

# WHAT BROUGHT AUSTRALIA THE KANGAROO?



When Captain Cook landed in Australia, he marvelled at the strangeness of the animals. The extraordinary kangaroo, which leapt along on its hind legs waving its powerful tail for balance, was something quite new. Odder still, it gave birth to its young when they were hardly bigger than a thimble, and raised them in a special pouch.

Although Captain Cook did not know it, marsupials such as the wallaby and the kangaroo were not unique to Australia. Back in geological time, Europe had animals which shared many of their characteristics, and there are still species of opossum and marsupial rat to be found in North and South America. But the range and variety of marsupials in Australia is unrivalled—the country has more than 170 different marsupial species, the Australian equivalents of Europe's dogs, rats, mice and even moles.

Sorting out why Australia should be so different has been an absorbing biological puzzle—Charles Darwin, in the last century, was one of those who grappled with it. But a recent paper by two British scientists in the publication "Nature" goes some way, at least, towards solving the puzzle. Dr. N. Jardine and Dr. Dan McKenzie of King's College, Cambridge University, England, have used the new discoveries of the movement of continental plates to explain at least part of the mystery.

"I won't say that we have finally discovered what did happen," says Dr. Jardine, "but at least we can now rule out nine-tenths of the hypotheses which have been put forward in the past."

## Act as Boats

According to the theory, the continents act as boats in which the various species of animals are carried as passengers. When the boats are isolated from one another by vast oceans, the passengers form an isolated community within which the processes of evolution take place. These can be explained by the Darwinian theories of natural selection. But the boats are not stationary. It is now known for certain that they move about on the surface of the earth. Sometimes two or more of the continents may run into each other, allowing the passengers to mingle freely, before parting again to form isolated communities.

"The idea which is new is to regard the continents as agents of dispersal," says Dr. Jardine. "It's always been known that orchid seeds or fern spores could cross the Atlantic Ocean on the trade winds, and birds carry seeds when they migrate. But how does one explain the distribution of animals?"

## Timetable Worked Out

What the two scientists have in fact done is to work out a timetable showing where the continents were at any time in the past. Continents move extremely slowly—but even a centimetre (0.4 inch) a year adds up to 1,000 kilometres (620 miles) after 100 million years, not a long time in geological terms.

"We've worked out a straight timetable for the contact of the continental masses, and tied it in with the fossil record of marsupials," says Dr. Jardine. "This produces a simple scheme which fits the fossil record."

The timetable shows that until 43 million years ago, Australia, Antarctica and South America formed a single land mass. Then Australia separated itself from Antarctica and moved away northwards, taking its animal passengers with it. It was completely isolated until the last 10 million years or so, when it began to approach the islands of Indonesia.



Map of the continental drift in the world's southern hemisphere.

## The Suggestion

"It has always been assumed," Dr. Jardine says, "that marsupials did not develop independently in Australia and spread out from there. The position of the continents in the past means that if the marsupials didn't develop in Australia, they must have got there by crossing Antarctica from South America when the three were linked to animals?"

What the theory suggests is that the marsupials, originating from one primeval species in North America, reached Australia by way of South America and Antarctica at some time more than 43 million years ago. Then the continents separated, trapping the marsupials on Australia, where they developed their amazing abundance and variety in the absence of competition from other species. The marsupials left behind in South America were having to compete with better adapted mammal species, and so became extinct, or nearly so.



Species of opossum and marsupial rat are still to be found in North and South America. These pictures show a type of opossum native to New Zealand (top) and an American opossum with its young.



#### Several Possibilities

There is one loophole. Why was it that only the marsupials reached Australia? Why didn't the other mammals cross with them and compete with them in Australia?

"We don't know the answer to that," Dr. Jardine admits. "It is possible that because the marsupials were less specialised animals they were able to colonise Antarctica more easily than the specialised herbivores and carnivores, and hence were

able to cross the land bridge more easily—but in a sense that's begging the question."

So there are still several possibilities open, and further research will be needed to sort out the details.

#### Wider Use Likely

But the idea of using the movement of the continents to explain the curiosities of biological distribution is bound to be more widely used.

"With the more dispersible organisms such as seeds, of course, we're on shaky ground," says Dr. Jardine, "because there are other ways they can be distributed. But one possibility is to use a kind of mirror-image of our technique to study the distribution of organisms in the sea.

"As the continents separated in the past there must have been a mixing of the ocean masses, and this will be recorded in the fossils of marine species. One difficulty, unfortunately, is that many of the crucial areas—the most interesting ones—are very difficult to reconstruct. For example, the Caribbean area is a place where many small continental plates meet, and it may never be possible to work out exactly how they moved in the past."

Quite clearly, not all the distribution of species in the earth's surface can be explained by the movement of the continents—but the new technique is a useful addition to the armoury of the palaeontologists.

## GOVERNMENT TREBLES A.C.F. GRANT TO \$150,000 A YEAR

The Federal Government has increased its grant to the Australian Conservation Foundation from \$50,000 a year to \$150,000. The decision was announced by the Federal Treasurer, Mr. Snedden, during his 1972-73 Budget speech on August 15.

The grant will meet the costs of the Secretariat only; funds for projects will still have to come from membership fees, gifts and bequests. The grant, however, will permit a significant expansion within the Secretariat.

After learning of the increased grant, the Foundation's Executive said: "We are most grateful to the Australian Government for its prompt action in providing such a useful grant. It will enable the Foundation to continue its task of reorganising for the future; its administrative machinery has been strained far beyond its capacity. The President said in June that if the Foundation were to represent the considered conservation opinion of the people of Australia, it must have the necessary financial support. The Australian Government's grant goes a long way towards meeting this urgent need."