ROCKS & LANDSCAPE NOTES

CAPE PALMERSTON

Paul Blake

Cape Palmerston occurs about 50 km southeast of Mackay. Its wave cut platforms and outcrops spectacularly display the local geology, particularly at the very northern tip of the cape, which will be the focus of this pamphlet.

The outcrop in Cape Palmerston area belongs to a unit of rocks called the Campwyn Volcanics by geologists. They were originally deposited in a very deep marine environment between 365 and 370 million years ago. It is estimated that they were deposited in water depths of between 750 and 1000 metres. Typically such environments have very little current activity. Because the stillness of the water in such an environment, very fine particles of material settle on the ocean floor, producing thick beds of mud or siliceous chert (Figure 1).

Figure 1: **Bedded chert at the northern tip of Cape Palmerston.**

Radiolarians are single celled organisms that are common in deep marine environments and build very tiny, but often intricate, skeletons (Figure 2). When examined with a microscope, the chert in Figure 1 was seen to contain abundant siliceous microfossils that are most likely to be radiolarian. Their skeletons commonly accumulate in deep marine environments on the ocean floor as siliceous ooze which hardens to chert.

At the time the Cape Palmerston area was a deep marine environment, a chain of volcanoes lay to the west in the area that now forms the Connors Ranges. Periodically, possibly triggered by earthquakes or eruptions, the material that built up on the flanks of the volcanoes would slide off and became massive avalanches under the ocean. These avalanches were so large and powerful that they were able to reach the Cape Palmerston area.

These submarine avalanche deposits are recognisable as thick beds of conglomerate and coarse-grained sandstone in the area. The avalanches were so energetic that as they flowed across the sea floor they would rip parts of it up. Parts of the seafloor that were ripped up by the submarine avalanches are visible as flat pieces of fine-grained siltstone and chert within the conglomerates (Figure 3).

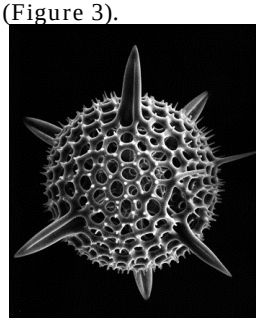

Figure 2: A modern radiolarian as seen by an electron microscope. This specimen is about 0.15 mm across.

Later, about 315 million years ago, the area was deformed by strong pressure that tilted and folded the strata that were originally horizontal. The old rocks in many parts of eastern Queensland were affected by this deformation. At Cape Palmerston the rocks were tilted so much they are now slightly upside down (called "overturning" by geologists). In Figure 1, the cherts in the top left hand corner of the image are older than the cherts in the bottom right hand side of the picture.

Figure 3: Conglomerate that was formed by a submarine avalanche. The flat pieces of rock visible within the conglomerate were siltstone beds on the seafloor that were ripped up as the avalanche passed over.

Heating that accompanied the deformation has recrystallised the microscopic fossils in the chert, so even thought they can be seen under the microscope they can not be extracted from the cherts.