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Geological Map of the North-Western End of Tasman Peninsula—A Revision

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WITH 2 TEXT FIGURES

ABSTRACT

The sedimentary rocks of the area are mainly Triassic sandstones with some Permian rocks near Turners Point and on the North-West of Slopen Island. Dolerite intrusions, Tertiary volcanic centres and basalt flows are also present. There are no Permian strata at Lime Bay as shown in previous maps.

INTRODUCTION

This study results from research on Permian strata in Eastern Tasmania. Reid (1922) who mapped the north-west end of Tasman Peninsula referred to calcareous mudstone of Permian age in the vicinity of Lime Bay. On examination, the rocks mapped as Permian proved to be Triassic sandstone. This anomaly led to the critical examination of the entire tip of the peninsula and the neighbouring Slopen Island, and to the preparation of a revised geological map. (Fig. 1.)

The area mapped consists of about 25 square miles. Good outcrops occur along the sea cliffs but few rocks are to be found inland. The area is underlain chiefly by Triassic sedimentary rocks which are intruded by Jurassic dolerite and Tertiary basalt.

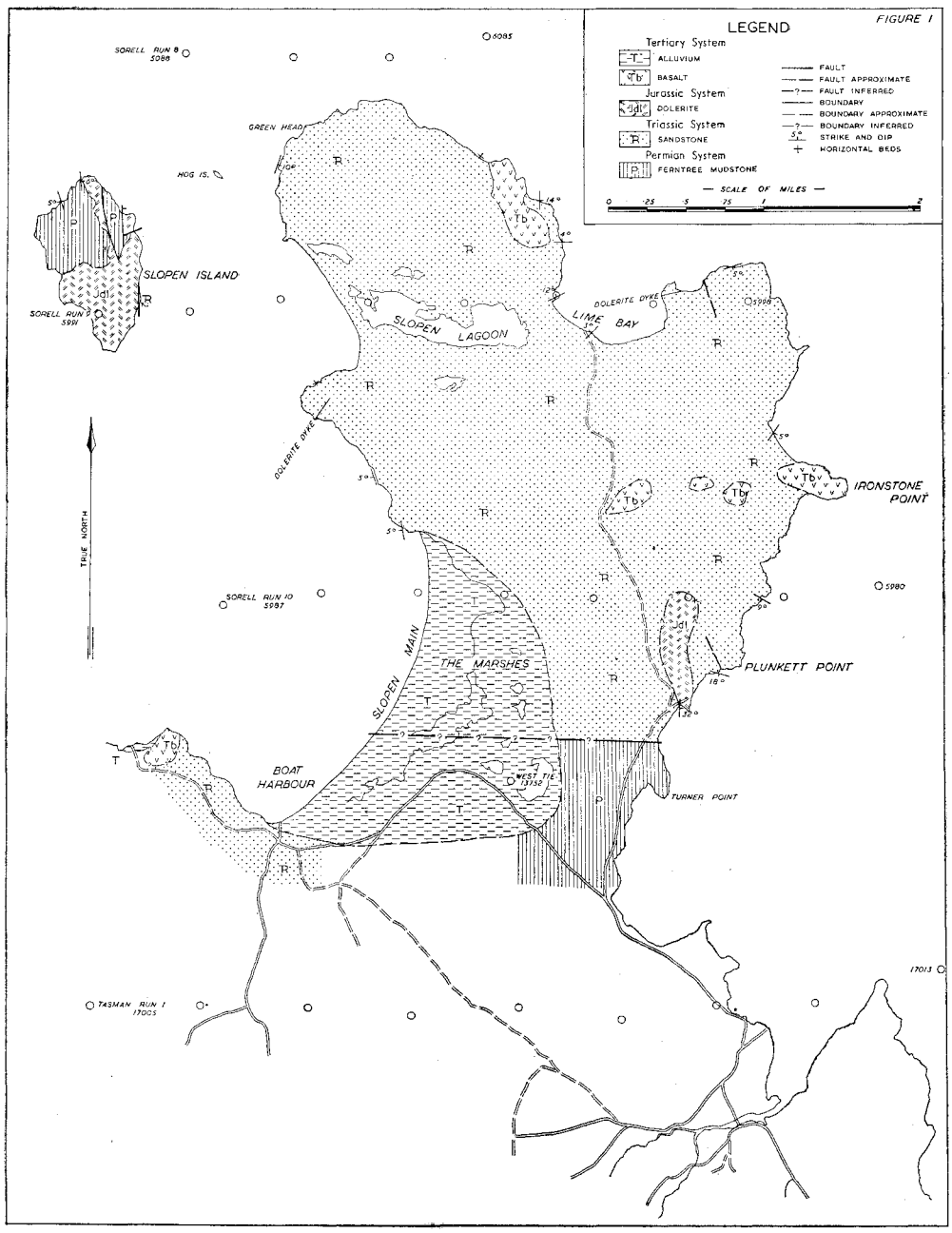
The writers wish to acknowledge the help and interest of Mr. Ian Jennings who called attention to the area and accompanied the writers on their initial visit.

STRATIGRAPHY

Permian System

Mudstones of the Ferntree Formation outcrop in a small area along the western shore of Norfolk Bay at, and south of Turners Point. The stratigraphic contact with the Triassic is not exposed in the area. The formation is faulted against the Triassic sandstones on the north side of the outcrop. External moulds of spiriferoid brachiopods occur in the mudstone north of the abandoned jetty.

REVISED MAP OF LIME BAY AREA



Much of the western half of Slopen Island is underlain by Ferntree Mudstone which rests on a dolerite sill. The mudstone is about 170 feet thick and contains scattered small pebbles and a few spiriferoid brachiopods.

Reid described and mapped a large area of Permian strata surrounding the shore of Lime Bay, but no Permian rocks outcrop in the vicinity.

Triassic System

The most widespread strata in the area are Triassic in age. Gentle folds expose various beds in the sea cliffs, but faulting and lateral changes in lithology make it difficult to trace individual layers. The folds are due, in part, to the faulting and, on a smaller scale, to the erosion of slump bedding and other sedimentary structures which here, as elsewhere, are a feature of the Triassic rocks. The limbs of the synclinal folds dip at less than 5°.

No detailed section was measured here but the general sequence from top to bottom is:

9. Sandstone, yellow, feldspathic.
8. Siltstone and shaly siltstones, grey and yellow with carbonaceous matter and coal.
7. Sandstone, yellow, massive, crossbedded.
6. Sandstone, yellow, spotted, with small limonitic concretions.
5. Shale, dark-red, silty, with sandstone and siltstone, grey and yellow.
4. Sandstone, yellow, spotted, with limonitic concretions.
3. Sandstone, yellow, massive.
2. Shale, grey.
1. Sandstone and siltstone, yellowish-green, with large limonitic cannonball concretions.

The total thickness may be 100 feet or more. The cannonball concretions of Unit 1 have been reported from Police Point (Hale, 1953) and the dark-red shale of Unit 5 has been observed in many parts of Tasmania. Both may become useful marker beds in the future but the sequence in this area has not been correlated with other Triassic sequences except in a very general fashion.

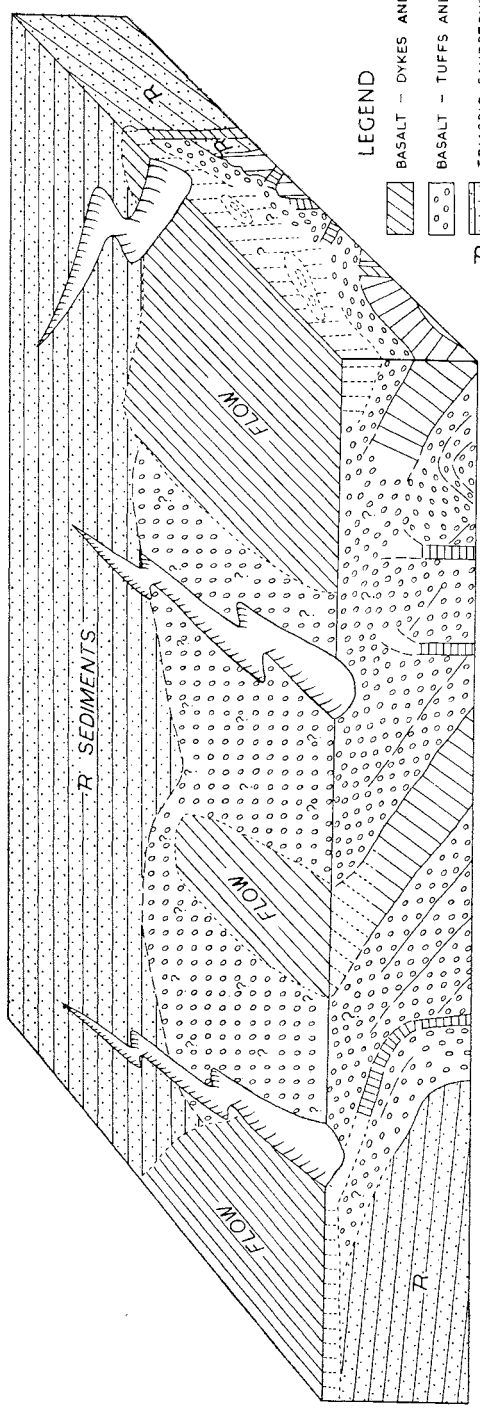
The coal deposits of the area were discussed by Reid (1922). Judging from the piles of waste on the surface the workings were rather extensive, but the entries and shafts have collapsed.

Clay for brickmaking was obtained by convict labour from a pit north of the convict barracks, from Unit 8 of the section listed above. Building stone was obtained from a quarry in massive yellow sandstone near Plunkett Point.

IGNEOUS ROCKS

Dolerite

Dolerite intrudes the Triassic strata in many localities: at the coal mines, at North-West Head, north of Slopen Main, at the east end of Lime Bay, on Hog Island, and Slopen Island.



BLOCK DIAGRAM SHOWING GREEN HEAD VOLCANIC STRUCTURE, TASMANS PENINSULA

FIGURE 2

At the coal mines, the boundaries and structural relations of the dolerite are not clearly defined. The intrusion seems to be a dyke which becomes a sill dipping gently to the north-east. All of the shafts seem to have penetrated dolerite and at the collar of the main shaft about 15 feet of dolerite is exposed. On North-West Head, the dolerite is strongly shattered and the outcrop continues southward for several miles broken only by small inclusions of Triassic strata. In the sea cliff north of Slopen Main, a well-developed dyke about 15 feet wide strikes 19° and can be traced inland for several hundred yards. Another small dyke strikes 54° across the small headland at the east side of Lime Bay. Hog Island which lies between Green Head and Slopen Island consists entirely of dolerite and the eastern half of Slopen Island is underlain chiefly by dolerite. The shore on the north side of Green Head and on the south side of the Boat Harbour strewn with dolerite boulders. Inasmuch as there is no dolerite on the land at these localities, it is assumed that the adjacent sea floor consists of dolerite.

Basalt

Basaltic dykes, lava flows, and agglomerate beds of Cainozoic age occur at several localities.

Ironstone Point consists of basalt which appears to have been intruded as a dyke into Triassic strata, perhaps along a fault. Three hills west of Ironstone Point are capped by basalt and dyke-like masses appear to have been feeders for the capping material. Some agglomerate and volcanic bombs occur locally.

A small pipe-like mass of vesicular basalt completely surrounded by Triassic sandstone may be observed on the wave cut bench between Plunkett Point and Ironstone Point.

A fine example of a small volcanic centre occurs in the sea cliff about 0·5 miles west of Lime Bay. It is a composite structure of interbedded basalt flows and beds of agglomerate (Fig. 2). The writers refer to this structure as the Green Head Volcano. The lowest agglomerate bed which lies at sea-level at the eastern end of the structure consists of basaltic tuff with large fragments of Triassic sandstone and dolerite. Numerous volcanic bombs ranging in length from three inches to three feet are associated with the agglomerate beds. Five or six steeply-dipping dykes radiate from the seaward side of the outcrop.

Another ancient volcanic vent lies on the peninsula at the west end of the Boat Harbour. It is not as well exposed as the vent on Green Head, but contains agglomerate as well as basalt flows. Several basalt dykes radiate from the seaward side.

Cainozoic Sediments

Beach gravels in the bay north of North-West Head consist of dolerite cobbles and pebbles loosely cemented with iron oxide. They seem to lie against the basaltic volcanic rocks. The age of the gravels has not been determined; but the fact that they are partly consolidated suggests that they may be of late Cainozoic age.

Much of the area is covered with loose sand and sandy soil, which appears to have resulted from the breakdown of Triassic sandstones. Source-bordering sand dunes of notable size occur at Slopen Main and at the south-west end of Slopen Lagoon.

The topography is in extreme youth and it is likely that much of the low-lying land area is newly upraised above sea level. Many undrained depressions are present and the stream drainage has scarcely accommodated itself to the topography. For example, on the north coast an intermittent stream runs into the sea at the end of a peninsula, but no streams are present in the bays on either side of the peninsula.

STRUCTURE

The structure of the area is simple. The Triassic strata are gently folded and are broken by numerous high-angle faults of small throw. The majority of the faults tend to strike about 20°. A smaller number tend to strike about 300°. The former set may be associated with the intrusion of dolerite dykes.

In addition, a primary set of joints seems to trend about 150° and the secondary set about 260°.

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