

THE POSSIBILITY OF LIMESTONE DEPOSITSON BRUNY ISLANDINTRODUCTION:

Bruny Island, named after the French navigator Bruny D'Entrecasteaux, is one of the oldest known parts of Tasmania. Tasman attempted to find shelter off its shores in 1642. Furneaux followed in 1773 and named his anchorage Adventure Bay after his ship the "Adventure", and Cook anchored at the same spot on his third voyage and released animals on the Island. Later the French explored and charted the adjacent waters.

A convict settlement was established under William Lawrence on North Bruny, and the four walls of the church built by the convicts are still standing. Clay was dug for bricks and the bricks were burnt on the spot, but there are no signs of limestone quarries or lime kilns, so probably the lime used for mortar and plaster was brought from elsewhere.

LOCATION AND ACCESS:

North Bruny and South Bruny are two tied islands lying south of Hobart. The northernmost point of North Bruny is thirteen miles south of Hobart and the southernmost point of South Bruny is about thirty three miles south of Hobart. The greatest width of the Island is more than ten miles, but owing to a remarkable irregularity of outline, the area is much less than these overall dimensions would indicate. D'Entrecasteaux Channel separates Bruny Island from the mainland of Tasmania. The Channel narrows at several points to a mile or less in width, but maintains a maximum depth along its length of about ten fathoms.

Communication with Hobart is maintained by a bus service to Tinderbox, which is connected by ferry with a bus service from Dennes Point to Lunawanna and Adventure Bay. A submarine cable from Tinderbox to Dennes Point connects the Island telephone system with the general telephone system of the State.

PREVIOUS WORK:

In 1915 Dr. Arthur Wade examined North Bruny as a prospective petroliferous area. His report was illustrated by a geological map and three cross sections. The map, which is on a scale of one mile to the inch is incomplete as Dr. Wade was concerned only with the possibility of striking oil.

In 1922 Mr. McIntosh Reid, then Government Geologist, described the Bruny Island coal area in "The Coal Resources of Tasmania". Actually, Mr. Reid gives a comprehensive account of the geology of Bruny Island, together with geological maps embracing the whole Island and contoured at 100 foot intervals, and a geological cross section across the southern part of North Bruny. His map of the Sandfly Cygnet Coalfield

is extended to include North Bruny, while the map of the Bruny-Strathblane Catamaran Coalfield also completes the map of the whole of Bruny Island.

GEOMORPHOLOGY:

The peculiar configuration of Bruny Island and the nearby coastlines has been caused principally by drowning. For so small an area, the relief is rather strong, an elevation of two thousand feet being attained on South Bruny. Slopes are steep with short streams flowing directly to the sea, and alluvial flats of any size are rare, the whole aspect of the Island being suggestive of an upland topography that has, in effect been rapidly reduced in level by drowning of the lower slopes. Hills have a meridional trend but are placed "en echelon" and do not form continuous ranges; a disposition that may be due to faulting.

The coastline is an alternation a steep headlands and bays, the headlands being better developed on the eastern side and the bays on the western.

The isthmus connecting North and South Bruny is a remarkable feature. It consists of a continuous line of sand dunes ranging up to perhaps fifty feet in height. There is a broad beach on either side, almost completely covered at high tide, but the slope is steeper on the ocean side than on the channel side, where there is a broad tidal flat. This neck of land has been formed from sand deposited by slowing currents, and later dried and banked up by the winds.

GEOLOGY:

The principal, and almost the only sedimentary formation on Bruny Island belongs to the Permian System and consists of mudstones, sandstones, grits and carbonaceous shales with coal seams. The formation is strongly bedded, and the beds nearly everywhere have a slight dip to the South West. Typical fossils, Fenestalla, Spirifer, Pecten &c. are common in the mudstones and these mudstones closely resemble those in the Hobart district. Dolerite intrudes the Permian strata both concordantly and discordantly exhibiting great range in grain size from coarse to very fine. Small deposits of Kainozoic and Post Kainozoic age occur at Adventure Bay, and there is a recent shelly deposit some few feet above high water mark at the southern end of the isthmus joining. North and South Bruny, indicating a corresponding slight elevation of the land surface. Sand dunes and beach sands, with pebble and boulder beds are the latest accumulations.

Discordant dolerite intrusions form the highest hills both in North and South Bruny. On either side lie the Permian deposits of which numerous excellent exposures exist along the coastline. In the neighbourhood of Blyth's point on North Bruny are low cliffs of sandstone and mudstone, with black graphitic shale, overlain by coarse grits. A similar sequence is to be found at Adventure Bay on South Bruny. At Shelah Cove and Hales Bay on North Bruny, thin remnants of the Permian strata overlies dolerite. South of One Tree Point, also on the east coast of North Bruny are considerable cliffs of pale mudstones with thick sheets of intrusive dolerite resting concordantly upon them. The bedding of the mudstones is undisturbed but thermal induration and extensive silicification has occurred.

Mudstones outcrop along the shores of Great Bay on the western side of North Bruny; and in Ford Bay, which

opens into Great Bay, bands of common opal occur in the mudstones. Sandstones and mudstones compose this part of the coast as far as the sand dunes of the isthmus, and just before entering the sand-dunes along the main road there is a roadside quarry in dense white sandstone. Further to the east are Recent deposits overlying the Permian rocks, and hot springs have been reported from this area.

On South Bruny very good exposures of the Permian sediments occur in Adventure Bay. The typical rock is a mudstone, but sandstones grits and carbonaceous shales are also present, and the horizons exposed near Blyths point on North Bruny seem to be exposed here. Thick mudstone formations are exposed in Little Taylors Bay along towards Point Ventenet. Silicified mudstones and calcareous mudstones occur near Alonnah along the Alonnah-Adventure Bay Road and south of the road. These rocks are being quarried for road metal for which they are very suitable. They have a gentle dip south of West. The geological structure of flat bedded strata dipping slightly to the South West, with large transgressive intrusions of dolerite from which offshoots at different levels have penetrated the sediments as sills, is complicated by faulting. North West-South East faults have been detected at Adventure Bay on South Bruny, and in the southern part of North Bruny.

POSSIBILITY OF LIMESTONE DEPOSITS:

No true limestone deposits were observed, nor is there record of any outcropping. However, a test hole put down in prospecting for oil is reported to have passed through limestone. This hole was put down on North Bruny near the head of a large lagoon, and about half-a-mile east of a point between the thirteen and fourteen mile pegs on the main road. The total depth of the borehole was 430' and the portion 179' - 248' was logged as limestone. The country is dipping to the South West so that the limestone might have been expected to outcrop to the North East, but is cut out in this direction by strike faulting and dolerite intrusions. Examination of the formations still further to the North East at Variety Bay did not reveal limestone beds of any thickness, though some calcareous beds a few inches thick, and thinning out in all directions, may occur in the mudstones. Dolerite sills of considerable thickness are prominent here also.

On South Bruny similar conditions prevail, and probably the same horizons outcrop. This would arise from North West-South East trending faults having the downthrow on the North easterly side, such as are known to occur. Beds on the Alonnah - Adventure Bay road, now being quarried for road material, are highly siliceous and thoroughly consolidated due to the influence of the surrounding dolerites.

It would appear improbable that beds of limestone of sufficient extent and purity to be of economic value, were deposited with the mudstones, sandstones and shales of the Permian formations of Bruny Island. Any calcareous deposits occurring are likely to have undergone alteration due to the large masses of intrusive dolerite which occupy a considerable area of the Island and invade various horizons.

Later formations, particularly beach sands, were examined for calcareous deposits. The beach sands proved to be uniformly highly siliceous. The shelly beds

on the isthmus joining North and South Bruny could be sieved free of sand and used as a source of lime; but it is doubtful if they are of sufficient extent and if their shell content is high enough to warrant their being considered for this purpose.

In conclusion it would appear improbable that economically useful deposits of limestone exist on Bruny Island. None were seen, nor have any been reported. The areas most likely to have contained calcareous beds are also areas containing intrusive dolerite, which converts lime in impure limestones by thermal alteration into compounds useless for agricultural purposes.

Signed G. Everard
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