# LIMESTONE OF THE MITCHELL - PALMER REGION, NORTH QUEENSLAND

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## LOCATION

Some 125 km south-west of Cooktown on the North Queensland coastline is the site of the old goldrush town of Palmerville. It is situated on the banks of the Palmer River from where it drew its name. Apart from being the surviving settlement from the great goldrusn days of the l9th century, Palmerville has given its name to a major geological feature in the Cape York Peninsula area, the Palmerville Fault.

This fault has been active up to recent geological times. It also marks the western boundary of the Tasman geosyncline, and the sedimentary rocks of the Chillagoe formation which extends southwards to Almaden. These rocks, once laid down on the floor of a Silurian sea, have since been uplifted and tightly folded, then subjected to erosion–deposition cycles leading to the present–day landscape.

Dominant in this landscape today is the line of limestone towers extending north of the Palmer River at Palmerville and southward for some 80 km to the Mitchell and beyond in the vicinity of Bellview Station homestead, where the exposed limestone disappears below the overlying sandstone of the Red Plateau.

This limestone exposure is known as the Mitchell–Palmer limestone belt. Contained on its eastern and western sides by a series of ridges, the limestone outcrops in a series of parallel towers aligned roughly north-south and occurring intermittently over the region. Tower height varies but exposures of 150 metres in height have been recorded.

## CLIMATE

The climate of the area is humid sub-tropical. The mean daily temperature exceeds 29.5$^{o}C$ for every month of the year with November experiencing the highest mean daily temperature of 36.3$^{o}C$. while in July the daily mean temperature is 29.7$^{o}C$. The mean annual rainfall is 1042 mm (41.68 ins) with 94% of the rainfall falling between the months November through to April. Implications of this climate make access to the area difficult and hazardous during the months December through to March because of flood levels in the Mitchell and Palmer rivers and waterlogged black soil plains. In the months of October and especially November, high temperatures make daytime outdoor work arduous. Freshwater supplies other than from the Major Mitchell or Palmer rivers become depleted in small creeks. Access to the area can only be made by four wheel drive vehicles due to river crossings and washed–out gullies.

## KARST

The limestone towers of the Mitchell–Palmer area, together with the exposed limestone from Rookwood to Almaden, are a part of the Chillagoe formation. an exhumed reef complex.

Some features of the karst in the Mitchell–Palmer are:

1. The towers are considerably higher relative to the surrounding base level of erosion, compared to the exposure of limestone in the Chillagoe, Rookwood Mungana area.

2. The bedding planes strongly control the cave development. The limestone has been upturned and the dip of the bed is approximately 85° east with a north-south strike. Strong jointing occurs at right-angles to the strike.

3. There is a phreatic origin of the caves. Some evidence of continuing (vadose) steam enlargement of caves occurs in areas where drainage is controlled by topographical relief.

4. The variation and exposure of the limestone towers are of two types. Firstly, aligned towers surrounded by undulating to flat terrain with associated surface erosion taking place from all sides. Secondly, partly exposed towers where the tower forms an escarpment on one side of a steep ridge of either chert or greywacke and the exposed limestone faces the drainage control.

5. The development to a lesser degree of secondary deposits within the caves as compared to the Chillagoe area. However, some larger systems have extensive decoration.

6. The evidence that the limestone towers were once considerably higher in that:

   (a) bone breccia containing bat skeletons and other unidentified bones are found on top of towers;

   (b) the massive scree slopes derived from the collapse of towers;

   (c) on top of the towers the surface is broken by the dense masses of closed depressions and adjacent depressions are separated by jagged, almost razor–sharp sheets of vertical bare limestone,

   (d) secondarily–cemented blocks of limestone and boulder chokes near the tops of limestone towers. These features have resulted from inward collapse of limestone caverns.

7. The possible age of the karst is seen in the fossil evidence of plant material below the present valley surface in certain localities within the Chillagoe formation, indicating a lower erosion surface as early as the Triassic period 230–180 million years ago.

8. The abundance of fauna in the Mitchell–Palmer caves ranging from colonies of northern grey swiftlet and bats to a wide variety of invertebrate fauna.

The geology of the Mitchell–Palmer area is fossiliferous coralline sediments of Siluro-Devonian age with interbedded basic volcanics. This has a northerly trend some 80 km long and 10 km wide and is part of the Chillagoe Formation.
The main landforms in the Mitchell–Palmer area are limestone towers with associated scree slopes resting at 15° to 30° and aligned north–south. Karren–type erosion is a prominent feature on these towers. The undulating to steep hill country derives from the erosion of cherts, greywackes and siltstone.

Three Aboriginal tribes existed in the area. Little is known of the culture of these tribes but limestone cave paintings have been located north and south of the Little Mitchell River. Aboriginal art is very prominent, being found only in the entrances of caves or rock overhangs. Paintings are of men, women, emus. dingoes and bats, with the most unusual figures being inverted males and females thought to be associated with sorcery. European settlement occurred in about the 1840s. Ludwig Leichhardt on an expedition from the Darling Downs to Port Essington followed the Lynd River down to where it joins the Mitchell which he named in 1845. Around 1873 James Venture Mulligan discovered payable amounts of gold in the Palmer river which led to the Great Palmer River gold rush. Around the time of the gold rush Mt. Mulgrave cattle station was established to supply beef to the diggers on the gold fields.

The Mitchell–Palmer area is currently used for grazing under a pastoral lease. The Chillagoe Caving Club is presently exploring the limestone towers, concentrating mainly on the southern end and slowly moving north. Northern end reconnaissance has been made to see what prospects exist for further discoveries.

The work by the Chillagoe Caving Club in the Mitchell–Palmer area has been carried out over three years whenever access to the area was possible. Around 158 tower clusters have been located from Bellview to the Palmer and out of 10 towers examined, over 100 caves have been tagged and explored. It is advised when visiting the area that the various holdings should be contacted to obtain entry permission. These holdings are Bellview to the south around the Mitchell River, Mt. Mulgrave in the main caving area and Palmerville to the north around the Palmer River.

The area has been examined by Comalco and BHP but authority to prospect was surrendered. Currently there is no authority over the area. Recently, a proposal for a national park over the area has been put forward. A detailed report on the Mitchell–Palmer area will be available in the Chillagoe Caving Club's occasional–paper publication *Tower Karst*.

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