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1980/13. Geology of the Mt Nicholas, Fingal Valley and Mt St John areas

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Abstract

Folded quartzwacke of the Mathinna Beds intruded by the Devonian St Marys Porphyry form the basement upon which subhorizontal Permian marine sandstone, limestone and mudstone were deposited. These are conformably overlain by Triassic coal measures up to 400 m thick, dominantly composed of lithic sandstone with a thin basal quartz sandstone unit. Basalt of probable Triassic age is locally developed near the base of the sequence. The Permo-Triassic contact generally lies slightly above the level of the floor of the Fingal Valley, and coal measures form the bulk of the surrounding highlands which are capped by Jurassic dolerite. The lower contact of the dolerite is generally conformable with the intruded sediments but complex relationships may be developed. Steep transgressive contacts occur in many places and low level areas of dolerite occur in which much of the coal measure sequence may be absent. Thick Pleistocene dolerite talus deposits are extensively developed.

PART 1. THE GEOLOGY OF THE MT NICHOLAS AREA

P.W. Baillie

INTRODUCTION

This report is a preliminary account of geological investigations of the Mt Nicholas area north of the Esk Main Road conducted during the summer of 1979-1980 when nine weeks were spent mapping.

Lack of outcrop throughout the area presented many frustrations, for example, intense coverage of a single paddock only yielded a couple of boulders to give a clue to the underlying bedrock. Throughout the mapped area only three good creek sections occur - Gardiners Creek [EP979980] and the two major creeks to the west [EP968990, EP950980].

Access throughout the area is excellent as the lower parts of the mapped area have been cleared for farming and the higher areas generally are covered by fairly open, dry, sclerophyll forest, although some thicker forest patches occur.

Farming, forestry and coal mining constitute the land use of the area.

STRATIGRAPHY

The geology of the area is shown as Figure 1. Folded quartzwackes of the Mathinna Beds intruded by the Devonian St Marys Porphyry form the basement upon which flat-lying sediments of the Permo-Triassic Parmeener Supergroup were deposited. Coal measures are an important component of the Upper Parmeener Supergroup and a small area of basalt of probable Triassic age which occurs north of St Marys is of special interest. Jurassic dolerite intrudes the rock units of the Parmeener Supergroup.

Minor Tertiary basalt and quartz gravels are present in the far north of the mapped area.

Thick talus deposits that sometimes show reworking by alluvial processes were deposited during cold periods of the Pleistocene.

River gravels are not extensively developed in the wide, flat plains of the Break-O-Day River.

MATHINNA BEDS

Folded quartz-wackes of the Mathinna Beds crop out in the eastern part of the mapped area on the Malahide Estate [EQ840000] and around Beauty Flat [EQ846029], and in the eastern part of the area in Gardiners Creek [EP982990] and the ridge to the east [EP982980].

Outcrop is poor and where observed it generally consists of graded, poorly sorted quartz-sandstone which occurs in beds up to 600 mm in thickness interbedded with cleaved mudstone usually no more than 50 mm in thickness. Thin section examination of a sample of the quartz-wacke (PM3) showed it to consist dominantly of quartz, with minor detrital mica and chlorite, in a clay matrix (*c.* 20%).

Quartz grains range in size from 0.05 mm to 0.6 mm, the median grain size being about 0.3 mm. The grains are poorly sorted.

DEVONIAN

St Marys Porphyry

A small outcrop of this rock type occurs in Gardiners Creek at [EP983997] intruding Mathinna Beds. When fresh the rock is dark grey in colour and strongly porphyritic.

In thin section (PM8) it has a porphyritic texture with phenocrysts of quartz, feldspar (dominantly zoned plagioclase), altered pyroxene and biotite, up to 8 mm in length in a very fine-grained groundmass of quartz, feldspar and biotite. Microprobe analysis shows the plagioclase to be andesine (An_{34} - An_{47}). Pyroxene was determined as ferrohypersthene.

The St Marys Porphyry has been radiometrically dated as 375 Ma (McDougall and Leggo, 1965, p.301.)

PARMEENER SUPERGROUP

Flat-lying rocks of the Permo-Triassic Parmeener Supergroup unconformably overlie the older rocks. The unconformity is not exposed in the mapped area although it was observed just to the west on Ben Lomond Sheet [EP831926] in escarpments above the flood plain of the South Esk River, upstream of its confluence with the Break-O-Day River.

Two major divisions can be readily recognised in the Parmeener Supergroup a lower glacio-marine sequence and an upper, dominantly freshwater, sequence.

Lower Parmeener Supergroup

Within this division three formations have been mapped although they are not given formal nomenclature at this stage.

The lower formation consists dominantly of poorly sorted sandstone with some pebbly siltstone and mudstone. The sandstone is well exposed on the Break-O-Day River to the west of White Hut Bend [EP850948] where it consists of thickly-bedded, pebbly, poorly-sorted quartz sandstone and lithic sandstone. Bedding reaches a maximum thickness of 300 mm. Fossils are rare in the formation which probably has a maximum thickness of about 40 m.

The overlying formation, which is often richly fossiliferous, is a calcareous sequence of bryozoal siltstone, pebbly sandstone, calcareous mudstone and massive limestone that reaches a thickness of about 20 m.

Its calcareous nature (although the carbonate may be leached out) distinguishes this formation from the underlying formation. Near its base the formation usually consists of bryozoal siltstone and calcareous mudstone which may contain *Cancrinella*. *Anidanthus* is plentiful and occurs in sandstone and calcareous mudstone.

Above these rocks and cropping out as low strike ridges is a richly fossiliferous bioclastic limestone that is probably about 2 m thick. In thin section (PM5) it consists dominantly of skeletal bryozoa, fragmented shells and productid spines in a later calcite cement. The skeletal material is generally less than 2.5 mm in length. Scattered throughout the rock are angular quartz grains 0.05-0.8 mm in diameter. Occasional grains of perthitic feldspar indicate that granitic rocks formed part of the source area of the clastic material.

The limestone is overlain by the uppermost formation recognised. It is about 50 m thick and consists dominantly of poorly-sorted, pebbly, lithic-sandstone with some pebbly mudstone. Outcrop of this formation is very poor, the best outcrops being on the northern flanks of Bridge Hill [EP880966] and road cuts north of Mt Durham on the Mt Nicholas Road [EQ877013].

On the Mt Nicholas Road and on Bridge Hill the top of the formation consists of fawn/grey, poorly sorted pebbly siltstone. This rock type was not observed to the west of these areas (although outcrop is very poor) and was not separated from the lithic sandstone sequences on the map.

Throughout the three formations pebbles occur and consist of quartz, sedimentary rocks of the Mathinna Beds, minor granite and rare schist. Grain size is very variable. On the Mt Nicholas Road at EQ877015 one 50 mm pebble was seen with its long axis perpendicular to bedding. The pebbles are believed to be dropstones, and the whole of the Lower Parmeener Supergroup occurring in this region is considered to be of glacio-marine origin.

Upper Parmeener Supergroup

The disappearance of pebbles was the criterion used to map the base of the Upper Parmeener Supergroup. The disappearance of the pebbles coincides with good sorting of sandstones (lithic or quartz). Within the Upper Parmeener Supergroup no mappable formations could be recognised although areas consisting of a dominant rock type (or sequence of rocks) are shown on the map.

Lithology of the rocks overlying the Lower Parmeener glacio-marine sequence is variable between well sorted quartz-sandstone and lithic sandstone. Quartz-sandstone is only seen on the south-west slopes of Mt Durham (*e.g.* at EP875979) and outcrop was extremely poor. Elsewhere, as can be seen from Figure 1, the Permian rocks of the Lower Parmeener Supergroup are overlain by massive, well sorted, medium- to coarse-grained lithic sandstone except at, and to the east of, the township of Cornwall [EP953983] where the Permian rocks appear to be overlain by basalt of probable Triassic age although the actual contact is not exposed. In the creek immediately west of Cornwall [EP950982] 7 m of section is missing between the lowermost exposure of basalt and outcrop of pebbly mudstone. The mudstone in this locality is highly jointed and it is probable that this contact is faulted.

The contact between the basalt and overlying coal measures is well exposed in the unnamed major creek 1.5 km east of Cornwall [EP968991]. It is considered highly likely that two flows of Triassic basalt occur in this creek and that they are separated by approximately 12 m of carbonaceous mudstone and lithic sandstone. Thin sections from both flows are similar and although usually altered contain olivine (< 2.5 mm) altered to iddingsite in a sub-ophitic groundmass of sometimes flow-oriented laths (0.2 mm) of plagioclase ($\simeq An_{50}$), titaniferous augite, ?K-feldspar, glass and opaques. Both the basalt and overlying sediments are often extensively replaced by calcite, but there is no obvious thermal metamorphism of the sedimentary rocks, which in places appear to be tuffaceous (*e.g.* PM18).

Overlying the basalt in the same creek about 250 m of coal measures are magnificently exposed. These are markedly rhythmic and show a generalised sequence of massive, cross-bedded (large to very large scale troughs) lithic-sandstone; overlain by massive mudstone generally containing abundant plant debris, the mudstone is often laminated in the upper section; the uppermost unit is a coal seam. Eight coal seams were observed in this creek, ranging in thickness from 150 mm to 2 m and were very variable in quality. Clastic material within some coal seams occasionally shows development of laminar or lenticular bedding indicating that at least some coals were formed by transport rather than being formed *in situ*. In none of the seams was root material observed at the top of the underlying unit.

Coal measure sediments are also well exposed in the creek to the west of Cornwall [EP950987] over a stratigraphic thickness of about 50 m.

West of this creek, creek outcrop is poor and the only rock type seen was lithic sandstone.

North-east of Mt Nicholas at EQ932015 abundant float of hornfelsed plant-bearing mudstone occurs (indicated as Ŧcm on the map).

JURASSIC DOLERITE

Dolerite outcrop forms the cap of Mt Durham [EQ887000], the Mt Nicholas Range [EQ912003] and South Sister [EQ976012]. During the mapping particular care was taken to separate dolerite outcrop from transported material and magnetometer traverses were used to confirm talus deposits. Apart from two small fine-grained dolerite dykes at EQ861000 and EQ888011 the dolerite is fairly uniform and no attempt was made to map grain-size variations. It is considered highly probable that the three main bodies of dolerite form part of the same sill and that the base is now covered by talus.

TERTIARY BASALT AND GRAVELS

A small area of dark, glassy oliving-bearing basalt occurs in the north of the mapped area west of Barnes Road at EQ845045 and is considered to be of Tertiary age because of its juxtaposition with unconsolidated well-rounded quartz-gravels that do not appear to be related to the present river system.

QUATERNARY DEPOSITS

Deposits of Quaternary age can be readily subdivided into two broad types:

(1) deposits associated with the present drainage systems (Qa on the map);

(2) older slope and reworked slope deposits.

Only the older deposits need to be discussed in any detail.

Mantling the slopes of the Mt Nicholas area are thick talus deposits. Drilling by the Shell Co. has indicated that more than 130 m of talus may be present. In present exposures there exists abundant evidence that two ages of talus formation occurred. In road cuts south of the major divide on the Mt Nicholas Road [EP900994] and on the road leading to the new coal mine west of Cornwall [EP943980] completely decomposed dolerite talus is seen to be overlain by a relatively fresh dolerite talus. The boundary between the two talus deposits is very sharp. The upper or younger talus is often rhythmically stratified.

Within the talus deposits blocks of dolerite many metres in diameter may occur and magnetometer traverses were necessary to show that such blocks were not *in situ*. Clastic material other than dolerite is only a minor component of the talus except small localised areas.

Some reworking of the talus is evident in road cuts west of Killymoon Bridge [EP880945] and in a creek section at [EP836925]. This material is shown as colluvium on the map indicating that alluvial as well as angular slope-derived material is present.

STRUCTURE

All faults indicated on the map are categorised as probable in that they are based entirely on consideration of inferred thicknesses and dip of adjacent stratigraphic units.

REFERENCE

McDOUGALL, I.; LEGGO, P.J. 1965. Isotopic age determinations of granitic rocks from Tasmania. *J.geol.Soc.Aust.* 12:295-332.

PART 2. THE GEOLOGY OF THE SOUTH SIDE OF THE FINGAL VALLEY AND OF THE MT ST JOHN AREA

C. Calver

INTRODUCTION

This report outlines field observations made over the 1979-1980 summer field season in two areas:

(1) the southern side of the Fingal Valley between the Esk Main Road and the edge of the Fingal Tier between the Duncan Road and Gray;

(2) the southern extension of the State Coal Reserve, in the north-western corner of the Bicheno quadrangle (Mt St John area).

About 40 days were spent in the field mapping these two areas. The broad dolerite plateau between the Fingal Tier and the southern edge of the St Marys map sheet has been mapped previously by R.H. Castleden.

Mapping was done at a scale of 1:20 000 and is reduced to 1:50 000 in Figure 1.

STRATIGRAPHY

Flat-lying marine sediments of Permian age (correlates of the Upper Marine sequence of the Lower Parmeener Supergroup) are conformably overlain by Triassic coal measures, up to 400 m thick, of the Upper Parmeener Supergroup. Jurassic dolerite intrudes the coal measures in both the areas mapped. Dolerite contacts are often transgressive; and an important aspect for initial coal exploration is to determine the configuration of the intrusions, and to locate faults. This is limited in the field by extensive talus cover, and lack of stratigraphic control in the thick coal measure sequence.

A tentative stratigraphy is shown in Figure 1 (Legend). The rock types differentiated are described more fully below. The oldest unit mapped on the south side of the Fingal Valley is Permian limestone and calcareous mudstone (Pc). No rocks older than Triassic coal measures (Ћc) crop out in the Mt St John area.

LOWER PARMEENER SUPERGROUP

Limestone and calcareous mudstone (Pc)

This unit is richly fossiliferous, with a highly variable terrigenous content. Relatively pure carbonate tends to be thick-bedded, with large brachiopods and bivalves in a medium- to coarse-grained, calcite-cemented, bioclastic matrix. With increasing terrigenous content this passes into calcareous, poorly sorted mudstone or siltstone, often leached of its carbonate content; and bryozoan-rich shale. These rock types are interbedded and are laterally variable on a finer-than-mappable scale. Glacially-derived dropstones, up to 0.5 m in diameter, composed of quartzite, quartz, conglomerate and granite are common. This unit crops out intermittently in creeks in the lowest parts of the floor of the Fingal Valley to the west of Cullenswood [EP945953].

Pebbly sandstone (Psl)

This unit consists of thick-bedded to massive, unfossiliferous, poorly sorted, pebbly, fine sandstone or siltstone, with or without glauconite. Dropstones are abundant and may be concentrated into bands, forming horizons of open-framework conglomerate. To the east of Bedding Hill [EP910955] glauconite is present and may form up to 20% of the rock. This unit is 2-4 m thick in the area mapped.

Mudstone (Psm)

This is a poorly stratified, rather uniform, pale-to-medium-grey mudstone; dropstones are present. Close-spaced joints and fractures impart a hackly appearance to outcrops, which tend to break up into centimetre-size cuboidal fragments. A few more massive, poorly-sorted grey siltstone beds are present. This unit is approximately 30 m thick in the Fingal Valley, but elsewhere in the St Marys Quadrangle it is highly variable in thickness (2-50 m). It crops out only in creeks, and elsewhere is mapped on the basis of surface float.

UPPER PARMEENER SUPERGROUP

Triassic sediments paraconformably overlie the Permian mudstone formation (Pm). The contact is not exposed in the areas covered by this report, but elsewhere in the St Marys Quadrangle, there is a sharp lithologic discontinuity between the mudstone and overlying, well sorted, coarse quartz sandstone. There is usually a pebbly horizon at the base of the sandstone containing mudstone clasts probably derived from the underlying Permian.

Quartz sandstone (Ʀs)

Coarse- to fine-grained, well sorted white quartz sandstone. A few metres of basal subarkosic quartz grits and coarse sandstone, with quartz pebble conglomerate horizons, grade up into medium- to fine-grained sucrose quartz sandstones. Undulose bedding-planes and trough cross-bedding are usual, in beds up to 2 m thick.

Outcrops are rare apart from good exposure in Cardiff Creek [EP910877] where the formation is 20-30 m thick, grading up over several metres into lithic sandstone. Elsewhere it is mapped on the basis of abundant surface float.

Coal measures (Ʀc)

This unit is dominantly comprised of fine- to medium-grained lithic sandstone, with siltstone, mudstone, carbonaceous mudstone, coal, rare conglomerate, and rare tuff. The lack of stratigraphic control in the coal measures is caused by rapid lateral and vertical variation, the absence of marker beds, the uniformity of the dominant lithic sandstones throughout the sequence, and poor outcrop.

The lithic sandstones are well-sorted, grey-green in colour, medium- to thick-bedded, with undulose bedding planes; trough cross-bedding is often apparent.

Intraclasts, in the form of mudflakes and flattened wisps of coal are common, especially near the base of thick sandstone units. Carbonate cementation and partial replacement of the lithic sandstone has occurred in a few places,such as at EP974928, where large (1-1.5 m) carbonate nodules are aligned in parallel trains, indicating a joint control. Particularly massive lithic sandstone units often tend to form cliff lines.

Siltstones and mudstones contain a variable proportion of carbonaceous material, often in the form of well-preserved plant fossils.

Coal exposures, which may be of possible economic or stratigraphic significance, are given in Table 1.

Pebbly horizons are found in the coal measures, and seem to be more common in the upper part of the sequence. Pebbles are usually found scattered along sharp interfaces at the bases of the coarser lithic sandstone units. They are well-rounded, up to 150 mm in diameter, and are composed of resistant rock types such as quartzite, quartz, hornfels, chert, siliceous tuff, and rare granite. A conglomerate, similarly composed and about 2 m thick, crops out in Micks Creek at EP931901 and conglomerate boulders occur almost *in situ* at FP006891, near Gray.

Blocks of tuff, almost *in situ*, overlie a coal seam at EP865706 (Mt St John area). It is massive, uniform, white, rather poorly sorted with

8/1.

Table 1. SUMMARY OF COAL OUTCROPS

	Thickness (approx.)	Description	Grid Ref.	Approx. Altitude (m)
FINGAL VALLEY			EP	
1.	2 m, bottom not exposed	Coal overlain by lithic sandstone. Duncan Seam	844893	480
2.	2 m, bottom not exposed	Coal overlain by lithic sst. Old workings in Cardiff Creek	874903	400
3.	2 m	Old workings	876902	430
4.	0.5 m, bottom not exposed	Coal and grey clay (30%) overlain by lithic sst.	881906	400
5.	1 m	Dull coal over and underlain by mudstone	928926	270
6.	1 m, contacts not exposed	Good-quality coal with some thin clay bands	933911	350
7.	0-7 m, bottom not exposed	Dull coal overlain by lithic sst.	929917	300
8.	1 m, contacts not exposed		932908	380
9.	1-2 m, contacts not exposed	Good-quality coal, with 30% thin beds of grey mudstone and sandstone	931903	480
10.	0.6 m, contacts not exposed		931901	500
11.	1 m, contacts not exposed	Poor quality coal, with carbonaceous siltstone	984930	257
MT ST JOHN AREA				
1.	0.3 m, contacts not exposed		897755	430
2.	0.5 m, contacts not exposed	30% white clay bands	893750	420
3.	1 m, bottom not exposed	30% grey mudstone, overlain by tuff	865706	425
4.	0.5 m, contacts not exposed	Good quality coal, overlain by grey mudstone	863797	400

particles up to sand size; abundant glass shards are visible in thin-section.

The thickness of the coal measures varies according to the level of the base of the dolerite, but on field evidence it appears to reach a maximum of about 400 m in the area south and east of the Duncan Mine.

JURASSIC DOLERITE (Jdl)

A subdivision into fine, medium and coarse grain size with arbitrary divisions at 0.5 and 1.5 mm was made, but no attempt was made to map grain size variations in detail.

Fine-grained dolerite (< 0.5 mm) is very dark in colour, with no regular jointing characteristic of coarser dolerites. Dolerite of this grain size is usually found to be in close proximity to a contact.

Medium-grained dolerite (0.5-1.5 mm) always has well-developed columnar jointing, and a smaller-scale vertical platy joint pattern (parallel joints 5-20 mm apart).

Coarse-grained dolerite (> 1.5 mm) is up to 4 mm in grain size in the Coggle Hills area, where columnar jointing tends to be poorly developed, outcrops tend to be low and rounded rather than columnar in appearance, eroding by exfoliation.

Occurrences of fine-grained dykes intruding the dolerite are indicated Figure 1. Typically, a limited area of dolerite contains many pale grey, aphanitic dykes up to 300 mm wide, with chilled margins, and very thin veins of quartz and black glass. The dykes are irregular, often sinuous, but tend to be roughly subhorizontal. The earlier dolerite usually shows evidence for brittle fracture at the time of intrusion of the dykes, which appear to be dilatational, with matching opposite sides. The three occurrences mapped by the writer were all intruding fine-grained dolerite [EP870890, EP880732, EP896690].

A dyke about 4 m thick intrudes lithic sandstone on the Meadstone Road at EP865740.

QUATERNARY

Dolerite talus (Qt)

This is composed of all sizes of boulders up to 10 m in diameter, usually in a matrix of clayey weathering products. Thick mantles of talus cover the slopes around the dolerite highland areas, and occupy a nearly continuous strip of land along the floor of the Fingal Valley.

Large talus boulders can usually be readily distinguished from outcrop by the absence of consistent vertical jointing (or the lack of any consistent jointing direction); variations in grain size between adjacent boulders; and lack of continuity of outcrop.

Isolated areas of talus, such as the occurrences on the floor of the Fingal Valley, may be erosional remnants of a once-continuous mass of talus,or may be lag deposits from relatively low-level intrusions.

Colluvium (Qc)

This consists of immature dolerite stream gravels composed of platy dolerite fragments,50-200mm in diameter, in a sandy or clayey matrix, usually showing imbrication.

Colluvium covers most of the southern side of the Fingal Valley. It is probably largely alluvial fan material derived from north-flowing streams. It reaches a maximum thickness of over 6 m near the foothills of the Tier, and thins northward.

Alluvium (Qa)

This consists of well-sorted, unconsolidated sands and gravels occupying low-lying areas adjacent to the Break-O-Day and St Pauls Rivers.

Swamp and marsh deposits, common in small basins on the high plateau south of the Fingal Tier, are included in this category.

STRUCTURE

Fingal Valley area

Between Smudgy Gully [EP870890] and Thebes [EP940890] the base of the sill appears to be nearly horizontal at about 650 m a.s.l. or rather lower (500-550 m) to the east of Ransom Creek [EP905900] where there is fault with a downthrow to the east.West of Smudgy Gully, the base of the sill rises further to over 700 m a.s.l. before descending rapidly to a low level (below 300 m) in the Fingal Rivulet.

There are three discrete bodies of dolerite, separated from the main sill, to the north of Appetite Hill/Smudgy Gully. The first is a roughly circular boss of dolerite [EP765905] about one kilometre in diameter with a steep transgressive contact at least on its eastern side. Extending south-west from this towards the Duncan Mine is a dyke-like body of dolerite which is well-expressed topographically. It is cut by creeks in two places, where outcrops of Triassic sandstone indicate that the 'dyke' is in fact discontinuous and is separate (at least at the surface) from the circular dolerite boss. Magnetometer traverses have confirmed that these occurrences are separated from the main sill to the south by a tract of intervening sediment thinly covered by talus.

To the east of Thebes Throne, the dolerite contact descends to about 360 m a.s.l. or lower, in the vicinity of Bare Rock. Further east, it rises again to about 500 m and it maintains this level down the eastern edge of the high, dolerite-capped plateau as far south as Bedggood Hill [FP040805].

A north-south fault downthrowing to the east at Ransom Creek can be inferred by the displacement of the gently south-east-dipping quartz sandstone from the foothills of the Tier to the central part of the Valley at Bedding Hill [EP910955]. The overall dip of the sediments, and hence the throw of the fault, are difficult to determine. A southerly component of dip of 2° would give a displacement of about 100 m. However, no such displacement has been found on the north side of the valley.

The inferred fault at Crouchs Creek, 2 km to the west and also down-throwing to the east, is suggested by a 20 m displacement in the level of the Triassic quartz sandstone.

Mt St John area

The high plateau which extends south-west of Mt St John is a remnant of a sill with a roughly horizontal base at about 500 m a.s.l. To the east of Little John, the base of the sill descends to 320 m a.s.l. in the Swan River, where the contact is exposed, and is conformable with horizontally-bedded lithic sandstone.

Triassic sediments crop out sparingly to the south of the Mt St John plateau, but south of the latitude of Woodheads Hill [EP848698], dolerite outcrops reappear. There is a general coarsening in grain size southwards towards the Coggle Hills. This may indicate a contact which dips gently to the south, to be well below 250 m at the latitude of Marshes Creek where very coarse-grained dolerite crops out.

Low-level dolerite outcrop also occurs in the St Pauls River, north-west of Meadstone Saddle. A zone of fine-grained dolerite at the southern side of this area [EP862746] suggests a steep transgressive contact. The dolerite outliers on the slopes to the north west of Mt St John were distinguished from surrounding large talus boulders and recognised as outcrop on the basis of the criteria mentioned above, but are marked by '?' because of their lack of topographic relief, which is usually characteristic of true outcrop.

[6 May 1980]


1 : 50 000
PROVISIONAL EDITION
ST MARYS
SHEET No: 8514-IV
12/12
LEGEND
Quaternary
Qa River gravels, alluvium
Qt Talus, composed dominantly of dolerite
Qc Colluvium, composed dominantly of dolerite
Erosional surface
? Tertiary
Quartz gravels
Basalt
Low angle unconformity
Fine-grained dolerite dykes (width exaggerated, strike approximate)
Jurassic
Jd Dolerite
c = coarse-grained (> 1.5 mm)
m = medium-grained (0.5-1.5 mm)
f = fine-grained (< 0.5 mm)
Triassic
Coal measure sequences (Tc); dominantly lithic sandstone (Tcl)
Dominantly mudstone (Tcm)
Basalt (Tb)
Dominantly quartz sandstone (Ts)
Permian
Psm Pebbly mudstone
Psl Dominantly poorly-sorted, pebbly, lithic-sandstone
Pc Usually calcareous sequence of bryozoal siltstone, pebbly sandstone, calcareous mudstone and massive limestone.
Pm Poorly-sorted sandstone with some pebbly siltstone and mudstone.
UPPER
LOWER
PARMEENER SUPERGROUP
Note: Ps, Pc, Pm are correlates of the Upper Glacio-marine sequence.
Angular unconformity
Devonian
Dm St Marys Porphyry - Quartz-feldspar-pyroxene porphyry
? Silurian-Devonian
SDs Mathinna Beds. Interbedded quartz-wacke and mudstone (crossed where contact metamorphosed).
Geological boundary - position approximate.
Strike and dip of bedding, overturned, horizontal.
Fault - position approximate.
Inferred fault.
h Indicates Upper Parmeener Supergroup hornfels associated with Jurassic dolerite intrusion.
Boundaries of Fingal Valley Exempt Area.
5 cm

Figure 1.