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THE GEOLOGY OF THE BLUFF POINT AND TROWUTTA QUADRANGLES

by M. J. Longman and W. L. Matthews.

INTRODUCTION

The geology of the Bluff Point and Trowutta areas (figure 21) was mapped during the summers of 1960 and 1961 using river and helicopter bases in conjunction with the Forestry Commission timber assessment programme. Rock outcrops are isolated and poor and the map has been compiled mainly from a series of creek and river traverses connected by air photograph interpretation.

McNeil (1961) introduced names for some of the Permian units, but no names have been used in this report. It is considered that more work may prove the rocks to belong to units named in other parts of Tasmania and a multiplicity of names for the same formation is undesirable.

The rock numbers refer to specimens held by the Mines Department of Tasmania and described by M. J. Longman and G. Everard elsewhere in this volume (pp. 79-85; 85-88), or Technical Reports No. 5 (McNeil, 1961, pp. 46-60; Matthews, 1961, pp. 63-71).

PREVIOUS LITERATURE

Most of this area has been studied only recently, but a few places have received attention previously. Sprent (1877), on his exploring expedition to the Pieman River, crossed the Rapid River and noted the sedimentary metamorphic rocks there and elsewhere. Waller (1902) reported on the rocks in the vicinity of the Victory Mine and Ward (1911) included part of the coastline and the south-west corner of the Bluff Point Quadrangle in his report on the Balfour area to the south. Nye (1925) also visited the Victory Mine but his report was not published. More recently, reports by McNeil (1961) and Matthews (1961) covered the area traversed by the Arthur and Rapid Rivers to the south and east of Trowutta, including the Victory Mine.

PHYSIOGRAPHY

The main physiographic features are:—

1. An uplifted, gently tilted, erosional surface, probably the Henty Surface, which rises from 200 feet near the coast to 800 feet inland.

2. Flat lying swampy areas with internal drainage, varying in altitude from 100 feet to 200 feet. They are developed on dolomite.

3. Monadnocks up to 1,500 feet high in the south-east.

The major rivers (Arthur, Frankland and Nelson Rivers) are consequent streams, originally controlled by the tilt of the surface and now entrenched in youthful valleys up to 300 feet deep. The minor subsequent streams (Little, Lyons and Roger Rivers) are controlled by regional strike or differential erosion between dolomite and other rock types.

Coastal features include the development of rock platforms 5-10 feet above present sea level, raised beaches at 20 feet and 60 feet levels and sand dunes, up to two miles wide, which contain numerous kitchen middens.

GEOLOGY

Stratigraphy.—The stratigraphy of the area is summarized below:—

	Age	Details	Thickness (feet)
Quaternary	Recent	Alluvium on beaches, river flats and button grass plains	up to 20
	Pleistocene (?)	Alluvium and gravels in dunes and swamps, gravels on valley walls and button grass plains	up to 60
Tertiary	Pliocene ?	Vesicular and massive olivine basalt flows	100+
		Formation and uplift of peneplain	
	Upper Oligocene-Miocene	Limestone with bryozoa, gastropods and pelecypods	15+

	Age	Details	Thickness (feet)
Upper Palaeozoic	Permian	Sandstone	100+
		Siltstone, mudstone, shale (fossiliferous)	220
		Mudstone	210
		Tillite	140+
	Devonian	Tabberabberan Orgeny, folding, intrusion of pink granite with Sn, W, Pb and Ag mineralization?	
Lower Palaeozoic	Cambrian	Basalt, tuff and interbedded greywackes	1,000+
		Greywacke, black and grey shale and intraformational breccia	500
		Breccia containing fragments of dolomite and chert in dolomite matrix	100—
	Disconformity		
"Younger" Precambrian		Smithton Dolomite (grey dolomite, chert and oolitic limestone)	1,200
	Unconformity ?		
		Bryant Hill Quartzite (quartzite and conglomerate)	2,000+
		Intrusion of basic dykes?	
		Interbedded quartzite, shale, sub-greywacke and rare conglomerate	2,000
		Black and blue-grey pyritic shale	1,000
		Interbedded green chloritic shale and quartzite	5,000+
		Neasy Formation (quartzite, slate and phyllite)	5-10,000
"Older" Precambrian		Intrusion of basic dykes, now amphibolites (?)	
		Keith Beds (schist and quartzite)	"several thousand"

"OLDER" PRECAMBRIAN

Keith Beds, consisting of muscovite, chlorite and biotite schists, quartz mica schists, phyllitic quartzite and quartzite, several thousand feet, at least, in thickness, (McNeil, 1961) are confined

to the south-east, in the vicinity of the Keith and Lyons Rivers. The schistosity varies in strike from 0° to 70° dipping between 50° and 90° to the east and west. Chevron type folding is common along Hilders Road, south of the Arthur River.

"YOUNGER" PRECAMBRIAN

Neasy Formation consists of 5-10,000 feet (McNeil, 1961) of interbedded grey and black argillites, usually with a slaty cleavage, and massive to thinly bedded white quartzite, occasionally current bedded and ripple marked, overlying the Keith Beds with a conformable and gradational boundary. This unit outcrops between the Lyons and Holder Rivers.

Green Siltstone and Quartzite.—(Specimens 61/15, 61/16, 61/132, 61/133—this volume, pp. 86; 84.) Conformably overlying the Neasy Formation are 5,000+ feet of impure quartzite, laminated argillite and siltstone containing chlorite, all with a distinct fracture cleavage. Intraformational slumping, festoon current bedding, sole markings, siltstone pellets and pyrite nodules occur in the finer bands. These beds, in which the chlorite decreases towards the top of the sequence, outcrop in the south-west and along the Frankland and Rapid Rivers.

Black Siltstone.—Overlying the chloritic siltstone and quartzite is 1,000 feet of intensely contorted massive to thinly bedded black and dark blue grey siltstone containing bands of euhedral pyrite crystals up to half an inch in size and rare sole markings. Towards the top of the sequence bands of impure quartzite occur. The best exposures occur in the Frankland and Rapid Rivers, but this unit can be used as a marker horizon throughout the area.

Siltstone, Greywacke and Quartzite.—(Specimens 61/14, 61/27—this volume, pp. 85; 88.) Conformably overlying the black siltstone is 2,000 feet of interbedded greywacke, showing intraformational slumping and festoon current bedding, white to pale grey quartzite, massive to thinly bedded with ripple marks and current beddings, and massive siltstone, pale cream to grey in colour. This unit contains one conglomerate band composed of rounded to subangular quartzite fragments two feet to one inch in size, embedded in a siliceous matrix.

In the west the proportion of quartzite increases towards the top of the unit, which appears to grade into the Bryant Hill Quartzite.

Bryant Hill Quartzite.—(Specimen 61/130—this volume, p. 84) Composed of well sorted quartzite bands, rarely showing ripple marks and current bedding, and minor lenses of quartz conglomerate, is restricted in outcrop to near the Salmon River Mill and the Frankland River, north of Balfour. The formation may also occur east of Trowutta and along the western margin of Dempsters Plains.

Smithton Dolomite.—(Specimens 60/3, 61/17, 61/18, 61/22, 61/125, 61/126, 61/127, 61/128, 61/129—included in McNeil, 1961, p. 60 and this volume, pp. 86-87; 83-4) consists of 1,200 feet of pale grey dolomite and blue grey chert with minor bands of sheared carbonaceous siltstone, oolitic limestone and black and white chert. It rests conformably on the siltstone, greywacke and quartzite unit in the Arthur River area, and overlies the Bryant Hill Quartzite in the north and south. This suggests an unconformity at the base, although no angular discordance has been observed in the field.

CAMBRIAN

Dolomitic Breccia.—(Specimens 61/23, 61/84, 61/85—this volume, pp. 87; 80). A disconformity exists at the base of this unit, which varies from 100+ feet in thickness near Trowutta and the Little River to less than 20 feet near Blackwater Rivulet and the Salmon River mill. It is composed of angular and rounded fragments of dolomite and chert set in a dolomitic matrix, the larger fragments occurring at the base of the unit.

Siltstone and Greywacke.—(Specimens 61/21, 61/86, 61/87, 61/88, 61/89—this volume, pp. 87; 80; 81.) The lowest beds, which rest conformably on and grade out of the dolomitic breccia, are dolomitic siltstone, which in turn grades into banded black and grey siltstone. Overlying this siltstone is a unit of massive to thinly bedded blue or green grey greywacke the upper part of which is interbedded red greywacke and siltstone. The total thickness of sediments is 500 feet in the Kepple Creek and Authur River area.

Basalt, Tuff and Greywacke.—(Specimens 61/19, 61/24, 61/25, 61/26, 61/90, 61/91, 61/92—this volume, pp. 86-8; 81-2.) Tholeiitic basalt, in flows varying in thickness from 200 feet to 500 feet, comformably overlies the red greywacke and siltstone, and is overlain by fine tuff and greywacke up to 200 feet thick which is in turn overlain by coarse tuff and volcanic breccia of unknown thickness. The best exposures are south-west of Trowutta and south of the Arthur River.

PERMIAN

This was discussed by McNeil (1961, p. 53) who described a tillite, 140 feet thick, composed of subangular to subrounded quartzite and schist pebbles in a clayey matrix, resting unconformably on the Keith Beds and grading upward into an unfossiliferous bluish-grey mudstone, 210 feet thick. Overlying this mudstone is fossiliferous calcareous shale about 20 feet thick containing fenestellids, productids, stenoporids and pectens. Above this shale is 200 feet of unfossiliferous siltstone overlain by 100 feet of interbedded quartz sandstone and shale.

TERTIARY

Limestone, pale yellow to pink in colour, composed of brachiopod, gastropod and bryozoa fragments cemented by coarse crystalline calcite, rests unconformably on "younger" Precambrian rocks near Temma and is overlain by basalt. The thickness is less than 20 feet.

Basalt.—(Specimen 61/20—this volume, p. 87), occurs in the south-west as small residuals varying between 20 feet and 100 feet in thickness on the Henty Surface, while thick flows extend eastward from the Dip River towards Preolenna. A probable volcanic neck occurs east of Trowutta.

QUATERNARY

Extensive deposits up to 30 feet thick of interbedded quartzite gravel, sand, clay and peat overlie the Smithton Dolomite and angular quartzite gravel, peat and sand varying in thickness from six inches to several feet cover the Henty Surface. Gravel also occurs on the valley walls and isolated areas on this surface.

North-easterly striking sand dunes, composed of yellow angular quartz sand containing lenses of pebbles, ilmenite bands and pseudo fulgarites, extend inland up to three miles from the coast. Aboriginal kitchen middens containing implements, charcoal, animal bones and sea shells fringe the coast.

Alluvium occurs along the beaches and in river valleys.

INTRUSIVE ROCKS

Amphibolite dykes (specimens 60/1, 60/2—described in McNeil, 1961, p. 55) confined to the " older " Precambrian, and basic dykes, some extensively altered (specimens 61/13, 61/82, 61/83—this volume, pp. 85; 79), intruding the " Younger " Precambrian, trend parrallel to the regional strike of the sediments.

Granite veins containing cassiterite and wolfram outcrop on Hilders Road south of the Arthur River.

STRUCTURE

All rocks below the Permian have been complexly folded. The dominant trends are NE and NNW but E-W trending folds are also present in many places.

Folding on several scales is present; the first order folds have a semi-wavelength of about six miles and the second order folds are about two miles across. Below this, several smaller scale fold systems are present. The interaction of the various trends in the second order folds has produced a series of elongated basins and domes.

The major faults indicated on the map are considered to be of Tertiary age but precise information concerning many of them is lacking. The major fault trending SW from Roger River divides the area into two structural provinces. To the east of this fault the folds are aligned in a NE direction whilst to the west of it the dominant strike is NNW.

Cambrian rocks are distributed symmetrically along the axis of a major synclinorium trending SW from Trowutta. East of this syncline a series of second order folds in progressively older rocks extends out onto the " older " Precambrian basement.

Schistosity is well developed in part of the " Older " Precambrian Keith Beds but is not present in the younger beds. A regional axial plane cleavage accompanied by the development of chlorite and sericite is present in the " Younger " Precambrian rocks up to the Bryant Hill Quartzite.

ECONOMIC GEOLOGY

Chromium

Chromite ocurs as small lenses in alluvium overlying dolomite near Salmon River and as traces in river gravels.

Copper

Small amounts of malachite and chalcopyrite occur in lodes in the Victory Mine on the Arthur River and at Couta Rocks. Copper minerals occur as accessories in the Cambrian volcanics.

Gold

A little gold has been worked at Folly Hill and traces of it have been found in the Arthur River between the Hellyer and Lyons Rivers.

Iron

Magnetite, limonite and hematite occur on the Nelson River and small deposits of limonite occur near the Lawson and Roger Rivers. Pyrite occurs as bands in the black siltstone.

Silver, Lead and Zinc

Small quartz lodes containing some galena, sphalerite and chalcopyrite occur at Couta Rocks.

Titanium

Thin bands and lenses of ilmenite occur on the beach between Gardiners Point and Sundown Point.

Dolomite

Extensive areas of dolomite in the vicinity of the Arthur, Rapid and Little Rivers are a potential source of agricultural lime.

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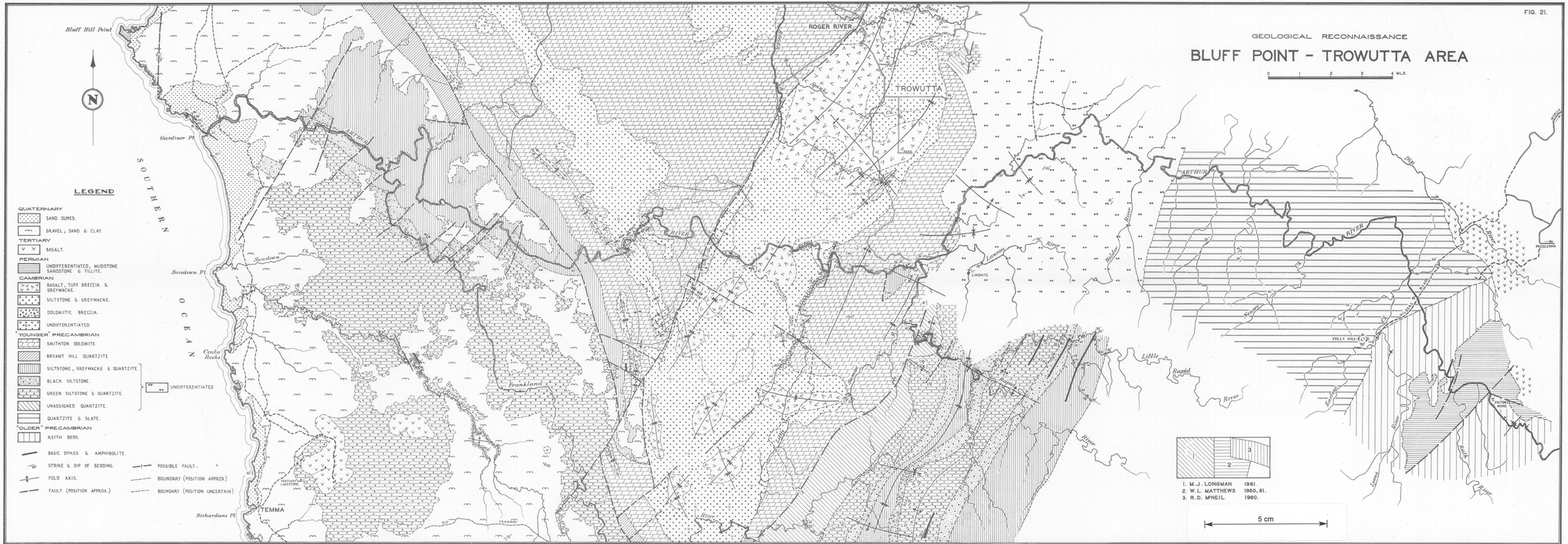
FIG. 21.

GEOLOGICAL RECONNAISSANCE

BLUFF POINT - TROWUTTA AREA

0 1 2 3 4 MLS.



LEGEND

QUATERNARY
- SAND DUNES.
- GRAVEL, SAND & CLAY.

TERTIARY
- BASALT.

PERMIAN
- UNDIFFERENTIATED, MUDSTONE SANDSTONE & TILLITE.

CAMBRIAN
- BASALT, TUFF BRECCIA & GREYWACKE.
- SILTSTONE & GREYWACKE.
- DOLOMITIC BRECCIA.
- UNDIFFERENTIATED.

"YOUNGER" PRECAMBRIAN
- SMITHTON DOLOMITE
- BRYANT HILL QUARTZITE
- SILTSTONE, GREYWACKE & QUARTZITE
- BLACK SILTSTONE.
- GREEN SILTSTONE & QUARTZITE.
- UNASSIGNED QUARTZITE.
- QUARTZITE & SLATE.
- ** UNDIFFERENTIATED

"OLDER" PRECAMBRIAN
- KEITH BEDS.

- BASIC DYKES & AMPHIBOLITE.
- STRIKE & DIP OF BEDDING.
- FOLD AXIS.
- FAULT (POSITION APPROX.)
- POSSIBLE FAULT.
- BOUNDARY (POSITION APPROX.)
- BOUNDARY (POSITION UNCERTAIN)

1. M.J. LONGMAN 1961.
2. W.L. MATTHEWS 1960, 61.
3. R.D. McNEIL 1960.

5 cm

MERCURY

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