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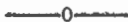
COAL FROM THE SPRINGHILL COAL-FIELD,

COUNTY CUMBERLAND, NOVA SCOTIA,

BY

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In the month of June, 1869, I had the honour to present a Report to Sir William E. Logan, F.R.S., then Director of this Survey, giving the result of a special examination of a box of coal samples, from the Main seam of the Springhill coal-field, County Cumberland, Nova Scotia. The facts contained in that Report are now included in the following paper, together with a few notes of interest concerning this important coal-field, which I have been able to obtain through the kindness of the Honourable Dr. Chas. Tupper, C.B., and M.P., for County Cumberland.

EXAMINATION OF MAIN SEAM COAL.

The samples of coal examined were taken from the Main seam of the Springhill coal-field, and were obtained at the "Black Mine." The Springhill Main seam. sample box contained about sixty pounds of coal (round and slack).

An examination of the external character of this coal shows it to be a bituminous coal of a moderately compact texture, and not inclined to fall to pieces, or *slack*. Its colour is a bright brownish-black, brilliant, except on the faces of the *partings*, which show a few patches of mineral charcoal. But a small proportion of the sample shows a shaly lamination, or tendency to break with the planes of deposition. It has a tendency rather to break with the cleat and cleavage-planes, which are inclined to the deposition-planes at angles varying from 65° to 75°, and occasionally 80°, giving irregular surfaces, known technically as *crystalline* faces.

Four samples were taken for analysis:—I and II were two

averages of the whole box;—III was a picked sample of the best (most compact) coal, and IV. was a specimen of the coal showing a shaly texture. The results of proximate analysis in the laboratory were as follows:—

Analyses.	HARTLEY.			
	I.	II.	III.	IV.
Hygroscopic moisture.....	1.21	.98	.58	1.28
Volatile combustible matter.....	33.08	35.52	33.27	35.66
Fixed carbon.....	61.49	59.42	63.85	58.53
Ash, (perfectly white).....	4.22	4.08	2.30	4.53
	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>
Coke.....	65.71	63.50	66.15	63.06

Sample I was carbonized by a slow and careful application of heat; but in treating II the heat was suddenly applied, and the carbonization effected as rapidly as possible. Analysis I thus shows the smallest amount of volatile matter obtainable from the coal, and II the largest. Determinations were made of the sulphur in sample I, with the following results:—

Sulphur-content.	Per cent.	
	Total amount of sulphur in coal.....	
Amount of sulphur in ash, (as gypsum).....		0.108
“ “ “ as iron pyrites, by difference.....		0.117

The analyses show this coal to belong to the class known as highly bituminous, or *fat caking* coals, in character very similar to those of the North of England, known as North Country, or Newcastle-Hartley coals.

Value for gas-making.

The high rate of volatile to fixed combustible matter should render this coal, in common with the Newcastle coals which it resembles, an admirable gas-coal, while in the amount of sulphur it falls much below the average of Newcastle coals (which contain about nine-tenths of one per cent, as determined by the Admiralty steam-coal trials); therefore the gas obtained from it should be very easily purified.

For iron-smelting.

The coke of this coal appears in every way well adapted for iron-smelting, as it is firm, and rather compact, and in content of ash and sulphur will compare most favourably with that from any coal of the Provinces. This coke is much more easily formed and of a better quality than from the greater number of Provincial coals. As the amount of ash is a most important point in iron-smelting, it may be well to give the following data concerning the ash content of other coals for comparison. They are taken from Professor W. R. Johnson's Coal Trade of British America, (page 126) in his comparison of the Reports of the British and American Commissions, on coal trials:—

Ash.

	Per cent.
Average of ash in 30 British coals.....laboratory analysis	5.76
“ “ “ 35 American coals..... “ “	7.76

Showing in favour of average Springhill coal as compared with British Comparison. coals, a balance of 1.61 per cent, and of 3.61 per cent., as compared with American, in ash-content. For comparison with coals of the other districts of Nova Scotia, it may be stated that Pictou coals average from 7 to 9 per cent. of ash; Sidney (so far as published analyses show), from 5 to 7 per cent., and Cumberland (Joggins) coal from 5 to 6 per cent.

With regard to the use of this coal as a steam-producer, I would refer the reader to the article "Remarks on the trials of steam-coals," in my recent Report on the Coals and Iron ores of Pictou County. (This vol. pp. 426 to 431) in which it is shown that coals of this class are now burnt with an evaporative power equal to that of the Welsh semi-anthracites, or free-burning steam-coals. The remarks there made, calling attention to the importance of these trials to the Pictou coal trade, apply with greater force to the coal under consideration than to Pictou coals, on account of the nearer approach in character of the Springhill coal to those of Newcastle. At the date of my original Report on the Springhill Main-seam coal, I was not possessed of any result of ultimate analysis, but attention was then called to the resemblance of the coals in proximate constituents, and the following analyses given: A—is an analysis of Hartley coal from Newcastle-on-Tyne. B—an average of a number of analyses of Newcastle Comparison with coals of Newcastle. coals (both A and B from the appendix to Richardson's, Knapp's Technology); and C—an average of analyses I and II of this paper; being of the Black Mine samples.

	A.	B.	C.
Volatile matter, water included.....	35.50	37.60	35.39
Fixed carbon	60.50	57.00	60.46
Ash	4.00	5.40	4.15
	100.000	100.00	100.00

Since the circulation (in manuscript,) of the original Report, I have received an ultimate analysis of this coal, by Dr. John Percy, F.R.S., of the Royal School of Mines. This analysis was made by Dr. Percy some years since, for parties interested in the Springhill coal-field, the specimen analysed being a sample from the outcrop, of which the following proximate analysis is given:—

	PERCY.
Coke	64.94
Volatile matter.....	31.08
Water.....	3.98
	100.00

The small amount of volatile matter, and the large amount of water present in this sample, would lead me to believe that its quality was not equal to that of the coal examined by me.

The following table gives Dr. Percy's analysis, and also analyses of the Newcastle coals used in the late British experiments on North Country coals, as noticed in the Report on Pictou coals, already referred to, the analyses of Newcastle coals being on the authority of the Reports of the British Commissioners in the Admiralty steam-coal trials. In these analyses no account of the moisture in the coals appears, and it is to be presumed that the samples of coal analysed were either dried before being treated, or that the amount of moisture was exceedingly small. Therefore, I have added a re-calculation of Dr. Percy's analysis, based on the supposition that the sample of Springhill coal was dried, (or disregarding water.) Analysis 7, of the following table is by Dr. Percy, of the coal from Springhill, including water, and 8 is the calculation from this analysis of the ultimate constituents of the dry coal.

NAMES OF COALS.		Carbon.	Hydrogen.	Oxygen and Nitrogen.	Sulphur.	Ash.	Coke.
NEWCASTLE COALS.							
Table of analyses.	1. West Hartley Main	81.85	5.29	9.22	1.13	2.51	59.20
	2. Hastings Hartley	82.24	5.42	8.05	1.35	2.94
	3. Davison's West Hartley	83.26	5.31	4.22	1.88	5.84	59.49
	4. Original Hartley	81.18	5.56	8.75	1.44	3.07	58.22
	5. Cowpen and Sidney's Hartley	82.20	5.10	9.65	0.71	2.83	58.59
	6. Derwentwater Hartley	78.01	4.74	12.15	1.37	3.73	54.83
SPRINGHILL COAL.							
	7. Main coal, (outcrop) including 3.98 p. c. of water	75.51	5.00	9.37	1.09	5.05	64.94
	8. Main coal, (dry)	78.51	5.19	9.66	1.12	5.20

GENERAL REMARKS ON THE COAL-FIELD.

The Springhill coal-field is situated about twenty miles south-east of the Joggins shore, in County Cumberland, Nova Scotia. Whether it is to be considered a detached coal-field, or a portion of the great Cumberland coal-field of Nova Scotia, is still an open question, only to be decided by a careful geological survey. This region appears to warrant the most careful examination, from the fact that it is destined to become of the greatest importance to the Province, at no distant period. At present no active collieries of any extent exist in this coal-field, for want of communication with tide-water; but the completion of the Intercolonial Railway, (which will pass directly through some of the surveyed coal areas,) will effect communication not only with the Bay of Fundy, (at Amherst, about 22 miles distant), but with the Basin of Mines, Halifax, and many other points where the coal will be in demand; and no doubt a large amount

General remarks.

Intercolonial railway.

of the coal, or coke produced from it, will be consumed upon the railway. About thirty miles to the south of Springhill, the railway will pass through the property of the Acadian Iron Company, about two and one-half miles from the Acadian iron mines at Londonderry, thus connecting this important district with the coal-field. The Acadian mines are so well known, from many published reports and descriptions, that it seems unnecessary to give any description of them here, and in this connection it will suffice to say that the supply of iron ore of remarkably good quality thus brought in connection with a coal well adapted for smelting and puddling, seems, from all descriptions, to be practically almost inexhaustible. The main vein (on the authority of Messrs. Woodhouse and Jeffcock, Mining Engineers, of London,) has been traced for a distance of twelve miles from east to west, and it is stated that did the trade admit, numerous workings might be located thereon. The ore at the Acadian Iron works is at present smelted with charcoal, the iron produced being of the best quality, taking a rank in the English market, second only to the better brands of Swedish charcoal iron.

Acadian Iron Works.

The Springhill district may be divided into two sections—North and South Springhill. The Black Mine, from which the coal examined was taken, is situate in the South Springhill section, or on the southern outcrop of a coal-measure synclinal, the axis of which is nearly in an east and west direction. Five coal seams have been discovered in this section, and their relations and thicknesses are stated to be as follows, in descending order:—

Divisions of the coal-field.

Seam A—three feet in thickness.

“ B—thirteen feet in thickness, lately discovered on the “McFarlane claim.”

Seams of South Springhill.

“ C—*Main Seam*; eleven feet three inches in thickness, the coal of which has received especial attention in this paper.

“ D—three feet in thickness.

“ E—two “ “

The Report of the Provincial Inspector of Mines, for 1869 (page 22), states that the coal of all these seams is of excellent quality.

MONTREAL, 28th June, 1870.

