ART. VIII.—ON THE ANALYSIS OF TWO SPRING HILL COALS.

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THE following brief notes are offered to the Institute as a contribution to the knowledge of the mineral resources of this province. They relate to a coal field about which less is known than of the Pictou and Cape Breton districts, but which presents many interesting features.

Late reports of the Geological Survey contain much interesting information respecting it, but as no analysis of one of the coals now referred to has appeared, I thought it, and a second analysis of one already examined a few years ago, might be acceptable to the members.

My experiments were made in the laboratory of King's College, Windsor, a privilege which I now gratefully acknowledge.

The following brief notice* of the seams of the Springhill Coal Field may be quoted to show their chief features.

"At present the survey is not sufficiently advanced to speak with any degree of certainty regarding the structure of the field or the extent, thickness and position of the several seams. The evidence so far as it goes, appears to show that in a distance of about eight hundred yards horizontal measurement across the strike of the measures, there are eight seams of workable thickness as under, in ascending order:

1	13′ 6″	
2	6′ 0″	
3	2′ 4″	
4	12′ 3″	
5	2′ 6″	
6 a crop...	thickness uncertain.	
7	4′ 0″	shaly coal.
8	2′ 0″	
Total	42′ 7″	

* "Geological Survey of Canada," 1870-71, page 6.

"The average dip is supposed to be about 30°, which would give a vertical thickness of measures from the 13′ 6″ seam to the 2′ seam of about 1200 feet. The dip increases as the seams are followed on their strike to the northward. The country is for the most part level and thickly forested, and the rocks are much obscured by drift, so that it becomes impossible to trace out the seams without the aid of pits and borings."

I. *The so-called "11 foot seam," or "Springhill main seam"* or "Black seam."*

This seam of coal, which is according to report just quoted, 12′ 3″ in thickness, is the property of, and worked by the Springhill Mining Company, who have now two slopes, the east and west, distant from each other about ¾ of a mile. The west slope has been driven some 450 feet, with a main level of about ½ mile. The east slope has been driven 850 feet, and will henceforth be the chief output.

The specimens from which the following analyses were made, were got by myself during the summer of 1874, while on a Topographical Survey under Prof. Oram, C. E., and will represent fairly the average quality of the coal exported by this company, at their wharf at Dorchester, N. B.

The analysis gave the following results:—

(I.) Ordinary coking (air-dry specimen).

Hydroscopic moisture	3.86	total vol.	30.32
Volatile combustible matter	26.46		
Fixed carbon	65.23	coke	69.68
Ash	4.45		
	100.00		

Theoretical evaporative power.. 8.858 lbs.
Specific gravity 1.29

Calculated weight of 1 cub. ft. unbroken ..... 80.48 lbs.
" " " " broken 54.08
Space for 1 ton (2240 lbs.) on stowage (economic weight) 41.41 c. ft.

* E. Hartley, in "Notes on Coal from the Springhill Coal Field," who, however, gives the thickness as 11′ 3″. Geological Survey Canada, 1866–69, page 445.

II. Rapid Coking.

Total volatile matters	35.65
Fixed carbon	59.90
Ash	4.45
	100.00
Theoretical evaporative power	8.23 lbs.
Coke, per cent	64.35

For the sake of comparison the following analysis by E. Hartley, Esq., Geological Survey of Canada, may be given, and if compared with II. shows the permanent character of this coal:

	11′ 3″ seam.
Total volatile matters	35.39
Fixed carbon	60.46
Ash	4.15
	100.00
Theoretical evaporative power.	8.37 lbs. (Prof. How.)
Coke	64.60
Sulphur	2.25

This coal breaks with cubical fracture, and for various reasons is very valuable, although its being tender causes a considerable amount of loss to the company by the formation of slack coal. The volatile matter is of such quantity and quality as to recommend this coal in the preparation of gas. It cokes freely with small increase of volume, giving a coherent, compact coke. The amount of sulphur is remarkably small, an important fact as regards domestic use, gas-making and preservation of grate-bars. The ash is grayish-white and bulky.

This company can export about 400 tons daily, from the wharf at Dorchester, N. B. The coal is held in high favour by all who have used it for domestic purposes.

II. *The 6 foot Seam.*

This seam is the property of the General Mining Association.

Only a few tons of this coal have been used by the people living in its immediate vicinity, and it is justly considered by them as a good house coal. The specimens were taken by myself from a heap at the mouth of the pit sunk near the outcrop.

The analysis gave the following results :—

Ordinary coking (air-dry specimen).

Hygroscopic moisture.....	3.47	total vol.	30.45
Volatile combustible matters	26.98		
Fixed carbon.....	64.48	Coke,	69.55
Ash	5.07		
	100.00		

Theoretical evaporative power .. 8.859 lbs.
Total sulphur per cent..... ..231
Specific gravity 1.30

Calculated weight of 1 cub. ft. unbroken..... 81.10 lbs.
" " " " broken..... 54.50 "
Space for 1 ton (2240 lbs.) on stowage (economic weight) 41.10 c. ft.

This is a compact, bright, clean coal, breaking with a conchoidal fracture. It has a peculiarly striated, slicken-sided surface. It cokes freely, swelling about ½ its original bulk, giving a firm, compact coke. The ash is white, which in itself is proof of but small amount of sulphur existing in the coal as pyrites. The ash proved to contain by qualitative analysis a considerable amount of insoluble residue; a little soluble silica; notable amount of peroxide of iron and alumina; sulphuric acid and lime decided in quantity; small amount of magnesia; trace of phosphoric acid.