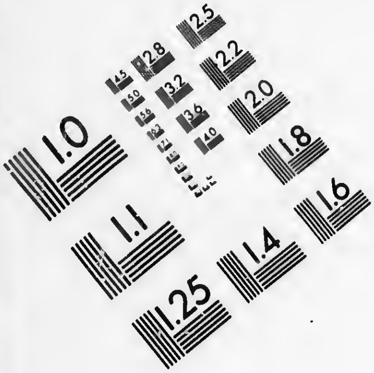

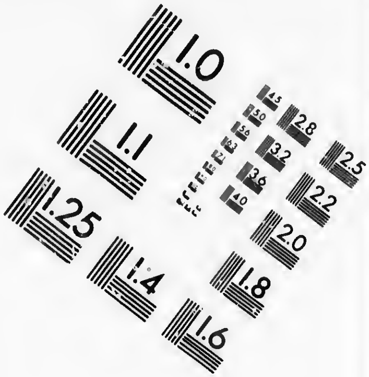

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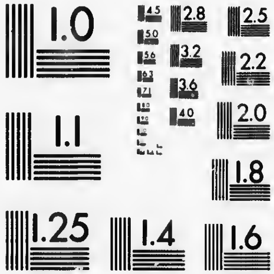

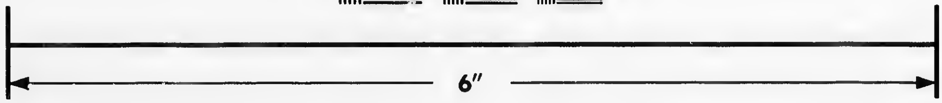

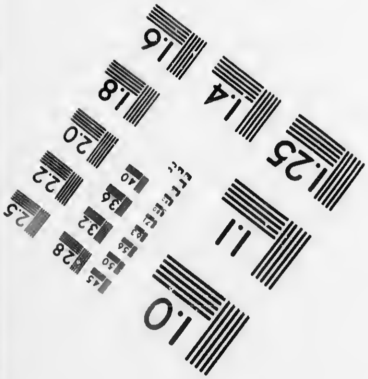

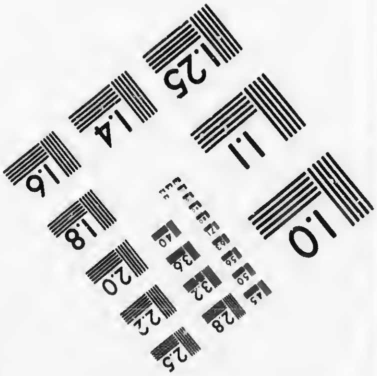

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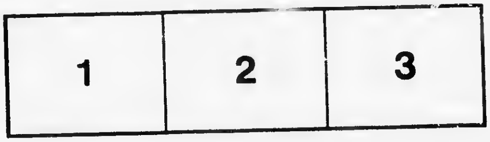
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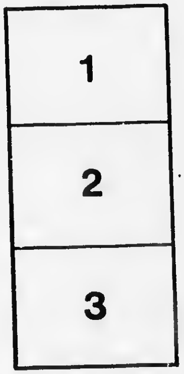
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Nova Scotia

Report

upon the
Examination and Survey
of a portion of the
Cumberland Coal Field

2nd January 1866.

Woodhouse & Jeffcock
Civil & Mining Engineers
Westminster & Derby

11, Great George Street,
Westminster, London S.W.
2nd January 1866

To the Board of Directors of the
International Contract Company (Limited)

Gentlemen,

In accordance with your instructions received on the 6th October 1865, we have made a careful examination and Survey, of a portion of the Cumberland Coal Field, in the Province of Nova Scotia, and now beg to hand you our Report thereon.

We are, Gentlemen,
Your obedient Servants,
Woodhouse and Jeffcock

Report

The Coal Field which we have carefully examined, and which is the subject of this Report, is situated in the County of Cumberland, in the Province of Nova Scotia.

It is generally described as the "Springhill Coal Field", but in reality it is a part of the Cumberland Coal Field. For the sake of avoiding confusion, however, it will perhaps be desirable to retain the name

It is proposed in the first place to state the circumstances under which it became necessary that this hitherto (comparatively speaking) unknown and improved Coal Field, should be carefully examined

Negociations have been effectually carried on between the Provincial Government of Nova Scotia and New Brunswick on the one part, and the International Contract Company on the other part, for the construction of a Line of Railway from the present Terminus of the Nova Scotia Railway at Truro to Monckton in New Brunswick being a portion of the great scheme of an Inter-Colonial and International Railway system, connecting the three British Provinces of Nova Scotia, New Brunswick and Canada with each other and with the United States.

As a tributary to this scheme it appeared highly desirable that the Springhill Coal Field should be opened and worked in connection with the Railway

The International Contract Company Limited, therefore desire to be informed as to the value of the Coal under 50 square miles, the Mining rights of which are proposed to be sold to them by the present holders of Licences to search - These ten areas of five square miles each are held under the following names

C. H. M. Black	Colored Yellow on Plan
Do	
Do	
Do	
Do	
John Livesey	Colored ,, ,, Plan
Acadian Charcoal Iron Co	
George Bute	
E. A. Jones	
Alexander Beattie	

The above parties have at present only the License to search, subject to the Law of the Province of Nova Scotia with regard to Mines and Minerals which provides as follows

"The Chief Commissioner of Mines may upon application grant licenses to be in force one year from the date of application thereof to enter upon any lands in this Province, not already under License or Lease for Mining purposes, and to dig and explore for such Minerals, other than gold as the Crown holds for the benefit of the Province, a bond being first given to the Chief Commissioner of Mines &c &c.

87. "No such application shall be valid unless accompanied by a payment of twenty dollars

and the license of exploration may cover any single tract of ground not exceeding five square miles in extent, but not less than two miles in width"

89. "Upon such application and payment being made the Chief Commissioner of Mines shall cause the lands applied for to be surveyed and laid off, and a full description thereof shall be embodied in the License of exploration" (The remainder of the Clause refers to Gold Mining)

90. "The said license of exploration may be renewed for a further period of 12 months on application thereof to the Chief Commissioner of Mines, setting forth the special circumstances of the case, not less than thirty days before the expiration thereof, and on payment of the further sum of twenty dollars, subject however to the approval of the Governor in Council, upon consideration of the special circumstances submitted. The holder of an exploration License may at any time before the exploration thereof, select from the land covered by such License, an area of one square mile, for the purpose of working the Mines and Minerals thereon and may make an application in writing to the Chief Commissioner of Mines for a license to work the same, which application shall be accompanied by a payment of Fifty dollars"

93. "Upon such application and payment being made the Chief Commissioner of Mines shall cause the portion so selected to be surveyed and laid off, and shall defray the expense of such survey, which

said portion shall be in one block, the length of which shall not exceed 2½ miles, and the person making such survey shall make a report, and plan thereof, and transmit the same to the Chief Commissioner of Mines"

94 & 95 "Relative to Land damages &c."

96. "License of occupation to be for 2 years"

97. "Holders of License to occupy having complied with previous terms, may then be entitled to a Lease of the Mines".

98. "License to work may be obtained without prior exploration Licenses".

99. "The Governor in Council may by special order authorise the granting a Lease or License occupy and work a larger area than one square mile, if on investigation of the special circumstances of the case they may think the public interests would be better served thereby, and in such case may propose such further conditions not at variance with the spirit of this chapter as may be deemed just".

100. "All leases of Coal Mines shall terminate on or before the twenty fifth day of August A.D. 1886".

101. "Spaces of 20 yards in width between lines of areas to be reserved, but on application of both parties interested, the Governor in Council may by special order direct a license or lease of such reservation to be granted on such terms and in such manner as may be just and reasonable"

102. "Royalty 10 cents (4d 3/4 sterling) on every ton of 2240 lbs."

163. "Lessees of Mines to make yearly Returns"

From the foregoing it will be seen that within a year (unless the time be extended by the Provincial Government as has been done in the present instance) of the date of taking out the license to search, the Holder of the License must be prepared to locate his area of one square mile, out of the whole area of five square miles, over which he has been granted the License to search [In Appendix will be found names of Holders and dates of Licenses to search.]

The Provincial Government have however the right of specially granting an additional fractional part or quantity up to the whole area of five square miles to the Lessee or Lessees.

In this case we were informed that some Members of the Provincial Government held out a prospect of granting on special grounds the whole quantity of five square miles in each of the lots or claims, making a total of 50 square miles (since however reduced to 30 square miles) and the International Contract Company were disposed to accept the original terms of Sale, provided a careful examination of the Coal Field should prove satisfactorily the existence of Coal good in quality and available in quantity.

We are informed that the original terms offered were; the Vendors to receive £10,000 in Cash and £40,000 of paid up shares in the Undertaking, assuming the Capital to be

£400.000. To these terms the representative of the holders of the areas colored yellow subsequently added a proposal for the payment of a Royalty of 2^{d} per Ton. We are desirous of stating this at the commencement as we were authorised and requested to "indicate the value of the property in question"

The reduction already referred to of the aggregate area proposed to be granted from 50 to 30 square miles was rendered neceſsary by the difficulty the Provincial Government had in granting an apparently entire monopoly and also by the fact of subsequent "Licenses to search" having been granted over some of the areas proposed to be included in the negociation.

In consequence of this modification it became neceſsary to obtain from the Provincial Government an extension of time for preliminary exploration, and a covenant that at the end of this additional time an aggregate area of 30 square miles should be granted to the proposed Lessees. The following is the Petition and the Grant of the Provincial Government in answer to the Petition

"To Lieutenant General Sir William Fenwick Williams Lieut^{t} Governor of the Province of Nova Scotia and to Her Majesty's Executive Council."

"The Petition of Ephraim A Jones George Bate Alexander Beattie, John Livesey and the Acadian Charcoal Iron Company Limited as follows

Humbly Sheweth

"Licenses to search for Mines and Minerals at Springhill in the County of Cumberland,

over five square miles (each) were granted by the Chief Commissioner of Mines on the 24th day of August last over adjoining and contiguous Areas to Ephraim A. Jones, George Bate and Alexander Beattie and on or about the 27th of the same month Licenses to search were also granted by the Chief Commissioner of Mines over 5 square miles (each) being contiguous areas to John Livesey and the Acadian Charcoal Iron Company (Limited) covering in all a district of twenty five square miles."

"In accordance with these Licenses we have caused a Mining and Geological Examination to be made at a very large outlay of money and extending from the granting of the Licenses to the present time but while the result of the said examination has developed the existence of Coal Measures in some of the said areas, the presence of faults in the Strata and the approaching winter season will necessitate the continuance of such examination at a still greater outlay beyond the periods when the Licenses expire and during the whole of the open season of next year."

"Meanwhile measures are being taken with every assurance of success and will continue to be taken on our behalf in conjunction with C. H. M. Black Esquire the Holder of Licenses to search over five adjoining areas of five square miles each, for the formation of a Company with large Capital to open and work the whole of the said

"areas containing deposits of Coal in connection with the Railway from Truro to the Border to be constructed by the International Contract Company to the great advantage of the Province and its revenues."

"In order to form the said Company and raise the necessary amount of Capital, it is indispensable we should obtain Licenses of occupation extending over the whole or a large proportion, but not less than three fifths of the said areas in the aggregate in such manner as the explanation may shew advisable, but for the reasons above stated we are not and cannot before the expiration of our Licenses to search, be in a position to locate the areas for which Licenses of Occupation are to be applied for and granted."

"We therefore humbly pray.

1st "That our said Licenses may be renewed for a further period or periods of twelve months"

2nd "That at or before the expiration of the last mentioned period, licenses of occupation may be granted to us or to our assigns in conjunction with the License of the other five areas above mentioned of not less in all than three fifths of the said area in the aggregate in such manner as the exploration may shew advisable".

Halifax 24th of November 1865

(Signed)
E. A. Jones
Alexr Beattie by his Atty Alexr Beattie
George Bate " their " E. A. Jones
John Livesey
A " Charcoal Iron Co

A similar Petition was presented by Mr C.H.M. Black the representative and holder of the other five Licenses colored yellow, and the following is the Government reply to the combined Petitioners

"On the application of Charles H.M. Black and E. A. Jones, A. Beattie, George Bate, John Livesey and the Acadian Charcoal Iron Company dated 24th November 1865 requesting an extension of the ten Licenses to search held by them for twelve months from that date, and that at or before the expiration of the last mentioned period Licenses of Occupation may be granted to them or their assigns of not less in all than three fifths of the said ten acres in the aggregate in such manner as the explorations may shew as advisable."

"It is Ordered that the Licenses to search be extended as requested for the period of twelve months and that during that period provided a Company is formed with sufficient Capital to operate the Mines on a large scale, and the Railway from Truro to Monckton is being vigorously prosecuted according to the Contract made for that purpose with the International Contract Company the said parties or their assigns shall be entitled to locate and shall receive Licenses of Occupation to the extent of three fifths of the areas covered by the said ten licenses to search in the form and manner described in the aforesaid application"

"I do certify that the foregoing is a true

copy of a Minute of Council passed and approved by His Excellency the Lieutenant Governor and the Members of his Council on the 25th November AD 1865

(Signed)

Jas H Thorne

Clk E C

(Signed) W F Williams

Lt Governor

We are of opinion that this reduction will not in any way affect the prospects of the undertaking, inasmuch as the 30 square miles may be selected and loc'd in such a manner that all the workable Coal of the originally proposed area of 50 square miles will be practically secured.

It is proposed for the sake of simplicity to explain the results of our investigations and enquiries in the following order.

1st The general position extent and value of the Springhill Coal Field and particularly with reference to the portion proposed to be sold to the International Contract Company Limited

2nd Our opinion as to the advisability of accepting the tracts of Coal proposed to be thus sold and our reason for so advising

3rd The course of action it will be necessary to pursue and a general comparison of the future prospects of the Springhill Coal Field when developed in the manner suggested in this Report with the existing Coal Trades of the Cape Breton and Pictou Coal fields.

With regard to the position of the Springhill Coal Field the accompanying Map will shew it is hoped, the general features of the district. It is to be regretted that no accurate survey of the district has been attempted, but we believe that for general purposes the accompanying Map may be taken as approximately correct.

It must be remembered that the Springhill Coal Field has hitherto been in every sense unexplored; the difficulties therefore of examining and ascertaining the value of a Coal field under such circumstances are obviously greater than those met with in making an investigation in a practically known district.

To this must be added that the whole area of the fifty square miles is almost entirely covered with a forest of densest growth the ground being (as is usual in such cases) very swampy and of great thickness owing to vast accumulations of decomposed vegetable matter covering the rocks and effectually preventing their open inspection.

There were thus unusual difficulties to be encountered in making the Survey and it at once appeared obvious (inasmuch as time was limited and opportunities were few) that it was necessary to have men simultaneously boring and excavating at different points in order to obtain further and more satisfactory proofs

We soon found that so little was known of any out-crops of any seams of Coal that there was no positive proof to be had by tracing the outcrop of any particular seam

for a great distance. The accompanying Map will shew the points where Coal has been actually opened and slightly worked on the crop at Springhill.

The first or upper Seam at this particular place we found to be a bed of remarkably good Coal, presenting a very clean compact appearance on its immediate outcrop.

The dip of the Seam is 25° and the direction of the dip N. W. 45° and the general direction of the strike about N. E. & S. W. 45°.

We were able by sinking a small pit to obtain a very fair section, but it must be mentioned that on account of the rather rapid dip at this point it was not feasible to obtain a section from the dip as a deep pit would have been necessary and we had no means of extracting the water; the Section obtained accompanies this Report.

The Section of the Seam of Coal was as follows:

Top Coal, very good for Roof . .	1.' 6"
Dirt	1.' 0"
Good Coal	11.' 0"
	13.' 6"

This may be considered a very valuable Seam of Coal. The quality of this Coal is exceedingly good; it may be correctly described as a bituminous Coal, but of dense and strong structure.

The top Coal in working would be found very good to be left as a roof and the dirt immediately under it would be holed, and

the remaining 11 feet blown and wedged down

A Seam 13' 6" is a maximum thickness to be worked with the greatest advantage.

In the Pictou Coal field there is a seam 35' 6" long but owing to a great loss of Coal in pillars in working this seam is by no means an economical one nor is the quality of the Coal equal to that of the Main Seam at Springhill. The average dip of this seam is about 25° N. W.

About 45 yards below the main seam we proved (by sinking a small shaft) another Seam about 3 feet thick of good workable Coal having the same dip and angle as the Main Seam. The dip of this Seam also was 25° N W. 45°

At a probable depth of 130 yards there appears to be another seam of good Coal about 2 feet thick. This has been partially worked by a man named Simpson who drove into it about about 20 yards and he proved the Coal to be very good considering it was near the Baſsit.

The Main Seam we distinctly traced for a distance from S W to N E of 2½ miles and it is a fair and geological inference (inasmuch as no change of angle of dip has been proved) that the lower beds of coal described above will be found in their proper position

We endeavoured with the utmost care to trace the outcrops of the seams further than shown but owing to the difficult nature of the ground as before described we were unable to do so.

After tracing therefore the outcrop of the main seam in a south westerly direction to the

point marked on the map without change of dip or strike we were prevented from proceeding further on the basset of the seams by the thick covering of swamps and dense forests We therefore were compelled to limit our investigation of this part of the Coal field to ascertain the general conformity parallelism and regularity of the Coal measures.

With this view we directed borings to be made in the "Mountain Road" at the point marked A on the plan in order to prove at this point the position of the Coal measures.

We found the dip to be only 3 degrees different from the angle of dip as observed towards the N E at the out crop in the general Mining Applications Area and the angle of dip was about the same The following is the section of strata cut through by boring at this point.

	feet	ins
Surface to Rock . . .	7	6
Rocky shale .	2 .	6
Blue shale	4 .	0
Rock . .	3 .	6
Brown shale . .	0 .	6
Rock	6	0
Shale very sandy	5 .	0
Blue Shale . .	11 .	0
Rock . . .	7	7
Rocky shale . .	3	0
Rock	7 .	0
Shale	6	4
White sandy rock . .	8	0
Soft Shale	9	9
Soft Rock .	4	0
Blue shale . . .	10	0
Very hard Rock .	4	0
Blue shale . . .	3 .	0
	102	2

We had also previously put down several holes more towards the rise of the measures so as to prove the upper series of strata. At this time we had only a very limited length of boring rods; the holes therefore were not carried to any great depth but we cut a sufficient thickneſs of strata to ascertain generally that they were of the true coal measures and occupied their proper relative position in the series.

We were unfortunately unable to cut the main seam but the results of our borings proved that the Coal measures maintained their regularity of relative position towards the south west, and therefore it is a sound geological inference to conclude that the main seam and the underlying beds of coal will be found under the areas held by Mr Livesey and the Acadian Charcoal Iron Company.

We examined on the surface the evidences of the position of the measures further still to the South west, and found a very slight difference of dip and strike of the measures.

Regarding the Cumberland Coal field generally we directed our efforts in the first place to ascertaining the relative position of the Springhill Measures with the Joggins measures, and especially to tracing and proving if poſsible the outcrop of the Coal seams and wherever the latter was impoſsible we directed our attention to the examination of the overlying strata in order to satisfy ourselves of their regularity of position.

We visited the South Joggins Coast and carefully examined the section of Coal measures exposed in the Cliffs. This section has been examined by Sir Charles Lyell and measured

by Sir William Logan and is the key which is necessary to explain the position and structure of the whole of what is called the Cumberland Coal field

At the Joggins there is a small Colliery at which a Seam of Coal called the Kings Seam is worked and another small seam below this called the "Hardscrabble" Seam has been slightly opened and worked.

The section of this Seam is.

Coal	3' 6"
Dirt	1 0"
Coal	1' 6"

The present worker of the Joggins Colliery is Mr Biggs the sub Lessee of the General Mining Association.

This seam has been worked further to the Eastward by the Lawrence Company and the Victoria Company, where the average thickness and quality appear to be about the same as at the Joggins. This appears to be the most easterly point where this seam has yet been worked

The next Colliery to the eastward is that worked by the Macan Colliery Company. The seam here appears to be identical with the "Hardscrabble" Seam of the Joggins. -

A Tramway of 4 feet guage has been made from this Colliery to a Shipping place in the Macan River of about 5 miles in length.

We visited and inspected the Chignecto and Sugarwood Collieries

The former is won by Pits about 60 yards deep and the latter by a drift driven in on the dip to a distance of about 22 yards The Dip is 41° S.S.W.

The following is a section of the seams at Chignecto and Sugarwood Collieries

Coal 5. 2
Dirt 3 1
Coal 4. 7

or 9' 9" of Coal of good quality

The Chignecto Colliery and the Sugarwood Colliery have only just been opened and a tramway has been made to the Shipping place on Macan River

The dip at Sugarwood is 14° S S W and about the same at Chignecto.

Proceeding again to the east the next place where the seam has been opened is at a place shewn on the Map and marked at Styles Mine. This pit was not sunk through the Coal but it proved a Seam (we were informed by a man who sunk it) as follows.

Coal 3' 6"
Dirt 6"
Coal 3' 8"

The Outcrop can be traced uninterruptedly from Sugarwood pit to Styles' Pit, and it is tolerably certain that the seam at Styles' is the Hardscrabble seam of the Joggins.

The dip of the Coal at Styles' pit was we were informed about 14° S. S. W.

A reference to the Map will show by arrows the direction and angle of strike and dip at each point as proved by actual measurement

We have thus proved the Coal Measures to a point at least 6 miles east and inland from the Joggins; and the general conclusion to be made is that the Joggins measures continue inland with a very slight change of dip and strike as far as

Styles Pit and that the seams of Coal improve in thickness.

Beyond Styles Mine about ¼ of a mile east of Stewarts House (shewn on Plan) we put down a hole which proved a dip S.S.W. of about 15 degrees. This proves the continuity of dip and strike thus far. We have indicated on the map accompanying this Report what we consider is the probable line of Outcrop and change of dip and strike from the Joggins measures to the Springhill Measures.

We were unable to prove anything but alluvial deposit by boring or otherwise. We then carefully examined the course of the coal measures and traced them to the Black River (as shewn on the Plan) and found that here the Coal measures appeared with a dip to the North east of about 40° A Seam of Coal crops out here of a thickness of 2 feet. It appears very good Coal and from its appearance we think it is identical with one of the lower seams as proved at Springhill

A reference to the Map will shew that Lime Stone Crops up immediately from under this Bed. In our opinion this Limestone outcrop indicates a more or less disturbed District and probably is about the point from which the Measures take their change of course towards the Joggins series on the North Crop

On the Plan is marked the ridge of the anticlinal or saddle back where the Coal measures dip away again to the South. This is in the Claim of Dorkin and Bragg and others. An American Company has been prospecting here during the whole of this year and are stated to have expended 20,000 dollars in proving these claims and to have succeeded in proving at least two workable seams

of Coal of good thickneſs These seams by all fair, geological inference should belong to the Springhill series

We are also informed that this American Company are intending early next year to make a Railway to Parrsborough and have already surveyed their Line, which will be rendered however, comparatively unneceſsary by the construction of the Railway from Truro to Monckton.

Having given a general account of the courses of the Coal Seams of the Joggins series on the North side of the Cumberland Basin, we propose to return to the Springhill series of measures on the South crop.

We traced the Main seam in a North Easterly direction as shewn on the Map to the point indicated We were unable to trace it further; but in proceeding in the same direction we suddenly came upon the Outcrop of the bed of concretionary and bituminous limestone already referred to This certainly appeared to us to indicate the existence of a fault and we carefully examined the District Unfortunately the forest here is denser and the surface soil deeper than elsewhere, in some places covered by an irregular alluvial deposit.

The Gypsiferous Strata of the Cumberland Coal field lie in the lowest series of the Coal Measures They may be seen on the Joggins Coast and the Gypsum has been proved and worked at the various points shewn on the Plan marked Blue between Amherst and Plaster Creek in River Phillip and between the latter place and the immediate vicinity of Springhill between the Amherst Road and the place called the Salt Springs

These Rocks being well defined in their Geological position serve as a datum line, so to speak, and help us in forming a correct idea of the position of the beds of the Cumberland Coal Field.

The most defined of the Rocks conformable with and overlying the Gypsiferous rocks are beds (varying considerably in thickness) of bituminous limestone. These have been opened or worked at the various points colored in the Plan. We consider that it is probable that the bituminous and con[illegible]ary limestone already referred to above (for [illegible] and 20) belongs to this series. If so, this proves the general regularity of the measures on this side.

Taking therefore all the facts and particulars already explained into consideration we arrive at the following general conclusions. –

1st That the Cumberland Coal Field exists in the form of a basin having its Northern Crop proved from the Joggins Crop to Styles Mine and that the Springhill Measures are identical with some of the Joggins series, and that the Strike of the Measures of the Northern Crop probably turn towards Springhill as shewn.

2nd That the Seams of Coal in the North Crop appear generally to improve in thickness and, going in an Easterly direction maintain their Geological position with regularity.

3rd That there are at least three seams of Coal proved at Springhill and the Coal Measures generally proceeding from Springhill in a South Westerly direction being proved

regular both in dip and position, it is right to conclude by Geological reasoning that three seams of coal at least will be found in the same relative position under the areas held by the Acadian Iron Compy and Mr Livesey as proved at the point already indicated.

4th That three seams of Coal at least exist in the same relative position under the areas between Springhill and Styles Pit and with an Outcrop somewhat as shewn on the plan.

5th That every portion of the 50 Square Miles may not contain Coal at an available depth The areas containing Coal at the most available depths are probably those held by the Acadian Charcoal Iron Company and Mr Livesey C H M Black on the south west and the claims held by E A Jones A Beattie George Bate and part of two claims held by C H M Black on the North east.

It is probable that the Measures flatten considerably in the deep and towards the centre of the basin If this should be proved to be the Case it will render a larger portion of Coal workable at moderate depths

Taking the whole matter into consideration we advise the acceptance (omitting the proposed Royalty or Tonnage) of the areas of the Coal field on the terms proposed viz that the Vendors receive £10000 in Cash from the International Contract Company and an Interest to the extent of 1/10th in any Company to be formed hereafter to work the Coal

The definition of 1/10th of an Interest should be understood as meaning not 1/10th of a nominal Capital, but of the profits accruing from the Capital actually expended on the works

The transfer being effected One Colliery might *in the first instance* be established in a suitable position (to be determined definitively after the necessary explorations have been made) of a capacity for raising 1000 Tons per day as an average quantity

[It will be observed that the proposed Line of Railway from Truro to Monckton will almost bisect the area of the 30 Square miles This is an advantage to the extent of rendering the Railway nearly equally available from all points for Colliery Branch Lines, there being no great obstacle on the surface]

An estimate of the outlay for one Colliery on this scale can only be approximate under present circumstances but we assume the probable cost to be £120,000

In this Estimate every thing has been taken at its *maximum* cost, the average rate of labour being computed at 2 dollars (8/-) per day and the cost of Machinery at 100 per cent more than in England.

For the opening of one Colliery an expenditure of £120,000 undoubtedly at first sight appears a large sum This, however need only be gradual and prospective, for when a practical commencement is made it will be found, good policy to take advantage of the fact that the Coal has not hitherto

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Note. When the works have been fairly commenced and Residences provided for the Work people this rate will doubtless be considerably reduced

been worked on the outcrop and is therefore whole from the surface right to the dip. This being so a series of pits not exceeding 50 fathoms in depth from the surface could be established on a line pretty nearly parallel with the outcrop. and this would give a pretty large supply of Coal up to 1000 tons a day at the gross maximum outlay of £120,000 already referred to

One great advantage of this plan is that the operations may in the first instance be confined to one establishment at a cost say of only £20000 raising from 150 to 200 tons per day, or extended in the like proportion to any amount that it may be found expedient to expend or that the Market for the Coal may require.

We think it advisable to give this explanation of the mode of proceeding lest it should be inferred that we recommended an immediate expenditure of the entire £120,000 on one Establishment

We are informed by Mr Beattie Engineer of the Railway that Vessels of an average Tonnage of 400 tons can be loaded in the Cumberland Basin at the point selected by him for making the Jetties, and that accomodation will be provided at first for shipping at least 1000 Tons a day.

With regard to the probable cost of working of course no estimate except a proximate one can be given From enquiries made with regard to working the Albion Mines at Pictou it appears that the average cost of cutting getting and putting the coal is from 2/- to 2/3 currency (1/7¼ to 1/9½ Sterling) per cubic yard (= to 1 Ton).

The circumstances of the Pictou Mines are favourable on the whole to cheap working We

were informed on good authority that the average cost per ton at the Shipping place is about 1¼ dollars currency (5/ sterling). At Cape Breton we are informed the Cost of the Coal delivered at the Shipping place is about 1 dollar (4/) per ton. Considering therefore the character of the Main Seam at Springhill, having a good roof and seam of dirt convenient for holing we should estimate the cost at a maximum (not including interest on Capital) of 1 Dollar per ton on the pit bank.

The cost of carriage from Springhill to the Shipping place in Cumberland Basin should not be more than 2/- per ton, making 6/- sterling as the total cost.

We are of opinion therefore that it will be quite poſsible to deliver 1000 tons per diem at Cumberland Basin at a maximum cost of 8/ per ton, thus allowing a margin of 2/ per ton to cover all incidental expenses, charges for dead work, wear and tear, depreciation of plant, interest on capital, and the usual Royalty to be paid to Government of 6d currency (or 4¾ sterling).

The freight from Cumberland Basin to Boston is about 7/- sterling and to New York about 9/- The average size of vessels trading in the Bay of Fundy between Nova Scotia and the United States is 200 tons.

The freights from Cape Breton, Sydney and Pictou to Boston are about 11/ per ton sterling and to New York about 13/- sterling per ton, so that the freight from Cumberland Basin (the proposed Springhill shipping place) is leſs by 4/ per ton than either of the above.

and an immense advantage is thus gained in favour of Springhill

We may therefore assume that Collieries opened out at Springhill in the manner indicated and with a commodious and convenient shipping place in Cumberland Basin, would with these advantages, and the very good quality of the Coal (see analysis) have a very large command of the American markets.

On the data already given, we may estimate the maximum cost of the Coal per ton delivered at the shipping place in Cumberland Basin at say 8/ and taking the average selling price there at 12/ per ton (the average market price at Boston being 24/ per ton) a margin of profit of 4/ per ton is gained, exclusive of the advantage in point of lower freights to the States This on a total vend of 200,000 tons per annum would be a profit of £40,000 per annum, thus allowing a margin of 100,000 tons between the estimated quantity of 300,000 tons capable of being raised by the plant annually and the probable actual quantity of 200,000 tons, leaving an ample margin for all irregularities of working and consequent loss of time.

This may appear a large annual profit for the extent of the Capital required for the Colliery, but we have little doubt with careful and judicious management of its being realized. –

It appeared desirable as part of the general enquiry, to investigate the connection with and bearing upon the Iron trade, that the opening of the Springhill Coal Field might have.

The Coal of the Main Seam appears to be very free from Sulphur and to yield only a

small quantity of white ash, and we think it is sufficiently hard in constitution to be suitable for fuel in smelting in the blast furnace

We were led to make enquiries as to the existence and value of any Iron ore which might be available for smelting at Springhill or in its vicinity.-

We found that Lodes of Brown Hematite and Micaceous Iron Ore, of the richest quality and remarkably free from phosphoric acid, and sulphur, existed, and had been proved in the neighbourhood of "Folly" River, and Great Village (and also near River Phillip) and these veins, though irregular, have been found at various points for 12 miles in length. They belong to and are worked by the Acadian Charcoal Iron Company (analyses of specimens from all these localities are in Appendix B.)

We suggest that a supply of that Iron Ore may be secured, by purchasing or leasing these Mines, and working them, the ore to be sent to Springhill or Cumberland Basin, to be smelted by Springhill Coal.-

It will be seen, that the area of Coal held by the General Mining Association, is surrounded by the Areas of Coal proposed to be sold to the International Contract Company Limited. We advise, if a moderate price can be ensured, that the Mining rights of this area should also be purchased by the International Contract Company, and a complete monopoly of the most valuable part of the Cumberland Coal field would then be obtained.

There is no doubt of the probability of the

existence of all the seams under this area, and we think the whole area of 4 square miles will be available for working in connection with the surrounding areas.—

It will be seen by reference to Section 101 that by the Provincial law, all leases terminate at the latest date on the 25th day of August 1886 thus limiting the available period from the present time to 20 years. This is a very short period for the magnitude of the works contemplated and is certainly a drawback, but nevertheless we are unaware by what means short of a Repeal of the Statute it will be poſsible to obviate this difficulty. It is probable however (and to this effect we were informed by the Authorities of the Provincial Government) that there will be found little difficulty in renewing the leases, if the Coal previously leased, shall have been worked to the advantage of the interests of the Province of Nova Scotia.—

We may remark that, until the last 4 or 5 years the General Mining Aſsociation appear to have enjoyed almost an entire monopoly of the Coal trade.— Lately however, other Coal Companies have been formed, a list of which with an account of their nominal capital will be found in the Appendix to this Report. Some of these have realized dividends amounting to upwards of 50 per cent.—

With regard to the Reciprocity Treaty between the United States and the British Provinces which expires next March, we are of opinion from enquiries we have made, that in case the Treaty should not be renewed, the effects on the exportation of Coal from Nova Scotia will not be very unfavourable From what we can ascertain

bituminous Coal is such a necessity, in the Eastern States especially, that beyond a certain nominal duty, the American Government would be adopting a most unpopular and unproductive policy in offering any obstructions to its continued importation in the largest poſsible quantities..

We do not therefore apprehend much interference in the exportation of Coal from Nova Scotia to the United States if the Reciprocity treaty be not renewed. During the last five years the exportation of Coal to the States (and that during the Civil War) increased nearly 100 per cent.—

In conclusion therefore, taking into consideration all the circumstances of the extent relative position with the Railway and Shipping place, availability and value of that portion of the Springhill Coal Field, which is proposed to be bought by the International Contract Company, we are of opinion that if purchased on the terms advised, and if the resources are properly developed, a most profitable investment will be made, and this result will be so considerably enhanced, if associated with the Iron Manufacture.

Woodhouse & Jeffcock

Appendix A

Analysis of Coals

By Dr. Robb of King's College, Fredericton

	Volatile	Coke	Ash
Newcastle (England)	36. 8	63 2	6. 6
Lewnabago Cannel . . .	49. 6	30. 4	9. 1
Picton	27. 1	61. 496	11.44
Springhill (Styles Main)	31. 3	61. 11	7.56
Sydney C. B.	24. 51	61. 61	13.88

29th. April 1859

Copy Memo: by S. O. Donnell Surveyor County of Cumberland. On plan of Mining Rights Springhill &c.–

"The Course of the Coal Veins at the Joggins Shore is S. 63° E. at Victoria Mines S. 80½° E. and at Maccan Mines S. 89° E.–

There has not been enough work done at the open Mines to determine the course of the Coal What is called the Sugarwood opening, seems to run about N. 61° W. until it reaches the S. E. corner of Hickman, Baker & Kerr's Claim, where Patrick & others have opened. Here it ran N. 55° W. when I was there in November, and I have been told since then, that further West it runs about N. 80° W. It appears to have been very much disturbed hereabout.

Jos. Smith, Agent of the Association traced the Coal as far as Halifax Break

on the road from Joggins Mines to Riv Hebert and there lost it.

It appears that it broke hereabouts and pitched Northwestardly, and in doing so changed its course materially.

Consequently, Victoria and the Lawrence " Mines have the old Joggins Vein, which on its changed course from Riv Hebert would pass through Binneys Square Mile if not intercepted.

Memo: Mining Rights

George Bute	Renewal Augt 24th 1865
	now extended to Augt 24-1867
C. S. Silver 2nd	July 4th 1865
Eph: A. Jones	Renewal Augt 24th 1865
	now extended to Augt 24-1867
Jno Thompson 2nd	July 20th 1865
Alexr Beattie	Expired Augt 24th 1865
Alexr Beattie 2nd	Took place of first Augt 24th 1865
	extended to August 24th 1867
Hon: R. B. Dickey	Expired Augt 5th 1865
C. H. M. Black 2nd & 3rd	June 29th 1865
	Extended to Augt 29th 1867
Wm R. Barnes	Expired June 29. 65
C. H. M. Black 1st & 2nd	June 29. 1865 extended June 29. 67
J. H Harding 3rd	July 1st 1865
J. D. Nash 4th	Septr 5th 1865
C. J. Stewart North Springhill	Expired 29 June 1865
C. H. Black 1st & 2nd	June 29th 1865 - extended
	to June 29th 1867.
C E. Ratchford & others 3rd	June 29th 1865
T. J. Wallace 4th	July 1st 1865
J. H. Harding 5th	— "

Memo: Mining Rights Contd.

C. J. Stewart West Springhill Expired June 29. 1865
C. H. M. Black 1st June 29 65 extended to June 29/1867
L. R. Kirby 2nd July 1st 65
R. G. Haliburton 3rd July 5th 65

C. E. Ratchford N of A. C. Co Expired June 29. 1865
C. H. M Black 1st June 29 65 extended to June 29/67
C. S. Silver 2nd July 4 - 65

Acadian Charcoal Iron Co Renewal Aug 27/65
C. S. Silver 2nd July 4 - 65
Extended to July 4th 1867

John Livesey Renewal Augt 27. 1865
extended to August 27. 1867
L. R Kirby 2nd July 11. 65
L. R. Kirby 3rd " 3. 65
T. J. Wallace 4th "

C. E. Ratchford North of E. A. Jones search
Expired June 29. 65
Applied for by E. A. Jones, June 29. 65
No second application

The following is an account of the total amount of Coals raised and shipped in the Province of Nova Scotia in Tons and Cwts, from the year 1827 to the year 1863 inclusive.—

Year	Tons	Cwts	Tons	Cwts
1827	11.491.	–		
1828	19.429.	17		
1829	20.252.	12		
1830	25.240.	6		
1831	34.424.	8		
1832	46.585.	6		
1833	59.497	4		
1834	46.677	12		
1835	51. 813.	5		
1836	98. 427.	3		
1837	109. 347.	12		
1838	97. 938.	14		
1839	133. 928.	11		
1840	98. 267.	17		
1841	136. 110.	9		
1842	119. 478.	12		
1843	97.200.	12		
1844	99. 993.	14		
1845	137. 908.	13		
1846	134. 393.	12		
1847	183.099.	13		
1848	170.518.	1		
1849	158 955.	10		
1850	163 725.	8		
1851	139. 976.	13		
1852	171. 821.	18		
1853	196. 935.	17		
1854	213. 250.	16		
1855	216. 338.	3		
1856	231. 934.	7		
1857	267. 808.	17	3.692.767.	2
1858	289. 618.	–		
1859	267 496.			
1860	304. 129.	–		
1861	334 545.	15		
1862	393 631	5		
1863	424.425.	2	2.013.845.	2

And during nine months of 1864 (change in Financial year } 406. 699

For the first nine months in 1865 the total quantity was } 631. 232

List of Incorporated Coal Companies &c. in Nova Scotia viz.

In the Island of Cape Breton

Date of Incorpn	Name	Description	Nominal Capital Dollars
1865	Bridgport Union	Coal & Iron Co.	600.000
"	Boston	"	100 000
"	Boston & Acadia	"	100.000
"	Cambridge	"	200.000
"	Caledonia	"	1,000.000
"	Cape Breton	"	250.000
"	Clyde	"	1,000.000
"	Mabon	"	250.000
1864	Block House		200.000
"	Boston & Bridgport		300.000
"	Broad Core		150.000
"	International Coal & Railway Co.		1,000.000
"	Sea Coal Bay Mining Co.		500.000
1862	Glace Bay	"	1,000.000

__Memo__: There are workings at Big Glace Bay, and Little Glace Bay but whether under the same or different Companies we are not aware.—

In addition to the above, Mines have been opened by,

Charles Campbell Esq. M.P.
Collins
G Co.
Schooner Pond Co.

Except these latter all the above have been incorporated by Legislature. The others may be working under the "Joint Stock Companies Act".—

The General Mining Association of London also carry on large works at Sydney & Lingan C. B.

In Pictou County

1865	Acadian	Coal Iron Co.	1.000.000
1864	Nova Scotia	"	1.000.000

The General Mining Associations Works are at Albion Mines New Glasgow, Picton. —

In Cumberland Co.

1860	Victoria	Coal Iron Co.	River Herbert
"	Lawrence	" " "	
1863	Maccan	Coal Co.	Maccan River
1864	Chignects	"	East Maccan
1865	Saint Georges	"	"
	R. B. Bogg	"	South Joggins

Comparative Statement
during the year

Mine	Lessee or
Albion Mines	General Minin
Sydney Mines	" "
Joggins Cumberland	Boggs
Lingan C. B	General Minin
Little Brass d'or (Collins Mine)	George L.
" Ganthro & Collins	"
"	C. J. Cam
Great Bras d'or	"
International (formerly Union) Mines	International Co
Glace Bay	Archbold & C
Clyde Mine Big Glace Bay	Alexr J. Cam
Schooner Pond	Ross Kay &
Cow Bay, Block House Mine	Belloni
" Gowrie Mine	Archibald & C
" Caledonia Mine	Wilson & Co
Mira Bay	McLeod & Tr
Little River Richmond	J. L. Marm
Sea Coal Bay	J. Campbell
North Sydney	Roach & Mc
River Hebert	Laurence C
"	Victoria Co
Macan Mines	Patrick Ward
Frasers Mines	Picton
Cape Breton Coal Co	H. N. Hyde

Statement of Coal raised from the Mines of Nova Scotia
ring the year 1863 and three quarters of 1864.

		Shipped and Sold in 1863			Twelve months ending 30th September 1864				
	Lessee or Licensee	Large 1863	Slack 1863	Total	Shipped		Raised		Total
					Large	Slack	Large	Slack	
	General Mining Association	175673	22640	198313	141363	17933	127401	20652	159296
	" " "	102785	1588	104373	55650	.	57435	3149	55654
	Boggs	4425	223	4648	4.080	915	4180	915	4.995
	General Mining Association	35907	151	36058	34.103	324	29383	.	34.420
	George L. Dix	2387	524	2.911	3.506	-	3506	-	
	"	1109	150	1.259					
	C. J. Campbell	726	79	805					
	"	3542	426	3968	5.554½	838½	5554½	838½	6.393
nes	International Co McLeod & Burchell	3699	499	4198	5766		5243	392	5.766
	Archbold & Co	26209	515	26724	43580	4848	43.580	4848	48.428
	Alexr J. Campbell	484	24	508	4023		6023		4.023
	Ross Kay & Symonds	1303	57	1.360	4930		6206		4.930
e	Belloni	15690		15,690	45315		46.000		45,315
	Archibald & Co	11.764	3306	15,070	17069	4884	17.069	4884	21.953
	Wilson & Co						162		162
	McLeod & Tracey	540		540					
	J. L. Marmand	888	211	1099	1167	210	1677		1377
							150		
	J. Campbell	219		219					
	Roach & McInnes		32	32	150		150		150
	Laurence Co	6058	3050	9108	7322		7322		7322
	Victoria Co				2020		2690		2.020
	Patrick Ward John P. Lawson				980		1300		980
	Pictou	1297	1171	2468					
	H. N. Hyde Agent						120		
		394765	34616	429351	376716½	29932½	354031½	35975½	406699

Appendix B

Report on Analysis of Coal from Main Seam, Springhill, in the County of Cumberland, Nova-Scotia.

The physical appearance of the Coal in the Main Seam is exceedingly good The Coal has a clean, cubical fracture and bright lustrous appearance, and does not make much dust in being broken. This of course will save a considerable loſs in practical working by prevention of "Small" – The appearance of the Coal throughout the whole Seam does not vary much, and considering that the Specimens examined were obtained from *the immediate outcrop of the Bed,* they may be taken to represent under the most unfavorable circumstances a Seam of great economical value

Distilled in a close Retort at a moderate heat, ammoniacal water, gas, and oil were obtained The quantity of Oil per ton is about 25 gallons; it is suitable for manufacture into lighting and lubricating Oils Grease and Paraffin

The Coke yielded was of exceedingly fine quality, being close grained, with a silvery lustre clean, and compact. The amount of Coke obtained was 65·62 per Cent of the quantity of Coal employed.

Volatile Matter	34·38
Coke (pure) .	54·74
White ash . .	10·88
	100·00

An Analysis of the Coal gave the following results: the specimens tried were pieces taken in equal quantities from every part of the Seam so that a perfect average sample was obtained

Specific gravity

Carbon	72·00
Hydrogen .	5·02
Oxygen . .	7·26
Nitrogen	1·96
Sulphur . .	·84
Water .	2·60
Ash . . .	10·88
	100·56

Analysis of Brown Hematite Iron Ore from Martins Brook, Londonderry, Nova Scotia

Peroxide of Iron	80·36
Carbonate of Lime	4·80
Carbonate of Magnesia	2·26
Silica .	4·60
Alumina	5·13
Water . . .	2·36
	99·51
Metallic Iron	56·25

Brown Hematite from Folly River

Peroxide of Iron . .	84·13
Carbonate of Lime .	4·70
Carbonate of Magnesia	1·80
Alumina, Silica .	5·20
Water	3·20
Phosphoric Acid	None
	99·03

Metallic Iron 58·90

Analyses of Red Hematite Iron Ore from River Phillip, Cumberland County, Nova Scotia

Peroxide of Iron	88.21
Carbonate of Lime	3.26
Carbonate of Magnesia	2.13
Silica	2.16
Alumina	3.26
Water	.72
	99.74

Metallic Iron 61.75

The quality of this Ore is exceedingly good, equal in yield to the best Ulverstone Ore. All the iron existed as anhydrous peroxide.

There was only a slight trace of Phosphoric Acid, no Manganese, and a very slight trace of sulphur.