

Geo-heritage of the Macquarie Harbour region

An ancient beauty

The rocks that underlie the rugged beauty of the Tasmanian Wilderness World Heritage Area (WHA), including the Macquarie Harbour and Gordon River region, are ancient. The oldest rocks date back a thousand million years and range in physical nature from the very hard quartzites and dolerites through to highly soluble limestones and readily eroded sandstones and gravels. The complexity of the geology contributes to the WHA values of the region. Sandstones, siltstones and conglomerates, dating back to the Ordovician period (505–433 million years ago), contain a variety of ancient marine fossils. These reveal a legacy from a distant past when what we now call Tasmania was beneath a shallow sea.

During the Cambrian period (505–570 million years ago) a line of volcanoes, known as the Mt Read Volcanic Belt, began erupting in an inundated region to the west of where Macquarie Harbour now lies. It was under these conditions that the ore bodies extracted from the west coast ranges were initially formed.

During the Jurassic, some 170 million years ago, tectonic activity associated with the fragmentation of the 'supercontinent' Gondwana and subsequent faulting laid the foundations of the dolerite mountains typical of much of the WHA. In the Macquarie Harbour region, faulting occurred during the Tertiary period (65–2 million years ago), resulting in the formation of the Macquarie Harbour graben. This down-faulted block is the most spectacular example in the State and reaches a depth of 600 m. Much of it is now filled by Tertiary sediments.

The Ice Age

In many respects today's landscape is a legacy of the Ice Age. Broad, U-shaped valleys, such as the Surprise Valley along the Lyell Highway, and highland tarns and cirques all owe their characteristic appearance to the action of glaciers. Like massive rasps across the landscape, glaciers have resulted in the dislodgment of vast amounts of gravel debris from the headwaters of the Franklin and Gordon rivers. Much of this sediment was subsequently washed downstream.

Tasmania has undergone at least three major glaciations throughout the Pleistocene (2 million–10 000 years ago). During the last Ice Age, from 100 000–10 000 years ago, global sea levels were about 100 metres lower than present. Macquarie Harbour as we know it today would not have existed. Instead, the Gordon and King rivers would have flowed to a coastline some distance seaward of the present day coast. With the end of the Ice Age, sea levels rose, stabilising to their present level around 6000 years ago. This resulted in the flooding of the Gordon and King River valleys.

The Gordon River

The Gordon River rises from Lake Richmond on the flanks of the King William Range and passes through some of the most rugged country in Tasmania. The river often cuts deeply against the grain of the prevailing direction of the mountain ranges, forming spectacular gorges. With the third largest discharge of any river in Australia, the river exerts an enormous influence on the hydrology of Macquarie Harbour, resulting in the brackish nature and

tannin-stained colour of its waters.

Along the lower reaches of the river, in-filling with fine sediments has resulted in the formation of levee banks and mud flats and may have forced the river to adopt its present meandering course. The levee banks that line the river between Sir John Falls and Lake Fidler are unique in the southern hemisphere and are of great interest in that they appear to be of very similar composition throughout their length. Such uniformity suggests that they were formed rapidly under a constant regime of deposition of unvarying source material.

Meromictic lakes

Lake Fidler and Sulphide Pool are rare examples of meromictic lakes, lakes which are stratified into narrow layers of fresh and saline water. They are probably the only meromictic lakes in the world formed by the cutting off of inner bend river channels by levee development. They are of outstanding significance on a global scale. The saline water within them is derived from the movement of salt water up the Gordon River. This permeates through the banks of the river, thereby entering the lakes and, being denser, forms the lower layer of their waters. The meromictic lakes are extremely fragile. The construction of the Gordon dam has had an adverse impact on the lakes. Due to the alteration of the natural discharge of the river, the movement of salt water up the lower Gordon river has

been altered, resulting in changes to the amount of saline water entering the lakes.

Limestone caves and cliffs

The caves in the Gordon River region are based on Gordon Limestone, a carbonate sediment up to 2000 m in thickness and considered to be one of the best developed in the world. The weathering of this limestone through chemical processes has led to a profusion of caves, many of which are globally significant archaeological sites. Kuti Kina Cave, on the Franklin River is one such site that has revealed one of the richest depositories of archaeological remains in Australia. The Champ Cliffs (Marble Cliffs) on the lower Gordon River are also derived from the Gordon limestone.

Why is the water brown?

The famous reflections found on the Gordon River are made possible by the dark colour of the water. This dark colouring is a typical feature of watercourses throughout the south-west and is caused by the presence of tannin in the water. The tannin is leached out of the peat substrate upon which certain vegetation communities (such as buttongrass, tea-tree scrub and rainforest) grow. Peat is composed of organic material derived from these vegetation communities and forms in areas where there is high rainfall and low evaporation. When the tannin-stained water tumbles over rapids and waterfalls a froth forms, often giving the ap-

pearance of a stream polluted by detergents. This is not the case, and the presence of tannins has no effect on the purity of the water. Indeed, Tasmania is very fortunate in the abundance of clean freshwater streams that flow throughout the State.

The appearance of the tannin stained water has led some people to believe that the water is poisoned, as this early account suggests:

'The torrents which pour down the mountains mingle with the decayed vegetable matter, and impregnated with its acids discolour the water of the harbour; and the fish that approach the coast often rise on the waves and float poisoned to the shores.'

(John West 1852)

Henty Dunes

The extensive dune field 12 km north of Strahan is one of the highlights of the Macquarie Harbour region. The highest dune is over 40 m and commands a good view across an undulating sea of sand. The dunes are a dynamic system, constantly changing their appearance and marching inland at over one metre per year. The longitudinal movement of sand along the Ocean Beach coastline provides the building material for the dunes, while the predominantly south-westerly airstream moves the sand inland. In some places the advancing dunes have uncovered the remains of old trees that once grew along the coast.