amphibole. Cummingtonite schist is an abundant lode rock. Common minerals include arsenopyrite, pyrrhotite, chlorite and quartz.

A number of other deposits might be mentioned as well as specific occurrences of minerals. A recent bulletin by Professor Connolly[14] gives a great deal of information on the deposits of the Northern Hills. Those interested should refer to this and other papers cited above. A visit is necessary to even partly appreciate the mineralogic wealth of the Black Hills and the collector will not fail to find many interesting specimens.

A MINERAL RELATED TO SAMARSKITE FROM THE WOODCOX MINE, HYBLA, ONTARIO*

H. V. ELLSWORTH, *Ottawa, Canada.*

The Woodcox feldspar mine[1] (lot 17, con. VIII, Monteagle township, Hastings county, Ontario) was noteworthy because of the occurrence of large individual masses of radioactive minerals, sometimes reaching a weight of 100 pounds or more. These masses were crudely globular in form and in most cases consisted not of one mineral species only but of several, each individually quite distinct. The association generally was cyrtolite, columbite, and black and brown minerals of the complex titano-tantalo-columbate types, the radioactive minerals usually making up from 75 to 95 per cent of the total mass, with columbite next in order of abundance. Walker and Parsons[2] have described black and brown hatchettolite which probably occurred in this way. The mineral here described was part of a large mass which originally must have weighed at least 100 pounds. It consisted chiefly of a brown complex columbate, with some black mineral (the subject of this paper) and columbite. There appeared to be little or no cyrtolite in this case. The brown mineral appears to be a more altered phase of the black one. The latter was analyzed because it presumably would represent more nearly the original composition of the mineral and might be expected to be more favorable material for de-

[14] Connolly, J. P.; Tertiary mineralization of the Northern Black Hills: *S. D. School of Mines, Bull.* **15,** (1927).

* Published by Permission of the Director of the Geological Survey, Canada.

[1] *G. S. C. Summary Report,* **1923,** Part CI, page 12 et seq.

[2] *Contributions to Canadian Mineralogy,* **1923.**

termining the radioactive age ratio. The samples selected for analysis on microscopic examination appeared to be homogeneous and free from inclusions of any kind. The mineral is brilliant jet black en masse, brownish and isotropic in grains or sections under the microscope. The powder is grayish-brown and lustre is brilliant submetallic. Cleavage none, fracture subconchoidal. H=6.5, sp. gr.=4.738, and massive.

An analysis yielded the following results:—

CALCIOSAMARSKITE FROM THE WOODCOX MINE, HYBLA, ONTARIO

	Per Cent	Mol. Wt.	Bases	Acids
PbO	0.44	222	0.0018	
(Pb=0.41)				
UO_2	9.00	270.2	0.0333	
UO_3	1.67	286.2		0.0058
(U=9.32=10.99 U_3O_8)				
ThO_2	3.34	264	0.0127	
(Th=2.93×0.38=1.05U equiv.)				
$(Ce,La,Di)_2O_3$	1.68	330	0.0051	
$(Yt,Er)_2O_3$	11.38	251	0.0453	
(Average At. Wt.=101.5)				
FeO	0.21	72	0.0030	
Fe_2O_3	7.67	159.7	0.0418	
MnO	0.04	70.9	0.0005	
Al_2O_3	0.16	102.2	0.0015	
BeO	0.26	25.1	0.0104	
CaO	7.56	56	0.1350	
MgO	0.02	40.3	0.0005	
ZrO_2	0.02	122.6		
SnO_2	1.49	150.7		0.0099
TiO_2	2.50	80.1		0.0325
Ta_2O_5	2.54	443		0.0057
Cb_2O_5	43.32	266.2		0.1627
SiO_2	2.39	60.3		0.0396
H_2O–110°	.40			
H_2O+110°	3.24		0.2909	0.2562
He, etc., alkalis—not determined				
Sp. Gr.=4.738 at 25.50°	99.33			
Pb/U+0.38Th=0.04				

The analysis yields a very low lead ratio in agreement with Todd's results[3] for hatchettolite from this mine. The high silica content is noteworthy and is unquestionably the result of alteration. The whole of the dike exposed by the workings has been

[3] Walker and Parsons, *loc. cit.*

more or less shattered apparently chiefly, if not wholly, by the radio-active mineral masses and has been subjected to considerable alteration by surface waters. This mineral furnishes another instance of a Precambrian mineral with an abnormally low lead ratio associated with a high silica content, a point to which the writer has given some attention in earlier papers.

The mineral seems to be most nearly related to samarskite though containing very much more lime than has been previously found in samarskite. All the radioactive minerals found in the calcite-bearing pegmatites of the Haliburton-Bancroft area tend to be high in lime, doubtless because of the universal presence of dissolved calcium carbonate in the magmas of that area. Thus this mineral perhaps represents the type of samarskite produced by a magma rich in lime. Considering the term samarskite as embracing a group of minerals in which considerable percentage variations of the constituents may conceivably occur, due to isomorphous replacement, the mineral here described seems to represent the case where iron is partly replaced by lime, and the name *calciosamarskite* is suggested as a suitable designation for this variety.

The writer is indebted to Dr. E. T. Wherry for a discussion and opinion regarding the classification of this mineral. Dr. Wherry considers that "as we know so little as to the constitution of the complex columbate-minerals the presence of a larger amount of calcium as compared with the original samarskite is not an adequate basis for classifying the mineral as a new species. If it could be demonstrated that the high lime content of this mineral represents a definite isomorphous replacement of some constituent of the original samarskite, then it might well be considered a distinct species, the end member of an isomorphous group analogous with the garnet or feldspar groups. Since, however, the role of the lime, iron oxides, etc., in samarskite cannot be clearly made out I would favor terming it calciferous samarskite."

A mineral similar to this in composition occurring at Parry Sound is described in the following article of this Journal.