

IX.—NOTES ON A CAPE BRETON MINERAL CONTAINING  
TUNGSTEN, AND ON THE EFFECT OF WASHING CERTAIN  
CAPE BRETON COALS.—BY HENRY S. POOLE, F. G. S.,  
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(*Read April 14th, 1900.*)

In the last issue of the Transactions of this Institute there was published a paper read March 13th, 1899, entitled "New Mineral Discoveries in Nova Scotia." The paper made reference to the finding at North East Margaree, C. B., of a mineral containing tungsten and speaks of it as Wolframite with 67.47 per cent. of  $W O_3$ , but makes no note of its other constituents. A month later, at a meeting of the Mining Society, Mr. A. C. Ross read a paper on the same mineral, and in the discussion which followed an analysis made by Mr. Mason, the assayer at Halifax, was given by Mr. Missener. This analysis,\* of concentrated ore, showed but a trace of iron, and was as follows:—

Tungsten Trioxide.....	66.32
Silica .....	6.25
Manganese.....	12.02
Iron.....	.12
	84.71

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\* The following letter from Mr. Mason gives additional information about this analysis:—

*Halifax, Nova Scotia, April 23rd, 1900.*

MY DEAR MR. POOLE:

The analysis was made for commercial purposes, not for scientific ones. However, being of a curious turn of mind I am able to give you some further information, although unfortunately only qualitative, not quantitative. A close inspection of the mineral (I fancy I gave you a sample) will I think reveal that it is composed of Quartz and Hübnerite principally, but there is also a little Scheelite. With regard to the missing 15 per cent., the Manganese is reported as metal. I fancy it exists in the mineral as  $Mn_3 O_4$ , and if so, that accounts for a difference of about 4.5%. The balance was made up of mixed oxides of Niobium and Tantalum, and also of Lime. Whether the lime all belongs to the scheelite or whether part of it should join the quartz as gangue, I did not determine. I regret that I have mislaid the memo. of the quantities. I did not discover that the mineral also contained Scheelite until I panned some of it, but afterwards clearly detected it in some samples but could not find it in others.

Yours very truly,

F. H. MASON

The absence of iron and the comparatively large amount of Manganese in the composition of this mineral would class it as more nearly allied to Hübnerite than to Wolframite.

In the same paper reference is made to the beneficial effects from washing certain Cape Breton coals, whereby the quantity of Sulphur ordinarily contained in coal as supplied from the slack heaps is greatly reduced, and the resulting Coke is made suitable for Iron smelting. The experience at the Ferrona furnace is spoken of, but as the reference to the operations at that furnace are somewhat incomplete, the following data supplied by the Manager, Mr. J. D. Fraser, will doubtless on comparison prove of interest. A test made in September and October, 1895, with fifty-ton samples from each of the following Mines, gave as follows:—

	RAW COAL.		WASHED COAL.	
	Ash.	Sulphur.	Ash.	Sulphur.
Hub. . . . .	7.50%	3.24%	4.37 %	2.38%
Caledonia ..	15.00 "	3.02 "	7.05 "	2.87 "
Stirling ....	11.09 "	4.23 "	5.50 "	3.12 "
Gowrie ....	11.55 "	5.26 "	6.01 "	3.15 "

D. HERTING, *Chemist.*

A test of 10,000 tons of small coal in December, 1897, and January, 1898, received from the Dominion Coal Company, gave the following average results:—

	RAW COAL.	WASHED COAL.
Moisture. . . . .	2.10 %	1.97 %
Volatile Combustible Matter.	31.00 "	33.21 "
Fixed Carbon. . . . .	56.83 "	60.00 "
Ash. . . . .	10.07 "	4.82 "
Sulphur . . . . .	2.38 "	1.79 "

Coke made from this washed coal analysed:—

Ash. . . . .	9.16 %
Volatile Combustible Matter . . . . .	1.86 "
Fixed Carbon . . . . .	88.98 "
Sulphur . . . . .	1.62 "

I. MACFARLAN, *Chemist.*

For comparison with the work done in the coal washer, a laboratory test was made. An average sample of the coal was treated in a solution of Calcium Chloride of 1.40 Sp. Gr., the coal of 1.30 Sp. Gr. floated on the solution, and the shale of 2.04 Sp. Gr. sank to the bottom. Thus separated, the coal and shale were thoroughly washed and dried, and severally bore to the unwashed material the following proportion:—

Coal. ....	81 %
Shale, etc. ....	90 "

Dried at 212° Fahr. they yielded on analysis:—

	RAW COAL	WASHED COAL.	SHALE.
Volatile Combustible Matter.	33.06 %	33.79 %	31.43 %
Fixed Carbon .....	55.93 "	61.33 "	15.33 "
Ash .....	11.01 "	2.89 "	48.08 "
Sulphur .....	2.41 "	1.64 "	5.16 "

The same Coal treated in the coal washer yielded:—

	RAW COAL.	WASHED COAL.	SHALE.
Volatile Combustible Matter.	33.06 %	34.07 %	30.82 %
Fixed Carbon .....	55.93 "	61.26 "	23.21 "
Ash .....	11.01 "	4.67 "	41.22 "
Sulphur .....	2.41 "	1.70 "	4.48 "

On coking, 204 ovens made 683 tons of coke which showed an average composition as follows, after being dried at 212° F. :—

Moisture ....	0.40	
Volatile Combustible Matter .....	1.60	
Fixed Carbon .....	89.82	
Sulphur .....	1.65	
Silica .....	3.52	} Ash 8.18 %
Metallic iron .....	1.71	
Alumina .....	.46	
Manganese .....	.03	
Lime .....	.82	
Magnesia .....	.16	
Phosphorus. ....	.02	

Available Carbon, 87.02.