NOTES AND NEWS

SEDIMENTARY ANALCITE*

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Analcite from sedimentary beds was described from two widely separated localities in 1928,[1] one from Utah, Colorado, and Wyoming; and the other from near Wikieup, Arizona.[2] Bradley stated, "Field and microscopic study of these two types of zeolite-bearing rocks indicates that both minerals [analcite and apophyllite] formed in place on the lake bottom (or when only shallowly buried in ooze) as a result of interaction between various salts dissolved in the lake water and the dissolution products of volcanic ash that fell into the ancient Green River lakes."

The Arizona material was submitted for identification by a local collector and no field examination was possible at the time. This did not permit definite conclusions on origin, but Ross made the following suggestion, " . . . volcanic ash showers frequently deposited beds of glassy ash in these playa lakes. Material of this kind commonly alters to bentonite but in the presence of concentrated sodium salts it might form analcite."

The origin of this material presented an interesting problem and Bernard Moore was requested to collect additional material during field work in 1934, while taking part in the study of the mineral resources of the region around Boulder Dam.

Mr. Moore submitted the following geologic section:

GEOLOGIC SECTION NEAR WIKIEUP ON BIG SANDY-BURRO CREEK, ARIZONA

Green arkosic sand	20 feet
Brown clay	30 feet
Porous tufa	1 foot
Green sands	2–3 feet
Brown clay	25 feet
Limy sand	1 foot
Green analcite	6–12 inches
Brown clay	

The following descriptions are based on studies of the material collected by Moore.

The green analcite is the material first recognized as analcite. It has a dull gray-green color, due to a thin film of nontronite clay between the grains of analcite that average 0.05 millimeters in diameter. Most of the grains are roughly rounded but some of these show euhedral outlines. These grains are cemented into a fairly coherent sandstone-like rock, with

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[1] Bradley, W. H., Zeolite beds in the Green River formation: *Science*, **67**, 73–74 (1928).

[2] Ross, Clarence S., Sedimentary analcite: *Am. Mineral.*, **13**, 195–197 (1928).

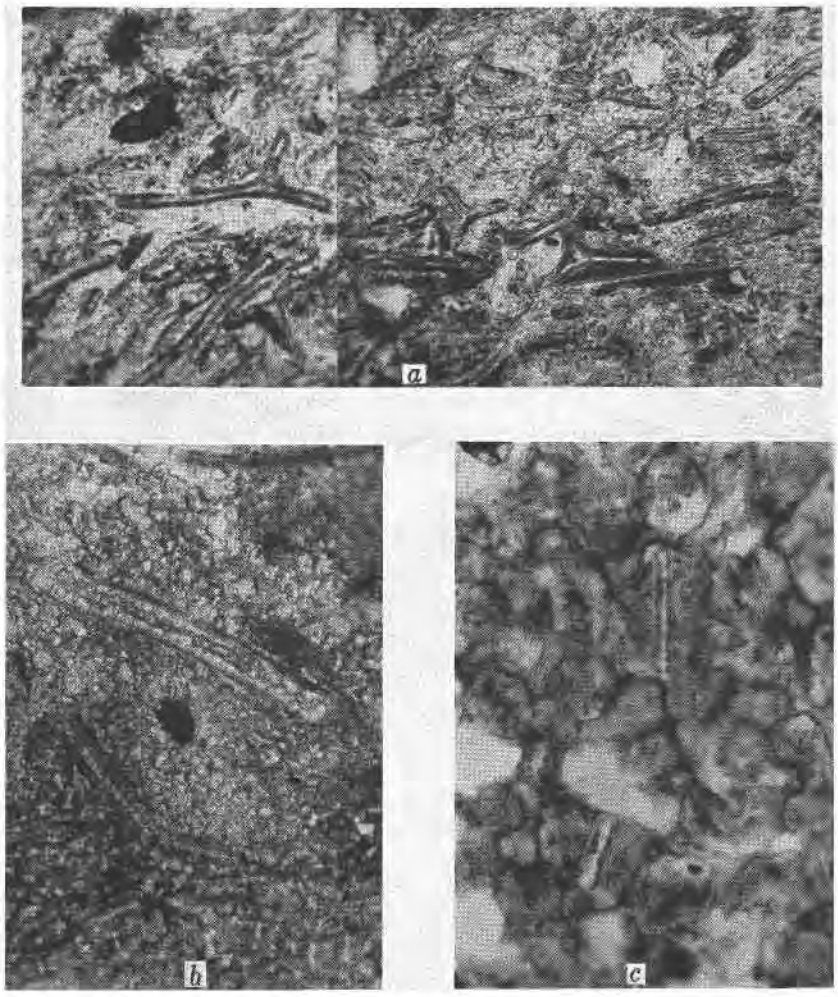

PLATE 1

Illustrating volcanic ash structure in analcite rock from near Wikieup, Arizona

Figure *a*. The lath and Y-shaped structures are typical volcanic glass shards, but have been completely altered to analcite. Interstitial material is also analcite grains, many of them showing hexagonal outline. ×65.

Figure *b*. Shards showing double row of analcite grains. ×100.

Figure *c*. Coarse-grained nearly pure analcite rock showing two platy shard structures, cutting through a single analcite grain. Dark material is pigmenting grains of iron-rich clay. ×54.

about 25 per cent of pore space. The tuff structure is not well preserved, but traces of it are shown in plate 1, Fig. *c*.

The "porous tufa" is a nearly white, fine-grained tuff-like material. Microscopic study indicated that it, like the green material, was composed essentially of analcite. Here, however, the tuff structure is perfectly preserved as shown in plate 1, Fig. *a*. Most of the original shards were flattened or slightly curved plates of glass, but many have the Y-shapes that are formed at the juncture of three bubbles. A few unbroken spherical bubbles are preserved. The fragments range up to about 0.5 millimeters in length and have been altered to analcite, together with perhaps about 20 per cent of bentonitic clay. The analcite grains range from 0.003 to 0.015 mm. in diameter, are colorless, and roughly euhedral in outline. Commonly a double row of analcite grains have formed within an altered shard as shown in plate 1, Fig. *b*. The clay material is slightly brownish. Orthoclase, biotite, and hornblende grains commonly represent less than 1 per cent of the material, but a few narrow lenses contain a little detrital quartz and small rounded oolite-like grains of carbonate are present.

Thus the Wikieup analcite was obviously derived from glassy volcanic ash. Moore concluded that the material was deposited in a playa; and there seems little doubt that sodium salts were the factor that resulted in analcite rather than bentonite, the normal product when glassy volcanic ash breaks down.

SHORTITE: CORRECTION OF SPACE GROUP[a]

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The space group of shortite was previously determined by the writer[1] to be D_2^6-$A222$. This choice of space group was based on the reflections given below, all of which were not given in the original paper. These reflections lead to the "probable" space group D_2^6-$A222$, as given in the *International Tables*.[2]

The reflections obtained from zero and first layer-line photographs about [100] and a zero layer-line photograph about [010] are listed below.

$hkl = k+l$ even
$0kl = (k+l)$ even, (k and l) both odd and both even
$h0l = l$ even
$hk0 = k$ even

[a] Published by permission of the Director, Geological Survey.

[1] Richmond, W. E., *X*-ray crystallography of shortite: *Am. Mineral.* **26,** 288 (1941).

[2] *Internationale Tabellen zur Bestimmung von Kristallstrukturen*, Borntraeger, *Berlin* (1935).