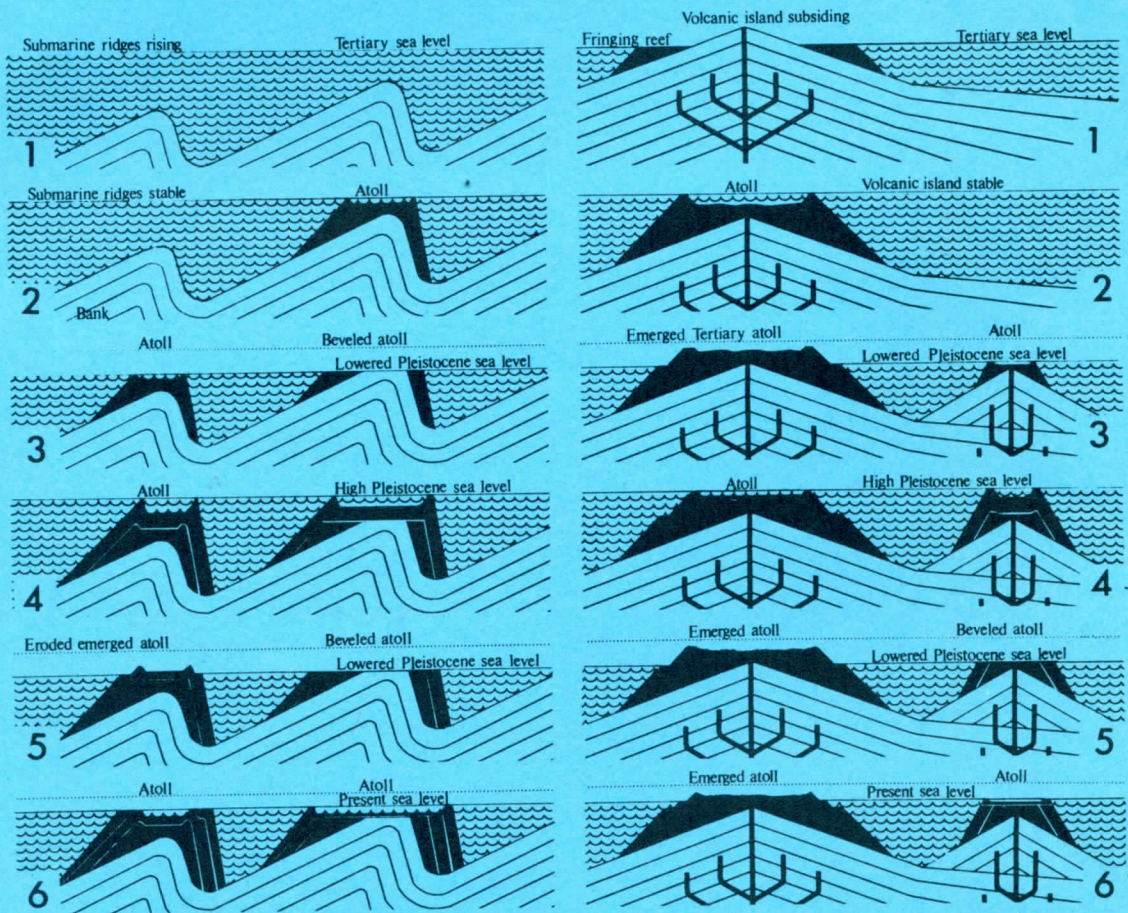


# REEF ENCOUNTER

The newsletter of the International Society for Reef Studies

Number 1

October 1983



See Reef island staging posts and Noah's Arks

# FROM ISRS

## REEF ENCOUNTER

*Reef Encounter* is the newsletter of the International Society for Reef Studies. This is its first issue, edited by Brian Rosen and assisted by Barbara Brown.

Please send all contributions for inclusion to Brian Rosen, Reef Encounter, British Museum (Natural History), Cromwell Road, London SW7 5BD.

## MEMBERSHIP AND SUBSCRIPTIONS

ISRS was formed at a general meeting held at Churchill College, Cambridge, England on Tuesday 9th December 1980, with the aim of co-ordinating research effort on coral reefs both through the publication of the journal *Coral Reefs* and through the holding of meetings and conferences on aspects of reef research.

The annual subscription for membership of the International Society for Reef Studies is £20 Sterling or US\$50; membership of the International Society for Reef Studies includes subscription to *Coral Reefs* which has now reached four issues, Volume 1, Numbers 1-4. Membership also includes subscription to *Reef Encounter* (student members receive *Reef Encounter* but not *Coral Reefs*). Subscriptions and enquiries about the Society should be addressed to Dr J.A. Crame,

Membership Secretary, International Society for Reef Studies, c/o British Antarctic Society, Madingley Road, Cambridge, UK.

## THE SOCIETY

The International Society for Reef Studies, with a membership of approximately 250, is almost three years old. Now is the time to consider what future lies ahead for the Society. The original aims of those interested in its promotion were to improve the co-ordination and dissemination of reef research, through the journal *Coral Reefs*, and the newsletter *Reef Encounter*. The possible future co-ordination of international symposia could also go some way to achieving this. But what should the Society be striving towards in the next five years? Some of the ideas currently circulating include the establishment of joint meetings and workshops with other international societies in specific disciplines, increasing research opportunities and exchange visits for young scientists, and promoting their attendance at international symposia. We should be very interested in any views that you hold about the future of your Society and the role it should be playing in the development of reef science.

Barbara E. Brown  
Secretary

# CONTENTS

## News

- Widespread coral bleaching and death in Panamá (1983)  
*Peter Glynn* ..... 4

## Comment

- Reef island staging posts and Noah's Arks  
*Brian Rosen* ..... 5

## Features

- The Leopard and Watamu Reef Expeditions to Kenya  
*Frances Green* ..... 6
- The Great Barrier Reef Marine Park and sustainable development  
*Kirk Peterson* ..... 8
- Reef Press ..... 11

## Meetings

- The 17th Meeting of AIMLC  
*John Ogden* ..... 12

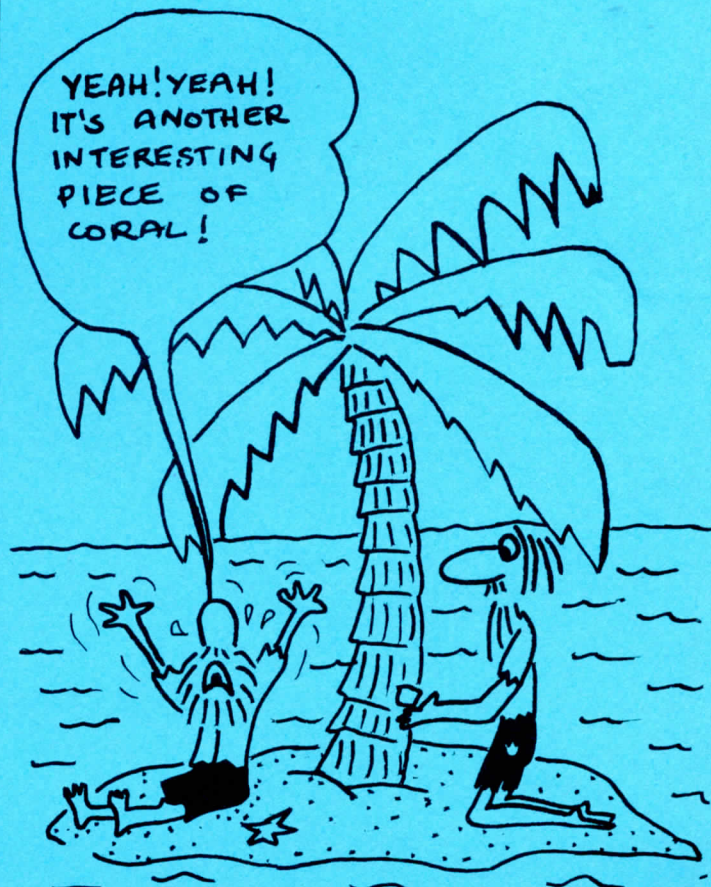
- Books ..... 13

- Projects and participation ..... 14

- Diary ..... 16

Printed by Spider Web, 14-16 Sussex Way, London N7 (01-272 9141).

Typeset by Bread 'n Roses (TU), 30 Camden Road, London NW1 (01-485 4432).



# Why Reef Encounter?

Here we are at last. Firstly, thank you for a good response to our appeal for contributions. As a result, *Reef Encounter 1* has quite an international flavour. I should explain too that in order to keep costs down we haven't sent formal thank-you's to contributors. We'll try and include everything you send us, or a version of it, but if you don't see your deathless prose in one issue, you should find it in the next one.

Looking back at our original appeal for contributions I see that we have managed to cover many of our suggested categories, but we should like to have more material dealing with reefs in a cultural, historical, social, political or humorous context. We are also very actualistic in this issue, but items on ancient reefs and 'reefs' are also equally welcome.

Elsewhere, we have given you a round-up of other reefy newsletters, and we shall try to maintain this in forthcoming issues. Amongst other things our round-up also enabled us to convince ourselves that we were filling a gap, and we hope you think so too. For those of you who are not so sure, here is why we think you need *Reef Encounter*.

If we genuinely value exchange of views, news and ideas, then it seems to us that a formal journal and scientific meetings are not sufficient in themselves. *Reef Encounter* should have a similar function to all those informal chats and discussions that take place over meals and drinks and who knows where else, between the actual sessions at scientific meetings: funny stories, ideas on backs of envelopes, arguments, winges, discoveries of kindred spirits, kindred problems and kindred solutions, and the wholesome sight of people helping each other. Very philanthropic. This is the communal side of research, the invisible academic village round its invisible village pump. At the very least it should be fun. At best it also generates new ideas and research directions. My own not-too-secret hope is that it can lead us to identifying real areas of interest, coordinating our efforts and sharing our resources.

We hope we'll eventually generate some lively correspondence. Is anyone out there willing to set it in motion with a really good moan, or a provocative gesture? While we're waiting, here are some random

outbursts from your usually docile and friendly editor:

1. We don't need even more big international reef meetings. We need more well coordinated regional informal working groups with foreign guest speakers.
2. Reef workers overlap their research interest unnecessarily, and
3. their publications appear too often in journals where they have not been edited by people with appropriate expertise.
4. Reef research students are still too often supervised and even examined by people who know too little or nothing of the subject.
5. Reef research does not exist. We are all really specialists on some other problem and just use reefs as good places to collect our data and because it's nice to go to such places.
6. Reef biologists and reef geologists don't talk to each other. Why should they anyway?!
7. For whose benefit is reef conservation? Tourist trade operators, local resource users or the organisms themselves?

In addition to correspondence on such general matters, we are also hoping to generate discussion from our comment column, in which one or more contributors will pick up a theme or new development which strikes them as having a special significance. We imagine this column would be like an informal version of *Current happenings in Paleobiology* or *Points of view in Systematic Zoology*. We'd like voluntary articles of this kind, but we shall also be inviting contributions from particular people. For a test sample, see *Reef island staging posts and Noah's Arks* elsewhere in this issue, which is also an oblique answer to Thought Number Six, above.

And now, the pompous bit. We have to make a disclaimer to protect ISRS from embarrassing salvos, threats and accusations. (Deep breath.) Opinions expressed in *Reef Encounter* are entirely those of individual contributors (including the editor) and are not necessarily the same as those of the Society. We do have a specially fenced off enclosure for Society Spokespersons to communicate with their members and the world at large. You can respond in the usual way, and we hope it will be printable.

Have a happy read. Give us one point if we make you laugh, and two if we make you write back with a contribution for the next issue.

## PICTURE DETAILS AND CREDITS

**Cover:** Six stages in the development of atolls west of the Sial Line in the Pacific (left); and six stages in the development of atolls east of the Sial Line (right). Drawn by Rosalind Randall after figs. 4 and 5 in H. T. Stearns, 1946. *Am. J. Sci.* 244, 245-262 (see p. 5).

**p. 2:** Cartoon realised by Heather Page and Jill Darrell.

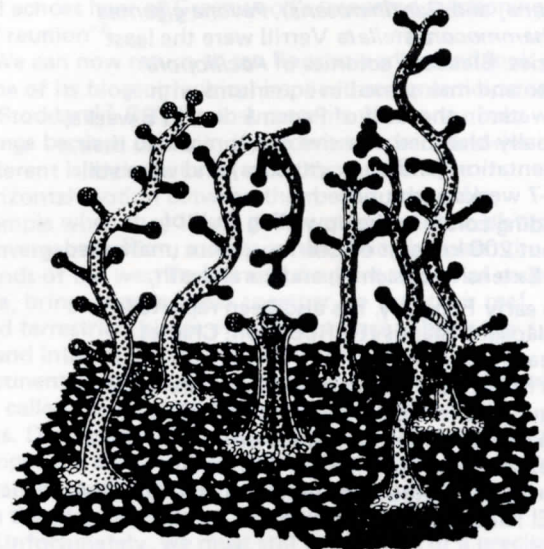
**p. 3:** *Millepora nodosa* zooids, pl. 16 (Hydrocorallinae), fig. 1, in H. N. Moseley, 1881, *Rep. scient. Results Voy. Challenger Zool.* 2(7).

**p. 9:** View of Wreck-Reef Bank, Great Barrier Reef, at low water. Opposite p. 312 in Vol. 2 of M. Flinders, 1814. *A voyage to Terra Australis*, G. & W. Nicol, London.

**p. 10:** Castell Dinas Bran, Llangollen. Detail from pl. 23 in T. Pennant 1778, *A tour in Wales*, Hughes, London.

**p. 13:** Kite fishing in Banda, Indonesia in M. Weber 1902, *Siboga Exped.* 1. p. 61

**p. 15:** 'Clermont Tonnerre, one of the Paumotu Atolls, from a drawing by A. T. Agate', p. 33 in J. D. Dana [1849] *Geology. United States Exploring Expedition*. Putnam, New York.



## WIDESPREAD CORAL BLEACHING AND DEATH IN PANAMA (1983)

Peter Glynn

Recent bleaching and death of hermatypic corals has occurred extensively in Pacific waters of Panamá (Gulf of Chiriquí), near the Panamá-Costa Rica border. All hydrocorals (*Millepora*) and scleractinian corals (5 genera) have been affected to some degree in the non upwelling environment of Chiriquí. No other members of the macrobenthos showed signs of stress (lowered activities, morbidity) or reduced abundances. The affected area, including the mainland, nearshore, and offshore islands, is about 10,000 km<sup>2</sup>. Further surveys in the Gulf of Chiriquí may reveal even more extensive mortality.

This disturbance began in the dry season (January-April, 1983), during a period of clear skies, low rainfall, and minimal river drainage. I first observed large, bleached coral patches (up to 100 m<sup>2</sup> in area) in mid March, and observations by others indicate that coral bleaching occurred in February and possibly as early as mid January. Normal and bleached corals observed in mid March were bleached and dead respectively by the end of April, suggesting that the disturbance is protracted. By the end of the dry season, 80 to 95% of all corals in the affected areas were severely bleached or dead.

Microscopic examination of bleached coral tissue showed few or no endosymbiotic algae (zooxanthellae) were present, while normal tissue showed abundant algae present. Polyps were extended normally in bleached corals, but affected pocilloporid species, the chief reef-building corals in Panamá, failed to grow (zero skeletal elongation), secreted only small amounts of mucus, and contained few crustacean symbionts compared with normal corals. Allografts from bleached and normal colonies transplanted to normal and bleached colonies respectively failed to induce bleaching. Initially (mid March) a greater proportion of shallow corals ( $\leq 10$  meters) were affected than deep corals (11-20 meters); later (late April) most deep corals were also bleached or dead. The most susceptible corals were *Millepora* (no live colonies were observed by the end of April), followed by *Pocillopora* and then massive corals (*Porites*, *Pavona*, and *Gardineroseris*). *Pavona gigantea* Verrill and *Psammocora stellata* Verrill were the least affected species. Bleached colonies of *Pocillopora* transported to and maintained in aquariums with running sea water in the Gulf of Panamá died in 5 weeks, whereas partially bleached, massive corals regained their normal pigmentation (and zooxanthellae) and were still alive after 6-7 weeks and survived.

Reef-building corals in the upwelling Gulf of Panamá, about 200 km east of Chiriquí, were unaffected (as of May). Extensive bleaching and coral death, beginning in early February, has also been reported from the Galápagos Islands (G. Robinson, Charles Darwin Research Station).

Although man's activities have increased dramatically in the Chiriquí area in recent years (copper mine project, dam construction, trans-shipment of oil, and pesticide use), and recurrent natural events have occurred during the disturbance (extreme, midday tidal exposures; El Niño-Southern Oscillation, an anomalous

warming of surface waters in the tropical Pacific Ocean; and a strong earthquake centered near the Gulf), no causative agent can be identified at this time.

Peter W. Glynn 16 May 1983 Smithsonian Tropical Research Institute P.O. Box 2072 Balboa, Republic of Panamá

See also Peter Glynn's item under Projects and participation. He tells us that a longer report will be appearing in *Environmental conservation* 10(2) for Summer 1983.

## A LITTLE BIT OF HALF OF PARADISE

### Corals to London . . .

A small collection of corals from the wildlife gallery of Sunderland Museum are on their way to London where they will contribute to international scholarship.

The corals are being donated at the request of the British Museum's natural history department.

The collection at Sunderland Museum came from the Joint Services expeditions between 1975 and 1978 to the Chagos Archipelago led by David Bellamy.

It has gained national acclaim since it first went on display and is regularly consulted by experts and specialists in marine biology.

Chairman of Tyne and Wear's Museums and Art Galleries subcommittee, Coun. Bill Craddock, said the corals when put on display in London would draw attention to the main display at Sunderland and will not reduce the value and importance of the Wearside collection.

— Shields Gazette 11 May 1982.

Sorry to disappoint you, Bill, but our Museum Mole suspects that Bellamy's corals won't be going on display. They're more likely to go into the white cabinets in the old whale hut. But they'll be in good company: J. Stanley Gardiner, Cyril Crossland, Saville Kent and other great seafarers.

## REEF ISLAND STAGING POSTS AND NOAH'S ARKS

Brian Rosen

Darwin was right. The Enewetak borehole, and others that have followed it, demonstrated the reality of subsidence of basaltic volcanic foundations beneath atolls. But it has taken quite a long time for us to grasp, or at least to spell out to each other how this subsidence is related to modern global tectonics. A recent batch of papers<sup>1, 4, 10, 13</sup> shows that different authors have evidently arrived at this stage of consciousness independently and are showing that there are more implications than we might at first think, both geological and biological. (Biologists, please don't run away at the beginning of the next paragraph. Your bit comes later. If the geological jargon is too heavy, look it up in a good earth science bible like Press and Siever<sup>8</sup>.)

The essential point is that sea floor spreading involves not just a lateral motion, but a vertical component as well. As sea floor spreads from mid ocean ridges it also subsides. Any feature that forms on the ocean floor, like a volcanic sea mount, subsides in its own right, but is also borne along and downwards by the general motion of the lithospheric plate on which it sits. Since seamounts are often capped by reefs we now have a unifying theory for atoll subsidence.

Perhaps this simple model was so self evident that for a long time no one thought it worth putting pen to paper to tell us all about it. We didn't seem to notice that marine geophysicists had for some time been using reef thicknesses and distances of particular reef islands from mid ocean ridges to calibrate amounts and rates of sea floor subsidence in relation to its thermal history<sup>e.g. 18</sup>. If Darwin had known about magnetic anomalies and the other standard kinds of data used by marine geophysicists, he wouldn't have needed to write a book showing how atolls prove that the ocean basins had foundered<sup>2, 10</sup>, and we should not now be revering him as one of the founding fathers of reef science. Darwin celebrators have not all grasped this point<sup>e.g. 5</sup>.

We can now look forward to devising a tectonogenetic classification of reefs. Can we do for reefs what Reading<sup>9</sup> has done for sedimentary facies in general, and explain reef formation and preservation of reef facies in terms of tectonic environments and tectonic history? I am especially struck by the fact that our 'typical' oceanic reefs can only rarely be preserved in geological sequences in a recognizable form, because they are unlikely to emerge unscathed from the hazards of tectonic activity at convergent (destructive) plate margins. This helps to explain why specialists of ancient reefs find it difficult to make whole-reef comparisons with today's 'typical' reefs. Just occasionally, unusual tectonic circumstances have allowed a few oceanic reefs to run the subduction gauntlet and beach themselves in recognizable form on continental margins. Interested persons might like to start looking more closely at the 'reef-associated carbonate build-ups' of the Permo-Triassic Oman Exotics<sup>14</sup>. More often, our beloved atolls are probably deformed, recrystallized, and shredded into carbonate smears and lenses in ophiolite suites or imbricate zones.

Survival of reefs, though not truly oceanic ones, would seem to be more assured when they have originated on the overriding side of a subduction zone. Olistoliths of shelf origin are the accepted kind of occurrence, but reefs can also originate on young uprising accretionary folds or prisms, as in the Miocene of southern Iran<sup>6</sup>. This recalls Stearns'<sup>16</sup> model of development of atolls west of the Pacific Sial Line, an imaginative anticipation of theories based on plate tectonics (see cover diagram).

Thoughts of the relationship between sea mounts and reefs makes one wonder in turn about the origin of sea mounts, for without them there would be few if any oceanic reefs. We now know for example that the Hawaiian style hot spot does not explain everything. A quick glance at one of those pictorial ocean floor maps shows that sea mounts do not occur in a universal and uniform pattern; nor are their origins uniform through time. At this point we have apparently digressed well beyond the usual range of reef expertise, but a little delving into the problem of intra-plate vulcanicity reveals that while the long term trend of all such features is downward, we are really looking at reef foundations which are a range of different phenomena at different stages of formation, interim uplift, erosion, and eventual subsidence. If as a biologist you have read this far, or even just alighted at this point, now is your moment.

Reef organisms are mostly dependent on their larvae for their distribution, so the overall range of a reefal species must depend on its limits of larval transport. Islands which lie within this limit are staging posts between other islands which are otherwise out of larval reach from each other<sup>12</sup>. Some authors call this phenomenon 'stepping stones' but this has overtones of chance dispersal. Now, the tectonic continuum of changing patterns of sea mounts and related features must undoubtedly affect the pattern of staging posts across oceanic regions. This is also a cue for us to try applying vicariance biogeography to reef organisms, because disruption of staging post patterns is an ideal (theoretical) circumstance for allopatric speciation in the resulting divided populations. Conversely, new staging post patterns can merge the ranges of pre-existing species. A frequent combination of both would give rise to numerous sympatric species, the familiar bane of coral taxonomists. If you have ever found yourself in the freshwater world of cichlid fish you will find echoes here of Greenwood's 'repeated fractioning and reunion'<sup>3</sup>.

We can now return to sea floor spreading and look at some of its biogeographical implications as anticipated by Stoddart<sup>17</sup>. Staging post patterns would not only change because of the independent tectonic histories of different islands, but also when there is relative horizontal motion between them. This occurs for example when they lie on different lithospheric plates. Convergent motion, such as is happening between the islands of the west Pacific and the land masses of eastern Asia, brings islands closer together, so that their reef (and terrestrial) biotas eventually merge. This is the 'island integration' model of Rotondo *et al*<sup>11</sup>. On a continental scale (e.g. India relative to Asia), McKenna<sup>7</sup> has called these tectonic shipments of biotas, Noah's Arks. Divergent plate motion, like that affecting islands on opposite sides of the Atlantic, widens the staging post distances until they are no longer staging posts at all. It is therefore a potential vicariance factor.

Unfortunately, we must still await news of a precisely

# FEATURES

## THE LEOPARD AND WATAMU REEF EXPEDITIONS TO KENYA

Frances Green

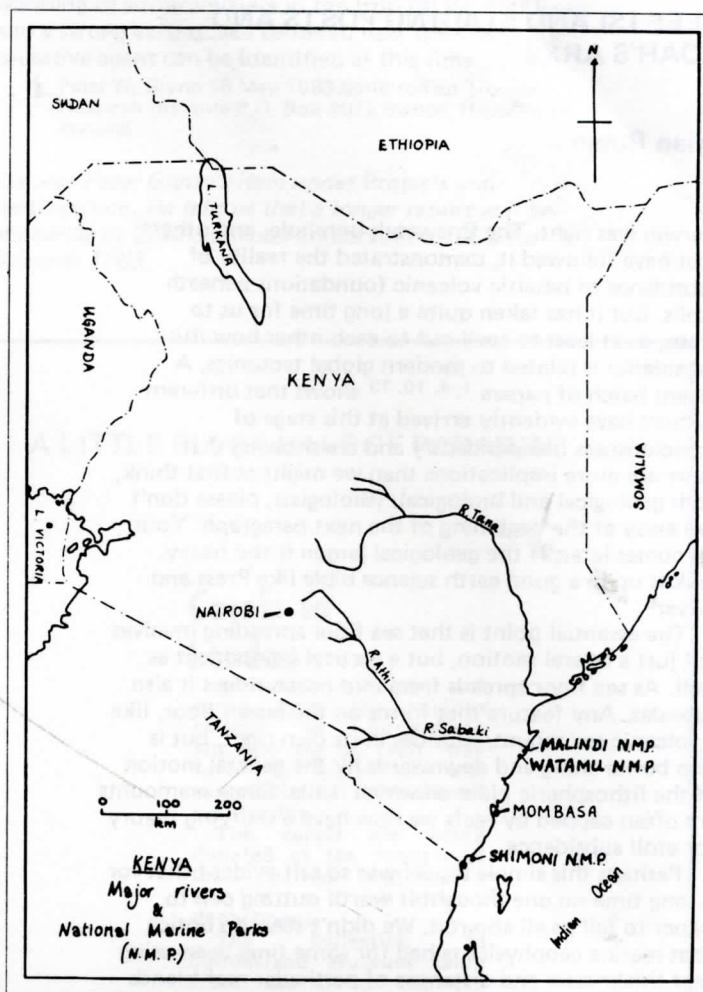
*You have all read those bland polished presentations of results of other people's reef expeditions and wondered what happened to the snags, hitches and omissions that afflicted your own trip. Now at last, someone's prepared to tell the truth.*

The Leopard and Watamu Reef Expeditions are separated in space and time by 30kms and 40 odd months. The former was a joint Durham University-Nairobi University SCUBA extravaganza led by one Richard Keech (who's now hiding behind his much coveted work permit in the Sultanate of Oman) and, fate being what it is, it proved to be one of those trips where everything you always hoped wouldn't happen, inevitably did — though more about that later.

By contrast, the Watamu Reef Expedition seems to have missed all the former's pit-falls and be chugging along nicely off the coast of Kenya.

'Cos that's where it's all happening. Back in 1968, the Kenyan government set up three marine parks along their stretch of Indian Ocean coast. They are at Shimu in the south and at Watamu and Malindi respectively 90km and 120km north of Mombasa (see Map No.1). The Malindi Marine National Park encompasses a length of fringing reef, a small patch reef and sort of blotchy pseudo barrier reef — North Reef. However, this name didn't appeal to the romantic in Richard Keech so he decided to call his Malindi expedition after Leopard Reef, just beyond the park boundaries. Though, interestingly enough, the old charts refer to this reef as Leopold Reef — shades of British colonialism hey what?'

The naming of the Watamu Reef Expedition sounds simple enough — but do not be deceived. They are also working in Malindi! Ah, yes, I haven't yet introduced



Map No. 1

this expedition's erstwhile leader: Will Geisen, from Nijmegen University. Actually, the way in which he

resolved example of species relationships in a group of reef organisms, in relation to ocean floor tectonics. Springer<sup>15</sup> thinks we have too little knowledge of either element to do this yet. We also need to take into account the effects of climatic change on ocean circulation and of changing sea levels. These two will affect the distribution and effectiveness of staging posts and mask biogeographic patterns of purely tectonic origin. This is a further story best left to another time, but if you are a reef biologist looking for something new to do, try imagining that your favourite reef is not so much a staging post or a Noah's Ark, but some kind of combination of them both. A non-hostile aircraft carrier perhaps?

1. Coudray, J & Montaggioni, L., 1982. *Bull. Soc. géol. France* (7) 24, 981-993.
2. Darwin, C., 1842. *Structure and distribution of coral reefs*. Smith Elder & Co., London.
3. Greenwood, P.H., 1981. pp. 61-74 in *Chance, change and challenge: the evolving biosphere*. (P.H. Greenwood & P.L. Forey, eds.) British Museum (Natural History) and University Press, Cambridge.
4. Grigg, R.W., 1982. *Coral Reefs* 1, 29-34.
5. Kühnman, D., 1982. *Mar. Ecol. Berlin & Hamburg* 3, 193-212.

6. McCall, G.J.H. & Kidd, R.G.W., 1982. *Spec. Publs. geol. Soc. Lond.* 10, 387-397.
7. McKenna, M.C., 1973. pp. 295-308 in *Implications of continental drift to the earth sciences*, Vol. 1 (D.H. Tarling & S.K. Huncorn, eds.) Academic Press, London.
8. Press, F. & Siever, R., 1982. *Earth*. 3rd edition. W.H. Freeman & Co., San Francisco.
9. Reading, H.G., 1978. pp. 439-476 in *Sedimentary environments and facies*. (H.G. Reading, ed.) Blackwell, Oxford.
10. Rosen, B.R., 1982. *BioScience* 32, 519-525.
11. Rotondo, G.M., Springer, V.G., Scott, G.A.J., & Schlanger, S.O., 1981. *Syst. Zool.* 30, 12-21.
12. Schlanger, S.O. & Premoli Silva, I., 1981. *Initial Reports of the Deep Sea Drilling Project* 61, 817-827.
13. Scott, G.A.J. & Rotondo, G.M., 1983. *Coral Reefs* 1, 139-150.
14. Searle, M.P. & Graham, G.M., 1982. *Geology* 10, 43-49.
15. Springer, V.G., 1982. *Smithsonian Contrib. Zool.* 367.
16. Stearns, H.T., 1946. *Am. J. Sci.* 244, 245-262.
17. Stoddart, D.R., 1976. *Micronesica* 12, 1-9.
18. Vogt, P. & Ostenso, N., 1967. *Nature, Lond.*, 215, 810-817.

Acknowledgements: Jill Darrell, Dr. Humphrey Greenwood, Dr. John Taylor, all of British Museum (Natural History).

Brian Roy Rosen, Department of Palaeontology, British Museum (Natural History), Cromwell Road, London SW7 5BD, U.K.

found the scattered remnants of the Leopard Reef Expedition was pretty amazing . . . You see, being a thorough sort of a chap he was doing his literary search through the more obscure journals on East Africa when he found reference to the expedition and its association with the Department of Biology at Nairobi University. This prompted him to write to Willem Brakel who was in the process of moving jobs from Nairobi to Loyola College in Maryland. However, he had the address of Frances Green, scientific co-ordinator to the Leopard Reef Expedition, and so passed it onto Will. Or so he thought.

As it happened, this letter chased her around Europe until finally coming to rest in The Hague, only a few hours drive from Nijmegen!

But back to business, the object of the WRE meeting the LRE (the initials are self explanatory, I think) was for the WRE mob to try to actually use the LRE baseline data. But hereby lies a tale . . .

Back in 1979 there was a lot of enthusiasm but little knowledge. The assembled masses from Durham, Nairobi, plus the photographer and a stray marine biologist from Oxford, set out to Malindi with three aims in mind:

1. To do a coral count within the park.
2. To carefully map a section of park (preferably where tourist predation was high) and use this as a baseline for future monitoring.
3. To carry out a sediment survey in an attempt to assess the degree and permanence of the sediment influx from the Sabaki river 10km to the north of the Park.

The first aim was satisfactorily carried out — at least to genera level. The bulk of the taxonomic work was done by Jon Moore with the help of Mary Stafford

Smith and even more help from the local coral enthusiast, Lallie Didham. In fact, without her the expedition would probably have been a total disaster instead of semi-total disaster. One look at the list of coral genera (see list) demonstrates just what she had already identified in the Malindi area.

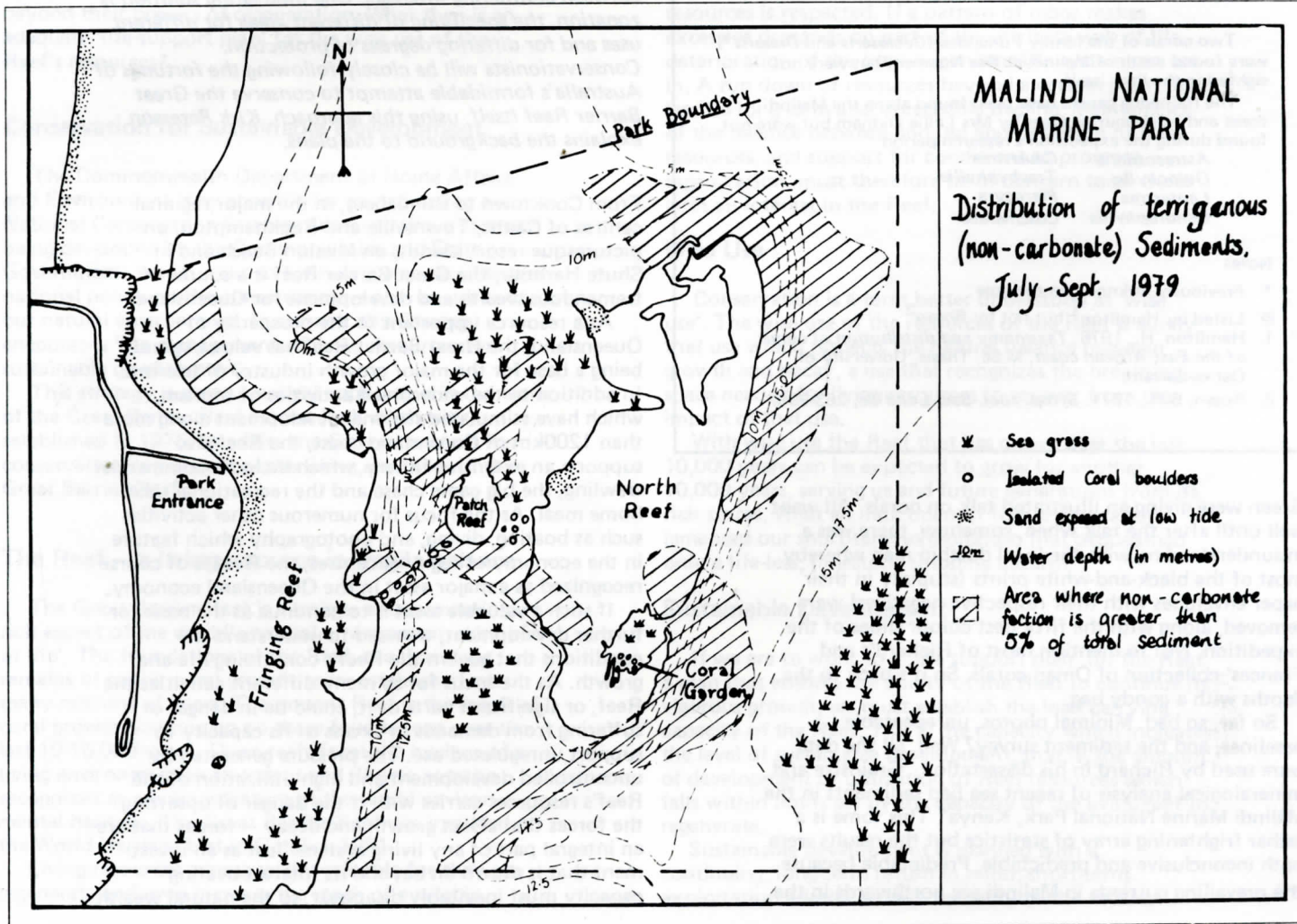
The second aim of the Leopard Reef Expedition was the least satisfactorily performed. It's true that a map was made of a 40x20m area in the main tourist area. It is also true that a very detailed list of the coral genera in that location was made. It is also true that scaled photos were taken. But, the terrible truth of the matter is that the chap who took the photos failed to record the exact location of the coral in question. And — and this is hot news from Malindi! — the 'permanent' markers which marked the edge of the mapped areas have disappeared . . . From which, I suppose, it can be inferred that either the storms of East Africa are shifting half-metre high lumps of concrete secured by long metal rods hammered into the seabed, or that local fishermen happen to like half-metre high lumps of concrete and long metal rods, or that the parrot fish have changed their diet.

But, as if it wasn't enough that the scaled coral photographs were worthless and that the markers have disappeared, scores upon scores of photographs and transparencies are now lost.

Now this story is a real tear jerker.

For months after the expedition members had returned to their native homes the negatives of the black-and-white photos went astray. Finally, after much agony and searching, they were found in a large brown envelope in a certain attic in Twickenham — the Dobbs emporium no less. Prints were duly made and studied. They travelled far, as far even as a meeting of the Oman Historical Society where Richard Keach and Frances

Map No. 2



## Complete list of the coral genera found in the Malindi Area

<b>THAMNASTERIIDAE</b> <i>Psammocora</i>	<b>RHIZANGIIDAE</b> <i>Culicia</i> @
<b>POCILLOPORIDAE</b> <i>Stylophora</i> <i>Seriatopora</i> <i>Pocillopora</i>	<b>OCULINIDAE</b> <i>Galaxea</i>
<b>ACROPORIDAE</b> <i>Acropora</i> <i>Astreopora</i> <i>Montipora</i>	<b>MUSSIDAE</b> <i>Lobophyllia</i> <i>Acanthastrea</i>
<b>AGARICIIDAE</b> <i>Pavona</i> <i>Leptoseris</i> * <i>Pachyseris</i> <i>Agariciella</i> * <i>Gardineroseris</i> *	<b>MERULINIDAE</b> <i>Merulina</i> *
<b>FUNGIIDAE</b> <i>Fungia</i> <i>Herpolitha</i> <i>Podabacia</i> *	<b>PECTINIIDAE</b> <i>Oxypora</i> * <i>Pectinia</i> <i>Mycidium</i> @ <i>Echinophyllia</i> *
<b>PORITIDAE</b> <i>Goniopora</i> <i>Porites</i> <i>Alveopora</i>	<b>CAROPHYLLIIDAE</b> <i>Gyrosmilia</i> *
<b>FAVIIDAE</b> <i>Favia</i> <i>Favites</i> <i>Goniastrea</i> <i>Platygyra</i> <i>Leptoria</i> <i>Hydnophora</i> <i>Cyphastrea</i> <i>Echinopora</i>	<b>DENDROPHYLLIIDAE</b> <i>Heteropsammia</i> * <i>Tubastrea</i> @ <i>Turbinaria</i>
	<b>OCTOCORALLIAN CORALS</b> <i>Tubipora</i> <i>Heliopora</i> @
	<b>HYDROZOAN CORALS</b> <i>Millepora</i> <i>Stylaster</i> * <i>Distichopora</i> *

TOTAL = 44

Two corals of the family Fungiidae (*Cycloseris* and *Diaseris*\*) were found north of Malindi at Ras Ngomeni but were not sighted in the Park itself.

The following genera have been found along the Malindi coast and neighbouring areas by Mrs Lallie Didham but were not found during the expedition's research period:

<i>Astraeosmilia</i>	<i>Caulastrea</i>
<i>Oulophyllia</i>	<i>Trachyphyllia</i>
<i>Leptastrea</i>	<i>Plerogyra</i>
<i>Dendrophyllia</i>	<i>Coscinaraea</i>

### Notes

\* Previously unknown in the area

@ Listed by Hamilton<sup>1</sup> but not by Rosen<sup>2</sup>

1. Hamilton, H., 1976. *Taxonomy and distribution of corals of the East African coast*. M.Sc. Thesis, University of Dar-es-Salaam.

2. Rosen, B.R., 1971. *Symp. zool. Soc. Lond* 28, 263-299.

Green were giving an illustrated talk on corals. All went well until after the talk when, somehow, there was a misunderstanding with the local dustbin men whereby most of the black-and-white prints (stupidly in their paper envelopes with their respective negatives) were removed, along with the fifty best colour slides of the expedition. Not to mention most of Richard's and Frances' collection of Oman corals. So it's back to the depths with a goody bag.

So far, so bad. Minimal photos, unrepeatable baselines, and the sediment survey? Well, all the data were used by Richard in his dissertation, 'Grainsize and mineralogical analysis of recent sea bed sediments in the Malindi Marine National Park, Kenya'. This tome is a rather frightening array of statistics but the results were both inconclusive and predictable. Predictable because the prevailing currents in Malindi are northwards in the

May-September monsoon and southwards in the November-January monsoon, so the river sediment could be expected to collect wherever there was a northern or southern barrier, like the extremes of the reefs or the promontories (see Map No.2). And the results were inconclusive because it is not really known how much of the terrigenous sediment actually affects the reef or chokes the coral. Or, for that matter, whether the clastic material is all or mostly river borne. However, it is hoped that the Watamu Reef Expedition will be able to answer that last question as they have hopes of sampling up the Sabaki river during the monsoon. Let's wish them luck and hope that they can produce a report of a much higher academic standard and with far fewer disasters than the Leopard Reef Expedition.

If you want to know more about any of this, try:

Lallie Didham, PO Box 390, MALINDI, Kenya  
 Willem Brakel, Loyola College, Evergreen Campus, 4501 North Charles Street, BALTIMORE, Maryland 21210, USA  
 Will Geisen, Faculteit der Wiskunde en Natuurwetenschappen, Katholieke Universiteit, Toernooiveld, 6525 ED NIJMEGEN, The Netherlands  
 Richard Keech/Frances Green, PDO (PEG/13), PO Box 81, MUSCAT, Sultanate of Oman

Frances Green, PDO (PEG/13), PO Box 81, Muscat, Sultanate of Oman.

## THE GREAT BARRIER REEF MARINE PARK AND SUSTAINABLE DEVELOPMENT

### Kirk Peterson

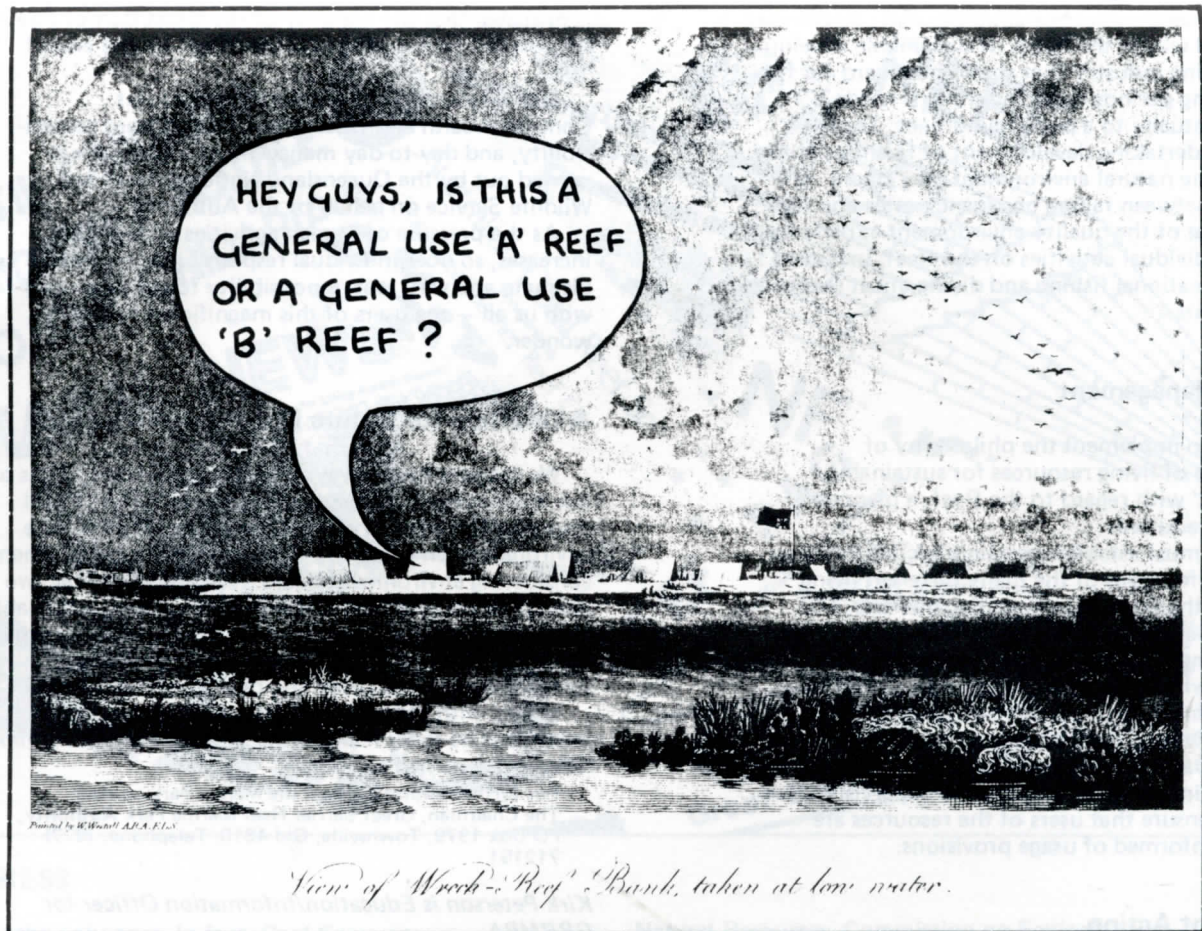
*Conservation schemes are invariably balancing acts between conflicting interests. One interesting solution is zonation, the specifying of different areas for different uses and for differing degrees of protection. Conservationists will be closely following the fortunes of Australia's formidable attempt to conserve the Great Barrier Reef itself, using this approach. Kirk Peterson explains the background to the plans.*

From Cooktown to Bundaberg, in the major regional centres of Cairns, Townsville and Rockhampton, on picturesque resort islands, on Mission Beach and in Shute Harbour, the Great Barrier Reef is a source of tremendous wealth and development for Queensland.

As a resource important to the prosperity of Queensland, the Great Barrier Reef has value beyond being a base for the major growth industry of tourism. In addition to the widespread activities of tourism, which have stimulated regional development along more than 1200km of Queensland coast, the Reef also supports an extensive fishery, which includes commercial trawling, the big game chase and the recreational take home meal. As the focus for numerous other activities such as boating, diving, and photography which feature in the economy of regional centres, the Reef is of course recognized as a major asset in the Queensland economy.

If such a valuable asset is to continue as the basis for further development, we need to understand the conditions that govern the Reef's continuing life and growth. As the focus for so many different activities the Reef, or significant parts of it, could be in danger of suffering from demands in excess of its capacity to support unregulated use. The pressure generated by uncontrolled development and high utilization of the Reef's resources carries with it the danger of upsetting the forces that affect growth and decay — forces that are an integral part of any living system. Just as an investment that is drawn on beyond its interest-bearing capacity must inevitably disappear, so the natural wealth





of the Reef will diminish if its living resources are allowed to degenerate, through over-exploitation, beyond their powers of regeneration. What then is an adequate 'life-support plan' for the wise use of the Reef's resources?

### Conservation for Sustainable Development

The Commonwealth Department of Home Affairs and Environment is responsible for co-ordinating a National Conservation Strategy for Australia, a strategy being developed by the Commonwealth and State Governments which seeks to formulate a comprehensive national policy on the conservation – or wise use – of our natural environment. In essence, this Strategy encourages 'the management of living resources for sustainable development'.

This strategy is given practical application in the work of the Great Barrier Reef Marine Park Authority, established in 1975, to advise the Government on the conservation or wise use of the living resources of the Great Barrier Reef.

### The Reef – a living resource in fragile balance

The Great Barrier Reef is a unique and fascinatingly rich aspect of the world's natural environment, a 'ribbon of life'. The foundations of the Reef, the limestone remains of earlier coral growth, were established over many millions of years. The present Reef is the result of coral growth building up on these foundations over the last 10-15,000 years. These reefs form the nucleus of a living environment so abundant and diverse as to be recognized as a unique feature of the world environmental heritage. The Great Barrier Reef was included on the World Heritage List in October 1981.

Living resources are especially valuable for they can regenerate and even increase the stock of available

resources. However, such regeneration can only be maintained when the load carrying capacity of those resources is respected. If a pattern of usage makes excessive demands on part of the intricate web of life, deterioration of the inter-dependent life system can set in. A run down of resources beyond a certain point may lead to long-term and irreversible decline. Maintenance of the balance between and use and depletion of Reef resources, and support for conditions to promote regeneration, must therefore be of concern to all those with an interest in the Reef.

### Wise Use

Conservation is a term better understood as 'wise use'. The wise use of the resources of the Reef is surely that use which respects the natural balance between growth and decay, a use that recognizes the breathing space needed for living resources to recover from the impact of that use.

With wise use the Reef that has grown over the last 10,000 years can be expected to grow for another 10,000 years, serving us and future generations from its rich stores. What an indictment if future generations lamented our short-term exploitation that bequeathed only a life-less, limestone shipping hazard!

### Sustainable Development

If we are to work to a 'life support plan' for the Reef, a plan that ensures the ability of the Reef to continue its vigorous growth, we must establish the load carrying capacity of the Reef. This is the capacity which indicates the level of sustainable development, that is, the amount of development or utilization of Reef resources which falls within limits set by the capacity of the living reef to regenerate.

Sustainable development is planned with a continuing, long-term return in mind; short-term exploitation admits no responsibility to the future.

All Reef-based extractive activities must be planned and managed within the limits of sustainable development. A fishing industry that shows no regard for fish stock breeding periods or replenishment needs is doomed eventually to a port bound fleet. Tourist operators undertaking development of facilities at the expense of the natural environment may find a connection between falling occupancy rates and the disappearance of the quality environment experience. Likewise, individual activities on the Reef, including boating, recreational fishing and diving, must recognize the same limits.

## Need for Management

In order to implement the philosophy of 'conservation of living resources for sustainable development' with regard to the Reef, a planned approach is required.

Research must establish certain basic information such as the life cycles of the many different living creatures of the Reef, their breeding habitats, and position and significance in the complex web of life. Many facts must be pieced together in order to ascertain the level to which a resource may be exploited.

Planning must be undertaken to ascertain the methods by which levels of use can be set and controlled. Day-to-day management, including the provision of information services and supervision, are essential to ensure that users of the resources are adequately informed of usage provisions.

## Government Action

In response to widespread public support for the conservation of the Great Barrier Reef, the Commonwealth Government acted in 1975 to establish a system for the regulation and wise use of the Reef's resources. The *Great Barrier Reef Marine Park Act 1975* makes provision for the establishment, control, care and development of a Marine Park so as to ensure that the Reef is used and enjoyed by people today and maintained, in trust, with the minimum of disturbance to its ecology and natural beauty, for future generations. The Act established the Great Barrier Reef Marine Park Authority with responsibility for recommending the areas of the Great Barrier Reef Region which should form part of a Marine Park, recommending the care and development of the Marine Park, undertaking research relevant to the Park, and the preparation of zoning plans which are the principal means for providing for the wise use of the Reef's resources.

The objectives of these zoning plans are stated as:

- the conservation of the Great Barrier Reef;
- the regulation of the use of the Marine Park so as to protect the Great Barrier Reef while allowing reasonable use of the Great Barrier Reef Region;
- the regulation of activities that exploit the resources of the Great Barrier Reef Region so as to minimise the effect of those activities on the Great Barrier Reef;
- the reservation of some areas of the Great Barrier Reef for its appreciation and enjoyment by the public, and
- the preservation of some areas of the Great Barrier Reef in its normal state undisturbed by man except for the purposes of scientific research.

Operations for the commercial recovery of minerals are excluded from the Marine Park. With this exception, The Great Barrier Reef Marine Park Authority is required to make provisions for the reasonable use of the resources of the Great Barrier Reef. To date three Sections of the Marine Park have been declared — the Capricornia and Cairns and Cormorant Pass Sections. It

is probable that the majority of the Great Barrier Reef Region will be declared as Marine Park by the end of 1983.

Management of the Marine Park is a joint Commonwealth and Queensland Government responsibility, and day-to-day management of the Park is carried out by the Queensland National Parks and Wildlife Service on behalf of the Authority.

As the pressure of human activities on the Reef increases, so does individual responsibility increase. The ultimate and very real responsibility for its care rests with us all — the users of this magnificent natural wonder.

## A Question for Future Development

We humans have always used the natural resources of our environment. In recent times use of some natural resources has been so concentrated as to threaten the environment on which we depend. Consequently, when considering environment-based development today, we must pose the question, 'How can we achieve sustainable development in a way which maintains or enhances the natural qualities of the environment, on which our future material well-being and quality of life depend?'

Midas, with the golden touch, may be the envy of many, but he sadly realized the tragedy when *everything* he touched turned to gold.

For further information on the Marine Park contact:  
The Chairman, Great Barrier Reef Marine Park Authority,  
PO Box 1379, Townsville, Qld 4810. Telephone: (077) 712191

*Kirk Peterson is Education/Information Officer for GBRMPA.*

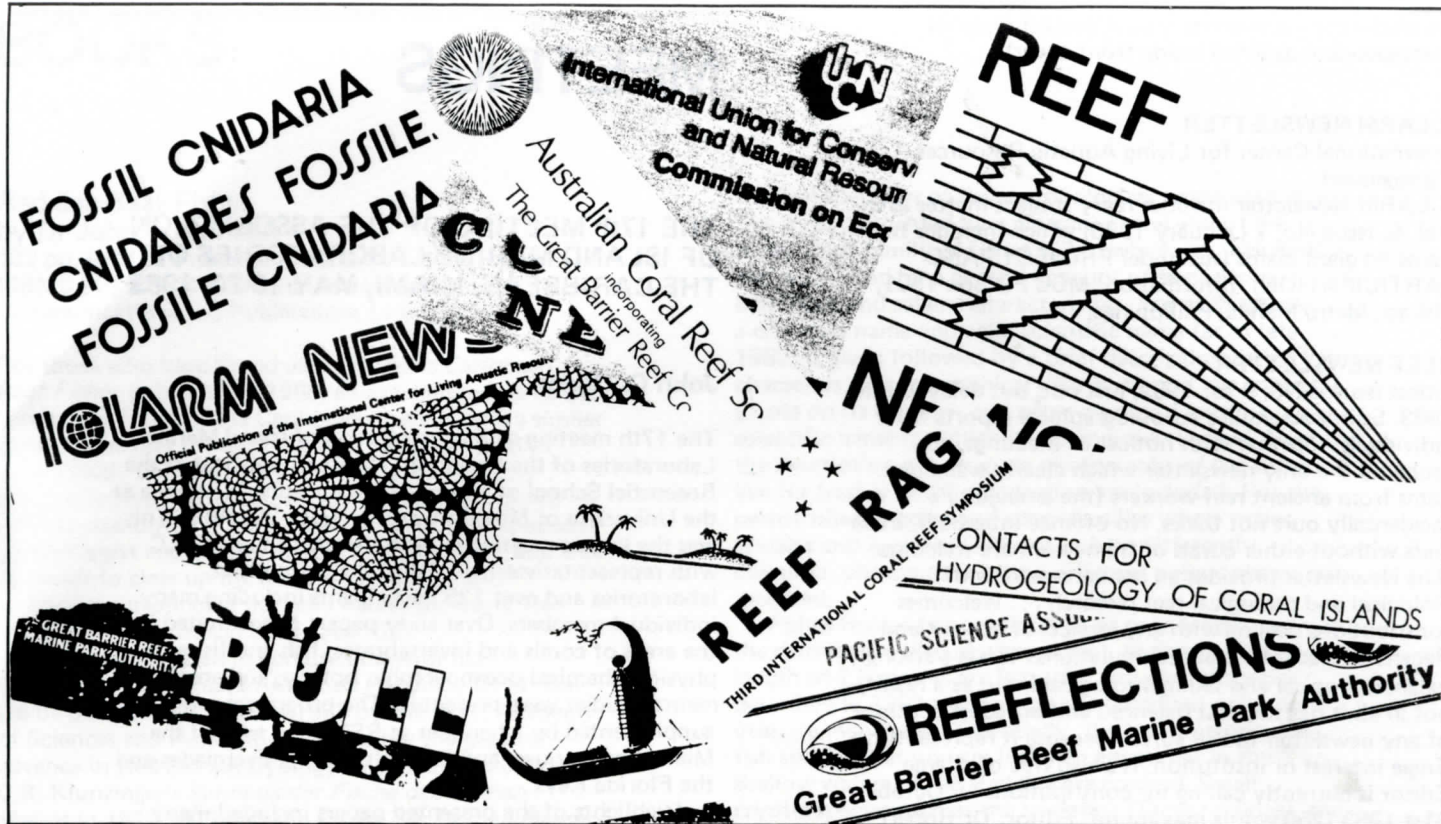
## NOT SO MUCH A SYMPOSIUM, MORE AN EISTEDDFOD?

*'November 15th [1835] — At daylight, Tahiti, an island which must for ever remain as classical to the voyager in the South Sea, was in view.'*

**Did Bernard Salvat know when he put forward Tahiti for the Fifth International Coral Reef Symposium in 1985, that it will be held on the 150th anniversary of Darwin's visit there?**

**Darwin went on to comment that the appearance of the inland vegetation 'was not very dissimilar from that on some of the Welsh hills'. Why go all that way to Tahiti? We might just as well hold the next symposium at Llangollen.**





## REEF PRESS

We are not the only ones. In fact, *Reef Encounter* is quite a long way back in the field. If you're a newsletter freak, here is a compilation of reefy newsletters and their parent bodies that we have received or heard of so far. If your mail is a bit thin and you're feeling lonely, read on and then send off immediately. Better still, send your news to all their hungry editors.

### AIMLC NEWSLETTER

Association of Island Marine Laboratories of the Caribbean

The AIMLC is open to individual members who will receive general announcements, abstracts of meetings and the AIMLC Newsletter. We have not seen a copy ourselves. Send US \$3.00 to: Secretary, AIMLC, Department of Marine Science, University of Puerto Rico, Mayaguez, PR 00708, Puerto Rico.

### AUSTRALIAN CORAL REEF SOCIETY NEWSLETTER

Current issue is for mid-year 1983. The Society is the parthenogenetic descendant of the former Great Barrier Reef Committee, though according to its official title, it has now consumed its own parent. The newsletter is formal, and is mailed to members. Current issue includes a copy of a letter from the Society President to the Australian Premier and similar Important Epistles. Intricacies of GBRMPA zoning schemes feature prominently. Contact: Dr P. Flood, Secretary of the Australian Coral Reef Society, Geology Department, University of New England, Armidale, NSW 2351.

### CONTACTS FOR HYDROGEOLOGY OF CORAL ISLANDS

This is a little newsletter for the 'silent college' (not too silent it seems) with a special interest in hydrogeology and associated subjects on coral islands. Coordinator: W.R. (Dick) Dale, DSIR, Private Bag, Wellington, New Zealand.

### CORAL REEF NEWSLETTER

International Union for Conservation of Nature and

Natural Resources. Commission on Ecology.

Latest issue in our hands is No. 4 for April 1982. Note that the title, which unfortunately is the same as the Pacific Science Association newsletter, though this one started more recently, does not indicate its particular conservationist role. Some of the content is repeated in French and Spanish. Content is largely assembled from progress reports on conservation in particular regions and places and on policies adopted by appropriate organizations. Editor: B. Salvat, EPHE, 55 rue de Buffon, 75005 Paris, France OR B.P. 562, Papeete, Tahiti, Polynésie Française.

### CORAL REEF NEWSLETTER

Pacific Science Association. Scientific Committee on Coral Reefs.

Latest issue in our hands is No. 11 for February 1982. Content consists of assembled autobiographical reports with notices and a few reports and reviews. Notwithstanding its organizational base, submissions on non-Pacific coral reef subjects seem to be welcome too. Modest subscription. Editor: Dr Roy T. Tsuda, Graduate School and Research, University of Guam, UOG Station, Mangilao, Guam, 96913, via USA.

### FOSSIL CNIDARIA

International Association for the Study of Fossil Cnidaria

This association exists primarily to organize its 4-yearly international symposia (e.g. Washington in August 1983) and to run its newsletter. Two issues per year, the latest being Vol. 11, No. 2 (1982). Contents more taxonomic than reefy, but as corals and reefs are never very far apart you will find reefy items scattered throughout its contents. Bias, as title suggests, is towards ancient reefs. Content consists of assembled autobiographical reports submitted by subscribers through regional correspondents, together with compilations of coral collections, bibliographies, etc. Modest subscription. Editorship regularly changes hands across the globe. Editor: Dr John S. Jell, Department of Geology, University of Queensland, St. Lucia, Queensland 4067, Australia,

(or find a copy and contact your nearest regional correspondent as listed inside front cover).

# MEETINGS

## ICLARM NEWSLETTER

International Center for Living Aquatic Resources Management

ICLARM Newsletter includes reefy subject matter as in Vol. 6, Issue No. 1 (January 1983) which includes two items on giant clams (see under PROJECTS AND PARTICIPATION). Information: MCC PO Box 1501, Makati, Metro Manila, Philippines.

## REEF NEWSLETTER

Latest issue is No. 9 for 1982, just out, but delayed into 1983. Editor assembles autobiographical reports from individuals, together with notices of meetings, etc. Probably the only newsletter which clearly welcomes items from ancient reef workers (the ambiguity's accidentally ours not theirs. No offence intended). Even reefs without either corals or framework are welcome: 'The Newsletter provides an annual overview of biological and geological reef research . . . welcomes contributions dealing with any aspects of ancient and Recent in-place skeletal accumulations'. It has a strongly palaeontological and sedimentological input as a result, but in all it has the best balanced and broadest coverage of any newsletter in this survey because it represents no single interest or institution. It's also free of charge. Editor is currently calling for contributions by October 31st 1983 (250 words maximum). Editor: Dr Robert Riding, Department of Geology, University College, Cardiff, CF1 1XL, UK.

## REEF RAG

(collectors' item only)

Years ago, at the Miami symposium, which your editor had to be content to observe through his binoculars from his offshore London base, a short-lived newsletter came into being just for the duration of the meeting. If you don't have copies, try to find some. It shows you how to laugh at the reefs you really love to hate. Your Super Sec. has lent your ed. four copies, and it seems to have appeared every day. Quite a feat. There are no editors' names on them. Who *were* these people? Please own up immediately and apply for a non-lucrative position on the staff of *Reef Encounter*. And if anyone does have a complete set, and doesn't want to keep them (sad) your ed. would like to nurture them in his own archives.

## REEFLECTIONS

Great Barrier Reef Marine Park Authority GBRMPA, which, notwithstanding its acronymic shortage of vowels, is easily pronounced 'gerbrumpah' by all bronchial Australians and probably by most tuba players. They (it?) also publish a newsletter, *Reflections*. Something weird about that spelling? Much of the issue which has recently reached us, numbered Free Issue 11, which seems like something more to do with school milk and which I am sure therefore our recently re-elected British Prime Minister would not approve of, is devoted to a very literary, and mildly anti-Pom article by Mark O'Connor. This is called *Putting the reef into words*, and he includes some of his own poetry. Pity he couldn't also put Britain into words too, as this appears as 'Britian' several times. But it's good to have a poetic insight into the reef business, so we hope to include a sample of O'Connor's poetry in another issue of *Reef Encounter*, if he is willing.

Gerbrumpah also issue a Bulletin, the one we have being a two-side report on drift card results. Both *Reflections* and the *Bulletin* are very well turned out, almost lavish. Contact: Great Barrier Marine Park Authority, PO Box 1379, Townsville, Queensland, Australia.

## THE 17th MEETING OF THE ASSOCIATION OF ISLAND MARINE LABORATORIES OF THE CARIBBEAN, MIAMI, MAY 16-20, 1983

### John C. Ogden

The 17th meeting of the Association of Island Marine Laboratories of the Caribbean (AIMLC) was held at the Rosenstiel School of Marine and Atmospheric Science at the University of Miami from May 16 to 20, 1983. This was the largest meeting in recent years of the AIMLC with representatives from 14 of the 19 member laboratories and over 125 participants including many individual members. Over sixty papers concentrated in the areas of corals and invertebrates, fish and fisheries, physical-chemical oceanography, botany, and environmental studies were presented. The programme was supplemented by a banquet at RSMAS, a tour of the Miami Seaquarium, and field trips to the Everglades and the Florida Keys.

Highlights of the presented papers included many ultra-structural studies of the skeleton and skeletogenesis in corals, and studies of planulation, larval recruitment, and early growth in corals. The fish and invertebrate studies covered a wide field but one was impressed by a general consensus on the lack of knowledge of reproductive cycles, larval life, and recruitment of fishes and invertebrates into the coral reef community. Many studies were presented which approached these problems. The oceanographic papers were highlighted by studies of internal waves which may have great importance in surface mixing and in bringing nutrient-laden water to the surface. Finally, man-induced effects on coral reefs, particularly sedimentation were discussed in several papers.

In informal discussions, the most dramatic news was of two 'ecological disasters' in Panamá. The coral reefs on the Pacific coast of Panamá in the region of the Gulf of Chiriquí are dead. While the cause is unknown, this year there has been a record El Niño, a warm equatorial counter-current which displaces the normally dominant cold, Peru current of the Eastern Pacific. Surface temperatures along this coast have been steady at 29°C for many months. On the Caribbean coast of Panamá, a disease is killing over 99% of *Diadema antillarum* populations in a wave spreading steadily east along the coast to Columbia. A number of studies are beginning to determine the cause of the disease, and to take advantage of a great natural experiment.

In its general meeting the Association debated its role in view of an increasing level of attention on the Caribbean by various international agencies such as UNESCO, USAID, and IUCN. The AIMLC could serve as a clearing house for information and expertise in the Caribbean. Following a presentation of a summary of a UNESCO-sponsored workshop entitled: 'Coral reefs, seagrass beds and mangroves: their interaction in the coastal zones of the Caribbean' held at the West Indies Laboratory of Fairleigh Dickinson University on St. Croix in May 1982, a committee was established to begin design of a pilot project to examine the influence of these three ecosystems on the structure and function of the Caribbean coastal zone.

See also item on AIMLC Newsletter in Reef Press.

# BOOKS

## Red Sea Reef Fishes

by Dr John E. Randall

192 pp. IMMEL Publishing, London. £19.50.  
ISBN 0 907151 04 3. Distributed by Scorpion  
Communications and Publications Ltd, London.

For those who have found Jack Randall's *Caribbean Reef Fishes* published in 1968, an excellent guide to the commoner fishes of the Caribbean, there is now a similar guide to the reef fishes of the Red Sea (published in June 1983). This copiously illustrated, remarkably comprehensive and taxonomically up-to-date volume with its authoritative text will be invaluable to specialist ichthyologist and general marine biologist alike, and will do much to clear up the misunderstandings and confusion surrounding the valid names for many Red Sea and western Indian Ocean reef fish.

This volume taken in conjunction with the forthcoming *Checklist of Red Sea Fishes* by Dr M. Dor (to be published in autumn 1983 by the Israel Academy of Sciences and Humanities) is possibly the greatest advance in Red Sea ichthyology since the publication of C.B. Klunzinger's *Synopsis der Fische des Rothen Meeres* in 1870-1871 and *Die Fische des Rothen Meeres* in 1884.

For too long, if one has not had a tame ichthyologist specialising in Indo-Pacific tropical fish at hand, it has been difficult to obtain nomenclaturally correct identifications of any except well known fish species. Without expert help, the only recent fish books one has been able to resort to have been either second rate general field guides cluttered with inaccuracies or glossier publications featuring only the most common and colourful species (and occasionally misnaming even some of these). The recent ecological and behavioural literature is consequently dotted with misnomers and misidentifications of fishes. Exceptions have been in those well studied areas such as Hawaii or southern Japan where good guides are available. Now at last an authoritative guide is available for the Red Sea which will be of considerable use for workers in the Indian Ocean (particularly the western part) as well.

Dr Randall has put together descriptions of 325 Red Sea reef fish species matched with 446 colour photographs, a remarkable achievement made possible by eight extensive trips to the Red Sea over the last ten years and some thirty years of experience in tropical ichthyology.

The book begins with an introduction to the study of fishes and a brief history of ichthyology in the Red Sea. This is followed by a succinct and clear explanation for

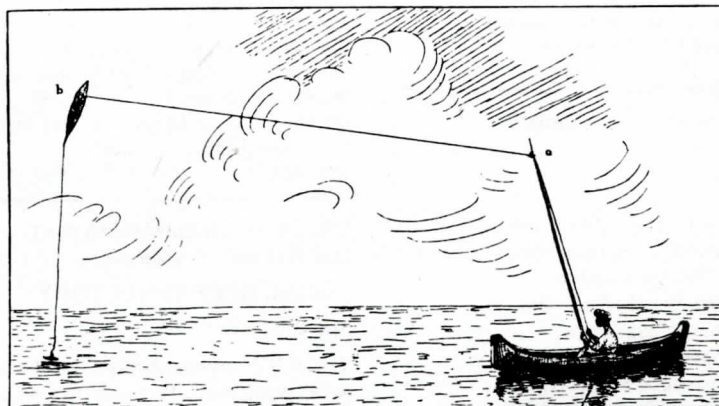
the non-specialist of the morphological terms used later; this is supplemented by a glossary at the end of the book. Each family of fishes (57 of which are included) are introduced by a general account of their ecology, behaviour and salient characteristics. For each species, a common name and valid scientific name (as of late 1982) is given followed by a brief description listing key characters, the geographical distribution of the species, a note on its ecology, and often a note of another scientific name by which it is commonly known. Next to the description one or more photographs of the fish in live (or freshly dead) colouration are included. For the parrotfishes, wrasses and other families where males, females and juvenile fishes may all be differently coloured, photographs of the different colour phases are included.

Fishes from a few centimetres or so in length, such as the dottybacks (*Pseudochromidae*), to sharks reaching a length of 2.5 metres are featured, and several species described in 1982 and one species described only this year are mentioned. Essentially, the great majority of fish species that you are likely to encounter in the shallow waters of the Red Sea are covered. Small, cryptic species such as the triplefins (*Tripterygiidae*), the less common, smaller and more cryptic species of goby and blenny, and certain rarely recorded species are not covered. However, these omissions are pointed out in the text and reference to Dr M. Dor's forthcoming *Checklist* should enable one to track down the literature on these more obscure species.

I found it a pity that a carefully selected bibliography could not have been included to lead the reader to the most pertinent literature. Also, it is irritating, given the general high quality of production of the book that the publisher/printer could not have taken more trouble with some of the photographs, which have not reproduced as well as they might have done, and a few of which are clearly substandard. However, overall the book is good value at £19.50 and I recommend it strongly to anyone with an interest in Red Sea or Indian Ocean fishes.

For use underwater, a waterproof edition with 365 photographs covering 325 species is also available (*The Diver's Guide to Red Sea Reef Fishes*. ISBN 0 907151 05 1. Price £11.50) from the same publisher/distributor. This is essentially a textless version of the main book and will be a useful aid to fieldwork in the area, or as decoration for submarine coffee-tables.

Alasdair Edwards, Department of Zoology, The University, Newcastle upon Tyne, NE1 7RU, UK



# PROJECTS & PARTICIPATION

## Australia: Northern Territory Museum

### MARINE FAUNA OF NORTHERN AUSTRALIA – SPECIALISTS WELCOME

Sandy Bruce

The Northern Territory Museum is about to commence a three year investigation into the marine fauna of Port Essington, Cobourg Peninsula. While the Northern Territory reefs are rather less conspicuous than the Great Barrier Reef there are areas of reef which have never been studied. The whole invertebrate marine fauna of north Australia has attracted very little attention. Museum staff will be concentrating their efforts on sponges, alcyonarians, annelids, carideans and various fish taxa, and would be interested in learning of systematists who may be interested in other taxa. The area under study presents a variety of habitats from brackish lagoons, creeks and mangrove to coral reefs. The area has been subjected to very little human interference and is part of a fauna reserve. Preliminary studies have indicated that a rich fauna is present. Getting this material identified presents the problems.

Dr A. J. Bruce, Head Division Natural Sciences, Northern Territory Museum of Arts and Sciences, Bullocky Point, Fannie Bay, N.T. Postal Address: G.P.O. Box 4646, Darwin N.T. 5794, Australia. Telephone: (089) 82 4211.

## France: International Geological Correlation Programme Project 200: Sea-level correlations and applications.

### SEA LEVEL HISTORIES WANTED

Paolo Pirazzoli

IGCP Project 200 is the successor project to Project 61 on Sea-level movements during the last deglacial hemicycle, widely known through its Information Bulletin *Sea-level*. Project 200 aims to identify and quantify the processes of sea-level change by producing detailed local histories that can be analysed and correlated for tectonic, climatic, tidal and oceanographic fluctuations. Its main approaches will be

- collection, analysis, interpretation and correlation of new and existing sea-level data
- survey and analysis of coastal and shelf deposits
- analysis of tide gauge records and modelling of short-term sea-level fluctuations

Coral reefs constitute a major environment in which such work can be carried out, and many members of ISRS are already active in this field. The 1985 annual meeting of IGCP Project 200 is already scheduled to coincide with the 5th International Coral Reef Congress in Tahiti.

Those wishing to participate in IGCP Project 200 should contact Dr Paolo Pirazzoli, Laboratoire de Géomorphologie de l'Ecole Pratique des Hautes Etudes, 1 rue Maurice Arnoux, 92120 Montrouge, France.

## Papua New Guinea: Motupore Island Research Centre (University of Papua New Guinea).

### RESEARCH VISITORS WANTED

Nick Polunin has recently become Director of this lab and is very keen that it should be used to its maximum potential. There are now new quarters for visiting scientists, and Nick has worked hard to refurbish the existing facilities. The lab has its own research programme and Nick welcomes scientists who would like to assist in this, as well as those who want to do their own thing. The lab is 15km SE of Port Moresby, close

to an interesting range of inlets, rocky shores, reef flats, fringing reefs and the fine Papuan Barrier Reef – all within 5km.

Contact: Dr N.I. Polunin, Biology Department, University of Papua New Guinea, P.O. Box 320, University, Papua New Guinea.

## Panamá: Smithsonian Tropical Research Institute.

### ASTOUNDING CORAL DEATH ALERT

Peter Glynn

We are presently suffering very heavy coral mortality on the Pacific side of Panamá – to a degree I have never seen before. It is truly astounding. [No, Rupert Murdoch does not edit this newsletter.] I want to alert as many reef workers on this incident as quickly as possible. If there is a connection with the warm El Niño Current and the North Equatorial Countercurrent, perhaps even the Line Islands are experiencing this mass bleaching and death?

Contact: Dr Peter W. Glynn, Smithsonian Tropical Research Institute, APDO 2072, Balboa, Republic of Panamá, OR APO, Miami 34002, USA.

See also Peter Glynn's news item *Widespread coral bleaching and death in Panamá*. (1983).

## Philippines: International Center for Living Aquatic Resources Management (ICLARM).

### GIANT CLAM SIGHTINGS SOUGHT

John Munro

The larger species of tridacnids have been extinguished over wide areas of South-east Asia and also in parts of the Pacific. For example, *Tridacna gigas* is extinct in the Marianas, Guam, Ponape, parts of Fiji and throughout much of Indonesia and the Philippines. *Hippopus hippopus* is extinct in American Samoa and Tonga.

However, information on what clams survive is hard to come by. Can *Reef Encounter* readers please help us by giving us information about the presence of the larger species (particularly *T.gigas*, *T.deresae* and *H.hippopus*)?

We are currently in the process of cobbling together an international research programme on giant clams with a view to reef restocking and mariculture. However at present, we have lots of ideas but few funds – not an uncommon situation!

Contact: J.L. Munro, Director, Resource Development and Management Programme, International Center for Living Aquatic Resources Management, MCC P.O. Box 1501, Makati, Metro Manila, Philippines.

For further information see:

Munro, J.L., 1983. *ICLARM Newsletter* 6(1), 3-4.

Munro, J.L. & Heslinga, G.A., 1982. in 35th Annual Meeting of the Gulf and Caribbean Fisheries Institute, Nassau, Bahamas, November 1982.

Heslinga, G.A. & Perron, F., 1983. *ICLARM Newsletter* 6(1) 5.

## UK: International Union for Conservation of Nature and Natural Resources.

### CORAL REEF DIRECTORY

Sue Wells

The IUCN Invertebrate Red Data Book has recently been published. It presents a wide-ranging set of case

histories illustrating pressures on invertebrate habitats and the range of threatened invertebrates worldwide. Each phylum is discussed in introductory sections which detail its biology and significance to man. The section on coelenterates covers economic importance and fishery management problems for precious and semi-precious corals and discusses general conservation requirements for the phylum.

Work is now starting on a 'Coral Reef Directory' which will list and describe coral reefs of international importance throughout the world. This is being compiled in collaboration with the IUCN Protected Areas Data Unit, based at Kew, and it is hoped that it will be completed in time for the 5th International Coral Reef Symposium in 1985. The aim of the directory is to provide a basis for establishing priorities for coral reef conservation at both national and international levels. Reefs that are already protected in some way will be included, as well as those which need protection or some form of management. Any information you can provide will be greatly appreciated and fully acknowledged in the final publication.

Further details: Sue Wells, IUCN, Conservation Monitoring Centre, 219c Huntingdon Road, Cambridge, CN3 0DL, UK.

*The IUCN Invertebrate Red Data Book*, compiled jointly by S.M. Wells, R.M. Pyle, and N.M. Collins, is available from the address above, price £14 (incl. p&p).

UK: International Society for Reef Studies [that's us]

EDITED ANY GOOD NEWSLETTERS LATELY?

Brian Rosen

We should like to receive or exchange reef newsletters or newsletters which contain some reefy material. We shall try to continue this round up in our own next issue.

Thank you, those of you who have sent us their newsletters already. Can we stay on your mailing list please, and we will exchange *Reef Encounter*?

Contact: Editor, *Reef Encounter*.

UK: Open University

SEEN ANY GOOD CORAL REEF FILMS LATELY?

Barbara Brown (on behalf of John Phillips).

Several enquiries have been made to the Society concerning films on coral reefs. One particular request comes from John Phillips of the Open University, who has the unenviable task of editing a ten-chapter text entitled *Tropical marine environments*. The project is a joint one between the Open University and UNESCO and the aim is not only to provide a teaching text but also a film to accompany the book. John is interested in any existing films containing reef footage and we thought it would be a good idea to collect a library of titles of films containing reef material. Please send us any titles you know, preferably with a short summary of the contents and any comments you have on the film's quality.

Contact: Dr Barbara E. Brown, Department of Zoology, The University, Newcastle upon Tyne, NE1 7RU, UK.



## THE COMPLEAT REEF ENCOUNTER

# Pacific rower rescued

From Reuter  
in Brisbane

The Australian Barrier Reef yesterday wrecked Peter Bird's attempt to become the first man to row the Pacific alone.

After 9,000 miles in 10 months, Mr Bird, aged 36, a photographer from London, was forced to radio for help just 33 miles from his target when he failed to find a gap in the reef during worsening weather.

In a final blow, his 34-foot bright red craft *Hele-on-Britannia*, modelled on a Second World War lifeboat, sank in

atrocious weather as it was being towed by the Australian Navy patrol boat which picked him up.

Mr Bird was left with only one small souvenir—his boat's tow ring.

The patrol vessel *Bendigo* spotted the *Hele-on-Britannia* just outside the reef off Cape Weymouth, wallowing in high seas. Inside the reef and its sheltered waters, Mr Bird would have had to row only 32 miles to reach the end of his voyage from San Francisco.

The *Bendigo* told Mr Bird, who had no detailed charts of the area, that it was a 12-mile

row to the nearest passage. One hour later he signalled he was ready to abandon his boat.

The *Bendigo* is due to reach Lizard Island today, where in 1769 Captain Cook climbed a hill to spot a channel through the reef for his ship *Endeavour*.

Mr Bird spent three difficult days being tossed by 10-foot waves while trying to find Cook's gap.

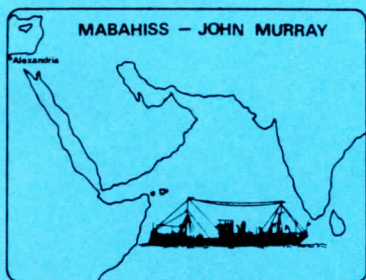
The boat turned over last Saturday and Mr Bird said in a radio interview: "It was the worst experience of the trip. It was like being in a spin dryer."

Those of you with a handsome bank balance might like to consider the following forthcoming attractions:

1983

### 3-7th September, Alexandria, Egypt

A meeting held to celebrate the sailing of the joint Anglo-Egyptian John Murray Expedition on 3 September 1933. Apart from historical papers, the main emphasis will be on a series of reviews of the general status of knowledge of the area and to act as a forum for initiating future international co-operation throughout the North-West Indian Ocean. Main topics for discussion will be earth sciences, physical and chemical oceanography, biological sciences (shallow and deep water), living and non-living resources, and pollution studies. Contact: Professor S.K. El-Wakeel, Head of Oceanography Department, Faculty of Science, University of Alexandria, Moharrem Bay, Alexandria, Egypt.



### 13-16 October, Virginia, USA

'Coral Reef Dynamics'. An international meeting advertised to cover the present state of understanding of physical, chemical, geological and ecological processes in coral reef environments. (We have heard little since the original circular arrived on our doorsteps four months ago but presume this gathering is still going ahead.) Contact: Bjorn Kjerfve, Belle W. Baruch Institute,

University of South Carolina, Columbia, SC 29208, USA.

*Stop press:* We have just heard that this meeting is cancelled but Bjorn Kjerfve would like to know if there is sufficient interest in the topic to hold a gathering next year.

### 5-6th November, Brisbane, Australia

Annual scientific meeting of the Australian Coral Reef Society entitled 'Current Reef Research'. Contact: Dr P. Flood, Geology Department, University of New England, Armidale, New South Wales 2351.

### 8-9th December, Nice, France

The annual meeting of the International Society for Reef Studies. Themes for discussion will include the population biology of coral reefs and structural and ecological similarities between pre-Tertiary and modern reefs.

Contact: Dr J. Jaubert, Université de Nice, Park Valpose, 06034 Nice CEDEX, France.

1985

### 27th May, to 1st June, Tahiti, Polynésie Française.

Fifth International Coral Reef Congress entitled 'Reef and Man'. Sponsored by the International Association for Biological Oceanography (Coral Reef Committee), hosted by the Research Centre of the Museum National d'Histoire Naturelle and the Ecole Pratique des Hautes Etudes. Activities to be divided into seminars, symposia and miscellaneous sessions. Field trips before and after to high volcanic islands (Society Is.) and atolls (Tuamotu Is.).

Contact: Antenne Museum - EPH, Congrès Récifs Coralliens 1985, B.P. 562, Papeete, Tahiti, Polynésie Française.

*Which man do they have in mind? Bernard Salvat perhaps.*

## SLUDGE REEFS BUT NOT MUD MOUNDS

If you can't afford to get to a coral reef, how about making your very own sludge reef?

# What about the sludge?

The controversy over acid rain, said to be caused by the sulphur in flue gases from power generation and other industrial processes, is if anything becoming more acute. Latest victims identified are forest areas in West Germany, Poland and Czechoslovakia. As has been considered several times in these pages, the scrubbing of the flue gases using a limestone slurry is one method of controlling the sulphur at source. The problem is that this procedure results in the formation of large volumes of sludge.

How to dispose of this sludge is occupying the minds of those in the United States (where there is a growing use of this scrubbing process at power stations) who have the job of thinking of uses of waste materials. One disposal technique is to mix the sludge with fly ash, allow it to solidify and use it as landfill.

However, there have also been some experiments in employing the sludge to make aggregates or concrete blocks. In one case a method of disposal is being proposed in which blocks are

made from scrubber sludge and then placed on the ocean floor on the continental shelf to provide reefs.

The article in the July issue of *Concrete International*, from which we gleaned this information, points out that one of the concerns over the use of scrubber sludge in concrete is its high calcium sulphate content. However, so far in the research project involving the experimental under-sea reefs, concrete made with sulphate sludge and a large proportion of fly ash appears to have good durability.