

LITERATURE REVIEWS

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THE “AUSTRALIAN PROBLEM”

ECOLOGICAL BIOGEOGRAPHY OF AUSTRALIA. Allen Keast, editor. 1981. Netherlands: Dr. W. Junk bv Publishers. 2142 p.

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The diversity of living organisms is perhaps the greatest source of joy and pleasure to the biologist or naturalist. Indeed, the amazement that one feels as a new form of life is seen for the first time can scarcely be matched. Thus in the age of exploration, one can appreciate the wonder expressed as the intrepid travelers discovered the southern continent of Australia. Here was represented perhaps the greatest assemblage of oddities in the natural world. The plants, the invertebrates and especially the mammals all shouted Australia's singularity. To the evolutionist this was a continental example of what had been observed on smaller islands — land mass isolation or development and then adaptive radiation of the life forms into evolutionary synchrony with the various ecological niches.

The monograph is divided into three individual volumes with a box cover and a separate large folded map of Australia. Within the three volumes are eight separate sections each containing a number of articles, 69 in all, by various specialists.

The first section logically begins with a geological study which supports the concept of Gondwanaland, its breakup and the drifting away of the continent from Antarctica, Africa and South America. Biological and geological affinities with South Africa and South America are often drawn. Some data that do not support such a conclusion are also given. However, all authors favor a drift model for the placement of the continent. The paleoclimate and the present are compared with evidence from palynological studies which support a moister climate in the past. A factor not appreciated by myself until reading this series was the role that fire plays in the distribution of life forms. The massive campaign by Smokey the Bear has left most with the understanding that fire is caused by man, and that it has no role in Nature's cycles. The reverse is true in many ecological zones.

The second section deals with the flora of Australia and its distribution. Because of the large size of the continent and its long north/south dimension, a wide variety of ecological regions are found varying from dry scrub desert to the wet tropical rain forest. An alpine area even exists in the south east. The dryer climates, however, are found on the majority of the land mass. The Eucalyptids, which are composed of nearly 500 species, are almost exclusively distributed in Australia, a few species being found on New Guinea and outlying islands. New Guinea is an area that provides good evidence of tectonic plate collision and has remarkable faunistic and floristic affinities with Australia. These affinities were often treated throughout the monograph, which was indeed welcome. Other plant forms have more cosmopolitan distribution, but even these have unique characteristics. The degree of endemic forms at the generic and even the family level is indeed impressive. With the disjunct patterns of plant habitats locations, good evidence again is presented for different climatic conditions in the past.

Section three deals with the invertebrates of Australia. Here the series is perhaps most deficient. This is to be expected, being that the invertebrates compose the vast majority of life forms, and it is not probable that they all would have received the same emphasis as have the vertebrates. Evidence is presented to show South American and African affinities between various invertebrate fauna. Yet one could wish that the treatment here was more extensive.

Section four concerns itself with the biogeography of fresh waters. Australian rainfall is largely seasonal and in most areas erratic in amount. This has resulted in a large number of organisms which have highly specific capabilities in coping with this seasonality. It is unfortunate that the biogeography of marine organisms was not treated, for there are numerous forms that have poor dispersal properties which inhabit the coastal shores, especially the Great Barrier Reef, and these certainly could have been examined with profit.

Sections five and six deal with the poikilothermic and homeothermic vertebrates respectively. The amphibians are logically dispersed in accordance with the abundance of moisture. Both the amphibians and reptiles show supposed mixed origins, a few with affinities to proposed Gondwanaland fauna and a majority having Asian affinities. Here again, the diverse habitats have allowed a high degree of local endemism to develop. An extensive presentation on both recent and fossil marsupials is next given. I was surprised at the limited amount of fossil mammal material that is extant and that it is mostly Quaternary in age, with rapidly reducing

amounts as one moves into the Tertiary. There appears to be no evidence of placental forms. Pleistocene giantism, with wombats the size of bears and kangaroos 3 meters tall, is seen in Australia, along with a massive Pleistocene extinction. Several papers on the biogeography of birds are also presented, but more from an ecological perspective, with the emphasis being on how the environment regulates their placement.

The seventh section is a group of papers on aboriginal man, his prehistory, culture and adaption to the various environments. Still unresolved is the question of multiple invasions by man as well as his possible role in the extinction of certain species.

The final section is a short synthesis which attempts to constrict the wealth of information into a manageable whole. These perhaps should be read first, as they provide an excellent overview of the entire series. The almost exclusive presence of marsupials in Australia is perhaps the greatest biogeographical and speciation puzzle faced by the creationist.

In overview, the series presents the fastest way of acquainting oneself with a vast amount of literature and provides the reader with an extensive bibliographic source. The articles are written at various levels of complexity, some to be read easily by most biologists, others intended for only the specialist. (The article on spiders was ponderous). Unfortunately, this monograph probably will not reach a wide audience as the price borders on the obscene — \$500.

In my tenure with the creation movement, perhaps no other questions come up with greater frequency than those revolving about the “Australian problem.” This problem is not unique to creationists. The pronounced paucity of fossil marsupials in Australia is far from a convincing argument for their evolution. The dilemma presented is as follows: Firstly, if the marsupials came from the ark, how could all the various families of marsupials have made it to Australia and nowhere else? In addition, why do none of the placental mammals arrive there also? There are the rare exceptions of a rodent family, some bats (whose source is obvious), man and his dog. Secondly, if it was possible for a marsupial type to have arrived on the continent first and later be isolated, an enormous amount of morphological change must then have taken place in that original ancestor, for there are marsupial moles, carnivores, insectivores and, of course, the unique kangaroo types. So we are presently stuck with either a highly unique dispersal mechanism or enormous amounts of morphological change. The creationist must squarely face this “Australian problem.” The above series seems an efficient place to begin gathering the data for such a study.