

ART. III.—*On Gyrolite occurring with Calcite in Apophyllite in the Trap of the Bay of Fundy*; by HENRY HOW, Professor of Chemistry and Nat. Hist. King's College, Windsor, Nova Scotia.

THE Mineral Gyrolite was first described by Professor Anderson of Glasgow,† as a new species from the Isle of Skye; it is stated by Greg and Lettsum‡ to occur without doubt at two localities in Greenland, and, according to Heddle, at Farøe. The only other notice of it that I am acquainted with is by L. Sæmann, who§ mentions that he examined a specimen, no locality being given, mixed or interlaminated with pectolite, and suggests that this mineral losing its alkali becomes gyrolite, and losing its lime becomes okenite. No other analysis than the original one of Professor Anderson has, I believe, been published; the following account of its occurrence among the minerals of Nova Scotia, shows it in such association as affords a mode of explaining its origin by change in apophyllite. I met with it in Anapolis County, N. S., some 25 miles S. W. of Cape Blomidon, between Margaretville and Port George, on the surface of fractured crystalline apophyllite, and, on further breaking the mass a good many spherical concretions of pearly lustrous plates were observed in the interior, of sizes varying from that of a pin's head to nearly half-an-inch in diameter; their outline was well defined and the external characters as given by Anderson were recognized on examination; it afforded the following results on analysis. The mineral was ignited for water, and the residue treated with HCl, the resulting dried silica was weighed,

* Dana's Min., 4th Ed., 394, 395.

† Trans. Roy. Soc. Edin. and Phil. Mag., Feb., 1851.

‡ Manual of Min., p. 217.

§ First Supp. to Dana's Min., p. 9. This Jour., May, 1855.

and then fused with carbonated alkali, and the weight of the small quantities of alumina, etc., so separated, was deducted from that of the first silica. I place my numbers by the side of those of Anderson, and give the calculated percentages for his formula :

	How.	Anderson.	Calculation.	
Potassa,	1·60	...		
Magnesia,	0·08	0·18		
Alumina,	1·27	1·48		
Lime,	29·95	33·24	32·26	2CaO = 56
Silica,	51·90	50·70	52·18	2SiO ₂ = 90·6
Water,	15·05	14·18	15·55	3HO = 27·0
	<u>99·85</u>	<u>99·78</u>	<u>99·99</u>	<u>173·6</u>

and a general accordance is observed sufficient to show the identity of chemical composition in the minerals examined; the small quantity of potassa present in my specimen probably modified the blowpipe character a little as I found it not to exfoliate completely, and it fused without any difficulty, and even with some ebullition.

Some of the numerous cavities in the apophyllite were empty, some entirely filled with gyrolite, and in others separate plates of this mineral were standing edgewise, leaving vacant spaces, while upon and by the side of the plates were in some cases rhombohedral crystals which proved to consist of calcite and were sometimes present alone in the cavities, which varied from being quite shallow to half an inch in depth. It is mentioned by Anderson that gyrolite occurs associated with stilbite, laumontite and other zeolites, and is sometimes found coating crystals of apophyllite.

The difference in chemical composition between apophyllite and gyrolite is very well seen on comparing the respective theoretical percentages of their constituents, thus :

	SiO ₂	CaO	KO	HO
Apophyllite,	= 52·70	26·00	4·40	16·70+HF variable.
Gyrolite,	= 52·18	32·26		15·50

and the existence of the calcite in the cavities seems clearly to show that the gyrolite is formed from the apophyllite by the waters which deposited the carbonate of lime reacting on the silicate of potass and dissolving out at the same time the fluorine as fluorid of calcium:* trial was made for fluorine on two fragments of the gyrolite and no evidence of its existence obtained.

* See Dana's Min. I, p. 232-233.