

the only forms observed. The optical properties agree perfectly with those accepted for bertrandite.

The occurrence of bertrandite and zeolites in any pegmatite is interesting from the standpoint of paragenesis and mineral sequence. Bertrandite never seems to form through ordinary weathering processes, but to be invariably the product of an hydrothermal attack upon beryl as that mineral becomes unstable in the environment of the later solutions. It has not been described as resulting from the alteration of any other beryllium mineral; beryl seems to be the sole parent mineral. Its occurrence, then, is a good indication of a complex pegmatite and a continued hydrothermal activity.

Consequently, with the addition of these minerals to the already long list of Bedford species, we may consider the deposit another of the pegmatite occurrences in which the entire sequence of mineralization, from late magmatic stages to the zeolite-forming phase, is revealed. With an intermediate period in which the bertrandite was formed before the zeolites began to crystallize, we can visualize a more or less continuous process of mineral formation and alteration.

URANINITE FROM HOTTAH LAKE

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Through the courtesy of Dr. A. C. Lane, a two kilogram sample of pitchblende from the Hottah Lake deposit was obtained from the Canadian Bureau of Mines.

The sample received had been crushed and coarsely ground. The mineral was subjected to a complete analysis, the results of which are given in the following table:

U ₃ O ₈	51.45%
Fe ₂ O ₃	41.51
Pb	2.31
SiO ₂	2.75
Al ₂ O ₃	1.12
CaO	1.01
MgO	Trace
Mn	Present
S	0.14
CO ₂	0.42
Total	100.71

Chemical and electroscopic tests failed to show any thorium; this absence has also been substantiated by other reports.

The lead and uranium were determined in a very careful manner. The results of these determinations gave a lead-uranium ratio of 0.0529,

which gives the approximate age as 387 million years.¹ The value of this ratio checks the ratio of 0.0530, found for the Beaverlodge uraninite.²

Thallium formate was chosen as the best heavy liquid to be used in a gravity separation. No satisfactory separation was obtained by this method. However, it was noticed that most of the finer brown portion of the ore that had been ground to 40 mesh fineness could be washed out with water by differential sedimentation. After washing, about eighty-six per cent of the brownish ore was left as a uniform black ore. A sample of this black residue was used for a second determination of the lead-uranium ratio. Practically all the lead was found in this black residue while it was only slightly enriched in uranium. The ratio in this second case, 0.0584, was slightly higher than in the original sample. This substantiates the belief that weathering is more selective to uranium than to lead.³

Using the acton method, the actinium-uranium ratio of this mineral was constant in accord with the seven minerals previously reported.⁴

A successful magnetic separation has been accomplished on roasted ore, and the determination of the lead-uranium ratio of the non-magnetic portion is under way at the present time.

In the future the Ac-U ratio and Pa-U ratio will be established by absolute methods.

¹ Kirsch, G., *Geologie und Radioaktivität*, p. 128, 1928.

² Private communication from W. R. McClelland of the Canadian Bureau of Mines.

³ Alter, C. M., and Kipp, E. M., *Science*, vol. 82, No. 2133, pp. 464-66, Nov. 15, 1935.

⁴ Bruner, F. H., and Schlundt, H., *Jour. Phy. Chem.*, vol. 38, No. 9, pp. 1183-88, 1934

LOCALITY FOR OPALIZED SPHERULES

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In answer to the writer's query, Mr. R. C. Vance of Rochester, N. Y., states that the opalized spherules mentioned in the August issue of the *American Mineralogist*¹ were obtained from Mt. Tate, Etchu Province, Japan. Specimens in his possession were compared with those described and proved to be identical.

¹ Alexander, A. E., Opalized spherules from Utah?, *Am. Mineral.*, vol. 20, pp. 602-3, 1935.