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## Schouten Island

by Terence D. Hughes

### Situation and Access.

The island, 11 square miles in area, is situated one mile from the southern tip of Freycinet Peninsula on the Central East Coast of Tasmania. It is 12 miles from Coles Bay and 15 miles from Swansea, the nearest ports. The principal anchorage for ships is at the central part of the north coast, where, except in very rough weather, small boats can run right up to the beach. A jetty once used for taking coal supplies from the island has now disappeared.

On the island itself, there are no roads or tracks. However, undergrowth is sparse and walking or horseriding is unimpeded over nearly all the country. An old tramway,  $1\frac{1}{2}$  miles in length, connected the coal workings with the former jetty. Much of this tram formation, which runs close to the northern coastline, has been destroyed by wave action.

### History and Previous Literature.

Extensive kitchen middens, both on the north and south coasts indicate the inhabitation of the island by the Tasmanian Aborigine. Among the mounds of shell and black earth are to be found artifacts of chert, a rock type not found on the island. This shows that the natives crossed from the mainland by boats.

In 1848 the island was visited by Joseph Milligan, Secretary of the Royal Society of Van Diemen's Land, and his report was published in 1849, in Volume 1, Part 1 of the Papers and Proceedings of that Society. At that time coal mining had been undertaken and abandoned. The workings, although accessible, were already beginning to collapse, so that the mining venture must have occurred in the early forties. Milligan also noted that two to three hundred sheep had run on the island and improved in condition.

In 1880, the eastern or granite portion of the island received attention from prospectors seeking tin deposits and four twenty-acre leases were granted. It is reported that about this time at least fifty Chinamen were working alluvial tin ground. A little alluvial tin was also produced in the early years of this century by one Luttrell and prospecting was carried on several years later by a man named Stacey.

Coal leases were held from 1888 to 1892 by Signor Bernacchi and it was probably during this period that the tramway and jetty were constructed. The last lease to be held was by J. A. B. McRae in 1925.

A report on the Schouten Island coal is contained in the Coal Resources of Tasmania, Mineral Resources No. 7, published in 1922.

At the present time, the island, which is Crown land, is let on lease and carries several hundred sheep. A house and a woolshed have been built near the anchorage, but there are no permanent residents.

**Topography, Vegetation, &c.**

The island may be divided into two distinct topographic units, according to the rock types comprising them. The granitic eastern part consists of a series of steep, though rounded, bare peaks and ridges, varying in height from one thousand to fifteen hundred feet, and intersected by straight narrow gullies. The two most prominent peaks are Mt. Story in the south, the highest point on the island, and Bear Hill in the north. Looking at the latter hill from near the house or the old coal workings, a huge protruding granite rock gives the appearance of a bear, climbing to the summit.

The western part of the island consists of one gently-sloping, wooded, dolerite hill, rising to a height of nine hundred feet. Around the periphery of this hill and forming the western shoreline are sandstones and shales rising in cliffs to two hundred and fifty feet in height from the water's edge. There is but one prominent steep-sided creek running to the western shore. At either end of the fault line separating the two portions of the island are sandy bays forming (according to the wind direction) anchorages for ships.

The principal vegetation consists of eucalypts and she-oaks, but there are patches of Oyster Bay pine and these trees are well developed in the valley running to the western shore. Undergrowth is sparse, except in the major valleys of the granite area. An introduced shrub, the Cape Gooseberry, is now growing wild along the north-western coastal area. In November the ripe fruit is bright yellow and as large as a golf ball. Clover and grasses seem to do well on the sandstone areas but there has been little recent cultivation.

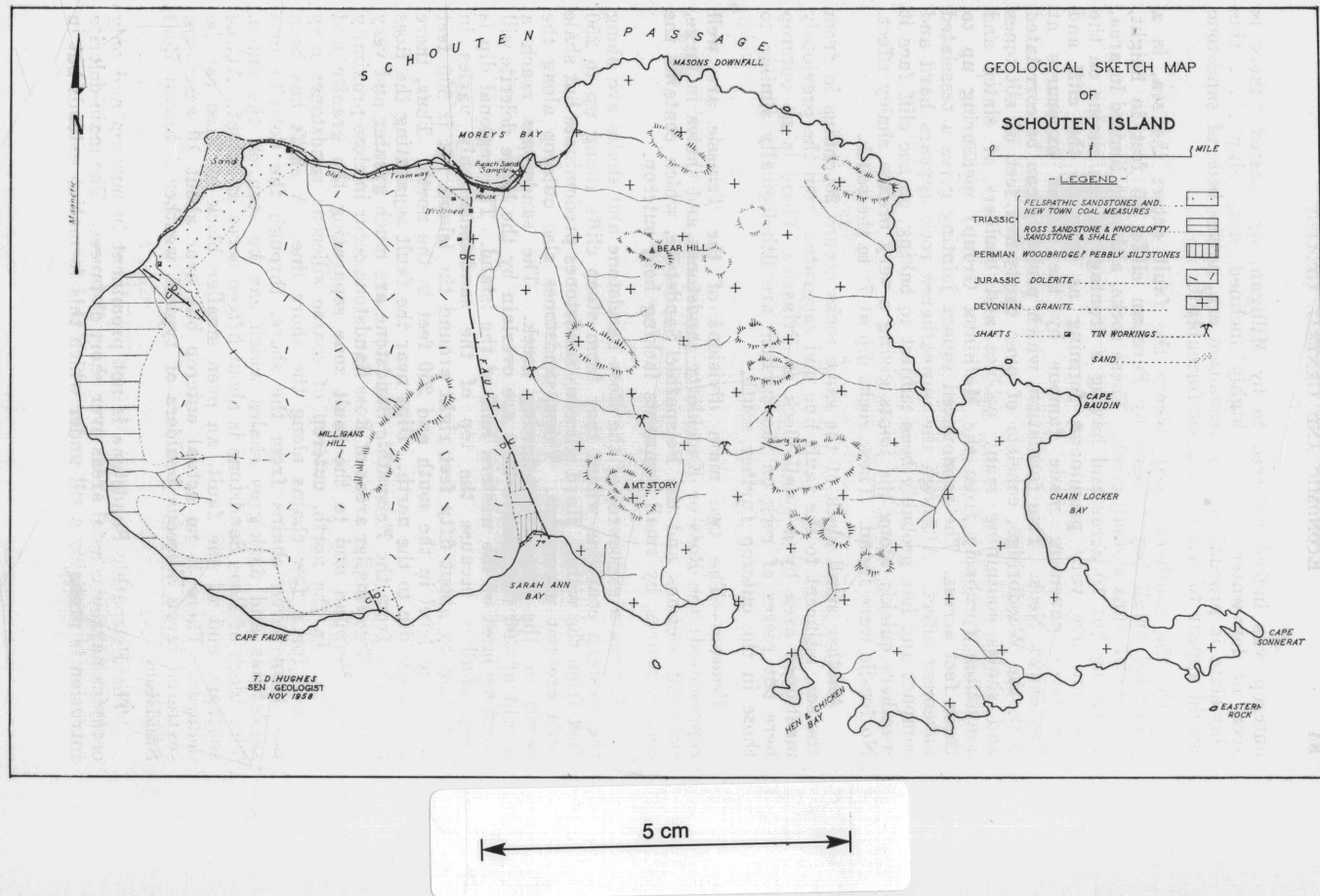
At this time of the year (November) the sheep are in good condition. Apparently the only mammals indigenous to the island are possum. There are no rabbits.

**Geology.**

*Devonian.*—The granite occupying the eastern half of the island is the typical red granite produced at Coles Bay for building and ornamental purposes. Normally it is of coarse grain with abundant orthoclase giving it the pleasing and characteristic red appearance. Finer-grained patches occur here and there but they are limited in extent and appear to contain the same minerals as the coarser-grained normal type and to be of the same age. Small quartz reefs are common but one reef was observed that was up to twenty-five feet in width and extended over several hundred feet. Jointing is common in two major directions,  $100^{\circ}$  and  $340^{\circ}$ , and weathering takes place rapidly along these joints leaving many perched blocks of granite, some of which assume sculptured shapes.

*Permian.*—Rocks of Permian age have not previously been reported from Schouten Island, but this is not to be wondered at as they are very limited in extent, consisting of two small blocks at the two seaward ends of the fault separating the granite and the dolerite. At the northern end, on the beach below the house, is a small outcrop of indurated siltstone, no more than fifteen feet in length and a few feet wide. This bed is dipping at a high angle and were it not for the correlation with the more extensive beds on the southern beach, may well be considered to belong to the Mathinna Group. This small

Figure 20



outcrop was indeed referred to by Milligan, who stated "there is seen at low-water mark a highly inclined slaty clay . . . this clay-slate is probably of the transition era, as the beds of sandstone would appear to rest on it unconformably".

On the southern coast, where the fault enters the sea, is a delightful small bay fringed by Permian cliffs, 35 feet in height, over which runs a small creek. These rocks, although limited in area, occupying but 10 acres and having a frontage of ten chains on the seafront, are very prominent, forming as they do the cliff and tessellated pavement made famous by the larger exposures at Eaglehawk Neck. This formation, which probably can be correlated with the Woodbridge, consists of over thirty-five feet of siltstones and shales containing many pebbles and boulders of slates and quartzites (probably from the Mathinna Group) measuring up to three feet across. The pronounced square jointing gives a tessellated pavement effect. Although the unweathered rock appears hard and compact and has probably been subject to baking, on the cliff face it weathers quickly along the joints giving a very broken shaley effect. No fossils were found. These rocks dip at 7° to the south.

Another small block of the same rocks occurs 20 chains in from the sea, adjacent to the fault line and separated from the previously mentioned area by a small block of Triassic. There is no outcrop here but pieces of rock on the surface are lithologically similar to those in the outcrop further south.

*Triassic.*—The two main divisions of the Triassic are well represented; the Ross or Knocklofty sandstones and shales in large, bold cliff sections and the Felspathic Sandstone, which contains the coal measures, by small remnants lacking bold outcrop.

The main exposures of the Ross Sandstone and shales are along the western coastline where they form steep cliffs rising up to 250 feet from the water. Hard siliceous sandstones predominate but shale beds are not uncommon. These sandstones also outcrop along the banks of the large west-flowing creek. The sandstones reach a height of 300 feet before they are overlain by the large dolerite sill forming most of the western half of the island. The regional dip is very shallow because the top of the sandstones only varies in elevation by about fifty feet right around the island. It is 300 feet above sea level in the south and 250 feet in the north. Thus, there is a slight dip to the north. Dips near the fault separating the Ross Sandstone from the Felspathic Sandstone are much greater and very erratic. Two smaller areas of Ross Sandstone occur in close proximity to the Permian and to the fault zone separating the granite and dolerite. In the north, outcrop of coarse siliceous sandstones may be seen for a few chains along the shore line. A shaft has been put down seven chains from the shore, through the dolerite into sandstones and dark-grey shales which can be seen on the dump. This block of Ross Sandstone is about fifteen acres in extent. At the southern end of the fault, an even smaller block of Ross can be deduced. There is no actual outcrop but over about 10 acres are scattered large siliceous boulders of typical weathered brown Ross Sandstone.

The Felspathic Sandstone is not prominent in outcrop and only occupies narrow coastal areas over short distances. The main dolerite intrusion is probably a sill under which this formation extends but in

the northern area a dolerite transgressive mass divides the coal measures into two parts, an eastern portion which is only 10 chains in length and a western nearly a mile in length. Typical Felspathic Sandstone forms a pavement prominent at high-tide along the waterfront. In this are embedded splendid examples of silicified trees of varying sizes. Most of them are lying parallel with the bedding. One excellent specimen is nine inches in radius, five feet long, and appears to have roots branching at one end. Another is 18 feet long and tapers to a point. A larger one, several feet across, can be seen in section and appears to be at right angles to the bedding. The sandstones contain numerous carbonaceous fragments and small remnants of coal and black shale can be seen just above high-water mark.

On the southern coast of the island, the area of the coal measures is smaller, but outcrop is better on the steep hillside. On one small headland, measuring 300 feet by 100 feet, a coal seam dipping the same way as the hill is just below the ground surface. Dips may be measured here and show that the felspathic sandstones and shales dip to  $105^{\circ}$  at  $14^{\circ}$ . Further west, near the fault separating these rocks from the Ross Sandstone a good section is exposed:—

	Black and brown shales
2"	Coal
6"	Black shale
1"	Felspathic Sandstone
3"	Black shale and coal
6"	Felspathic sandstone
12"	Black shale
1' 8"	Coal (poor quality)
	Black, brown shales.

*Jurassic.*—The typical Jurassic dolerite occupies most of the western half of the island, rising to a height of about nine hundred feet above the sea. The main mass appears to be in the form of a sill intruding the Ross Sandstone and its base is 200 to 300 feet above sea level. Near the centre of the island, between the two faults, however, the intrusion is more complex. Where the first coal seams were worked, half a mile west of the house, the base of the dolerite is only 40 feet above sea level, and near the house an old shaft, 70 feet above the sea, goes through dolerite before it reaches the Ross Sandstone. Between these two areas, the dolerite is plainly transgressive, reaching low-tide level without any trace of sandstone. In the south, the same pattern is repeated, but here the transgressive tongue is much wider, dolerite fringing the sea for sixty chains.

*Structure.*—The large fault, which is so prominent a feature of Tasmania's East Coastal Region, separating as it does the Devonian granite and Silurian sediments from the younger Permian-Triassic rocks with their dolerite intrusions, is well represented on this island. To the east, occupying almost two-thirds of the island, is the Devonian



granite with no sediments. The downthrow block to the west contains Triassic sandstones, shale and coal measures intruded by Jurassic dolerite. The fault zone itself is wide and straight, striking almost due north. However, a slight swing to the west at higher elevations indicates a very steep easterly dip. In this fault zone are blocks of Permian rocks and Triassic sandstone (Ross Sandstone) which have been caught up in the earth movement and remnants of which have survived erosion and can be seen in outcrop at either end of the island fault zone. Although fairly straight, the zone does swing as it enters the sea to the west on the north coast and to the east on the south coast.

One mile west of this main fault zone and parallel to it is another fault separating the coal measures from the barren Ross Sandstone. The expression of this fault can be seen on both north and south coasts and in the vicinity of it the beds are tilted with angles of dip up to 30°. On the southern coast the presence of large cracks and earth movements extending over several hundred feet shows that there must have been some quite recent movements on this fault. The direction of movement on this fault is east side down.

All this faulting was initiated in the Jurassic and probably occurred at much the same time as the intrusion of the dolerite. The sediments are not folded but have some steep dips in the vicinity of fault zones.

#### **Economic Geology.**

1. *Coal*.—Coal was first worked during the forties of last century and a good description of the workings has been left by Milligan<sup>(1)</sup>, who reported only a short time after production had ceased. All workings have now fallen in and no actual adit openings are visible, but the area worked seems to have been in the small patch of Felspathic Sandstone half a mile west of the house. Here an adit was driven on a seam of coal six feet thick for a distance of 300 feet. This heading was driven with a slight upward rise and was only six feet wide. Two branch roads led off from this main heading and were driven back towards the outcrop. The drive ended suddenly in massive clay which Milligan thought may have been a fault but later writers have questioned this interpretation. A second drive, 90 feet away, was driven up the dip for 150 feet. Milligan also speaks of a seam of hard earthy anthracite, about 35 feet above the six-foot seam and overlain with shale, clay and soft carbonaceous sandstone.

Farther to the west and also near the shore, old shafts have been put down, probably in Bernacchi's time. No real outcrops of coal can be seen now in this locality, but the old tram has a great deal of coaly matter on its surface and coal can be seen on the remains of the shaft dumps.

Near the house several shafts have been put down in the dolerite. Fifteen chains north-west of the woolshed, two shafts, very close together, have penetrated the dolerite and finished in the Ross Sandstone. The elevation of the collars of the shafts is 70 feet above sea level and they appear to be about 50 feet deep. There are dark-grey shales on the dump but, naturally, no coal. Twenty chains south of the woolshed is a shaft, also at an elevation of 70 feet, which shows nothing but fresh blue dolerite. By the dump size the depth is estimated to be over 50 feet. The dolerite intrusion seems to

be in the form of a sill near the two shafts and the southern one was put down in the hope of striking the supposed coal measures further inland. Doubtless the main dolerite mass is sill-like in form, but all sorts of irregular transgressions also occur and it would be dangerous to estimate coal reserves on the basis that the coal measures persist below the dolerite between the two faults.

On the southern side of the island the steep foreshore permits the exposure of a good section of the coal measures (see above) and narrow bands of coal occur at at least three horizons. As well as being narrow, the beds are of poor quality and freely mixed with black shales. An analysis of a sample taken over two feet showed 60% of ash.

2. *Tin*.—Alluvial tin occurs in several creeks on the eastern or granite side of the island but it seems mainly associated with two creeks which rise on either side of a hill dominated by a huge white quartz reef. This reef is formed of very white, hard, compact, and quite barren-looking quartz, is more than 600 feet in length and varies in width from eight to 25 feet. It strikes to 290° and dips north at 80°. Small trenches have been put across it here and there. On both the hanging and footwall sides, the granite appears softer and greyer than the normal red variety. Two samples taken from the footwall and hanging wall respectively showed no tin. Similarly, dishes washed from broken material on both walls showed no tin. And yet it is difficult to think that this large structure had nothing to do with the tin found as detrital, rather than alluvial material, in creeks on either side.

At an elevation of 800 feet and a few hundred feet south-east of and 200 feet below the quartz reef is a small shallow alluvial flat containing good coarse detrital tin. The extent of this flat is about  $\frac{1}{2}$ -acre and the depth to granite about three feet. The position of the bottom is hard to determine as it is difficult to distinguish the boundary between weathered in place and detrital granite. Though small and lacking in adequate water supply, the flat is very rich. Two dishes were washed and the concentrates weighed and assayed. The material was got from two holes, three feet deep and about 30 feet apart. One showed the equivalent of 1.22 oz. of 70% tin and the other 0.46 oz.

A small amount of dirt has been treated from this flat, doubtless by very primitive means. It should be kept in mind that this would be a good small area for two sustenance prospectors.

At intervals, in the creek flowing north-west from the quartz outcrop, can be seen old workings and in one place are the remains of a small dam.

The Chinese were reported to have worked in the creek that flows north from the highest granite hills and enters the sea near the old jetty.

3. *Beach Sands*.—After rough weather, the beaches near the anchorage are in places covered with a mixture of heavy dark minerals often up to half an inch thick. Digging down in the sand until granite is reached at 2-3 feet one can see layers of these minerals interspersed with normal sand. In places the dark material seems to occupy 5% to 10% of the beach.

Two samples of these beach sands were taken. No. 1 was the material scraped from the surface and concentrated by the rough weather of the previous night. No. 2 was a concentrate obtained from washing a dish of material taken from 0 to 2 feet. These samples were examined under a petrological microscope and also assayed for tin and showed:—

	No. 1	No. 2
	%	%
Opaque .....	40	40
Zircon .....	35	18
Garnet .....	12	18
Quartz .....	9	8
Topaz .....	3	8
Tin .....	1	7
Rutile .....	Trace	1
Tourmaline .....	Trace	Trace
Tin Assay .....	0.56	15.8

The difference between the amount of tin observed under the microscope and the assay of No. 2 sample is due to the fact that in the former instance some tin is contained in the opaque material.

The composition of these beach sands is interesting, particularly as to their tin content. Unfortunately, the beach concerned is small and shallow and would not warrant large-scale operations but tin has been concentrated by wave action and may repay further investigation.

#### REFERENCES.

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