prokaryotes than eukaryotes. In particular, gene regulatory schemes in which a eukaryotic RNA transcribed at one place in the genome is used to mediate RNA synthesis at a second site have been difficult to support with experimental evidence. Except in the case of a few viruses, proposals from the early 1970s invoking the use of a RNA specifically processed from one gene transcript to stimulate transcription at a second genomic site have remained in limbo. One good reason for this state of affairs was the discovery in 1977 of introns in eukaryotic genes, leading to wide acceptance of the existence of an RNA-splicing mechanism to allow the covalent linkage of non-contiguously coded RNA transcripts. Consequently, there seemed little biochemical need for another way to obtain the same result.

Nevertheless, the idea that RNA primers could be cleaved from one RNA molecule and used to stimulate transcription of another remains an attractive hypothesis, supported in recent years by evidence published by R. Krug and his colleagues at the Sloan-Kettering Institute of the use of host-cell RNA primers for influenza virus mRNA synthesis. They could be sure that their data did not reflect a conventional RNA-processing reaction because the primer RNA sequence linked by the 5′ terminus of each influenza virus-encoded mRNA segment was demonstrably of cellular origin. Thus, mRNA molecules originating both *in vivo* and *in vitro* could be synthesized in controlled conditions and the origins of their segments analysed in detail.

Until recently, the search for such events — with their regulatory potential — in eukaryotes has awaited a system of sufficient interest to make worthwhile the extra effort needed to distinguish transcription-level effects from those at the level of conventional RNA processing, and in which it was feasible to analyse in detail the expression of various RNA segments comprising a candidate mRNA molecule.

A pool of small RNA molecules containing the mini-exon sequence, such as the 137-base RNA reported by Campbell *et al.*, is a pre-requisite for all models of discontinuous transcription of the VSG genes although it presence does not prove that discontinuous transcription is occurring. Similar results have recently been obtained by Borst and his co-workers using several trypanosome strains (*EMBO J.*, in the press). The next step is clearly the direct analysis of the RNA precursors to VSG mRNA, particularly those containing the mini-exon sequence. In this way, it should be possible to tell whether the RNA segments are made separately and then joined by some unconventional mechanism; whether RNA-primed transcription is responsible; or whether some combination of these events in an even more exotic process could be taking place in this system. □

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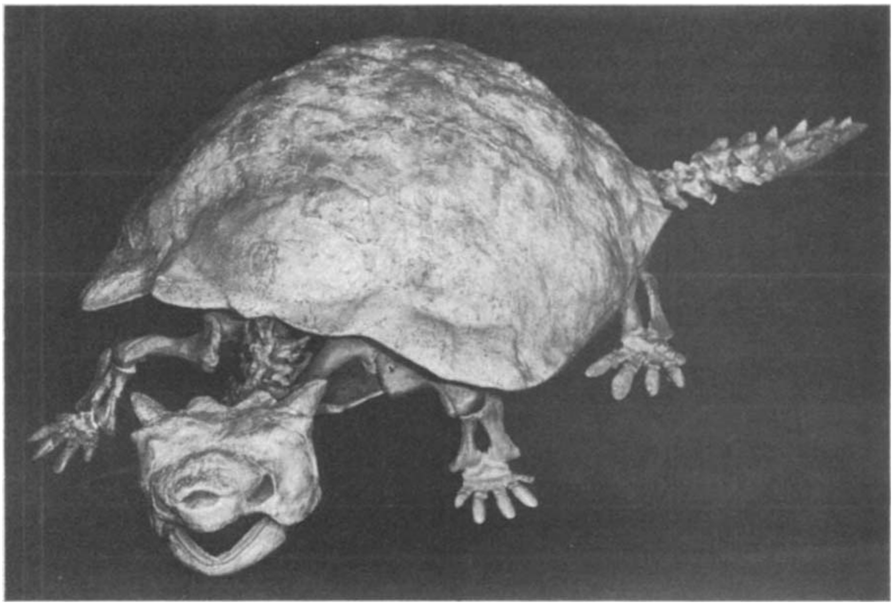

Giant tortoises down under

THE present-day animals of Australia are a peculiar bunch, but those that lived one million years ago, in the Pleistocene, were even stranger. There was a giant wombat called *Diprotodon* which was the size of a rhinoceros, and a monster 3-metre-high kangaroo named *Procoptodon*. This trend to large size was also seen in the turtles. The available specimens of the tortoise *Meiolania* have recently been restudied (Gaffney, E.S. *Bull. Am. Mus. nat. Hist.* **175**, 361; 1983) and some important new finds are reported.

Meiolania platyceps was a 2-metre-long tank-like land tortoise that is known from numerous remains found on Lord Howe Island, New South Wales. Its skull was heavy and covered with an outer armour of plates and horns — no doubt so that it could withstand the impact of a giant kangaroo landing on its head. *Meiolania*, like most turtles, had a relatively small braincase, so it probably wasn't very bright. Its shell was huge, and its arms and legs could be pulled in beneath it. One remarkable feature of *Meiolania* is its tail which was long and carried at its end a bony mass made from rings and spikes. Like certain armoured dinosaurs (the ankylosaurs), *Meiolania* could have swung its tail from side to side to deliver a powerful blow to any potential predator.

All the material has been collected from shoreline and soil deposits on Lord Howe Island, and these have been tentatively dated as 100,000 - 120,000 years old. The first *Meiolania* bones may have been collected in 1844, when John Foulis MD visited the island. He later recommended that it be developed as a penal colony, stating that the island could "support a population of 5,000 souls if under control". One wonders what 'control' he had in mind. The island was not developed in that way. Later, Robert D. Fitzgerald visited the island and found turtle bones in 1869. He sent specimens to Sir Richard Owen, the leading British comparative anatomist of his day. Further bones have been collected since then, with recent finds in 1971, 1980 and 1982; most of these went to the Australian Museum, Sydney.

Richard Owen identified the first skull and tail club of *Meiolania* that he saw as that of a giant lizard (1881, 1882) and, later (1886), other remains as those of a large turtle. It was Thomas H. Huxley, a rival of Owen's, who gleefully pointed out that Owen's 'giant lizard' was in fact a turtle (1887). Since then, other British and Australian scientists have identified various *Meiolania* bones, and speculated wildly about the animal's precise taxonomic relationships.

In the new work, Gaffney redescribes the skull in detail, and concludes that *Meiolania* is a cryptodire turtle, related to present-day soft-shell turtles and tortoises.

Meiolania died out, with the giant wombats and kangaroos, some time ago. This may have been caused partly by climatic changes during and after the Ice Ages, or by the arrival of humans in Australia. Giant tortoises still survive, but only just, on the islands of Aldabra and the Galapagós, but these are not close relatives of *Meiolania*. *Meiolania* would have been a tempting food-source for humans because of its large size, although it would not have been easy to kill because of the heavy armour over its head and body. It was probably very slow-moving and dim-witted, however, and an enterprising group of aborigines could have stood on the tortoise's back to avoid the tail-club, and attacked its unprotected neck with blunt instruments. □

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