

LIZARD ISLAND RESEARCH STATION  
NEWSLETTER 1992 / 1993



AUSTRALIAN MUSEUM

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*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.*

*This newsletter covers the period from  
1 July 1992 to 30 June 1993.*

*Please address any queries about the Station  
to the 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

## *Our Mission*

IS TO INCREASE UNDERSTANDING OF THE GREAT BARRIER REEF BY FOSTERING HIGH QUALITY SCIENTIFIC RESEARCH. PROVIDING SUPERIOR RESEARCH FACILITIES IS CENTRAL TO THE ACHIEVEMENT OF THE MISSION.



### *Biological superlatives abound at Lizard Island*

*Recent work at Lizard Island has discovered the world's oldest living animal*

.....

Dr Joachim Reitner and PhD student Friedhelm Grothe of the Freie University in Berlin have been studying the fauna of underwater caves at Lizard Island and on the nearby outer barrier reefs for several years. Their particular interest is the sclerosponges, or stony sponges, which are restricted to this specialised habitat.

Joachim, a paleontologist, has researched fossil sclerosponges in Lower Cretaceous reefs of northern Spain for many years. Turning to modern reefs for comparison and for information on the biology of sclerosponges, Joachim and Friedhelm have found that the modern sclerosponges on the Great Barrier Reef are almost identical to 120 million year old fossils in Spain.

Living specimens collected from the Lizard Island area have been aged using carbon 14 and electron resonance spinning techniques: one specimen 20 cm in diameter was aged at 3,000 years, making it a candidate for the world's oldest living organism.

However, a specimen collected in their most recent field trip in March 1993 was even larger and thus presumably older. Sclerosponges exhibit concentric banding within their skeletons. The cause of the banding is unknown but is probably related to water chemistry, so sclerosponges may contain a long-term record of changes in seawater chemistry.

### *... and the world's largest bacterium*

While engaged in PhD research at Lizard Island on the gut micro-organisms of surgeonfishes, Dr Kendall Clements found a large (0.5 mm long) unicellular organism without a nucleus.

He considered that it was a bacterium, despite its relatively enormous size; it is thousands of times larger than most prokaryotes. The organism had been found previously in surgeonfishes from the Red Sea, but had been interpreted as a eukaryote because of its size. Studies of the organism's genetic material, however, showed that the giant cell is indeed a prokaryote, upsetting long-held notions that prokaryotes must be tiny because they have no nucleus to organise intracellular functions. Rating the cover picture on Nature and a segment on ABC TV's Quantum, as well as numerous other mentions in the media, Kendall's "big bug" is a star.

*(Photo) GERT WÖHRHEIDE WITH A LARGE SCLEROSPONGE*

## *Two new Lizard Island Doctoral Fellows in 1993*

The Lizard Island Doctoral Fellowship 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 funding for 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. Information about applications for the 1994 fellowship, is provided in the last page of this newsletter.

Although a single new fellowship is usually offered each year, we were very pleased to be able to award two fellowships this year. The successful applicants were Lexa Grutter and Dirk Zeller, both from the Department of Marine Biology, James Cook University.

Lexa is studying the biology and ecology of cleaner wrasse at Lizard Island. She wants to determine what benefit the wrasses derive from their characteristic cleaning behaviour, and whether the behaviour has any importance to reef fishes generally. Already well into her research, Lexa has found that the ectoparasite load on reef fishes around Lizard Island is high in contrast to that of other localities for which such data have been reported, and that cleaner wrasse at Lizard Island have more parasites in their gut contents than those reported from other localities. This makes Lizard Island an ideal locality to perform a field experiment to determine the effect of removal of cleaners on host fish populations; such an experiment is currently underway.



DIRK ZELLER AND MICHAEL MACKIE INSERTING A TRANSMITTER INTO A CORAL TROUT

Dirk is using ultrasonic telemetry to determine both large and small-scale movement patterns of large reef fishes. This work builds upon that of a previous Lizard Island doctoral fellow, Campbell Davies, who used mark/release/recapture techniques to determine movements of commercially-valuable fishes in the Lizard Island lagoon. Dirk plans to determine short-term movement patterns of individual fish, evaluate the extent of inter-reefal movements, and investigate movements of coral trout associated with spawning aggregations.

## *Staff*

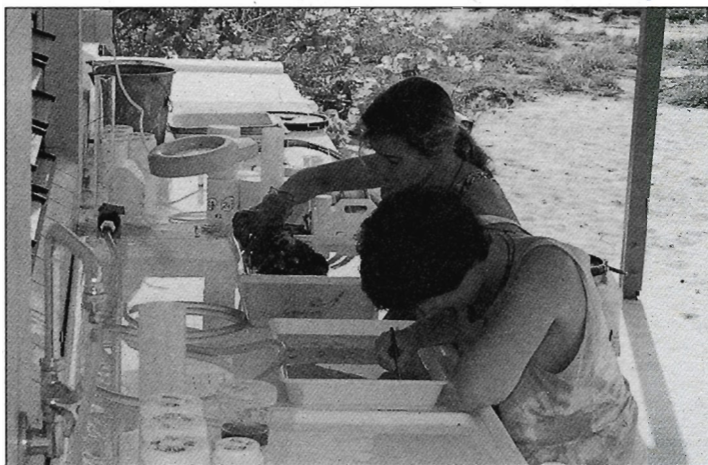
There were no staff changes during the year. Lyle Vail and Anne Hoggett entered their third year as the Station's Directors, and Lance and Marianne Pearce entered their fifth year as Maintenance Officer and Accommodation Officer, respectively. Mike and Renie Hood ably filled in for Lance and Marianne during June and July 1992 when the latter were on leave. Kellie Hellyer entered her second year on the island as Alex Vail's home tutor.

### ***RV Sunbird sold***

The RV Sunbird was sold at auction in Cairns in February 1993 after ten years of service to the research community in the northern Great Barrier Reef and Torres Strait. Conceived and realised by former Director, Barry Goldman and Secretary, Lois Goldman (now Lois Wilson), the 14 metre sailing catamaran was originally intended as a supply vessel for the Station as well as for research charters. The former usage waned in importance as other means of supplying the Station developed, but Sunbird was well-occupied with research charters throughout her career.

Under the management of crew members Lois Wilson and Terry Ford from 1989 until her sale, the Sunbird saw especially active (and often hair-raising!) service in the cause of science. Terry and Lois are to be congratulated for their fine management and sea skills, and we wish them well for the future.

The sale represents the end of an era for the Station, but the resources that would have been put into Sunbird will now be channelled into the Station itself. The RV Sunbird is still based in Cairns at present, and is still being chartered by researchers who require her specialised and unique facilities.



### ***How did we ever get along without the Raymond E. Purves Laboratory?***

The new wet laboratory has proved an outstanding success in its first full year of use. It was initially put to the test in the pre-summer period by several school groups, who used the laboratory for examining specimens, holding group discussions and conducting seminars. During the summertime peak in research usage of the Station, the Purves Laboratory hummed with activity as researchers dissected fish, extracted invertebrates from corals, and preserved specimens, often late into the night. With all the other laboratory areas similarly well-occupied, the question was asked more than once: "How did we ever get along without the new lab?"

### ***Donation of compressor by German Government***

A major acquisition this year was a new scuba filling compressor donated by the Government of the Federal Republic of Germany. Complete with automatic dump valves and numerous expensive cartridges for the recently purchased filter system with Securus purification control, the 12 cubic foot Bauer compressor is a valuable addition to the Station, helping to achieve our mission of providing superior facilities for reef research.

In presenting the compressor at Lizard Island in March 1993, the Acting Consul-General of the Federal Republic of Germany, Mr Rolf Meyer-Olden, said that the high level of usage by German scientists influenced his Government's decision to support the Station.

*(Photo)* VICKI NELSON AND BARBARA MUSSO USING THE OUTDOOR WET BENCH AT THE PURVES LABORATORY

## *Diving update*

During another year of accident-free diving, 3,934 scuba dives were logged, representing over 4,700 hours underwater. Dives to depths of less than 16 metres account for over 96% of all diving done from the Station, with the most common depth range being 6 to 10 metres.

1,413 DIVES TO 0 - 5 METRES DEPTH

1,750 DIVES TO 6 - 10 METRES DEPTH

621 DIVES TO 11 - 15 METRES DEPTH

127 DIVES TO 16 - 20 METRES DEPTH

23 DIVES TO 21 - 30 METRES DEPTH

DIVING IN 1992/93

Total dives 3934

Total duration

132, 036 minutes

## *House extensions: the James N. Kirby Foundation continues support*

The Station's long-term development plan recognises the need for more housing at the Station to cope with increased usage. The largest visitor houses, Kirby and Suntory, each have two bedrooms and are identical in design; they were originally intended to accommodate four people each. For the last five years or so, Kirby and Suntory have each regularly housed eight, and sometimes even ten, people. Extensions are planned to both Kirby and Suntory in 1994. Each house will have two additional bedrooms, an additional bathroom and an enlarged verandah providing an outdoor living and dining area.

Raymond Kirby, a trustee of the Lizard Island Reef Research Foundation, announced in November 1992 that the James N. Kirby Foundation had pledged funds to carry out the work on its namesake house. The James N. Kirby Foundation has been a consistent supporter of the Station since its early days and we are grateful for this sponsorship. Funding for extension of Suntory house is being provided by the Australian Museum.

## *Water quality monitoring*

The Great Barrier Reef Marine Park Authority (GBRMPA) has identified water quality as a major management issue in the coming decade. Increasing nutrient and sediment loads are potential assaults on the quality of water that is necessary for "healthy" coral reefs. Cyclones, with their enormous input of fresh water and energy, are natural events that affect water quality episodically. Human activities can also affect water quality on an on going basis: run-off from agricultural land can contain fertilisers; run-off or seepage from inadequate sewage facilities can contain nutrients; building projects can stir up sediments or change water flow patterns with long-term changes in sedimentation rates.

GBRMPA is coordinating a water quality monitoring program to enable detection and quantification of changes in water quality within the Great Barrier Reef. Salinity, temperature, turbidity, chlorophyll concentration and weather data are being collected at sites along the length and breadth of the Reef in the initial phase of the program; more detailed assessment of particular nutrients is planned for a later phase. Field data is being collected by the Lizard Island Research Station, Heron Island Research Station, the Australian Institute of Marine Sciences, the Queensland Department of Environment and Heritage and Reef Biosearch.

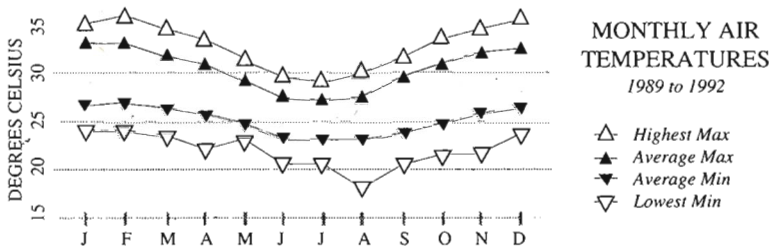
The first samples were taken in January 1993 and the program is intended to continue indefinitely.

The Lizard Island transect comprises four stations, each at least 2 miles from the nearest reef: W of Linnet Reef, NW of Eyrie Reef, N of North Reef of Lizard Island, and NE of MacGillivray's Reef.

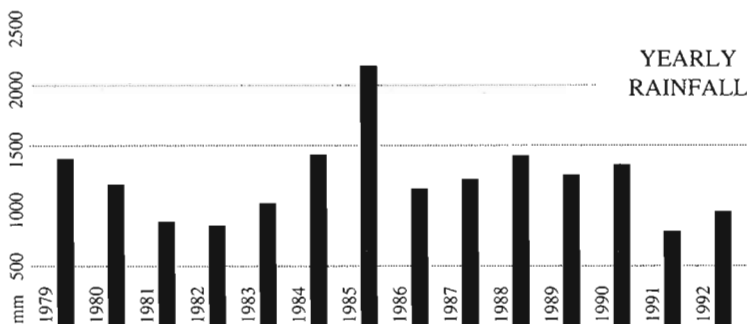
These stations are monitored monthly. In addition, four stations near Lizard Island itself are monitored on the same schedule. These stations are not part of the GBRMPA program, but are intended to provide basic hydrological data for Lizard Island Research Station users.

### Lizard Island weather data

The Research Station has been monitoring daily rainfall since 1979 and daily air temperatures (maximum and minimum) since 1989.



The driest year yet recorded was 1991, with most of 1992 being similarly dry. The level of the freshwater well at the Station was low but sustaining careful usage when significant rainfall occurred in December 1992. This rain brought the water table up to a high level.



### Acquisitions

In accordance with the long-term development plan, the Station acquired several items this year that, while small in themselves, constitute tremendous improvements.

- Three powerful VHF radios were purchased to replace CB radios, making communication between the Station and its larger boats much more reliable.
- The office is now equipped with two 486 computers with uninterruptible power supplies, a phenomenal difference from the old XTs that lost data every time the power flickered.
- A GPS (Global Positioning System) receiver was obtained specifically for the water quality monitoring project. While the GPS is not available for use by visiting researchers, the Condor Cat is fitted with a bracket and antenna that can be used for researchers' own compatible GPS units.

### Lizard Island Management Plan

An "issues document" concerning the management of Lizard Island has been prepared by the Queensland Department of Environment and Heritage. Covering both terrestrial and marine usage of the Lizard Island area, the document should be available for public comment in the latter part of 1993. Based on input from interested parties, a management plan will then be formulated. The management plan will provide a basis for decision making on the part of QDEH officers who are the day-to-day managers of the terrestrial and marine parks of Lizard Island.



The Research Station will be viewing the issues document with great interest, as this is the best chance we will have of influencing the future usage of Lizard Island. Users of the Research Station are urged to comment upon the issues document. Please register your interest with the Station, and we will make sure you receive a copy when they become available.

### ***Cod Hole survey***

With generous assistance from the staff of Lizard Island Charters, the Research Station is compiling data on human usage and the fauna and environment of the Cod Hole. Situated at the northern tip of Number 10 Ribbon Reef, about 16 km from Lizard Island, the Cod Hole has become renowned as one of the world's premier dive destinations. The main attraction is a group of large potato cod that live in the small, shallow indentation in the reef. With numerous dive charters and other boats visiting this tiny part of a once-remote area, the potential for damaging the Cod Hole and its inhabitants is real.

The Lizard Island Charters vessel *Volare* visits the Cod Hole about three times each week with divers from the Lizard Island Lodge. On each trip since mid 1992, skipper Duncan MacFarlane and his crew have filled in a data sheet drawn up by the Research Station, recording information on the number of people and boats present and their activities; presence and condition of individual large fish and eels; presence or absence of other fishes and specific invertebrates; incidence of any environmental damage and weather data.

Physical damage to the reef due to anchoring has been documented, and feeding the cod is a

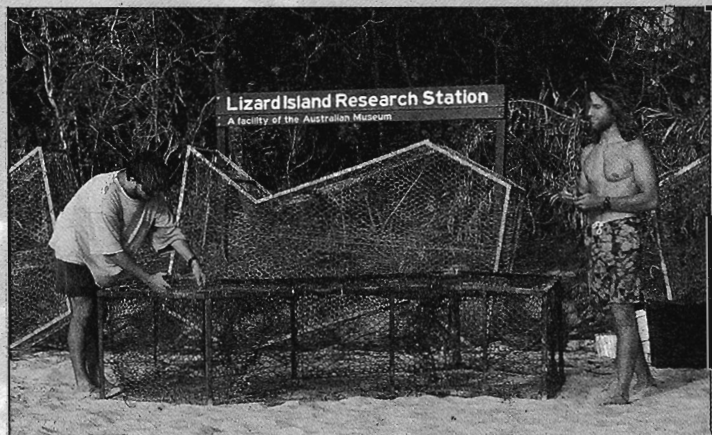
widespread practice. The survey already shows that a management plan for the Cod Hole is badly needed, and it will provide valuable baseline data for the planning process.

### ***Update on Lizard Island Doctoral Fellows***

***Vicki Nelson*** (1992 doctoral fellow) completed her field work on the demography of reef crest corals at the Station in February 1993 and is now analysing data and writing up. Vicki's quadrats will continue to provide valuable data on reef dynamics as they will continue to be monitored in the long-term.

***Alison Green*** (1991 doctoral fellow) will make the final field trip to the Station for her project on wrasse biology and ecology in the latter part of 1993. She won a Fulbright Scholarship in 1992 which enabled her to conduct comparative studies on wrasses in the Caribbean.

***Campbell Davies*** (1990 doctoral fellow) completed his field work on movement patterns of large reef fishes in November 1992, and is now writing up. This year, Campbell has been involved in the Great Barrier Reef Marine Park Authority's program on the effects of fishing.



CAMPBELL DAVIES AND STEVE PURCELL WITH Z-TRAPS USED IN MARK / RELEASE / RECAPTURE STUDIES OF LARGE REEF FISHES.

**Mark McCormick** (1989 doctoral fellow) submitted his PhD thesis in December 1992, and now has a postdoctoral research fellowship at James Cook University to study the role of hormones in development of fish larvae. Mark plans to conduct this work at Lizard Island in 1993 in collaboration with Dr Ned Pankhurst of New Zealand's Leigh Marine Laboratory.

### **Many PhD projects completed**

In addition to the Lizard Island doctoral fellows, many other PhD students use the Research Station as the main base for their projects. Over the three-year period of their field work, these repeat and often long-term visitors become part of the Research Station community, and the last field trip is often one of mixed feelings.

This year, we said sad goodbyes to Beatrice Ferreira and Mauro Maida, who will be returning to Brazil to put their coral reef expertise to good use. With visa deadlines looming, their theses were completed in the nick of time.

Barbara Musso and Campbell Davies completed their last field trips on the same day, and their farewell get-together on the beach turned into an impromptu engagement party as their intention to marry was revealed. We think (and hope) we have not seen the last of Barbara and Campbell.

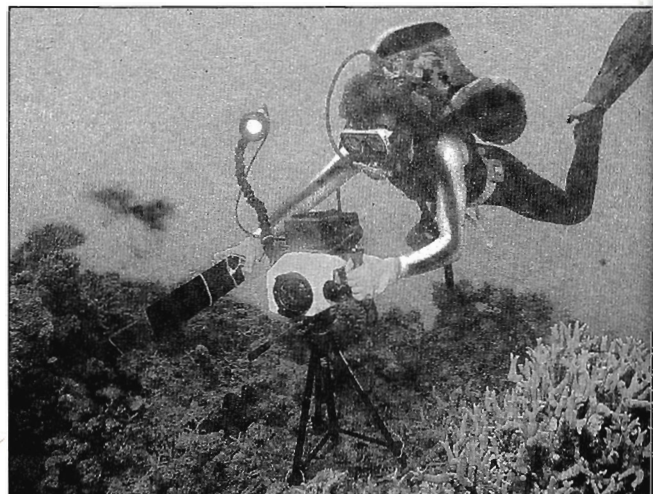
Brigid Kerrigan also finished her field work this year, and we are sure we will see her again at Lizard. Her last-night party was also a celebration for her impending marriage to Mark McCormick, another Lizard Island researcher. There must be something in the air at Lizard....

### **Lizard Island Travel Fellowship news**

Unfortunately after only a year, United Airlines is unable to continue its sponsorship of the Fellowship because of hard times in the airline industry.

Two researchers from the USA were able to benefit from the Lizard Island Travel Fellowship in 1992, thanks to United Airlines, Australian Airlines and the Lizard Island Reef Research Foundation.

Dr Barbara Best (University of California at Berkeley) was awarded a travel fellowship for her work on gene flow and dispersal in corals. She is returning to Lizard Island for the 1993 coral spawning to continue and expand upon this work.



BARBARA BEST USING FLUORESCENCE DYE TO VISUALISE WATER CURRENTS NEAR CORALS

Dr Jeffrey Shields (Virginia Institute of Marine Science) was awarded a travel fellowship to continue his work on the parasites of crustaceans. Jeff had made several previous trips to Lizard Island during his time as a postdoctoral research fellow at the Department of Parasitology at the University of Queensland, and has discovered many new species.

## Bench fees

Visiting researchers are charged a bench fee that covers self-catering accommodation, use of a small boat, use of laboratory and aquarium facilities, with scuba tanks and air fills for qualified divers. The fee is subsidised by the Australian Museum Trust, and is \$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. For visits longer than 28 consecutive days, a 10% discount applies. These fees remain unchanged from last year, and will be in force until at least June 1994. Attractive rates are offered to groups of school and university students undertaking course work directed by teachers or lecturers from their own institutions.

## Volunteer program

The Station would not function as well as it does without the assistance of volunteers. Most volunteers visit for one to four weeks, giving four hours labour per day, usually for maintenance projects, in return for accommodation. This year we accepted a volunteer for the entire summer, whose main job was to fill scuba tanks. This has always been done by researchers on a roster system in the past, but with the enormous amount of diving done over summer, it can be an onerous task. Having a volunteer to fill tanks proved very popular with researchers and we will endeavour to continue the practice during busy periods.

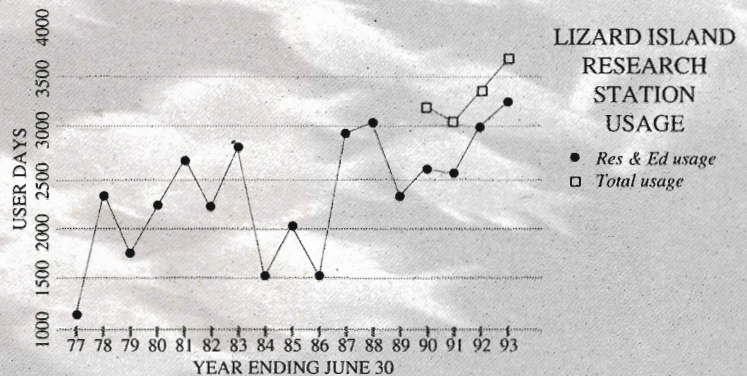
This year, we express our gratitude to the following volunteers: John Spencer (USA), Achim Katter (Germany), Kai Hoppe (Germany), Christele and Yannick Locquet (France), Lucy Marcus (USA),

Jean-Luc Solandt (England), Michael Molinari (Italy), Sven Uthicke (Germany), Chad Lunow (Australia), Marek Cuhra (Denmark), Russell Markel (Canada), Ben White (Australia), Elizabeth Fraser (England), Geoff Avern (Australia) and Scott Winspear (Australia).

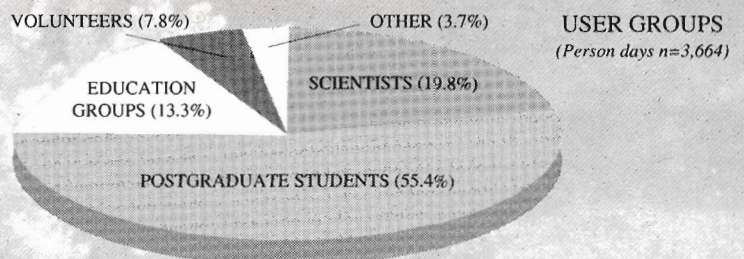
Special thanks are due to Zoli Florian (Curator of Microscopes at James Cook University) who donated his time once again to service the Station's microscopes, and to Margaret Hoggett, Gloria Pearce, Annie Stap, and Joe Stap (parents of staff) who helped above and beyond the call of duty.

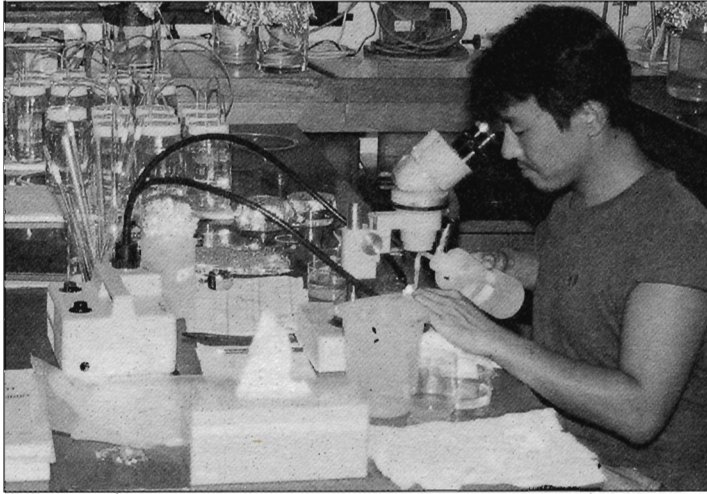
## Visitor statistics

The Station has just completed its busiest year ever with 3,664 user days, resulting in an average occupancy of 10 people per day throughout the year.



Most users are researchers, either fully-qualified scientists or postgraduate students conducting research towards PhD or Honours theses; 52 research projects were conducted during the year.





KEN OKAJI SET UP THIS LABORATORY TO REAR ALGAE AND LARVAE FOR FEEDING EXPERIMENTS WITH LARVAL CROWN-OF-THORNS STARFISH

## **Tours**

Although guided tours of the Station for passengers of tourist boats proved extremely popular last year, the Station was unable to continue them this year because the time required was too great for our resources. Guests of the Lizard Island Lodge continued to visit the Station for guided tours every Monday and Friday, and itinerant visitors, such as campers and yachts, are always welcome for an informal "look around". About 1,300 people visited the Station 1992/93.

Special tours of the research Station were conducted for His Excellency Bill Hayden, Governor-General of Australia, and Her Excellency Mrs Hayden, and for Lizard Island Reef Research Foundation trustee, Mr John Barraclough AM and Mrs Barraclough.

## **Research Projects and Participants**

The following projects were carried out at the Station during the year. An asterisk (\*) indicates the researcher is a postgraduate student.

### **Studies on calcareous red algae**

Dr Juan Braga (Universidad di Granada, Spain)

### **Bacteria from the wreck of the "Pandora"**

Dr David Moriarty (Queensland Museum, Brisbane) and \*Jodie Guthrie (University of Queensland, Brisbane), with the Moriarty family

### **Search for marine bacteria resistant to heavy metals**

Dr Mervyn Franklin and Dr Maxine Holder-Franklin (University of Windsor, Canada)

### **Cryptic corraline sponges and associated organisms**

Dr Joachim Reitner and \*Friedhelm Grothe (Freie University, Germany), assisted by Gerd Wöhrheide and Dorothea Hause-Reitner

### **Biology of jellyfishes**

Dr Thomas Heeger (Institut für Meereskunde, Germany) assisted by Dr Jörg Hartmann

### **Demography of reef crest corals**

\*Vicki Nelson (James Cook University, Townsville) assisted by Mark Burnham

### **Erosion of coral skeletons**

\*Barbara Musso (James Cook University, Townsville)

**Coral population genetics**

Dr Terry Hughes (James Cook University, Townsville) and  
Dr David Ayre (University of Wollongong) assisted by Craig  
Syms, Adrian Newton, Liz Dinsdale and Rachel Standish

**Population relatedness and gene flow in corals**

Dr Barbara Best (University of California at Berkeley, USA)

**Reproductive biology of corals**

\*Vicki Hall (James Cook University, Townsville)

**Diseases of corals**

\*Elizabeth Dinsdale  
(James Cook University, Townsville)

**Survivorship of coral fragments**

\*Luke Smith (James Cook University, Townsville)  
assisted by Dave Hocking

**Reproductive biology of soft corals**

\*Micaela Hellström (University of Helsinki, Finland)  
assisted by Chris Ryan, Guy Smith, Jean-Luc Solandt and  
Marek Cuhra

**Biology of soft corals**

\*Emma Hutchison (James Cook University, Townsville)

**Ecology of demersal reef plankton**

Dr James Stretch (Blue Water Consulting, USA)  
assisted by Dr Sybil Carrere

**Parasites of crustaceans**

Dr Jeffrey Shields (Virginia Institute of Marine Sciences,  
USA) assisted by Ingo Ernst

**Distribution and behaviour of eumedonid crabs**

Dr Peter Castro  
(California State Polytechnic University, USA)

**Biology, zoogeography and taxonomy of crustaceans**

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

**Observations on decapods**

Dr Toshiaki Watanabe (visiting researcher,  
University of Queensland, Brisbane)

**Collection of spiders and burrowing cockroaches**

\*Margaret Tio (University of Sydney)  
assisted by Dr Julie Macaranus

**Relationship between occurrence of web-building spiders  
and vertebrates on small islands**

Dr Thomas Schoener (University of California at Davis,  
USA) assisted by Dr Susan Keen

**Ecology of coral-eating gastropods**

\*Robyn Cumming (James Cook University, Townsville)  
assisted by Adrian Newton, Natasha Kollosche,  
Andrew Wood, Chad Lunow and Ben White

**Brittlestar systematics**

Dr Seiichi Irimura (independent researcher, Japan)

**Sperm activation in echinoderms**

Dr Richard Miller (Temple University, USA)

**Feeding ecology of larval crown-of-thorns starfish**

\*Ken Okaji (Australian Institute of Marine Sciences,  
Townsville) assisted by Marie Ito.

**Ecology of reef flat holothurians**

\*Sven Uthicke (Institut für Hydrobiologie und  
Fischereiwissenschaften, Germany) assisted by  
Britta Schaffelke and Katharina Weitemeyer

**Population dynamics of the pincushion starfish**

\*Kevin Grannum (University of Queensland, Brisbane)  
assisted by Chad Hunter

***Parasites of fishes***

*Dr Ian Whittington (University of Queensland, Brisbane) assisted by Marnie Horton*

***Population studies of juvenile squid and fishes***

*\*Natalie Moltschaniwskyj (James Cook University, Townsville) assisted by Craig Syms and Ilona Stobutzki*

***Effects of habitat structure and physical disturbance on reef fish assemblages***

*Dr Geoff Jones (James Cook University, Townsville) assisted by Dr Ursula Kaly and Julie Martin*

***Effects of sedimentation on primary and secondary producers***

*\*Steve Purcell (James Cook University, Townsville) assisted by Kurt Bonair and Zoe Rosser*

***Feeding biology of cleaner fishes***

*\*Lexa Grutter (James Cook University, Townsville) assisted by Mark Johnson and David Blakeway*

***Population structure and movements of large reef fishes***

*\*Campbell Davies (James Cook University, Townsville) assisted by Steve Purcell and Dr Gary Russ*

***Movement patterns of large reef fishes determined by telemetry***

*\*Dirk Zeller (James Cook University, Townsville) assisted by Michael Mackie and Brenda Cook*

***Biology of black marlin***

*Peter Speare (Australian Institute of Marine Sciences, Townsville)*

***Survivorship and development of juvenile damselfishes***

*\*Brigid Kerrigan (James Cook University, Townsville) assisted by Jeremy Taylor, Mickey Lachmann, Mark McCormick, Julie Martin and Vicki Hall*

***Development and behaviour of larval and juvenile damselfishes***

*\*Kathy Kavanagh (James Cook University, Townsville) assisted by Jean-Luc Solandt*

***Swimming and sensory capabilities of larval and juvenile fishes***

*\*Ilona Stobutzki (James Cook University, Townsville)*

***Ecology of wrasses***

*\*Alison Green (James Cook University, Townsville) assisted by Adrian Newton, Natalie Moltschaniwskyj, Karina Hall, Larnie Linton and Dr Tony Preen*

***Systematics and biomechanics of wrasses and pipefishes***

*Dr Mark Westneat and Melina Hale (Field Museum of Natural History, Chicago, USA)*

***Bioerosion and feeding behaviour of herbivorous fishes***

*Dr David Bellwood (James Cook University, Townsville) assisted by Emma Hutchison, Kylie Pitt, Steve Purcell and Adrian Newton*

***Ecology of herbivorous fishes***

*Prof. Howard Choat (James Cook University, Townsville) assisted by Lynda Axe, Eric Fisher and Vince Gleeson*

**Gut microorganisms of fishes**

Dr Kendall Clements (University of Sydney) and  
\*Esther Angert (Indiana University) assisted by  
Lynda Axe

**Female mate choice and evolution in damselfish**

\*Roland Knapp (University of California at Santa  
Barbara, USA)

**Acoustics and fish behaviour**

\*John Barimo (Woods Hole Oceanographic  
Institution, USA)

**Ecology of a wrasse species**

\*Jenny McIlwain (James Cook University,  
Townsville) assisted by Dr Ursula Kaly

**Relationships between wrasses and their habitats**

\*Craig Syms (James Cook University, Townsville)  
assisted by Michael Marnane and Judy Logan

**Factors influencing demography of a reef fish  
population**

\*Jo Beukers (James Cook University, Townsville)  
assisted by Dr Ursula Kaly and Bob Hunt

**Monitoring seabirds and their stomach contents**

Dr Steve Blaber (CSIRO Marine Laboratories,  
Cleveland) assisted by Dr Geoff Smith, John Salini  
and Dave Brewer, with the Blaber family.

**Monitoring seagull populations**

\*Stephan Bauhus (University of Münster, Germany)

**Vegetation, soils and insects of Nymph Island**

Prof. Jacques de Sloover, Dr Michel Baguette,  
Ann-Louise Jacquemart and Damien Lanotte  
(Université Catholique de Louvain, Belgium)

**Clastic/carbonate sediment interactions**

\*Jody Webster and Prof. Peter Davies  
(University of Sydney) assisted by Marilyn Davies

**Examination of modern reef for comparison with  
fossil reefs**

\*Alex Gordon and Prof. Peter Davies  
(University of Sydney) assisted by Marilyn Davies

**Compilation of educational materials**

- Dr Jon Hawker  
(St. Louis Community College, USA)  
assisted by Patricia Hawker
- Steve Arnam (USA)  
assisted by Nancie de Neve

**Exploratory visits**

- Dr Ned Pankhurst  
(Leigh Marine Laboratory, New Zealand)

### **Group visits**

- Members of the **North Queensland Naturalists**

**Club:** Neil Boland, Marjorie Coburn, Mona Cunningham, Alison Darroch, Ann Downey, Jim Downey, Beryl Goodman, Ruth Huwer, Margaret Merril, David Merril, Anne Sutherland, Ted Thompson, Jo Tresize, Margaret Vale, and Hilary Walker; led by Ceri Wait.

- Students of **St. Johns College Woodlawn**

**(Lismore):** Brett Evans, Daniel Farrell, Simon Hunt, Peter Kelly, Robert Lacey, Sam Lehman, Ben McCowen, Ben McCosker, Tom McGuire, Darren Pearson, Richard Santa, John Taylor and Glen Tranter; led by teachers Mark Ellis, Scott Whitby and John Whitney and assisted by Mick Whitney.

- Students of **SCECGS Redlands (Sydney):**

John Allinson, Nellie Anderson, Beckie Fish, Jade Harkness, Edwina Illman, Claire Kilham, Greg Linklater, Beth Montz, Claire Porter, Maki Susuki, Mark and Scott; led by teacher Rachel Elphick and assisted by Don Elphick and Peter Castor.

- Staff and associates of **Ryde TAFE College**

**(Sydney):** Carin Bolles, Martina Fechner, Peter Freeman, Gwen Higgins, Alan Hill, Tony Hill, Peter Leonard, Alan Mann, Margot Mann, Jenny Turpin, Barbara van den Broek and Alan Yuille; led by Phil Stewart.

- Students of **Geelong College Preparatory School**

**(Geelong):** Warwick MacCallum, Ben Sullivan, Monty Hamilton, Anna Parker, Andrew Newlands, Andrew Clark, Seamus Balkin, Amber Richardson, Christopher Eagles, Duncan Couchman, Rhys Bailey, Nicole Ronald, Sarah Holberg and Caine Tsang, led by teachers Stuart MacCallum and Lynne Ord.

### **Other visitors**

- Dr David Sinclair, medical entomologist with the **Queensland Department of Health**, conducted a search for malaria-carrying mosquitos on Lizard Island following a visit by a person who was later found to be carrying the disease; luckily, no Anopheles mosquitos were found.

- A high school student from NSW, Vikki Spencer, conducted her **work experience** program at the Station.

- Jon Brodie of GBRMPA visited to discuss the Station's role in the large-scale **water quality monitoring program** that began this year.

- Dr Mal Eutick, member of the **Lizard Island Reef Research Foundation**, visited with his family (Kate Shearer, Elizabeth, Alec and Laura Eutick) and others (Colin, Patricia, David and Christine Storey; Marcus Foster, Lynne Chapman, Louise and Steven Foster).

- Max Gibbs visited from England to take **photographs** for a book on coral reef fishes.

- Prof. Kurt Lambeck and Fiona Lambeck stayed at the Station to make connection with a **research vessel**.





STEVE BLABER RECORDED 3,200 BREEDING PAIRS OF  
CRESTED AND BRIDLED TERNS AT EAGLE ISLAND IN  
FEBRUARY 1993

- Jayne Jennings and Frank Gleeson (of the Queensland Department of Environment and Heritage) and Dan and Gordon Charlie (of the Hopevale aboriginal community) studied issues relating to the proposed *Lizard Island Management Plan*.
- Dr Des Griffin, Dr Jeff Leis (Australian Museum, Sydney) and Prof. Howard Choat (James Cook University, Townsville) visited the Station for *management committee* meetings.
- A crew from *ABC television's Quantum* program visited to film a segment on the largest known bacterium, discovered in the gut of surgeonfishes at Lizard Island by Dr Kendall Clements.
- *Supporters* who visited during the year were Dr Don Hill, Judith Hill, Liz McPhee, Craigie McPhee, Sandra Heilpern, Hans Heilpern, Kerry Gordon and Robert Gordon; Prof. Michael Birt and Jenny Birt; Prof. Michael Lewis and Rhoda Lewis; Dr Howard Gospel and Cathy Gospel; Prof. David Gifford and Heidi Wyle; Dr Gerald Burnett and Kirsten Burnett; Jane Ingham, Peter Ingham, Lynda Mulder and John Mulder; Shona Ballantyne and Jeff Ballantyne.

## Publications

*This list contains 61 publications based on work carried out at the Station this year. The total number in the collection now stands at 369. All visiting scientists are invited to send two copies of papers resulting from work at the Station to be added to the collection.*

*Our specialised Lizard Island reprint collection is a valuable resource for other researchers and for visiting educational groups. A complete list of contributions is available on request.*

*The relatively large number of papers acquired this year was mainly due to individual requests for reprints from past users. Thank you to all the people who responded. All efforts will be made in the coming year to search out other publications based on research at Lizard Island.*

**Angert, E.A., K.D. Clements and N.R. Pace, 1993.** The largest bacterium. *Nature*, 362:239-241.

**Behrens, P., 1991.** Ostracoda (Crustacea) from Lizard Island, northern Great Barrier Reef, Australia. I. Families: Cytherellidae, Loxoconchidae, Cytherideidae, Cytheruridae, Paracytherideidae, Pectocytheridae, Krithidae, Cytheromatiidae, Bythocytheridae, Cytheridae. *Helgolander Meeresuntersuchungen*, 45:107-142.

**Behrens, P., 1991.** Ostracoda (Crustacea) from Lizard Island, northern Great Barrier Reef, Australia. II. The family Paradoxostomatidae Brady and Norman, 1889. *Helgolander Meeresuntersuchungen*, 45:143-163.

**Ben-Eliahu, M.N. and H. Ten Hove, 1989.**

Redescription of *Rhodopsis pusilla* Bush, a little known but widely distributed species of Serpulidae (Polychaeta). *Zoologica Scripta*, 18:381-395.

**Bowden, B.F., J.C. Coll, L. Hongtu, R.C.**

**Cambie, M.R. Kernan and P.R. Bergquist, 1992.**

New cytotoxic scalarane sesterterpenes from the dictyoceratid sponge *Strepsichordaia lendenfeldi*. *Journal of Natural Products*, 55(9):1234-1240.

**Bruce, A.J., 1992.** Two new species of

*Periclemenes* (Crustacea, Decapoda, Palaemonidae) from Lizard Island, Queensland, with notes on some related taxa. *Records of the Australian Museum*, 44(1): 45-84.

**Clements, K.D., 1991.** Gut microorganisms of

surgeonfishes (Family Acanthuridae). PhD thesis, James Cook University

**Clements, K.D. and S. Bullivant, 1991.**

An unusual symbiont from the gut of surgeonfishes may be the largest known prokaryote. *Journal of Bacteriology*, 173(17):5359-5362.

**Dufour, V., 1992.** Colonisation des récifs

coralliens par les larves de poissons. PhD thesis, Université Pierre et Marie Curie. Perpignan, France

**Fork, D.C. and A.W.D. Larkum, 1989.** Light

harvesting in the green alga *Ostreobium* sp., a coral symbiont adapted to extreme shade. *Marine Biology*, 103:381-385.

**Goggin, C.L., K.B. Sewell and R.J.G. Lester,**

**1989.** Cross-infection experiments with Australian *Perkinsus* species. *Diseases of Aquatic Organisms*, 7:55-59.

**Goggin, C.L. and R.J.G. Lester, 1990.**

Rickettsiales-like infection in the gills of *Tridacna crocea* from the Great Barrier Reef. *Journal of Invertebrate Pathology*, 56:135-138.

**Harris, P.T., E.K. Baker, A.R. Cole and J.B.**

**Keene, 1991.** Final report: sandwave movement, currents and sedimentation in Torres Strait. *Ocean Sciences Institute Report No. 47*, 1-113. University of Sydney, Sydney.

**Hay, M.E., 1992.** The role of seaweed chemical

defenses in the evolution of feeding specialization and in the mediation of complex interactions. Chapter 3 in "Ecological roles of marine natural products" (Valerie J. Paul, Ed.) Comstock Publishing Associates: Ithaca, NY, USA,

**Hulsman, K. and G.C. Smith, 1988.** Biology and

growth of the black naped tern *Sterna sumatrana*: an hypothesis to explain the relative growth rates of inshore, offshore and pelagic feeders. *Emu*, 88:234-242.

**Hutchings, P.A. and C. Glasby, 1987.**

The Thelepininae (Terebellidae) from Australia, with a discussion of the generic and specific characters of the subfamily. *Bulletin of the Biological Society of Washington*, 7:217-250.

**Hutchings, P. and L. Howitt, 1988.** Swarming of

polychaetes on Great Barrier Reef. *Proceedings of the 6th International Coral Reef Symposium*, Australia, 2:739-744.

**Hutchings, P.A. and C. Glasby, 1988.** The

Amphitritinae (Polychaeta: Terebellidae) from Australia. *Records of the Australian Museum*, 40:1-60.

- Hutchings, P. and A. Reid, 1991.** The Nereididae (Polychaeta) from Australia - *Leonnates*, *Platynereis* and *Solomononereis*. *Records of the Australian Museum*, 43:47-62.
- Hutchings, P., A. Reid and R. Wilson, 1991.** *Perinereis* (Polychaeta, Nereididae) from Australia, with redescrptions of six additional species. *Records of the Australian Museum*, 43:241-274.
- Hutchings, P.A., W.E. Kiene, R.B. Cunningham and C. Donnelly, 1992.** Spatial and temporal patterns of non-colonial boring organisms (polychaetes, sipunculans and bivalve molluscs) in *Porites* at Lizard Island, Great Barrier Reef. *Coral Reefs*, 11:23-31.
- Johnson, C.R., D.C. Sutton, R.R. Olson and R. Giddins, 1991.** Settlement of crown-of-thorns starfish: role of bacteria on surfaces of coralline algae and a hypothesis for deepwater recruitment. *Marine Ecology Progress Series*, 71:143-162.
- Keable, S.J., 1992.** The scavenging, small marine invertebrates of Lizard Island, Queensland, Australia. Masters thesis, Macquarie University.
- Kleeman, K.H., 1977.** A new species of *Lithophaga* (Bivalvia) from the Great Barrier Reef, Australia. *The Veliger*, 20(2):151-154.
- Kleeman, K.H., 1978.** Mit den Taylors auf Lizard Island. *Submarin*, 78(1):40-42.
- Kleeman, K.H., 1980.** Coral-boring bivalve unchanged since Middle Liassic. *Beitrage zur Palaontologie von Osterreich*, 7:239-249.
- Kleeman, K.H., 1984.** *Lithophaga* (Bivalvia) from dead coral from the Great Barrier Reef, Australia. *Journal of Molluscan Studies*, 50: 192-230.
- Kleeman, K.H., 1984.** Lebensspuren of *Upogebia operculata* (Crustacea, Decapoda) in Caribbean stone corals (Madreporaria, Anthozoa). *Beitrage zur Palaontologie von Osterreich*, 11:35-57.
- Leis, J.M., 1991.** The pelagic stage of reef fishes: the larval biology of coral reef fishes. In "The Ecology of Fishes of Coral Reefs" (Ed. P. Sale), Academic Press: San Diego.
- Leis, J.M., 1991.** Vertical distribution of fish larvae in the Great Barrier Reef lagoon, Australia. *Marine Biology*, 109:157-166.
- Leis, J.M., 1992.** Summing up. In "Larval Biology", Proceedings number 15 of the Australian Society for Fish Biology Workshop. D.A. Hancock (Ed.). Australian Government Publishing Service: Canberra.
- Lou, D.C., 1992.** Daily otolith increments in juvenile tropical parrotfishes and surgeonfishes. *Australian Journal of Marine and Freshwater Research*, 43:973-981.
- Lou, D.C., 1992.** Validation of annual growth bands in the otolith of tropical parrotfishes (*Scarus schlegeli* Bleeker). *Journal of Fish Biology*, 41:775-790.
- Lou, D.C., 1993.** Growth in juvenile *Scarus rivulatus* and *Ctenochaetus binotatus*: a comparison of families Scaridae and Acanthuridae. *Journal of Fish Biology*, 42:15-23.

- Lowry, J.K. and H.E. Stoddart, 1992.** A revision of the genus *Ichnopus* (Crustacea: Amphipoda: Lyssianassoidea: Uristidae). *Records of the Australian Museum*, 44:185-245.
- McCormick, M.I. and B.W. Molony, 1992.** Effects of feeding history on the growth characteristics of a reef fish at settlement. *Marine Biology*, 114:165-173.
- Newman, L.J., 1986.** Snails with clear 'plastic' shells. *Australian Shell News*, 55:1-2.
- Newman, L.J., 1986.** Catching snails that swim. *Hawaiian Shell News*, 1986:3.
- Newman, L.J., 1987.** Swarms of sea-butterflies. *Hawaiian Shell News*, 1987:3.
- Newman, L.J., 1988.** Holoplanktonic gastropods from Great Barrier Reef waters, Australia. *Hawaiian Shell News*, 1988:5.
- Olson, R.R., 1986.** Light-enhanced growth of the ascidian *Didemnum molle/ Prochloron* sp. symbiosis. *Marine Biology*, 93:437-442.
- Page, A., 1987.** Great corallivorous gastropods! *Hawaiian Shell News*, 35(4):7.
- Page, A.J. and R.C. Willan, 1988.** Ontogenetic change in the radula of the gastropod *Epitonium billeana* (Prosobranchia: Epitoniidae). *The Veliger*, 30(3): 222-229.
- Reitner, J., 1992.** Coralline sponges: an attempt of a phylogenetic analysis. *Berliner Geowissenschaftliche Abhandlungen, Reihe E (Palaobiologie)*, Band 1:1-352 + figures.
- Russell, D., 1992. Barrier Protection. *ALR*, 145:21-25.
- Saunders, W.B., 1986.** *Nautilus* in Australia. *Australian Shell News*, 56:1-2.
- Saunders, W.B. and P.D. Ward, 1987.** Ecology, distribution and population characteristics of *Nautilus*. Chapter 9 in "Nautilus" (W.B. Saunders and N.H. Landman, Eds.), Plenum Publishing Corp.
- Saunders, W.B., 1987.** The species of *Nautilus*. Chapter 3 in "Nautilus" (W.B. Saunders and N.H. Landman Eds.), Plenum Publishing Corp.
- Smith, G.C. and P. Ogilvy, 1989.** Rocky Islets, Great Barrier Reef, Queensland. *Corella*, 13(4):107-109.
- Smith, G.C., 1990.** Factors influencing egg laying and feeding in black-naped terns *Sterna sumatrana*. *Emu*, 90:88-96.
- Smith, G.C., 1991.** The roseate tern *Sterna dougallii gracilis* breeding on the northern Great Barrier Reef, Queensland. *Corella*, 15(2):33-36.
- Smith, G.C., 1991.** Kleptoparasitic silver gulls *Larus novaehollandiae* on the northern Great Barrier Reef, Queensland. *Corella*, 15(2):41-44.
- Smith, G.C., 1992.** Observations of crested terns with an experimentally added egg in the nest. *Corella*, 16(2):38.
- Sorokin, Y.I., 1992.** To the characteristics of plankton in the waters of the Great Barrier Reef, Australia. *Zhurnal Obshchei Biologii*, 53(4): 557-570.

**Stafford-Smith, M.C. and R.F.G. Ormond, 1992.**

Sediment rejection mechanisms of 42 species of Australian scleractinian corals. *Australian Journal of Marine and Freshwater Research*, 43(4): 683-705.

**Stock, J.H., 1988.** A bizarre parasitic copepod (nereicoliform Poecilostomatoida) from the great Barrier Reef. *Tropical Zoology*, 1:217-222.

**Sweatman, H., 1988.** Field evidence that settling coral reef fish larvae detect resident fishes using dissolved chemical cues. *Journal of Experimental Marine Biology and Ecology*, 124:163-174.

**Sweatman, H.P.A. and J. St. John, 1990.**

Effects of selective settlement and of aggression by residents on distribution of young recruits of two tropical damselfishes. *Marine Biology*, 105:247-252.

**Wells, M.J., 1987.** Oxygen uptake and the effect of feeding in *Nautilus*. *The Veliger*, 30(1):69-75.

**Whittington, I.D. and G.C. Kearn, 1993.**

A new species of skin-parasitic benedeniine monogenean with a preference for the pelvic fins of its host, *Lutjanus carponotatus* (Perciformes: Lutjanidae) from the Great Barrier Reef. *Journal of Natural History*, 27:1-14.

**Woodruff, D.S., M.P. Carpenter, W.B. Saunders**

**and P.D. Ward, 1987.** Genetic variation and phylogeny in *Nautilus*. Chapter 5 in "Nautilus" (W.B. Saunders and N.H. Landman, Eds.), Plenum Publishing Corp.

## ***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. Since its inception in 1978, the Foundation has raised over one million dollars to facilitate research on the Great Barrier Reef.*

*Two new Trustees were welcomed into the Foundation this year. They are Dr Malvin Eutick, who is Chairman of Bioquest Ltd. and Marketing Director of G.M. Laboratories and Ms Patricia Watson, who is Editorial Business Manager of Condé Nast Publications.*

*The board of trustees of the Lizard Island Reef Research Foundation in 1992/93 is as follows:*

MR JAMES CREER (CHAIRMAN)  
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# LIZARD ISLAND RESEARCH STATION DOCTORAL FELLOWSHIP 1994

*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. 1994 is the 10th anniversary of the Lizard Island Research Station Doctoral Fellowships.*

*The Fellowship is available to a student from any country 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***

The fellowship is primarily intended to pay bench fees at the Lizard Island Research Station for field work over three years. It can also be used to cover some travel expenses and to purchase a limited amount of equipment. The value of the Fellowship is A\$14,500; \$4,833 per annum for three years. The Fellowship is not available for living expenses.

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 water aquaria and accommodation units are available. Ready access to an extremely wide variety of coral reef and other tropical marine habitats is provided from the Station.

Lizard Island is 30 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; that would be acceptable provided that the data from Lizard Island contributes significantly to our understanding of the Great Barrier Reef. 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, plus 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 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.

*For further details regarding research facilities at Lizard Island etc please contact:*

THE CO-DIRECTORS  
LIZARD ISLAND RESEARCH STATION  
PMB 37  
CAIRNS QLD 4870  
AUSTRALIA

PHONE AND FAX: (070) 60-3977  
INTERNATIONAL: 61 70 60-3977

*For general information about the Fellowship please contact:*

SASCHA LYNCH  
DEPUTY DIRECTOR'S OFFICE  
AUSTRALIAN MUSEUM  
PO BOX A285  
SYDNEY SOUTH NSW 2000

PHONE: (02) 339 8118  
FAX: (02) 332 3656

*Six copies of the application should be sent to:*

SASCHA LYNCH  
LIRS FELLOWSHIPS  
AUSTRALIAN MUSEUM  
PO BOX A285  
SYDNEY SOUTH NSW 2000  
AUSTRALIA