

## Bullock Creek Caves

Rowan Emberson

The Bullock Creek Caves are located adjacent to the usually dry river bed of Bullock Creek, which reaches the sea about a kilometer north of Punakaiki. The caves have been comprehensively written up by Rodgers(1972).

Under conditions of normal water flow Bullock Creek submerges where the stream meets limestone on the west side of the Punakaiki syncline. In flood conditions it overflows the first submergence and progressively floods a series of smaller submergences down valley until it comes to the caves shown on the map. All these with the exception of Wazpretti Cave and Dry Valley Cave are probably more or less flooded during and after heavy rain.

Approximately 1,500 metres south of the submergence is a well defined resurgence cave (Cave Creek Cave, not shown) the active part of this resurges in Cave Creek a tributary of the Pororari River. This has usually been assumed to be the resurgence for Bullock Creek but two colourings with dye failed to establish a connection. A further attempt with larger quantities of dye and a longer sampling period proved to be successful.

It is assumed that the main Bullock Creek Caves (Telluris, Winding Staircase, parts of the Xanadu System) are former submergence caves of Bullock Creek showing progressive headwater recession.

The character of the caves varies considerably, but nearly all show considerable joint control with a series of joints at about 315° magnetic being most important.

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In Xanadu and possibly other caves bedding plane control has also been important, the dip of the limestone being 5-7° in this area, many passages follow the dip very closely.

The development of the caves has not been studied but some observations are possible. The caves have all formed down dip from Bullock Creek with the exception of Wazpretti Cave which is up dip and appears of a different character to the main caves, it is no longer active and there are extensive calcite deposits. The other caves are all almost completely without decoration. The active caves with the exception of Winding Staircase, are all on the south side of the creek bed.

Several developmental phases are evident in Xanadu. There are several areas of tortuous maze which have evidently formed phreatically, as shown by the meandering anastomosing roof half tubes and the segments of more or less circular cross section. At least three phases there is often a vadose trench. There is also the remnants of a calcited false floor in this maze suggesting a period of gravel deposition and subsequent erosion, a process still continuing in side passages of Cairns. In a very simplified way two main types of passage are visible in Xanadu, relatively level passages, often maze-like following a bedding plane, intersected by near vertical narrow rift type passages.

The other caves generally lack the intricate mazes of Xanadu. The main passage of Cairns Catacombs is a large high stream passage which still acts as one of the most important overflow submergences for Bullock Creek Phreatic development is less apparent except in some of the side passages near the main sump.

All the major caves end in sumps 60-70m below the creek bed. Further vadose extensions are generally unlikely in this direction as the sumps must be close to the level of the resurgence. Active streams are present in Xanadu, Kubla Khan,

Telluris, and Cataract Pot.

It is possible that the main caves including Cataract Pot could drain into a largely submerged master cave, also collecting water from the main submergence of which Cave Creek Cave could be a portin.

The history of discovery has been discussed by Rodgers (1972). Although one of the caves was entered by Tony Rodgers and others in 1964 it was not until July 1969 that systematic caving took place. Most of the main passages of the Xanadu System were found in July and August 1969 but it was not until September 1970 that it was all tied together. Most of the other main systems were also first visited in 1969 and were largely explored by the end of 1970, although smaller discoveres continue up to the present time. Surveying got underway in May 1970 (Graham Wilson, Xanadu) and gradually spread to all the more important caves. Bruce Annabell has been largely responsible for the overland survey and for tidying up the numerous small holes. The Xanadu system with 4,900m of surveyed passage is now the third longest surveyed system in New Zealand. Many members of C.C.G. and G.C.G., too numerous to mention have made significant contributions to the exploration and surveying of the Bullock Creek Caves. All surveys have been made with a tape, compass and inclinometer.

In general, most of the main caves are accessible with minimal equipment. 10m ladders are necessary to visit parts of Cairns and Kubla Khan. Winding Staircase has two pitches one of 10m and one of 12m. The Peters Pot and Mikes entrance of Telluris need 15m of ladder and Cataract Pot has an entrance shaft of 42m.

I wish to thank Professor Paul Williams for pointing out various features in Xanadu.