

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

Research Station

NEWSLETTER 91/92



The Trustees of the Lizard Island Reef Research Foundation and everyone connected with the station have pleasure in thanking those organisations and individuals who have provided financial assistance.

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LIZARD ISLAND RESEARCH STATION NEWSLETTER 1991/92



The aquarium is essential for work such as Robyn Cumming's study on corallivorous gastropods. Photo: Lyle Vail

This newsletter covers the period from 1 July 1991 to 30 June 1992.

Please address any queries about the station's facilities to either of the Co-Directors, Dr Lyle Vail and Dr Anne Hoggett at:

Lizard Island Research Station
PMB 37
Cairns Qld 4870
Australia
Phone and fax: (070) 60-3977
International: 61 70 60-3977

*Cover photo: Lexa Grutter catching cleaner wrasse in a fence net.
Photo: Mark A Johnson.*

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About the Station

Situated in the pristine waters of the northern Great Barrier Reef, the Lizard Island Research Station provides housing and research facilities for scientists and educational groups. The station is a facility of the Australian Museum and it supports research into all aspects of the biology, geology, hydrology, history, management and conservation of the Great Barrier Reef. The station's primary aims are to encourage high-quality research leading to an understanding of tropical marine ecosystems and to foster education on that topic.

Staff

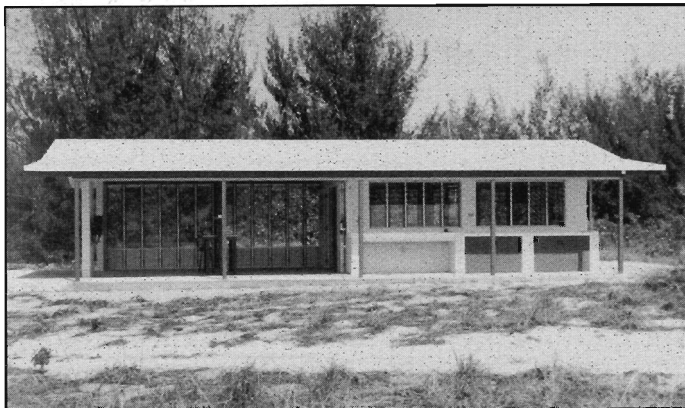
Co-Directors Dr Lyle Vail and Dr Anne Hoggett completed their second challenging year at the station in mid-1992. Lance and Marianne Pearce enter their fifth year as maintenance officers in September 1992. Kellie Hellyer has been on the island since October 1991 as caregiver and teacher to Alex Vail.

Raymond E. Purves Laboratory constructed

A new laboratory building was completed in June 1992. It will be known as the Raymond E. Purves Laboratory in recognition of significant funding provided by the Raymond E. Purves Foundation for the \$70,000 project. Additional funding was provided by the Australian Museum Trust and from a fundraising subsidy paid by the New South Wales Government.

The Raymond E. Purves Laboratory provides 104 square metres of covered work space and has several wet benches supplied with both fresh and salt water. This open, airy building provides an ideal environment for sorting and fixing samples, and will relieve the heavy pressure on existing lab areas used for these purposes. It also provides a lab and meeting area suitable for visiting educational groups; the need for such an area has existed since the station began to accept groups several years ago.

The laboratory was built on a tight budget that did not allow for a special barge to deliver the materials. This was overcome by bringing the materials across from Cairns piece by piece on the fortnightly barge that supplies the Lizard Island Lodge. They then had to be carted across the island to the research station.



*The Raymond E. Purves Laboratory, completed in June 1992.
Photo: Lyle Vail.*

Accumulating materials took almost a year by this method, and construction eventually began in April 1992. We acknowledge the tremendous support given to us in this operation by the Lizard Island Lodge and the Jardine Shipping Company.

Old laboratory refurbished

The new wet laboratory has allowed some improvements to be made to the station's oldest laboratory. Because the Purves Laboratory is now the place for fixing specimens, the formalin bench on the back verandah of the old lab became unnecessary. A new chest freezer and chest refrigerator have been installed in its place. These appliances were purchased to replace the cold room. This combination is much more energy efficient and flexible than the cold room, and is a great boon when there are large numbers of people at the station. The cold room has been removed from the end room of the old laboratory building, which has been refurbished into lab space for up to three people. The small lab next door has been converted into a much-needed store room.

Donation of diving equipment by Apollo Sports Company

This year, the Apollo Sports Company donated a large amount of high quality snorkelling and scuba gear to the station. This is in line with Apollo's policy of donating a proportion of its profits each year to assist conservation of the marine environment. Lizard Island Research Station was proud to be selected in 1991 and thanks Apollo for its generous donation.

The Apollo equipment is available for hire (see below). There is enough snorkelling gear to outfit groups of up to 20 people. The gear was received in October 1991, and it has already been put to good use.

Item	Daily	Weekly
Mask and snorkel	—	\$10
Fins and boots	—	\$10
Buoyancy compensator	\$10	\$50
Regulator, octopus and gauge	\$10	\$50
Wetsuit	\$10	\$20

New display erected

A grant of \$2,200 from the GBRMPA Reef Education Development Program this year enabled development of a display to provide information about the Reef, its management, the role of research, and the work of the research station. The display has been erected on the lab verandah and is aimed at the large number of tourists who visit the station each year. Many of these tourists are on self-guided tours of the Reef who may miss out on the interpretative material available to people on more formal tours. The new display and accompanying handouts help to fill this gap.

Advertising pays!

A full-colour flyer advertising the station was produced during the year and distributed to scientists and institutions in North America and Australia, and to schools in New South Wales. The level of interest from overseas scientists and from schools was phenomenal. The station's busy season used to be from October to February. As a result of the advertising campaign, the busy season in 1992/93 will be from July to February.

The response was lukewarm from Australian scientists. We think (hope!) that the low level of interest from within Australia is because the station is already well-known by that group.

The flyer will be sent out again in 1992/93 and the mailing list will be expanded to include Europe, Japan and more addresses in North America.

Our Foundation saves the day

The station's venerable LandRover, loved by many, went the way of all good things this year. It was taking too much time and money to keep in running condition and its replacement was a priority. The Lizard Island Reef Research Foundation provided the funds to purchase a new Nissan Patrol wagon. While several die-hards have expressed their disapproval of the smooth ride, comfortable seats and air conditioning, the new vehicle is a necessary and welcome development.

The station's two scuba filling compressors were also replaced this year with funds provided by the Foundation. New compressors were necessary to uphold air quality standards without the expense and inefficiency of extensive overhauls. The new Bauer compressors are of the same size as the fifteen-year-old ones (12 and 7 cubic feet) but they fill at a much faster rate.

Liquid nitrogen must come by barge

Liquid nitrogen can no longer be transported by air between Cairns and Lizard Island due to new regulations. It can be sent by the barge which supplies the island every two weeks.

Future developments

A plan for the next 15 years has been drawn up for development of the station. The plan is for refurbishment and upgrading rather than for massive expansion, so regular users need not be concerned that the station's character will change for the worse. All we need now is the funds!

Tropical Marine Research Network makes ASTEC short-list

In 1991, the Prime Minister commissioned the Australian Science and Technology Council (ASTEC) to report on assessment and funding of major national research facilities. The Lizard Island Research Station submitted a proposal along with the other three island research stations on the Great Barrier Reef, James Cook University and the Australian Institute of Marine Science. The total cost of the proposal put forward by this Tropical Marine Research Network is \$20.7 million.

In May 1992, ASTEC identified seven facilities likely to be developed in the next 5-10 years at a cost of \$40 million per year.

The Tropical Marine Research Network is included in the seven. Funding has not been allocated to any of the Facilities yet, but having gone to the expense of commissioning the study, it is to be expected that the government will heed ASTEC's recommendations to some extent.

Diving update

During the year, 2,380 scuba dives were logged, representing over 1,818 hours underwater.

The following regulations came into effect in November 1991.

Qualifications:

To qualify as a scuba diver at the station, a person must be at least 18 years old and present the following items:

- a diving certification card
- a log book validating experience of at least 900 minutes underwater
- a medical certificate dated within the past 12 months stating that the person is fit to dive
- a completed Lizard Island Research Station diver registration form

A check-out dive may be required for people who have not dived within the last six months; there is a charge for this. Also, there may be some restrictions based on an individual's logged experience. For example, if a person has logged only shallow dives but wants to work at 20 m depth, a series of dives will be planned to work up to the greater depth.

Equipment:

In addition to other standard scuba equipment, the following items must be used:

- submersible pressure gauge
- buoyancy compensator with both oral and scuba-feed inflation
- watch or other submersible time-keeper
- depth gauge

Other requirements

- Dive flag must be flown while diving
- Details of every dive must be entered in the station log daily

Prohibited dives

- Decompression dives (although a safety stop at 5 m for 5 minutes is recommended for all dives deeper than 9 m)
- Dives deeper than 30 m
- Dives less than 24 hours before flying

Dives requiring special approval

- Night dives
- Dives deeper than 20 m
- Any deviation from procedures outlined below

Dive teams

A dive team normally comprises two qualified divers and one competent boat person. Diving can take place without a boat person in the striped area shown below providing that:

- both boat and divers are within the striped area throughout the dive
- both divers agree to dive without a boat person

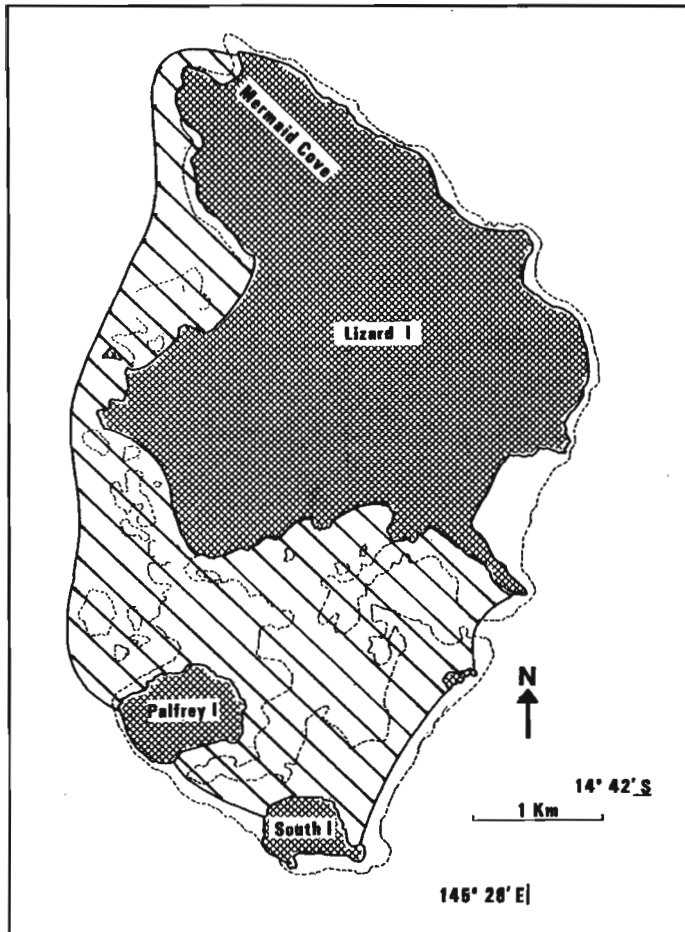
and only while the following specific conditions are met:

1. Maximum depth shall not exceed 15 m
2. Swell and/or wave height shall not exceed 0.5 m
3. Current shall be nil to slight (the diver shall be able to swim into the current easily, with minimum exertion)
4. Underwater visibility shall be greater than 4 m

Two-person dive teams must agree to abort the dive if the conditions 1-4 are exceeded, and must observe the following additional procedures:

- Deploy a 15 m floating, buoyed line from the boat before entering the water
- Check that the anchor is secure immediately upon starting the dive
- Dive only during daylight hours

Two-person dive teams may be allowed to dive outside the striped area around Lizard Island when conditions 1-4 above are met, at the discretion of the co-directors.



Bench fees

From 1 July 1992, bench fees are \$75 per day for a researcher and \$55 per day for an assistant. A more highly subsidised rate is available to postgraduate students working on their own projects: \$29 per day for the student and \$22 per day for an assistant. Attractive rates are offered to groups of school and university students led by their own teachers/lecturers to undertake course work at the station.

For visits longer than 28 consecutive days, a 10% discount applies. These fees will be in force until at least 1 July 1993.

Where to stay in Cairns?

Cairns is a tourism hot-spot with a wide variety of accommodation. The Cairns Tourist Information Centre can assist in choosing and booking accommodation and tours (GPO Box 7208, Cairns, Qld. 4870; phone 070 31-1751; fax 070 51-9682).

We recommend the Cascade Gardens (179 Lake Street, Cairns, Qld 4870; phone 070 51-3000) for moderately-priced

accommodation with good facilities situated close to the city centre. The studio apartments have either two single beds or a double bed, a bathroom, a well-equipped kitchen, phone, television, washing machine and dryer. Suites are also available, with a separate bedroom and a sitting room with two divan beds. There is a small pool and outdoor area. The Cascade Gardens offers its stand-by rate to researchers at the station on a space-available basis: \$70 per night for a studio apartment from 21 October to 31 May and \$88 from 1 June to 20 October (the normal rates are \$88 and \$96 respectively). Please tell them that you are a Lizard Island researcher and confirm the price when booking.

Visitor statistics

	1990/91	1991/92
Projects	36	48
Australian scientists and assistants	20	31
Aust. postgraduates and assistants	27	29
Foreign scientists and assistants	21	36
Foreign postgraduates and assistants	10	20
TOTAL research personnel	78	116
Educational group members	38	41
Volunteers	24	23
Commercial users	23	1
Other visitors	46	36
TOTAL number of visitors	209	217
Average number of:		
Researchers & educational users per day	5.2	8.5
All visitors per day	8.1	9.6
Average research visit duration (days)	24.5	14.1

Volunteer program

The station greatly values its volunteers. The work of volunteers is supervised by maintenance staff and includes activities such as painting, cleaning, digging and unloading supplies. Work of a scientific nature is usually not available. During their time off from station duties, volunteers may assist visiting researchers by mutual agreement.

In return for four hours work per day, the station provides accommodation free of charge. Volunteers must pay their own travel expenses and arrange their own food supplies. Volunteers do not have the use of boats although they may go out with visiting researchers by mutual agreement.

Space at the station cannot be committed to volunteers for more than two weeks initially. If a longer visit is desired, extension beyond two weeks will depend upon work performance and availability of space. Because researchers have priority, bookings for volunteers cannot be confirmed until about six weeks before the beginning of the proposed visit. Opportunities for volunteer work are most likely to occur between March and June.

This year, 23 volunteers carried out a great deal of work at the station. Our thanks go to: Margaret Airey, Peter Airey, Peggy Nelson, Betty Speechley, John Davies, Lyn Davies, Kirsten Michalek, Tina Goh, Ken Goh, Maria Eriksson, Uli Salzman,

Maria Eggerup, Thomas Leya, Burkhard Baschek, Scott Winspear, Janelle Hatherley, Bertrand Plouffe, Angela Gürlich, Christoph Kolb, Evizel Seymour, Lynda Axe, Justin Grubich and Glen Wittick.

Special thanks are due to Charlie Makrae, a first aid instructor from Cairns. Charlie donated his time to conduct courses in basic first aid and diving first aid for the four station staff members. He was accompanied by his wife, Jackie.

Tours

Guests of the Lizard Island Lodge visit the station every Monday and Friday for a tour of the station. Passengers of the

Cairns-based tourist ships "Queen of the Isles" and "Reef Escape" also visited regularly during the year. Two international cruise ships ("Sea Goddess II" and "Aurora") were in the northern Barrier Reef for several months, and large numbers of their passengers visited the station. Itinerant visitors such as campers and yachties are also welcome at the station.

Special guests of the station during 1991/92 were two groups of National Trust members; Lizard Island Reef Research Foundation Trustee, Kenneth Coles, and his wife, Rowena Danziger; and Dr Teruhisa Noguchi and Dr Tadashi Kanai of Suntory Limited.

A total of 1,725 tourists visited the station during 1991/92, an increase of about 42% on last year's figure.

Support for Research

Lizard Island Doctoral Fellowship

This fellowship, now in its ninth year, is funded by the Lizard Island Reef Research Foundation and the Australian Museum. Valued at \$14,500 over three years, the fellowship covers bench fees at the station as well as some travel and equipment. This highly sought-after fellowship is open to PhD candidates conducting significant long-term field studies in a scientific discipline relevant to the Great Barrier Reef. Applications for the 1993 fellowship close on 31 October 1992. For more information, see page 14 of this newsletter.

The 1992 doctoral fellowship was awarded to Vicki Nelson (Marine Biology, James Cook University) for her work on the demography of reef crest corals. Reef crest areas are dominated by fast growing corals but, paradoxically, the reef itself grows only slowly in this region. Parrotfishes erode living corals as they eat and they are found in the greatest densities on the reef crest and flat. Vicki is testing the hypothesis that the reef crest is an area of rapid turnover; that is, that there is a high rate of both growth and destruction of corals. She is monitoring particular

marked areas of corals on reef crests around Lizard Island to find out the fate of individual colonies. Her work will provide valuable information on coral reef dynamics.

Alison Green (1991 doctoral fellow) and Campbell Davies (1990 doctoral fellow), both of James Cook University, continued their field work at Lizard Island during the past year. Mark McCormick (1989 doctoral fellow) will submit his thesis by the end of 1992. Dr Kendall Clements (1988 doctoral fellow) now has a postdoctoral research fellowship at the University of Sydney.

Lizard Island Travel Fellowship

New sponsors for the Lizard Island travel fellowships are United Airlines, Australian Airlines and the Lizard Island Reef Research Foundation. The first two fellowships will be awarded for travel to Lizard Island in late 1992. Applications for the 1993 fellowships close on 31 October 1992. Detailed information on the travel fellowships is on page 15 of this newsletter.

Issues

New Cairns Section zoning plan

The zoning plan for the Cairns Section of the Great Barrier Reef Marine Park has been reviewed and amended; the new plan came into effect in March 1992. Several significant changes have been made to the zoning around Lizard Island. Most are improvements from the research station's point-of-view.

There is now a transect of National Park Zone reefs across the shelf in the Lizard Island region. The National Park Zone replaces the Marine National Park B Zone of the old plan. This is a "look but don't take or interfere" zone, except that research can take place under permit. National Park Zone areas in this region include a large section of the coast near the Starke River, the Turtle Group, Nymph Island, Eyrie Reef, a large part of Lizard Island Reef (including a new section in Watson's Bay), MacGillivray's Reef, South Direction Island, Rocky Islets, No Name Reef, and the northern end of Number 10 Ribbon Reef. The large increase in the number of National Park Zone reefs in the Lizard Island area is an excellent change as long as permits continue to be issued for research.

Buffer Zones continue to surround most National Park Zone reefs. Trolling for pelagic fish is the only extractive activity allowed in these zones; bottom fishing is not allowed.

The Conservation Park Zone replaces the Marine National Park A Zone of the old plan. The only Conservation Park Zone that remains in the Lizard Island region is around the northern part of Lizard Island itself. Limited line fishing and trolling are allowed but spearfishing remains prohibited in this zone at Lizard Island.

The major backwards step in this plan is the demise of the Research Zone and a weakening of the Preservation Zone. Research Zone areas in the old plan were kept purely for research use; access was denied to people other than researchers with a permit. Preservation Zone areas in the old plan were just that: access was denied to everyone. Carter Reef was a Research Zone in the old plan and it is now a Preservation Zone. The research station and others lobbied to keep Carter Reef as a Research Zone, citing the body of information that has been built up for it over the years and its relative accessibility from the research station. GBRMPA's response was that research that could not be done elsewhere would continue to be permitted at Carter Reef. In the research station's view, this seriously undermines the concept of the Preservation Zone while providing inadequate access to this reef for research purposes.

Another change in the new plan is that research permits are now no longer required for activities that are allowed in certain zones. For example, under the old plan, a permit would have been required for a research project that obtained samples by line fishing within the Marine National Park A Zone (where recreational fishing is allowed anyway). Under the new plan, a permit is not required for this activity. This sensible amendment to the plan will save a lot of paper-pushing. Detailed information packs (\$10 plus postage) and a large zoning map (\$5 plus postage; this map is included in the information pack) on the new Cairns Section Zoning Plan are available from the station.

The changing usage of Lizard Island

The face of Lizard Island is changing. This is because of steadily increasing human usage which is due mainly to the tourism boom in north Queensland.

Ten years ago: the research station had four residents and up to 16 visitors; the Lodge had about half the number of staff and guests that it has at present; camping was minimal; and the only boats to visit were marlin boats during the short season, itinerant fishing vessels, and a small number of private yachts. Now: the research station has increased its capacity by 8; the Lodge has about 40 staff and up to 60 guests; camping is still kept at a low level, but the campground is full more often; during the marlin season there are at least 100 more people; and the increase in usage by short-term visitors is phenomenal.

At least five commercial tourist boats visit Lizard Island weekly, bringing a total of about 200 people. There are weekly light aircraft flights from Cairns bringing up to 15 day visitors. One or more luxury ocean liners visit the northern Barrier Reef for several months each year, stopping at Lizard Island several times and each time bringing a new complement of about 200 passengers. The increase in yacht traffic using Lizard Island has been huge. Most of this activity is centred on the anchorage in Watson's Bay. This upsets campers' realisation of their expectation of a wilderness experience and puts strain on the freshwater supply at the campground. Several tour boats are now spending time in Mermaid Cove, as well as at Watson's Bay, so that their passengers can have the sought-after "wilderness experience".

Lizard Island is in danger of being loved to death. Most people who visit the island want to come here because it is remote and wild. This aspect of its appeal is diminished by the fact that so many people are now able to visit.

The impact of this influx of people on the environment has not been determined adequately. Damage by repeated anchoring of large boats is probably occurring, particularly in Mermaid Cove which is littered with bommies. This year, the Queensland Department of Environment and Heritage documented significant damage to a population of rare solitary corals by the anchor chain of a large tour boat in about 20 m depth on a sandy bottom off Watson's Bay. The boat has been instructed to anchor in shallower water to avoid damaging these corals. Seagull populations have increased noticeably over the past few years and this could be a problem because seagulls can displace other species of sea birds. The increase in gull numbers could be due to an increase in food supply caused by the greater number of human visitors. Nutrient levels in the water may be higher than usual when a large number of boats are occupying the anchorages, and this could affect coral reef communities over time.

The Queensland Department of Environment and Heritage is preparing a management plan for the island to address these issues. The research station will contribute to this plan, and the Lodge and other users will also be given the opportunity to provide input.

Research Activities

Projects and participants

(* indicates researcher is a postgraduate student)

Preparation for major geological coring program

Dr Dieter Meischner, assisted by Dr Rudiger Vollbrecht and Dieter Wehmeyer (University of Göttingen, Germany)

Reconnassance for work on Holocene reef growth and past climates

Dr Sandy Tudhope (University of Edinburgh, Scotland)

Taxonomy and biology of sclerosponges

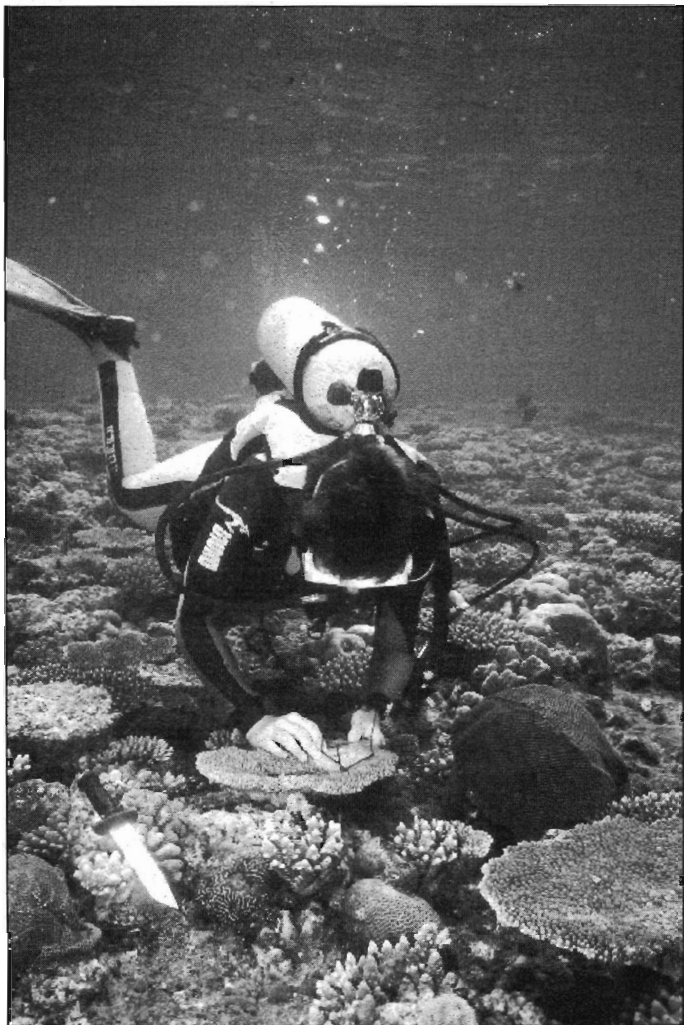
Dr Joachim Reitner and Friedhelm Grothe (Freie University, Germany), assisted by Dorothea Hause-Reitner, Dr Ursula Rehfeld-Kiefer and Gabriele Ulrich

Chemical factors affecting coral settlement

*Mauro Maida (James Cook University, Townsville) assisted by Beatrice Ferreira, Claire Dickinson and Dr John Coll

Demography of reef crest corals

*Vicki Nelson (James Cook University, Townsville) assisted by Guy Smith and James True.



This year's doctoral fellow, Vicki Nelson, at work near the reef crest. Photo: Barbara Musso.

Erosion of coral skeletons

*Barbara Musso (James Cook University, Townsville)

Coral ecology

Dr Terry Hughes (James Cook University, Townsville) assisted by Vicki Hall, Liz Dinsdale and Jackie Wolstenholme

Coral ecology

*Vicki Hall (James Cook University, Townsville) assisted by Jackie Wolstenholme

Ecology of soft corals

*Micaela Hellström (University of Helsinki, Finland) assisted by Dr Vivian Hellström, Guy Smith, Keith Martin-Smith and Evizel Seymour

Spawning, fertilization and early development in hard corals

Dr Andrew Heyward (Adelaide University, Adelaide) assisted by Polly O'Neill

Biology of ostracods

*Patricia Behrens (University of Hamburg, Germany)

Biology and ecology of stomatopods

Dr Thomas Cronin (University of Maryland, USA), Dr Justin Marshall (University of Sussex, England) and Dr Roy Caldwell (University of California Berkeley), accompanied by Michael Caldwell

Biology of symbiotic decapod shrimps

Dr Volker Siegel and Dr Ute Mühlenhardt-Siegel (Seafisheries Research Institute, Germany)

Biology of land crabs

*Karen Diele (University of Würzburg, Germany) assisted by Uli Salzman, Elke Aug and Hanna Reichel

Spider Biology

Dr Fritz Vollrath (Oxford University, England), accompanied by Leslie Scott, Freddie and Digby.

Parasites of crustaceans

Dr Jeff Shields (Purdue University, USA) assisted by Julie Shields and Ingo Ernst and accompanied by Jason Shields.

Ecology of coral-eating gastropods

*Robyn Cumming (James Cook University, Townsville) assisted by Adrian Newton and Emma Hutchison

Cone shell venom studies

*Mike Fainzilber (Hebrew University of Jerusalem, Israel) assisted by Ada Viterbo

Distribution of boring molluscs

Dr Karl Kleeman (Institute for Paleontology, Austria)

Biology of gastropods associated with sponges

*Alexander Nützel (University of Hamburg, Germany)

Sensing of food by nudibranchs

Dr Tony Carroll (James Cook University, Townsville)

Reproductive biology of nudibranchs

Ron Aiken (Mount Alison University, Canada) assisted by Ellen Pickle

Search for juvenile crown-of-thorns starfish

Jon Brodie, Dr William Gladstone, Udo Engelhardt and Martin Robinson (Great Barrier Reef Marine Park Authority, Townsville)

Observations on crown-of-thorns starfish

Dr Erik Rasmussen and Gary Preston (Independent researchers, USA)

Ultrastructure of featherstars

Dagmar Sicks (Anatomical Institute, Germany)

Embryology of the starfish *Linkia laevigata*

Dr Terry Crawford and Dr Bruce Crawford (University of British Columbia, Canada)

Systematics of siganid fishes

Dr Dave Woodland (University of New England, Armidale), Dr Mark Adams (South Australian Museum, Adelaide) and Glen Wilson (James Cook University, Townsville)

Collection of fishes for blood samples and parasites

Prof. Howard Choat (James Cook University, Townsville), Dr Kendall Clements (University of Sydney) assisted by Dr Geoff Jones, Lynda Axe and Marina Hunt

Effect of cyclones on coral reef fish populations and benthic assemblages

Dr Geoff Jones (James Cook University, Townsville) assisted by Dr Ursula Kaly, Dr Neil Andrew, Sally McNeill, Bruce Kilpatrick and Wendy Kilpatrick

Nutritional value of fish mucus

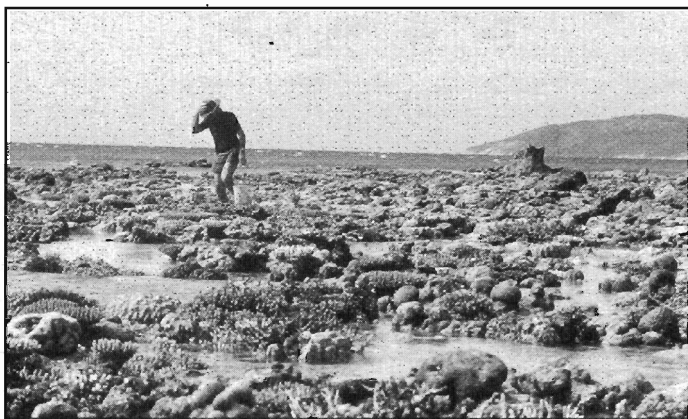
*Lexa Grutter (James Cook University, Townsville) assisted by Mark Johnson

Population structure and movements of large reef fishes

*Campbell Davies (James Cook University, Townsville) assisted by Peter Eaglen, Tony Hart, Jeremy Taylor, Dirk Zeller and Michael Mackie

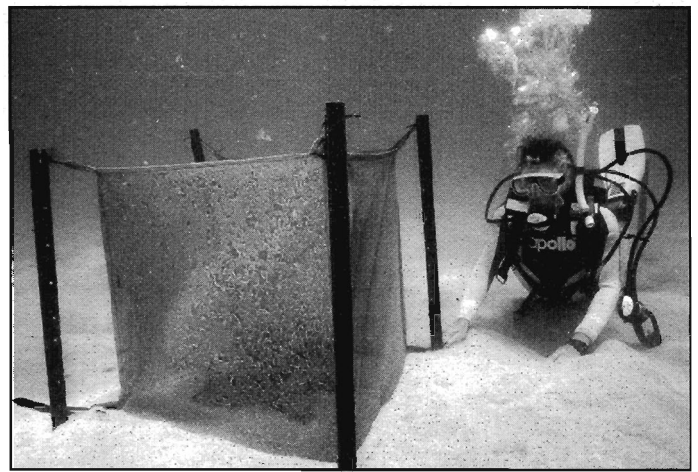
Feeding of coral trout

*Jill St. John (James Cook University, Townsville) assisted by Chris Robb



Jon Brodie searching for juvenile crown-of-thorns starfish at low tide on an outer barrier reef near Lizard Island.

Photo: William Gladstone.



Brigid Kerrigan with a fish cage, part of her field experiment on the consequences of different nutritional regimes on juvenile pomacentrids. Photo: Lyle Vail

Biology of goatfishes

*Mark McCormick (James Cook University, Townsville) assisted by Steve Purcell and Evizel Seymour

Nutritional status of juvenile pomacentrids

*Brigid Kerrigan (James Cook University, Townsville) assisted by Guy Smith, Emma Hutchison and Evizel Seymour

Juvenile coloration in wrasses

*Jeff Mahon (Hawaii Institute of Marine Biology, USA) assisted by Mary Durand

Reproduction and growth of coral trout and spangled emperors

*Beatrice Ferreira (James Cook University, Townsville) assisted by Mauro Maida and Dirk Zeller

Biology, ecology and biogeography of wrasses

*Alison Green (James Cook University, Townsville) assisted by Adrian Newton, Emma Hutchison, Mark Johnson and Justin Grubich

Reef bioerosion; age structure and feeding behaviour of herbivorous fishes

Prof. Howard Choat and Dr. David Bellwood (James Cook University, Townsville) assisted by Lynda Axe, Andrew Lewis, Emma Hutchison and Jenny McIlwain

Feeding and behaviour of herbivorous fishes

Dr Frank Talbot (National Museum of Natural History, USA) assisted by Sue Talbot

Female mate choice and evolution in damselfish

*Roland Knapp (University of California Santa Barbara, USA) accompanied by Sally

Gonad structure, social organisation and reproductive behaviour of gobioid fishes

Dr Kathleen Cole (Bishop University, Canada) assisted by Sally Reader

Sex differentiation in damselfishes

Dr Richard Francis (Stanford University, USA)

Archaeology of Lizard Island

*Robynne Mills (University of Sydney) assisted by Dr Val Attenbrow, Kath Wilkinson and Sharon McLean

Environmental management of Lizard Island

Graeme Gibson (Charles Sturt University, Mitchell)

Observation of marine park management

Meriwether Wilson (East-West Centre, Environment and Policy Institute, USA)

Philosophical basis of reef management

Prof. Denise Russell (University of Sydney) assisted by Hal Pratt

Monitoring seabirds and their stomach contents

Dr Steve Blaber (CSIRO Marine Laboratories, Cleveland) assisted by Dr Geoff Smith and Dr David Milton

Comparison of marine communities

Gary Hickman (US Fish and Wildlife Service) accompanied by Lorraine Thompson and Arlain Hickman

Exploratory visits

- Dr John Bishop (University of Richmond, USA) accompanied by Carol Bishop
- Dr Scott Brady
- Dr Peter Braun (McGill University, Canada)
- Dr Jeff Sewell (Copland College, Canberra)
- Mr Rolf Annerberg (Environmental Protection Agency, Sweden)
- Prof. Dr Hans-Jürgen Behr (University of Göttingen, Germany)
- Dr Nigel Crawford (University of California San Diego, USA) assisted by Cathy Dante
- Marie Demos, Pam Mizzi and Donna Schofield (University of Michigan, USA)
- David Bondi and Sandrine Roustan (Inseel University, France)
- Dr Barbara Bentley (Bodega Marine Laboratory, USA), accompanied by Dr Glenn Prestwich and Jocelyn Bentley-Prestwich.

PUBLICATIONS

This list contains 16 publications based on work carried out at the station that have been added to the station's collection this year. The total number in the collection now stands at 312. All visiting scientists are invited to send two copies of papers resulting from work at the station to be added. Our specialised Lizard Island reprint collection is a valuable resource for other researchers and for visiting educational groups. The number of relatively old papers in the list below indicates that our collection is by no means complete. Lizard Island researchers, please send us your reprints, even old ones! A complete list of contributions is available on request.

Babcock, R.C., G.D. Bull, P.L. Harrison, A.J. Heyward, J.K. Oliver, C.C. Wallace and B.L. Willis, 1986. Synchronous spawnings of 105 scleractinian coral species on the Great Barrier Reef. *Marine Biology* 90:379-394.

Bellwood, D.R. 1985. The functional morphology, systematics and behavioural ecology of parrotfishes (Family Scaridae). PhD thesis, James Cook University, Queensland.

Bellwood, D.R. and J.H. Choat, 1990. A functional analysis of grazing in parrotfishes (Family Scaridae): the ecological implications. *Environmental Biology of Fishes* 28:189-214.

Caley, M.J. 1991. Mechanisms of coexistence in communities of coral reef fishes. PhD thesis, 237 pp.

Chisolm, J.R.M., J.C. Collingwood and E.F. Gill, 1990. A novel in situ respirometer for investigating photosynthesis and calcification in crustose coralline algae. *Journal of Experimental Marine Biology and Ecology* 141:15-29.

Coleman, N. 1976. Aerial respiration of nerites from the north-east coast of Australia. *Australian Journal of Marine and Freshwater Research* 27:455-466.

Dingerkus, G. 1991. Sharks on the Great Barrier Reef. *Tropical Fish Hobbyist* 40:52-76.

Gladstone, W. 1985. Behavioural ecology of the sharpnose pufferfish *Canthigaster valentini* (Bleeker), at Lizard Island, Great Barrier Reef. PhD thesis, Macquarie University, New South Wales.

Hemsley, A.C. 1987. An investigation into *Conus* toxin precursor genes. BSc(Hons) thesis, Griffith University, Queensland.

Holland, N.D., A.B. Leonard and D.L. Meyer, 1991. Digestive mechanics and gluttonous feeding in the feather star *Oligometraserripinna* (Echinodermata: Crinoidea). *Marine Biology* 111:113-119.

Hutchings, P. and C. Glasby, 1986. The Polycirrinae (Polychaeta:Terrellidae) from Australia. *Records of the Australian Museum* 38:319-350.

Kleeman, K.H. 1980. Boring bivalves and their host corals from the Great Barrier Reef. *Journal of Molluscan Studies* 46:13-54.

Mills, R. 1991. Evidence of aboriginal occupation on Lizard Island, North Queensland. Unpublished report to Queensland National Parks and Wildlife Service.

Olson, R.R., R. McPherson and K. Osbourne, 1988. In situ larval culture of crown of thorns starfish, *Acanthaster planci* (L.): effect of chamber size and flushing on larval settlement and morphology. Pp 247-251 in "Proceedings of the Sixth International Echinoderm Conference, Victoria, B.C." (Eds. R.D. Burke, P.V. Mladenov, P. Lambert and R.L. Parsley), Balkema, Rotterdam.

Rudman, W.B. 1990. The Chromodoridae (Opisthobranchia: Mollusca) of the Indo-west Pacific: further species of *Glossodoris* Thorunna and the *Chromodoris aureomarginata* colour group. *Zoological Journal of the Linnean Society*, 100:263-326.

Thorrold, S.R. and M.J. Milicich, 1990. Comparison of larval duration and pre- and post-settlement growth in two species of damselfish, *Chromis atripectoralis* and *Pomacentrus coelestis* (Pisces: Pomacentridae) from the Great Barrier Reef. *Marine Biology*, 105: 375-384.

Educational and Other Activities

Groups

Five members of the German Science Foundation visited Lizard Island in July 1991 as part of a tour of research sites in Australia. Led by geologist Prof. Dieter Meischner, the group comprised: Prof. Werner Buggisch, Dr Wolfgang Eder, Prof. Erik Flügel, Dr Joseph Paul and Prof. Heinrich Zankl.

Several members of the Sydney branch of the World Wide Fund for Nature visited the station in August 1991. These included: Don Henry, Molly Olsen, Richard Morecroft, Dianne Money, Michael Ward, Lynette Thorstensen, Allan Tate and David Freeman.

Senior students from Brigidine College and St Vincent's College (Sydney) undertook a study trip at the research station in October 1991. They were led by teachers David Randall, Michelle Demain and Aileen Gratten-Smith and assisted by Lindy Randall and Paul Demain. The students were: Suki Sproule, Simone Polly, Simone McGonigal, Monique Rennie, Celia Tesoriero, Anna Wood, Joanne McAusland, Naomi McGee, Simone Sadler and Suyin Cavanagh.

Two groups from The Australian Museum Society (Sydney) visited Lizard Island in October 1991, led by Penny and Peter Berents (accompanied by Natalie Berents). The TAMS members were: Margaret McCord, Pat Anderson, Max Fitch, Vera Fitch, Susan Bryant, Andrew Bryant, Anthony Mobbs, Gail Mobbs, Shirley Watkins, Greta Savage, Helen Smith, Leona Greaves, Ian Stevens, Pat Stevens, and David Havercroft.

Other visitors

Several science teachers visited the station during the year to gain an appreciation of the coral reef environment: Canadian exchange teachers Michael Schmierer (with family) and Irena Furlan (with partner), and Patricia Greene-Karl from the United States.

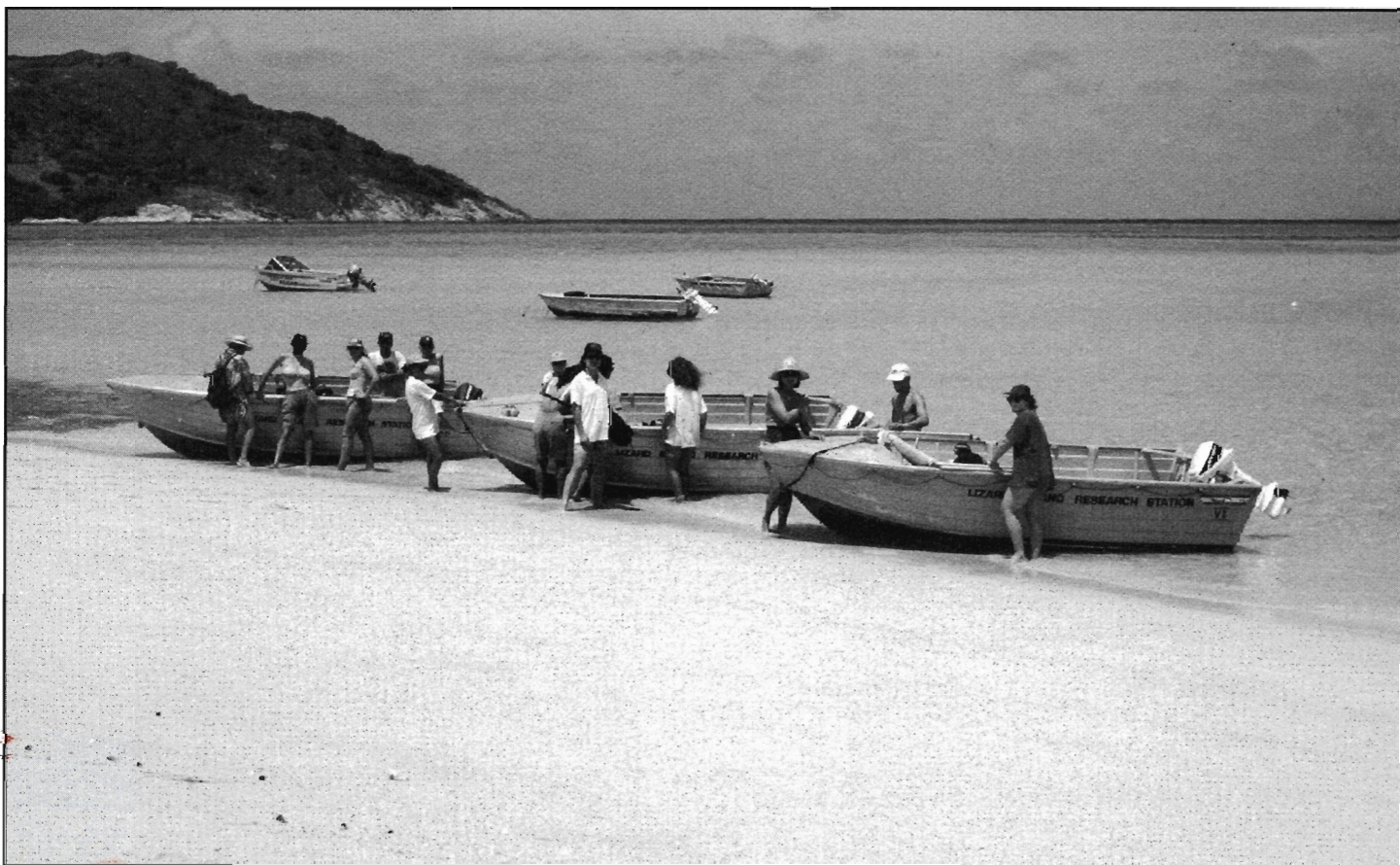
Our federal member of parliament, John Gayler, paid a flying visit to Lizard Island and stayed at the research station. He was accompanied by his wife Mary Gayler and by Jenny Garrett and Mungo McCallum.

Dr Richard Smith, a journalist for the ABC television science program Quantum, visited the station to observe and film the annual coral spawning event.

Helen Twomey (aged 12) from Sydney visited the station as part of a prize awarded by the World Wide Fund for Nature for her poem entitled "To keep the world a better place". Helen was accompanied by her mother, Marie Twomey.

Dr Jeff Leis (Australian Museum) visited the station in his capacity as a member of its management committee.

Supporters who visited during the year were the Hon. Tom Lewis, Glenn Murcutt, Janice Robertson, Marjorie Haworth, the Kelly family (Jim, Trudy, Bryan and Alexander), Frances Green, Dr Ivor McCaw, Dr Paul Featherstone and Yvie Featherstone.



Students and staff from Brigidine College and St Vincent's College prepare for a day on the reef. Photo: Lyle Vail.

R.V. Sunbird

"Oh no, not prawns again!"
"What is Roland doing in there?"

The above memorable quotes from charterers will stay with me, as I reflect on the year spent largely in Torres Strait waters. Prawn trawler operators overwhelmed us with product in response to air fills of their emergency tanks, while the unique locking system on the head door gave others something to worry about. We worried about inadequate charts, dirty water in the north which masked depths (take your pick – anything from 2–30 metres at any time), strong currents and study sites that were not chosen for their anchorages. But it was a successful year and we are proud that R.V. SUNBIRD had the opportunity to support a diverse range of researchers in their quest for knowledge.

[Lois Wilson]

FEATURES AND CHARTER FEES

R.V. SUNBIRD is available for charter by researchers from any institution for work in the Great Barrier Reef waters, Torres Strait and western Coral Sea.

R.V. SUNBIRD is an aluminium motor-sailer catamaran, purpose designed research vessel with accommodation for 6 researchers, a small laboratory below decks and an exceptionally large and stable aft deck to facilitate SCUBA diving operations and trawling using hydraulic winches and A-frame. For full details of usage, 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

PO Box 5955

CAIRNS QLD 4870

Phone: 070 332 889

International: 6170 332 889

Fax: 070 517 683

Seaphone: 22 3000 Call 0108 O.T.C. first to book the call.

Communications are made easy on R.V. SUNBIRD with the installation of an automatic seaphone, and new HF radio with channel scanning facilities available, and VHF hand held radio for mobile activities. A GPS navigation system was also installed and has proven invaluable for repeatability of study sites as well as positioning.

As from July 1st, 1992, fees are \$795 per day for bona fide research activities, and includes use of SCUBA tanks, weights, Zodiac, outboard and fuel. Provisioning costs are \$20 per person per day which includes 3 full meals, snacks and (non-alcoholic) beverages.

RESEARCH ACTIVITIES

Recollection of sponge samples, algae, soft corals, gorgonians and ascidians from the reefs in the Flora Passage off Cairns, for testing for bioactivity (antifungal, anti-bacterial, antitumour, etc.) and for isolation of active constituents. (Author's Note: I look forward to the day when an effective replacement is discovered for TBT in antifouling paints. The industry needs your help as today's products are sadly lacking.)

Dr Bruce Bowden, James Cook University, Townsville, Qld., assisted by Tony Carroll, Rocky Denys, Priscilla Leone, Lu Yalin and Maritza Oliveira.

Recollection of a special sponge from South Ledge Reef, which had shown activity in the National Cancer Institute's anti-cancer and anti-AIDS screen. The trip was an unqualified success with the sponge being easily located and recollected, and some survey work being undertaken to establish distribution and abundance of the organism.

Dr Peter Murphy, Dr Martin Riddle, AIMS, Townsville, Qld. Mr Suraphol Puicharecon, visiting investigator from Thailand. Russell Kell, Peter Illidge and Elizabeth Evans, scientists/divers, the latter two now based in Torres Strait.

A collection of sediment samples, water samples and "boomer" seismic data from northern Torres Strait along the southern coast of Papua New Guinea in September, 1991. The cruise had several aims, the major ones being to determine the fate of Fly River sediment and the geological history of Torres Strait. A significant portion of the cruise was carried out in uncharted waters with strong tidal currents and demanded skillful navigation and seamanship on the part of R.V. SUNBIRD's crew. One interesting result of the seismic survey was the finding that fluvial processes were restricted to northern Torres Strait during Pleistocene lower sea level stands. These older river channels still exist and could provide a shipping channel along the southern coast of Papua New Guinea linking the Coral and Arafura Seas. Biological specimens, sediment and water samples will be analysed at Sydney University to determine geochemical parameters and water turbidity. Funding for the project was provided by the Department of Defense and Sydney University.

A research team from Sydney University's Ocean Sciences Institute: Drs Peter Harris, Jock Keene, Phillip Gibbs, Alison Cole, Elaine Baker and David Mitchell.

The Torres Strait Baseline Study Scientific Programme was instigated in response to concerns about the possible effects of mining developments, particularly those within the Fly River catchment of Papua New Guinea. Water, sediment and biota samples were collected from all corners of the Strait to establish existing levels of trace metals, and to provide the basis for an ongoing monitoring programme for trace metal levels and their effects within the Torres Strait.

Cruise No.1, October 1991.

Dr David Laurence, GBRMPA, Townsville, Qld. Co-ordinator. Ian Dight, Scientific Advisor.

Scientists/Divers: Libby Evans, Jamie Oliver, Terry Walker, Steve Hillman, Anita Smyth, Bill Gladstone, John Brodie, Paul Bikaniaks, Christine Schweizer, Udo Engelhardt, Clive Cook and Lea Scherl.

Cruise No.2, April 1992.

Dr David Laurence, as above.

Dr Bill Gladstone, GBRMPA, Townsville, Qld. Scientific Advisor. Scientist/Divers: Libby Evans, Peter Illidge, Rick Schneider, Ray Berkelmans, Dennis Lee Sye, Paul Hough, Chris Thomas and Allan McManus.

Raine Island Corporation's sponsored charter in association with GBRMPA's Torres Strait Heavy Metal Baseline Study. Programme of activities involved photographing beach rock and sand accretion on behalf of Dr Mike Gomlay, University of Queensland; the foundations of the beacon on behalf of the Scientific Advisory Committee of the Corporation; the Seabirds (Brown, Red-footed Boobies, Red-tailed tropic bird, Bridled and Sooty Terns, Common Noddy, Lesser Frigatebird) and a northwest to southeast profile of the island for the Corporation's slide library. A preliminary study investigating the response behaviour of nesting seabirds to disturbance by human activity was undertaken.

Anita Smyth, Raine Island Corporation, Brisbane, Qld.

Effects of Fishing on the Great Barrier Reef, Cairns Section, sponsored by GBRMPA. Coral trout counts were undertaken on twelve of these reefs while swimming along transects at each end and middle of the reefs, front and back, i.e. 6 transects per reef.

Dr Tony Ayling, Sea Research, Daintree, North Qld.
Diver Assistants: Cathy Bone and Warren Nott.

Dredging for sponge and sediment samples on the eastern side of the Great Barrier Reef in the vicinity of Lizard Island. Records of such transects were made on video tape and depth sounder. Dives in search of sponges in more cryptic habitats in shallower reef areas were also undertaken.

Dr Joachim Reitner, Freie Universitat, Berlin.
Scientists/Divers: Friedhelm Grothe, Joachim Reitner, Ursula Relifield-Kiefes.

The Tropical Rock Lobster Project; a repeat performance of 1991's Torres Strait Rock Lobster population survey. The GPS navigation system ensures the same 50 randomly chosen study sites were

again targeted for comparative analysis. Additional data was collected from the south eastern reefs, as the "A" team dived over a 50 sq.n.m. grid pattern looking at bottom environments and for post-larval lobsters. Dawn dives were also part of the programme in a bid to collect stomach and gut contents before digestion.

Dr Roland Pitcher, CSIRO Fisheries, Cleveland, Qld.
Scientists/Divers: Tim Skewes and Darren Dennis, as above.

R.V. SUNBIRD and her crew were host to a special visitor in November, 1991 – Dr Teruhisa Noguchi, Senior Managing Director of Suntory Limited, Pharmaceutical Division, Tokyo. Dr Noguchi was responsible for directing significant funding from his company for the building of R.V. SUNBIRD, after a visit to Lizard Island Research Station in October, 1979. He says, "Now, 12 years have passed and I am very much impressed to see my dream, the Sunbird, in excellent operation. I set a model of Sunbird in my room in my institute, so that I will always keep it in my mind."

We thank Dr Noguchi for his vision.

Our condolences go to the friends and family of Terry Walker, National Parks and Wildlife, Townsville, who was lost in the Gulf of Carpentaria.

PUBLICATIONS

Harris, P.T. and E.K. Baker, A.R. Cole and J.B. Keene. Dec 1991. Final Report: Sandwave Movement, Currents and Sedimentation in Torres Strait, including results obtained during a cruise of R.V. SUNBIRD in Sept 1991.
Ocean Sciences Institute, University of Sydney, Report No. 47.



Station co-Director, Anne Hoggett, shows reef organisms to special guests Teruhisa Noguchi and Tadashi Kanai. Photo: Lyle Vail.

Support for the Station

Lizard Island Reef Research Foundation

The Lizard Island Reef Research Foundation is an independent trust established to raise funds for the station and to support research on the Great Barrier Reef. The foundation funds capital developments at the station and directly funds research through the Lizard Island Doctoral Fellowship. In 1992/93, the foundation will also contribute towards the Lizard Island Travel Fellowship. Since its inception in 1978, the foundation has raised over one million dollars to facilitate research on the Great Barrier Reef.

Trustees of the Lizard Island Reef Research Foundation in 1991/92 are as follows:

Mr James Creer (Chairman)
Mr Andrew Green (Secretary and Treasurer)
Mr John Barraclough, AM
Mr George Bennett
Lord Catto of Cairncatto
Mr Kenneth Coles, AM
Dr Desmond Griffin, AM
Mr Raymond Kirby
The Hon. John Moore, MP
The Hon. Peter Phillips, AM
Sir John Proud, BE, Hon DEng, FIMM
Mr Robert Purves
Mr Charles Warman
Mr Brian Wiesener
Mr Robyn Williams, AM, Hon DSc

This year, developments enabled by the foundation include a new four-wheel-drive vehicle, two new scuba filling compressors, and the Raymond E. Purves Laboratory. The majority of funding for the new laboratory was obtained from the Raymond E. Purves Foundation and the remainder was made up of numerous monetary donations, both large and small. The Lizard Island Reef Research Foundation thanks all its contributors.

The foundation will be working closely with the station to realise the Stage III development plan that was drawn up this year detailing improvements to be made over the next 15 years.

\$80,000 needed in 1992/93

The foundation must raise at least \$80,000 in 1992/93 to meet the station's most urgent needs for capital expenditure and to meet its own commitments to the Lizard Island Doctoral Fellowship and Travel Fellowship. Foundation funds will be used in 1992/93 to:

- support research by three doctoral fellows
- contribute towards two international travel fellowships
- purchase new outboard motors
- replace solar hot water systems
- replace kitchen cabinets in a visitors' house
- purchase a new computer
- replace old stoves and a refrigerator
- purchase a new microscope light
- carry out major work on the Condor Cat and some dinghies

Fund-raising priorities

The station's Stage III development plan lists six projects in its first set of priorities: sponsorship is required for all of them. The projects and some of the items required are:

- Acquire environmental monitoring systems
- automatic weather station
 - underwater data loggers

- Upgrade research equipment
- dissecting microscopes and lights
 - audiovisual equipment
 - image analysis system
 - spectrophotometer
 - computer facilities
 - uninterruptible power supply
 - glassware

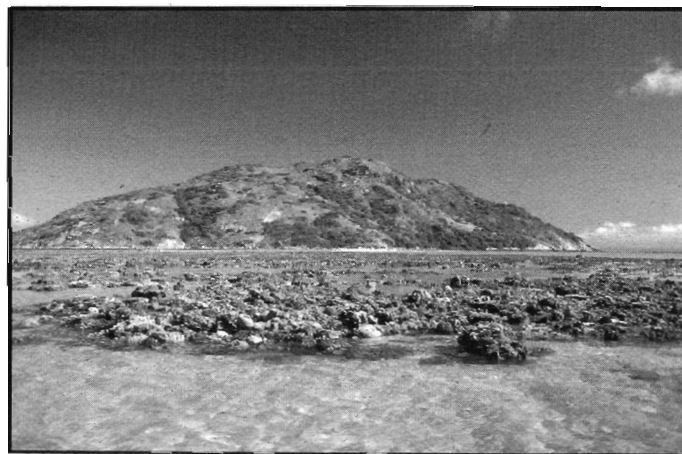
- Acquire field equipment
- 4.3 metre aluminium dinghy
 - video cameras with underwater housings and lights
 - portable global positioning navigation system

Replace and expand saltwater aquarium facilities

Extend Kirby, Suntory and Loomis houses

Upgrade power generating equipment

The most urgent requirements are for a new 4.3 m aluminium dinghy and for dissecting microscopes and light sources. A new dinghy is desperately needed to replace one that is about 15 years old and is no longer safe, and additional microscopes are needed because increasing usage of the station is stretching the existing microscope facility to the limit.



Palfrey Island from the lagoon at low tide. Photo: Anne Hoggett.

**LIZARD ISLAND RESEARCH STATION
GREAT BARRIER REEF, AUSTRALIA**

Doctoral Fellowship 1993

The Australian Museum, in conjunction with the Lizard Island Reef Research Foundation is offering a three-year fellowship to a PhD student to support field work on the Great Barrier Reef, based at Lizard Island Research Station. The inaugural fellowships were awarded in March 1984.

The Fellowship is available to any student enrolled, or about to enrol, in a PhD program. It is expected that the recipient will carry out significant long-term field studies in a scientific discipline relevant to the Great Barrier Reef.

The Fellowship includes two return air fares from the participant's university to Lizard Island, bench fees and accommodation at the Lizard Island Research Station for approximately four months per annum for a maximum of three years. A limited amount of money is also available for equipment. The total value of the Fellowship \$A14,500 (\$4,833 per annum for three years), and is not available for living expenses or salary.

The Australian Museum established the Research Station at Lizard Island on the northern part of the Great Barrier Reef in 1972. The Station supports research into all aspects of the biology, geology and hydrology of coral reef ecosystems. Air-conditioned laboratory space, boats, diving equipment, running sea-water aquaria and self-contained accommodation units are available. A 14 metre motor/sailing catamaran, RV Sunbird, carrying up to six scientists and giving access to all of the northern Great Barrier Reef, is operated in association with the station.

Lizard Island is 27 km off the coast of Queensland and 240 km north of Cairns. Transport from the mainland is by daily commercial aircraft.

CONDITIONS OF AWARD

The applicant must either be in receipt of a scholarship or provide documentation showing that living expenses will be covered during the proposed tenure of the scholarship. An overseas student may wish to apply for a Fellowship for only one year in order to obtain comparative data with other geographical regions; this would be acceptable provided that the data from Lizard Island contributes significantly to our understanding of the Great Barrier Reef.

INFORMATION

For further details regarding research facilities at Lizard Island, etc., please contact The Co-Directors, Lizard Island Research Station, PMB 37, Cairns, Qld., 4871. Phone no. (070) 603-977. For information about the grant please contact Amanda Egan, Australian Museum, PO Box A285, Sydney, N.S.W., 2000. Phone no. (02) 339 8118, Fax no. (02) 339 8304.

Fellows will be required to make a progress report at the end of each year of the grant.

APPLICATION

A research proposal clearly setting out: (1) aims, (2) methodology, (3) budget, (4) name of supervisor, and a referee who may be contacted regarding the application, (5) summary of the applicant's academic record and achievements, (6) significance of research to the Great Barrier Reef, (7) personal Curriculum Vitae and (8) a letter approving the project from the head of the university's department where the applicant would be enrolled, must be sent to the Museum. Overseas students should include a letter from their supervisor indicating the acceptability of overseas field work to the program at that particular university and how closely involved the supervisor will be with the project.

CLOSING DATE: 15 OCTOBER, 1992

Six copies of the application should be sent to:

Attention: Amanda Egan

LIRS Fellowships
Australian Museum
PO Box A285
SYDNEY SOUTH NSW 2000
AUSTRALIA

**australian
museum**
6-8 COLLEGE ST · SYDNEY 2000 · TEL (02) 3398111

**LIZARD ISLAND RESEARCH STATION
GREAT BARRIER REEF, AUSTRALIA**

Travel Fellowships 1992 & 1993

Coral reef scientists are invited to apply for travel assistance to conduct management oriented research on the Great Barrier Reef, based at the Lizard Island Research Station. The location and facilities of the research station are outlined in the accompanying brochure. Two fellowships are offered in 1992 and two more may be offered in 1993.

Each fellowship comprises return economy air travel for one person between any port served by United Airlines in the USA and Cairns, Australia.

CONDITIONS OF AWARD

Applicants must be prepared to meet additional costs involved in the trip, including air travel between Cairns and Lizard Island (approximately US\$225), bench fees payable at the research station (approximately US\$60 per day), and food costs (up to US\$10 per day). A visa is required for travel to Australia and this is the responsibility of the successful applicant. Fellowship recipients must spend at least 21 days at Lizard Island carrying out the research program outlined in the application. Outward travel for the 1992 fellowships must begin before 31 December 1992; for the 1993 fellowships, outward travel must begin before 30 September 1993. An article on the research program with colour transparencies, suitable for publication in an airline magazine, must be submitted within six months of leaving Lizard Island.

APPLICATION

Applications should be or four pages or less, comprising a brief research proposal and curriculum vitae. The proposal should outline the aims, methodology and significance of the work to management of coral reefs. The preferred timing of the field work should also be stated. The curriculum vitae should emphasise experience and publications that demonstrate the applicant's ability to carry out and publish the proposed research. Please also include the name of two referees, and their facsimile number, who may be contacted regarding the application. The proposals will be subject to peer review. Selection is based on the relevance of the proposed research to coral reef management issues and on the demonstrated ability of the researcher to carry out the proposal.

CLOSING DATES:
1992 FELLOWSHIPS, 15 JUNE 1992
1993 FELLOWSHIPS (SUBJECT TO FUNDING), 31 OCTOBER 1992

Three copies of the application, and any inquiries should be sent to:

The Co-Directors
Lizard Island Research Station
PMB 37, Cairns QLD 4870
AUSTRALIA

Proudly sponsored by:



and the Lizard Island Research Foundation



6-8, COLLEGE ST · SYDNEY 2000 · TEL (02) 339 8111

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

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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

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