Bakerite (a new borosilicate of calcium) and Howlite from California.

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THE new mineral to be described occurs as veins and as nodules of considerable size in the mines of the Borax Consolidated Company, Limited, situated in the Mohave Desert, sixteen miles north-east of Daggett in San Bernardino County, California. The white, amorphous[1] masses resemble in appearance unglazed porcelain or fine white marble. Sometimes the mineral has a faint tinge of a sea-green colour. Its hardness is about $4\frac{1}{2}$, and specific gravity 2·73. Up to the present time no specimens showing any signs of crystallization have been noticed. In external appearance the mineral shows a striking resemblance to the pandermite of Sultan Tchair in Asia Minor, and it may be here noted that this amorphous variety of calcium borate occurs also in the Californian mines.

A fragment of the mineral when heated on platinum wire before the blowpipe imparts to the flame a greenish colour and yields a white, perfectly transparent bead. When free from the external coating or matrix of calcite, the mineral is readily soluble in warm dilute hydrochloric acid without effervescence, and on evaporating the solution the silica gelatinizes. Analyses of two specimens from different mines yielded the following results:—

	White.	Faint greenish.
B_2O_3	27·74 ...	26·85
CaO	34·88 ...	35·22
SiO_2	28·45 ...	28·05
H_2O	8·30 ...	8·66
Al_2O_3, Fe_2O_3 ...	0·63 ...	1·22
	100·00	100·00

[1] Specimens of 'bakerite' presented by Mr. Giles to the British Museum appear to be perfectly homogeneous, except in one piece, which is intermixed with a little calcite. The microscopical examination of several fragments crushed in oil and of a thin section showed the material to have an extremely minute spherulitic structure and to be feebly birefringent. There was nothing suggestive of a mixture of minerals. On the other hand, the specific gravity of several small fragments from two specimens

The water was estimated by calcining with materials, such as monosodic borate, which prevent any slight simultaneous loss of boric acid: the boric acid by the Ebelmen-Rose-Gooch method (distillation with methyl alcohol), but somewhat modified to make it more practicable than the Gooch process.

These analytical results give the formula:—

$$8CaO . 5B_2O_3 . 6SiO_2 . 6H_2O.$$

The name bakerite is proposed in honour of Mr. R. C. Baker, of Nutfield, Surrey, one of the managing directors of the Company, and by whom the mineral was discovered.

The several borosilicates of calcium hitherto known are:—

Danburite, $CaO . B_2O_3 . 2SiO_2$.
Datolite, $2CaO . B_2O_3 . 2SiO_2 . H_2O$.
Howlite, $4CaO . 5B_2O_3 . 2SiO_2 . 5H_2O$.

For purposes of comparison, the calculated percentage compositions of these, together with that of bakerite, are given below.

	Danburite.	Datolite.	Howlite.	Bakerite.
B_2O_3	28·4	21·8	44·6	27·7
CaO	22·8	35·0	28·6	35·4
SiO_2	48·8	37·6	15·3	28·4
H_2O	—	5·6	11·5	8·5

Howlite.

This mineral, previously recorded only from Nova Scotia, has been considered to be of rare occurrence. It occurs, however, in immense quantities in the Californian borax mines mentioned above, and has been used commercially in the manufacture of borax and boric acid. One large nodule, or rather boulder, noticed by the author when he visited the mines, weighed between two and three hundredweight, and was snow-white, and almost pure. The mineral is found in many forms, sometimes in large masses of fine small scaly crystals soft enough to be crushed in the hand, and sometimes massive in hard rock-like and amorphous masses, and also in intermediate forms. In these mines howlite frequently occurs associated with natroborocalcite or 'cotton-

(differing somewhat in compactness and hardness) varied between about 2·7 and 2·93 (as determined in methylene iodide with indicators of calcite and aragonite).—L. J. Spencer.

ball,' and with colemanite. In the exceedingly dry air of these desolate regions the soft crystalline mineral loses some of its water.

Many analyses made by the author on various specimens agree exactly with the composition and formula given above.

Analyses of Californian Howlite.

	Pure white mineral in soft scale-like crystals.	Hard rock-like white masses, not crystalline.
B_2O_3	44·38 ...	43·78
CaO	28·45 ...	28·44
SiO_2	15·50 ...	15·33
H_2O	11·58 ...	11·39
Na_2O, MgO ...	0·09 ...	1·06
	100·00	100·00