sion of belts of mangrove, themselves initially dependent on a degree of stability imparted by storm ramparts. But there is little to suggest that such an evolutionary sequence would be synchronous on neighbouring islands.

With the recent establishment of the Australian Institute of Marine Science at Townsville, a new phase of intensive long term study of ecological and sedimentary processes has become possible. This should go a long way towards rectifying our present ignorance of scale and rate factors operating in the overall barrier system.

In order to capitalise on the geophysical work of the expedition a series of boreholes at intervals across the shelf is needed to demonstrate the nature and sequence of the suspected major Holocene fluviatile development overlying the −109-m terrace: until this is done the interpretation of seismic evidence must remain conjectural. Such a study would be well complemented by detailed examination of the aggradational sequences along the Queensland coast.

On a more local scale the expedition has demonstrated that the time is ripe for 'taking an island apart' by systematically drilling a series of holes through a single island like Bewick, with a view to reconstructing in three, rather than in two, dimensions the evolution of the modern reef geometry. Again, the seismic survey has suggested the potential rewards that such a drilling programme might bring in revealing exactly how the morphology of the earlier dissected reef limestone surface influences the subsequent growth and development of the modern reef system.

Over the next few years, therefore, we should see a new understanding emerge of the internal structure of the Great Barrier Reef, even perhaps including an appreciation of its foundation structure in relation to the plate-tectonic history of the western Pacific.

But there is surely another side to all this. Plate tectonics is all very well, but have we not forgotten the organisms—the very substance and most singular feature of the reefs? Have we yet begun to appreciate, for example, the immense potentiality that the 1,600 km length of reef offers for latitudinal studies of organic diversity? As it is, the basic fieldwork still remains to be done, to enable the spectrum of reef communities of the northern Barrier to be compared with those at Low Isles, let alone with other Indo-Pacific reefs. So we can confidently look forward to a resurgence of interest in the natural history of the Great Barrier, and the despatch of a further, faunistically orientated expedition. □

. . . and ecology

Reef biogenesis

from Jean H. Weber

A symposium on coral reef biogenesis was organised by the Australian Institute of Marine Science (AIMS) on December 15–16, 1975 in Townsville, Queensland, Australia. The long term objective of the AIMS work on coral reef biogenesis is to develop a unifying model of the growth, development, and maintenance of the Great Barrier Reef, and the symposium was held to identify critical areas of research. Further details may be obtained from the Director, AIMS, Townsville, Queensland 4810.

M. LITTLER (University of California, Irvine) reviewed and evaluated the literature pertinent to the calcium-depositing habit in macroalgae, noting the current debate on the relative ecological importance of various kinds of calcifying organisms. Suggested research areas included partitioning *p*H changes into those due to calcification and those due to photosynthesis, by following changes in total alkalinity of the system by chemical methods. Studies of periodicity and stress effects on deposition rates were also recommended, as well as of grazing pressure on reef-building algae, inter and intraspecific competition, recruitment, and bioenergetics.

One vital group of reef algae are the symbiotic zooxanthellae, which make possible the survival of reef corals in a nutrient-poor environment. L. Muscatine (University of California, Los Angeles) evaluated the state of knowledge of the coral/zooxanthellar symbiosis. Some fundamental questions still remain unresolved (what, for example, is the quantitative contribution of zooxanthellae to maintenance respiration of a coral? what is the mechanism of nutrient retention and recycling? how does photosynthesis accelerate calcium deposition?).

Marine productivity begins with photosynthesis and the production of metabolic intermediates. A. Benson (Scripps Institution, San Diego) noted that the importance of lipids in the energy budget of a wide variety of reef organisms was first suggested by the recognition of wax esters, triglycerides, and phospholipids as components of mucus secreted by corals and other reef organisms. This mucus is consumed by various animals, including fishes and many commensals. Reef corals derive their stores of lipid by a yet undefined transfer process from their symbiotic zooxanthellae.

M. Doty (University of Hawaii) reviewed the essential functions of the serally appearing algal components of coral reefs: the planktonic (micro-), fleshy (meso-), and crustose (macromorphic) constituents.

Coral reefs are unique among marine ecosystems in their ability to produce biogenic sedimentary materials and to retain these materials in the form of a wave-resistant structure. This ability to alter the environment is a function both of the rate of production and the nature of the material produced. The growth of reefs is mediated initially by an environmental "coarse-tuning", imposed by geological, meteorological and oceanographic variables. The reef system itself then acts as a "fine-tuning" device. S. Smith (Hawaii Institute of Marine Biology) examined the nature of $CaCO_3$ materials produced, rates of production, and the external factors which influence and are in turn influenced by the growth of coral reefs.

D. Stoddart (University of Cam-

A hundred years ago

MOST of the natives who come into intimate contact with the Russians at the present time, we are informed, profess Christianity. That many heathen customs still, however, cleave to them is shown by the following incident. At a "simovie" where we landed for some hours on Sept. 16, we as usual came upon a burying-place in the wood near the dwelling-houses. The corpses were laid in large coffins above ground, with a cross in nearly every case raised over them. At one of the graves there was a consecrated picture fixed to the cross, which must be considered an additional proof that a Christian reposed in the coffin. Notwithstanding this, several garments, which had belonged to the deceased, were found hanging on a bush near the grave, together with a bundle containing food, principally dried fish. At the graves of the richer natives we are informed that the survivors place, together with food, some rouble notes, in order that the departed may not be altogether destitute of ready money on his entrance into the other world. But that fine clothes are not considered any special recommendation with St. Peter was evidenced by the exceedingly shabby, tattered, and patched condition of the garments hung up at the grave in question.

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