DANBURITE FROM LA SIRENA, NEAR ZIMAPAN, MEXICO

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In a paper[1] on a deposit of jamesonite at La Sirena near Zimapan, Mexico, W. Lindgren and W. L. Whitehead described the occurrence of the mineral danburite in a recrystallized and somewhat metamorphosed limestone in contact with a basic dike. It occurs as one of the gangue minerals together with calcite, quartz, grossularite, albite, fluorite and actinolite.

Their description is believed to be the first on record of the occurrence of danburite in Mexico. Subsequently another occurrence of this mineral from Guadalcázar has been described.[2]

In the material from La Sirena, given the writer by Dr. Lindgren for examination, the danburite was associated with jamesonite, calcite, fluorite and quartz. It was colorless, transparent and granular but in places there were some elongated crystals in rudely parallel intergrowths. None of these, however, were sufficiently well developed to measure.

The material was finely crushed, suitably screened, and then treated with a heavy liquid in order to eliminate the associated minerals. After repeated treatment the material was found by microscopic examination to be of a sufficient degree of purity for analysis. Some of the grains were colored slightly yellow, presumably by limonite, but no chemical methods such as treatment with dilute acids were employed to clean them.

An analysis by the writer yielded the following:

	La Sirena	Mol. ratios	Theor. comp.	Danbury,[3] Conn.
SiO_2	48.35%	0.801	48.8	48.15
Al_2O_3 and Fe_2O_3	0.23			
CaO	23.07	0.41	22.8	22.37
MgO	trace			
B_2O_3	27.74	0.39	28.4	27.44
Loss on ignition	0.54			0.50
Total	99.93		100.0	98.46

[1] Lindgren, W. and Whitehead, W. L.: *Econ. Geology*, **9**, 435-462 (1914).

[2] Wittich, W. and Kratzert, I.: Contribuciones a la Min. Mex. *Mem. Soc. Alzate*, *T.* **39** & **40.**, 1921 and 1922.

[3] Dana, E. S.; A System of Mineralogy, Sixth Ed., p. 492 (1914).

The mineral corresponds, therefore, in chemical composition to $CaO.B_2O_3.2SiO_2$ or $CaB_2Si_2O_8$. It agrees closely in composition with the mineral from the type locality, Danbury, Connecticut, the analysis of which is given for comparison. The loss on ignition in the two analyses probably represents hygroscopic water.

The same material used by the writer for analysis was examined optically. It shows a very low birefringence, is optically negative and has a large optic axial angle, nearly 90 degrees. The minimum and maximum refractive indices were determined by immersion methods, using monochromatic light, as follows: $\alpha_{Na} = 1.630 \pm .001$; $\gamma_{Na} = 1.636 \pm .001$.

On account of the low birefringence of the mineral the value for the beta index was not determined, but since 2V is close to 90 degrees, this value can be assumed to be approximately intermediate between the values for alpha and gamma.

E. S. Larsen[4] gives the values of the indices of refraction of the mineral danburite as follows: Alpha = 1.632; Beta = 1.634; Gamma = 1.636.

The specific gravity of the mineral from La Sirena was determined as 2.93. The values quoted in Dana's System of Mineralogy vary between 2.97 and 3.02.

[4] Larsen, E. S. The Microscopic Determination of the Non-opaque Minerals: *U. S. Geol. Survey, Bull.* **679**, (1922).

THE CRYSTULE; A UNIT MEASURE OF MATTER

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Amidst a wealth of stimulating discussion on the different phases of matter which held the rapt attention of the large majority of the members at the recent Toronto Meeting of the British Association for the Advancement of Science, the outstanding prospect was the unit mass and its relationships to the world about it.

It made little difference in what branch of science it happened to be, the fundamental unit of make-up was the prime consideration, whether in description, in discussion or in speculation. Of all the departments of knowledge in which there were read papers aplenty, and over which there was invariably warm controversy, physics, chemistry, biology, astronomy, geology, mineralogy, the last mentioned science alone stood unabashed for want of a crisp,