ISSN 0255 - 2787

REEF ENCOUNTER

NEWSLETTER OF THE INTERNATIONAL SOCIETY FOR REEF STUDIES

Number 4

November 1988

The Amazing Adventures of Captain Coral

FEATURES: THE AMAZING DISCOVERY OF CAPTAIN CORAL

REEF ENCOUNTER NO. 4 APRIL 1987
Newsletter of the International Society for Reef Studies
EDITED BY BRIAN ROSEN
Sub-Edited and Produced by Jeremy Thomason and Newcastle University Student Union Print Shop.
INTERNATIONAL SOCIETY FOR REEF STUDIES

WHAT IS THE ISRS?

The International Society for Reef Studies was founded at a meeting in Churchill College, Cambridge, England in December 1980.

WHAT IS THE AIM OF THE SOCIETY?

Under the Constitution the AIM of the Society is to:

Promote for the benefit of the public the production and dissemination of scientific knowledge and understanding concerning coral reefs, both living and fossil.

HOW IS THIS TO BE ACHIEVED?

The Society shall have the following powers:

i. To hold meetings, symposia, conferences or other gatherings to disseminate this scientific knowledge and understanding of coral reefs, both living and fossil;

i i To print, publish and sell, lend and distribute any papers, treatise or communications relating to coral reefs, living and fossil as well as any Reports of the Proceedings and the Accounts of the Society;

iii To raise funds and invite and receive contributions from any persons by way of subscription, donation or otherwise providing that the Society shall not undertake any permanent trading activities in raising funds for its primary objects.

CORAL REEFS: a Springer-Verlag publication:

The ISRS collaborates with Springer-Verlag in producing the quarterly journal CORAL REEFS. This large format journal is issued free of charge to all full members of the Society. Contributed papers concentrate on quantitative and theoretical reef studies, including experimental and laboratory work and modelling.

HOW CAN ONE JOIN THE ISRS?

An application for membership in the ISRS is found on the reverse of this sheet. Annual subscription for full membership is US $50 or £35 for 1987. Full membership includes Volume 6 (1-4) of CORAL REEFS, REEF ENCOUNTER (the ISRS newsletter), Abstracts of the papers of the Annual Meeting, and other periodic mailings. Student membership costs US $8 or £6 and includes all of the above with the exception of the the journal. Spouse membership costs the equivalent of one full plus one student membership and entitles the couple to one copy of the journal volume and the other mailings.

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RE4

Admit it! You thought we'd died. Well, so did we. Yet here we are again. But first, we must apologise again for letting everyone down, especially Student Members of ISRS, who don't appear to get much for their money and haven't received RE either. Second, and we hope this will do much to put things right, we have reorganized ourselves and saved production costs too. We also think this will put us in a stronger position to produce RE more reliably. (If excuses for delays don't interest you, skip the next bit).

For the sake of posterity, when the glorious history of ISRS comes to be written, and for the benefit of eminent lobbyists on behalf of ISRS whose eloquence has probably been completely undermined by the failure of RE to deliver (not to mention their rumoured flight to Berkeley), this is what happened. No, we did not move to Wapping, but just as we finally begun to get RE4 under way, ISRS's funds wobbled away. This was probably an early sign of things to come on the international stock markets, or perhaps just the reluctance of various officers and editors of the Society to pay their subscriptions.

Our treasurer, Rolf Bak, taking a severely monetarist line after the liberal regime of founding Treasurer P Spender Davies (for an explanation of this very obscure and tasteless joke see RE3, p25, lower left, two lines up), had no option but to declare RE a No-Go Area (not that it was going very far at the time - oops). Privatisation of RE was out of the question, there being nothing much to privatise. Rumours that the Editor had defected to organizing the next International Coelenterate Biology Conference, or been approached to run Scripps Institute or the Italian national football team, can now be discounted. Or, to be more precise, fairy godmothers, knights in shining armour, lifeboats and mountain rescue teams came to the rescue of a beleaguered Editor from the University of Newcastle upon Tyne, and took over entire responsibility for the production side. So the production of this issue is due to Jeremy Thomason's efforts as well as those typesetters and printers in UNUT (no obvious jokes please) whom he's managed to persuade to take us on. By the way, he did not choose the cover of this issue.

But now I see an irate mob of anxious shareholders, RE contributors, IABO, IUCN, UNESCO and Pacific science liaison officers, various Ombudspersons and the otherwise patient and long-suffering 288 members of ISRS (not all of whom are on the editorial board of Coral Reefs*) banging on my windows demanding their rights, in view of our failure to print all the vast amounts of copy that came flooding through the Natural History Museum's Romanesque porch, destined for immortalization on these pages. All we can say to you is that we are sorry, but we couldn't fit in everything this times, and are keeping some of the unpublished copy back for a Books-and-Conservation issue, code name (you've guessed it) RE5. Once we had got ourselves together for RE4, we wanted to make it a reasonably short issue, so as to produce it faster. It's also unfortunate, and nothing to do with the ceaseless efforts of the authors themselves, that some of the copy we had to omit was simply cold by the time we assembled our final choice. This will of course be carefully consigned to the RE archives.

Please note that we're not asking for a copy of RE5 because we have plenty already, and are working on it now. If however there is anything short and urgent you want us to consider, please send it immediately. Otherwise, keep faith with us, and aim your contributors for RE6 (wow!), by sending them to us in October - November.

* and vice versa. For instance, it can now be revealed, following our privately commissioned survey, that four names on the monolithic editorial board of Coral Reefs do not actually feature in Rolf Bak's recent (April 15th) ISRS membership list (Shame, shame - Ed.). Fear and discretion, not to mention a delicate problem of homonymy, dictate that these names cannot be revealed in print (Shame, shame - Ed.).

The President's Farewell

I look back over the past three years as President of the International Society for Reef Studies with a sense of accomplishment. At the same time, I am aware, of course, that we have some way to go before the society is firmly established as a voice of coral-reef scientists throughout the world. Nonetheless, we have made great strides in just three years.

To begin with, we have established our historical ties with all the researchers who have preceded us by accepting the T. Wayland Vaughan rule as the symbol of the office of President. This impressive 15 inch wooden ruler once belonged to Vaughan himself, who careful carved his name on the back of it. We have added a brass plaque identifying the holder as President of the Society.

Second, we now have an official logo to give the Society a higher profile at meetings and in our journal. This logo has become popular, particularly on t-shirts, which have been in great demand by both members and non members.

Third, our journal Coral Reefs is now well established and widely recognized in the research community for the fine quality of its contributions.

Fourth, we have invited the full membership to participate in the elections of officers and council members. The response to this innovation has been most encouraging - over half the society participated in the recent election.

Finally, we have established a new position, that of Membership and Development Officer, to support the Treasurer and help keep track of our mobile (and somewhat absent-minded) membership. David Montgomery has ably filled this position in the past months.

As I leave this office, I can happily report that our footings are solid and our future promising. I am confident that the Society will soon become a unifying force among all the coral-reef workers of the world. On to Marburg and a changing of the guard. It is time to enter a new phase in our development - let us now strengthen our Society and leave ad hoc committees to history.

(Ian Macintyre, ISRS President from 1983 to 1986)

CURRENTS

The following item is a non-reef-specialist's encounter with reefs, a follow-up to the first of two articles published by Colin Braithwaite in Geology Today (Vol. 3, pp. 16-21, 197-201, 1987). We found this wry glance from an outsider suitably provocative for our CURRENTS column. We don't know what kind of feedback Ted Neild will get from Geology Today readers, but if anyone is going to REact it surely has to be our own REaders. All UPWELLINGS gratefully received.

A reef by any other name

Ted Neild

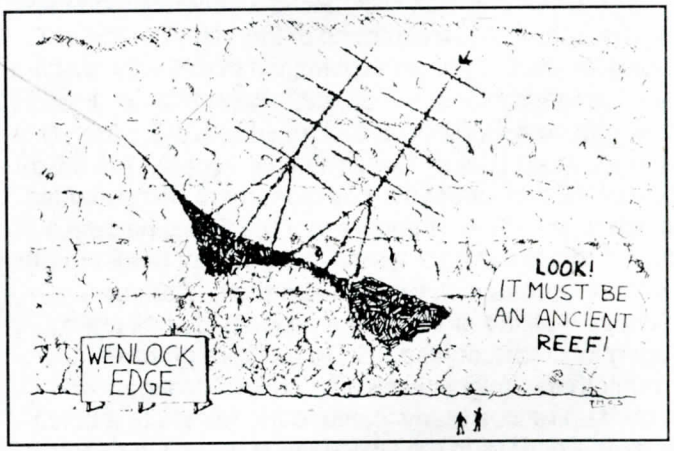
'Pleistocene, pliocene, miocene: are regrettable BARBARISMS. It is worth while to mention this, not because the words themselves can now be either ended or mended, but on the chance that the men of science may some day wake up to their duties to the language - duties much less simple than they are apt to suppose....' Thus spake H W Fowler in Modern English Usage in 1926 surveying some of our newer coinages - thanatocoenosis and parautochhon spring immediately to mind - I fear that the great man must now be undergoing circuition in his graben.

A lot of us agonise long and hard about the language; and the memory of research days is too fresh for me to forget the semantic problems of a field that still doesn't know what it's talking about. I start by paraphrasing the palaeontologist A E Wood and posing the question 'What, if anything, is a reef?'. According to most dictionaries a reef is something natural that pokes out of the sea to impale ships. Some are made of coral, and the rock record contains many spectacular fossil examples. But what are we to call them?

Well, why not.... reefs? Would that calling a spade a spade were all the linguistic philosophy one needed! Fossil reefs were not always recognized as such. They were thought to be chemical concretions, formed long after the deposition of the rocks around them. It was Sir Charles Lyell, in 1841, who finally made the analogy between the fossil reefs at Wenlock, Shropshire, and those coralline shipping hazards of the modern tropics. It is this analogy that has since caused trouble. Exactly how far are geologists to take it? Modern reefs are made up of coral that is better at making reefs than any other reef building animal is, or has ever been. This coral does not occur in rocks older than about 200 million years. Yet fossil reefs may be much older than that, with extinct corals and heaven knows what else in them.

So purists insist that, to be worthy of the name, a 'real' reef has to be water resistant, must grow close to surface, and display ecological zonation as a result of being there. They say this because the term, as first defined, means a shipping hazard. Modern reefs are thus taken as yardsticks for ancient ones; and if the ancient ones don't measure up, then they must be something else. But this approach makes nonsense. Ecological zonation may develop in deep-water reefs too. But on these terms, only zonation caused by being close to surface will suffice to make a 'real' reef. From this it is evident that the ultimate test of a 'real' reef is wave resistance, since without it none would reach the surface in the first place.

So all that geologists have to do is to find out if a fossil reef was wave resistant, and the 'real' reefs will be separated from the unreal ones. But how can this be done? you cannot possible observe wave resistance in a reef somewhere on Wenlock edge. You cannot even observe it on a modern reef if the tide is out. All you can do is infer it.



The word 'reef' therefore now relies for its meaning upon an interpretation. It becomes a genetic term. But genetic terms are the scourge of science, the stylistic equivalent of leading the witness. You introduce your argument into the evidence by describing it in words loaded with assumption and implication. This might not be so bad if there were some infallible marker for wave resistance, but there isn't.

Dr Colin Braithwaite of Dundee University hit the nail on the head when he wrote 'Only by the use of some non-genetic term can the facts of observation be understood and stand apart from the delusions of interpretation'. Amen to that. But alas, reefs have proved just too complex and variable for an objective system of classification to come about. Many of the classes that have been invented contain only one example, and this is not good.

Semantically speaking, the approach of the purists has been to take linguistic priority as a reason for choosing a reefal paradigm. But since hardly any fossil reefs match up to modern ones, a whole circus of wordmongering has ensued to make names for all

those fossil 'failures'. There is also a philosophical error. Words do not have a meaning of their own; they mean what we choose them to mean. Clawing back through years of subsequent usage in the hope of uncovering the jewel of primitive truth that is the real meaning is lunacy. It owes a lot to Rousseau's noble savage and the Platonic Ideal, but contributes little to practical semantics.

Two years after Fowler wrote his diatribe against 'the men of science', two American geologists, Cummings and Shrock, proposed the word 'biotherm' in an attempt to solve this problem by wiping the vague, illdefined 'reef' out of the vocabulary. It was elegant enough, and is still used. But they made the mistake of using 'reef-like' in its definition. So all the sins of the four-letter father were visited on it, and nobody is any clearer about what a reef (or biotherm) is, isn't wasn't or should be.

A worse horror yet was included in a paper published in the 1970's by Neumann, Kofoed and Keller, describing some new types of modern reef forming in deep waters on the edge of the continental slope off Florida. They were considered new and unique, mainly because they were initiated by natural cementation on the sea floor. This stimulated the settlement of organisms and so initiated a reefal structure. The authors defined the new whatsits (which were too deep to be shipping hazards, and so needed a new term) as 'formed by constructive interaction of penecontemporaneous submarine lithification and organism attachment below the photic zone' and dubbed them 'lithoherms'. Was this taking their responsibilities to the lingo seriously? Alas, no. The unique feature of the lithoherm, namely that cementation preceded and stimulated its inception, was unfortunately overlooked when the definition was written. The rest of it could describe almost any sort of reef. This would not have impressed Professor Fowler.

The first general lesson to be drawn is that it is no use enforcing precise nomenclatures while still in a state of ignorance. Secondly, giving scientific connotations to ordinary words is usually a disaster. From this it follows that any yardstick should be selected for practical reasons and should not have to bear witness to the usage of any word by non-scientists, especially sailors.

New jargon is usually ugly, ill-conceived and barbarous, just as the great H W said; but we can't live without it completely. All we can do is strain every fibre to avoid the circumstances that demand it. Most reef-workers, if asked why something is a reef, will reply testily 'because I say it is' and to hell with semantics. I don't know what Fowler would have said, but I suspect that this simple method has more good sense to recommend it than they, in their linguistic innocence, are apt to suppose.

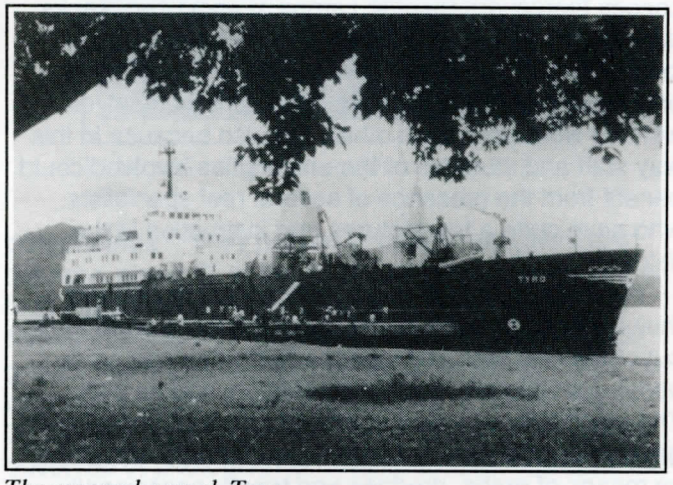
This article first appeared in Geology Today (Vol. 3, pp. 155-156, 1987) and is reproduced here by kind permission of the author, the Editor of Geology Today and its publishers, Blackwells.

The Indonesian-Dutch Snellius - II Expedition

Jacob van der Land & Maya Borel Best

In RE2, Maya Best told us about the plans for Snellius II, probably the most ambitious and comprehensive of ship-based reef expeditions in recent years. Here, she and Jacob van der Land give an account of the kind of reef work accomplished by the Expedition. Of special interest is the technological support, including container labs, underwater video, a helium kite balloon and a helicopter.

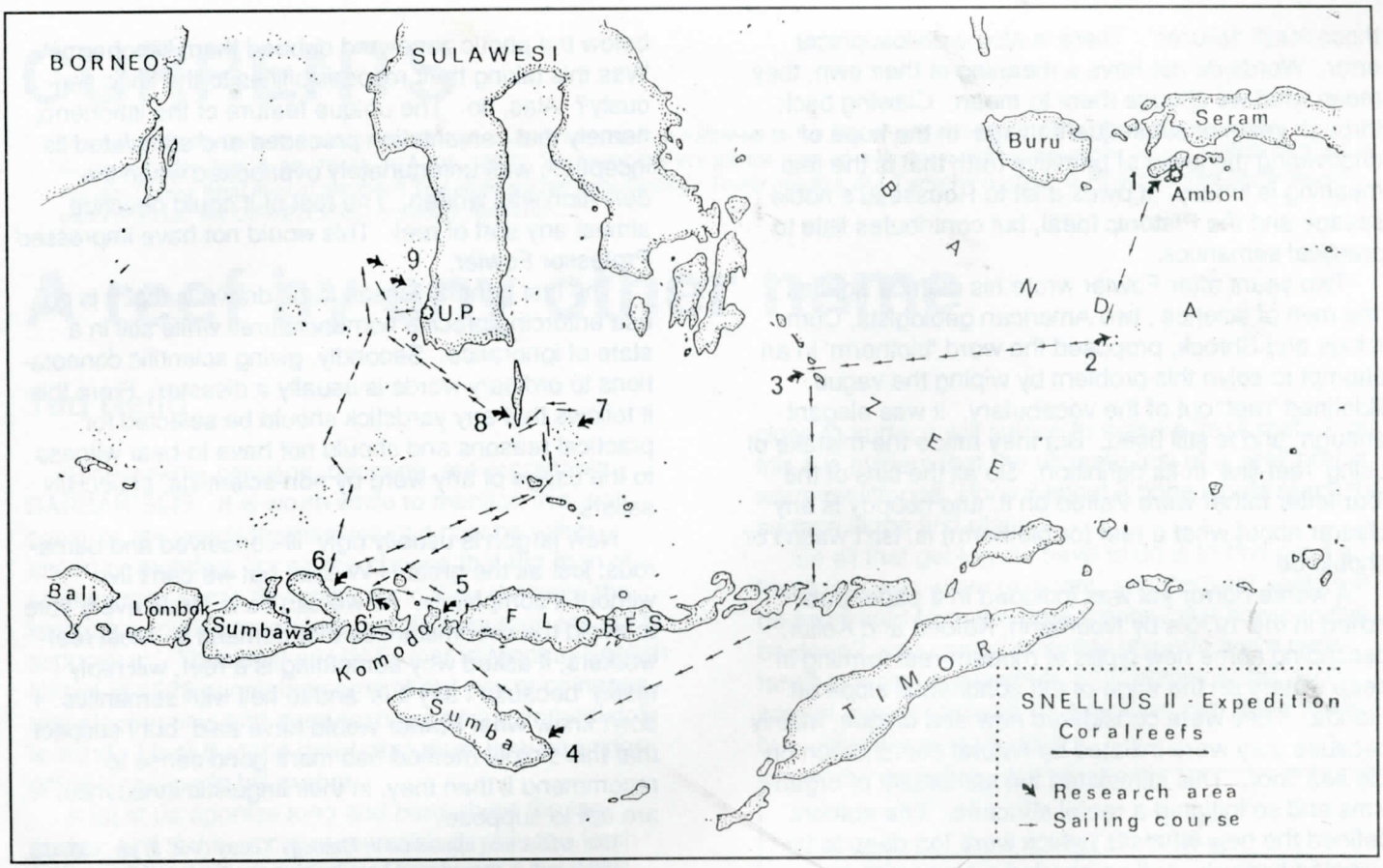
Eastern Indonesia can be called the centre of the world from the point of view of the coral reef researcher, at least in many respects. Therefore the interdisciplinary Indonesian-Dutch Snellius-II Expedition to this area in 1984 in 1985 was partly dedicated to reef studies. We were fortunate to be able to visit nine widely separated reef areas according to our plans as published earler in Reef encounter [1] .



The research vessel, Tyro.

Container Labs

Ship-based reef expeditions of some magnitude are rare nowadays. Of course they have disadvantages, but great advantages as well, and we tried to make use of these as much as possible. During a period of two months we had at our disposal two research vessels,



the large Dutch "Tyro" and the smaller Indonesian "Samudera", as well as nine small craft, mostly rubberboats. The "Tyro" is a special research vessel in that it was originally a cargo vessel, which means that the deck and hold space is very large, so that, e.g., more than 20 container laboratories and an enormous amount of equipment could be installed. A total of 62 Indonesian, Dutch and Belgian scientists and technicians, originating from 18 institutes, joined the Expedition for one or two months. Prior to each of the two cruises there were training camps of about two weeks duration on Ambon and SW Sulawesi, organized by local universities. They proved to be very useful not only because participants could aquaint themselves with the work (and each other) but also because in this way staff and students of the universities involved could benefit from the presence of several reef specialists, who gave quite a few lectures and instruction in the field.

Reef research was taken in its widest sense and thus included not only the study of the living coral reefs, but of the reef flats and lagoons (with their sea grass beds), reef islands, and fossil reefs on land as well. The availability of a well equipped research vessel also gave us opportunities to sample the fauna of the slope by means of grabs, dredges and trawls, occasionally down to a depth of more than 1000 m. The research programme included many different topics such as taxonomy and biogeography of algae, seagrasses and several groups of animals, seagrass and coral reef ecology, reef cartography, palaeontology, geomorphology, fisheries biology and socio-economic aspects. This getting together of several disciplines is clearly one of the great advantages of a large expedition, providing possibilities for close cooperation and interaction in various remote areas.

Obviously it is impossible to present here an adequate report on an undertaking like this. We must restrict ourselves to giving some impressions and a summary of the programme as executed.

Centre of the World

What does it mean when we say that the eastern Indonesian waters nowadays form the richest coral reef area in the world , and how can this be explained? How far have these reefs deteriorated due to human interference and how can this huge area be adequately managed to safeguard its wealth? Of course such general and practical questions were being asked before the Expedition as result of prior reef research, e.g. the Buginesia project. We could not expect to solve them, but we felt that we could make a modest contribution.

Of course several historical, climatological, oceanographical and geographical factors have coincided to make the area the richest of the world for many groups of organisms. However, this is not expressed in the optimal development of single reef communities or reef types. We think that more beautiful and better developed reefs can be found in several other areas, notably oceanic areas. The Indonesian area however seems to be characterized by a greater variety of reef communi-

ties and consequently by a greater number of species of several groups of reef building or reef dwelling organisms. This was particularly evident around the island of Komodo. Its reefs are nowhere impressive but they show a great variety of types along its complicted shore line. Perhaps the extremely complicated geography of the archipelago, with sheltered as well as exposed situations, and with estuarine as well as oceanic waters, is the main reason for its richness in reef types and reef organisms.

Videos and Volcanoes

A summary report on the living and fossil reefs studied during the expedition has already been presented to the 5th International Coral Reef Congress[2]. The studies included a taxonomic inventory of **stony corals**, which yielded a total of more than 360 species, including several undescribed ones. Much of the ecological work was concentrated in transects in order to integrate the different types of studies and to facilitate comparisons between the different reefs. A total of 42 transects were studied, all at a depth of 6 to 10 m on the seaward slopes of the reefs. The line-transect method was chosen because, during an expedition, limited time is available at each locality. A first report on the analysis of line-transect data was published recently [3]. This analysis was made to establish the use of simplified line-transect studies in reef monitoring for management purposes.

Because we spent only a very short time at any one locality we decided to make video recordings along each transect line. This enabled us not only to check the field records but to study the transects in greater detail as well. A video camera can give you a practically unlimited number of overviews supplemented by close shots including ertain details invisible to the driver. On board, the recordings greatly stimulated discussions among the divers about their work. We think the modern professional underwater colour video cameras will become an indispensable tool for reef research because diving time is always a limiting factor. Moreover computer analyses of the recordings is becoming feasible.

The growth rate of corals at different locations was studied by X-raying slabs of 180 *Porites* colonies. Growth band width in the X-ray photographs varied between 0.5 and 1.0 cm / year. Occurrence of lesions and inclusions in these sections is being studied as well. *Porites* species were also used to study predations by parrot fishes and excavation by boring animals in living coral heads. In the transects hardly any predation by sea urchins and *Acanthaster* was observed and nowhere else did they cause much damage.

On Sumbawa, we chose the Tambora volcano as an area with young reefs because we expected the huge 1815 eruption to have killed off all life in its vicinity. Indeed in some places the black volcanic sand was still practically devoid of life but unexpectedly we also found flourishing reefs with colonies that must have survived the eruption. Colonies of *Galaxea* and *Porites* were over 2m across and must have started growing before the eruption.

Diving Specialists

Taxonomic and biogeographical studies benefit most from short visits to several areas and a variety of habitats. Consequently several taxonomists joined the Expedition. From the ship we sampled many groups by grabs, dredges and trawls, including several non-reefing but nevertheless interesting animals like stalked crinoids and pogonophores. However, most effort was put into the study of certain groups of reef inhabitants by diving specialists.

Previous knowledge differs widely in the different groups. We just give a few examples. Very little was known about the **seagrasses** of the area, but the group is small and well known from surrounding areas. The 13 species encountered were all to be expected. Another generally well known group are the **serpulid**

Video recording transect lines.

polychaetes . They proved to be well represented in the area: about 55 of the 80 taxa known from the whole Indo-Pacific region were collected. Stony corals and **fishes** are also well known taxonomically and in these groups few undescribed species were found, in spite of intensive search. About 400 species of fish from about 75 families were collected (16,000 specimens in total), observed or photographed. More undescribed species were encountered among the macro-algae, which were sampled intensively (1500 collections of about 300 species), although at least part of this group is well known. This situation is in contrast to **sponges**, of which 300-400 reef species were collected. The sponge fauna of Indonesia, supposedly the richest in the world, is known from a few old publications only,

the most recent one dating back to 1934. Consequently the Expedition has already contributed considerably to the knowledge of these important reef animals (the first results were presented by van Soest [5] to the 3rd Int. Conf. on the Biology of Sponges, 1985). Of course there are other groups of which even much less is known. The meiobenthologist of the expedition studied a group of **turbellarians** and described 59 species, of which at least 45 are new to science.

Because virtually nothing was known about the **seagrasses** of Eastern Indonesia, two of the scientists made an inventory of the species and communities and selected suitable areas for further studies during the second. Their main goal was to get an insight into the structure and functioning of seagrass dominated ecosystems. In all the areas visited areas they surveyed the seagrass species and communities and in selected places they studied zonation, community structure and biomass (botanical as well as zoological). Technically the most difficult part was the study of community metabolism by means of plexiglass enclosures and the measurement of primary production of epiphtyes on seagrass leaves by means of micro-oxygen electrodes. The measurements were quite successful although the climate proved to be quite destructive to delicate electronic equipment. Probably such sophisticated methods cannot be applied on tropical reefs during longer periods because of maintenance problems.

Helium Kite Balloon

Reef cartography is very time consuming and consequently only a number of rather small areas could be mapped. The main goal was to study the feasibility of the use of a number of methods for future large scale survey for management purposes. Subsea surveys were made with an underwater scooter along transects of 500 to 1500 m. Aerial photography was executed with a helium kite balloon with a remote controlled camera and on one occasion we were able even to use a helicopter. A portable echosounder, employed in a rubberboat, was used for geomorphological studies. Of course subsea surveys were made to study the features found on the photographs and the echo-soundings. Old hydrographic charts and aerial photographs made from great heights proved to be valuable as a basis for the field work, but they also showed long-term changes, e.g. in the morphology of bank reefs.

The **geomorphologist** of the Expedition worked in close collaboration with the geologists, biologists and cartographer to try and understand the present morphology of a number of reef and coastlines. The **palaeontological work** was concentrated on stony corals of Pleistocene, Pliocene and Miocence age. Occasionally, fossils of other groups were sampled. Of particular interest was the discovery of a Miocene alcyonarid fossil. We soon identified it because one week later we found a similar animal living on some of the modern reefs.

Reef fishes were sampled intensively for several purposes. Some effort was made to find somewhat standardized sampling and observation techniques from which future reef fish monitoring programmes might benefit. Gill nets were used on the living coral reef, while beach seines were used to sample the fish fauna over the reef flats. Visual census of transects proved to be quite useful, but the use of video recordings for this type of monitoring proved to be difficult, though not useless.

Fellowships

Part of the results of the Expedition will be published in an Expedition Report, to appear in early 1987, and in the proceedings of the Snellius-II Symposium. This symposium, to be held in Jakarta in autumn 1987 is considered the official end of the Snellius-II project, which in fact is more than an Expedition (e.g. there were also extensive pre and post-expedition fellowship programmes, in which more than 100 Indonesian scientists came to the Netherlands). At present follow-up programmes are being worked out for several of the Expedition topics, including aspects of coral reef biology. The Indonesian government is determined to develop **reef management programmes** and we think that Dutch and other foreign reef scientists can be of great help in the provision of a scientific basis for monitoring and management.

Address of the authors:
Rijksmuseum van Natuurlijke Historie
PO Box 9517, 2300 RA Leiden, Netherlands

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Postscript

The Indonesian-Dutch Snellius-II Expedition, a major interdisciplinary programme of oceanographic research in Eastern Indonesian waters, will come to an end in 1988. This international programme started in 1983 and included several ship-board and land-based research projects, covering most disciplines of marine research. The projects were grouped in five themes of research, one of which covered several types of coral reef research.

The final phases consist of the organisation of the "Snellius-II Symposium" in November 1987 and the publication of the proceedings of this symposium and the final report of the expedition in 1988. The symposium war held in Jakarta from 23rd to 28th November 1987. It included five half-day sessions dedicated to aspects of reef-research such as taxonomy and zoogeography of corals and other reef animals, seagrass ecosystems, algology, reef ecology, reef cartography, reef-fish, biology and reef management.

The Complete Reef Encounter - No. 4.

CORAL

The world's greatest stony coral structure is the Great Barrier Reef of Queensland, north east Australia. It stretches 1260 miles 2028 km and covers 80,000 miles^2 (207 000 km^2.)

The world's largest reported discrete coral is a stony colony of *Galxea fascicularis* found in Sakiyama Irimote Island, Okinawa on 7 Aug 1982 by Dr Shohei Shirai. It measured more than 16m (52$^1/_2$ ft) overall.

From The Guinness Book of Records, 32nd Ed., 1986 N.D. McWhirter (ed.), Guinness Books (publ.).

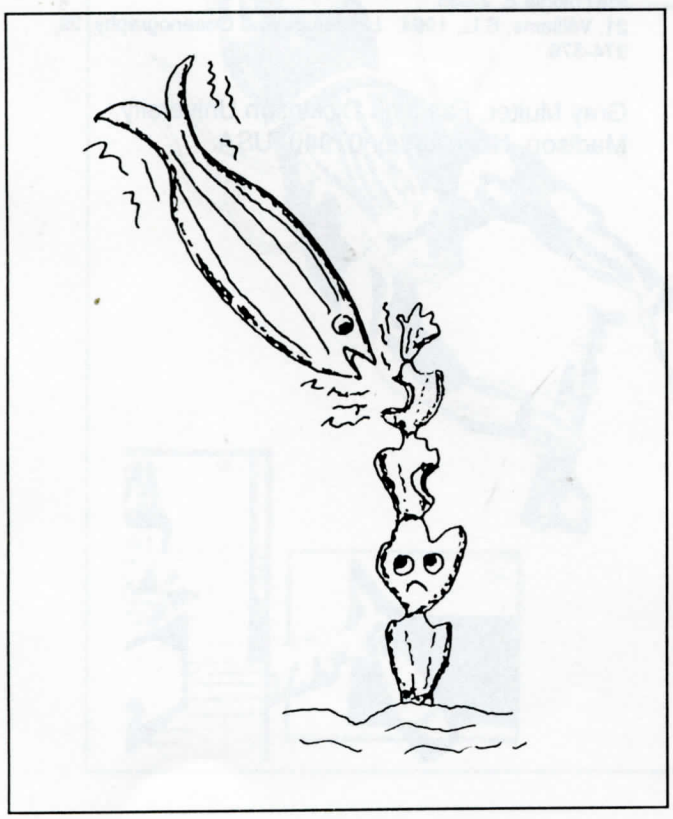
Features

1. Has Halimeda Arrived?

Gray Multer

The following summary by Gray Multer was inspired by various Halimeda events at the ISRS Meeting at Marburg, December 1986. It also gives an instant introductory bibliography to this intriguing and important reefal organism.

Some people seem to think that Halimeda has "arrived" and point to evidence such as (1) the increasing number of significant papers on this green alga, (2) the emphasis on it at the Marburg ISRS meeting in December 1986 (twelve participants in the Halimeda workshop, one poster session and four papers presented at a special Halimeda Scientific Session), and (3) the forthcoming special issue of CORAL REEFS devoted to Halimeda.



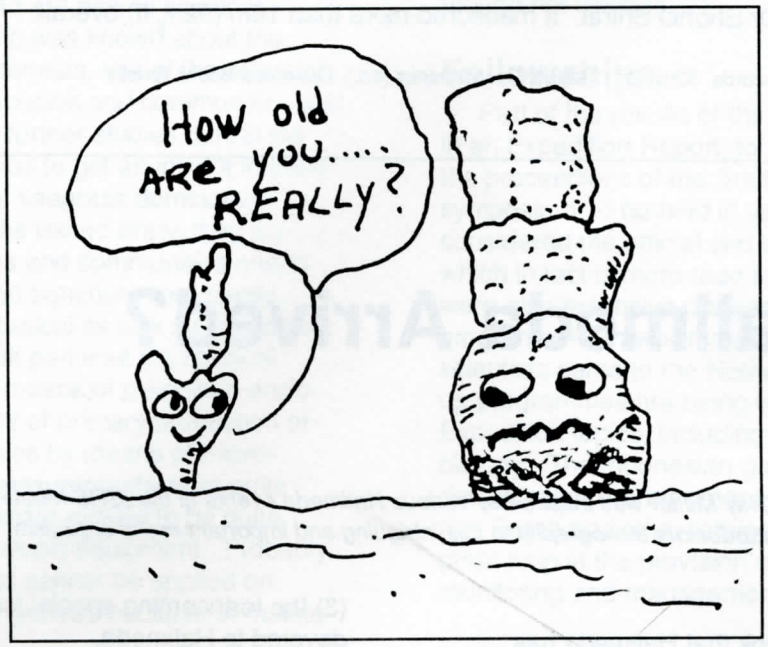
Growing through a hole

Although recognized as a common calcerous reef component ever since Finckh (4) first decribed it growing up through a hole in a submerged board at Funafuti Atoll, its role has usually been considered subordinate to that of the other more classical reef invertebrates and coralline algae. Sporadic serious attention was given to Halimeda in the 1956-1980 period by a variety of workers. Examples include: Folk & Robies (5), Ginsberg (6), Hillis (9), Goreau (7), Wilbur et al (20), and Hillis-Colinvaux (10). Since that time however, we have witnessed an increasing number of papers dealing with both biological and geological aspects of Halimeda.

Remarkably swift calcification

New growth techniques include (1) monitoring Halimeda growing up through monofilament screens, (2) counting segments, measuring their surface area and turnover rate above wire twist tags (2), counting segments and determining turnover above an Alizarin Red-S stained time line (19), and weighing segments and determining turnover using Alizarin Red stain (12). Differences in these techniques and their assumptions can make comparison of some results difficult. New data (11) on fore-reef diversity and habitat range (maximum depth 150m) indicate that caution must be used when interpreting specific palaeoenvironments using Halimeda. Biohermal accumulations of record sizes (2,18), as reported for different Pacific sites, present

fascinating sediment production and analogue models. Recent finds on physical (8,13) and chemical (15,16,17) defence mechanisms by Halimeda may influence future evaluations of predation. A new discovery (21) concerning the ability of Halimeda to obtain nutrients from the sediment may help to explain its distribution, growth and segment production. Scanning electron microscope studies(14) indicate remarkably swift calcification - up to 50% of a new segment weight being calcium carbonate within 48 hours.



Marburg musings

At the ISRS meeting in Marburg, some of concerns and questions raised by participants of the Halimeda Workshop were as follows:

(a) Basic problems still exist in identification and taxonomy (Hillis-Colinvaux).
(b) Can we look for taxonomic signatures in loose Halimeda segments using scanning electron microscopy (Frost)?
(c) What causes species variations on the St. Croix shelf (Hubbard)?
(d) Halimeda is a chief contributor to the Australian reef tract, and its biohermal accumulations represent modern analogues for the Paradox Basin (Davies).

(e) Can rhizoids serve as perennial structures; what controls growth spurts; why is there so little date on the life span of individual plants (Multer)?

Whether Halimeda has really "arrived" or not is irrelevant, but we have certainly been learning much more about this very important alga in recent years. However, as in other areas, the more we learn, the more we realize how very little we really know about this fascinating, erect, sediment-stabilizing, prolific, rock-clinging sprawler and deep-hanging curtain-former!!

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Gray Multer, Fairleigh Dickinson University, Madison, New Jersey 07940, USA.

RE is not generally regarded as a suitable vehicle for MAJOR RESEARCH BREAKTHROUGH'S, but because of our unashamedly good record on rapid and frequent publication, we make an exception here for Futurus's astounding NOBELOGENIC work on REPRODUCTIVE PSYCHOSOMATISIS in corals, a study whose repercussions will undoubtedly go far beyond the walls of your average run-of-the-mill tropical marine lab.

2. Motility, Transmogrification, Consciousness and Assiduity in a Novel Scleractinian

R.Q.R. Futurus
Department of Thaumaturgy
Diabolical State University

Introduction

Although certain scleractinian corals have recently been demonstrated to possess certain faculties of motility (1), consciousness and assiduity(2), and transmogrification(3), as yet no single species has been shown to possess all four of these remarkable abilities. The discovery of Captain Coral *nov. gen. nov. spec.* is probably the most exciting breakthrough in modern diabolistics.

Methods and Materials

A combination of tried and tested techniques, including prolonged incantation, hyperventilation, meditation and the application of d-lysergic acid diethylamide, with the novel approaches of high-speed cinematography and abundant imagination, enabled the following semi-photographic images to be captured. All scale bars are totally meaningless.

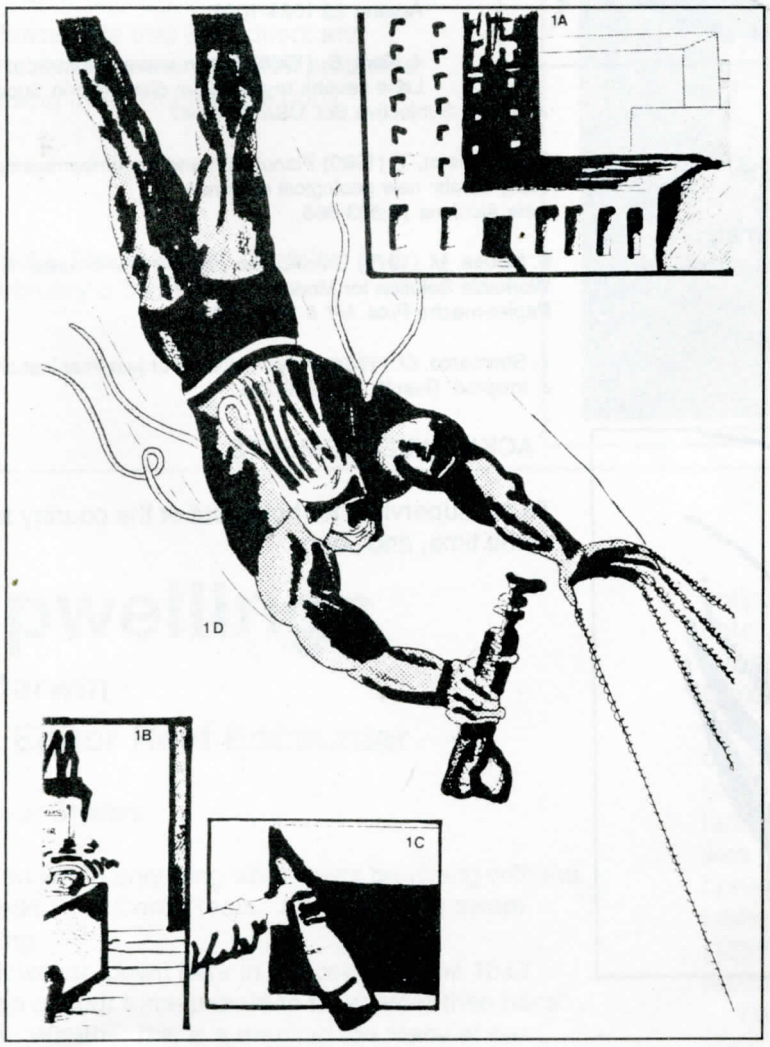

Figure 1

The primary environment of Captain Coral $(C)^2$ is a crumbling ivory tower in a crumbling East-coast university (a). The exact location is a decrepit laboratory (b) renowned for the wall to wall dust and unopened text books. Latent motility, assiduity and the processes of transmogrification are released by the application of the contents of an ancient and mysterious container (c). Consciousness is assumed to be permanent, though this may be erroneous. The motile form of $(C)^2$ is characterised by the possession of a tentacle crown, extrudable mesenterial filaments, fingertip nematocyst batteries and a Smith & Wesson Delta-Ray ZAPPO calicoblaster (d). The absence of genitals is notable.

Figure 2

The usual plank-eyed vertebrate foes (a), or the more unusual planci'd invertebrate foes (b) are no match for the cunning and abilities of $(C)^2$. The timely application of finger-tip nematocysts (c) can disable the most ferocious of marine predators (d).

Figure 3

Is $(C)^2$ totally invincible?

Discussion

Many diabolical aspects of $(C)^2$ are still unresolved. Presumably the lack of genitals avoids problematical encounters with the likes of Lois Lane(4), or the embarrassment of synchronous lunar planulation(5). The Delta-Ray ZAPPO calicoblaster has been shown to have a calcifying effect on recalcitrant villains(6). Further studies will attempt to elucidate the functional morphology of the mucus secreting boots, the mode of balistic zooxanthellae expulsion and the reasons behind the processes of polyp balls-out[7].

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ACKNOWLEDGEMENTS

To my supervisor for being out of the country most of the time, and John.

Australian Bicentennial Reef Fashion

Throw out all those un-cool heavy gas tanks, cumbersome flippers and wet-suit flares. The only possible thing to be seen in, on the reefs and along the King's Road this year, is this nice little warning colouration number by the well known Pommie coral worker, Jean Muir. What's more, its unisex appeal is unmistakable. All I would say to aspiring male wearers, is don't forget to keep your Aussie Rules gear on underneath. Then, just hold on to your noses, everyone, take a deep breath, jump in, and join in the fun with the little coral-worals. Or, better still, why not keep it back for the Mass Spawning Ball?

Outfit, Aus $4931, from Oz & Pom's The Cryptic Habitat Boutique, 291b Chaetodon Street, Charters Towers, Queensland; or Harrods of Scunthorpe, South Dakota, USA.

Please note that the Editors are unable to answer personal problems arising from wearing this outfit.

Photo: The Guardian, Monday February 8 1988

Upwellings

C Darwin
c/o Editor Reef Encounter

Dear Charles

You wrote enquiring what might be wrong with the first edition of Coral Reefs. As far as I am aware, nothing.

However, down here in the colonies, the 1842 edition of your tome proves to be scarcer than hens' teeth. Whether this is a result of too many of our antipodean libraries being established after the 1842 date, or whether it is a consequence of the megabucks this item now commands amongst the Legion of Rare, Curious and Pre-Loved Book Dealers is unclear. I know only that in my efforts to sight a first edition, in order that I might cite from it, I found that the guardians of those institutional libraries which did possess a copy, tended to behave in a manner which suggested that it was possible to trace their ancestry directly to Cerberus, in all his multifanged glory. Invariably, I was fobbed off with a second edition (1874), a third edition (1889) or, more commonly, with some hick modern reprint of the paper back version.

I am afraid to report that I seemed singularly unable

to communicate that you had revised your text between each of these editions; that the descriptive detail and local interpretations changed with your having acquired new data from fellow scientists and sea captains.

Eventually, when I did manage to pry an 1842 edition loose from the protective bosom of one librarian, I found it to be mutilated and the coloured map missing. As such I never have been able to compare these maps between all three editions and I would appreciate if you, or your editor, could tell me whether these maps were revised also upon reach successive edition?

Believe me,
I remain,
Antipodeanly yours,

Kerry Rodgers.

Darwin boffs, here's your chance. Show your expertise, or better still, send a first edition - Ed.

We are very sorry that it has been so long before we were able to produce RE4 and publish the following letter while it was still reasonably up to date. Further developments have probably overtaken us, but we feel we should still publish this letter on a 'right of reply' basis - Ed.

Dear Sir

I am writing following publication in "Reef Encounter" - Number 3, February 1986 of an article entitled "Scientific Blinkers and the Great Barrier Reef" by Ann M. Cameron.

The article claims I maintain that my "organisation has the situation under surveillance and that all is well". She is referring to the outbreaks of crown of thorns starfish on the Great Barrier Reef. It is true that I have maintained that GBRMPA has the situation under surveillance. I have never said that all is well. The purpose of the surveillance and of the massive scientific program that has been commenced is to find out whether all is well or not. I have always maintained this.

It was I who pushed for and received approval for the re-establishment in 1983 of the expert multidisciplinary committee with international representation - the Crown of Thorns Starfish Advisory Committee (COTSAC) - which reported in January 1985 and recommended an integrated research program on the phenomenon. That research program has now been funded by the Government partly as a consequence of my organisations repeated and emphatic approaches to the Government on the matter.

Put briefly, our position has always been that there is insufficient information available to know whether or not the crown of thorns starfish phenomenon is a problem (i.e. has been caused by human activity), or whether it is a natural part of the Reef system, and that we should work as rapidly as we competently can do to resolve the issue.

COTSAC concluded that:

"Present evidence is inadequate for scientists to agree on the nature and significance of the phenomenon of aggregations of large numbers of crown of thorns starfish and thus on the extent of any consequent risk".

Finally, why does Ann Cameron claim that I have said that all is well? All of my staff can vouch that I have cautioned them for many years against adopting such a position, on the grounds that to do so would be unscientific in our present state of knowledge. If any one doubts this, I can supply file records to demonstrate its validity. we all should hope that the present major investment in the crown of thorns starfish research program will tell us whether we have a problem or not and what, if anything, should be done about it.

Yours faithfully

Graeme Kelleher
Great Barrier Reef Marine Park Authority
Canberra

DIARY

12th Caribbean Geological Conference St Croix, August 7 - 11 1989

The Twelfth Caribbean Geological Conference will be held in Christiansted, St Croix in August 1989. Local academic hosts are the West Indies of Fairleigh Dickinson University, Christiansted, on St Croix, and the Departmetn of Geology, University of Puerto Rico, Mayaguez, Puerto Rico.

Contact: Frederick Nagle, General Chairman
Twelfth Caribbean Conference
Department of Geological Sciences
PO Box 249176
University of Miami
Coral Gables, FL 33124

6th Pacific Science Association Intercongress, Vina del Mar, Chile, 7 - 10 August 1989

Contact: Professor Francisco Orrego Vicuna
Institute of International Studies
University of Chile
PO Box 14187 Suc. 21
Santiago, Chile
(Telex 346275 INTERC)

International Conference on Recent & Fossil Sponges, Berlin, Septmber 26 - 28 1988.

Contact: Hulmut Keupp & Joachim Reiter
Institut fur Palaontologies der Freien Universitat
Schwendenerstr. 8
D-1000 Berlin 33
West Germany

5th International Conference on Coelenterate Biology, Southampton, UK.

Secretary: Elaine Robson
Dept. of Pure and Applied Zoology
The University, PO Box 228
Reading RG6 2AJ United Kingdom
(0734) 875123 ext. 7619 or 7630

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