

Tropical Topics

An interpretive newsletter for the tourism industry



The Gondwana connection

Vol 1 No. 1 April 1992

Notes from the Editor

Welcome to 'Tropical Topics', a newsletter designed to help you keep up to date with natural science and conservation news and issues of north Queensland. This innovative monthly newsletter will provide you with interesting reef and rainforest facts.

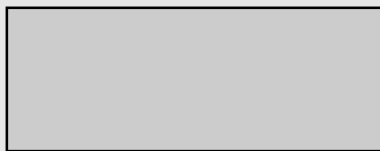
What's so special about the Wet Tropics?

To be selected for World Heritage listing, an area must satisfy at least one of the following criteria. It must represent:

- a major evolutionary stage of the earth;
- a continuing process of geology, evolution, or man-and-environment;
- natural beauty; or
- a habitat that shelters threatened plants and animals.

The Wet Tropics satisfies all four!

This month 'Tropical Topics' will provide an insight into how the Wet Tropics represents a major evolutionary stage of the earth, and why it could have gained World Heritage listing on this basis alone!



A living museum

Australian rainforests have long been considered poor cousins of rainforests in other parts of the world.

The 'jungles' of Africa, Asia and South America conjure up romantic visions of exotic paradise and 'Tarzan' movies. So much so that we are constantly trying to emulate them by landscaping our gardens and resorts with introduced foliage. (Which in many cases has resulted in the invasion of our native forests by 'runaway' exotics.)

What respect we have held for our native flora in the past has generally been reserved for the distinctly Australian flora of the drier parts of the continent; our famous wattles, eucalypts, banksias and grevilleas. Most scientists believe that these plants all originated from the ancient stock of Gondwana, the living descendants of which can be found in the Wet Tropics.

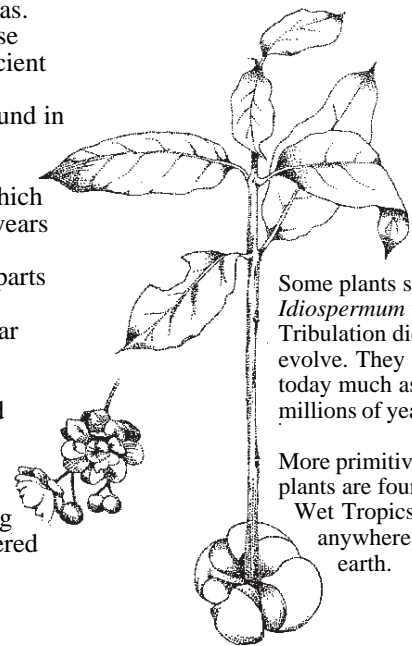
Gondwana - a supercontinent which existed hundreds of millions of years ago - comprised the southern continents as well as India and parts of southern Asia. (The northern continents were joined in a similar landmass called Laurasia.)

For millions of years life evolved across these supercontinents. Dinosaurs came and went and flowering plants developed. At times much of the land (including what is now Australia) was covered by rainforest.

About 180 million years ago Gondwana started to break into continents which gradually drifted apart. Australia was the last continent

to break away, about 45 million years ago.

For 30 million years Australia's life evolved in isolation. As the climate became drier many species died. Others adapted to the drier conditions and survived to colonise the vast areas of dry open forests, grasslands and deserts which cover much of the continent today. Only the mountainous regions of the east coast remained constantly moist. It is here that the last remaining refuges of Australia's ancient tropical rainforests survive, with many species little changed since the evolution of the first flowering plants.



Some plants such as the *Idiospermum* from Cape Tribulation did not evolve. They appear today much as they did millions of years ago.

More primitive flowering plants are found in the Wet Tropics than anywhere else on earth.

Idiospermum australiense
Flowers and seedling

W E T  T R O P I C S
W O R L D H E R I T A G E A R E A

Wet tropical rocks

What have rocks got to do with the rainforest?

Everything! Rocks are the foundations of the landscape and the origin of the soil. They even affect the weather. For example, the north-south alignment of coastal mountains of north Queensland's Wet Tropics traps rain-laden clouds from the moist ocean breezes. In normal years rain erodes the rocks at an imperceptible rate creating the lofty crags, ridges, valleys, gorges and spectacular waterfalls which form the dramatic landscape. Rock fragments removed in this sculpting process accumulate on lower slopes to form a variety of soils which in turn support a range of forest types.

Rocks weather differently. Grain size and mineral composition of rock determine how fast it erodes, the depth of the soil it produces, its texture and nutrient content. Soils in the Wet Tropics vary from thin, stoney, leached and infertile 'lithosols' of some ridge-tops to the deep, red, rich and fertile basalt-derived soils of the Atherton Tableland.

The large-scale structure of the rocks, along with their variable resistance to weathering provides the landscape master plan. Cracks and fractures in the rock can form lines of weakness that stretch for kilometres, often directing the flow of creeks. Rocks without cracks are most resistant to erosion and may be left as pinnacles when surrounding rocks are eroded.

Three main types of rock form the Wet Tropics landscape; metamorphics, granites and volcanics. Each type has its own characteristic combination of chemical and structural properties:

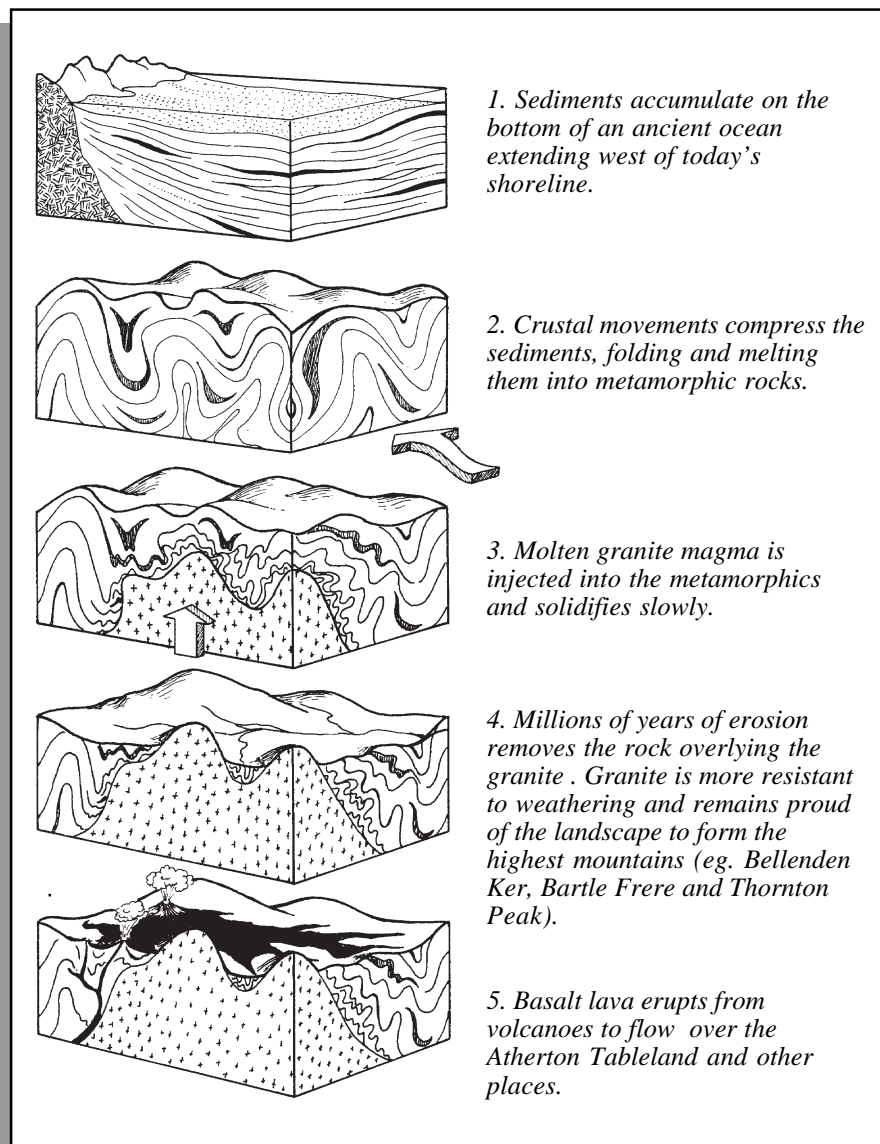
- **Metamorphics** were formed about 360 million years ago when sediments on the bottom of an ancient ocean were compressed by movements in the earth's crust. The sediments fused into a layered and folded block of mixed composition extending for hundreds of kilometres along the coast and for a hundred kilometres inland. Folds and layers give rise to

characteristic weathering patterns such as those found in shale and slate.

- **Granites** formed from the injection of magma (molten rock) into overlying rocks about 200 to 300 million years ago. Magma is rich in quartz and cools slowly, deep below the surface, forming coarsely crystalline, light-grey to pink rock which is only exposed where overlying rock has eroded.

- **Volcanics** formed when lava erupted

onto the surface of the land and cooled quickly. Some light-pink and grey volcanic rocks which are rich in quartz and have the texture of porcelain formed in the southern and western parts of the Wet Tropics about 250 million years ago. More recently (about one to three million years ago) basalt lava, which contains no quartz, erupted and flowed over the Atherton Tableland and other parts of the Wet Tropics. The basalt, often containing bubbles, formed a layer of black, finely crystalline rock which weathered to bright red soils.

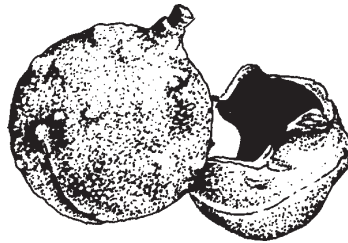


Nature notes

A diary of natural events creates a pleasing journal which grows richer with the passage of time. Watching for the recurrence of an event after noting it in a previous year, and trying to understand what could have caused changes in timing, is intriguing.

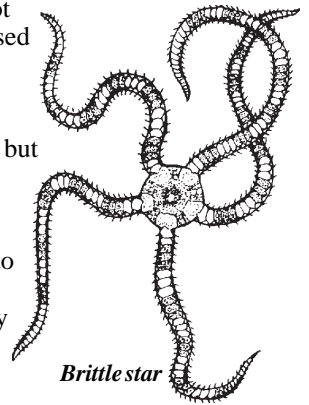
These notes are from the author's own notebook, or were offered by researchers and fellow naturalists. Readers will, inevitably, note variations between their observations and those appearing here. If you do not keep a nature diary perhaps this will inspire you to begin one.

Trees used for communal nesting by **shining starlings** will fall silent this month as the birds fly to New Guinea, or northern Cape York for the cooler months. Around the base of each nesting tree will be a thick carpet of seedlings, representing the fruits which were fed to the young starlings.

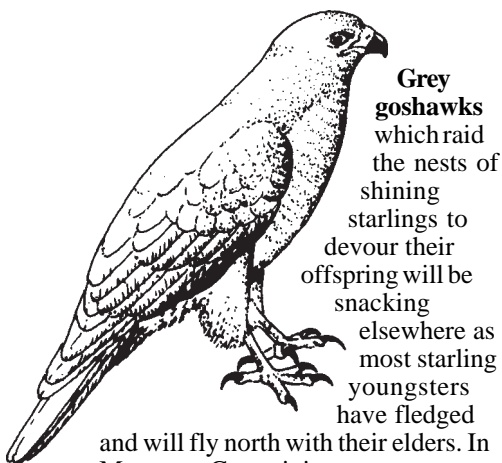


Golf ball-sized fruit will be dropping from the **north Queensland macadamia** (*Macadamia whelanii*). The brownish, granular surface of this fruit is characterised by an off-centre protrusion. Unlike the well-known macadamia of commerce, (which is native to more southerly latitudes) the fruit of *Macadamia whelanii* is **poisonous** to humans. The woody nuts are only a temporary obstacle for rodents which eat the kernels, leaving 'igloos' for ants seeking a dry refuge for their pupae.

About lunchtime on May 14 and 15 the sea will recede further than usual during **very low tides**. Marine organisms not usually exposed to direct sun and air will endure a difficult time, but for humans a very low tide provides an opportunity to view a world that is usually awash.

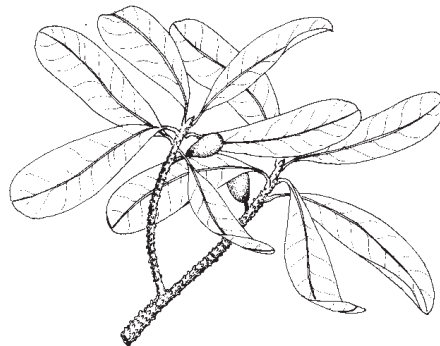


Brittle star



Grey goshawks which raid the nests of shining starlings to devour their offspring will be snacking elsewhere as most starling youngsters have fledged

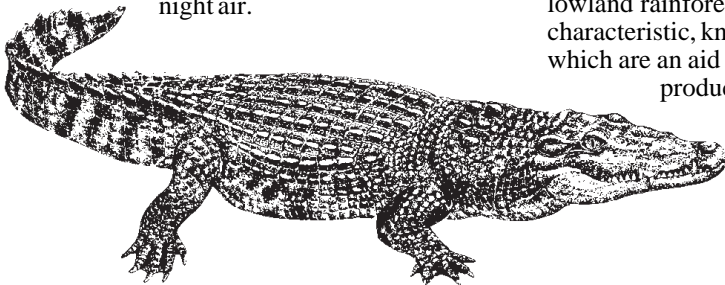
and will fly north with their elders. In Mossman Gorge it is not uncommon to see a grey goshawk delving into a nest, while the adult starlings watch from a nearby tree. These gregarious birds do not combine to mob a predator. Nest defense is left to concerned individuals which occasionally dive-peck the offending goshawk



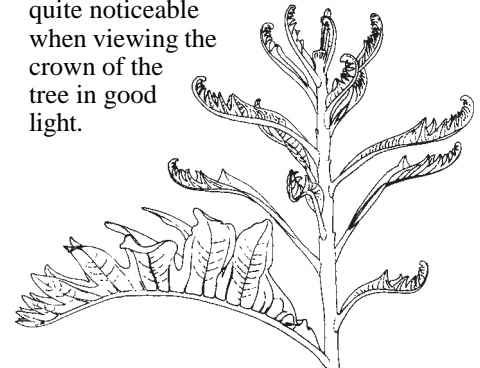
Honeyeaters and butterflies will visit the lofty crowns of **pencil cedar** (*Palaquium galactoxylum*) when they set clusters of short-stemmed creamy flowers. These trees with their impressive buttresses are common in lowland rainforests. They shed characteristic, knobbly-stemmed twigs which are an aid to identification and produce tasty, egg-shaped, pale yellow fruit which will be ripe towards the end of the year.

Migratory waders will fly north this month, leaving our shores in order to enjoy summer in the northern hemisphere. Two of the largest and most recognisable species, the **eastern curlew** and its smaller relative, the **whimbrel**, will head for the coasts of Korea and the coastline around Vladivostok. Migratory birds must need particular fortitude to fly between the two hemispheres, never knowing what changes may have overtaken their destination since last they saw it.

As the weather cools crocodile-watchers are likely to be rewarded with sightings of **estuarine crocodiles**. These reptiles climb ashore to warm up in the winter sun but are likely to re-enter the water after dark, when water temperature is warmer than the night air.



Where **briar silky oak**, also known as findlay's silky oak (*Musgravea heterophylla*) is found, the forest floor is likely to be littered with spent stems from its flower spikes. Although the flowers are cream coloured, the buds have an orange-brown appearance, quite noticeable when viewing the crown of the tree in good light.



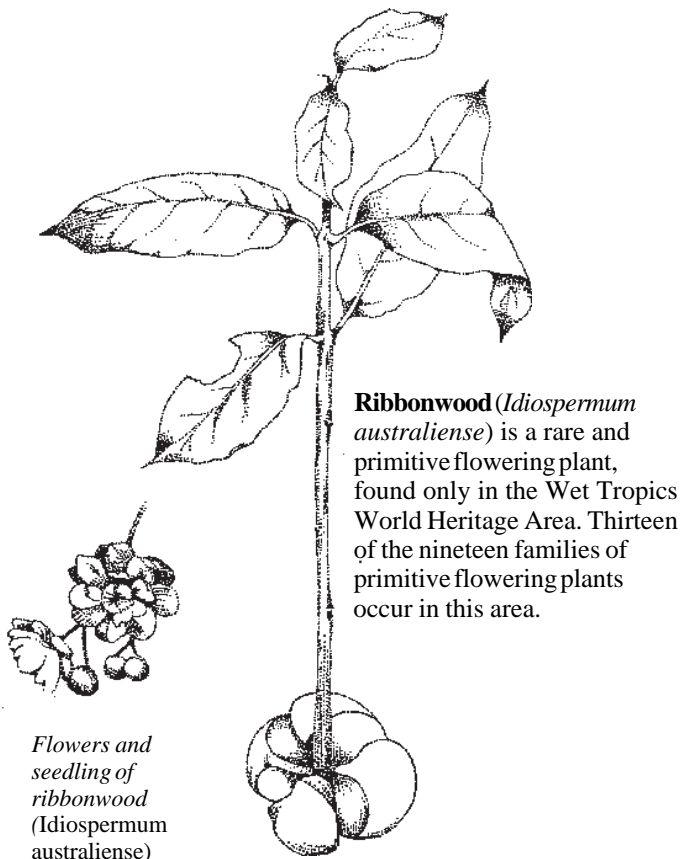
The Gondwana connection



Gondwana

The land masses of the world were once joined into a super-continent called Pangaea. This separated into two smaller land masses, Laurasia in the north and Gondwana in the south. Australia was part of Gondwana.

Until recently, north Australian rainforests were thought to have invaded from Asia when the continental plates collided. More recent theories suggest that Australian rainforests are largely inherited from the ancient stock of Gondwana. This is particularly true of upland and southern forests, while lowland forests have mixed Asian and Gondwanic origins with refugial areas, such as Noah Creek in the Daintree, where Gondwanic plants predominate.

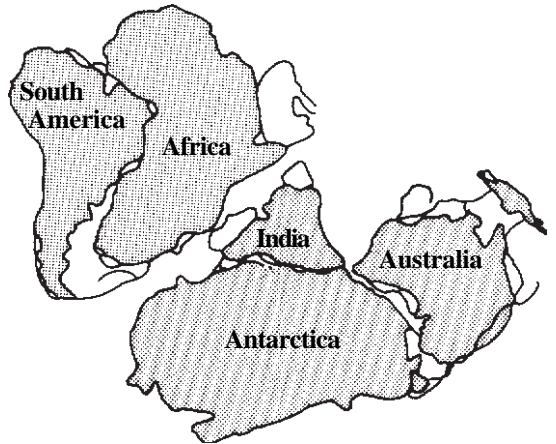


Ribbonwood (*Idiospermum australiense*) is a rare and primitive flowering plant, found only in the Wet Tropics World Heritage Area. Thirteen of the nineteen families of primitive flowering plants occur in this area.

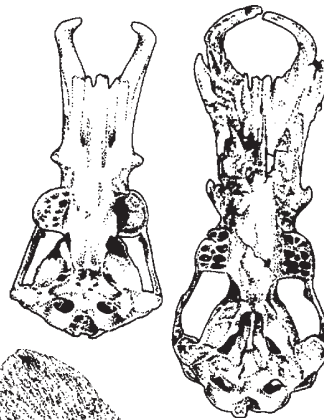
Flowers and seedling of ribbonwood (*Idiospermum australiense*)



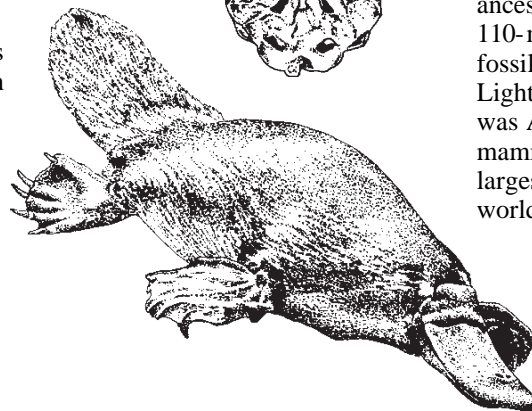
With a family tree dating back at least 20 million years, **musky rat-kangaroos** are considered the most primitive of living kangaroos. Four million years ago, their west Victorian relatives died out, leaving them as the sole survivors of the genus *Hypsiprymnodon*.



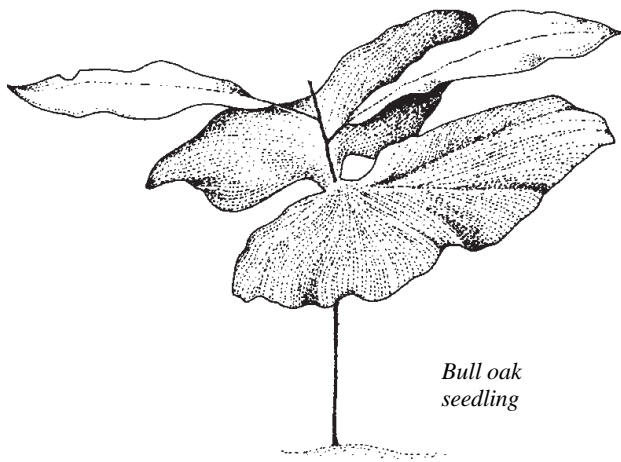
180 million years ago Gondwana started to break into continents which gradually drifted apart. Australia broke away about 45 million years ago.



Compare the skull of a modern **platypus** (left) with the 15 to 20-million-year-old fossilised skull (right) of a platypus ancestor found at Riversleigh Station, north-west Queensland.



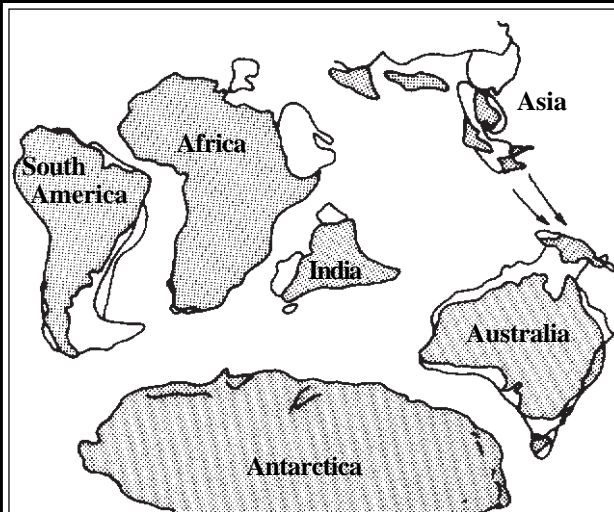
A giant platypus ancestor (known from a 110-million-year-old fossilised jaw from Lightning Ridge, NSW) was Australia's oldest mammal, and possibly the largest mammal in the world at that time!



Bull oak seedling

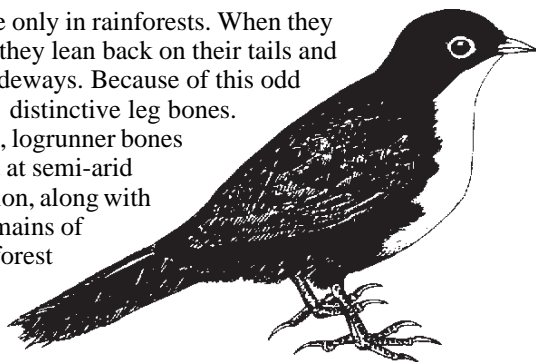
Millions of years ago rainforest covered much of Australia. As the climate began to change, many species of the Proteaceae family (including grevilleas, banksias and acacias) and the Myrtaceae family (eucalypts and bottlebrushes) began to adapt to the drier conditions. These now dominate the landscape and are distinctly Australian.

Ancestors of these plants still exist in the Wet Tropics. The **bull oak** (Proteaceae family) is one such plant.

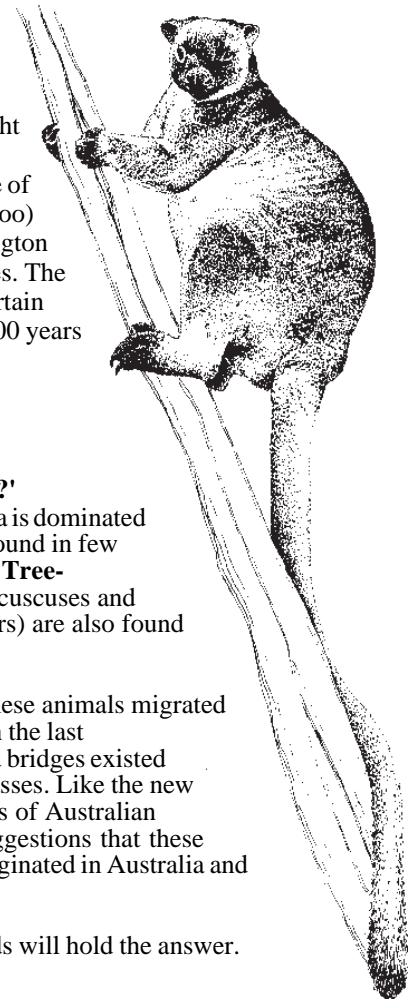


Australia slowly moved northwards, completely isolated from other land masses. About 15-20 million years ago it collided with the Asian plate. Some plants and animals were able to move between the two continents.

Logrunners live only in rainforests. When they search for food, they lean back on their tails and toss leaf-litter sideways. Because of this odd habit, they have distinctive leg bones. Small, fossilised, logrunner bones have been found at semi-arid Riversleigh Station, along with the fossilised remains of many other rainforest ancestors.



In 1982, the fossilised remains of what is thought to be a giant **tree-kangaroo** (about the size of a present day red kangaroo) were found in the Wellington Caves, New South Wales. The age of the bones is uncertain but they are at least 50,000 years old.



'Where do I come from?'

Australian mammal fauna is dominated by marsupials, a group found in few other parts of the world. **Tree-kangaroos**, (along with cuscuses and some possums and gliders) are also found in New Guinea.

Some theories suggest these animals migrated to Australia some time in the last 120 000 years when land bridges existed between the two land masses. Like the new theories about the origins of Australian rainforests, there are suggestions that these amazing animals also originated in Australia and migrated north.

Perhaps future fossil finds will hold the answer.



At times during the last 120 000 years, sea water became bound in ice. This caused lower sea levels and the gap between Australia and Asia became narrower. More species crossed over.

Questions & Answers

Q. What's the difference between cycads and palms?

A. They may look similar but cycads and palms are not related. It's true that they both produce seeds (unlike mosses or ferns) but there the similarities end. Cycads are one of the most primitive seed-bearing plants and do not have flowers. They were one of the dominant plant types during the age of the dinosaurs. Palms, on the

other hand, belong to the huge group of flowering plants and are relatively modern.

It can take a century for a cycad to grow only one to two metres! Next time you see one try to guess its age.

If you have any questions you'd like answered, send them in and we'll do our best to find the answers for you.

'The cat's caught a rat!'

What's so special about that?

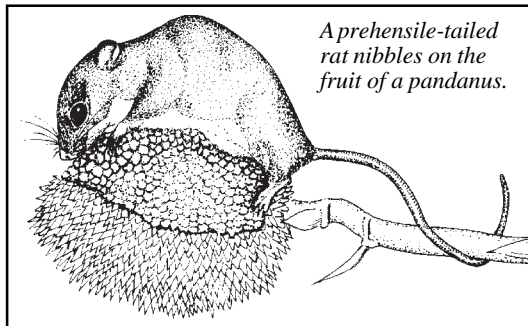
Plenty when the rat turns out to be a prehensile-tailed rat. As its name suggests, this rare nocturnal rat has a tail which it curls upwards to grip twigs when climbing. It can even hang by its tail.

The prehensile-tailed rat (along with the cuscus and tree kangaroos) is believed to have migrated to Australia from Papua-New Guinea thousands of years ago when there was a land bridge across Torres Strait.

Little is known about the habits and distribution of this beautiful, little rat. Sadly, domestic cats have been responsible for most of the finds. The first one discovered in Australia was brought into the lodge at Lake Barrine by a cat in 1974. Since then, several have been caught in Kuranda, also by cats. Two have been

collected from Gordon Creek, near Iron Range and an owl pellet from Mt Lewis contained the remains of one.

The latest specimen was killed in March last year by a pet cat at Whitfield, a suburb of Cairns. It was brought into the National Parks Office for identification. The wildlife officer was busy at the time and put it into the freezer for later examination. Almost a year later, the rat was found again, causing considerable excitement after its true identity was established!

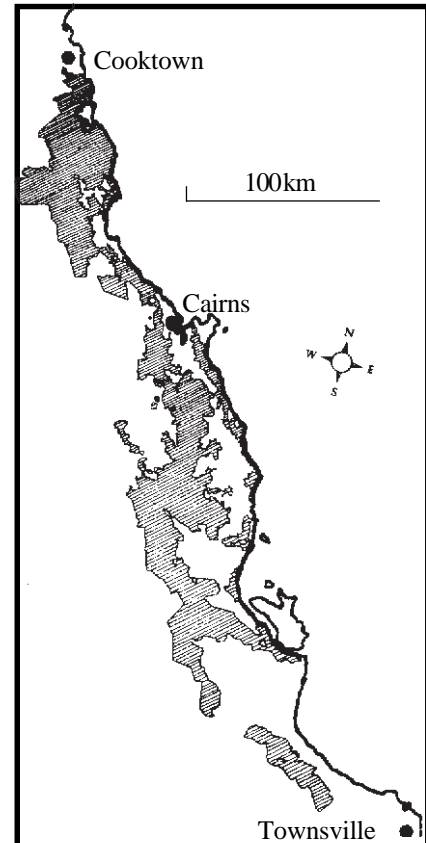


Prehensile-tailed rat nibbles on the fruit of a pandanus.

Facts and stats on the Wet Tropics

Having been around for more than 100 million years, rainforests of the Wet Tropics World Heritage Area are the oldest, continuously surviving rainforests on earth.

Conifers and cycads of the Wet Tropics are living remnants from the time, 200 million years ago, when dinosaurs roamed the earth.



The World Heritage Area covers nearly 900 000ha, extending more than 400km between Cooktown and Townsville. It covers only 0.1% of Australia's total land mass.

The boundary of the Wet Tropics World Heritage Area has been estimated at about 3000km long.

About 300 000 people live in or within 50km of the Wet Tropics World Heritage Area.

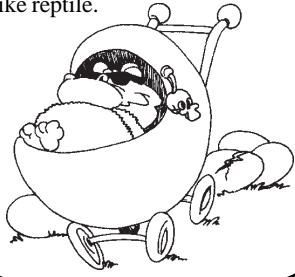
The Wet Tropics currently receives about 2.5 million visits per year.

Tourist talk

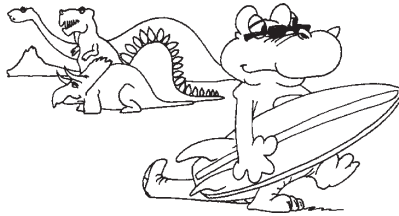
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World Heritage	Welterbschaft	sekai isan	世界遺産
continent	Kontinent	tairiku	大陸
rainforest	Regenwald	nettai u rin	熱帯雨林
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primitive	primitiv	genshiteki na	原始的な
refuge	Zuflucht	hogo	保護
modern	modern	gendai no	現代の

Have you ever wondered why crocodiles are protected?....

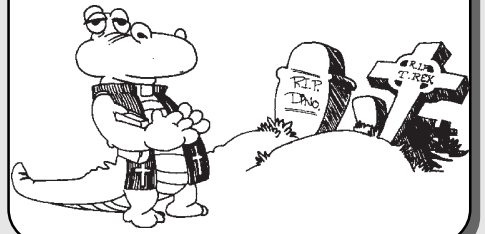
Imagine earth 240 million years ago: enter the first crocodile-like reptile.



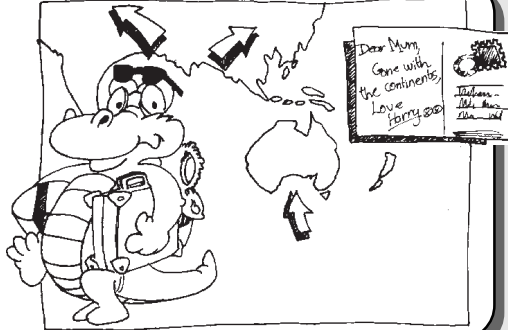
Dinosaurs came and went.



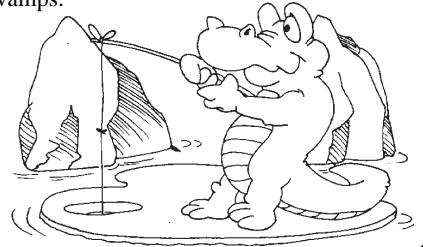
For some reason dinosaurs became extinct about 65 million years ago. Crocodiles lived on.



Over millions of years, the continents have moved and mountains, rivers and coastlines have changed. However, there have always been tropical, coastal river systems...a home for crocodiles.



Ice ages came and went causing large changes in sea level. Crocodiles didn't mind – they could swim to wherever the edge of the ocean was and live in other swamps.



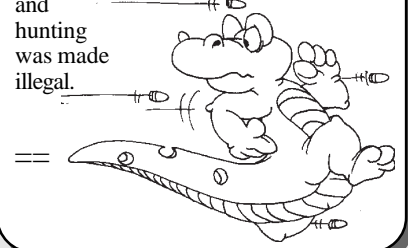
Crocodiles saw the arrival of the mammals and were probably drooling over a new diet!



After surviving for over 240 million years, it is only in the last 50 years that there has been a chance of extinction. Hunters killed so many crocodiles that we almost lost this ancient species!



In the late 1960s, Australians became concerned about the possible extinction of crocodiles. By 1974, crocodiles were recognised as an endangered species and hunting was made illegal.



Bookshelf

The Greening of Gondwana The 400 million Year Story of Australia's Plants

Mary E. White
Reed Books Pty Ltd (1986)

This book gives a thorough account of theories and fossil evidence of the evolution of Australia's flora. Written in chronological order, it may be too technical for some readers. Recommended to anyone with an interest in botany.

After the Greening The Browning of Australia

Mary E. White
Kangaroo Press Pty Ltd (1994)

This four-part follow-up to The Greening of Gondwana deals with the breakup of Gondwana (Rifting), changes as Australia moved north (Drifting), effects of the Ice Ages (Drying) and finally the impact of European settlement (Unbalancing the Biota).



Riversleigh The Story of Animals in Ancient Rainforests of Inland Australia.

Archer, Hand and Godthelp
Reed Books Pty Ltd (1991)

The amazing fossil 'goldmine' of Riversleigh Station makes fascinating reading for anyone. This book is written in a reader-friendly style with the enthusiasm of its authors showing through. However, a little over-enthusiasm in some areas (especially relating to flora) has led to errors. Nevertheless an interesting book.

Greater Daintree World Heritage Tropical Rainforest at Risk.

Gregg Borschmann
Australian Conservation
Foundation (1984)

The ACF published this book to promote the conservation values of the Daintree area prior to the Wet Tropics World Heritage listing. The book covers the political and natural history of the

area. Unfortunately out of print, the book is well worth reading. Most local libraries should have a copy.

Wet Tropics in Profile

A reference guide to the Wet Tropics of Queensland World Heritage Area

Cassowary Publications (1996)

This booklet looks at World Heritage listing, the area and its special qualities, maintaining the Area's Heritage values and the Wet Tropics experience. A wealth of information.

Protection Through Partnerships

Policies for implementation of the Wet Tropics Plan
Wet Tropics Management
Authority (1997)

This booklet deals with management processes, conservation and enjoyment of the Wet Tropics.

This newsletter was produced by the Queensland Department of Environment and Heritage (now The Environmental Protection Agency) with funding from the Wet Tropics Management Authority.

Opinions expressed in *Tropical Topics* are not necessarily those of the Department of Environment and Heritage (EPA).

While all efforts have been made to verify facts, the Department of Environment and Heritage (EPA) takes no responsibility for the accuracy of information supplied in *Tropical Topics*.

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**WET TROPICS
MANAGEMENT AUTHORITY**



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