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OUTLINES

OF

MINERALOGY, GEOLOGY,

AND

MINERAL ANALYSIS.

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HISTORY SOCIETY OF MONTREAL, ETC. ETC.

Robert Troup Paine

IN TWO VOLUMES.

to

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of those tourmalins that contain a notable quantity of magnesia :*

Silica, . . .	37.65	35.48	38.79	37.81
Alumina, . . .	33.46	34.75	37.19	31.61
Protoxide of iron,	9.38	17.44	5.81	7.77
Protoxide of manganese,	—	1.89	trace	1.11
Magnesia, . . .	10.98	4.68	5.86	5.99
Lime, . . .	0.25	trace	—	0.98
Potash, . . .	} 2.55	0.48	0.22	1.20
Soda, . . .		1.75	3.13	—
Boracic acid, . . .	3.83	4.02	3.63	4.18
Loss by ignition, .	—	—	1.86	0.24
	98.11	100.49	96.48	90.89

A bare inspection of these analyses shows that it would be useless at present to attempt to calculate the constitution of this mineral. The methods of analysis adopted are still too imperfect to render it probable that the results obtained hitherto, are sufficiently exact for our purpose. Boracic acid is obviously a constant ingredient, but the quantity is doubtless considerably greater than has hitherto been obtained. Some tourmalins contain lithia, others contain magnesia, and others potash, or soda, or both. But the great variation in the ratios of all these bodies, renders it impossible to draw any conclusion relative to them as essential constituents of tourmalin.

Sp. 6. *Bytownite*†

I received the mineral to which I have given this name from Dr. Holmes, of Montreal, who informed me that it came from the neighbourhood of Bytown, in Upper Canada.

Colour light greenish-blue.

An amorphous mass, texture granular.

Fracture splintery, with some foliated portions like little crystals.

Translucent.

* Gmelin, Ann. des Mines (second series), iii. 218. The first specimen was a black tourmalin from Kåringbricka, in Westmanland, having a specific gravity of 3.044. The second, a black tourmalin from Rabenstein, in Bavaria, specific gravity 3.113. The third, a black tourmalin from Greenland, specific gravity 3.062. The fourth, a deep brown tourmalin from St. Gothard. The loss of 9 per cent. in the analysis of this tourmalin is remarkable. Bucholz had analyzed it before, and had met with a still greater loss.

† Named from Bytown, in Upper Canada, where it has been found

Lustre vitreous, shining.

Hardness 6; specific gravity 2.801.

Before the blowpipe becomes friable and white, but does not fuse. With carbonate of soda effervesces, but dissolves very slowly into an opaque white globule. With borax fuses into a transparent colourless glass, leaving a silica skeleton.

It was subjected to two separate analyses, which gave the following results:—

			Mean.	Atoms.
Silica, . . .	47.735	47.400	47.567	23.78
Alumina, . . .	29.695	29.60	29.647	13.17
Lime, . . .	8.800	9.32	9.060	2.58
Peroxide of iron, . . .	3.750	3.4	3.575	0.715
Magnesia, . . .	trace	0.4	0.400	0.16
Soda, . . .	7.600	7.6	7.6	1.9
Moisture, . . .	2.000	1.96	1.98	1.76
	99.58	99.68		

These atomic quantities approach very nearly

- 15 atoms silicate of alumina,
- 3 atoms bisilicate of lime and magnesia,
- 2 atoms bisilicate of soda,
- 1 atom bisilicate of iron.

Or, admitting the bisilicates of soda and iron to have been previously united,

- 5 atoms silicate of alumina,
- 1 atom bisilicate of lime and magnesia,
- 1 atom bisilicate of soda and iron.

The formula is $5AlS + (\frac{1}{2}Ca + \frac{1}{2}Mg)S^2 + (\frac{1}{2}N + \frac{1}{2}f)S^2$.

Sp. 7. *Vermiculite*.*

This mineral also was sent me by Dr. Holmes, to whom I am indebted for so many new and interesting species. The locality is Vermont, one of the divisions of the United States.

It is composed of micaceous looking plates cemented together by a whitish matter.

Lustre soapy; feel greasy; sectile.

Hardness 1; specific gravity 2.5252.

When heated nearly to redness it projects out with a vermicular motion as if it were a mass of small worms. Hence the name. By ignition becomes of a silvery aspect with a shade of red or yellow.

* So named from *vermis*, a worm, because it twists itself up like a worm when heated to redness.