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TASMANIA DEPARTMENT OF MINES

GEOLOGICAL SURVEY
EXPLANATORY REPORT

GEOLOGICAL ATLAS 1:250 000 SERIES

SHEET SK-55/6

OATLANDS

*by S.M. FORSYTH, B.Sc.
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PREFACE

This explanatory report gives a brief outline of the area of the Oatlands 1:250 000 sheet. This sheet is one of a new series of geological maps which will provide a complete coverage of the State.

The geological information is derived from both departmental and external sources.

The list of selected references at the end of the report will serve as a guide to the more important geological publications which deal with the area.

J.G. SYMONS, Director of Mines

PHYSIOGRAPHY

The topography of central eastern Tasmania is generally mountainous and hilly, with the Central Plateau (1 000 to 1 400 m a.s.l.) dominating the western area. The central area is of varying relief, while the eastern strip is characterised by a range of moderately high hills (500 - 1 000 m a.s.l.) which diminish in height toward the east coast.

Tertiary faulting has played a prominent role in forming this topography, particularly in the north central area where there is a southward continuation of the Tamar Graben. Erosion and intense block faulting has resulted in an area of irregular and lower relief south of Oatlands [EP3016] and Lake Crescent [EP1430].

The higher elevation of the eastern and western mountain ranges is due to the resistant nature of the thick dolerite bodies occurring in these areas. Ice action during the Pleistocene sculpted many landforms on the Central Plateau, particularly in the Mt Field area [DN7078] where cirques, tarns, morainal ridges and periglacial rock fields are numerous.

Much of the coastal topography appears to be a result of submergence. Well developed depositional features occur along the east coast at Nine Mile Beach [EP9540], Rheban [EN7778], Wineglass Bay isthmus with associated sand dunes [EP0730] and the Oyster Bay isthmus, joining north and south Maria Island [EN8874].

PRECAMBRIAN

Dolomite, quartzite and argillite underly rocks of the Florentine Synclinorium in the south-west corner of the map [DN6067]. Some of these rocks may be Lower Cambrian in age. They are unconformably overlain by a thick unit of essentially non-marine conglomerate and sandstone (Reeds Conglomerate, Corbett and Banks, 1974), a correlate of the Ordovician Owen Conglomerate of the Queenstown area.

A small outcrop of probable Precambrian dolomite occurs in the bank of Brumbys Creek [EP0177], about 9 km south-west of Cressy. This fine-grained grey rock assays 55% CaCO_3 and 45% MgCO_3 , with a trace of insoluble material (Hughes, 1957) and is unconformably overlain by Permian rocks.

CAMBRIAN

Cambrian rocks are unconformably overlain by Permo-Carboniferous sedimentary rocks around the foothills of O'Connors Peak and O'Connors Sugarloaf [EP0864] and at Little Den [EP0755]. All outcrops lie south-west of the Tiers Fault [EP1267]. Sedimentary facings within the Cambrian rocks is unknown, but the areas of phyllitic rocks associated with basic igneous bodies are possibly oldest. The sequence is comprised of a black to greenish and cream, closely cleaved siltstone to phyllite sedimentary assemblage. Bedding is not apparent, but the dominant cleavage surface dips to the south-west. The dark, fine-grained basic igneous rock is thought to occur as intrusive bodies.

Massive cream coloured crystalline limestone is found at The Glen [EP0565] with an assemblage of pyroclastic rocks nearby; these comprise sheared basic tuff, lithic tuff, andesite, minor bands of grey slate, crystal tuff, volcanic breccia and tuffaceous conglomerate. The main cleavage surfaces dip toward the north-east and bedding is possibly in the same direction.

Alluvial gold has been mined at Little Den and may be associated with these rocks.

ORDOVICIAN

A limited area of rocks of the Florentine Synclinorium are exposed in the Junee River area in the south-west corner of the map. The basal member, the Reeds Conglomerate (Corbett and Banks, 1974) is a quartzose conglomerate and conglomeratic sandstone, reddish to purplish in colour. It is demonstrably a non-marine deposit and can be correlated with other early Ordovician conglomerates such as the Owen Conglomerate at Queenstown.

The Reeds Conglomerate is overlain by the Florentine Valley Formation, which consists of siltstone, calcareous siltstone and calcareous sandstone containing fossils of Lower Ordovician age. Gordon Limestone overlies this formation conformably and contains a variety of fossils of Late Canadian to probably Early Maysvillian (Corbett and Banks 1974) age. The limestone ranges in colour from dark grey to black and has a calcium carbonate content of up to 93%. In some horizons, irregular beds of chert are present. Limestone quarried at Maydena has been used by the Australian Newsprint Mills at Boyer.

MATHINNA BEDS

Folded Lower Palaeozoic sedimentary rocks are found in the north-east and along some of the eastern parts of the map area. Fossil fauna of probable Early Ordovician age and Lower Devonian age (Banks, 1973) occur elsewhere in the Mathinna Beds. Late Devonian granite intrusions into these rocks indicate that they are no younger than Late Devonian.

Little study has been made of the outcrops of this map sheet, but the rocks appear to be similar in lithology and structure to Mathinna Beds to the north which have been studied in detail (McClenaghan and Baillie, 1975). The main rock types include sandstone, siltstone and claystone or their metamorphic counterparts. The main occurrences are in the vicinity of Avoca [EP6573], the north end of The Friendly Beaches [EP0653], Bluestone Bay [FP1038] and Maria Island [EN9076].

The arenite-lutite association seems to prevail and Williams (1959) showed that the normal sediments at Upper Scamander were claystone and mudstone with intermittent interruptions by turbidity currents which brought in sand, silt and organic debris. The turbidity currents also produced a variety of sedimentary structures, represented by graded bedding and sole markings. At Piccaninny Point, 6 km north of the map, Mathinna Beds are in contact with granodiorite and thermal metamorphism has produced sillimanite, cordierite, corundum and other metamorphic minerals (McNeil, 1965).

DEVONIAN GRANITE

Granite emplacement occurred predominantly in Late Devonian to Early Carboniferous times (McDougall and Leggo, 1965). Occurrences on this map sheet are in the Bicheno-Coles Bay-Freycinet Peninsula areas, Royal George-Avoca area and on Maria Island.

Around Coles Bay, coarse sub-porphyrific red adamellite is most common and encloses smaller areas of strongly porphyritic red adamellite (Groves, 1966). Grey adamellite occurs at Bluestone Bay [FP1038] and Wineglass Bay [FP0830]. Field evidence suggests that the red potassic adamellite is younger than the grey variety. The large number of sedimentary rock xenoliths in the grey adamellite suggests original intrusion of this rock into

sedimentary country rock. There are no sedimentary rock xenoliths in the red adamellite, but it does contain xenoliths of grey adamellite. The red variety also cuts quartz veins which are restricted to the grey adamellite.

Numerous micro-adamellite and quartz feldspar porphyry dykes up to 33 m in width intersect the adamellite. Intersections of these two types of dyke rock indicate that the porphyry is the younger.

Cassiterite bearing gravel occurs in the Saltwater Creek area [FP0636] of Coles Bay and is considered to be derived from small mineralised veins associated with the younger emplacement (Groves, 1966). Quantities of red adamellite have been quarried from Coles Bay [FP0533] mainly for use as ornamental stone.

No detailed information is available on which to classify the granitic rocks in other areas, but they are known to be of several types. Associated with the Royal George [EP7469] emplacement is the secondary uranium mineral torbernite, as well as cassiterite. On Roys Hill [EP7167] acid igneous greissenic granite predominates. The rock exhibits compositional and textural layering which parallel the contact with Mathinna Beds hornfels (Williams, 1969).

No data have been collected on the type of granite occurring on Maria Island and there are no known commercial minerals associated with the intrusion.

LATE CARBONIFEROUS-PERMIAN-TRIASSIC SYSTEMS (PARMEENER SUPER-GROUP)

Flat-lying sedimentary rocks, ranging in age from Late Carboniferous to Late Triassic, rest with angular unconformity upon older folded rocks and granite and constitute the Parmeener Super-Group (Banks, 1973). The Parmeener Super-Group has been divided into a lower division, consisting of a lower glacio-marine sequence at the base, a freshwater sequence and an upper glacio-marine sequence at the top and an upper division of entirely freshwater sedimentary rocks (Forsyth *et al.*, 1974). In this sheet the greatest development of the Lower Parmeener Super-Group is along the Western Tiers and in the southern Midlands. The youngest basal beds of the Parmeener Super-Group are found near Avoca [EP6074] and along the East Coast, where they consist of conglomerate and arkose. In the Midlands, rock distribution is strongly controlled by faulting and nowhere is the basal part of the succession exposed. Faunal studies indicate widespread depositional breaks within the Lower Parmeener Super-Group (Clarke and Banks, 1975).

LOWER PARMEENER SUPER-GROUP

Lower glacio-marine sequence

Tillite with subordinate limestone, sandstone and rythmite forms the basal unit along the Western Tiers from Millers Bluff [EP1457] to Palmers Rivulet [DP9373] (Matthews, 1975). At Poatina [DP9575] the tillite is at least 105 m thick and is composed of erratics of quartzite, slate and schist set in a grey micaceous mudstone matrix. Erratics are up to 300 mm in diameter and may be faceted or striated (McKellar, 1957). Similar rocks occur in the Florentine Valley [DN6084] (Corbett, 1964). The Permo-Carboniferous boundary is thought to be within the upper part of the tillite sequence (Banks and Clarke, 1973).

The tillite is overlain by about 90 m of dark-grey, pyritic interbedded mudstone and siltstone in which bedding is poorly defined. The rocks

contain glendonites, calcareous concretions, pyrite nodules, rare marine fossils and few dropstones (McKellar, 1957; Matthews, 1975; Corbett, 1964).

The youngest rocks of the lower glacio-marine sequence are commonly richly fossiliferous and consist of about 60 m of mudstone and calcareous siltstone with both well and poorly sorted pebbly sandstone and bioclastic limestone (McDougall, 1959a; McKellar, 1957). Along the Western Tiers (McKellar, 1957) and in the Florentine Valley (Corbett, 1964), the higher part of the sequence is poorly fossiliferous and consists principally of dark carbonaceous and pyritic siltstone. On Maria Island, basal arkose and conglomerate pass upwards and laterally into interbedded bryozoal siltstone and pebbly sandstone containing dropstones up to 2 m long (Banks, 1962). Overlying these rocks on Maria Island are a *Eurydesma* limestone and calcareous siltstone.

Freshwater sequence

The freshwater sequence is 26 - 36 m thick along the Western Tiers and contains plant fossils. It consists of well-sorted, coarse-grained, cross-bedded sandstone with subordinate thinly bedded micaceous sandstone, carbonaceous shale and a characteristic worm-cast sandstone (McKellar, 1957). Similar carbonaceous sediments occur in the Florentine Valley (Corbett, 1964). Banks (1957, 1962) regarded portions of the sequences at Mt Nassau [EN1567] and Maria Island [EN8985] as being littoral deposits and interpreted the sequence at Mt Nassau as comprising two cyclothems. In the St Pauls Dome area [EP7076] the lower glacio-marine sequence is absent and thin basal beds of conglomerate and arkose are overlain by the lower freshwater sequence.

Upper glacio-marine sequence

Along the Western Tiers (McKellar, 1957) the upper glacio-marine sequence consists of 61 m of poorly fossiliferous interbedded mudstone, siltstone and fine sandstone, overlain by two pebbly sandstone units separated by a bryozoal shale. This is overlain by 200 m of sparsely fossiliferous mudstone and siltstone with dropstones, containing two persistent thin bands of sandstone and quartz conglomerate.

In southern Tasmania, the bottom portion of the upper glacio-marine sequence is more uniformly fossiliferous and is more calcareous. Fossiliferous sequences of calcareous mudstone, mudstone and sandstone occur north-west of Lake Echo [DP7030] (Prider, 1948) and Waddamana [DP7936] (Fairbridge, 1949). The Florentine Valley sequence includes calcareous fossiliferous sandstone and fossiliferous siltstone (Corbett, 1964), while limestone (McDougall, 1959a), crinoidal limestone (Banks, 1962) and metabentonite (Hale and Brill, 1955) occur in the sequence at Maria Island.

The lower 80 m of the beds overlying the fossiliferous calcareous facies at Mt Dromedary (McDougall, 1959a) consist of sandstone, fissile siltstone and massive siltstone with fossiliferous coarse-grained sandstone at the base and fossiliferous fine-grained sandstone and siltstone at the top. Dropstones are not generally common, but are locally abundant. A prominent thin sandstone occurs 200 m below the top of the upper glacio-marine sequence. The beds above this sandstone are mottled grey mudstone with subordinate fissile mudstone containing sparse fossils and rare dropstones which locally become common. The beds overlying the fossiliferous calcareous facies of the upper glacio-marine sequence are widespread and of uniform lithology. The top 200 m in particular shows little variation (Banks, 1962; Fairbridge, 1949; Leaman, 1977; Prider, 1948; Woolley, 1959), but the lower portion becomes less distinctive near Apsley. On Maria Island the succession is much attenuated and glauconitic (Banks and Clarke, 1973).

Near Westerway (Anandalwar, 1960), Apsley and elsewhere in the southern Midlands (Leaman, 1977) and Maria Island (Clarke, 1973), there are thin persistent sandstone bands or a pebbly sandstone band in the predominantly mudstone sequence. At Hermitage [DP8932] (Fairbridge, 1949) and in the Florentine Valley (Corbett, 1964) parts of the mudstone sequence are dominated by more sandy beds.

The lower freshwater sequence is probably absent at The Friendly Beaches [FP0646] (Clarke, 1969). Here the succession begins with about 110 m of basal conglomerate and coarse arkose with some marine fossils. This arkose is overlain by 50 m of coarse conglomerate. The overlying rocks belong to the upper glacio-marine sequence and include sandy shale, siltstone and sandstone succeeded by richly fossiliferous limestone beneath glauconite sandstone.

UPPER PARMEENER SUPER-GROUP

A return to freshwater deposits which may include a basal carbonaceous sequence marks the base of the Upper Parmeener Super-Group. Intermittent outcrops up to 43 m thick of the carbonaceous sequence occur along the Western Tiers from Parson and Clerk [EP0558] to Poatina [DP9573]. The sequence is variably micaceous and carbonaceous and Permian plants and palynomorphs have been found at Poatina (Banks and Clarke, 1973). Between the Clyde [DP9504] and Coal River [EN3395] valleys the basal carbonaceous sequence is up to 60 m thick and consists of arkosic sandstone, micaceous fine-grained sandstone, micaceous siltstone, mudstone and carbonaceous mudstone. It contains sparse Permian plant fossils and rare coal seams and conformably overlies the Lower Parmeener Super-Group. The basal carbonaceous sequence is attenuated from Elderslie [EN0683] to Black Hills [EN0571], but up to 30 m of laminated carbonaceous, micaceous sandstone with plant fragments occur in the Florentine Valley (Corbett, 1964).

Massive cross-bedded medium- to coarse-grained quartz sandstone overlies the basal carbonaceous sequence or lies directly on the upper glacio-marine sequence of the Lower Parmeener Super-Group. Early Triassic palynomorphs occur 85 m above the base of the quartz sandstone at Poatina (Playford, 1965), but for ease of mapping a Triassic age has also been assumed for the basal quartz sandstone beds. The thin basal beds are usually coarse-grained sandstone or granule conglomerate, although pebbly conglomerate occurs above a possible unconformity in the Derwent Valley (Anandalwar, 1960) and a probable disconformity near Mt Dromedary (McDougall, 1959a).

The quartz sandstone is 120 - 200 m thick and is usually well-sorted, exhibits overturned current-bedding and contains minor feldspar, mica and graphite. It occasionally includes subordinate lenses of micaceous shale and mudstone and intraformational clay pellet conglomerate. In the Derwent Valley, current-bedding in the sandstone layers indicates transportation from the north-west, although near Hermitage [DP8923] the current direction is from the west to north-west (Anandalwar, 1960; Fairbridge, 1949; Jennings, 1955; Leaman, 1971; Prider, 1948; Woolley, 1959).

Above the quartz sandstone in the Derwent Valley (Anandalwar, 1960; Jennings, 1955) and in the southern Midlands (Leaman, 1971; 1977) there is a general increase in the proportion of lutite to arenite and the arenite becomes finer grained. The increase in lutite is usually accompanied by interbedded micaceous, feldspathic quartz sandstone, micaceous shale and brown, orange, grey, green and purple siltstone and mudstone. Plant fossils are occasionally found in the mudstone. Some sandstone has an argillaceous cement with varying amounts of iron oxide. Thick (30 m) mudstone has been reported by Leaman (1971) and Jennings (1955). At Poatina, 140 m of quartz

sandstone and carbonaceous siltstone occur in equal proportions and contain rare amphibians (Banks and Clarke, 1973).

The overlying 90 m thick sequence at Poatina consists of grey-green lithic feldspathic sandstone and siltstone and contains Early to Middle Triassic palynomorphs (Playford, 1965; Banks and Clarke, 1973). Rock sequences of approximately equivalent age in the lower Midlands include quartzitic to arkosic sandstone and buff, green and grey carbonaceous mudstone and coal bearing sequences with well-preserved plant fossils.

The top 165 m of the sequence at Poatina consists of lithic feldspathic arenite and lutite along with carbonaceous siltstone and sub-bituminous coal of Late Triassic age (Playford, 1965). Similar rocks are widespread from Wayatinah [DP5907] to the East Coast and contain most of the productive Triassic coal measures (Hills et al., 1922). Cobbles of volcanic and related rock types occur in the Triassic sedimentary rocks at York Plains (Nye, 1921) while widespread volcanic lithic fragments may indicate Triassic volcanism (Lewis and Voisey, 1938), but could possibly be derived by erosion of Palaeozoic rocks.

In the north-eastern region, the more quartzitic Triassic sequences are much attenuated and at Apslawn [EN9654] are very thin (Hills et al., 1922). The feldspathic and lithic sandstone and accompanying coal-measures are correspondingly thicker.

JURASSIC DOLERITE

Middle Jurassic (McDougall, 1961) tholeiitic dolerite intrusions occur mainly as slightly discordant sheets, commonly over 300 m thick. Thin sills are found near Hermitage (Fairbridge, 1949) and there are dykes of varying widths up to 800 m (Leaman, 1971). Carey (1958) suggested that some intrusions (e.g. at O'Connors Peak [EP0766]) are cone sheets which begin to diverge near the base of the Parmeener Super-Group and intrude the overlying rocks with decreasing discordance. Stepped sheet structures akin to cone sheets and dyke-fed sheets have been described from the southern Midlands (Leaman, 1975). Chilled contacts of dolerite against dolerite and more than one major sheet in the one sequence suggest phases of intrusion, as at Mt Dromedary and near the Shannon River [DP8619] (Leaman, 1975).

The dolerite is chemically and mineralogically uniform. That occurring near Great Lake at DP9170 shows plagioclase laths zoned from bytownite cores to labradorite rims. In the lower 120 m of the sheet, bronzite (2 - 7%) occurs in addition to pigeonite and augite (McDougall, 1958, 1962, 1964). The main variations from typical dolerite are granophyre differentiates (McDougall, 1964) or granophyres, possibly formed by absorption of sedimentary rocks (Leaman, 1971) and rare dolerite with calcite and quartz amygdales (e.g. at Rosegarland [DN9573]) (Anandalwar, 1960).

Dolerite intrusion was associated with faulting and produced many dilational structures. Zones of marked thermal metamorphism of sedimentary rocks surrounding dolerite intrusions are usually only a few metres wide.

TERTIARY SYSTEM

Early Tertiary faults trending north to north-west are widespread and often produced topographic depressions in which Tertiary sediments were deposited. The damming of fault controlled valleys and pre-existing river valleys by lava flows deepened and enclosed basins which were already accumulating sediment before the volcanism.

A discontinuous series of lake sediments of varying thickness and lithology were deposited in the middle Derwent Valley (Jennings, 1955; Anandalwar, 1960). Accumulation was very rapid in the deeper and lower basins as shown by conglomerate (Anandalwar, 1960) in the Glenora Lake [DN7390] of Banks (1955), followed by sediments showing poor sorting, current-bedding and slump structures. As the troughs filled sediments became finer and better sorted. Lava flows are frequently interbedded with sediments; this can be seen near the Lyell Highway at Plenty [DN9669]. Damming of the Bagdad Rivulet by lava is thought to have resulted in an extensive terrace of Tertiary sediments in the Mangalore area [EN2077] (McDougall, 1959a). These comprise poorly consolidated clay and sand beds. An analysis of the clay showed 20% quartz, 40% kaolinite and 40% abnormal montmorillonite.

Silcrete, a silicified sand and quartz gravel deposit, commonly known as greybilly, occurs in several localities as a sub-basalt formation. All occurrences are in basalt areas and although some form the present land surface they are considered to have been overlain by basalt.

The Tamar Graben and associated Tertiary sediments extend southward as far as the Ross area [EP4442], with smaller horsts and grabens continuing through the Midlands to the Hobart area. Lake sediments with lignite occur throughout the sequence. Laterite horizons are present and some may represent Tertiary land surfaces (McClenaghan and Baillie, 1975; Jennings, 1955).

The Coal River [EN3674] and Orielson Rivulet [EN4369] occupy troughs formed by early Tertiary faults; the sediments comprise sand, gravel, clay and lignite. Dolerite derived pebbly gravel sometimes occurs near dolerite capped hills (Leaman, 1971). Buckland [EN6082] is situated on another structurally initiated basin of deposition where lateritic soils, clay, sandstone and carbonaceous clay occur (Goede, 1965). Palaeontological dating of plant spores from sediments in the Tea Tree Rivulet [EN6480] gave an Eocene to Lower Miocene age.

Pyroclastic deposits often occur in the vicinity of volcanic centres, together with sub-aqueous deposits of material derived from volcanic eruption. In the Great Lake area [DP7360] (Sutherland and Hale, 1970), 27 m of lacustrine deposits and bedded pyroclastic rocks with vitric tuff of suggested sub-aqueous eruptive hyaloclastic origin and agglomerate overlain by basalt are recorded. Tuff, reported to be 23 m thick, occurs at Kenmore [DN9074] near Glenora (Anandalwar, 1960). Several basalt flows are interbedded with lacustrine sediments and pyroclastic tuff at Macquarie Plains. Trees opalised in the growth position occur in a tachylitic breccia and tuff formation (Banks, 1955). Sub-basalt sediments have been dated in the Ouse area as Lower Oligocene (Gill and Banks, 1956).

TERTIARY BASALT

Tertiary basalt is widespread and occurs principally as flows, necks and dykes. The larger bodies are usually found in fault controlled valleys into which they have been extruded. Such conditions apply in the Derwent Valley, particularly between Wayatinah [DP6107] and Macquarie Plains [DN9472] and from Conara Junction [EP3669] southwards to EP4927 (extension of the Tamar Graben) and eastwards to Avoca [EP6669] along the valley of the South Esk River. Smaller areas of basalt occupy the Coal River valley from Campania [EN3680] to Richmond [EN3570] and the Bagdad Rivulet from Mangalore [EN2078] to Bridgewater [EN2069].

Large flows of basalt cover the dolerite plateau areas around Great Lake [DP7360], The Steppes [DP9040] and from Waddamana [DP7640] to near Dee [DP7020]. The flows range in thickness from a few metres to over 100 m. Jointing in massive flows is often columnar, whereas it may be platy in dykes. Textural differences in the basalt, with little accompanying compositional variation, may be attributed to different rates of cooling of a single flow (McDougall, 1959b). Other features, such as vesicles, grain size and form may also depend on the environment in which the lava solidified and the rate of solidification. Pillow lava is reported from Macquarie Plains [DN9373] (Banks, 1955).

Saturated olivine basalt is the dominant basalt rock type in the Derwent Valley and Midlands localities, undersaturated alkaline types occur at Apsley, New Norfolk and Great Lake, and a tholeiite olivine lava also occurs at Great Lake. Volcanic centres are numerous and usually have large associated pyroclastic deposits. Eighteen centres have been inferred in the Great Lake area (Sutherland and Hale, 1970).

QUATERNARY SYSTEM

Both erosional and depositional glacial features occur in the high plateau area north-east and north-west of Great Lake and in the vicinity of Mt Mawson [DN6674] (Derbyshire *et al.*, 1965). Periglacial talus and solifluction deposits are widespread in areas above 450 m and are particularly extensive on the Central Plateau and in the Lake Leake [EP6848] - Tooms Lake [EP6525] area in eastern Tasmania (Davies, 1967). West of Great Lake (Derbyshire, 1968) and at Monpeelyata Canal [DP7246] solifluction deposits are underlain by older more deeply weathered gelifluctates. The deposits at Monpeelyata Canal are separated from one another by a humic silty clay with a 14_C age of $30\ 400 \pm 2300$ BP (Colhoun, 1975).

Slope deposits along the Western Tiers scarp near Poatina include scree, block streams, thick talus deposits and large portions of dolerite cliff that have undergone rotation on collapse. The scree occurs at the cliff base and contains angular blocks of dolerite up to 6 m in length, whilst the block streams extend down to 300 m a.s.l. Alluvial sheets derived from slope deposits, Permian rocks and Triassic rocks occur on the scarp pediment (McKellar, 1957; Davies, 1967).

Grèzes litées occur on the lower slopes of Mt Dromedary (Colhoun, 1975). In the lower Derwent Valley at EN1667 alluvial fan deposits attributable to two different periods of formation are separated by a palaeosol developed on an aeolian deposit.

Aeolian sand sheets and occasional dunes occur leeward of river terrace and other sand sources in the Derwent Valley (Nicholls, 1958) and in the low country of the Midlands and eastern Tasmania. Extensive aeolian deposits are associated with Triassic and Tertiary sediments along the Macquarie River [EP2863] (Matthews, 1975). Charcoal dated at $15\ 740 \pm 700$ BP occurs interbedded with aeolian sand near Richmond (Colhoun, 1975). Lunettes occur at Lake Crescent [EP1631] and border numerous lagoons north of and including Lake Tiberias [EP3004]. Loess occurs in the lower Derwent Valley (Sigleo, 1975).

Thin Holocene fluvial sand, silt and clay (overlying gravel) occurs along most river valleys. Estuarine deposits occur in the lower Derwent Valley. Higher level fluvial deposits and erosional terraces pre-date Holocene alluvium in the Derwent, Tea Tree [EN6480] and Coal River valleys (Anandalwar, 1960; Colhoun, 1977; Goede, 1973).

Marine sands occur at Denison Rivulet [FP0569] and emerged beach deposits at Swansea [EP9935] (Davies, 1967). Other major coastal sand deposits occur south of Rheban [EN7680], at Nine Mile Beach [EN9540] and at the tombolo on Maria Island. Coastal dune sands are widespread at The Friendly Beaches [FP0645].

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