, clay resources and clay mineral technology, groundwater geology and geophysical exploration, areal and engineering geology, stratigraphy and paleontology, and subsurface geology. In the Geochemical Section of the Survey Dr. William F. Bradley has been made chemist and head of the Division of *X*-ray and Spectrography.
