

L I Z A R D I S L A N D

Research Station

NEWSLETTER 89/90



THE
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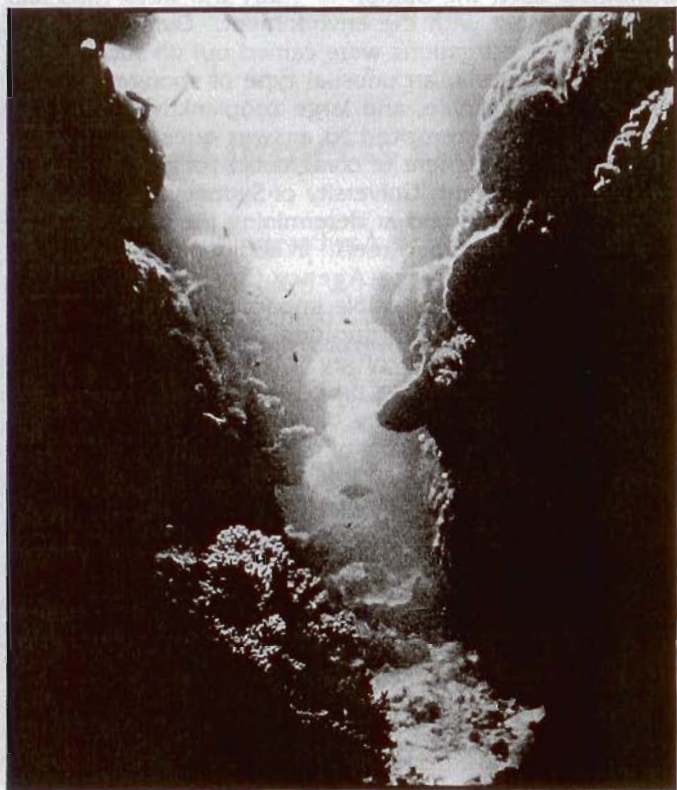
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LIZARD ISLAND RESEARCH STATION NEWSLETTER 1989/90



The Lizard Island Research Station is a facility of the Australian Museum dedicated to supporting research into all aspects of the biology, geology, hydrology, history, management and conservation of the Great Barrier Reef.

Accommodation for up to 24 people, boats, diving equipment, a running seawater system and air conditioned laboratories are available on the reef to support scientists and students with research and educational interests in the tropical marine environment. Enquiries concerning these facilities are invited and should be addressed to:

Co-Directors
Lizard Island Research Station
Private Mail Bag 37
Cairns, Qld. 4871
Australia
Phone and fax: 070 603977

This newsletter summarises the activities of the station from 1 July 1989 to 30 June 1990.

Photos: J. Gates, P. Hoyle

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Research activities during 1989-90

During the year, 113 scientists, postgraduate students, and their assistants used the facilities of the Lizard Island Research Station. As well as Australians, this number includes visitors from Britain, Canada, Germany, New Zealand, Italy and the United States, representing several scientific disciplines.

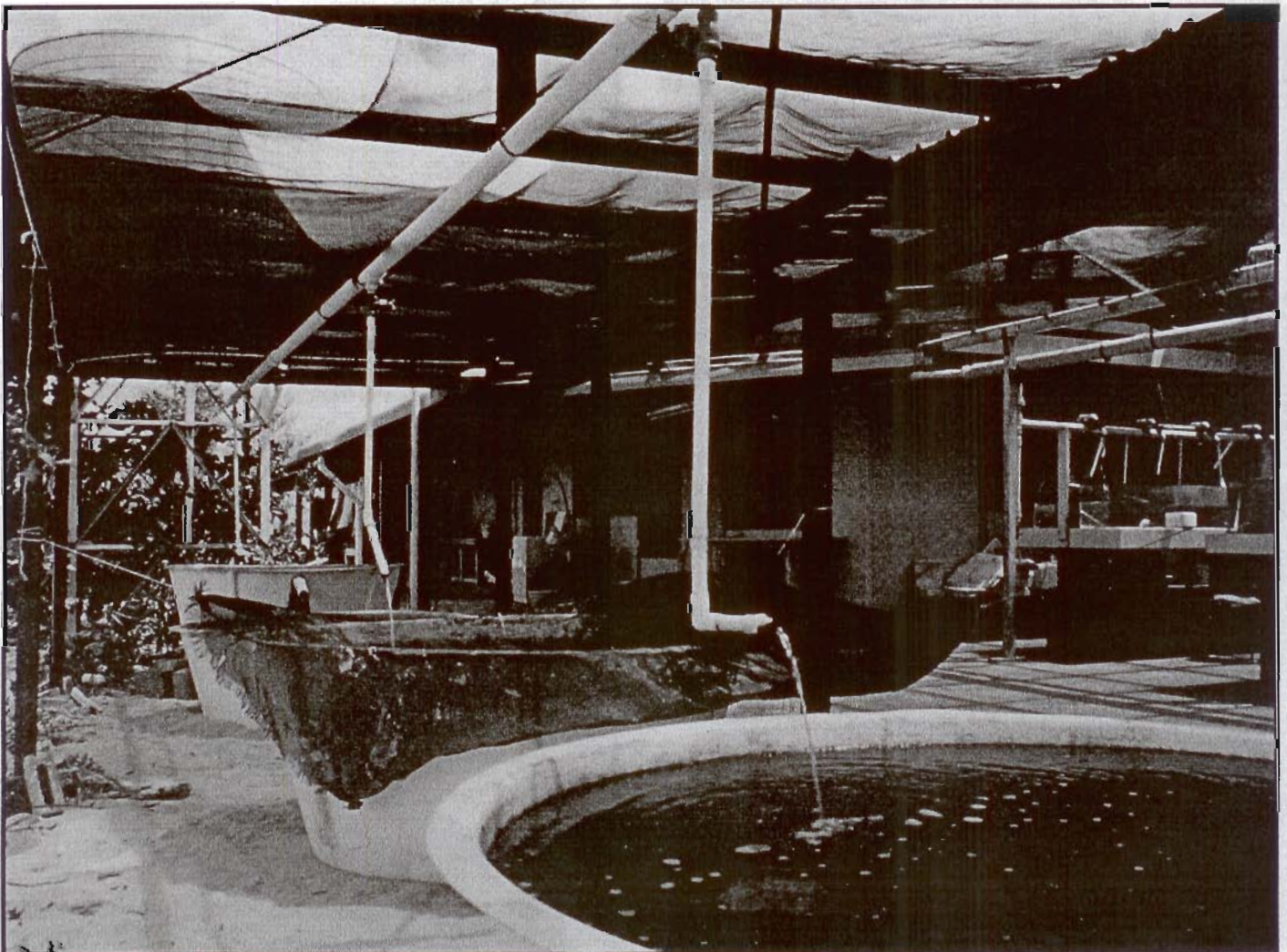
Biology

Biologists studied a wide variety of topics, from micro-organisms in fish guts to growth rates of giant clams. These studies contribute to our knowledge of the lives of coral reef animals and some have direct implications for effective management of coral reefs.

For example, Marti Anderson (Ph.D. student, Occidental College, California, USA) studied larval development in the Crown-of-Thorns starfish at the station this year. Her work will contribute to understanding the population explosions of this species that have been observed on the Great Barrier Reef and elsewhere in recent decades. Also, a team of scientists and students led by Professor Howard Choat (James Cook University, Townsville) investigated various aspects of fish biology. One of these projects concerns determination of age and growth of parrotfishes.

These fish are significant eroders of coral reefs as they crush hard corals with their beak-like jaws in search of food. Knowledge of the population structure of parrotfishes represents part of the information needed for rational management of coral reef ecosystems.

Ecologists used the Station to study the ways coral reef animals interact with the environment. During the year, ecological investigations were carried out on such diverse groups as bacteria, an unusual type of sponge, limpets, ostracods, fish larvae, and large zooplanktivorous fishes. Some projects attempted to answer questions directly related to management of coral reefs. For example, Julian Caley (Ph.D. student, University of Sydney) completed his project this year aimed at determining the patterns of fish settlement on disturbed reefs. In addition, representatives of the Cape York Space Agency (Brisbane) visited the Station to assess the possible impact of a proposed space port on coral reef communities. Dr B. Tucker (CSIRO Department of Meteorology, Melbourne) studied the effects of global warming on coral reef communities, and Dr. N. Polunin (University of Newcastle, England) and Dr. J. Greenwood (University of Queensland) studied the feeding energetics of zooplanktivorous fishes and the importance to the reef of nutrients recycled by these fish.



Taxonomists collected specimens of marine invertebrates from groups including sclerosponges, ostracods, crabs, chitons, octopus and echinoderms, as well as terrestrial amphibians and reptiles. These specimens will be incorporated into permanent research collections in various museums. Taxonomic work involves comparing specimens from many localities to determine the boundaries and identity of species and relationships among species. Knowledge of the identity of animals and plants is basic to all biological work, but the marine invertebrate fauna in particular is incompletely known. For example, Patricia Behrens (Ph.D. student, University of Hamburg, West Germany) found many species of ostracods at Lizard Island this year that were previously unknown to science.

Biological projects carried out this year

(* indicates principal researcher is a postgraduate student)

Ecology of marine fungi (B. & J. Kohlmeyer, University of North Carolina, Morehead City, North Carolina, USA)

Ecology of tropical *Vibrio* bacteria and their role in nutrient transformations in tropical marine environments (*S. Smith, James Cook University, Townsville, Australia, assisted by D. Pugh)

Ecology and taxonomy of sclerosponges (J. Reitner, D. Salomon & F. Grote, Freien Universitat, Berlin, Germany)

Chemical communication in stomatopods (Roy Caldwell, University of California, Berkeley, USA)

Taxonomy and ecology of benthic ostracods (*P. Behrens, University of Hamburg, Hamburg, Germany, assisted by J. Kirsch, U. Kwitt & O. Gross)

Population biology of the shrimp *Periclimenes holthuisi* (H.D. Pfannenstiel, Freien Universitat, Berlin, Germany, assisted by R. Klose)

Population biology of the shrimp *Periclimenes holthuisi* (*A. Haas, Freien Universitat, Berlin, Germany)

Taxonomy of *Carcinonemertes* crabs (J. Shields, University of Queensland, Brisbane, Australia, assisted by T. Warren)

Biology of small demersal invertebrate scavengers (*S. Keable, Macquarie University, Sydney, Australia, assisted by D. Townsend & R. Springthorpe)

Coral reproduction (M. Young, Queensland Museum, Brisbane, Australia)

Larval development in the crown-of-thorns starfish, *Acanthaster planci* (*M. Anderson, Occidental College, Los Angeles, California, USA)

Starfish morphogenesis (B. Crawford & T. Crawford, University of British Columbia, Vancouver, Canada)

Collection of echinoderms, chitons and crustacea (J. & A. Glover, South Australian Museum, Adelaide, Australia)

Growth comparisons of giant clams (J. Barker, James Cook University, Townsville, Australia)

Crypsis and camouflage in nudibranch molluscs and effects of fish predation (C. Todd & C. Hill-Venning, Gatty Marine Laboratory, University of St. Andrews, Scotland)

Ecology of nudibranchs (*S. Schubert, Kiel University, Kiel, Germany, assisted by S. Bassham, J. Schneider, S. Major and B. Reiner)

Ecology of limpets (B. Creese, University of Auckland, Auckland, New Zealand)

Systematics and biogeography of octopods (*M.

Norman, University of Melbourne, Melbourne, Australia, assisted by C. Davies, J. Martin and J. Smith)

Bioerosion studies (P. Hutchings, Australian Museum, Sydney, Australia, assisted by R. Paterson)

Zonation of benthic organisms (*B. Humberg, University of Heidelberg, Germany, assisted by S. Dortmund)

Visual development in fishes (*J. Shand, James Cook University, Townsville, Australia, assisted by R. McCauley)

Age and growth of parrotfishes (*L. Dongchun, James Cook University, Townsville, Australia)

Age and growth studies of coral reef fishes (*B. Ferreira, James Cook University, Townsville, Australia)

Sex change in anemone fish (*J. Elliot, University of Florida, Tallahassee, USA, assisted by J. Elliot)

Sex change in anemone fish (*J. Godwin, University of Hawaii, Honolulu, USA)

Ecology of coral reef fishes (R. Bellig, Gustavus Adolphus College, St. Peter, Minnesota, USA)

Dynamics of herbivorous fish populations and experimental fish trapping (J.H. Choat, W. Oxley, G. Russ, B. Kerrigan, M. Milicich & D. Bellwood, James Cook University, Townsville, Australia)

Larval fish ecology (J. Leis & T. Trnski, Australian Museum, Sydney, Australia)

Feeding behaviour of planktivorous fish (N. Polunin, University of Newcastle, Newcastle-upon-Tyne, United Kingdom and J. Greenwood, University of Queensland, Brisbane, Australia, assisted by K. Martin-Smith & V. Nelson)

Fish settlement on disturbed reefs (*J. Caley, University of Sydney, Sydney, Australia)

Herbivory in newly settled reef fish (*K. Clements, James Cook University, Townsville, Australia, assisted by L. Schwartzkopf, L. McIlwain & S. Bassham)

Fish community dynamics (*M. McCormick, James Cook University, Townsville, Australia, assisted by L. Axe, S. Bassham, B. Kerrigan, C. Paporakis, S. Seddon, K. Tricklebank and A. Wakeford)

Fish recruitment on disturbed reefs (*M. Meekan, Griffith University, Brisbane, Australia, assisted by S. Bassham, P. Scaumells, C. Paporakis, O. Gross, J. Murdoch and A. Nichols)

Fish gut microflora (D. Sutton, James Cook University, Townsville, Australia)

Parasitic indicators of black marlin migrations (*P. Spear, James Cook University, Townsville, Australia, assisted by T. Munday, O. Gross and A. Wakeford)

Effects of global warming on coral reef communities (B. & M. Tucker, CSIRO Department of Meteorology, Melbourne, Australia)

Visual survey of reef-associated organisms (B. Mapstone, James Cook University, Townsville, Australia)

Survey of venomous marine animals and compilation of clinical histories of researchers (C. Edmonds, C. Lowry, C. Edmonds, Diving Medical Centre, Sydney, Australia)

Conservation of nesting sea turtles (T. Agardy, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA)

Collection of reptiles and amphibians from Barrier Reef Islands (U. & P. Meede, Hamburg, Germany).

Disturbance to seabirds (*H. Lister, Griffith University, Brisbane, Australia, assisted by G. Paull)

Possible impact of a Cape York space port on coral reef communities (J. & A. Sulzback, Cape York Space Agency, Brisbane, Australia)

Effect of aircraft intrusion on nesting seabirds (L., L. & T. Brown, Griffith University, Brisbane, Australia)

Geology

The following geological projects were carried out from the Station during the year (* indicates the principal researcher is a postgraduate student):

- Geology of beach rock sediments** (D. Meischner, University of Goettingen, Germany)
- Sea level change evidence in beach rock** (*R. Heykes, Institut für Geologie und Palaontologie, Goettingen, Germany)
- Sea level change evidence in beach rock** (*J. Lutze, Institut für Geologie und Palaontologie, Goettingen, Germany)
- Morphologic, eustatic and tectonic controls on deposition of hybrid arenites** (G. Zuffa, University of Bologna, Bologna, Italy)
- Growth and distribution of oolitic sediments** (K. & J. Swett, University of Iowa, Iowa City, Iowa, USA)

Station Publications

All visitors carrying out research at the Lizard Island Research Station or on RV "Sunbird" are encouraged to send two reprints of each paper published to the Co-Directors. These papers will be stored permanently in the Station's library. At the end of June 1990, the number of reprints in this collection was 280. Of these, 19 were received in the last year (listed below). A complete list of publications is available on request.

- Alder, J. and R. Braley, 1989. Serious mortality in populations of giant clams on reefs surrounding Lizard Island, Great Barrier Reef. *Australian Journal of Marine and Freshwater Research*, 40:205-13.
- Bellwood, D.R. and J.H. Choat, 1989. A description of the juvenile phase color patterns of 24 parrotfish species (Family Scaridae) from the Great Barrier Reef, Australia. *Records of the Australian Museum*, 41:1-41.
- Braley, R., 1987. Distribution and abundance of the giant clams *Tridacna gigas* and *T. derasa* on the Great Barrier Reef. *Micronesica*, 20:215-223.
- Braley, R., 1987. Spatial distribution and population parameters of *Tridacna gigas* and *T. derasa*. *Micronesica*, 20:225-246.
- Clements, K.D., D.C. Sutton and J.H. Choat, 1989. Occurrence and characteristics of unusual protistan symbionts from surgeonfishes (Acanthuridae) of the Great Barrier Reef, Australia. *Marine Biology*, 102:403-412.
- Gladstone, W., 1988. Correlates and possible costs of reproductive success in males of a harem coral reef fish. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 2:693-698.
- Hay, M.E., J.R. Pawlik, J.E. Duffy and W. Fenical, 1989. Seaweed-herbivore-predator interactions: host-plant specialization reduces predation on small herbivores. *Oecologia*, 81:418-427.
- Hay, M.E., J.E. Duffy and W. Fenical 1988. Seaweed chemical defenses: among compound and among herbivore variance. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 3:43-48.
- Hutchings, P. and M. Peyrot-Clausade, 1988. Macro-boring communities of Porites - a biogeographical comparison. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 3:263-268.
- Larkum, A.W.D., G.C. Cox and T.P. Dibbayawan, 1988. Prokaryotic algal symbionts of coral reef sponges. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 3:163-170.
- Meekan, M.G., 1988. Patterns of settlement and mortality of juvenile reef fishes at Lizard Island, northern Great Barrier Reef. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 2:779-784.
- Milicich, M.J., 1988. The distribution and abundance of presettlement fish in the nearshore waters of Lizard Island. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 2:785-790.
- Pitcher, C.R., 1988. Spatial variation in the temporal pattern

of recruitment of a coral reef damselfish. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 2:811-816.

- Roper, C.F.E. and F.G. Hochberg, 1988. Behavior and systematics of cephalopods from Lizard Island, Australia, based on color and body patterns. *Malacologia*, 29:153-193.
- Smith, G.C. and R.C. Buckley, 1986. Eagle Island, Great Barrier Reef, Queensland. *Corella*, 10:81-83.
- Smith G.C., 1989. The feeding and breeding relationships of black-naped (*Sterna sumatrana* Raffles) and crested (*Sterna bergii* Lichenstein) terns in a tropical reef environment. Ph.D. thesis, Griffith University, Brisbane.
- Stroud, G.J., B. Goldman and W. Gladstone, 1989. Larval development, growth and age determination in the sharpnose pufferfish *Canthigaster valentini* (Teleostei: Tetraodontidae). *Japanese Journal of Ichthyology*, 36:327-337.
- Sutton, D.C. and K.D. Clements, 1988. Aerobic, heterotrophic gastrointestinal microflora of tropical marine fishes. Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 3:185-190.
- Sutton, D.C., L. Trott, J.L. Reichelt and J.S. Lucas, 1988. Assessment of bacterial pathogenesis in crown-of-thorns starfish, *Acanthaster planci* (L.). Proceedings of the 6th International Coral Reef Symposium, Australia, 1988, 2:171-176.

Other visitors

In addition to its primary function of facilitating scientific research, the Station encourages education about the Great Barrier Reef. To this end, the following media-related groups used the Station during the year.

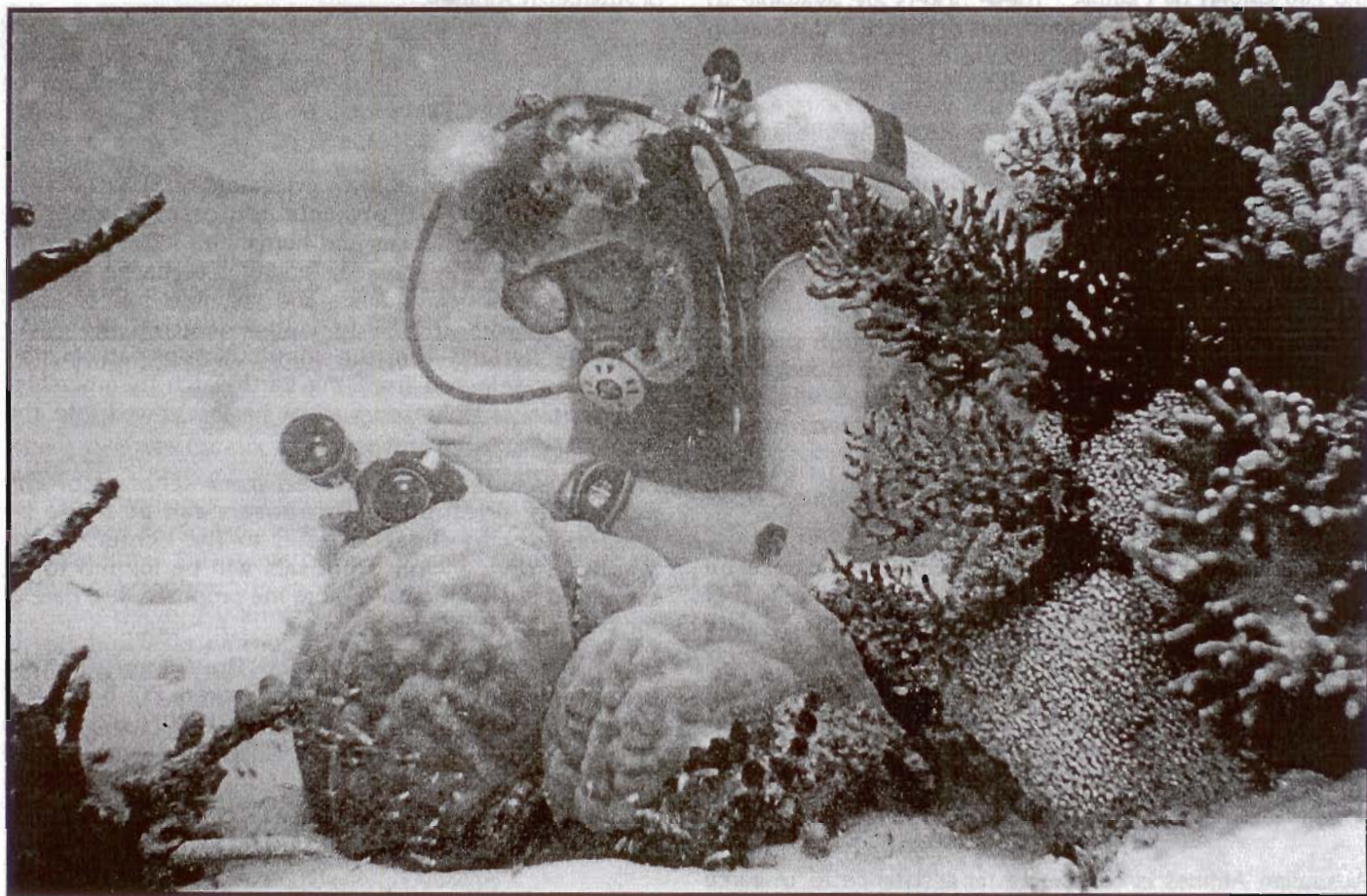
- F. Bavendam, New Hampshire, USA. Underwater photography.
- D. Hannan, Coral Sea Images, Townsville, Australia. Filming billfish research.
- M. Holmes, R. Hiller, R. Zitermann & M. Milicich, British Broadcast Corporation, Bristol, United Kingdom. Survey of sites for future filming.
- M. Mackel & B. Townsend, Australian Broadcast Corporation, Sydney. Interviews for ABC radio "Science Show".
- E. Linden, Time magazine, New York, New York, USA. Research for article on conservation of fragile ecosystems.

The first **high school group** to use the facilities of the Station visited in October 1989. From Copeland College, Canberra, a group of seven final year students carried out individual research projects under the supervision of two teachers, Jannine Cowan and Jeff Sewell. The visit was extremely productive for the students and demonstrated that the Station is well-equipped to cater for small, well-organised groups of this type.

Other visitors to the Station during the year are as follows:

- T. Ardz and E. Lyndon, USA
- S., J., M. & B. Ballantyne, Donors, Cairns
- P., P. and N. Berents, L. Geeves, S. Horn, R. Watkins, G. Savage and A. & J. Sinclair, Members of The Australian Museum Society expedition, Sydney
- R. and S. Bischof, Switzerland
- J. Delgado, USA
- T. Ford & L. Wilson, Cairns. Master & crew, RV "Sunbird"
- D. Gane, Donor, Cairns
- G. Ginn, Owner MV "Noel Buxton", Brisbane
- C. Johnson, USA
- H. Johnson, Formplex Australia Pty. Ltd., Melbourne
- R. MacAllister, Captain of MV "Queen of the Isles", Cairns
- R. and M. Purves, Raymond Purves Group, Donors, Sydney
- F. & S. Talbot, Smithsonian Institute of Natural History, Washington, D.C., USA
- A. Wiley, Donor, Sydney
- B. Wingett, Donor, Sydney
- RV "Lady Bastion" crew and researchers, Townsville
- RV "Acedemik Oparin" crew and researchers (Russian Scientific Ship)

Support for Research



Lizard Island Research Station Doctoral Fellowship

The Australian Museum, in conjunction with the Lizard Island Reef Research Foundation, each year offers a three-year fellowship to a PhD student to support field work on the Great Barrier Reef, based at the Lizard Island Research Station.

The Fellowship for 1990 was awarded to Campbell Davies of the Department of Marine Biology, James Cook University, Townsville. His project title is "The use of mark-release-recapture methods to study the demography of large reef fish on the Great Barrier Reef". Campbell's work concerns commercially valuable fish species such as coral trout and emperors, and will provide data needed for effective management of these resources.

Last year's fellowship winner, Mark McCormick (James Cook University), continued his experimental work at Lizard Island during the year to determine factors that influence settlement and subsequent survival of mullid fish. Julian Cayley (Sydney University), who was awarded the Fellowship in 1988, completed his PhD thesis this year. Kendall Clements (James Cook University), who was awarded the 1987 Fellowship, expects to submit his thesis early in 1991.

Doctoral Fellowship Details

Any student who is enrolled, or is about to be enrolled, in a PhD program is eligible to apply for the Fellowship. It is expected that the recipient will carry on significant long-term studies in a scientific discipline relevant to the Barrier Reef.

The fellowship is valued at \$A13,000 (\$4,333 per annum for 3 years). It covers bench fees and assists with travel costs to the island and a small amount of equipment. It is not a stipend. A student enrolled at an Australian university should be in receipt of a Commonwealth or other recognised scholarship. A student enrolled at an overseas university should provide documentation showing how living expenses will be covered. Fellowship holders are required to make a progress report at the end of each year.

Applications for the 1991 Fellowship closed on 15 October 1990, and applications for 1992 will close on 1 October 1991.

Applications and requests for further information should be sent to:

The Director
LIRS Fellowships
The Australian Museum
PO Box A285
Sydney South, NSW 2000
Australia

For details about facilities at the Lizard Island Research Station, contact the Station's Co-Directors directly.

Qantas/Lizard Island Travel Fellowships

The Australian Museum and the Lizard Island Research Station in cooperation with Qantas Airways, are able to offer two economy class return air tickets to Cairns from any city served by Qantas. These tickets are available to people who will conduct significant research at the Station within the next year. The successful applicants should spend a minimum of four weeks at Lizard Island.

Applicants for the travel fellowships should submit a three page research proposal clearly setting out: 1) aims, 2) methodology, 3) a personal curriculum vitae and 4) significance of research to the Great Barrier Reef. Bench fees and other costs are not included in the fellowship. Visa arrangements are also the responsibility of the successful applicants.

A condition of the award is a report on the project, including photographs if possible, within two months after visiting the Station. This report will be used as a basis for publicity by both Qantas and the Research Station.

Applications should be sent to Dr Pat Hutchings, Australian Museum, 6-8 College Street, Sydney, NSW 2000 (Fax 02 339 8304).

Applications for the 1991 Qantas Fellowship closed on 30 November 1990. It is anticipated that a Travel Fellowship will be available for 1992. The closing date for applications for the 1992 award will be 1 October 1991.

Air travel assistance to Cairns for Australian researchers

Australian Airlines is continuing its assistance to research at the Station by offering a limited number of confirmed economy air tickets at 50% of the regular price. These tickets may apply to travel between any city served by the airline within Australia and Cairns. The offer does not include the cost of travel from Cairns to Lizard Island. The

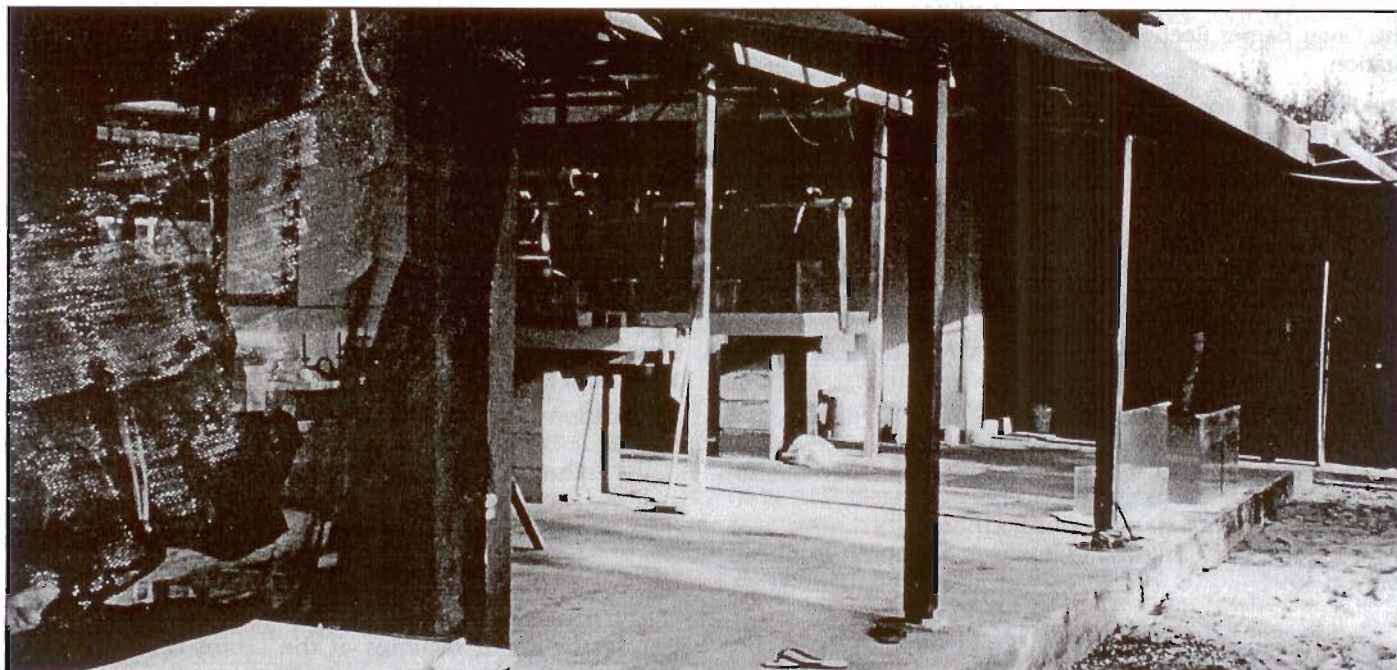
tickets are not transferable and the number to be given is limited. They will be offered on the basis of scientific merit and need. Applicants for this program should send their research proposal to the Co-Directors at the Research Station. Please indicate the source of funding for your project and why travel assistance is required. Approval for the discount is granted by management of the Cairns office of Australian Airlines.

Earthwatch

In 1991, Earthwatch will award grants of \$US10,000 to \$US100,000 for 110 projects addressing significant questions in the sciences and humanities. The Center for Field Research invites scholars engaged in marine research to apply for awards of funds and volunteer staff to assist them with work at Lizard Island Research Station. All funds are derived from the contribution of participating volunteers selected from the Earthwatch membership; non-specialist volunteers must be integrated into the research design.

Proposals will be considered from scholars of any nationality. Preliminary proposals can be made by telephone or by detailed letter to The Center. Upon favorable review, full proposals will be invited to be submitted twelve months before the proposed field date of the project.

For further information contact: The Center for Field Research, 680 Mount Auburn Street, PO Box 403, Watertown, MA 02272, USA. Phone (617) 926-8200.



The Station

Staff 1989/90

Dr Barbara L Kojis	Co-Director (until August 1, 1990)
Dr Norman J Quinn	Co-Director (until August 1, 1990)
Mr Lance Pearce	Maintenance Engineer
Ms Marianne Pearce	Accommodation/Transport Officer

Change of Co-Directors

Barbara Kojis and Norman Quinn will leave the Station in early August, 1990. They will be replaced by Anne Hoggett and Lyle Vail. Both Anne and Lyle spent the last five years at the Northern Territory Museum in Darwin, where Lyle was Curator of Echinoderms and Molluscs and Anne was a Research Associate. Anne's research interests are the systematics and ecology of echinoderms, and she has worked particularly with ophiuroids and crinoids. She completed her PhD thesis on systematics of the brittlestar genus *Macrophiothrix* in 1990 through the Northern Territory University and the University of Queensland. Lyle's interests centre on echinoderm ecology. He completed his PhD on reproduction and population dynamics in crinoids in 1988 at James Cook University. Both Lyle and Anne worked in the Echinoderm section at the Australian Museum in the early 1980s.

Diving regulations

Please contact the Co-Directors about your diving plans prior to coming to the Station. Every effort will be made to accommodate the diving program needed for your research project.

Developments planned for 1990/91

Station Displays:

Displays explaining research being carried out at the Station will be established on the laboratory verandahs. These will enable the Station's numerous day-visitors learn more about the Great Barrier Reef and that scientific research is a basic pre-requisite for management of natural resources.

Visitor Accommodation:

Bedroom windows of the three houses currently without insect screens will be screened. These will improve living conditions, especially during the mosquito season.

Laboratories/Aquaria:

A new wet laboratory, to be known as the "**Raymond E. Purves Laboratory**" will be built in 1991. This will increase existing laboratory space by 30% and will provide a much-needed "messy work" area for activities such as dissection and sorting of fish in which preservatives such as formalin can also be used. The building will incorporate a small chemical store room and general storage areas.

Cyclone Ivor, which struck Lizard Island in March 1990, caused extensive damage to the shadecloth over the aquarium area. This will be replaced with a slightly denser shadecloth. The saltwater intake line will be extended by 50 m, which will allow the pump to run continuously, even at low tides.

Boating/Diving:

In order to help minimize sun exposure to people working from the boats, canopies will be fitted to most of the Station's dinghies. Several dinghies need replacing, and funds will be sought for this purpose in 1990/91. Air quality testing equipment will be acquired in order to ensure that high quality air is being supplied by the Station's two dive compressors.

Station Visitor Statistics 1 July to 30 June

	1988-89	1989-90
Australian scientists & assistants	31	29
Foreign scientists & assistants	71	27
Australian postgraduates & assistants	55	39
Foreign postgraduates & assistants		18
TOTAL researchers and assistants	157	113
Volunteers	33	15
Media representatives	-	9
Other visitors	96	11
TOTAL number of visitors	286	147
Mean number of:		
Researchers per night	6.3	7.5
All visitors per night	8.8	8.9

Station tours

Tours of the station remained popular, attracting over 1600 people during the year. Most of the visitors were passengers from tour boats, the MV "Noel Buxton", MV "Queen of the Isles", and MV "Spoilsport". The remaining visitors were from the MV "Nimrod", the Lizard Island Lodge, private yachts or the camping area.

Volunteer program

Fifteen volunteers contributed to over 300 full-time work days at the Station. They assisted with: gardening around houses, labs and along the vehicle tracks; painting signs and houses; cleaning and anti-fouling dinghies; derusting equipment; cutting down dead trees for firewood; landscaping; filling in eroded portions of the track to the airport; entry of meteorological data on a database; and assisting the Co-Directors with their research. In addition, in their free time, volunteers helped visiting scientists with their research projects.

The following people are thanked for volunteering their time to help improve the facilities of the Station and to assist with scientific research: S. Bassham (USA), H. Brown (USA), A. Cerneaz (Australia), K. Diele (West Germany), A. Hannig (West Germany), O. Hansen (Denmark), R. Heykes (West Germany), J. Lutze (West Germany), L. McCann (USA), M. Meekan (Australia), C. Mohn (West Germany), U. Meischner (West Germany), D. Quamme (Canada), S. Uthicke (West Germany) and M. Witt (West Germany). The assistance they provided is very much appreciated.

Enquiries are welcome from people wishing to visit the Station in return for work. Opportunities for volunteer work occur mainly from March to September. Please contact the Co-Directors for details.

New usage fees

As of 1 January, 1991, usage fees for the Station will change. The new fees will be valid at least until the end of 1991. The new fee structure differentiates between primary researcher and accompanying assistants, mainly to reduce the cost of bringing support staff. A commercial rate is introduced for the first time.

Researchers applying for grant funding for work at the station are requested to write to the Co-Directors to obtain a quote for fees applicable at the proposed time of usage.

The bench fees listed below cover the following facilities:

- 1) Accommodation, generally in two bedroom cottages, with fully-equipped kitchen and hot-water shower;
- 2) 4.3-4.6m dinghies powered by 9.9 hp motors suitable for work around Lizard Island (For work further afield, larger boats are available for a fee to cover excess fuel, provided the driver has an appropriate qualification);
- 3) SCUBA tanks (to suitably qualified divers), weights, and weight belts (Air fills are free and tank filling is done on a roster basis by visitors);
- 4) Laboratory facilities, including two photomicroscopes (a Leitz Dialux 22 fluorescent microscope and a Wild M400 photomicroscope with MPS45 photoautomat), a range of stereo microscopes, spectrophotometer, freeze dryer, scintillation counter, centrifuges, IBM computers and walk-in cold room (4°C and -15°C);
- 5) Aquarium facilities with flow-through saltwater system.

Bench fees (per night) effective from 1 January 1991

Researchers (Note 1)

October to February	
Researcher (Note 2)	\$75
Accompanying assistants, each	\$55
March to September	
Researcher (Note 2)	\$65
Accompanying assistants, each	\$50

Students working on their own projects (Note 3)

Researcher (Note 2)	\$29
Accompanying assistants, each	\$22
House-group (Note 4)	\$160

School and University groups (Note 5)

October to February	
Per person	\$60
March to September	
Per person	\$40

Commercial users (Note 6)

All year, per person	\$90
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Other visitors

Visitors not carrying out research, each	\$105
Non-participating family of researcher, each (Note 7)	\$32

All categories

- * All fees must be paid in full on departure unless account arrangements have been made in advance (Bankcard, Mastercard, and Visa are accepted).
- * A 25% non-refundable deposit is necessary to confirm a booking.
- * If a block booking is made for 28 consecutive days or more a discount of 10% applies to the whole period. This discount is not applicable to house-groups.

NOTES

1. The researcher rate applies to scientists conducting a research program, except students as outlined in (3) below.
2. Each team must be working on a single project and will have access to one boat.
3. This rate applies to Honours and postgraduate students conducting independent research leading to a degree. Supervisors pay the student rate when acting in a purely supervisory role.
4. A "house-group" is a group of students from a single institution who act as dive buddies and boat attendants for each other. The rate covers the use of one 2-bedroom house and two boats (when possible: some sharing of boats may be necessary during busy periods). A maximum of 12 people can stay in one house. The house-group rate must be prepaid. Staff members from the students' institution are included in the house-group rate if they are acting solely in a supervisory capacity. Staff members carrying out their own research while in a house-group pay an extra \$30 per night each. If extra boats (9.9 hp) are required and available, \$10 per day will be charged to cover fuel costs.
5. In order to obtain this rate, the minimum group size must be 8. Groups smaller than 8 people are charged at the applicable researcher rate.
6. This rate is for visitors whose work is of a commercial nature, such as photographers and film-makers.
7. Non-participating family members do not have use of boats or scuba tanks, and are not included in the house-group rate.

Lizard Island rainfall (mm)

	1986	1987	1988	1989	1990
January	519	205	33	96	155
February	53	399	297	138	13
March	149	117	435	340	386
April	187	147	141	263	261
May	57	49	13	115	183
June	74	52	44	29	118
July	31	32	68	9	-
August	11	20	21	10	-
September	2	53	16	0	-
October	51	0	23	24	-
November	7	18	36	221	-
December	6	132	312	57	-
Total	1,207	1,224	1,442	1,302	-

Support Services

Getting to Lizard Island

The closest major city to Lizard Island is Cairns. It has both domestic and international air terminals. Australian Regional Airlines (phone 070 527700) flies daily from Cairns to Lizard Island.

A range of discount fares within Australia is available from domestic carriers. For international travellers, a 30% reduction on the economy fare can be received on domestic sectors. Full-time students under the age of 26 receive a 25% discount on the economy fare for domestic travel, including the Cairns/Lizard Island sector.

Travel by boat from Cairns to Lizard Island (or Lizard/Cairns) is sometimes possible. Please contact the Co-Directors about the availability of boat travel for the time of year you intend to visit. The trip from Cairns to Lizard Island generally takes about 18 hours. The cost is marginally cheaper than air travel.

Food/alcohol provisioning

Supplies can be ordered from:

Mrs Janice Woodhams Country Orders Woolworths 103 Abbot Street Cairns, Qld 4870 phone 070 512015	Stella's Fruit Supply PO Box 23 Cairns Qld 4870 phone 070 517640	The Liquor Barn Abbot & Wharf Streets Cairns Qld 4870 phone 070 516300
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Groceries, fruit and vegetables can be ordered from Woolworths, but they do not supply alcohol. A cheque

must be sent with the order, and should be made out to excess because Woolworths will not send goods on credit. Woolworths charges \$1.10 for each box sent to the barge or air cargo depot, as well as a small surcharge depending on value of the order (10% if less than \$100, 5% if more than \$100, 0% if more than \$500). The order should be organised into the following categories: non-perishables, cold store, freezer, and fruit/vegetables. Indicate whether they should substitute if the exact item is not available.

Stella sells only fruit and vegetables, but she will purchase small meat, grocery and alcohol orders from other shops for people staying at the Research Station. Stella will supply goods on credit, but if the order is large it is best to send at least part prepayment.

The Liquor Barn supplies alcohol and will accept credit card payment as well as cheque in advance.

Freight

Supplies can be sent to Lizard Island by the Jardine Shipping Co. barge from Cairns. It arrives at Lizard Island every second Tuesday, leaving Cairns at about midday the day before. Orders to the three suppliers should reach them no later than the Wednesday before the barge leaves Cairns. Please contact the Co-Directors to determine the barge schedule before consigning any food/alcohol orders. The Research Station charges \$8 per box for freight on the barge. Please do not consign any freight other than food/alcohol directly to the Jardine Shipping Company. Contact the Co-Directors for consignment of other types of freight. Supplies can also be air freighted (Australian Cargo, phone 070 527714), but this is expensive.



R.V. Sunbird

Under New Management

Steadily increasing usage and wider ranging operations, led to a decision in June, 1989, to separate the direct management of R.V. SUNBIRD from the Lizard Island Research Station. While the purpose-designed marine research catamaran maintains close ties with the Station, R.V. SUNBIRD is now home ported in Cairns, facilitating both the embarkation/disembarkation of research teams and routine management/maintenance activities.

R.V. SUNBIRD remains a facility of the Australian Museum but is now managed and operated by Capt. Terry Ford and Ms. Lois Wilson, both residing in Cairns. Terry's 22 year Naval career and Lois's long association with both the Lizard Island Research Station and R.V. SUNBIRD have proved a successful combination during R.V. SUNBIRD's first year of "autonomous" operation.

A busy and successful year for R.V. SUNBIRD

Following the transfer of management in July, 1989, several upgrades to R.V. SUNBIRD's facilities were undertaken to improve reliability and utility of the vessel. These included an additional hydraulic power source to provide redundancy for the air compressor, freezer, A-frame/winch and other vital systems, a desalinating unit, a medium sized (MKII 13'9") inflatable dive/utility boat and outboard and a 1.1 KVA static inverter to provide 240V AC power for computers etc. without a requirement to run the auxiliary generator.

These upgrades and an on-going maintenance programme enabled R.V. SUNBIRD to achieve 162 days at sea during the year, of which 148 days saw research personnel actually embarked and operating. The other 14 days were mainly undertaken for transit trips to/from the Torres Strait area in positioning for CSIRO operations.

While R.V. SUNBIRD remains essentially a non-profit facility, being primarily a research vessel, it is also required to pay its way and it was pleasing to achieve just over a break-even figure for the year's operations. This self-supporting potential should enable R.V. SUNBIRD to remain available as a low-cost marine research platform for the foreseeable future.

Features and Charter Fees

R.V. SUNBIRD is a motor-sailing catamaran of 14.1 m. length, 7.2 m. beam, and shoal-draft configured hulls allowing operations in water depths as little as 2 metres. She cruises at 8 knots under power and is in survey to carry up to six research personnel for operations throughout the entire Great Barrier Reef/Torres Strait area as well as the western Coral Sea and Gulf of Carpentaria regions. Operations further afield may be undertaken with adequate notice to arrange appropriate permits. Sufficient

food, water and domestic facilities are available for uninterrupted operations of around 120-130 research mandays (viz 6 for 3 weeks, or less personnel for longer periods).

R.V. SUNBIRD has a laboratory space below decks together with a large saloon/galley area and an exceptionally large unobstructed and stable aft deck. 12V DC and 415/240V 50Hz AC generators are standard, refrigerator and freezer facilities are available and a 6 cfm 3200 psi SCUBA compressor with 6 x 90 cf tanks are carried for use by certified divers.

CHARTER FEES current till at least 31 December 1991 are \$725 per day for bona-fide research activities; this figure is after a \$110 subsidy by the Australian Museum for research operations, and covers use of all R.V. SUNBIRD facilities (SCUBA equipment, ZODIAC dive tender and outboard fuel etc.). The only additional charge is \$15 per research manday for catering which includes 3 full meals as well as snacks and (non-alcoholic) beverages.

The forgoing rates apply for operations to/from Cairns; R.V. SUNBIRD can be positioned to commence operations elsewhere if required for a rate of 1 day per 250nm (400 km) travel required to/from Cairns.

For full details as to usage, facilities, costing availability and any special requirements enquiries are welcomed and should be directed to either Lois Wilson or Terry Ford,

R.V. SUNBIRD Marine Research Charters
P.O. Box 5955
CAIRNS QLD. 4870

Phone 070 532 889
International 6170 532 889
Fax 070 517 683

Research Activities

Dr IAN POINER, CSIRO, Cleveland; chartered R.V. SUNBIRD for a total of 30 days in the Torres Strait. Ian was assisted by Aubrey Harris, Brian Long, Mark Pilsworth and Eva Stejskal at different times on a number of research projects.

- 1. SEAGRASS SURVEY:**
Cruise No. 8 of a series of quarterly cruises investigating the spatial and temporal variability of the sea grasses of Torres Strait.
- 2. TROCHUS SURVEY:**
Sampled the trochus habitats of selected reefs of Torres Strait to test the feasibility of using LANDSAT TM imagery to indicate the expected stock size.
- 3. BENTHIC SURVEYS:**
To compare the epibenthic communities of areas closed to trawling with those open to trawling as part of an "effects of trawling project". A video camera, set up inside an underwater housing and mounted to a sled was towed along the bottom simultaneously with a dredge.
- 4. MACKEREL TROLLING:**
Part of previous work in the Torres Strait on the effect of trawling for prawns on the Islander fisheries of Torres Strait. Bamboo poles were fitted to the sides of R.V. SUNBIRD, from which a number of mackerel lines were strung. The aim was to investigate the gut contents to see if mackerels are eating the same fish as caught by prawn trawls. Islanders maintain that the prawn trawls catch the food of mackerel and therefore decrease their catches of mackerel. The data collected will either confirm or deny this.

5. SEDIMENT SAMPLES

A small grab was used to collect bottom samples for Dr Peter Harris of Oceans and Science Department, Sydney University, to check for the presence of heavy metals from the outflow of the Fly River relating to the mining at Ok Tedi.

DR BRUCE BOWDEN, James Cook University, Townsville, (assisted by Tony Carrol, Rocky Denys, Marco Maida, Priscila Leone and Ioana Vasilescu-Bowden), spent four days diving the reefs in the Flora Passage off Cairns. Various marine organisms (e.g. algae, soft corals, gorgonians, sponges, ascidians) were collected for testing for bioactivity - antifungal, anti-bacterial, antitumor etc., and for isolation of active constituents.

DR ROLAND PITCHER, CSIRO, Cleveland, chartered R.V. SUNBIRD for three weeks to support his study of the lobster population in Torres Strait. He was assisted by Tim Skewes and Darren Dennis. The population was surveyed using a predefined sampling strategy which will be repeated in following years. This sampling will provide information on interannual changes in relative abundance particularly of the 1+ year-class which has not yet recruited to the fishery. The sampling will also provide size-frequency information that is not biased by minimum sizes and selection as is the case for size-frequency distribution of the fishery catch. This unbiased size-frequency distribution can provide information on growth and mortality - the fundamental input parameters of fishery models.

MS SUZANNE WILLIAMS, AIMS, Townsville, supported by a dive group of four (Steve Clarke, Glen Docherty, Debbie Bass and Irena Zagorskis) ventured into the far northern section of the Great Barrier Reef for 12 days. Mantle biopsy samples were collected from 3 species of giant clam - *Tridacna gigas*, *T. deisra* and *T. maxima* to be used for electrophoretic analysis. The project, run by Dr John Benzie, is funded in part by ACIAR and is researching the genetics of clam populations along the Great Barrier Reef.

DR HOWARD CHOAT, JCU, Townsville, in conjunction with DR JEFF LEIS, Australian Museum, Sydney, with their assistants Tom Trnski, Brigid Kerrigan, Maria Milicich and Will Oxley chose R.V. SUNBIRD to support their fish larvae studies for 13 days at Holmes Reef in the Coral Sea. Dr

Choat's group collected fish larvae by purse seining from a tender while Dr Leis' group towed both bongo nets from the stern at various depths and also a neuston net for collection of fish larvae from the bows of the catamaran without prior surface disturbance.

DR BRUCE MAPSTONE, JCU, Townsville, co-ordinated 4 trips each approximately 17 days, between Cairns and Lizard Island employing a research field party of six to do counts of various fish species and corals on outer reefs and mid-shelf reefs. R.V. SUNBIRD provided 996 SCUBA fills for this operation and those consuming the air were Dr Tony Ayling, Richard Birdsey, Ian Butler, Ian Roderick, Peter Stoutjesdijk, and Rob Van Woesik.

R.V. SUNBIRD's cargo carrying capacity was beneficial to DR LEX BROWN, AES, Griffith University, in putting his party of six on site at Lizard Island from Cairns with much field and sound recording equipment.

Publications

The following publications for 1989-90 have resulted from field work using R.V. SUNBIRD.

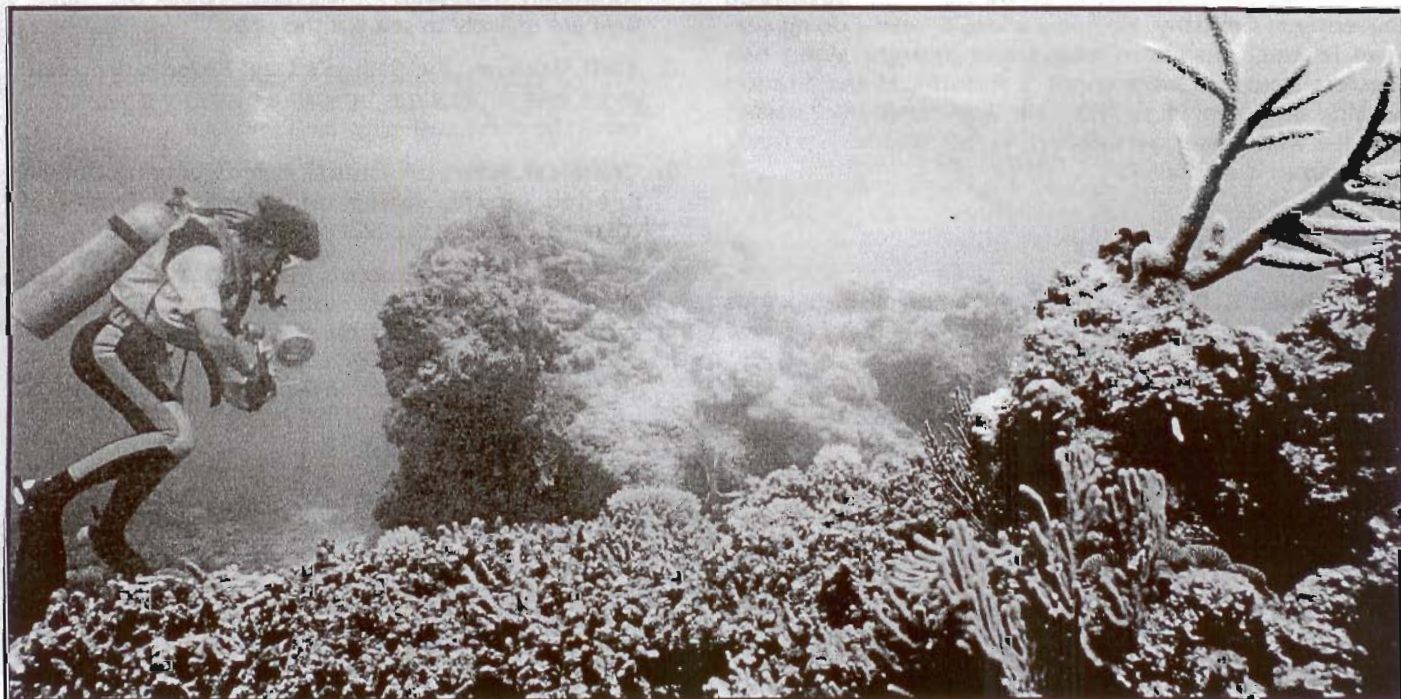
LEIS J M, B GOLDMAN and S E READER, 1989.
Epibenthic fish larvae in the Great Barrier Reef Lagoon near Lizard Island, Australia.
Japanese Journal of Ichthyology 35(4):428-433.

LEIS J M and T TRNSKI, 1989.
The larvae of Indo Pacific shore fishes.
NSW University Press 371 pp

LEIS J M 1989
Larval biology of butterfly fishes (Pisces Chaetodontidae): what do we really know?

Environmental Biology of Fishes 25(1):87-100.

LONG B G, I R POINER and A N M HARRIS.
A method of estimating the standing stock of *Trochus niloticus* using Landsat - T M Satellite data: application to the *Trochus* resources of the Bourke Islands, Torres Strait, Australia.
In press, *Marine Biology*.



Support for the Station



Lizard Island Reef Research Foundation

The Foundation was formed in 1978. It exists to gain financial support for the Lizard Island Research Station. In particular, the Trustees of the Foundation work toward introducing business, science and community leaders to the Station with a view to having them make a contribution.

Since its inception the Foundation has raised a total of \$950,000. This year we will break the \$1 million.

The Foundation also seeks to introduce the Station to the broader community. It tries to involve everyone who has a commitment to the wise management of the Great Barrier Reef. This is done through mailings, advertisements, and articles in magazines such as Australian Natural History.

The Trustees of the Foundation are particularly grateful for the continued support from the Slade family of Mona Vale, the Ballantynes from Whitfield in Queensland, and to Mr and Mrs Tieman. Thanks also go to Dr Dieter Meischner. Dr Meischner is Professor of Geology at Gottingen University in Germany. He spent some 6 weeks doing sea-level research on Lizard Island and brought along two Masters students who spent 3 months at the Station working on a related project. He was extremely satisfied with the work done. So satisfied, in fact, that he has made a substantial cash donation.

A New Wet Lab

The Raymond E. Purves Foundation has made a generous contribution of \$20,000 toward the construction of a new wet lab.

This will be a boon to researchers. It will provide more lab space and a safer working environment. There is also the opportunity to use the lab as a teaching facility, particularly for students from James Cook University.

Quotes are currently being sought for the construction of the "Raymond E. Purves Marine Laboratory".

In-Kind Donations

The following organisations have made non-monetary donations or offered discounts for their services to the station during the year. Their assistance is sincerely appreciated.

Lizard Island Lodge; Australian Regional Airlines; Ansett Airlines; Australian Airlines; Qantas; MV "Noel Buxton"; MV "Queen of the Isles"; Park Royal Hotel, Cairns; Rodeway Granada Hotel, Cairns; Pacific International Hotel, Cairns.

Priority Projects

These are the current fundraising priorities:

1. **Dive compressors:** New regulations and outdated equipment make 2 new Bauer dive compressors essential.
2. **Outboard motors:** The Station needs a total of 12 outboards. Currently there are only 10, and of these, 3 need replacing.
3. **Boats:** 4.6 metre aluminium dinghies are the most commonly used boat for research. Two of the Station's fleet are unlikely to see out the year.
4. **4WD Vehicle:** The Station's Land Rover is demanding more and more time in maintenance and repairs. It would be more cost-effective to replace it.
5. **Chemical Store:** A central, safe, storage location is needed for the variety of hazardous, flammable chemicals used at the Station.
6. **Housing Refurbishment:** The demands of several hundred researchers annually on the limited accommodation means there is a need for major work on the houses.

Help!

Your support will help to ensure the future of this vital research facility.

Please respond today by completing this coupon.

I wish to make a donation of \$ _____ to the Foundation. Payment is by attached cheque/money order.

Please charge \$ _____ to my Bankcard/Mastercard/Visa No.

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I wish to make a bequest to the Lizard Island Reef Research Foundation. Please send me further information.

Name _____

Address _____

Postcode _____

Send to: Lizard Island Reef Research Foundation
Australian Museum
P.O. Box A285
Sydney NSW 2000 Australia
Telephone (02) 339 8111

DONATIONS WITHIN AUSTRALIA
ARE TAX DEDUCTIBLE