



BRUCE HIGHWAY

ROCKHAMPTON TO MACKAY

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These notes describe some of the geological and geographic features along this 330 km section of the Bruce Highway. The road generally follows the coastal plain in a northwesterly direction, between Shoalwater Bay and Broad Sound on the east, and the Boomer, Broadsound and Connors Ranges to the west.

Geological history

The oldest rocks in the region, about 425 to 385 million years old, came from an offshore volcanic island chain – the *Calliope Island Arc* – which extended from southeast of Mackay to at least south of Gladstone. Remnants of this arc are located at The Caves (the limestone of Mount Etna etc formed as a fringing reef) and at Stanage Bay; but as its name suggests, the most extensive exposures are in the Calliope area. This volcanic arc died away about 385 million years ago and its rocks were transported westward to be added to the edge of the ancient continent.

A second volcanic chain – the *Connors-Auburn Volcanic Arc* – then developed along the edge of the continent itself and was active from 375 to 320 million years ago. The volcanic activity was the result of converging crustal plates, whereby the ocean floor to the east was being pushed (subducted) under the continent to the west. There are remains of this arc in the Broadsound and Connors Ranges. Shallow marine sediments accumulated on the continental shelf to the east – these are preserved in rocks of the *Yarrol Province* in the Rockhampton area and the *Campwyn Volcanics* further to the north around Mackay. Other sediments originally deposited in deep water off the continental edge became smeared up against the continent. These are now rocks of the *Wandilla Province* (or *Curtis Island Group*) and *Shoalwater Province*, seen on the Capricorn Coast.

Both the shelf and deepwater rocks were compressed by crustal movements about 315 million years ago, and intruded by bodies of granitic rocks. The deep-water rocks seem to have borne the brunt

of the compression and were converted into meta-sediments.

In the early Permian (290 to 265 my), a number of elongate basins subsided behind the active continental edge, initially accompanied by volcanic activity. Rocks of the *Berserker Group*, *Lizzie Creek Volcanics* and the *Carmila beds* were deposited in basins around Rockhampton and Mackay, and the large *Bowen Basin* began to sink to the west.

Further compression occurred in the late Permian to middle Triassic (265 to 235 my), deforming many of these sediments and thrusting them up in slices along major faults into mountain terrain. Bodies of granitic rocks were also intruded. In places this episode also resulted in regional metamorphism of the rocks to schist, and the emplacement of a large slice of the old oceanic crust to form serpentinite (a greenish black metamorphosed ultramafic rock with a distinctive soapy texture) in the Marlborough and other areas.

The region has been relatively quiet since then. However the Styx Coal Measures of the Ogmoo district were laid down about 120 million years ago in the early Cretaceous, when a number of small basins subsided on the continent.

Widespread eruption of basalt lavas and intrusion of trachyte and rhyolite plugs occurred at the end of the Cretaceous, (75 my), marking the earliest phase of the extensive basaltic volcanism that occurred in eastern Australia in Tertiary times. Somewhat later in the early Tertiary (65 to 55 my) a number of rift-valley basins formed on the continent in response to tension in the crust, associated with opening of the Tasman and Coral Seas. Thick sedimentary sequences (including oil shale) were deposited in these.

The present landscape is dominated by broad alluvial plains that developed in the last 2 million years.

Points of interest

Rockhampton

So named because of the rocks in the city reach of the Fitzroy River, Rockhampton is dominated by the Berserker Range to the east. This is formed by resistant sediments and volcanic rocks of Permian age, appropriately named the *Berserker Group*. The hard *Ellrott Rhyolite* of this unit caps the summit of Mount Archer.

The Caves

The highway follows the regional geological trend in a northwesterly direction to The Caves township. Mount Etna, a distinctive 284 metre-high conical hill east of the highway 3 km to the north, is partially composed of limestone. It was quarried for many years for a number of products including phosphate (in bat guano), and limestone for cement and agricultural lime, and for flux and acid neutraliser for the Mount Morgan mine. It is a habitat for a variety of species including the Little Bent-Winged Bat and Ghost Bat, and is now part of the Mount Etna Caves National Park. The mine of Pacific Lime Pty Ltd relocated to the western base of the hill away from the cave system in 1988 and finally closed in 2004. The old benches on the northeast are being rehabilitated but remain clearly visible. The company's cement plant is on the northern outskirts of Rockhampton but is now supplied from elsewhere.

Cavernous (karstic) limestone is exposed over a 10 km² area northeast of The Caves. The weak carbonic acid in percolating rainwater has sculpted the caves. Limestone Ridge and Cammoo Caves are accessible parts of the National Park, and the commercially operated Capricorn Caves are open for public inspection.

Serpentinite is also present in this area, emplaced in a slice along a major fault just west of Mount Etna. A small road-gravel quarry is immediately south of the mountain, on the eastern side of the railway line. Part of the quarry is unsuitable for this purpose due to the presence of white asbestos (chrysotile). Large serpentinite masses are also located south of Marlborough and at Cawarral, between Rockhampton and Yeppoon. Serpentinites host unique plant species that can tolerate the high nickel, chromium and cobalt contents in the soil.

Yaamba

In this area a 20 km section of the highway traverses the highest alluvial terrace of the Fitzroy River. The river is about a kilometre west of the township. Prior to the construction of the Rockhampton Barrage in the 1970s, the city's water was piped from Yaamba, which marked the tidal limit. Barrage water now backs up Alligator Creek. This stream is thought to follow an old channel of the Fitzroy River, which once emptied into Broad Sound and Corio Bay. A large sand and gravel deposit just north of Yaamba partly supplies the local construction market, and once supplied ballast for the original railway line.

About 15 km north of Yaamba a monument commemorates the Canoona Goldfield. The discovery of alluvial gold in Bonnie Doon Creek in

1858 sparked Queensland's first gold rush, and was responsible for the establishment of Rockhampton. About 40,000 ounces (over a tonne) of gold was won in two years, but deposits quickly ran out and little has been produced since. The gold originated from the local serpentinite, which makes up the saw-tooth range in the west. Bonnie Doon Creek is crossed about 5km down the Eden Bann Road.

Kunwarara-Marlborough

White stockpiles of the Kunwarara magnesite mine are visible on the plain southeast of the Stanage Bay turnoff. This deposit of magnesite (magnesium carbonate) originated from magnesium-rich sediments, eroded from serpentinite to the west, being deposited in one of the Tertiary basins (see above). The white magnesite was subsequently concentrated at the surface by circulating groundwaters. This basin has also been explored for oil shale, which underlies the magnesite. Large magnesite and oil shale deposits are also located around Yaamba.

Greenish-black serpentinite can be seen in road cuts south of Marlborough. White magnesite nodules are common in the local stream beds, such as Princhester Creek (10 km south of Marlborough).

Mountains of the Torilla Peninsula, in the Shoalwater Bay Military Reserve, dominate the eastern skyline. This range is developed on hard meta-sediments of the *Curtis Island Group*, best seen on many Capricorn Coast headlands.

Most peaks in the discontinuous mountain range between Princhester and Marlborough are comprised of metamorphic rocks (schists etc) and granitic intrusions, such as the curiously named Mounts Og, Gog and Magog (biblical references) and the 500m-high Mount O'Connell.

Prior to 1981, the Marlborough-Sarina section of the highway took an inland route, west of the ranges. The turnoff onto the old highway is just north of Marlborough on the left. A small quarry, in quartz-mica schist, is located about 7 km down that road on the left. The site of a proposed nickel and chromite mine is located a short distance along Marlborough Creek. Chrysoprase mines can be seen on the hilltops nearby. Chrysoprase is semi-precious gem, a translucent, apple-green, nickel-rich variety of chalcedony (a type of quartz). The Marlborough Museum features a number of specimens.

Marlborough-Ogmore-Clairview

Mounts Redcliffe and Slopeway, to the west of Marlborough, are outliers of lateritised Tertiary strata. From Marlborough through to St Lawrence, the highway traverses rocks of the Permian *Lizzie Creek Volcanics*, although the southern end of the Cretaceous Styx Basin is intersected between Deep and Tooloombah Creeks, which converge to become the Styx River.

Quartz sandstones belonging to the *Styx Coal Measures* are exposed between Mount Bison and Wumalgi Rail Siding. The soils on the rocks of the Styx Basin are sodic and highly erodible, and hence the gullying and scalding.



Mount Funnel east of Ilbilbie. An erosion remnant of thick beds of conglomerate of the Carmila beds.

Coal for the railways was mined from the coal measures at Ogmoo from 1918 to 1961, and sporadic exploration for coal and gas continues. Remnants of the coal mining era are evident at the northern end of the town. The Styx River is known for its tidal bores (standing waves up to a metre high – true tidal waves). Tides in Broad Sound are among the largest in Australia. “Charons Ferry” station is located beside the river (in Greek mythology, the dead were carried over the Styx River into Hades by the ferryman Charon).

St Lawrence is the administrative centre of the Broomsound Shire. The port of St Lawrence operated from the 1880s to the 1920s, serving the cattle industry and the Peak Downs copper mine near Clermont.

The Croydon Road lookout, in rainforest on the escarpment of the Connors Range about 10 km west of the highway from the St Lawrence intersection, offers a panoramic view of Broad Sound. The road rises 300 metres in less than 2 km, so it is not recommended for caravans or trailers.

The highway breaks out onto the coast at the fishing village of Clairview. High-strength rhyolitic volcanic rocks belonging to the Permian *Carmila beds* feature in the road cuts in this area.

Carmila-Sarina

Carmila Beach is about 5 km from the township. West Hill National Park, comprising West Hill Island and the south bank of West Hill Creek estuary, is located immediately to the north. West Hill Island is visible from the highway as a 282 metre high conical peak, which is composed largely of granodiorite.

The pockmarked “concrete” on the beach near the mouth of Carmila Creek is in fact conglomerate of the Permian *Carmila beds*. This unit is responsible for the cuestas (slopes controlled by inclined strata) to the west of Carmila. Purple conglomerate (also *Carmila beds* strata) is quarried at Oonooie, 10 km south of Sarina.

The turnoff to Cape Palmerston National Park is located at Ilbilbie. The well named Mount Funnel (344 m) is visible northeast of Ilbilbie. This peak at the western limit of the park is another example of the *Carmila beds*, where resistant conglomerates and sandstones cap more erodible strata.

Cape Palmerston itself and nearby Temple Island, consist of contorted meta-sediments of the older *Campwyn Volcanics*. The park features a sand dune system on the exposed eastern coastline, and a swampy, low-energy environment in Ince Bay.

The highest peak in the Connors Range, Black Mountain west of Koumala (685 m), is the expression of another granitic intrusion.

Sarina – Mackay

Mount Chelona is located on the east about 5 km north of Sarina. This granodiorite intrusion was used to supply armour rock for the Hay Point and Dalrymple Bay Coal Terminals, which service mines in the northern Bowen Basin. The Hay Point turnoff is located about 12 km north of Sarina.

The highway traverses the Pioneer flood plain from 10 km north of Sarina to Mackay. Sandy Creek (16 km south of Mackay) and Bakers Creek (10 km south) were old channels of the Pioneer River. The river’s course suddenly shifted from Bakers Creek to its present location during a very large flood, possibly within the last 3000 years. Its present course is unusually straight (“the Pioneer Lineament”), resulting in very fast and destructive flood flows.

Further reading

‘Rocks and Landscapes of the National Parks of Central Queensland’ by Warwick Willmott. Available from the Society \$18.00 + \$3.00 postage.