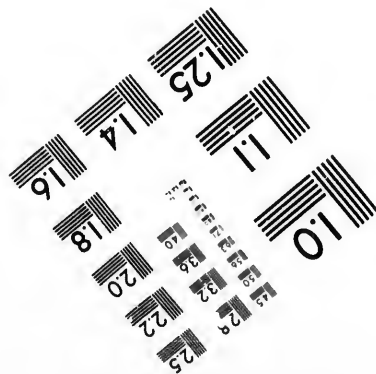
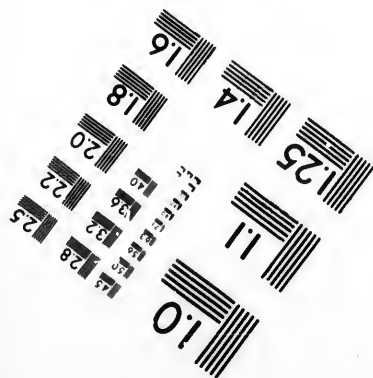
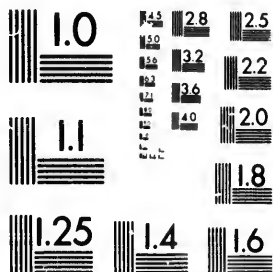


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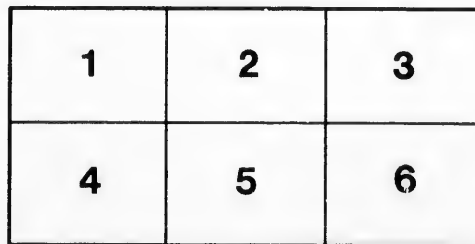
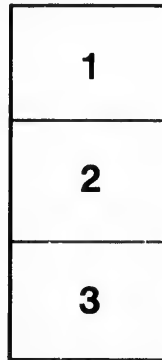
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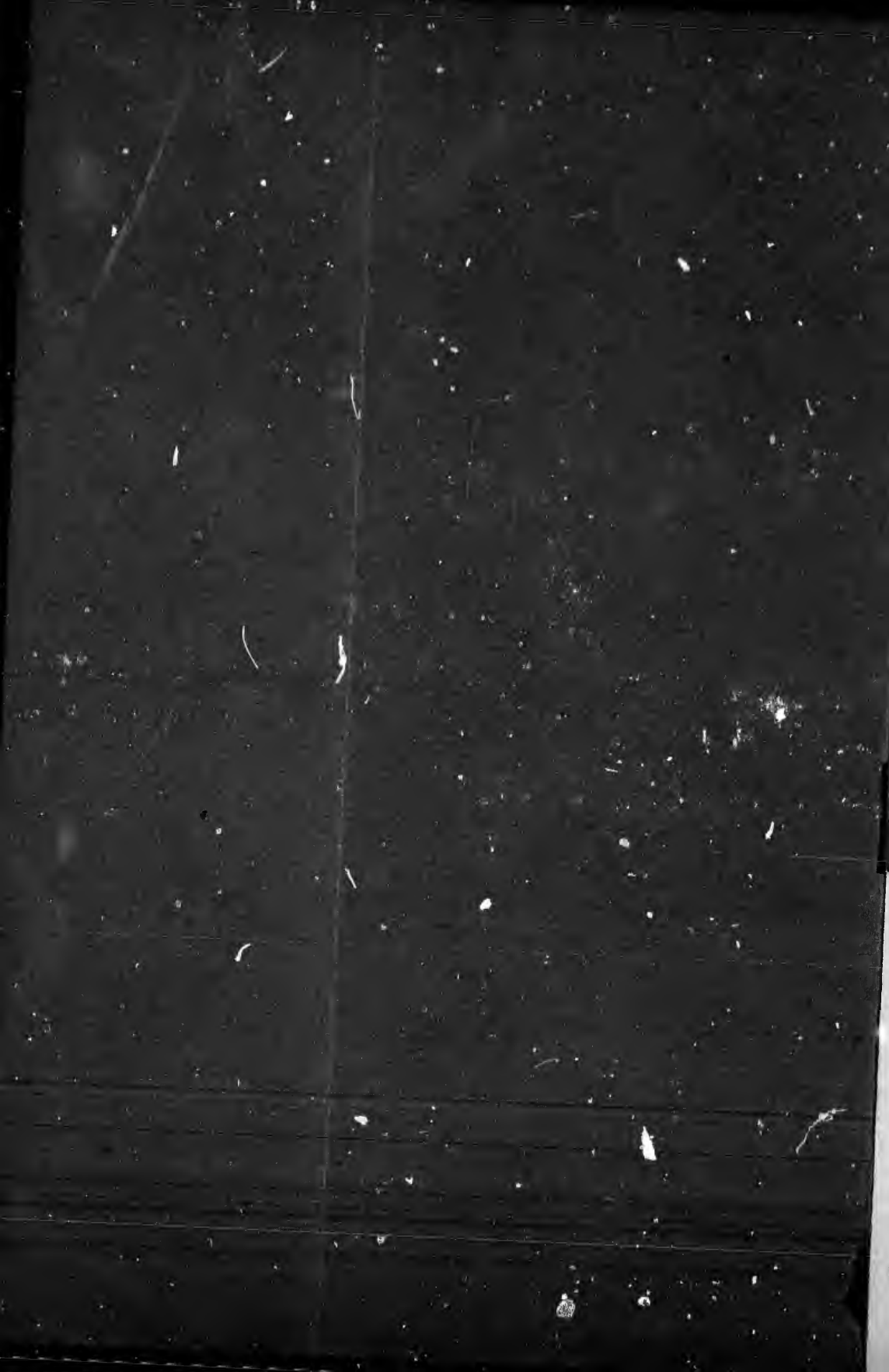
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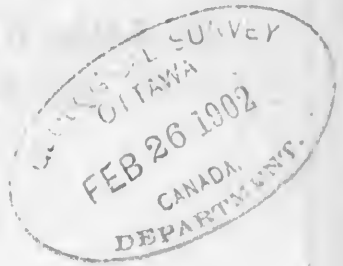
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PROFESSOR CHAPMAN'S REPORT
ON
COLLINS COAL AREA
CAPE BRETON,
1873.





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1873.

ISLAND OF CAPE BRETON



VANU
VIVRE JARDIN

REPORT
ON THE
COLLINS COAL AREA,
CAPE BRETON

In pursuance of instructions to examine and report upon the coal property in Cape Breton, known as the COLLINS COAL AREA, I visited the spot and made a careful examination of the ground. The results of my examination, including a sketch-plan and section, and analyses of the coal from two of the outcropping seams upon the property, are embodied in the following statements:

1. *Site and general description of the Property.*—The Collins Coal Area, 700 acres in extent, lies on the east bank of the Little Bras d'Or, close to the southern entrance of the latter. It is bounded on its eastern side by the property of the General Mining Association, including the well-known "Sydney Mines," and on the south by the Ingraham Coal Area. Both of these properties extend to the west shore of Sydney Harbour, distant about a mile and a-half from the Collins Area. The western and northern limits of the area range along the east bank of the Little Bras d'Or throughout a distance of about a mile and a-quarter; and a depth of about twenty feet of water is found at this point close to the shore. The ground rises inland in a series of

steps or undulations; its highest elevation at the eastern boundary being about 130 feet above the ordinary level of the "lake," the term by which this arm of the sea is commonly designated. Several good seams of coal, referred to in detail in the following section, outcrop on the shore of the lake, and the outcrop is easily followed, in the more important seams, in a curved direction running roughly north and south throughout the property, as shewn in the accompanying plan.

2. *Coal seams on the Property.*—The three principal seams of coal which outcrop on the Collins Area, are known, in descending order as the Edwards seam, the Three-foot seam, and the Collins seam. These are followed by five other seams at present of undetermined thickness, but probably in no case exceeding three or four feet. Another seam apparently exceeding five feet in thickness, and consequently of good workable dimensions, crops out a few yards beyond the south-western limits of the area; and as all the seams here have a general easterly dip or underlie, it must necessarily extend beneath the entire property.

The Edwards seam, the highest and most easterly of these seams, is said to average 5 feet in thickness but in one of the trial pits, in which I measured it, the thickness was nearly 6 feet. It dips easterly at an angle of from 5 to 6 degrees, equivalent to 1 in 10. Between its undulating line of outcrop and the eastern boundary of the property, a space of about 155 acres is included. Taking the specific gravity of the coal, as found by my trials, to equal 1.268, and assuming the average workable dimensions of the seam to equal 5 feet only, the amount of coal in the portion of the seam underlying the property will be equivalent to 1,205,680 tons.

The Three-foot seam is at present entirely undeveloped, but it can easily be traced across the property, and it is thought to be identical with the Matheson seam on the other side of the Bras d'Or. The area between its outcrop and the eastern boundary of the property, towards which it dips, is

probably not far short of 250 acres. It must contain, therefore, within these limits about 1,166,786 tons.

The Collins seam varies from 5 to nearly 6 feet in thickness, and may fairly be assumed to equal 5 feet. It underlies, from its more westerly position, a much larger proportion of the property than either of the above seams, and includes at a fair estimate about 380 acres. It must contain, therefore, 2,955,858 tons of coal. Like the Edwards and other seams on the property, it dips towards the east at a general inclination of 1 in 10. A shaft has been sunk in connection with this seam to a depth of between 70 and 80 feet, at about 10 chains within its outcrop, close to the outcrop of the Three-foot seam; and a slope has been carried from the outcrop about 100 yards in the direction of the shaft. From this slope, a considerable quantity of coal (stated at 25,000 tons) was extracted and sold in Boston and other markets.

The seams which lie beneath the above, and outcrop upon the property, will not probably be found of any great account, at least until the stronger seams come to be worked out in the course of years; but the comparatively large seam of 5 feet or more in thickness which crops out just beyond the south-westerly limit of the Collins Area, and passes entirely under the property, must contain nearly five and a-half millions of tons, or strictly, 5,445,000 tons. This seam is probably identical with a five feet seam which strikes the shore of Sydney Harbour a few chains north of the North Bar.

3. *Quality of the Coal.*—The coal from the above seams is an ordinary bituminous coal of good quality. The only samples at present obtainable are merely outcrop samples but these shew good results on analysis, and it may be fairly concluded, therefore, that when the seams are worked at lower depths a very superior coal will be produced. The sample from the Edwards seam, submitted to analysis, I took from the bottom of one of the trial pits sunk close to the outcrop; and the sample from the Collins seam I col-

lected from the end of an old level or slope which has been driven upon the seam to a length of about 100 yards to connect with a shaft sunk to a depth of 70 feet at some distance east of the outcrop of the seam. Whilst in this slope, I examined the sides and pillars every here and there with the lamp for the detection of pyrites, but saw very little. The coal from trial pits on the Edwards seam (one of which is down about 20 feet) appears also to be very free from pyrites. Both of these coals burn with a long flame, and yield a semi-fused agglutinated coke, amounting to between 63 and 64 per cent. of the weight of the air-dried coal. The following are the results of my analyses:

	(1) From the Edwards seam: sp. gr. = 1.238.	(2) From the Collins seam: sp. gr. = 1.271.
Moisture	1.82	1.63
Volatile Combustible Matter.....	34.94	35.12
Fixed Carbon.....	56.97	57.10
Sulphur.....	trace.
Ash.....	6.27	6.06
	100.00	100.00

4. *Mode of winning the Coal upon the property.*—The greater portion of the coal in the Edwards seam, and a large portion of that in the Three-feet and Collins seams, might be removed by means of levels driven from the high bank of the Bras d'Or; but a more satisfactory mode of winning the coal, and in the end, I think, a cheaper mode, would be to sink a deep shaft near the eastern boundary of the property, and to carry, from this, slopes along the rise of each of the workable seams. All the water could be led into the sump of this shaft; and from the mouth of the shaft a double tramway of 40 chains in length might be easily constructed to connect with the short tramway already on the ground, by which the loaded cars could be run down by gravity to the wharf, and the empty cars drawn up simultaneously. Whilst the shaft was in progress, it would be advisable to utilize the present shaft and slope in getting out coal from the higher portion of the Collins seam. A depth of 20 feet of water occurs quite

close to the shore. The proposed new shaft would strike the Edwards seam at a depth of about 90 feet, the Three-foot seam at about 150 feet, and the Collins seam at from 260 to 270 feet. These depths in coal mining are comparatively insignificant. When once the shaft was established, and proper lifting and pumping gear connected with it, a very large annual output from the three seams might be safely calculated upon. If sufficient labor could be obtained, there should be no difficulty in raising at least 125,000 to 130,000 tons from the combined seams.

5. *Shipping facilities.*—Probably few coal properties in Cape Breton offer better facilities for shipping than the Collins Area. All the coal could be conveniently run, either from adits or from the proposed shaft described in the preceding section, to a wharf on the Bras d'Or, where vessels of twenty feet draught could be alongside and load. These vessels could then round the southern extremity of Boulardrie Island, and so pass down the Great Bras d'Or into the Atlantic Ocean; or they might sail up the Lake, and pass by the St. Peter's Canal into the Gut of Canso, directly. A shoal near the mouth of the Little Bras d'Or prevents vessels drawing more than nine feet from passing into the Atlantic by that passage, but a Government grant for dredging this entrance has already been obtained. The combined cost of mining, raising, and loading the coal of the Collins Area, ought not certainly to exceed a dollar and a-quarter per ton.

since
removed
20 feet
water

6. *General Conclusions.*—The leading features of the Collins Area may be briefly summarized as follows:—

The property comprises 700 acres, and is situated on the east bank of the southern entrance to the Little Bras d'Or, with 20 feet of water immediately adjacent to its loading ground.

Three workable seams of good quality coal outcrop upon the property, and underlie a considerable portion of its area. These united seams carry very nearly $5\frac{1}{2}$ millions of tons. They admit of being economically worked, either by adits, or

by a main shaft striking the undercrop of each seam at a comparatively moderate depth, as explained in Sec. 4 of this Report.

Five other seams, some of which, when more fully explored, may prove workable, underlie the above: and the entire area is underlaid by a somewhat deeper seam, not yet thoroughly explored, but estimated at 5 feet in thickness, and consequently containing beneath the limits of the property upwards of 5 millions of tons.

As explained in the Report, the raised coal can be run down by gravity upon a short tramway to the water side and shipped with great facility.

A sum of from \$30,000 to \$35,000 would be amply sufficient to sink the main shaft, provide hoisting and pumping machinery, complete tramway and wharf, put up boarding-house and forge, etc., and generally start the mine. The large output which must necessarily then result would soon repay this sum, and yield a large interest on the capital invested in the purchase of the ground.

E. J. CHAPMAN, PH. D.,

*Professor of Mineralogy and Geology in University College, Toronto,
and Consulting Mining Engineer.*

