

1983/08. The Strathblane, Hastings, Ida Bay, Moss Glen, and Catamaran coalfields

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Abstract

The southern coalfields were intermittently worked from the discovery of coal at Ida Bay in 1892 until the closure of the last mine in the Catamaran field in 1939.

The coal seams in each area belong to the fluviatile sequence of the upper division of the Upper Parmeener Super-Group, and are of Triassic age.

Problems of coal seam thinning, faults disrupting the workings, and poor coal quality caused by mudstone bands interbedded with the coal plagued most mines.

Substantial infrastructure development such as large coal loading bins and extensive tramways were built on the Catamaran field, leaving little capital for actual mine development. This procedure caused the collapse of a number of syndicates mining at Catamaran.

The Catamaran-Moss Glen area provides the best potential target area for exploration out of all the southern coalfields. Inferred reserves are not likely to exceed five million tonnes and the deposit is classed as a very small inferred reserve.

The Strathblane coalfield

LOCATION AND ACCESS

The original coal leases which comprised the Strathblane (or Esperance as P.B. Nye calls the field) coalfield occupied a north-south trending ridge some eight kilometres south-west of the town of Dover. Creekton Road, a forestry road, currently traverses around the ridge. Tramways originally built to serve sawmilling operations were used by mining interests in the 1920s and 1930s. The tramways were in "a decayed condition" in 1952 (Keid, 1952) and in 1983 only small portions of the tramways could be found.

GENERAL GEOLOGY

The geology of the Strathblane coalfield is shown in Figure 1. The high ridge which covers most of the coal-bearing area rises abruptly to a height of 280 m from the western side of the Strathblane Plain. Creekton Creek wanders across the plains in a generally east-west direction. The ridge is capped by dolerite, which is probably in the form of a dyke (Keid, 1952). Dislocation of seams on each side of the ridge was observed by Reid (1921a), who stated that the working seam on the western side of the ridge dips at 18° to the north-east, while seams on the eastern part of the ridge dip to the south-west. All workings on the western side of the ridge eventually encountered dolerite.

The dolerite intruded and now partly caps a coal-bearing fluviatile sequence of dominantly lithic sandstone, minor shale, mudstone and coal of the upper division of the Upper Parmeener Super-Group. These sediments are

underlain by economically barren quartzose sandstone of the middle division of the Upper Parmeener Super-Group, which crops out over parts of the Strathblane Plain and has been intersected in a number of drill holes (Bunny, 1976).

On the eastern and south-western sides of the ridge a group of coal seams could, in the 1920s, be traced for over 1.5 km. These seams were worked by a number of dip tunnels driven into the hill.

PREVIOUS MINING ACTIVITY

The Strathblane coalfield was discovered in 1908 when coal was found on the western side of the ridge. From 1910-1915 some 120 m of 'driving and sinking' had been done, and the work was temporarily abandoned in 1915 pending the workers (Messrs Woods and Anderson) securing more capital for the venture (Twelvetrees, 1915). Work continued intermittently on the field until 1933. A large number of pits, trenches, adits and shafts were put in on both sides of the ridge, but with most of the activity being concentrated on the eastern side. The original workings started on the western side; some were quite extensive, as was the 'main tunnel' which was a drive 2 m x 2 m running horizontally into the hill for 10 m, where coal was intersected. The tunnel then followed the dip of the coal at 20 - 25°, eventually linking with other minor workings (the Creek drive) to the north. Specific details of drive depths, widths, bearings (but no specific locations) of the various workings may be gleaned from Twelvetrees (1915), Reid (1921a) and Nye (1927a, 1927b, 1928a, 1928b, 1934). Nye noted a total of seven adits and three shafts, as well as a large number of trenches. Three adits were located by the author in 1982 (fig. 1).

The last commercial operations on the coalfield commenced in 1926 with the driving of two adits into the south-west part of the field. Both adits encountered dolerite, as had earlier adits on the western side of the ridge. Messrs Bond and Gepp removed pillars from these workings during 1932-33 and the lease was then transferred to W.J. Forster who held it until expiry in 1936. Apparently coal for domestic use was being dug out of one adit close to the Darcy Link-Creektion Road junction in the 1960s.

Most of the seams worked were about 0.6 - 1.0 m thick. Substantial variation in seam thickness is recorded, with seams thinning from 1.6 m to 0.6 m over short distances. The average working thickness was about one metre.

RECENT EXPLORATION

In 1976 Earth Resources Australia Pty Ltd conducted an exploration programme to determine if any economic deposits of open-cut coal could be found in the Strathblane area for Australian Paper Manufacturers. Two lines of holes were drilled near Strathblane (fig. 1). The most southerly line (Line A) intersected minor intervals of coal up to 0.20 m thick (Appendix 1). The remainder of the holes in this line were devoid of coal intersections. The northernmost line of holes (Line B) yielded only 0.12 m coal in DDH 12. The remainder of the holes intersected the quartz sandstone sequence which underlies most of the Strathblane Plain (Bunny, 1976).

COAL QUALITY

The coal is reported to be dull, black and dense with numerous bright bands (Nye, 1934). A typical analysis would be:

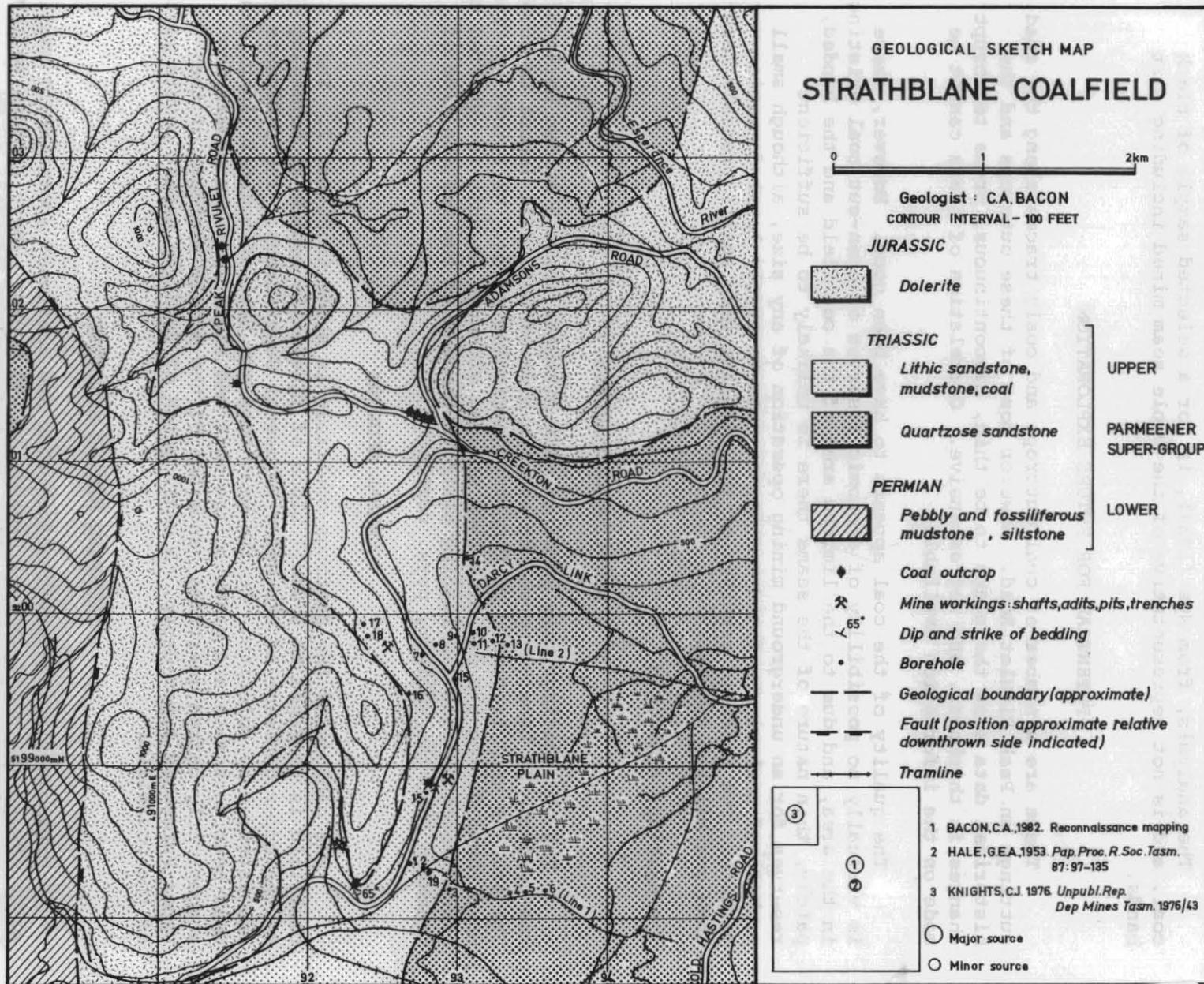


Figure 1.

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5 cm

Moisture	7.4%
Volatiles	26.12%
Fixed carbon	55.04%
Ash	18.10%
Sulphur	0.57%
Specific energy	25.7 MJ/kg

The analysis, from Nye (1934), is for a selected sample of black coal, and is not representative of the whole seam mined including dirt bands.

POTENTIAL FOR FUTURE EXPLORATION

There are a number of coal outcrops and coaly traces along the road cuttings on Peak Rivulet Road. However most of these outcrops and the historical data show the seams to be thin, discontinuous, prone to abrupt changes in thickness, and not extensive. Correlation of seams cannot be made on the information available.

The quality of the coal appears to have been good. However, there is virtually no possibility of economic reserves of open-cut coal existing in the area, and due to the limited area of the coalfield and the banded, patchy, thin nature of the seams there is unlikely to be sufficient reserves for an underground mining operation of any size, although small pockets of coal may be found and may be able to supply local domestic markets. The inferred reserves of the area are very small, probably less than one million tonnes.

The Hastings coalfield

LOCATION AND ACCESS

The old Hastings mine workings were situated about 5 km due north of the township of Lune River on the eastern side of Coal Hill [about DM920960]. The area is well traversed by Forestry Commission roads. No actual workings were found during the author's 1982 search, although an adit is reported to exist beneath an old log loading platform found near the eastern side of Creekton Road (L. Whitham, pers. comm.).

GENERAL GEOLOGY

The geology of the Hastings coalfield is shown in Figure 2. The coalfield is confined to a small block of fluviatile sediments belonging to the upper division of the Upper Parmeener Super-Group. The sediments are intruded by dolerite. To the west they are faulted against older, non coal-bearing strata and grade to the east and south into the underlying economically barren quartzose sandstone of the middle division of the Upper Parmeener Super-Group. A small patch of Tertiary basalt covers part of the coalfield.

PREVIOUS MINING ACTIVITY

Mining activity started before 1900 and continued sporadically until after 1922. The exact date of closure is not known. There appears to have been one main seam with three plies, worked as three separate seams.

The 'seams' were:

Gamma seam; 1.45 m (4'9") thick; dips 23° on bearing 288°
intraseam sediments 0.94 m (37");

Delta seam; 0.89 m (2'11"); dips 23° on bearing 288°
intraseam sediments 0.69 m (27");

Eta seam; 0.53 m (1'9").

The names 'gamma', 'delta' and 'eta' were given by Hills *et al.* (1922), who devised a seam classification for the whole of Tasmania.

Hills *et al.* (1922) refer to the development of a maximum of eight coal seams in the eastern and southern coal-bearing areas. Hills *et al.* named these seams (from the top) alpha, beta, gamma, delta, eta, theta, iota and kappa, and named the seams in each coalfield according to this classification, supposing that the seams could be traced down the east coast from St Marys to Catamaran. The geology is now known to be far more complex than envisaged by Hills *et al.* (1922) and the same seams certainly cannot be traced over such large distances.

The 'seams' were worked by means of a dip tunnel on the 'gamma' seam and a horizontal tunnel which intersected all three 'seams'. The workings reportedly showed evidence of considerable movement resulting in the displacement of the strata.

RECENT EXPLORATION

No work has been done on the Hastings coalfield since 1922.

COAL QUALITY

Twelvetrees (1902a, p.239) records the coal as "fair but mixed with band stuff which requires separating". A given analysis (Johnston, 1888, p.191), probably for part of the worked seam is:

Moisture lost at 212°F	2.5%
Volatiles	30.8%
Fixed carbon	58.0%
Ash	8.7%
	<hr/>
	100.0%

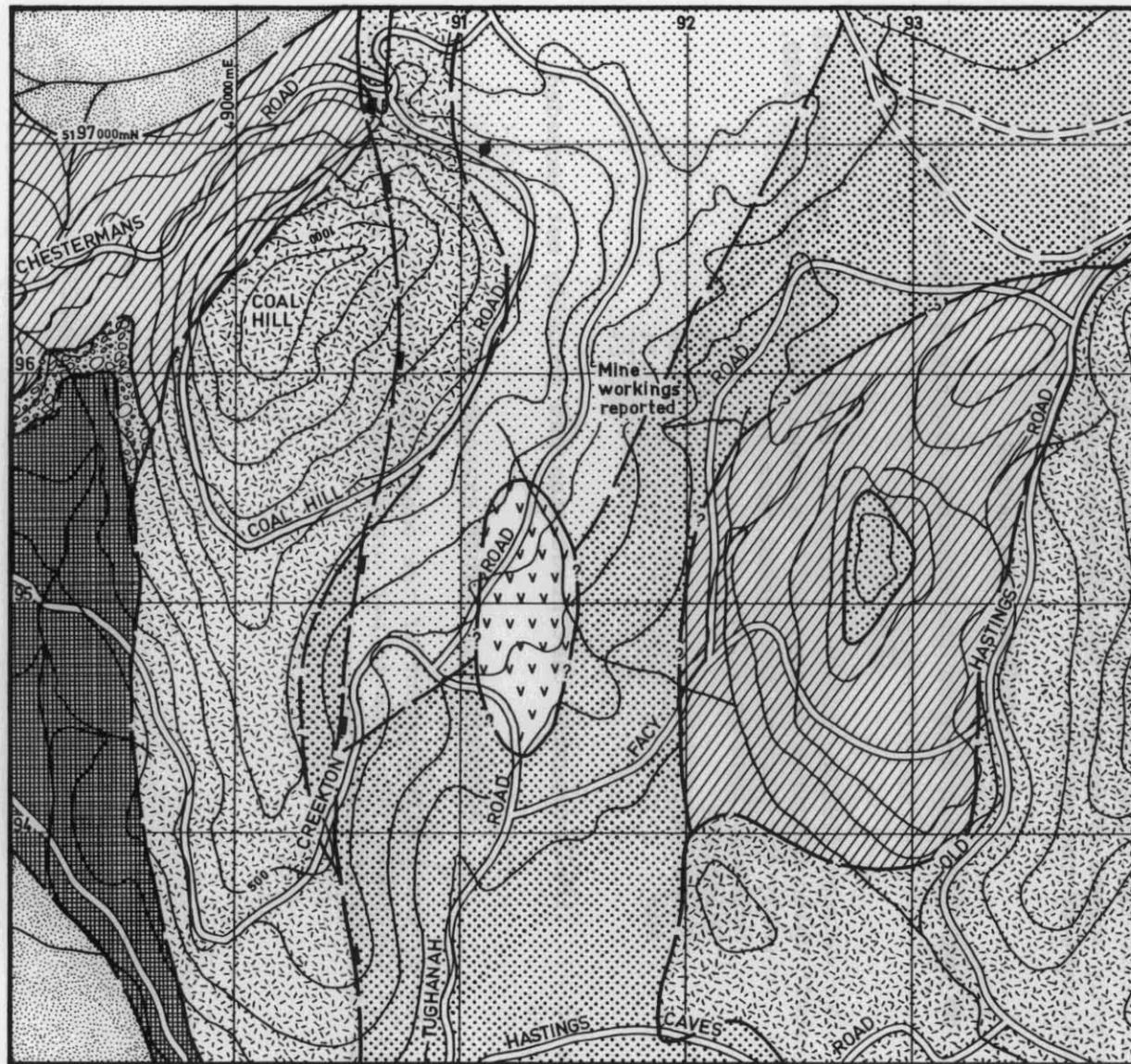
Hills *et al.* (1922) reported that production had probably not exceeded 500 tons.

POTENTIAL FOR FUTURE EXPLORATION

Due to the limited extent of the coalfield and the thin, banded nature of the seams, the area is not considered to contain any economically viable deposits of black coal.

9-8

5 cm



GEOLOGICAL SKETCH MAP
HASTINGS COALFIELD

0 1 2km

Geologist: C. BACON
 CONTOUR INTERVAL - 100 FEET

	Alluvium	
TERTIARY		
	Basalt	
JURASSIC		
	Dolerite	
TRIASSIC		
	Lithic sandstone, mudstone, coal	UPPER
	Quartzose sandstone	
PERMIAN		
	Pebbly and fossiliferous mudstones, siltstones	PARMEENER SUPER-GROUP
	Tillite	
PERMIAN		
	Pebbly and fossiliferous mudstones, siltstones	LOWER
	Tillite	
PRE-PERMIAN (Age unknown)		
	Siliceous sediment	
	Coal outcrop	
	Geological boundary (approximate)	○ Minor source
	Fault (position approximate, relative downthrown side indicated)	○ Major source
		①
		②

- 1 BACON C.A., 1982. Reconnaissance mapping
- 2 SHARPLES C.E. 1979 Honours Thesis, University of Tasmania.

Figure 2.

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The Ida Bay coalfield

LOCATION AND ACCESS

The mine workings at Ida Bay were located 100 m west of the old Hastings-Cockle Creek road about 1.8 km south of Ida Bay township. The workings were accessible by road, some 100 km from Hobart. Forestry roads currently cross the area in a number of places. The site of the old workings was later occupied by a sawmill, and sawdust piles can still be seen from the South Cape (Catamaran) Road.

GENERAL GEOLOGY

The geology of the Ida Bay coalfield is shown in Figure 3. The Lune River mine was situated in an isolated block of fluviatile sediments (belonging to the upper division of the Upper Parmeener Super-Group), bounded to the west by the Lune River fault, to the north and south by dolerite bodies, and grading to the east into the stratigraphically lower and economically barren quartzose sandstone of the middle division of the Upper Parmeener Super-Group. Lune Sugarloaf, a striking hill feature to the west, is capped with dolerite overlying fossiliferous mudstone of Permian age. A large fault runs north-south along the base of the hill. Basalt, presumably of Tertiary age, overlies both lithic sandstone and dolerite.

PREVIOUS MINING ACTIVITY

The Ida Bay mine was opened in 1892, and 330 tons of coal was produced from one main dip tunnel reported to be 55 m (180') long (Hills et al., 1922). Twelvetrees (1902a) recorded a dip of 40° at the mouth of the tunnel and noted that the seam dipped south-west at 10-11°. A band of coal 450 mm thick known as 'Schäffner's' occurs above the 'main seam'.

Another band of coal 300 mm thick occurs lower down the hill from the dip tunnel. A shaft "further up" the hill from the main tunnel, sunk to provide ventilation for the tunnel, was abandoned at 18 m due to blasting damaging the timber.

None of the workings were accessible in 1921 (Hills et al., 1922). In a later visit, Keid (1952) located three collapsed adits, one of which yielded a section of two metres of coal interbedded with 'band stuff'. The seam dips westerly at 10°. The mine was originally part of a scheme to manufacture cement, but which never eventuated, and the mine closed down. Twelvetrees (1915) recorded a 1.6 m seam of good coal 50-60 m in the main adit. The adits were not found during the author's 1982 visit to the area.

RECENT EXPLORATION

In 1974-76 Earth Resources Australia Pty Ltd conducted a search for potential open-cut coal near Ida Bay for Australian Paper Manufacturers. Fifteen shallow holes were drilled in two lines. The northern line runs east from near the old Ida Bay mine, and the second runs NW-SW about one kilometre south of the old mine (fig. 3). Thin, inferior coal seams were encountered in DDH 6 (1.12 m, 1.37 m thick) and in DDH 7 (1.20 m thick). Carbonaceous mudstone horizons were encountered in Holes 8, 9, and 11 (Bunny, 1975).

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Most of the holes drilled on the plain to the east of the old mine were collared in the quartzose sandstone sequence. Bunny (1974) stated that the quartzose sandstone under the plain is 85 m thick. Dolerite crops out at the eastern edge of the plain, and is also alleged to occur at shallow depths in Holes 10 and 11. However, the basalt hill adjacent to Holes 10 and 11 is shown on plans in Bunny (1974) as dolerite, and a coal outcrop south of the mine stated to occur "under a dolerite sill" was found under basalt, so some caution is required when reading the literature.

COAL QUALITY

The coal was reported to be dirty, containing much clay and shaly matter, and was not a good steaming coal nor valuable for domestic use (Hills *et al.*, 1922).

The following analyses are probably selective and not representative of the whole seam worked:

	1	2	3
Moisture (%)	3.8	2.8	1.54
Ash (%)	11.8	15.9	17.55
Fixed carbon (%)	55.5	67.3	64.90
Volatile carbonaceous matter (%)	28.9	14.0	10.01
Sulphur (%)	-	0.8	0.45

- 1 Twelvetrees (1915): sample from working face 30 m (100') from entrance.
- 2 Twelvetrees (1915): sample from 12 m (40') from entrance.
- 3 Twelvetrees (1915): A.J. Willcoxson, published analysis of seam.

POTENTIAL FOR FUTURE EXPLORATION

Considering the small areal extent of the coalfield, the banded nature of the coal and the relative thinness of the main seam worked (1.5 m), the potential for future development is small. There is no coal suitable for open-cut mining in the area (Bunny, 1975) and the inferred reserves of underground coal are very small, probably less than one million tonnes.

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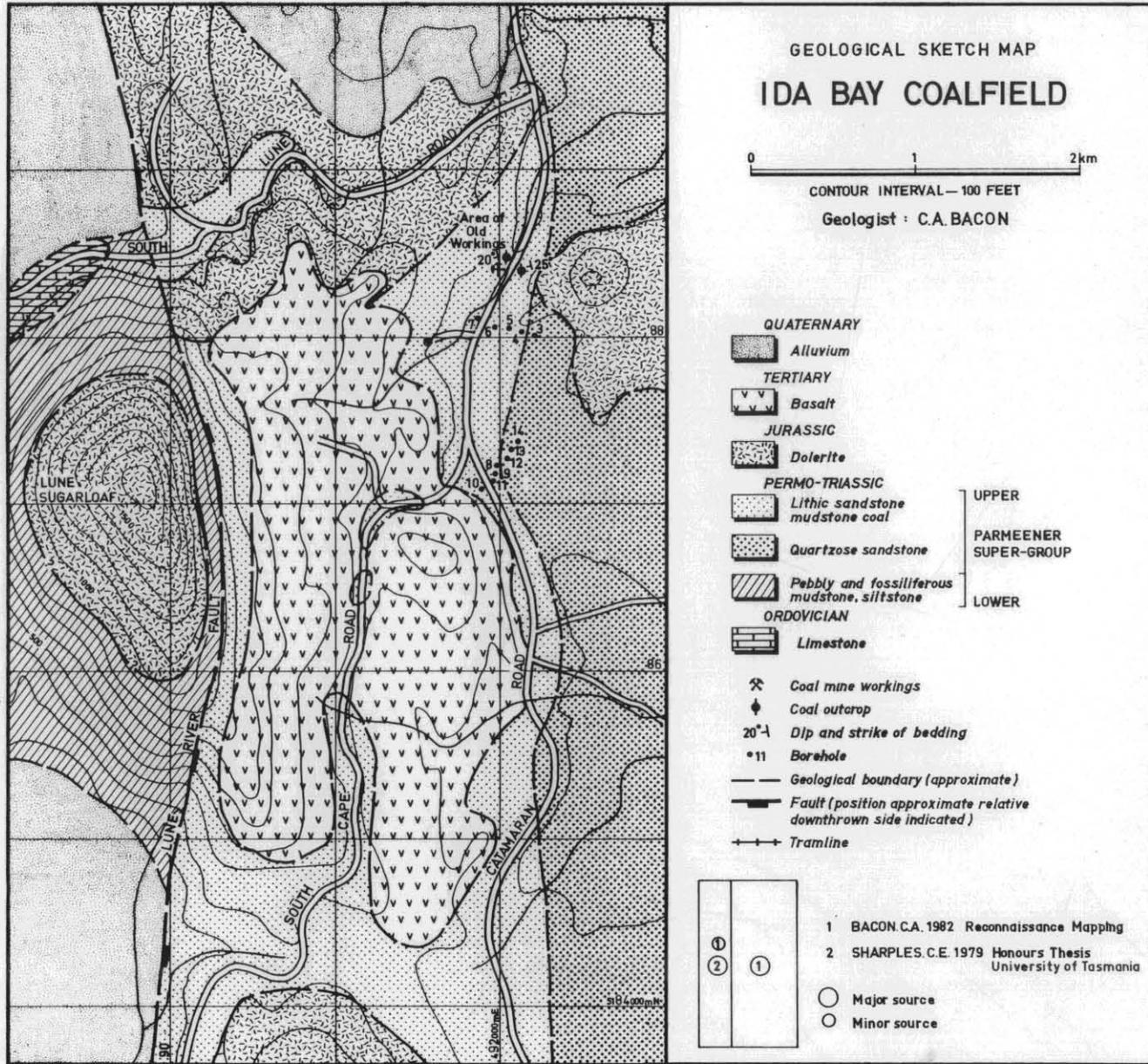
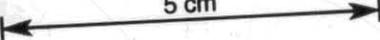


Figure 3.

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5 cm



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The Moss Glen coalfield

LOCATION AND ACCESS

The Moss Glen coalfield was 2 - 3 km to the north of the Catamaran coalfield workings, stretching from a low range of hills west of the current forestry road (South Cape Road) to within 500 m of the coast at Recherche Bay (fig. 4). The area is referred to as the 'Reward Claim' in the literature and was originally held by G.H. Smith, whose grandson, Mr Algie Smith currently lives at Moss Glen.

GENERAL GEOLOGY

The area is thickly overlain by dolerite talus on the hill slopes and alluvial soils on the plain. The South Cape Road has exposed a number of seams in road cuttings; these are marked on Figure 4. The fluviatile sequence of interbedded lithic sandstone, mudstone, claystone and dull coal belongs to the upper division of the Upper Parmeener Super-Group. Meaningful correlation with the seams exposed in the road cuttings and those at Catamaran or elsewhere is not considered possible with the limited information available.

Faulting severely disrupts the seams, as is shown by reports of 'non-discovery' of coal seams in holes drilled in order to plan coal extraction.

PREVIOUS MINING ACTIVITY

The Moss Glen Colliery Company was, in 1902, prospecting on the Reward Claim and had found three seams, but none of these were properly mined. The 1902 workings consisted of a number of pits and bores drilled by the Company's Mine Manager, a Mr Hardwick, together with a short tunnel 6.4 m long on the 'lower' seam and a shaft four metres deep on an 'upper' seam.

The main seam (opened in the tunnel) was reported to be 1.85 m (6'1") thick of which 1.68 m (5'6") was coal. The seam was recorded by Twelvetees (1902a) as dipping at 20° to the north-west. A bore drilled about two metres from the end of the tunnel failed to strike the seam. This is probably the same seam that crops out in a drain on the forestry road, near a filled-in adit. A bore in the area (shown on Figure 4 as 'area of Hardwick's bores') is recorded as having passed through 3.0 m (10') of overburden, then 7.6 m (25') of coaly sediments and bands, containing one 1.37 m thick band of stony coal, all above the level of the tunnel seam. These coaly bands are probably those which crop out along the South Cape Road to the north of the 2.0 m thick seam cropping out in the road drain.

The 'Reward Claim' lease was forfeited in 1912, due to no work having been done, and was taken over by Messrs A.E. Sherwin, Smith and others, who sank two shafts to intersect the 'upper' coaly sequence, reported by Noetling (1912a) to be 4.52 m (14'10") thick, of which 3.66 m (12'0") was coal and the rest shale bands.

There would appear to be two coaly horizons in the Moss Glen Area; an 'upper' horizon consisting of a number of thin seams, and a 'lower' 1.85 m (6'1") thick seam, both of which are disturbed by faulting.

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RECENT EXPLORATION

The area of the Moss Glen coalfield is currently held under Exploration Licence 6/79 by Marathon Petroleum Limited. There was no exploration of the Moss Glen coalfield after the initial prospecting efforts until the area was acquired under exploration licence by Marathon Petroleum in 1979.

COAL QUALITY

The following analysis (from Twelvetrees, 1902a) is probably for part of one seam and not representative of a whole seam:

Gases and Moisture	26.2%
Fixed carbon	54.0%
Ash	<u>19.8%</u>
	<u>100.0%</u>

POTENTIAL FOR FUTURE EXPLORATION

Although the area is known to be faulted and no coal of commercial quantity has been extracted from the field, the area, in conjunction with the Catamaran coalfield to the south, provides a better prospect for exploration than the Strathblane, Ida Bay, or Hastings coalfields.

The Catamaran coalfield

LOCATION AND ACCESS

The Catamaran coalfield is located on swampy ground north of the Catamaran River and immediately to the west of the South Cape forestry road. A number of workings have existed over various parts of the coalfield (fig. 4). The area is currently accessible by road, some 115 km from Hobart. After mining the coal was transported by tramway to Evoralls Point where large coal bins had been erected. Some of the major tramway is still visible to the determined seeker. Cutting grass and thick scrub obscure most of the coalfield, covering the workings and tramways.

GENERAL GEOLOGY

The hills to the west of the workings are capped with dolerite of Jurassic age which has intruded the Triassic fluviatile coal-bearing sediments belonging to the upper division of the Upper Parmeener Super-Group. Dolerite crops out to the south of the coalfield, and also to the east along the shore of Recherche Bay. Much of the low-lying land between the Catamaran and Moss Glen coalfield is covered with alluvium. The area of the old Catamaran workings is largely covered with dolerite talus, with a dolerite ridge, probably a dyke trending ENE-WSW, separating the Ribbon and Anthracite workings. Outcrop is poor and access today very limited due to thick scrub growth. Agates are reported to have been found in the soil covering the hills behind the Moss Glen coalfield (L. Whitham, pers. comm.).

Twelvetrees (1915) reported finding basalt boulders but no *in situ* basalt in the area, so the hills are probably mantled with Tertiary basalt lag covering dolerite.

There appear to be three coal seams in the Catamaran coalfield. In the area of the Ribbon workings and the main McKenzie workings, the seams are:

8-12

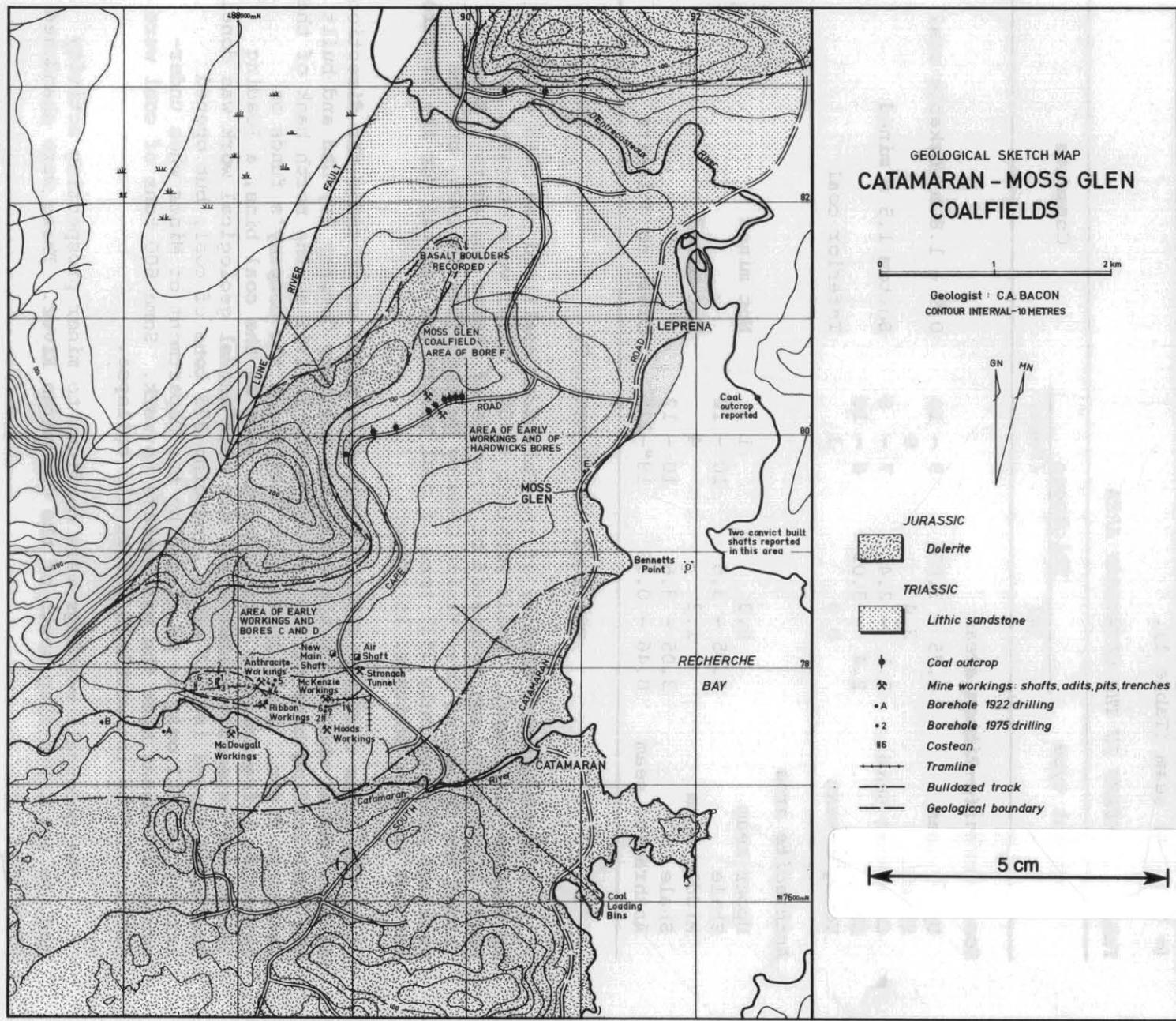


Figure 4.

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an upper, poor quality seam; the Catamaran seam (1.2 m to 1.5 m of banded coal and mudstone); and the lower 'Bottom' or 'Young's' seam. Hudson and Nye (1932) recorded two large faults, one with an upthrow to the north of 30 m between the Ribbon and Anthracite workings, and one 15 m north of the new main shaft "near the extremity of the flat", upthrown some 180 m to the north. The seams at the Anthracite workings are given (Hudson and Nye, 1932) as: the upper seam; the middle (= Catamaran) seam; and the anthracite (= Young's) seam (Table 1).

Table 1. SEAMS IN THE CATAMARAN AREA

Sediment type	Thickness		Comments
	(m)	(feet)	
<i>Hoods-McKenzie-Ribbon areas</i>			
Upper seam	2.75 - 3.05	9 - 10	0.9 - 1.8 m workable coal
Shale	2.4	8	
Catamaran seam	2.1 - 2.4	7 - 8	Bottom 1.5 m mined
Shale	2.4 - 3.05	8 - 10	
Young's seam	0.9	3	Inferior coal
<i>Anthracite area</i>			
Upper seam	0.3	1	Not mined
Shale	3.05 - 3.6	10 - 12	
Middle seam	1.2	4	Not mined
Shale	3.05 - 3.6	10 - 12	
Anthracite seam	0.46 - 0.56	18"-22"	Close to dolerite

PREVIOUS MINING ACTIVITY

A comprehensive history of the Catamaran coalfield has been compiled by Whitham (in press). Hoods workings (1900 - 1910) were operated by Major Lloyd Hood, and consisted of a number of shafts and adits. Hood formed the Catamaran Coal Mining Company No Liability in 1905, but the workings produced only 2527 tons of coal before the capital for the venture ran out in 1906 (Whitham, in press).

The James workings (1910 - 1912) were minor works under the direction of E.C. James, who formed the Catamaran Colliery Company Pty Ltd and built the coal loading bins of 250 tons capacity in 1911 on the north bank of the Catamaran River. James appears to have spent the company's funds on extensive infrastructure arrangements, such as the coal bins, a loading jetty, and extensive tramways but not much actual geological work was done. The works closed in 1911 after producing 375 tons of coal, but opened briefly in 1912 only to be closed by the Department of Mines when underground collapses made the mine unsafe to work. Some 600 tons of coal were extracted from the workings before the collapse.

The McDougall workings were confined to minor prospecting activity and one shaft 9 m deep south of the Catamaran River. These were abandoned by 1912.

The New Main Shaft was sunk by a syndicate from Broken Hill in 1913, under the direction of an engineer, R.C. Young, but no actual production was undertaken from the 40 m deep shaft as the work ceased in 1914 for want of additional capital.

Work recommenced in 1921 on the New Main Shaft with a new company, the Catamaran Colliery Pty Ltd. Reid (1921b) noted that the roof and floor of the seam being worked from the New Main Shaft (the Catamaran Seam) were very soft and the mine workings were badly affected by water, severely limiting the economic viability of the mine. The New Main Shaft is now fenced off and may be seen close to the western side of the South Cape Road, 1.5 km north of the bridge over the Catamaran River.

A new manager suggested mining from dip adits would be more economical and in 1923 production from the New Main Shaft, which had never been great, ceased (Whitham, in press).

The McKenzie workings (1923 - 1930) were commenced in 1923 with the construction of a brick-walled dip adit, the entrance to which may be seen today. Underground workings connected these workings with the New Main Shaft, 200 m to the north. Lighting was by means of a 500 volt cable and the coal was drawn from the working face to the main haulage tunnel by pit ponies, then hauled to the surface by a steam powered winch, which was replaced by an electric winch in 1927. A new tramway was constructed to Evorells Point, where 1200 ton capacity coal bins were built. The mine closed due to economic troubles initiated by flooding of the works in late 1926, the workings encountering faults which proved costly to tunnel through, and a demarcation dispute on the Hobart wharves. About 18 270 tons of coal were produced in the first nine months of 1927.

The demarcation dispute was finally resolved and a new dip adit opened up close to Hoods old 1905-06 workings in 1928, when 16 000 tons of coal were produced. Unfortunately one third of the coal produced was termed 'slack' (i.e. apt to break up and choke most furnaces) and a market for this product could not be found. Mining activity continued until 1930, when the mine closed.

The Anthracite workings (1927) worked the so-called 'anthracite' seam which was only 450 - 500 mm of heat-affected coal. Blake (1939) recorded the 'anthracite' seam as being partly exposed at intervals in seven pits over a distance of 300 m. A small tunnel, 99.4 m long, was dug to work this seam in 1927, the seam dipping to the north at "about 1 in 4" (Blake, 1939).

The Ribbon workings (1931 - 1934) were opened in 1931 when the New Catamaran Collieries Pty Ltd opened a new mine close to the north bank of the Catamaran River. The seam worked here was actually Young's seam, below the Catamaran Seam. Ratten drive was driven upwards from the Ribbon workings to work the Catamaran Seam and for a time both seams were worked.

Keid (1952) located the approaches to the dip tunnels, driven in a north-westerly direction on a dip of 10° "near to the river and west from main dip tunnel". The collapsed entrance to one adit could be seen in 1982.

Stronach Tunnel (1934-1939) was located east of the New Main Shaft and was the last area worked in the Catamaran field. The tunnel portal was dug in 1931 by a Mr Stronach, but no further work was done until 1934. Mr Algie Smith of Moss Glen worked out this mine, which he said was driven in on the dip of the seam for more than 275 m before a fault was encountered.

RECENT EXPLORATION

A costeaning and drilling programme in 1974-5 by Earth Resources Australia Pty Ltd for Australian Paper Manufacturers was aimed at delineating potential open-cut coal in the Catamaran area. The study concluded that the area was incapable of providing any appreciable quantity of open-cut coal of the quality required. Positions of the drill holes and costeans are shown on Figure 4. Details of seams encountered in the drill-holes and costeans are given in Appendix 3.

Anthracite area

Five of the seven holes drilled by ERA (DDH 1 - 5) were located in the old 'anthracite' area. Two seams were recognised, called by Rasmus (1975) the Upper (= Middle Seam of earlier workers) and the Lower (= Anthracite Seam).

Analyses from the Upper (= Middle) Seam (2.6 - 3.1 m thick) show an ash content of each ply of between 30 - 41%. This seam was never mined.

The Lower (= Anthracite) Seam ranged from 7.9 - 10.0 m in thickness, with basal parts of the seam cindered and 'digested' by underlying dolerite. All plys analysed showed high (30 - 40%) ash contents with only two thin plys having ash contents of less than 20%. These were 0.18 m in DDH 4 with 14.7% ash and 1.27 m in DDH 2 with 17.9% ash. The Anthracite Seam was not mined extensively.

The drilling proved the existence of a fault known to be between the Anthracite and Ribbon workings.

McKenzie area

Only two holes were drilled in this area (DDH 6, 7); each intersected old mine workings and no analyses were made.

Conclusions

The results of the drilling reflect the poor quality of the target area. More profitable results may have been obtained from holes drilled between the old Ribbon and McKenzie workings.

COAL QUALITY

A number of historical analyses are given in Appendix 4. More recent analyses are given in Rasmus (1975).

Typical analyses are:	1.	2.
Moisture %	2.04	6.1
Volatiles %	23.34	20.2
Fixed carbon %	66.66	42.0
Ash %	12.96	31.7
Sulphur %	0.51	-
Specific energy (MJ/kg)	281.5	-

1. Hudson and Nye (1932), sample 464
2. Rasmus (1975), sample C4/5

There are large variations in the ash contents of the historical analyses, ranging from 3 - 30% ash, depending on the actual piece of coal

analysed. The historical analyses are for selected parts of seams worked and not entire seams.

The more recent ply analyses, done by Earth Resources Australia (Rasmus, 1975) show ash contents ranging from 14 - 80%, with most ply samples having an ash content of 30 - 40%. Most of these analyses are, however, from seams which were either never worked or not worked extensively.

POTENTIAL FOR FUTURE EXPLORATION

The potential for open-cut coal in any appreciable quantity is virtually nil, and the most accessible parts of the coalfield have already been well worked by underground means. However, small areas between the original workings are likely to contain limited reserves and the area north of the Catamaran coalfield (including Moss Glen) is probably worth closer inspection. The coal seams are expected to be thin, banded, discontinuous and badly disrupted by faulting. Nevertheless, the Catamaran area offers the best potential of the southern coalfields for yielding small quantities of useful coal.

The total *in situ* reserve is unlikely to exceed 5 million tonnes and would therefore be classed as a very small inferred reserve according to AS 2519-1982.

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APPENDIX 1

Coal intersections in the Strathblane area

DRILLHOLE DATA (Bunny, 1976)

DDH	Depth range (m)	Thickness (m)	Remarks
1	1.50 - 2.00	0.50	Weathered shale and coal
2	7.50 - 7.67	0.17	Banded and bright coal
19	6.80 - 7.00	0.20	0.12 m coal, 0.08 m shale

APPENDIX 2

Coal quality data, Strathblane area

	1	2	3	4
Moisture (%)	4.7	3.1	0.64	0.74
Volatile carbonaceous matter (%)	29.6	20.7	28.64	26.12
Fixed Carbon (%)	57.5	56.0	57.46	55.04
Ash (%)	8.2	20.2	13.26	18.10
Sulphur (%)	0.79	0.75	0.42	0.57
Specific energy (MJ/kg)			25.4	26.7

Analyses

1. Nye (1927b) : representative sample of full thickness of most southerly adit 13.7 m long on section 9651/M.
2. Nye (1927b) : sample of outcrop of coal 400 m NW of the NE corner of section 10311/M.
3. Nye (1934) : sample from screened coal, 75 - 100 mm in size.
4. Nye (1934) : sample from screened coal pile from which pieces < 20 mm had been removed.

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APPENDIX 3

Coal intersections in the Catamaran-Moss Glen areas

COSTEANS

No.	Length (m)	Width (m)	Depth (m)	Seam*	Comments
1	245	-	-	-	Entire length underlain by dolerite.
2	9	2.4	2.4	-	Seam 2.84 m thick, dips 17° towards 350°.
3	Cut unsuccessful. Nearby ant nest exposed coaly material.				
4	Cut unsuccessful. Old adit thought to be Anthracite tunnel nearby. Seam dips 15° towards 350° (Lower seam).				
5	15	-	1.8	Upper	Interbedded, inferior coal, dull coal and waxy claystone 1.72 m+ thick.
6	45	-	1.8	Lower	Interbedded dull coal, carbonaceous claystone, and grey claystone. 8.3 m+ thick.

* Seam name of Rasmus (1975)
 Costeans 1 - 4 from Bunny (1974b), 5 - 6 from Rasmus (1975)

DRILL HOLE INTERSECTIONS - ANTHRACITE AREA

DDH	From (m)	To (m)	Thickness (m)	Seam name		Comments
				Rasmus (1975)	Historical	
1	5.12	7.76	2.68	Upper	Middle	Poor quality coal Basal 4.62 m cindered
	11.41	19.40	7.99	Lower	Anthracite	
2	15.23	18.38	3.15	Upper	Middle	Poor quality Basal 5.64 m cindered
	22.10	31.01	8.91	Lower	Anthracite	
3	2.13	10.68	8.55	Lower	Anthracite	Upper seam not intersected, basal 1.64 m cindered
4	3.66	13.71	10.05	Lower	Anthracite	Seam exposed in cut 4; basal 6.63 m heat affected, calcite veining over basal 2.13 m
5	3.94	6.95	3.01	Upper		
	9.75	19.25	9.50	Lower		

DRILL HOLE INTERSECTIONS - MCKENZIE WORKINGS AREA

DDH	From (m)	To (m)	Thickness (m)	Seam name		Comments
				Rasmus (1975)	Historical	
6	7.61	11.17	3.56	Upper	Upper	Inferior coal
	13.03	13.17	0.14	Middle	Upper	Inferior coal, carbonaceous claystone
	14.22	15.52	0.30			Claystone, inferior coal, carbonaceous claystone
	17.83	18.28	0.45	Lower	Catamaran	Inferior coal, old workings intersected at 18.28 m
7	2.13	2.94	0.81	Upper	Upper	Interbedded inferior coal and claystone, truncated section
	4.50	6.09	1.59	Middle	Upper	Interbedded inferior coal and claystone
	9.24	11.58	2.35	Lower	Catamaran	Interbedded inferior coal and claystone, old workings intersected at 11.58 m, total seam thickness 5.65 m with basal part removed by workings

Drill hole intersections from Rasmus (1975)

APPENDIX 4

Coal quality data - Catamaran area

The Catamaran coal is reported to be "hard to burn with a long flame and ignite readily" (Hudson and Nye, 1932). The following historic analyses (presumably of parts of seams, not whole sections) have been recorded.

	1	2	3	4	5	6	7	8
Moisture (%)	5.0	4.4	4.0	2.8	1.4	4.24	3.0	2.2
Volatiles (%)	21.0	20.3	24.5	27.7	24.0	25.72	24.9	24.7
Fixed Carbon (%)	65.8	66.7	67.8	65.6	69.6	66.2	61.2	69.3
Ash (%)	8.2	8.6	3.7	3.9	5.0	3.84	10.1	3.8
Sulphur (%)	-	-	-	-	-	-	0.8	-

All analyses by Government Analyst

- 1, 2 - 1902
- 3, 4 - 1905
- 5, 6 - Noetling (1912)
- 7 - Twelvetrees (1915), New Main Shaft
- 8 - Twelvetrees (1915), Electric Shaft

Further analyses are given of the Catamaran Seam, the main seam worked in the coalfield, by Hudson and Nye (1932).

	430	464	465	879	880	881	882
Moisture (%)	3.46	2.04	2.16	2.80	3.20	2.34	3.14
Volatile matter (%)	22.00	23.34	61.66	28.90	25.74	27.46	20.36
Fixed Carbon (%)	58.84	61.66	62.08	60.84	57.76	51.86	43.30
Ash (%)	15.70	12.96	11.46	7.46	13.30	18.34	33.2
Sulphur (%)	0.44	0.51	0.56	0.52	0.52	0.44	0.25
Specific energy (MJ/kg)		28.1		29.9	27.3	25.3	19.4

All analyses from Hudson and Nye (1932)

- 430 - From bins near James workings
- 464 - Bottom of Main shaft, 0.79 m samples
- 465 - West tunnel, James workings 0.71 m
- 879 - Ratten drive, Ribbon workings, 0.635 m (lowest coal)
- 880 - As above, 0.2 m
- 881 - As above, 0.33 m
- 882 - As above, 0.23 m (uppermost coal)

The following analyses are given by Hudson and Nye (1932) for the Bottom or Young's seam which was reported to occur below the Catamaran seam:

	462	463	464	465	877	878
Moisture (%)	2.95	5.06	3.94	3.65	2.80	3.56
Volatiles (%)	20.13	20.04	26.86	22.53	28.26	22.60
Fixed Carbon (%)	54.32	36.46	52.54	60.12	58.60	57.60
Ash (%)	22.60	38.44	16.66	13.70	10.34	16.24
Sulphur (%)	0.55	0.57	0.55	0.48	0.57	0.37
Specific energy (MJ/kg)	24.8	17.9	26.3	27.2	29.5	26.7

- 462 - Ribbon workings, No. 2 East drive, 300 mm samples
- 463 - As above, 100 mm samples
- 464 - As above, 300 mm samples
- 465 - As above, 600 mm samples (top)
- 877 - As above, 180 mm samples
- 878 - As above, 560 mm samples

The following analyses are given by Blake (1939) for coal samples gathered near the Anthracite workings. The analyses are for seam sections excluding mudstone bands.

	1	2	3
Moisture at 105°C (%)	2.92	0.86	1.32
Volatile matter (%)	20.74	7.28	4.20
Fixed Carbon (%)	54.80	86.22	87.34
Ash (%)	21.54	5.64	7.14
Sulphur (%)	0.32	0.38	0.46
Specific energy (MJ/kg)		33.1	

1. Middle seam, 1.32 m thick
2. Anthracite seam, 450 - 550 mm thick
3. Anthracite seam, 430 mm thick, west of Anthracite workings

Additional ply by ply analyses from drilling done in 1975 (shown on fig. 4) are given in Rasmus (1975).