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PAPER 43-14

ST. ROSE-CHIMNEY CORNER COALFIELD, INVERNESS COUNTY, CAPE BRETON ISLAND, NOVA SCOTIA

(Report and Two Maps)

BY

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W. A. Bell

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THE ST. ROSE-CHIMNEY CORNER COALFIELD
INVERNESS COUNTY, NOVA SCOTIA

LOCATION AND AREA

The St. Rose-Chimney Corner coalfield is the most northerly of a number of small, separate coalfields that fringe the western shore of Cape Breton Island. Chimney Corner, where the coal seams all strike under the Gulf of St. Lawrence, is about 13 miles in a direct line from Inverness, the nearest railhead; St. Rose is about 10 miles distant from the same railhead. Cheticamp, which has the nearest harbourage for ocean-going vessels, is about 17 miles northward from Chimney Corner.

The width of the coal-bearing land area varies from 1.2 miles, at St. Rose in the south, to 0.2 miles at Chimney Corner in the north. There is no submarine coal in the St. Rose part of the field, but in the Chimney Corner area a submarine coal-bearing area at least 1½ miles long has an unknown breadth seaward. The separation of the field into St. Rose and Chimney Corner areas is due to an intervening barren tract inferred to be 1½ miles long; in the greater part of this central area, structural disturbances have led to the loss of the coal through erosion.

STRATIGRAPHY

The succession of strata in the St. Rose-Chimney Corner coalfield is as follows:

Age	Formation	Lithology	Thickness Feet
Upper Carboniferous	Riversdale group	Zones of generally fine-grained, grey sandstones, several hundred feet thick, alternating with grey, dark grey, and brownish red shales and siltstones; red beds more abundant and thicker in lower part; coal-bearing zone near top.	8,000+
	--Disconformity--		
	Canso group	Grey, dark grey and brownish red shales, siltstones, and thin red and grey sandstones; calcareous bands sparingly present in ribbon-banded shales in lower part.	1,500+
	--Fault Contact or Disconformity--		
Lower Carboniferous	Windsor group	Red shales, siltstones, mudstones, grey limestone, calcareous shale, gypsum, and anhydrite.	?

Windsor Group

In the coalfield proper the Windsor Group is restricted to a narrow strip, a mile long, on the shore of the St. Rose area (See Figure 2). It is an upfaulted block with scattered outcrops of gypsum associated with red mudstones and lesser amounts of light brownish grey dolomite or limestone. Much of the gypsum has small crystals of selenite. The strata of the group are here too disturbed and poorly exposed to permit a determination of their sequence. At the southwestern end of this strip the contact with younger strata is concealed. At the northeastern end the group is in fault-contact with nearly vertical Canso beds. A thick fault-breccia of gypsum, calcareous shale and grey and red shale, cut by numerous veinlets of gypsum, marks the contact-zone.

Windsor strata are also exposed on the shore in both limbs of a synclinal fold that is the main structural feature of the larger area embracing the coalfield (See Figure 1). On the east limb of the syncline ribbon-banded, grey gypsum outcrops on the shore 1,000 feet north of Margaree Beach (Figure 1a). To the north it is seemingly faulted against red mudstone and siltstone. The latter beds occur for 700 feet in scattered outcrops, and include near their base a poorly exposed, fetid, dark grey, earthy and partly oolitic limestone, so they are probably of Windsor age. Farther north they are faulted against red beds that include a band of grey shale containing Leaia, Estheria, and small Anthracomya, and these shales apparently belong to a narrow fault-block of Canso strata, interpolated between beds of the Windsor and Riversdale groups. Windsor beds may be in contact with those of the Riversdale group in this Margaree Harbour area, but if so, the contact is concealed under the sea. It may be a fault, but more probably is an unconformity.

Windsor strata of the western limb of the major synclinal fold are exposed on the shore about 1 to 1½ miles northeast of Inverness (Figure 1c). They form an upfaulted block lying between Canso strata on the northeast and beds of the Broad Cove formation (Upper Pennsylvanian or (?) Permian) on the southwest. Vertical movement on the southeastern fault appears to have been slight; although there is a narrow fault gouge about 2 feet wide, the highest Windsor beds are gypsum and red shale lying upon Schizodus-bearing dolomitic limestone that elsewhere in the region is the youngest limestone member of the Windsor group. But upward movement of the Windsor beds relative to the Broad Cove formation along the other fault was very great, as the whole of the Inverness formation has been faulted down at this locality.

The Windsor beds of the fault-block itself are cut by minor faults, evidenced by a repetition in outcrop of the limestone beds. The general sequence is decipherable, although thicknesses of the shale and gypsum beds are questionable. In descending order the succession is as follows:

	Feet
Red and some greenish grey siltstone and mudstone	?
Gypsum	? 150±
Dolomitic, partly oolitic, grey, Schizodus-bearing limestone	35
Greenish grey siltstone	12

	Feet
Red mudstone and argillo-arenaceous shale..... ?	350 ±
Gypsum..... ?	75±
Grey, partly oolitic, Martinia-bearing limestone.	37
Red mudstone, thin sandstone, and siltstone.....	?

Canso Group

Canso beds adjoin Windsor strata at all the localities mentioned above. They are best exposed in the Broad Cove area on the shore northeast of Inverness (Figure 1c). The strata comprise brownish red, grey, and dark grey shales, siltstones, and mudstones, with thin beds of red and grey sandstones. The grey shales are commonly silty and ribbon-banded, and include, particularly in the lower part of the formation, thin limestone or calcareous bands commonly less than a foot thick. The grey sandstones are fine-grained like those of the Riversdale group, but individual members are less than 50 feet thick, commonly much less, and drift plants contained in them are generally finely broken, although larger fragments of Calamites are sparingly present. Occasionally green, cupric carbonate stains are seen on some of the plant drift. Leaia and Estheria are present in a few grey shale beds. The total computed thickness of these Canso beds is about 1,500 feet. Their contact with Windsor beds appears to be along a fault, although as already stated there is little evidence of any important vertical displacement. As the Canso beds are apparently non-marine, it is probable that they were deposited disconformably upon Windsor beds. The contact with overlying Riversdale beds is not marked lithologically, although, as a whole, the two groups are well differentiated. It is placed, arbitrarily, at the base of a grey sandstone that is more than 50 feet thick and that bears a closer lithological resemblance to the Riversdale sandstones above it than to Canso grey sandstones below. As thus defined the top beds of the Canso, mainly red shale, include a grey band, about 40 feet below the inferred contact, carrying a small species of Leaia.

On the shore at St. Rose, in the central part of the coalfield, Canso strata are exposed immediately northeast of Windsor gypsum beds (Figures 1b and 2). A breccia, 50 feet or more wide, separates them, and the contact is inferred to be a fault. The Canso, of which about 600 feet are exposed, comprises red and grey shales and a few grey siltstones or fine sandstones. The grey shales are commonly ribbon-banded and Leaia occurs in some. The contact of these beds with the Riversdale is a disconformity, and is inferred to lie at the base of the lowermost, thick grey sandstone.

Canso beds exposed on the shore north of Margaree Beach, between gypsum, red shale, and limestone of Windsor age and thick grey sandstone of the Riversdale group, seemingly belong to an intervening narrow fault-block (Figure 1a). Perhaps not more than 100 feet, mainly red shale, is represented; it includes a grey band with Leaia, Estheria, and Anthracomya. The uncertainty about the true thickness is due to poor exposures and the difficulty of differentiating between red beds of the Canso and those of the Windsor. The fault between the Canso beds and the Riversdale has apparently involved little vertical displacement and the two groups where unfaulted are probably disconformable.

The above Canso beds all agree in lithology and fossil content with the Mabou formation of the Lake Ainslie map-area[1] and are

[1] Norman, G. W. H.: Geol. Surv. Canada, Mem. 177, p. 43 (1935).

correlated with that formation.

Riversdale Group

Riversdale strata occupy the whole shoreline from Margaree Harbour to Broad Cove, except for a length of about 2 miles in the St. Rose area where the Canso and Windsor groups outcrop. They are folded in a snycline of which the axial region in the St. Rose area is broken by faults. The axial trend is presumed to be about north-northeast. In the eastern limb the computed thickness of sediment is a little over 8,000 feet. In the western limb about 4,250 feet are exposed between the Canso contact and Marsh Point (see Figure 1c). Northeast of Marsh Point the strata for 3,000 feet along the shore are disturbed by faults, and their position within the group is doubtful. For another 2,400 feet northeast the strata are concealed. Beyond this concealed interval 2,950 feet of strata are exposed, but a second concealed interval then separates these beds from an inferred fault-contact with the Windsor group. As nearly 7,200 feet of strata are exposed and accounted for in the western limb of the syncline, additional strata that may be represented in the concealed and faulted areas need not exceed the 800 feet necessary to balance this limb with that to the east, providing of course, sedimentation was generally uniform in thickness over the whole area.

The Riversdale group of this area comprises an alternation of thick grey sandstone "flood-zones" and zones of brownish red and grey shales and mudstones. Red members are thicker and more abundant in the lower half of the group, and more so in the area of the western than in the eastern limb of the syncline. Current ripples are not abundant, the majority indicating currents from southeast to east-southeast. In general there is an absence of marked crossbedding, but moderate current-action is evidenced by channelling of sandstone into shales. A very common feature of the thicker sandstone zones is the presence within them of partly enclosed masses of greenish grey, silty shale, up to 15 or 20 feet thick. The top surface of these shales is channelled by the sandstone. They seemingly represent interruptions in the flood-deposit of sandstone sufficiently long for depressions and channels in the sand-flats to be filled with silty sediment deposited by the stream or streams under less flooded conditions. Lenticular patches of intraformational conglomerate, chiefly made up of pebbles or fragments of concretionary ironstone, are present in some of the sandstones, although seldom a marked feature. The sandstones near the top of the group are somewhat coarser than those below, and might be classed as medium-grained. A characteristic feature of most of the sandstones is the presence of abundant coarse plant debris, commonly coalized, including Calamites, Lepidodendra (not abundant), Artisia, and petrified logs (Cordioxylon). Only a single upright tree was noted, although Stigmarial soil-beds are sparingly present. Coal seams are very thin and rare except in a single coal-bearing member, not over 500 feet thick, that lies towards the top of the group. The majority of the dark grey shale zones include beds carrying small naiaditiform Anthracomya (Anthracanauta) or Naiadites of the N. modiolaris group. These shell-beds are particularly abundant in the upper half of the Riversdale, especially throughout 1,800 feet of strata exposed on the shore between the St. Rose area and Marsh Point.

Insufficient evidence was gathered for zoning the Riversdale group on the basis of its fossil content. The flora includes

Rhodea cf. sparsa Kidston, Rhodea laqueata Bell, Sphenopteris licens Bell, Sphenopteris minuscula Bell, Sphenopteris amoenaeformis ? Kidston, Mariopteris acuta (Brongniart), Neuropteris smithsi Lesquereux, Whittleseya desiderata D. White, Alethepteris decurrens (Artis), Sphenophyllum cuneifolium (Sternberg). The age represented by this assemblage is considered to be Westphalian A of the European chronology.

STRUCTURE

The St. Rose-Chimney Corner coalfield lies structurally in the axial region of a north-northeasterly trending syncline. This axial area, however, has been disturbed by an upthrust of gypsum of the Windsor group and by several other faults. It is difficult, therefore, to define the locus of the synclinal axis closely. Striking northwards from the St. Rose area for about 7,200 feet, it is apparently offset by faulting to a submarine position, and extends seaward an unknown distance from the shore of the Chimney Corner coal area.

The position of the fault along which the Windsor gypsum has been upthrust is assumed to be a short distance inland and nearly parallel to the shore. This assumption would carry the fault in a northeast direction to near the mouth of Neil MacLeod Brook (Figure 2). But the only evidence of a major fault in this vicinity is on the shore about 100 yards west-northwest of the brook mouth, and this fault must trend about north 6 degrees west. It is inferred, therefore, that the fault limiting the gypsum passes northeasterly into Canso and Riversdale strata and is deflected seaward before reaching Neil MacLeod Brook. In its further seaward extension it not improbably forms the terminus of the two other major faults of this area. These latter occur on the shore at distances 4,100 and 6,800 feet respectively north-northeasterly from the mouth of the brook. Between them is a down-faulted block of Riversdale strata, and as those strata should be younger than the coal-bearing member, the area of this fault-block should be underlain by the coal seams. The trend of the two faults is inferred to be about north 68 degrees east and north 77 degrees east respectively.

The stratigraphic effects of the remaining major faults have already been noted, and they are too distant from the coalfield to require detailed discussion. The nearest are two that lie northeast of Marsh Point. They apparently trend about 18 degrees south of east, have downthrows on their northern sides, and thus define between them a tilted block of Riversdale strata about 2,000 feet wide.

GLACIAL MOVEMENT

In the boulder clay that overlies the gypsum of the St. Rose area of the coalfield and that extends northeastward to the cove at the mouth of Neil MacLeod Brook are abundant smoothed fragments of coal. Were these derived from an unknown submarine body of coal or from the known St. Rose coal area? The general direction of ice movement in this part of Cape Breton Island has been considered to be southeasterly to easterly[1], which would suggest that the coal

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[1] Goldthwait, J. W.: Geol. Surv., Canada, Map No. 2006.
Norman, G. W. H.: Ibid., Mem. 177, p. 62.

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fragments were derived from a submarine area. But Norman drew attention to an anomalous northward movement of drift in the Lake Ainslie district only 12 miles south of the St. Rose area. Coal fragments in the boulder clay were only noted on the shore for $1\frac{3}{4}$ miles southwest of the mouth of Neil MacLeod Brook, or precisely in a segment of coastline lying northwest of the St. Rose coal area. If the coal were

derived from the St. Rose area, its movement would be limited to an arc of about 63 degrees, lying between azimuths north 26 degrees west and north 37 degrees east. In the whole area examined glacial striae were observed at only four localities. At two of these the striae ran about east-west. At the third locality two sets of striae were noted, one set running about south 20 degrees west-north 20 degrees east and the second set about north-south. At the fourth locality striae ran in a direction north by east. Hence the striae at both the third and fourth localities permit derivation of the coal fragments from the known St. Rose area providing the glacial movement was northward and not southward. The distribution of the coal drift at the northern edge of the St. Rose area makes such a local movement of drift highly probable.

COAL

As stated in the stratigraphic section of this report, all of the economically important coal seams are confined to a member near the top of the Riversdale group. This member is about 500 feet thick at Chimney Corner. It is overlain definitely by 330 feet of sediments, and probably additional younger beds, inferred to be at least 600 feet thick, occur in the down-faulted block lying south-southwest of the Chimney Corner area.

Chimney Corner Area

The Chimney Corner coal area extends from the Gulf of St. Lawrence, at Chimney Corner, south-southwest for about a mile and has a mean width on land of about 1,100 feet (Figure 2). The land area thus enclosed is a little less than $\frac{1}{4}$ square mile. To the southwest it is in contact with a down-faulted block which is about $\frac{1}{2}$ mile wide. Although this block represents an additional part of the coalfield, nothing is known of the attitude of its strata inland from the shore, and it is excluded from consideration in estimates of coal reserves of the area. The coal-bearing strata and coal seams of this member are now for the most part poorly exposed in the cliffs at Chimney Corner. This is probably largely due to early mining explorations. The following succession as reconstructed by the writer, must therefore, be considered only an approximation to the true sequence. R. Brown[1] and H. Fletcher[2] previously published a section made by

[1]Coal Fields and Coal Trade of the Island of Cape Breton, p. 40 (1871).

[2]Geol. Surv., Canada, Rept. of Prog. 1882-84, p. 75H (1885).

H. Y. Hind, and recently G. V. Douglas and N. R. Goodman[3] published

[3]Nova Scotia Dept. Mines, Ann. Rept. 1941, p. 71 (1942).

a detailed section of measures that include the coal beds.

Section at Chimney Corner
(in descending order)

	Thickness in Feet
Sandstone, grey, in part massive, in part shaly; purplish spots on many bedding planes; lenticular pockets or filled channels of grey, argillo-arenaceous stone or siltstone.....	50±

	Thickness in Feet	
Coal (= No. 1 ? seam of St. Rose area; a 4-inch shale parting in middle)	1.7	
Shale, grey arenaceous, and dark grey, argillaceous, with thin coaly and carbonaceous laminae in basal part	22 ±	
Coal and splint (several clay partings and totalling only about 1 foot of clean coal)	2.5	
Shale, grey and dark grey, arenaceous and argillaceous, with coaly and carbonaceous laminae near top	38 ±	
Sandstone, grey, fine-to medium-grained, outcropping at Chimney Point	50 ±	
Shale, blackish grey, argillaceous, with small Anthraconauta, Spirorbis, ostracoda	6	
Shale, carbonaceous and argillaceous	0.9	
Coal (impure)	0.5	
Shale, grey, argillo-arenaceous and arenaceous	24 ±	
Shale, calcareous, areno-argillaceous, with abundant small Anthraconauta, ostracoda, etc.	1.4	
Sandstone, grey, with argillo-arenaceous shale and silty mudstone	28 ±	
Coal and carbonaceous shale	0.3	
Clay, light and dark grey; dark grey shale with ostracoda and small shells	1.9	
	177.2	177 ±
Coal (= No. 2 seam of the St. Rose area; bed No. 3 of Hind's section)		3
Strata, poorly exposed, including brownish red and grey siltstone, and at base argillo-arenaceous shale with ironstone nodules	44 ±	
Coal and carbonaceous shale	0.4	
Strata, poorly exposed, including grey sandstone at top and grey, areno-argillaceous shale with ironstone nodules at base	46±	
	90.4	90 ±

Coal (= No. 4 seam of St. Rose area; bed No. 5 or main seam of Hind's section) comprising:

Coal	1.1
Clay	0.3
Coal	0.15
Clay	0.15
Coal	0.45
Clay	0.10

Coal	1.60	
Clay	0.40	
Coal	0.30	
Clay	0.15	
Coal	0.10	
	4.8	4.8
Strata, mostly concealed, but in part thin grey sandstone	24±	
Clay and carbonaceous shale	0.5	
Coal	0.6	
Clay	0.4	
Coal	0.5	
Strata, partly concealed, including grey, areno-argillaceous shale	25±	
Coal and carbonaceous shale	0.7	
Clay	0.1	
Coal	1.1	
Clay	0.15	
Coal	0.45	
Strata, poorly exposed; in part thin grey sandstone, argillo-arenaceous shale, and dark, argillaceous shales with fossil shells	116±	
	169.5±	170±
Coal (= No. 5 seam of St. Rose area; bed No. 7 of Hind's section), not exposed, but assumed to be		3.5±

Assuming 3 feet of coal relatively free of injurious partings as a minimum workable thickness in such highly dipping measures, only two seams of the above section are considered to be economically important under present conditions. These seams are respectively 3 and 3.5 feet thick, and are correlated by the writer with seams 2 and 5 of the St. Rose area.

If the composition of the 4.8 foot seam, which is here correlated with No. 4 seam of the St. Rose area, is actually like that measured, it has evidently too many clay partings to be economically workable. Where seen by the writer, the seam was badly weathered, poorly exposed, and not positively in place in the face of the cliff. The section of the seam presented by Douglas and Goodman (op. cit.) is certainly quite different in details, but it presents a similar picture of a seam of coal broken by numerous clay partings. Yet this was seemingly the main seam that was worked prior to 1873, although the total production was probably not over 10,000 tons.[1] This was partly due to destruction of surface buildings,

[1] Mr. G. V. Evans, owner and operator of the present St. Rose mine, informed the writer that, in his opinion, No. 7 bed of Hind's section provided the greater part of the 10,000 tons.

including miners' dwelling, by fire in 1873, and partly no doubt to inadequate shipping facilities.

In 1919 a slope was started on the lowermost seam, considered in this report to be No. 5 of the St. Rose area. The mine, known as the Chimney Corner mine, lay about 1,000 feet inland from the nearest point on the shore, and at an elevation of 62 feet above mean high water. It was operated first by S. J. Doucet, and in the following 2 years by A. W. Chisholm. The slope ran about south 60 degrees west and was inclined 37½ degrees at nearly 45 degrees left of the true dip. The seam was stated to be 3.5 feet thick. Production did not exceed several thousand tons.

The seams at Chimney Corner are known to extend inland along a ridge of high ground for a distance of a mile. This ridge roughly parallels the shore and rises to elevations of 200 to 350 feet. The coal seams probably extend south-southeasterly another 1,000 feet before being cut off and offset in the down-faulted block already noted. In 1937 one of the seams was opened at an elevation of 199 feet by a slope lying 3,600 feet south by west of the Chimney Corner mine. This seam is considered by the writer to be the same as that of the Chimney Corner mine, or No. 5 of the St. Rose area. The slope was driven in a direction about north 29 degrees west, at an inclination of 23 degrees or nearly 45 degrees right of the true dip, which is here about 33 degrees. At the surface the seam was measured by the writer and was found to consist of 2.6 feet of coal overlain by 0.4 foot of clay and splint, with a roof of dark, shell-bearing shale. An overlying seam, considered to be No. 4 of this report, was opened up 165 feet about west by south of the slope at an elevation of 244 feet, and was found to contain 2.5 feet of impure coal. The stratigraphic interval between the two seams was calculated to be about 158 feet, as compared with an estimated distance of 170 feet between the supposedly equivalent seams at Chimney Corner.

St. Rose Area

The St. Rose area of the coalfield lies between the northern branch of Neil MacLeod Brook and John MacLeod Brook (See Figure 2). Eastward the coal-bearing area does not reach more than half a mile from the Dunvegan-Margaree Harbour road. Westward it is limited by a fault that runs nearly parallel to, and probably within a quarter of a mile of the shore of the Gulf of St. Lawrence. The area thus enclosed is roughly about 1 square mile and is covered with drift up to 50 feet or more thick. The few scattered outcrops that may be seen on the branches of John MacLeod Brook and on Neil MacLeod Brook indicate a synclinal basin, with the strata dipping generally from 17 to 30 degrees. The basin structure is due, primarily, to the synclinal folding of the Riversdale group in the larger area extending from Broad Cove, near Inverness, to Margaree Harbour, the St. Rose area being a part of its axial region. But the fault that has upthrust gypsum of the Windsor group immediately west of the St. Rose coal area has apparently disturbed the simple major structure, possibly resulting in a secondary closed syncline in the St. Rose area. Such an interpretation was made by A. O. Hayes.[1] As the beds in the southern

[1]Geol. Surv., Canada, Sum. Rept. 1918, pt. F, Fig. 1, p. 9 (1919)

border of the St. Rose area, however, strike towards the shore, nearly parallel to the beds in the western limb of the main syncline, it is doubtful whether farther west they were deflected northward parallel to the fault to form a closed secondary structure. At present, therefore, it is expedient to consider the coalfield as mainly confined to area A of the accompanying sketch map (Figure 2).

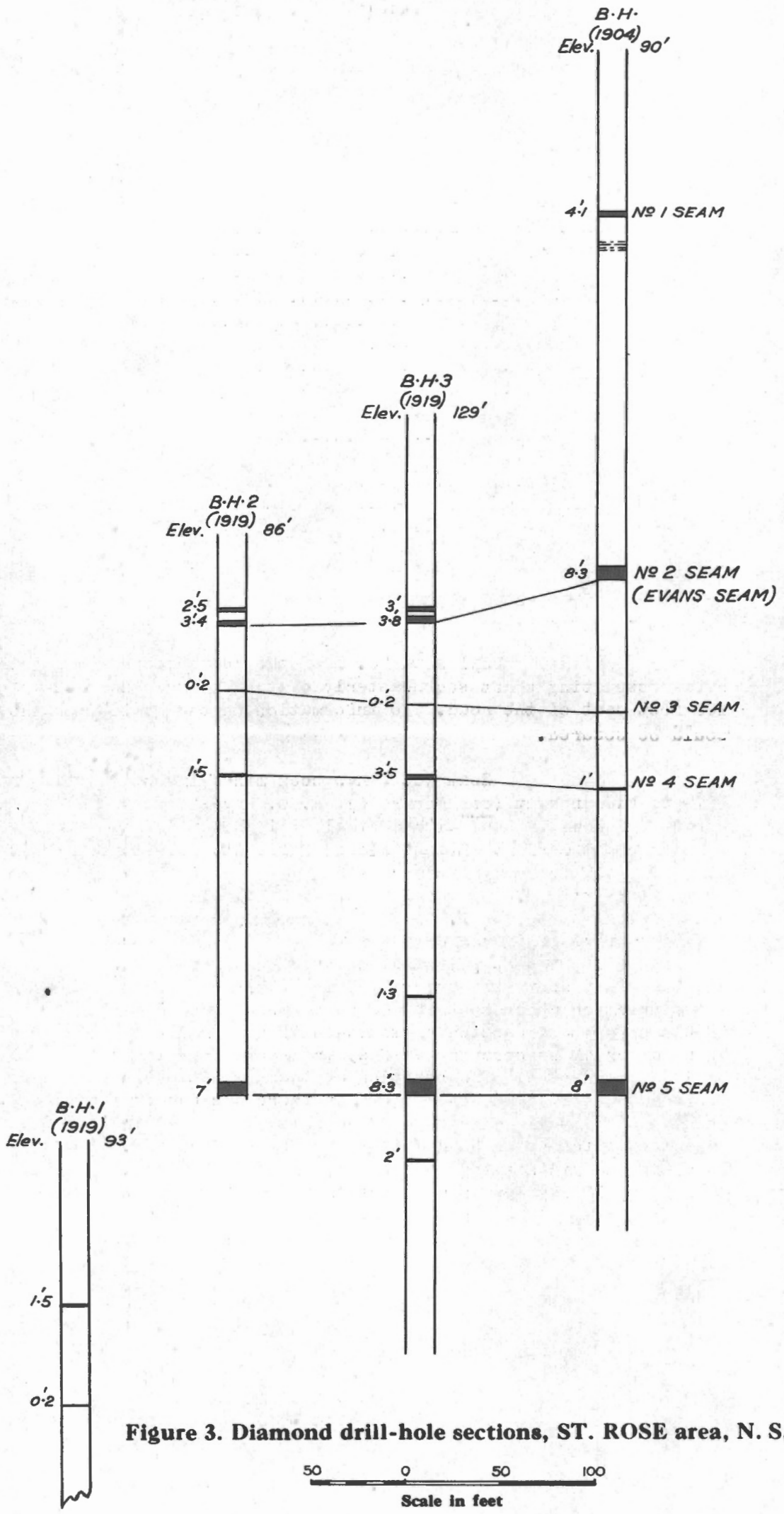

Figure 3. Diamond drill-hole sections, ST. ROSE area, N. S.

Sections of the strata of the area are presented by four diamond drill holes, one put down in 1904, the other three in 1919. Their record is recorded diagrammatically in Figure 3, and the St. Rose borehole of 1904 is chosen to designate the succession of seams, which for purpose of reference are numbered from 1 to 5, as follows:

	Thickness in Feet
Glacial drift.....	63
Strata.....	26
Coal (No. 1 seam).....	4
Strata.....	12
Coaly shale.....	6.5
Strata.....	172
Coal (No. 2 seam), dirty.....	8.3
Strata.....	71
Coaly matter (No. 3 seam).....	0.4
Strata.....	41
Coal and shale (No. 4 seam).....	2
Strata.....	160
Coal (No. 5 seam).....	8
Strata.....	74

Additional older strata were cut by borehole 1 of 1919 and showed 1.5 feet of coal lying presumably about 200 feet stratigraphically below No. 5 coal seam.

Coal seam No. 1 of the above section was opened by a prospecting shaft southeasterly of the St. Rose borehole, and about 100 feet east of the road. No information on the quality of the seam could be secured.

Seam No. 2 has been mined intermittently from 1916 to the present (See Figure 4). A. O. Hayes (op. cit) records 5 feet 2 inches of coal with a single $\frac{1}{4}$ inch parting lying 1 foot 8 inches from the roof. Evans' slope of the St. Rose mine on this seam is inclined about 17 degrees on the true dip in a direction about north 71 degrees west or northwest magnetic. The seam was traced by hand borings north for 1,600 feet where it was found to curve west. This curvature is in conformity with the evidence presented by an outcrop of light grey siltstone on a branch of Neil MacLeod Brook, about 75 feet above the bridge. This siltstone dips 23 degrees in a direction about south 30 degrees west. The seam has been proved in the opposite direction or south-southwest from the St. Rose mine by a number of prospecting shafts, from some of which considerable coal was extracted. The position of those shafts lying south of Neil MacLeod Brook indicate that the seam there has curved westwardly. A pronounced westerly curvature of underlying beds is indicated by sandstone outcrops on John MacLeod Brook near the Dunvegan-Margaree road, in the vicinity of borehole 1, put down in 1919. This sandstone dips 24 to 30 degrees in a direction about north 23 degrees east. The records of boreholes 2 and 3, in which the strata were found to dip only 10 degrees, apparently indicate that the seam continues to dip northward without further deflection, and it seems probable that the coal at one time opened up lower down on John MacLeod Brook belongs to this seam. The coal was stated by Fletcher to be 3 feet thick, but no information could be secured by the writer as to its true dip or strike.

Coal seam No. 3 is thin in all the boreholes cutting it, and may be dismissed as an economic seam.

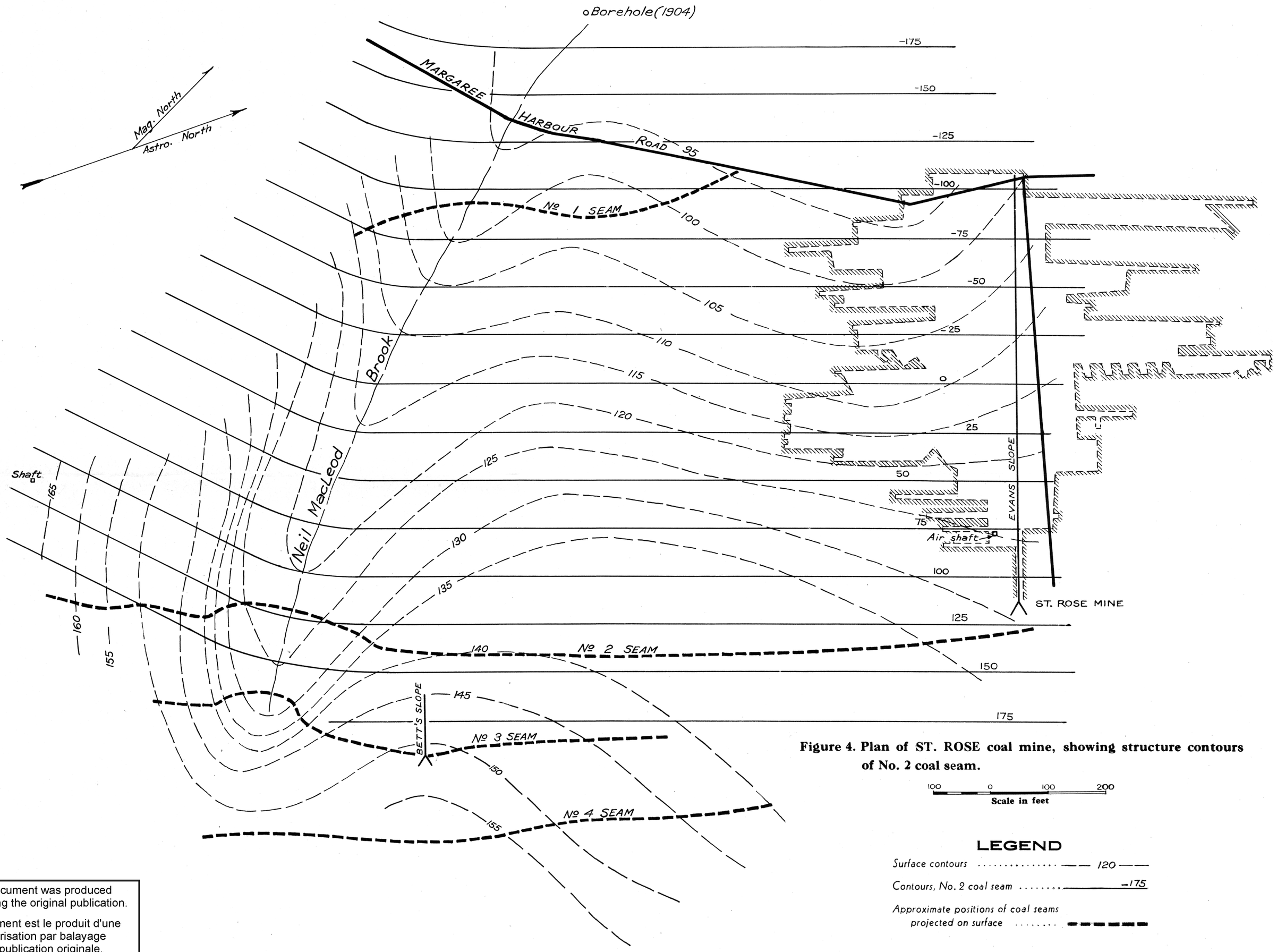

Figure 4. Plan of ST. ROSE coal mine, showing structure contours of No. 2 coal seam.

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Seam No. 4 as cut by the boreholes varies from 1.5 to 3.5 feet thick. If the quality of coal is good, it might locally be worked in conjunction with the underlying seam, and cannot, therefore, be dismissed as economically unimportant. But until it is further tested by borings, it is overlooked for the present in calculations of coal reserves of the area.

Nothing is known of coal seam No. 5 beyond the information of its presence in the boreholes. On the map the writer has plotted its inferred position on the rather meagre data available in order to assist in its prospecting by further boring. No information could be secured on the quality of the coal. Being the lowest seam of economic importance in the area, it has the greatest working area and adds appreciably to the coal reserves.

Coal Reserves

The coalfield contains four seams that, individually, are 3 feet or more thick, namely Nos. 1, 2, 4, and 5. Only two of these, Nos. 2 and 5, appear to be economically workable over an important part of the field, and they alone were considered by the writer in estimating probable coal reserves. In the Chimney Corner area submarine reserves were restricted arbitrarily to a narrow area "B", as shown on the map. In the St. Rose area estimates of reserves were confined to area "A" (Figure 2). On this basis the following probable reserves in gross tonnage contained in the two seams were estimated.

Long tons (2,240 lbs.)

	St. Rose area	Chimney Corner area
No. 2 Coal	(Assuming 4 feet mean thickness)	(Assuming 3 feet mean thickness)
	1,902,800	Land area 326,800 Submarine area 838,900
		1,165,700
No. 5 coal	(Assuming 7 feet mean thickness)	(Assuming 3 feet mean thickness)
	5,985,000	Land area 536,700 Submarine area 901,900
		1,438,600

Both seams--about 10,000,000 long tons

The above calculations were based on an assumption of 28 cubic feet of coal per long ton.

It is questionable how much probable workable coal in the Chimney Corner area may be contained in an area seaward of area B. If the fault near the mouth of Neil MacLeod Brook continues seaward on the same course, it would cut off the coal seams $\frac{1}{2}$ to $\frac{3}{4}$ mile north of area B. Whether the fault be so extended or not, the synclinal axis of the main structure may lie within this distance, and beyond it the coals would dip in a reverse direction. But it

is probable that a seaward area, 1,000 feet wide, may be safely added to area "B" in calculation of coal reserves additional to those estimated above. If this additional area be considered to have a length of area "B", or of 6,300 feet, the additional probable reserves would be 1,350,000 long tons.

In order to determine the possibility of a reappearance of the coal measures seaward of the St. Rose area, an examination was made of the rocks of Wolf (Margaree) Island. The strata on this island, which lies 2½ miles from the mainland, were found to belong wholly to the Pictou group, and hence they belong more properly to the Inverness than to the Margaree basin.