

GEOLOGY OF TASMANIASedimentary Rocks

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Quartzite, quartz schists and mica schists of upper Pre-Cambrian age are the oldest rocks known in Tasmania. Dark slates of the Dundas series containing Cambrian dendroids, and Tasmanadia and Hurdia unconformably overlie the Pre-Cambrian. Volcanic phases with spilites, tuffs and breccias are present within the Dundas Series, which passes conformably upwards into a thick volcanic suite of sheared keratophyric lavas, tuffs, and breccias which have been referred to as "porphyroids". This series is complicated in some areas by subsequent injection of Devonian porphyries along shear zones. Conformably overlying the porphyroids are the Farrell slates, which are succeeded by schistose conglomerates containing pebbles of volcanic rocks probably derived from the earlier Cambrian lavas. Another unconformity precedes the Ordovician System which commences with the West Coast Range Conglomerate passing up into white or pinkish quartzites which are followed conformably by sandstones and shales with Tremadocian trilobites. Overlying these are dark blue limestones containing a varied fauna of cephalopods, corals, gasteropods and brachiopods, and the alga Girwanella. Some of these fossils such as Tetradium, are Ordovician whereas others such as Hercophyllum shearebyi are restricted Silurian forms. It seems that the limestone ranges through from the Ordovician in the lower part to the Silurian in the upper layers. The Queen River sandstones and slates follow the limestones with apparent conformity but are somewhat transgressive. They contain a rich and varied upper Silurian fauna. The Mathinna slates and sandstones in north-eastern Tasmania are mostly barren but plant remains of the Hostimella type occur and suggest a Silurian age. They may be facies variants of the Queen River Series. No Devonian sediments have been recognised, and a strong unconformity precedes the Permo-Carboniferous Wynyard Tillite. Permian marine strata are interrupted by a coal and oil shale interlude, and are followed by further coal measures with Glossopteris. Triassic quartz sandstones succeed the Permian with disconformity, and pass up into arkosic sandstones and coal measures bearing a rich Rhaetic flora. No Jurassic or Cretaceous sediments are known.

Thin veneers of marine Miocene sediments are present about Bass Strait and lacustrine basins probably of Upper Miocene age occur in the Derwent Valley and south of Launceston. Pliocene basalt is widespread and there is also evidence of earlier Tertiary basalts. Pleistocene glacial relics are common in the highlands.

Intrusive Rocks:

A small body of granite of late Cambrian age occur at Mt. Darwin. The extensive granites of Western Tasmania are Devonian, and the granites of the north-east and the Furneaux Group are probably Devonian also. Some evidence suggests that two Devonian granite epochs are developed in Tasmania, one of early and the other late Devonian age. Pre-granite pyroxenites and serpentine are widely distributed usually in Cambrian country. They have been regarded as of Devonian age but some evidence suggests they may be older. Widespread stratiform and transgressive sheets of dolerite invaded the Permian and Triassic probably during the Jurassic. Alkaline syenite with many cognate variants intrudes the Permian and the Jurassic sills at Cygnet. It is of late Mesozoic or early Tertiary age.

87

West of the Tamar is a complex of old folded rocks ranging from Pre-Cambrian to Silurian, which appear as inliers beneath a broken and much eroded covering consisting of Permian strata, Jurassic dolerite, Tertiary basalt and young superficial sediment.

Western Region

About half the western region is made up of Pre-Cambrian sediments, unconformably overlying which are troughs of strongly folded Lower Palaeozoic strata. This is the type area of the Cambrian Dundas and "porphyroid" volcanic series, as well as the West Coast Conglomerate series which form the base of the Ordovician. Limestones ranging from Ordovician to Silurian are well developed as a transgressive formation on the Pre-Cambrian core, and in thinner beds infolded with the Palaeozoic sediments between the top of the West Coast Conglomerate and the base of the Queen River Series. The latter formation is well developed and carries a rich upper Silurian fauna. Late Cambrian granite is present at Mt. Darwin. Devonian granites are prominent at Mt. Heemskirk and near Granite Tor and cognate porphyries are intrusive into the Cambrian sediments and porphyroid volcanic suite and also into the Queen River formation. Several bodies of pre-granite ultra-basic rock are developed in the region. Permian strata occur as outliers capping the Pre-Cambrian mountains and also in a depressed basin between Zeehan and Macquarie Harbour. Remnants of dolerite cap some of the higher mountains especially towards the east.

Midlands Region

The Midlands region is occupied by horizontal or gently dipping strata of the Permian and Triassic systems which were intensively injected with dolerite during the Jurassic. This dolerite is now the dominant surface rock. Strong Pre-Miocene block faulting further complicates the structure. Miocene lacustrine beds occur in the middle Derwent and upper Macquarie valleys and are overlain by basalts, remnants of which are scattered throughout the area.

In the extreme west and south-west of the region older formations appear from beneath the plateau rocks. These include Pre-Cambrian schists and quartzites followed unconformably by dark slates correlated with the Cambrian Dundas series, overlain unconformably by bold conglomerates and quartzites at the base of the Ordovician system. These are followed by sandstones and shales with Tremadocian trilobites overlain in turn by limestones with Upper Ordovician and possibly Silurian fossils.

South-Eastern Region.

Geologically the south-eastern region is similar to the Midlands. It consists of Permian and Triassic sediments intensively injected by Jurassic dolerite and subsequently disrupted by faulting. The subjacent basement of granite and Palaeozoic sediments emerges along the Coast between Bicheno and Schouten Island and on Maria Island. Remnants of Pliocene basalt are present round Sorell and Copping.

Structural Features:

The most fundamental feature of Tasmania is the Pre-Cambrian core trending from Port Davey northwards to Cradle Mountain. This was folded during the late Proterozoic and has not suffered strong folding since, although it is flanked on east and west by strongly folded belts of lower Palaeozoic sediments. This core has been generally emergent ever since the Cambrian. It supplied gravels to form the West Coast Conglomerate during the lower Ordovician, and was an area of minimum subsidence during the Permian and Mesozoic transgressions. It suffered maximum uplift during the lower Tertiary movements and at present contains the highest and most dissected country of Tasmania.

The dominating structural feature of the State is the great composite intrusion of dolerite which extends through the greater part of the island. The dolerite burst through the basement in the Midlands and spread out laterally through the Permian and Triassic strata, sometimes concordantly often discordantly, some-times at the basal unconformity of the Permian, more often higher up, often on more than one horizon preserving a general sill-like character in spite of many transgressive contacts. Remnant outlies show that the sheet extended originally to the West Coast Range and north east to Banks Strait. Towards the margin the intrusion was generally concordant.

Extensive block faulting and warping with a dominant north-westerly trend have determined much of the present physiography, such as for example the Derwent Valley, the Western Tiers, and the Launceston Basin. This faulting is later than the Jurassic dolerite and precedes the valley basalts and the subjacent Miocene lacustrine sediments.

The North-West Region:

The north-west region has greater geological diversity than any other region of Tasmania. With the single exception of the Triassic, every geological system present in State is well represented. There is also a wide variety of igneous rocks and diversity of mineral prospects covering nearly every mineral produced from Tasmania. Nevertheless a considerable proportion of the region is geologically unexplored and much of the old strata which have been grouped with the Cambrian as a convenient "hold-all" may prove on close inspection to belong elsewhere.

Northern Region:

The northern region is divided by the lowlands of the Launceston Tertiary Basin. To the north-east are highlands of the Mathinna slates and sandstones, strongly folded and invaded by granite. An unconformable blanket of Permian and Triassic strata with coal measures, injected by Jurassic dolerites overlaps from the south and west on to the flanks of the highlands.

South-west of the Launceston Tertiary Basin rises the fault scarp of the Western Tiers along which the Permian and Triassic plateau rocks with their intrusive dolerite have been uplifted some 2,000 feet and tilted to the south-west.

Southern Region

The southern region consists of ancient rocks in the west and progressively younger rocks in the east. Pre-Cambrian sediments outcrop in the extreme west, and eastwards are followed unconformably by Cambrian Dundas Series and Ordovician West Coast Conglomerates and Quartzites then shales with Tremodocian trilobites. Overlying these are June limestone Ordovician in the lower part, probably extending upwards into the Silurian. These limestones appear again near Adamson's Peak. The eastern part of the region is geologically similar to the Midlands. It consists of gently dipping Permian and Triassic sediments with coal measures, intruded on a grand scale by Jurassic dolerites. Alkaline syenites and trachytes and cognate rocks were intruded into the plateau rocks late in the Mesozoic or early in the Tertiary.

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