

book reviews

Coral, the living rock

Biology and Geology of Coral Reefs. Edited by O. A. Jones and B. Endean. Vol. 1 (Geology 1): pp. xvi+410; vol. 2 (Biology 1): pp. xxi+480. (Academic: New York and London, November 1973 and January 1974.) Vol. 1: \$28; vol. 2: \$42.50; £20.40.

THE appearance of these two volumes, to be followed by a like number, indicates the present interest in coral reefs. The great controversies of the last century concerning their origin, unresolved by the outcome of expeditions to Funafuti, were succeeded by a period of greater interest in living corals including taxonomy and the vexed significance of growth forms, work associated with the names of Mayor and Vaughan in the United States, of Stanley Gardiner in Britain and of Dutch workers in the then Netherlands Indies with the lone enquiring figure of Wood-Jones at Cocos-Keeling.

It was on the falling crest of this wave that in 1928 I took the Great Barrier Reef Expedition to Australia to study reefs as living systems but the only follow up came from the Tropical Biological Station established by the Japanese at Koror in the Palau Isles in 1935 and later destroyed in the war.

The present wave of interest was generated by mighty forces. In 1945 the United States Government decided to test atomic weapons at Bikini Atoll in the Marshall Isles. 'Operation Crossroads' in July 1946 was followed by other explosions until testing ceased in 1958. Accompanying operations involved major oceanographic surveys with wide ranging geological and geographical studies including the deep drillings on Eniwetok which, at long last, ended the controversy in Darwin's favour. Most detailed analyses of coral formations included taxonomy and ecology of corals.

But although attempts were made to estimate productivity, there was a singular lack of what may be described as intimate contact with living corals. This came with the work of T. F. Goreau in the Caribbean. Starting with calcification which he studied experimentally *in situ* below the surface, he proceeded with ecological analyses of coral formations and also revealed the unexpected richness of the Atlantic coral fauna. The greatest blow that coral reef studies have suffered was his premature death in 1970.

The editors of these volumes which summarise much of what has been achieved are connected with the Great Barrier Reef Committee at Brisbane which maintains an active centre for teaching and research on Heron Island in the Capricorn Group. When completed by the publication of two further volumes, the entire work will contain 46 contributions by 41 authors from 6 different countries. Unfortunately there is no indication of the contents of these future volumes so that one cannot judge how complete will be the final coverage.

There is little arrangement of chapters and no cross references between them; each must be read in isolation; however one knows the difficulties inherent in such composite works. The first, geological, volume which is essentially descriptive, contains an excellent account of Caribbean reefs by J. D. Milliman. His comparisons between these and Indo-Pacific reefs are illuminating and his description of sand cays as "slowly moving sand waves" is apt. There is no one so well qualified as Harry Ladd to write about Bikini and Eniwetok Atolls and everything affecting corals that occurred there. All will be grateful for this comprehensive statement.

The extensive recent work on reefs in the Indian Ocean, including Aldabra, which was covered by the symposium in 1971 is well summarised by David Stoddart. The reefs of French Polynesia (The Marquesas, Tuamotus, Society Islands, and the Austral Archipelago) with those of New Caledonia are described by J. P. Chevalier. F. W. Whitehouse deals with the reefs off New Guinea but strangely without illustrations: the one map referred to was certainly not in the copy I have received. Not surprisingly the volume ends with five chapters devoted to various aspects of the Great Barrier Reef, from the nature of its waters to geomorphology, structural and tectonic factors and sediments. There is a mass of useful information here—asking to be coordinated some day—although the maps illustrating distribution of sediments, some of them appearing isolated at the end of the book, are very difficult to understand; colour should have been used.

Much is made in the biological volume of microbial ecology and the pos-

sible—for it is as yet no more—significance of the microflora in coral nutrition. In a later chapter on marine antibiotics, interesting enough in itself, there seems to be no specific reference to scleractinian corals, only to gorgonids which are now, at any rate in the Caribbean, assuming unexpected significance as a source of prostoglandins.

Leonard Muscatine gives an expectedly judicial survey of the nutritional problem in hematyphic corals. But his extensive references to our work in 1928/29 is clear indication of how little, apart from studies on the zooxanthellae, to which he has contributed so notably, has since been done. J. H. Connell's chapter on coral ecology is also to be commended. He stresses the significance of interactions between coral colonies, a further indication (so badly needed) that, despite the immobile masses of lime they form, corals are living animals.

Peter Glynn contributes a long descriptive account of the ecology of coral reefs in the Caribbean which can usefully be read with Milliman's chapter in the other volume. G. J. Bakus provides what I take to be the fullest review to date of knowledge about tropical holothurians, so numerous in species and so ubiquitous on sandy areas of reefs. The last two chapters deal with that most destructive echinoderm, *Acanthaster planci*, adding to the rich literature on this now notorious, but biologically so interesting, starfish.

These volumes contain a wide range of information, the chapters inevitably varying widely in degree of relevance and mode of approach. They will be of real value to all engaged in aspects of coral reef research although they are hardly likely to draw anyone to the subject. They lack the breath of recent research which permeates the pages of the just completed "Coral Reef Project. Papers in Honor of Dr Thomas F. Goreau 1924-1970" (*Bull. mar. Sci.*, Miami, vol. 23) which should be seen by all who are interested in the volumes under review. The two further volumes will soon, one hopes, be available. The editors somewhat strangely dedicate the work in part to themselves but, more significantly, add the name of H. C. Richards, at one time Professor of Geology at Brisbane, to whom I gladly offer a personal tribute.

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