Editor Sue Wells  
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Cover: Five fish skeletons
There still seems to be much discussion on where coral reef research should be going and to what extent it should be responding to current environmental concerns. Reef Encounter has covered many of the issues recently, and referred to meetings and publications that have already attempted to outline research agendas for the coming millennium. Discussion is invaluable, provided it leads to action, and perhaps it is now time for the reef science community to return to the field and lab and get on with the business of research. In a future issue of the newsletter we will try and synthesise some of the main conclusions on priorities in scientific research, and how this specifically relates to reefs. Please send in your ideas and comments.

The next issue of Reef Encounter will come out in March and, contrary to our comments in the last issue, we will remain with this spring and autumn schedule. Many thanks once again to Margaret Roberts for providing cartoons, and to Jay Maclean, a new contributor of artwork. Thanks also to Rupert Ormond and Tim Austin for providing help and facilities to get this issue together while we were away from our respective homes. Sue is now based in Belize and, contrary to many people's ideas, this is as accessible as Cambridge in terms of fax, phone and e-mail! Please keep in touch with us both — addresses are given on the back cover of this issue. And don't forget to send off your ballot papers — ISRS needs the officers that you want.

Sue Wells
Callum Roberts

COPY DEADLINE FOR REEF ENCOUNTER 17
(due out March 1995) IS JANUARY 31st 1995

ISRS HONORARY MEMBERS

From the very inception of our International Society for Reef Studies, a proviso in our constitution stipulated that the Council could elect as Honorary Members those who had distinguished themselves in the field of coral-reef research or who had provided outstanding service to the Society. This would be our way of recognizing our renowned coral-reef scientists and acknowledging those who have made major contributions to our Society's activities.

To date we have elected ten Honorary Members, five of whom have since died. These people are all giants in their field of research, and it would take a large book to cover all their contributions to science. In this short review, I can only focus on their most noteworthy accomplishments in coral-reef research.

Our first three Honorary Members were elected in 1981 at the 4th International Coral Reef Symposium in Manila, in the Philippines.
HARRY S. LADD  Born in St. Louis, Missouri in 1899, Harry is best remembered for his drilling on atolls, which not only validated Darwin's theory of atoll formation on volcanoes but demonstrated that the geological history of atolls is a complex one extending back through the Tertiary and involving thousands of feet of subsidence and several periods of reef growth and subaerial erosion with cyclic changes in sea level. Because some of these sea-level fluctuations were related to the waxing and waning of ice sheets, the Daly glacial-control theory was also shown to be partly correct.

Harry had wide scientific interests and published on topics in the fields of ecology, palaeontology, and stratigraphy — but his primary interest, particularly in his later years, was the systematics of Pacific fossil molluscs. He died on November 30, 1982.

SIR CHARLES MAURICE YONGE  Sir Maurice was born in 1899, in Wakefield, England. For coral-reef workers, Sir Maurice's major contribution was his leadership of the 1928-29 Great Barrier Reef Expedition. This was the first long-term multidisciplinary project to focus on coral reefs and broke new ground in detailed biological in situ reef investigations. Although reef workers generally associate Sir Maurice with this expedition and his work on coral physiology, his contributions to other aspects of marine biology and malacology are outstanding — particularly his later work on adaptive radiation and the evolution of the Bivalvia. He died on March 17, 1986.

FRANCISCO NEMENZO  Professor Nemenzo was born in 1905 in a small village on the west coast of Cebu in the central Philippines. As a youngster, his playground was the shallow reef flat fronting the village, and this was his introduction to a long life devoted to the description of Philippine scleractinian corals. He published a classic series of more than 20 taxonomic papers on corals from an area with the highest diversity in coral reefs in the world. As a result, he is credited with introducing more than 5 percent of the currently accepted names of Indo-Pacific corals.

Prof. Nemenzo's interests in natural history were wide and even included the lowly rat. He was noted for demonstrating that the Cotabato rat plague on Mindanao was related to breeding grounds in the nearby Liguasan marsh during the wet season. He died on January 1, 1991.

The next three Honorary Members were elected in 1985 at the 5th International Coral Reef Congress in Tahiti.

F. RAYMOND FOSBERG.  Ray was born in Spokane, Washington, on May 20, 1908. He had no equal when it came to understanding the taxonomy, distribution, ecology, and conservation of the vegetation on coral-reef islands of the Pacific Basin. This broad understanding of island ecosystems was gained from extensive field work in more localities than has ever before been attempted by an individual, and the work continued for a period of over 60 years. During this time Ray saw the serious impact of human activities in many areas and became active in island ecosystem conservation — highlighted by his successful campaign, joined by others, to protect the natural heritage of the Indian Ocean island of Aldabra.

Ray was not only interested in a variety of disciplines, among them geography, but he was deeply dedicated to studying the vegetation and florals of many areas of the world, including the Americas and Caribbean islands. Ray died on September 25, 1993.

SIRO KAWAGUTI  Dr. Kawaguti was born in Toki City, Japan, in 1908. He is a distinguished pioneer in the research of reef corals initiated 50 years ago at the Palau Tropical Biological Station. He is particularly noted for his research in isolating and identifying zooxanthellae in corals and establishing the role that these symbiotic algae play in the respiration, ammonium metabolism, nutrient supply, calcification, growth, and larval behavior of corals. He was also able to demonstrate that corals use absorbing pigments to convert UV radiation to visible light, which aids photosynthesis by the zooxanthellae.

There are few aspects of reef corals that Dr. Kawaguti has not investigated. He has studied the regional distribution of coral fauna, coral calcification, and morphological and ecological habits, along with reproduction and regeneration.

JOHN W. WELLS.  Dr. Wells was born in Philadelphia in 1907, but grew up in a small-town setting in Homer, New York. Most coral-reef scientists consider Dr. Wells the father of present-day coral taxonomy. Cenozoic and Mesozoic Scleractinia were always of interest to him, but it was not
JOSEPH H. CONNELL. Dr. Connell was born in Gary, Indiana, in 1923. His work has had a large impact on biological research, particularly on temperate rocky shores and tropical rainforests, as well as coral reefs. He was one of the first to demonstrate the role of biological interactions in determining zonation patterns of organisms in an ecological system. He initiated coral-reef monitoring studies in 1962 off Heron Island, on the Great Barrier Reef. This work resulted, in part, in his classic Intermediate-Disturbance Hypothesis following the impact of cyclones on his study site. He is a truly outstanding ecologist with important contributions in the area of coral population dynamics and ecological succession.

Dr. Connell has made so many notable contributions in the fields of biology and ecology that it is difficult to work in these fields without considering his work. He is clearly an "Eminent Ecologist," the title awarded him by the Ecological Society of America in 1985.

JOSHUA I. TRACEY, JR. Josh was born in New Haven, Connecticut, in 1915. He considered himself to be a bauxite specialist until 1947, when Harry Ladd asked him to come to Bikini Atoll to study the reefs and islands as part of Operation Crossroads — the project established to study the effects of atomic bomb tests on the environment of this area. It was a spectacular introduction to the study of coral reefs and the history of coral-reef island formation with such notables as Harry S. Ladd, John W. Wells, and Kenneth O. Emery.

Josh is mainly associated with the Pacific atoll drilling programs and the wealth of information gained on the geological history of atolls. He was, of course, involved in many other aspects of work on Pacific coral reefs, including coral-reef topography and growth patterns and the ecological, erosional, and sedimentological processes that controlled reef development. His geological mapping as part of the Military Geology Pacific Islands Program is legendary, and many who participated in the Coral Reef Symposium in Guam were impressed with the accuracy of his geological map of Guam, which had been surveyed 38 years earlier. Josh still enjoys an active retirement career at the Smithsonian Institution in Washington, D.C.

It is indeed a pleasure to honor these truly outstanding coral-reef scientists, most of whom I have had the pleasure of knowing, and several of them very well. I hope that in the future we will give more recognition to our esteemed Honorable Members, particularly at our meetings and possibly in our society masthead.

I owe a debt of gratitude to a number of colleagues for their assistance in compiling this information, including Gregor Hodgson, Terry Hughes, William A. Oliver, Helmut Schuhmacher, David R. Stoddart, Josh Tracey, and Kiyoshi Yamazato.

Ian G. Macintyre, 
Smithsonian Institution, Washington D.C.

THE COMPLEAT REEF ENCOUNTER
No. 16

"Mr Kupu said he was not concerned about possible environmental damage from harvesting the coral, maintaining that very soon all sea creatures would be poisoned or killed by leaking radioactive contaminants from atomic testing.

"Meanwhile, he said, Tonga could earn money from a resource that would ‘turn out to be dead soon’."

Tonga Chronicle, 29 December 1993
ISRS NEWS

REPORT OF THE GENERAL ASSEMBLY, LUXEMBOURG 9 SEPTEMBER 1994

Despite the fact that the General Assembly had been rather optimistically scheduled for 8.30 a.m., the morning after the sumptuous congress banquet, there was a good turn-out of ISRS members, reflecting the growing size of, interest in and activities of the Society. The increase in membership and associated stronger financial basis has meant a number of improvements in the running of the Society. Reef Encounter is now sent to you through a mailing company rather than through the rather haphazard system that existed before, and shortly the ISRS membership list will be managed professionally by a company in the US which will enormously assist the Treasurer. The revised agreement with Springer-Verlag over Coral Reefs provides ISRS with greater benefits, capitalising on the fact that after ten years in the red the journal is finally showing a profit.

Perhaps the most exciting piece of news was that Coral Reefs was listed top of the 56 journals in the marine and freshwater section of the 1992 Science Citation Index, beating Mar. Ecol. Prog. Ser., Mar. Biol., Mar. Poll. Bull. and a host of others. It will be a challenge to maintain this position, particularly as more and better papers are still needed. The journal has a 45% rejection rate, and is still smaller than many people would like. A new category of contribution has been introduced: 'Notes', which will have a faster publication time and will be shorter, but still peer-reviewed. Help to keep ISRS on top by submitting good papers on your research!

TREASURER'S REPORT

As of 8 August 1994, the ISRS had US$ 34,653.50 in its bank account. This sum takes account of the deduction of payment for the audit of the 1993 books (see below) and for printing and posting Reef Encounter 15 and Coral Reefs Volume 13. The major expenses remaining in 1994 are the issue of Reef Encounter that you are reading, and Coral Reefs for people joining or renewing in the second half of the year. In addition, the ISRS bank account contained US$ 11,227.28 that belongs to the Seventh International Coral Reef Symposium, for printing of the proceedings.

Membership on 8 August 1994 was 580:
- 5 honorary members
- 22 family memberships
- 69 student members
- 484 individual members

This compares with 559 at the end of 1993. Nearly 100 people who were members during the past year or two have not renewed for 1994; one final notice for 1994 will be sent to them in October.

THANK YOU DEPUTY TREASURERS - Francoise Bourrouilh-Le Jan, Michio Hidaka, Jamie Oliver and John Ryland - for helping to bring ISRS membership to an all-time high!

INDEPENDENT AUDITOR’S REPORT

ISRS accounts were audited for the first time for five years, and the report is reproduced here:

We have audited the accompanying statement of assets, liabilities and fund balance - modified cash basis of the International Society for Reef Studies (a non-profit organization) as of December 31, 1993 and the related statements of revenues and expenses, changes in fund balance, financial position, and cash flows - modified cash basis for the year then ended. These financial statements are the responsibility of the Society’s board. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by the board as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

As described in Note 1 to the financial statements, the organization’s policy is to prepare its financial statements on the basis of cash receipts and disbursements modified as described in the notes; consequently, certain revenues and the related aspects are recognized when paid rather than when earned, and certain expenses are recognized when paid rather than when the obligations are incurred. Accordingly, the accompanying financial statements are not intended to present financial position and results of operations in conformity with generally accepted accounting principles.

In our opinion, the financial statements referred to in the first paragraph present fairly, in all material respects, the assets, liabilities and fund balance of the International Society for Reef Studies as of December 31, 1993 and its revenue, expenses and changes in fund balance and financial position for the year then ended, on the basis of accounting described in Note 1.


MEMBERSHIP FOR THOSE UNABLE TO AFFORD IT

Some ISRS members have asked the Society to develop a mechanism to subsidise the dues for deserving individuals and institutions who are unable to afford them. The Officers and Council Members who have discussed this proposal are sympathetic with the need, and also eager to enhance and broaden ISRS membership. In Townsville, they decided that, as an interim measure until the new administration can develop procedures for determining worthy recipients and organising the subsidies, to ask members to take on this task themselves. This will also provide some idea of the magnitude of the need.

Members are encouraged, either individually or in groups, to make gifts of ISRS memberships to worthy people or individuals. You individual members, after all, are in the best position to identify such potential members. When you give a gift of an ISRS membership, please:

1. Indicate on the membership form or in an accompanying letter whether you wish the recipient to be notified of the donor’s identity.
2. If the recipient is an organisation, provide the name of an individual in whose name the membership can be entered (Springer-Verlag will send Coral Reefs only to individuals).

FUTURE ISRS MEETINGS

September 1995
EUROPEAN MEETING: ‘BIOLOGY AND GEOLOGY OF CORAL REEFS’
University of Newcastle, UK
This will be held jointly with the British Ecological Society and is being hosted by the Department of Marine Sciences and Coastal Management at Newcastle University. The programme will consist of two full days of oral presentations plus a full day poster presentation and workshop session. Outings are being planned to fossil coral reefs and the Northumberland coastline and there will be a banquet and ceilidh on the final evening at medieval Langley Castle.

Suggested topics for workshops and sessions include: photobiology of reef organisms; dynamics, diversity and disease - microbial interactions; remote sensing and GIS in reef ecosystem management; fishery productivity; land-ocean interactions; valuation of reefs; biogeography and biodiversity; coral microstructure and environmental signals; carbonate platform development; reef taphonomy; structure and evolution of fossil reefs; European research collaboration. Suggestions for changes and additions are requested as soon as possible.

For further information, confirmation of dates and fees, and copies of the first circular, write immediately to: Dr N. Polunin, Dept Marine Sciences and Coastal Management, University of Newcastle, Newcastle upon Tyne NE1 7RU, UK. Tel: (44) 91 222 6659; Fax: (44) 91 222 7891; e-mail: n.polunin@ncl.ac.uk.

24-29 June 1996
8th INTERNATIONAL CORAL REEF SYMPOSIUM
ATLAPA International Convention Center, Panama City, Panama
This is being organised by the University of Panama and the Smithsonian Tropical Research Institute, and is the first ICRS to take place within the neotropics and within easy reach of two oceans. A mixture of biological and geological topics of both basic and applied interest will be presented, and a comparative and synthetic approach to understanding coral reefs will be stressed.

There will be five days of plenary talks, symposia, contributed sessions and public lectures and one day of workshops or expeditions to neighboring sites (e.g. mangroves, reef flats, fossil reefs) midway through the program. Symposia will last for either a half or a full day. Contributed papers can be on any topic related to coral reefs science, conservation, policy or management. A number of suggestions have been made for symposia and workshop topics. Up to 10 plenary speakers will be invited by the Organising Committee and their talks will be scheduled with no other concurrent activities; they will be asked to discuss their respective fields in a way that will be of interest to all attendees.

Field trips will be organised both immediately before and immediately after the symposium to a variety of locations in the Caribbean, south-western Atlantic and eastern Pacific.

Two questionnaires have been prepared to gather further suggestions for symposium and workshop topics and for field trip preferences. Please request these from the address below as soon as possible if you wish to have an input into the programme.

Further information from: Convention Manager, 8th International Coral Reef Symposium, STRI Unit 0948, APO AA 34002-0948 USA. Tel: (507) 28-4022; Fax: (507) 28-0970. N.B. Fax communication is strongly recommended.

1994 ANNUAL ISRS MEETING

James Cook University, Townsville, Queensland

Over 900 marine scientists met recently in Townsville for a series of overlapping meetings, running from July 4th to 11th 1994. The host organisations were the Pacific Congress on Marine Science and Technology, the Australian Marine Sciences Association (AMSA) and the Australian Coral Reef Society (ACRS). ISRS was a co-sponsor of the AMSA/ACRS sessions which attracted over 300 registrants.

The AMSA/ACRS/ISRS meeting was organised by a committee co-chaired by Carden Wallace, Chris Crossland and Pat Hutchings and the theme was ‘Reef Science, Management and Sustainability of Reefal Habitats in the 21st Century’. Other major themes included coral biology, reef fish ecology, herbivory, mangroves and seagrasses, fisheries biology and management and the effects of nutrients. Keynote addresses were provided by Ove Hoegh-Guldberg (Sydney University), Mick Keough (Melbourne University), Ned Pankhurst (University of Tasmania) and Charlie Veron (Australian Institute of Marine Science). In all, over 200 talks were given in four exciting (and exhausting!) days.

The future of reef science in Australasia was illustrated by the many excellent student presentations. Both AMSA and ACRS provided funds for numerous prizes for outstanding student talks and posters. The meeting also enjoyed a series of evening social events, including a banquet, barbecue and a mixer at the Great Barrier Reef Aquarium.

Over 60 ISRS members came to the meeting from Australia, Asia, North America and Europe. ACRS has held regular annual meetings at venues rotated throughout Australia for many years, but this was the first ISRS meeting in Australia since the 1988 conference in Townsville. The next annual ACRS meeting will be hosted by the School of Resource Science and Management, Southern Cross University, Lismore, N.S.W.

Terry Hughes, Dept of Marine Biology, James Cook University, Townsville, QLD 4811, Australia. Fax: (61) 77-251570.
1994 EUROPEAN REGIONAL MEETING OF ISRS

Centre Universitaire, Grand-Duchy of Luxembourg 6–9 September 1994.

The Grand-Duchy of Luxembourg, the smallest member state of the EU, lies over 250km from the coast and over 3000km from the nearest living coral reef. So what possible reason could there be for holding a reef meeting there? Luxembourg’s Minister for Education and Environment, Dr Marc Fishbach, provided some clues in his opening address as he described the geological history of his country. The Grand-Duchy has been submerged for longer than it has been above sea level. It also has some of the finest Jurassic reefs in Europe. The final clue had nothing to do with geology however, it transpires that Dr Jorn Geister, the key organiser of the meeting, has a wife from this country!! Organised by Jorn Geister (Universitat Bern, Switzerland), in collaboration with Bernard Lathuilière (Université de Nancy I, France), Alain Faber (Musée d’Histoire Naturelle, Luxembourg) and Robert Maquil (Service Géologique, Luxembourg), the meeting attracted some 120 participants from over 15 countries and we readily took up the Minister’s invitation to transform Luxembourg, once again, into “the pulsating heart of the coral reef world”. Plenary lectures covered topics from oil spills and the Gulf war, to algal and stromatolite reefs in the Bahamas, to small and unique Silurian reef structures from the coasts of Canada. These set the scene for the wide and fascinating series of workshops and lectures that followed, under the theme of ‘Coral Reefs in the Past, Present and Future’. (The strong geological side to the meeting is described below).

In a workshop on ReefBase, information was provided on the highly detailed and complex database being developed at the International Center for Living Aquatic Resource Management in the Philippines, together with an update on the related coral reef mapping initiative being undertaken at the World Conservation Monitoring Centre in Cambridge (see last issue).

A number of sessions were held under the general workshop heading of Reef Degradation. For the biologists, this began with a fascinating overview of reef health at levels from the community to the molecular, followed by a number of compelling community level case studies. Further talks moved ‘From the Community to the Laboratory’ and considered coral bleaching and new methods for investigating coral health looking at individual coral colonies. In considering ‘Monitoring and Management Implications’ presentations covered a number of issues including diseases, lesions and coral breakage: an overview of reef decline in the Caribbean; and two presentations which brought in social and economic factors.

A unique group gathered on the Thursday to discuss the use of volunteers in applied marine research and management. A wide range of presentations gave a broad representation of the type of work currently being undertaken. Compelling evidence on data validation showed volunteer science in some cases to be at least as reliable as that coming from the professionals! Certainly their contribution to reef conservation and management is unquestionable, while the existence of volunteers as a resource still largely untapped must stand as a challenge to many of us. In follow-up to the meeting it is hoped that those involved with volunteers will write-up and publish details of their work and also work together to standardise methodologies.

Other sessions covered the potential and limits of sclerochronology and the Second Meeting of the ‘International Working Group on Scleractinian Corals’ was held at this venue. The meeting closed with a number of case studies of anthropogenic effects on reefs from the Caribbean, Indian Ocean and the Pacific Oceans. The importance of reef science could not have been clearer, while the role of European-based research, alongside that of other regions remains crucial. The proceedings will be published as a special volume of Publications du Service Géologique de Luxembourg.

Before closing I should mention the field-trips and excursions. A pre-meeting trip to the Jurassic reefs of the region was concluded with a wine-tasting event which also provided an opportunity for a pre-conference get-together. Wine remained a central theme as drinks were provided after the talks on two further occasions. A wonderful dinner was held in Bourglinster Castle. And, as I write this, and a cold wind blows in the start of the European winter, the lucky ones are on a post-conference trip to the fringing reefs of the Sinai Peninsula.

Mark Spalding, World Conservation Monitoring Centre, 219 Huntingdon Rd, Cambridge, CB3 0DL, UK, Tel. +44 (0)223 277314; Fax. +44 (0)223 277136; E-mail, spalding@wcmc.org.uk

GEOLOGICAL AND PALAEONTOLOGICAL PERSPECTIVES

There was a true cross pollination between biological and geological sciences at this meeting. Nearly 60% of participants were geologists or palaeontologists but interest in living reefs was also great. Topical lectures of multidisciplinary interest included Quaternary reefs and adjacent sediments, palaeoecology of corals and fishes, and Mesozoic and Palaeozoic reefs. To further the goal of interdisciplinary cross-pollination, four workshops were organised: (1) reef degradation (ancient and modern), (2) non-anthozoan reefs, (3) the potential and limits of sclerochronology, and (4) a workshop on scleractinian corals.

Paul Sudbury organised a successful workshop on degradation of ancient reefs. It emphasised how little we know about ancient reefs under stress and what caused the major collapses so indelibly punctuating the Phanerozoic record. The workshop addressed environmental factors which might have been responsible for the breakdown of reefs during the Devonian, Cretaceous–Tertiary and Triassic–Jurassic intervals. Following a series of afternoon lectures, some fruitful discussions took place where neither biologists nor palaeontologists were reticent about expressing their views! The workshop addressed reef collapses of the past.
with strong emphasis on sea level changes. Drowned reefs, tectonic movements, the carbon cycle, nutrient flux, onshore-offshore trends, Lazarus taxa, island refuges, global reorganisations following mass extinctions and post extinction turnover were also covered. Although not presented in the workshop, Johnson (Glasgow), and his co-author Budd, described analyses of free-living corals which overlapped these topics, suggesting that the Caribbean Plio-Pleistocene extinction was even more severe than previously believed.

Another fruitful workshop was organised by Hansmartin Hüssner (Tübingen) to address non-anthozoan “reefs”. This full day session was one of the highlights of the meeting and it brought together a diverse group of participants who discussed virtually everything from calcareous algae, sponges and cyanobacteria to vermetid gastropods and gregarious sabellid worms, some of which have been important from Precambrian times to the present day. Although anthozoans are an ancient group, possibly arising in the Cambrian, non-anthozoans have, at certain times, been as important in ancient reefs.

Participants in the workshop contributed interesting discussions on diagenesis and cementation in ancient sediments. These included examples from Helmut Weller (Greifswald) of some impressive Devonian (mid-Frasnian) stromatactis-dominated mudmounds which he studied in the Harz mountains of Germany. The role of cyanobacteria and diagenesis are judged important in the formation and stabilisation of these steep-sided enigmatic structures which have no counterpart today.

During the workshop, Hüssner directed discussions toward reef classification, structure and the distribution of non-anthozoan reefs in space and time. Questions were posed and discussed on the roles of climate, temperature and sea level changes and on reef evolution in general. It was agreed that many non-anthozoan reef organisms, due to their broad ranges of tolerance (e.g. stromatolites, serpulids and sabellarians) can and did exploit settings not occupied by anthozoan reefs. Also some types of non-anthozoan reefs were established in the intervals following the collapse of the anthozoan reefs.

Another full day workshop by Jürgen Patzold featured coral sclerochronology (see also Feature article in this issue). Topics touched on coral growth bands, stable isotopes, fluorescent bands, and trace elements in modern and ancient corals. Study of growth bands in conjunction with stable isotopes offers great potential for improving understanding of ancient reefs and corals. Most geologists were very attentive at this workshop and discussions were lively. Of special interest to palaeontologists was a lecture by Jörn Geister on growth banding rhythms in Jurassic corals. Most Jurassic corals showed relatively high growth rates and results could be extrapolated to provide geologists with quantitative estimates of reef growth and carbonate production. In addition they provided information on the frequency of storms. Another lecture by Insalaco (Birmingham) also addressed the significance of growth bands in two Jurassic coral species, relating them to growth rates, climate and depth of light penetration. Sclerochronology is clearly an emerging and useful tool for studying fossil corals, providing precise chronometers to resolve growth rates and yearly events in ancient reefs.

The International Working Group on Scleractinian Corals convened a half day workshop addressing both fossil and living corals and their classification, morphology, and ontogeny. A contribution by Marcus Bertling (Münster) reviewed a hierarchical organisation for the standardisation of morphologic characters in scleractinians. It became apparent that if palaeontologists and modern coral workers are to speak the same language, they must come to some general concensus on the terms they employ.

From my admittedly limited perspectives on fossil reefs, I found the cross pollination at the second ISRS European Meeting to be very stimulating with nearly continuous cross-disciplinary exchange of ideas. It confirmed my suspicions that reef research is more alive and healthy than ever before. Also, judging from the number of high quality lectures delivered by students and the active student participation in workshops and discussions, the future holds good prospects for reef research. Relative to larger conferences I have attended, I found the Luxembourg regional meeting to be an especially rewarding experience.

George Stanley, Dept of Geology, University of Montana, Missoula, Montana 59812, USA. Fax: 406 243 4028.
IN MEMORIAM JOHN WEST WELLS
1907-1994

John can no longer identify a dubious coral, death has taken the magnifying glass out of his hand.

Born in Philadelphia in 1907, John was the undisputed expert on both recent and fossil corals. To us he was the 'coral pope' whose judgement in controversial issues was always accepted. He started his university education in Pittsburgh, then worked at the University of Texas and in 1933 received his doctorate at Cornell University, Ithaca.

His first publication appeared in 1930 and was followed by a host of papers and treatises in the 1930s, when he worked at the British Museum in London, the Musée National d'Histoire Naturelle in Paris, the Humboldt Museum in Berlin, the US National Museum in Washington D.C., the State Normal School at Fredonia N.Y. and Ohio State University at Colombus. In their obituary in Fossil Cnidaria and Porifera, William Oliver and Stephen Cairns provide an annotated list of John's publications, which totalled 190. He finally dropped his pen with his last publication in 1988, several years after he had retired as Professor of Geology at Cornell, where he taught from 1948-1973.

One of his most important publications was the 1943 'Revision of the suborders, families and genera of the Scleractinia' with a bibliography of over 1000 references. His taxonomic revision 'Scleractinia', written during a Fulbright Scholarship at the University of Queensland, is of similar significance. In order to produce such comprehensive works, John developed a detailed knowledge of corals from the most widespread locations; publications reflect his visits to Cocos-Keeling, the Great Barrier Reef, the Maldives (Addu Atoll), Easter Island, Jamaica, and the Galapagos. Several publications came out of his co-operation with the U.S. Geological Survey in the 1940s and 1950s, which took him to Bikini and Arno atolls in the Marshalls.

His 1963 paper on 'Coral growth and geochronometry' caused a particular stir. He had demonstrated that a year in the Devonian period was longer than a year today, a discovery that was rapidly taken up by astronomers and geophysicists, who had already developed the theory that the earth's rotation was slowing down but who had lacked the independent evidence. John was a member of a number of scientific societies, including ISRS, and received many awards and in 1968 was elected member of the National Academy of Science.

His wide range of interest and extraordinary skills are illustrated by other publications: on zoophytes, on Lake Cayuga, where he and his wife had their summer home, and a variety of other topics. His summer home was like an enchanted museum with numerous pictures and old engravings, old and new books, fossils, minerals, shells and a unique collection of lids of chamber pots and soup bowls. Despite his scientific success, John remained a modest man. He loved entertaining guests and discussing topical issues while drinking one of his concoctions or a bottle of wine. Pie, his wife, was also a strong personality – a master cook who also wove the fabric of John's suits herself. Her death in 1990 came as a severe blow to John, from which he never fully recovered.

In their obituary, Oliver and Cairns wrote: "... he was both a specialist and a generalist. He knew species-level taxonomy, from Triassic to Recent, on a world-wide basis but also synthesized these data into a higher classification and evolutionary scenario of the whole order. He was the doyen of 20th century scleractinian workers." With John's death, a whole era has come to an end and the time of computers has begun. Coral databases are mushrooming from institutes worldwide. And somewhere John may be sitting, cautioning us with a smile: "Computers cannot do the job alone – experience is what matters in controversial cases."

Georg Scheer, Ostpreussen-Str., D-64297 Darmstadt, Germany.
WHEN PERCENT COMPOSITION ANALYSIS IS SAFE

In the article 'Problems with percent composition analyses' (McManus, 1993), John McManus illustrates how data which have been converted to percentages may produce problematic results. On page 10 he advises that: 'The problem arises whenever abundances, density or cover data are converted such that the total is set to a constant.' Since the relevant constant (100) is produced by converting the data to percentages, the rule in this case may be stated: the problem arises whenever abundances, density or cover data are converted to percentages. Thus one way to avoid the problem is to avoid using percentage conversions, and this is what McManus advocates. While this will work and is appropriate for count data (e.g. the anchovy-sardine anecdote in McManus, 1993) and the special case where a subset of total cover data is used (e.g. the coral cover example in McManus, 1993), it seems to overlook the most common use of cover data which, as explained below, is exempt from this rule.

In most reef surveys, area or distance measures are taken within a sampling unit (e.g. a plot or transect line) of a fixed size which is independent of the measurements of the items sampled. Both the items within the sampling unit and the sampling unit itself are measured using the same metric (e.g. area for a plot and distance for an intercept transect line). Selected items are then rendered as a percentage of the sampling unit size, i.e., as percentage cover. In this case the percentage conversion is simply a proportionate data transformation (multiplication by a constant = 100/sampling unit size) in which the denominator is independent of the numerator. Relations among variables are not altered by the transformation and bogus correlations are not produced (but the size of the sample is masked, so this information should be supplied).

Although there is no doubt that percentage conversions should be handled with care, to shun them entirely is to eliminate a useful means of standardizing data for presentation and comparison. It is not the conversions per se which are problematic, but the inappropriate use of these conversions. As a general rule of thumb, statistical analyses of percentage converted data will be fine if the numerator and denominator in the percentage conversion are logically independent of one another. Specifically, when percentage cover is calculated, bogus correlations can be avoided if the sampling unit size (e.g. plot area, intercept transect length) is used as the denominator in the percentage conversion.

REFERENCE


William R. Allison, Institute for Environmental Studies, University of Toronto, Toronto, Ontario, MSS 1A4, Canada
and fundamental reasons why coral skeletons have not lived up to expectation.

Firstly, rarely, if ever, is it mentioned that skeleton formation is a biogenic process. Any signal in the skeleton is the interpretation by the coral tissues of its cause. Coral tissues may not 'read' the signal in the same way that our instruments do and, in the case of a chemical signal, may modify its magnitude. Remarkably there have been no extensive studies describing temporal patterns of skeleton formation by coral tissues over prolonged periods, although studies by Johnston in the late seventies and myself in the mid-eighties (references cited in Le Tissier, 1988) characterised cellular processes associated with skeleton deposition. With such information, it would be possible to determine where and when on the skeleton new deposition occurs. Modern histochemical techniques also should allow the route of incorporation of chemical markers into/onto the coral skeleton, and the degree of cellular modification of concentrations, to be determined.

Secondly, X-radiographic banding patterns are not accurate images of the coral skeleton. Instead they are 2-dimensional images that average density variations through the thickness of a skeletal slice of coral. This last point was recognised by David Barnes and his group who launched an exhaustive series of studies in the late 1980s, resulting in some 11 publications (see Barnes and Lough 1993 for references). They have attempted to understand the relationship between the coral skeleton, its X-radiographic image, skeletal density and environmental variables, as well as analysing methods for extracting the growth record. Their studies have led them to suggest that alternatives to X-radiography should be sought to derive chronological and climatological information recorded in coral skeletons.

Barnes and Lough (1993) have pursued an ambition to understand growth processes and mechanisms in coral skeletons in order to understand X-radiographic banding patterns. Their work has surely more than shown that X-radiographs cannot be used to demonstrate patterns of growth in the coral skeleton. As they state "[X-radiography] compresses 3-dimensional density patterns into a 2-dimensional image in which different density patterns associated with different growth processes are overlaid, merged and combined." I would propose an alternative ambition, namely to understand growth processes and mechanisms in order to realise any potential coral skeletons may have as records of coral growth and environmental information.

How should this ambition be realised? If a coral skeleton includes within its structure a growth record then the most accurate method of extracting that record is from the skeleton itself rather than from an abstract image that averages variations within the skeleton. Excepting a study by Macintyre and Smith in 1974, it is only very recently that Dodge et al. (in press) and Scrutton and myself (Le Tissier and Scrutton, 1993; Le Tissier et al., 1994) have used direct observations from corals to describe skeletal characteristics associated with X-radiographic density band patterns. These studies show that coral growth patterns are characterised...
NEWS

1994 CORAL BLEACHING EPISODES

French Polynesia

In March, a diving instructor in Tahiti alerted the national newspaper to a major outbreak of bleaching, reported to have affected up to 50 per cent of corals in the Papeete lagoon. The last bleaching episode in Tahiti was in 1991, when about 70 per cent of Acropora corals were affected, with only 10 per cent recovering. By April, reports of the bleaching had been confirmed by the French research station on Moorea, where scientists have been monitoring the reef annually since 1991. Sponsored by Greenpeace, Dr Ove Hoegh-Guldberg from the University of Sydney visited Tahiti to study this episode with the Moorea team. He reported unusually high sea temperatures, up to 30°C in some areas, with temperatures higher at 15-25 m depths than at the surface. Almost all coral species were affected with more than 70 per cent of live corals bleached and predicted mortality of at least 50% living coral cover. Bleaching was at its worst at depths of 15 m, but continued down to 25 m. An analysis of photographs from a series of transects at three sites showed that 90-100 per cent of Acropora colonies were bleached. Porites was least affected, with about 13-43 per cent of all colonies partly bleached. Details of this bleaching event were presented at the Townsville ACRS/ISRS meeting in July by Dr Hoegh-Guldberg and at the Luxembourg ISRS meeting by Dr Salvat.

American Samoa

In American Samoa, Peter Craig from the Department of Marine and Wildlife Resources reported severe coral bleaching around Tutuila island, including the Fagatele Bay National Marine Sanctuary. The episode started in early March 1994. Qualitative estimates suggested that 80-90 per cent of corals were bleached in shallow waters, and that at depths of 25-40 metres, 10-40 per cent of corals were badly affected. As in French Polynesia, this event was correlated with unusually warm water up to 33.9°C in adjacent waters.

Kenya

March also saw the largest bleaching event in Kenya that has been reported over the last decade. Dr Tim McClanahan and other Wildlife Conservation Society researchers have been monitoring reefs there since 1986, and reported that the 1987 bleaching event was much less severe. The last two years have been notable for their cool weather (it is suggested that this was due to a combination of factors: a low frequency sun-spot period, and soot and volcanic ash from Mt Pinatubo and the Gulf War). They postulate that a return to warmer weather may have provided the conditions for bleaching. Bleaching was most evident on the second spring tides of March when maximum sunlight was received. In the Kenyan episode, only a small proportion of colonies have been killed by bleaching; mainly recruits. Reefs are now recovering, but...
it is pointed out that in this state they are particularly vulnerable to other forms of human impact such as sedimentation and overfishing.

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**MARINE PARKS PROTECTING ENDEMIC FISH**

Endemic species of fish inhabiting shallow waters have a high chance of extinction with the intense fishing common to many developing countries. A study of the species diversity of Kenyan reefs found that only 48 of the 110 coral reef species found and studied in the national marine parks were found on heavily fished reefs. One species of damselfish was found to occur only in marine parks: the recently named *Pomacentrus baenchi*. This species was named after the publisher of G.R. Allen’s recently published study on damselfish. The study was conducted at the scale of one hectare and so subsequent studies need to search at a larger scale. However, the findings suggest that shallow-water endemic species are in jeopardy of extinction because fishing on the high diversity reefs of Kenya and Tanzania occurs on a large scale in shallow waters and beyond the maximum sustained yield. Future taxonomic surprises await us on coral reefs and thankfully the Kenyan Government’s efforts have resulted in four marine parks to safeguard the reef heritage.

T. McClanahan, Coral Reef Conservation Project, P.O. Box 99470, Mombasa, Kenya. Tel. 254-11-486549; Fax (254) 11 472215.

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**THE CONTENTIOUS SHOALS**

The Spratly Islands, named after an obscure English whaling captain who visited the area at the end of the last century, lie in the middle of the southern South China Sea. This seemingly innocuous group of some 500 or more shoals and reefs are widely considered to be the next potential ‘flash point’ in this region. They are claimed either entirely or in part by six of the region’s littoral states (Philippines, Viet Nam, Taiwan, People’s Republic of China, Malaysia and Brunei), few of which have indicated any willingness to abandon their claims, and five of which maintain military bases on the islands.

For the last 38 years, these nations have been actively pursuing their claims through military pretensions. Military activities escalated in the late 1970s and 1980s with the false promise of hydrocarbon wealth in the islands, and culminated in a brief but violent naval battle in which the Chinese (PRC) sank three Viet Namese vessels killing 72 people. Not only are lives being lost, but in the rush to develop the claims, an enormous amount of damage is being done to the reef ecosystem.

Currently there are about 38 occupied sites, range from the virtually submerged Chinese installation at Curaton Reef to the Taiwanese held island of Itu Abu where some 400 personnel have been stationed on an island 1360m by 350m. A further example of the seriousness of the claims is that of Malaysia, which has created an island on Swallow Reef, in the Southern Spratlys by dredging, to the extent that it now has a 1 km runway, a 70 personnel garrison and is being promoted as a tourist resort. Potted trees are reportedly brought in to give the reef a tropical island atmosphere!

The reefs themselves are particularly important in the context of marine biodiversity, as outlined by McManus (1994), with some 350 coral species and numerous species in other taxa. The Spratlys also play an important role in the region’s fisheries. Many of the larvae produced on the reefs find their way to the coastal zones of the surrounding states, where they help to replenish heavily exploited fish populations.

Their relative inaccessibility has meant that these reefs have been spared much of the damage seen in other parts of South-east Asia. Although the Spratlys have witnessed human activity for centuries, in the form of seasonal fishing, they have remained almost pristine. Now however, increasing numbers of fishermen are coming to the area to exploit this vast unregulated resource. The recent escalation in fishing activities and military presence also seriously jeopardizes the integrity of the reefs. Not only are the reefs under physical assault from activities such as dredging to create runways, but there is also pressure from the many soldiers who are taking corals and fish as an additional source of income. Furthermore there is a serious potential threat of oil spills from the large military vessels in the area.

There is however, a glimmer of hope. In 1990, the Indonesian Ministry of Foreign Affairs and the Centre of Asian Legal Studies, at the University of British Columbia, Canada, initiated a series of information meetings to discuss areas of co-operation in the South China Sea. These ‘Managing Potential Conflicts in the South China Sea’ meetings are primarily funded by the Canadian International Development Agency and are attended by officials, in their independent capacity, by no less than ten of the region’s states.
At one of the meetings, held in Bali, Indonesia, in 1992, a proposal for a Spratly Islands marine protected area was brought to the fore. The advantages of such an endeavour would not only serve to preserve some of the world's most diverse reefs, but would also support the development of a sustainable regional fishery. Furthermore, a park would have the advantage of diffusing tensions with respect to current claims, and would have a proactive effect of reducing the potential for further violence due to declining resources.

In a recent meeting on Marine Scientific Research in the South China Sea, it was proposed that a scientific study be undertaken by scientists of ten of the regional states, to assess the biodiversity of the South China Sea. This would require an enormous degree of co-operation and at least a temporary shelving of claims in the South China Sea. Whether a research vessel actually sails remains to be seen, but its proposal indicates an increased acceptance of the issue. Perhaps a protected area will not seem to be such a radical idea in the future.

REFERENCE

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THE RAP, REV, RIP AND EVEN ROT OF REEFS

1996 is still destined to be the Year of the Reef (YOR), even if progress on its implementation appears slow. It is up to everyone involved in reef research and management to make it happen, so if you have ideas please get in touch. Themes under which scientific activities might take place are fairly well developed:
RAP – rapid assessment of reef status
REV – re-visits of previously studied reefs
RIP – assessment of reef impact
ROT – assessment of tolerances of reef organisms

The NGO community is shortly to be approached for their involvement, and this should lead to greater public awareness and support for the idea. Many initiatives are already underway that can be given greater focus by linking them with the YOR initiative; for example, the November meeting on reef assessment in Indonesia (see Diary) is billed as a contribution to the YOR; the first version of ICLARM's ReefBase is to be released in 1996 as part of the YOR; activities being developed through the US Coral Reef Initiative will also contribute to the YOR; and so on. So send in your ideas, and we hope to publish a firmer plan of action in the next issue of the newsletter.

US CORAL REEF INITIATIVE

The US Coral Reef Initiative arose out of a meeting held at the US Department of State in January this year, as reported in the last issue of Reef Encounter, and an inventory prepared by the University of Rhode Island Coastal Resources Center of over 70 government-sponsored and privately organised activities involved in reef-related research and management. A strategic document has been prepared which proposes a framework for the Initiative and outlines some initial activities. There are four main aspects to the strategy: partnerships, coordination, integration and capacity-building. Three principle programme areas have been identified:

1. Global coral reef research and monitoring, building on existing activities, and establishing new ones as needed. Under the Initiative, support is being provided to the CARICOMP programme, and plans are being made to fund a co-ordinating post for international reef research and monitoring through the IOC (International Oceanographic Commission).

2. Improving the health of US Coral Reef Ecosystems; a U.S. Coral Reef Co-ordination Team will be established.

3. Capacity building and developing networks with international and regional organisations; this programme will be developed further in the course of a workshop to be held next spring.

All the US government agencies involved in coral reef related programmes are now looking at opportunities for collaborative action and expanded programmes. The initiative is envisioned as a multi-year effort that will require additional funding in 1996 and beyond.


CORAL REEF MAPPING AND THE INTERNET

For those people familiar with the Internet, and with the World Wide Web, the World Conservation Monitoring Centre is going live on the Internet this month (September). Information will cover the full range of WCMC's activities, from protected areas to trade in endangered species. It will also contain sections covering marine and coastal activities, the ReefBase project, and specifically on reef mapping. Over the coming months the total quantity of information displayed will be considerably increased, but a few sample reef maps and other information are already on display, so please feel free to "browse the Web". To access this from within your WWW client open the URL "HTTP://WWW.WCMC.ORG.UK"

Mark Spalding, World Conservation Monitoring Centre, 219 Huntingdon Rd, Cambridge, CB3 0DL, UK. Tel. +44 (0)223 277314; Fax. +44 (0)223 277136; E-mail: spalding@wcmc.org.uk
ANNOUNCEMENTS

AIMS MONOGRAPH CORAL COLLECTION

The Museum of Tropical Queensland in Townsville wishes to announce that it has now completed the cataloguing and database for the 'AIMS Monograph Coral Collection'. This collection of some 18,000 specimens consists of the specimens documented in the 5-volume Scleractinia of Eastern Australia published between 1976 and 1984 by J.E.N. Veron, M. Pichon, M. Wijsman-Best and C.C. Wallace. The collection is arranged in systematic order in easily accessible housing and is documented on a Rbase database. Each species is represented by numerous specimens allowing variability to be readily examined. There is an in-house printed catalogue for each volume of the Monographs.

Scientists wishing to visit the Museum and to work at its benches on this collection, or to ask questions about the database, are most welcome. As a guide, students and researchers wishing to school themselves in coral taxonomy mostly find about two weeks with the collection provides a good overview.

Further information from: Dr Carden Wallace, Museum of Tropical Queensland, 70-84 Flinders St, Townsville, Q 4810, Australia. Fax 077-21 2093; Phone 077-21 1662.

GREAT BARRIER REEF DOCUMENTARY TV SPECIAL

'50 Million Years Under the Sea'

Produced by the Australian Broadcasting Company (ABC) Science and Documentary Unit with support from the Great Barrier Reef Marine Park Authority, 50 Million Years Under the Sea investigates how research is providing a better understanding of reef ecosystems. Filmed at locations including the Red Sea, Florida Keys, Philippines and the GBR, the documentary covers threats and solutions to the future survival of coral reefs today. It was screened in Australia and the UK in September, but will also be available as a video.

For further information contact: Don Alcock, CRC Extension and Training Program, CRC Reef Research Centre, James Cook University, Townsville, Q 4811, Australia. Fax 077 814099; Phone 077 814976.

AFRICAN REGIONAL INTERNSHIP PROGRAMME

The New York Zoological Society (NYZS) and the Wildlife Conservation Society (WCS) have established a regional internship programme through their African Coral Reef Conservation Project which is based in Mombasa, Kenya. This aims to train regionally-based scientists in methods of coral reef monitoring, experimentation, environmental assessment and modelling. The long-term objective is to develop a regional association of nationally-based marine scientists who will assist in setting up a regional database in environmental and biological characteristics of Indian Ocean and Red Sea coral reefs, as well as studying comparative biogeography, human impacts and experimental management.

The internship programme is open to nationals of African coastal and West Indian island countries. The interns' travel, living stipend and equipment will be paid by NYZS-WCS through joint programmes. Internships will last from 3 to 12 months depending on the interests and capabilities of the applicant. Topics covered in the first 2-3 months include: species identification, basic survey methodology, database entry and organisation, basic analytical techniques (biomass, MSY, population density), basic bioassay techniques, statistical procedures and an introduction to modelling. In the remaining time, interns are free to apply the methods that they have learnt to individual research or monitoring projects within the existing research program of the NYZS-WCS Coral Reef Conservation Project.

Applicants should send 3 copies of their c.v., a short essay or cover letter describing experience, interest in the programme and future plans, a letter of support from a college or release from a supervisor, a photocopy of the first 2 pages of their passport, and 2 black and white passport sized photos. Applications will be reviewed twice a year and should be submitted by September 30th or March 30th. Decisions will be made by December and June each year.

Applications to: Dr A. Vedder, NYZS-WCS, Bronx Zoo, 185th and Southern Blvd, Bronx, N.Y. 10466, USA.

BOOK REVIEWS

SAVE OUR CORAL REEFS: A CORAL REEF CARE MANUAL FOR THE PHILIPPINES AND NEIGHBOURING SEAS
Don McAllister and Alejandro Ansula

Save our Coral Reefs is intended as a manual for laymen, especially those in coastal areas who derive their livelihood from the sea. With the help of numerous illustrations and cartoons, it successfully describes the importance of reefs and coasts (Chap. 1), what corals are and their requirements for survival (Chap. 2) and the causes of their destruction in the Philippine setting (Chap. 3). There are also sections on the care of coral reefs (Chap.5), resource organisations, references to topics such as marine reserves and artificial reefs, as well as instructions for treating ciguatera and cyanide poisoning and for giving artificial respiration. Compiling and condensing all this information cannot have been an easy task and the authors should be commended for their achievement.

The manual comes across as a well-intentioned and comprehensive compendium of information. Nevertheless some improvements can still be made to the information presented. Chap 5 (How to care for your coral reef) lists measures that can be taken to ensure the preservation of reefs. However, these are not presented within a
general framework and might lead to piecemeal efforts that could even be counterproductive. The small amounts of information given on topics such as artificial reefs and coral transplantation could be misleading without more caveats and advice on the context within which such measures should be used. In particular the few sentences on coral transplantation (p. 60) should be omitted in future editions, and the authors could instead explain that this is a poorly studied option; the approach taken on mangrove reforestation – to refer readers to expert authorities – should perhaps be used. More information on community management would also have been useful, with suggestions of how the conservation initiatives mentioned can be integrated with this.

The authors have also generally taken the short-cut of equating corals with coral reefs, an approach that has led many to believe that the presence of corals implies the existence of a reef. It is important to distinguish between true reefs and non-reef coral communities (sensu McManus, 1988) since these different habitat types have implications for the management approach.

The book will be useful for teachers at grade school and possibly high school level, although the illustrations and content are perhaps not sufficiently factual for the latter, and a teacher’s guide with additional teaching aids will be needed. The manual includes sets of questions intended to stimulate discussion and test comprehension which will be of use to teachers. However, they may not be as useful to social facilitators and community organisers (to whom the manual is also addressed). In fact, the authors have sometimes ignored the advice that they often give in the manual – to be aware of the knowledge of local people about the reef resources they depend upon. Environmental concerns in the Philippines are proving to be addressed most effectively at the grass roots level (Broad and Cavanagh, 1993) and it is probably better to build on existing knowledge at that level rather than teach truisms such as ‘Everything is connected to everything else’.

There is a great need in rural areas of the Philippines for information on local natural resources. Achieving the right balance between the amount of information provided and the ease with which it can be read and understood by local communities is always difficult, especially in pioneering efforts such as this book. I hope that this balance will be improved before the manual is translated into local dialects. Nevertheless this book certainly represents a firm step in the right direction.

REFERENCES


Licuanan, W.Y. 1987. Marine science institute, University of the Philippines, Dilmran, Quezon City, 1101, Philippines. Current address: Dept Biological Sciences, University of Southern California, Los Angeles CA 90089-0371.

BOOK SHELF

GLOBAL CLIMATE CHANGE AND CORAL REEFS: IMPLICATIONS FOR PEOPLE AND REEFS

Report of the UNEP-IOC-ASPEI-IUCN Global Task Team on the Implications of Climate Change on Coral Reefs

C.R. Wilkinson and R.W. Buddemeier


Available (free) from: Marine and Coastal Programme, IUCN, Rue Mauverney 28, 1196 Gland, Switzerland.

This report was prepared by the two primary authors on the basis of input from and review by a larger international task team. Although climate change concerns were the primary motivation for initiating the project, the team has taken a holistic approach. The report describes how coral reef biology, ecology and geology (including evolutionary history) relate to past, present and future human uses and how these relationships interact with needs for environmental management and conservation in the presence of both climatic and local anthropogenic stresses.

The primary conclusion is that although climate change threatens the habitability of coral reef islands, the greater threat to the existence and continued human use of reefs on a global scale is local and regional over-exploitation and environmental degradation. The chapters on coral reef biology and on climate change assume some basic scientific background on the part of the reader, but the socioeconomic and management sections do not, and an effort has been made to keep the material understandable by the educated layperson. The narrative text is highlighted with boxed examples and summary statements, and the report contains both an executive summary and a conclusions section. Although not all-inclusive, the bibliography is extensive and should provide access to literature on the diverse range of topics discussed.

An abbreviated version of the report is also available in the form of a brochure: Reefs at Risk – a Programme of Action.

GLOBAL MARINE BIOLOGICAL DIVERSITY: A STRATEGY FOR BUILDING CONSERVATION INTO DECISION MAKING

edited by Elliott A. Norse


Sponsored by several major international agencies (IUCN, UNEP, WWF-US, World Bank), this provides the first overview of the values and vulnerabilities of marine species and ecosystems and what can be done to maintain them. It was compiled from information provided by over 100 experts including marine biologists, oceanographers, economists, anthropologists and even attorneys, and involved hundreds of reviewers in over 40 countries. It is

From “Save our coral reefs”
prominently useful in presenting the basic principles of marine conservation, particularly the fundamental difference between land and sea, and is aimed at decision makers in government, industry and conservation organisations, but as a general text is likely to have widespread appeal.

The 'strategy' section is disappointing, consisting essentially of a 20 page list of recommendations relating to the marine and coastal environment that have been gathered together from a variety of sources, such as Agenda 21. There has been no attempt to put these into a proper strategic framework with objectives, goals and specific activities directed at implementation. Nevertheless, this section provides a good general overview of the type of activities that are required globally if the coasts and seas are to be maintained on a sustainable basis. There are ambitious plans to distribute some 20,000 copies to all authorities in coastal countries responsible for any aspect relating to the coastal environment.

As a further follow-up to the book, an International Marine Conservation Network is being set up, under the auspices of the World Conservation Union (IUCN), the Center for Marine Conservation, the United Nations Environment Programme and the World Wildlife Fund US. The network will function through e-mail, a newsletter and meetings at international fora and will attempt to promote the recommendations in the book.

Information on the International Marine Conservation Network can be obtained from: Charlotte Delahay, Center for Marine Conservation, 1725 DeSales St. N.W., Washington D.C. 20036, USA.

PAST AND PRESENT BIOMINERALIZATION PROCESSES: CONSIDERATIONS ABOUT THE CARBONATE CYCLE
edited by F. Doumenge, with D. Allemand and A. Toulemont

This volume reproduces the six key note papers that were presented in the course of an IUCN-Commission on Ecology workshop held in November 1993. At least half the contents concern reef-related topics. A better understanding of the process of biomineralization is essential, from the molecular to the global scale, if predictions of the maintenance of climatic equilibria are to improve. Research into this topic is also of interest to those using minerals of biological origin as medical materials, such as the use of corals for bone implants.

The Proceedings of the Seventh International Biomineralization Symposium, Biomineralization 93, are available from the same address, price 600 FF.

ENVIRONMENTAL GUIDELINES FOR REEF CORAL HARVESTING OPERATIONS
Sue Wells, Paul Holthus and Jim Maragos

The harvesting of coral for the marine curio trade, the aquarium industry and for medical uses has long been a controversial issue, but continues to be a significant economic activity in many countries. Concern in several Pacific island states about the impact of such activities on coral reefs led to SPREP commissioning the production of these guidelines. These emphasise the precautionary approach, recognising that good scientific knowledge on growth and reproductive rates is still lacking for most coral species so that scientifically based management plans cannot yet be prepared.

Part 1 of the guidelines gives background information on coral harvesting, biology and the management options now available. If on the basis of this information, it is decided that harvesting can be carried out in a sustainable manner, the agencies concerned can use Part 2 in the consideration of proposals and in the developing of harvesting programmes. Although directed at Pacific island countries, the guidelines are of general application.

DOLPHINS & PORPOISES: A worldwide guide
Jean-Pierre Sylvestre

The quality of identification guides to marine mammals continues to improve with this book on dolphins and porpoises. In a handy-sized guide over 40 species are described in detail. Information is given on taxonomy, common names, description, reproduction, population size, diet, field identification, communication and distribution. The description of distribution is supplemented by range maps and each species is illustrated in a black and white line drawing, and for many, excellent photographs of animals in the wild. In addition, skulls of all species are illustrated for the benefit of those with a penchant for anatomy or a handy roadkill to examine. This book is well worth the modest asking price.

REEF SHARKS & RAYS OF THE WORLD: A guide to their identification, behavior, and ecology.
Scott W. Michael
Here is a book which does for the elasmobranchs what modern fish identification books do for teleosts: illustrates them using underwater photographs. The quality of many of the latter books fails when they reach the sharks section, and a few fuzzy shots of animals receding into the distance, or of gruesome distended cadavers leaking blood over beaches, are often all that is on offer. There are a few such pictures in this book but they are a small minority which is remarkable given the breadth of its coverage. The author has gathered together a large number of shots from some of the best underwater photographers around to illustrate 120 species of sharks and 112 species of rays. All of them are found around coral or rocky reefs and notes on identification, range and biology are given. This book is a welcome addition to the literature on reef fishes.

UNDERWATER GUIDE MALDIVES: FISH
Peter Nahke and Peter Wirtz

& UNDERWATER GUIDE THE CARIBBEAN: FISH
Peter Wirtz and Peter Nahke

Here are another couple of fish guides to places for which excellent guides already exist. They are aimed primarily at the German diver market and rely on the underwater photographs of the fishes covered for their appeal. Like previous guides in this series the pictures range from stunningly good to strikingly out of focus! Each species distribution on the reef is illustrated on a standard diagram of the reef profile. Exactly the same diagram was used for previous Red Sea books, and while it works well there and for the Maldives, the shape of the profile applies to only a small fraction of Caribbean reefs. Descriptions are brief and given in German and English. Unless you are a monolingual German (are there any?) these guides are unlikely to be for you.

CORAL RECORDS OF OCEAN-ATMOSPHERE VARIABILITY: Report from the workshop on coral palaeoclimate reconstruction.
R.B. Dunbar and J.E. Cole

Excitement over the potential of coral colonies to record the environmental history of the marine realm has been growing steadily as people find more and more ways of interpreting clues locked in coral skeletons. Coral bands and their components have been used to define all kinds of conditions, ranging from flood histories of coastal regions, through El-Niño periodicity and intensity to sedimentation rates, heavy metal and oil pollution. This report summarises the state of the art and the potential of the field as perceived at the time of a workshop held in Puerto Rico in November 1992. Corals have the potential to be dated as accurately as tree rings and can often provide sub-annual resolution of conditions over timescales of weeks to months. They can help to bridge the gap between the very long-term, geological measurements of marine environment history and the short-term ecological data being collected today. In an era of global climate change, such records may be critical to resolution of trends in ambient conditions. Furthermore, use of radiometric dating techniques can potentially extend fine-scale records deep into the geological past through use of dated samples from fossil reefs. Coral dating and palaeoconstruction has a drawback: it is expensive and very time consuming. Consequently sample sizes analysed by research groups tend to be rather small. To help overcome this problem, the workshop has led to the creation of a pan-tropical database of coral palaeoclimate records at the World Data Center-A for Palaeoclimatology in Boulder Colorado. The report gives full details of how interested researchers can add to and access the holdings of this database.

DIARY

2-9 November 1994, East-West Center, Honolulu, Hawaii
MARINE/COASTAL BIODIVERSITY IN THE TROPICAL ISLAND PACIFIC REGION
This meeting is by invitation only and comprises two workshops: I. Species Systematics and Information Management Priorities (2-4 November) and II. Population, Development and Conservation Priorities (7-9 November). Participants will include leading scientists, island resource managers and data/information managers who will prepare brief status reviews on a number of topics and develop overviews and an Action Plan for the implementation of priority activities. Further information from: Dr. J. Maragos, Program on Environment, East-West Center, 1777 East-West Road, Honolulu, Hawaii 96848. Fax: 808-944-7298.

8 November-1 December 1994, Ambon and Banda Naira, Indonesia
CORAL REEF ASSESSMENT AND STATUS EVALUATION WORKSHOP
This meeting is sponsored by UNESCO-COMAR and is being organised by the Center for Oceanological Research and Development (Indonesian Institute of Sciences). It will consist of a 4-day workshop centred in the Banda Sea in eastern Indonesia, during which protocols that have recently been recommended for monitoring reef health will be closely examined and improvements developed. This will be followed by a repeat survey of the reefs in Pulau Seribu, originally surveyed by a UNESCO team in 1985. The first day will be held in Ambon, after which participants will board a vessel and proceed to Banda Naira. A 50% fare reduction on all Garuda Indonesia flights can be obtained through the organisers.

Further information from: Dr. J.R.E. Harger, UNESCO/ROSTEA, Jl. Thamrin 14, Jakarta, Indonesia. Fax 62.21.3150382; Phone 62.21.3141308/3140066; e-mail: UHJAK@FRUNES21.BITNET.

5-12 June 1995, International Convention Center, Beijing, China
XVIII PACIFIC SCIENCE CONGRESS
Sponsored by a number of Chinese scientific institutions, this will have 'Population, Resources and Environment: Prospects and Initiatives' as its central theme. There will be six general symposia as well as scientific sessions organized by the Scientific Committee of the Pacific Science Association, including one on coral reefs. The first circular is available from: XVIII Pacific Science Congress Secretariat, c/o Institute of Atmospheric Physics, Chinese Academy of Sciences, P.O. Box 2718, Beijing 100080, P.R. China; Fax: 86-1-2562458.

26 June-2 July 1995, University of Sydney, Sydney, Australia
INTERNATIONAL LARVAL FISH CONFERENCE
This joint meeting of the Early Life History Section of the American Fisheries Society and the Australian Society of Fish Biologists will include symposia on Larval biology, development & behaviour, Condition & growth, Systematics, Aquaculture, Population dynamics & oceanography, Fisheries independent measures, and Biology of Pomatomus saltatrix. The meeting will include a keynote speech by W.C. Leggett. The first circular has now been issued and includes a call for papers.

Further details from: M.J. Kingsford, ILF Conference 1995, University of Sydney A08, Sydney, NSW 2006, Australia. Fax: (02) 692 4119.

10-14 July 1995, University of Sydney, Sydney, Australia.
REEFS AND CARBONATE PLATFORMS IN THE PACIFIC AND INDIAN OCEANS: AN INTERNATIONAL WORKSHOP.
The program for this meeting, convened by Peter Davies, Douglas Bergerson and Gilbert Camoin, will cover numerous current topics in reef growth including Turn on/turn off- unconformities, survival, and demise of carbonate platforms, Growth in response to 3rd to 5th-order sea level fluctuations, Fluid movements through carbonate platforms, Litudinal gradients in accretion, Tectonic and environmental controls, Climate and reef growth and Integrated approaches to defining geometry and architecture of reefs.

Registration forms from: Douglas Bergerson, Dept of Geology and Geophysics, University of Sydney, Sydney, NSW 2006, Australia. Fax: (02) 692 0184; Email: dougb@es.su.cz.au
NOTES FOR CONTRIBUTORS

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DEADLINE FOR COPY FOR REEF ENCOUNTER 17 (DUE OUT MARCH 1995) IS JANUARY 31ST 1995; please send to:

Callum Roberts                     Sue Wells
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10–14 July 1995, Amsterdam, Netherlands
2ND INTERNATIONAL CONFERENCE ON PELAGIC BIOGEOGRAPHY (ICoPB)
Following several meetings of the SCOR Working Group on Pelagic Biogeography, this conference will be held to discuss new developments in biogeography of plankton and nekton, its relation to climate, hydrography and history and the results of the 1993 Working Group meeting. The meeting will be held in the Amsterdam area. The conference language will be English. The programme will probably include lectures, poster sessions and working groups, and proceedings will be produced.
Further information from: S. van der Spoel, Institute of Taxonomic Zoology, P.O. Box 94766, 1090GT Amsterdam, Netherlands. Fax: 20-5255402.

17–21 July 1995, Amsterdam, Netherlands
6TH INTERNATIONAL CONFERENCE ON COELENTERATE BIOLOGY (ICCB)
This sixth international conference will present new developments in the field of reef science in general. Reef Encounter does not publish original scientific data, so please do not submit such papers. The newsletter aims to complement the journal which carries scientific papers, in that it provides an outlet for book reviews, discussion of papers in the journal and a correspondence column (Upwellings). It also carries short reviews of recent trends and developments in reef research or events that bear on reef studies. In the tradition established by the first editor, Reef Encounter is cheerfully illustrated, with cartoons, newspaper cuttings and other entertaining material.

Further details from: Prof. George Losey, Co-Chair XXIV IEC, Zoology Department, University of Hawaii, Hawaii, 96822, USA. Fax: 808 236 7443. E-mail: IEC@ZOOGATE.ZOO.HAWAII.EDU.

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