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LIZARD ISLAND RESEARCH STATION

p.m.b. 37 cairns qld 4870 australia

Newsletter No. 9 1982–83

The Lizard Island Research Station is a facility of the Australian Museum to support coral reef research. Accommodation, boats, diving equipment, aquaria and laboratory facilities are available for up to fourteen visiting scientists. Those interested are invited to write to the Director for brochures, booking forms or more detailed information.

R.V. SUNBIRD:

The commissioning of the R.V. SUNBIRD marks the passage of another major stage in the development of the research and support facilities offered by this Station.

The R.V. SUNBIRD is a 14 meter long by 7 meter wide motor-sailor catamaran research vessel and now services all the Station's freight, fuel and cargo requirements as well as providing researchers access to the reefs and islands of the entire northern Great Barrier Reef. The R.V. SUNBIRD is named in honour of the Suntory Company (Torii meaning bird in Japanese). She was designed to the specifications of the Director by world-renowned yacht designer Lock Crowther and has accommodation for up to 6 researchers plus skipper, a small lab. below decks, hydraulic trawling winches and an exceptionally large and stable aft-deck. The R.V. SUNBIRD was built under contract by S.B.F. Engineering in Fremantle, Western Australia and is of all aluminium, welded construction, built to survey of the West Australian Harbours & Lights Department. Construction took seven months.

She was launched in early December, 1982, handed over to the Director on December 29, and sailed via Darwin to Lizard Is. during January/February, 1983. The trip of 3,000 nautical miles took 21 days at sea and she was crewed by B. Goldman (master), L. Goldman (first mate), and deck-hands L. Crowther (the designer) and C. Sinclair from Perth to Broome; B. Russell and C. Short from Broome to Darwin; and D. Griffin (Director of the Australian Museum), J. McLeod and B. Russell from Darwin to Lizard Island .

The official commissioning of the R.V. SUNBIRD was performed by the Honorable Barry Jones, Minister for Science and Technology on April 16 in Cairns. It was attended by Dr. Baker (President of the Museum Trust), Sir John Proud (Chairman of the Lizard Island Reef Research Foundation), Dr. Griffin (Director of the Australian Museum), Mr. Narumi (Senior Managing Director, Suntory) & wife, Mr. Matsushita and Mr. Tokuda (both of Suntory Ltd., Sydney), Professor & Mrs. Back (Vice Chancellor of James Cook University), Mr. John Gayler (Federal Member for Leichhardt) and his wife, Dr. Farrands (Chairman of A.I.M.S. Council), Mr. Wilkinson (Queensland National Parks & Wildlife Service), Barry & Lois Goldman (Lizard Island Research Station) and a number of other dignitaries.

Immediately after the ceremony, Mr. Barnett (skipper of the James Cook University Research Boat) and Mr. Florian sailed the R.V. SUNBIRD overnight to Lizard Island while the 'official party' flew up the next morning to inspect the Station and experience the R.V. SUNBIRD operating in 'home waters'.

A management procedure is now being formulated for the operation of the research vessel and it is planned to undertake fairly regular trips to Cairns to collect fuel and supplies for the Station (and personnel and equipment for researchers). Bulk fuel capacity is 4,000 litres and the R.V. SUNBIRD can sit on the beach in front of the Station for discharging fuel and cargo. An electric pump which is connected to an underground

steel fuel line installed during the year allows the diesel fuel to be pumped directly into the 20,000 litre bulk fuel tank installed last year - the process taking about 90 minutes. Outboard fuel unfortunately still has to be carted in 200 litre drums but the boom acts as a cargo device and at low tide the tractor can be driven alongside the R.V. SUNBIRD and loaded directly. We are entering the age of machinery!

The Station now operates a total of 10 boats.

The only other major item of equipment acquired by the Station during the year was a display unit and DPM package to expand the functions of the Liquid Scintillation Counter. This additional equipment, valued at $3,000 was generously donated by Mr. Gower of Lindbrook International.

STAFF:

Mr. R. Wasser, the Maintenance Engineer, resigned after 10 months service and left the island with his wife and 2 children to seek employment on the mainland. He was replaced by Bob Milne on a casual basis until Mr. Peter Pini arrives with his wife Gwen to take up the post in early July. From late December to early February Dr. Jeff Leis and Sue Bullock stood in as acting Director and Acting Secretary respectively while Barry and Lois Goldman sailed the R.V. SUNBIRD round from Perth.

FUTURE DEVELOPMENTS:

Cairns architect, Mr. Barney Lynn has been commissioned to design and supervise construction of extensions to the laboratory which are planned to commence about October 1983. The new laboratory will be of besser brick construction and will contain offices for the Director and Secretary, a library/reading room, instrument room and radio-isotope room. The existing lab. will then be modified, funds providing, with the wet lab. being converted into a chemistry lab. and the old library being converted into a wet lab. for identification and sorting of material. The present dry lab. will convert into a microscope/photography/physiology lab. and should the demand arise, the old library can be further divided into a clean lab. for culture work. A second cold room to operate at 4 degrees is also planned (to supplement the present - 30 degree room).

FELLOWSHIPS ESTABLISHED:

Although all the funds have not yet been officially promised, we are sufficiently confident and will be offering later in 1983 the first AUSTRALIAN MUSEUM - LIZARD ISLAND POSTGRADUATE AWARD. These awards will be offered each year, to a promising graduate student enrolled in an Australian University and will provide financial assistance to the student for a period of three years to enable the pursuit of field work at the Lizard Island Research Station. The funds will be used to cover all travel and bench fee costs (at the subsidised level) with a small budget for purchase of equipment.

This is an exciting stage in the development of the Lizard Island Research Station and it is hoped that sufficient interest and enthusiasm can be generated so that we may be able to offer two of these fellowships each year.

Academics who may have post-graduate students interested in this scheme are invited to write to the Director for more details.

Others who have a sympathy for the scheme are invited also to write if they have any ideas as to possible sources of financial support.

VISITORS DURING 1982-83:

This year has been the busiest and most productive to date. A total of 108 researchers and assistants visited the Station during the year and 12 of these came more than once. The average occupancy per day throughout the year was 8.5 for all visitors, with 7.6 being the average number of researchers working at the Station at any time.

A breakdown of the research visitors is as follows:

From Australian Institutions	: 57
From Overseas Institutions	: 40
Doctoral students	: 11 (1 from overseas)

These are listed below:

AUSTRALIAN SCIENTISTS:

DR D. MORIARTY, C. MORIARTY, P. POLLARD and team from the Division of Fisheries, C.S.I.R.O., Cleveland visited the lab. twice for two weeks each in July and January to study bacterial productivity in coral reef sediments and lagoon waters.
DR G. DENTON, Marine Biology, James Cook University visited the Station twice - for a week in July and again in January to continue his monitoring program on the bio-accumulation of heavy metals in reef organisms.
DR D. GRIFFIN, Director, Australian Museum, spent five days at the island in July to continue his studies on the psychological development of marine station staff. An illuminating report is expected shortly.
DR R. WASS, Department of Geology, University of Sydney: seven days in August continuing his studies on settlement and growth in Bryozoa (lace corals).
DR M. STREAMER, Chemistry Department, James Cook University: ten days in August using radio-isotopes to assay hard corals for the enzyme arginine decarboxylase.
DR R. WILLAN, Zoology Department, Queensland University and R. BURNS, Associate of the National Museum of Victoria: two weeks studying the taxonomy and ecology of nudibranch molluscs.
DR R.B. JOHNS, Department of Organic Chemistry, Melbourne University, together with DR LEEUW and 3 Ph.D. students: two weeks in September investigating the chemistry of organisms contributing to the lagoonal sediments; the organic constituents of these sediments; and a study of the food chain in the sea cucumber Holothuria atra.
DR A. AYLING joined DR H. CHOAT for two weeks in September to undertake surveys of coral trout populations for the Great Barrier Reef Marine Park Authority.
DR T. DONE, Australian Institute of Marine Science came with two assistants for a week to continue his underwater stereophotographic survey of various coral reef habitats to monitor changes in reef structure with time.
DR J. LEIS, Fish Department, Australian Museum visited the Station a number of times during the year. He spent a week in October and three weeks in February, accompanied by M. Richman, undertaking his larval fish sampling program which is

conducted jointly with the Director. The project is looking at the ecology, taxonomy and distribution of coral reef fish larvae in the waters of the northern barrier reef and was the first to use the R.V. SUNBIRD which proved very adept at trawling amongst the outer barrier reefs in all kinds of weather.
DR P. HUTCHINGS, Marine Invertebrate Department, Australian Museum, also visited twice, for two weeks each, to continue her long term studies on coral reef endolithic cryptofauna (boring animals), polycahete worm taxonomy, and bio-erosion in dead coral substrates.
MR G. STROUD, Macquarie University, visited twice for 5 and 2 weeks, to work with the Director on the ecology of coral reef fish larvae with emphases on spawning sites and timeing, habitat preferences of fish larvae, age at settlement and general taxonomy.
PROF B. ZERNER & D. TENCH, Biochemistry Department, Queensland University: 3 days in November to investigate mechanisms of calcification in corals, and to inspect the Station's facilities.
DR M. WESTOBY, Zoology Department, Macquarie University: two weeks in December, as University Supervisor of H. Sweatman and B. Gladstone, to assist with field work and gain some perspective on the problems of coral reef research - both theoratical and practical.
MR R. STEENE, Associate of the Australian Museum, had two trips in January and February to gather photographic material on larval forms and plankton in coral reef waters.
MR R. GRIFFITHS, Division of Fisheries, C.S.I.R.O.: one week in February to inspect procedures and oversee the water sampling program undertaken by the Lizard Island Research Station for the C.S.I.R.O.
MR E. GRANT, Department of Harbours & Marine, Queensland Government, with two assistanst spent a month at the island in May-June gathering material for the next edition of his Guide To Fishes.
PROF M. PICHON & J. MORRISSEY, Marine Biology, James Cook University: 10 days in May to begin a project on nutrient cycling and ecosystem properties of coral reefs.

OVERSEAS SCIENTISTS:

DR G. ARMSTRONG, Western Mineral Resources, U.S. Geological Survey spent the month of August investigating the diagenesis of carbonate rocks at Lizard Island.
DR H. CHOAT, Zoology Department, Auckland University, visited the Station twice for two weeks each in July and September. His primary project concerns the factors influencing the distribution of herbivorous fishes, in particular the parrot fishes. Ancilliary work involves the taxonomy of the parrot fishes (with J. Randall) and surveys of coral trout populations (with A. Ayling, on contract to the Great Barrier Reef Marine Park Authority).
DRS N. HOLLAND and K. SULLIVAN, Scripps Institution of Oceanography and DR D. MEYER, Cincinnati University worked at the Station for the month of August accompanied by a party of 8 assistants from the University of California Research Expedition Program (similar to Earthwatch). Research centred on feeding, nitrogen metabolism and predation on crinoids (feather stars).

DR MEYER revisited for three months on sabbatical from January through April to continue his studies on feeding and predation in crinoids. He was accompanied by his wife and son of 3 months.
DR A. RODANICHE & M. MOYNIHAN, Smithsonian Tropical Research Institute, Balboa: 4 weeks to study social behaviour and communication in cephalopods (squid and cuttlefish).
DR F. PERKINS, Virginia Institute of Marine Science: one week visit to investigate the incidence of pathogens in tropical oysters.
DR R. & A. SCHELTEMA, Woods Hole Oceanographic Institute: continuing studies on reproduction and development in tropical polychaete worms and molluscs.
DR J. RANDALL and two assistants from the Bernice P. Bishop Museum, Honolulu, spent 3 weeks gathering specimens and photographs for his taxonomic work on the parrotfishes of the Indo-Pacific (in conjunction with DR H. CHOAT).
DR C. ERSEUS, Zoology Department, University of Goteborg: Two weeks in November; taxonomy, morphology and physiology of marine oligochaete worms, largely within the family Tubificidae.
DR D. FORD, Union of Concerned Scientists, Massachussets, accompanied by H. KENDALL, visited the Station for a week to pursue general studies on coral reef ecosystems.
DR F. TALBOT, California Academy of Science, visited again for two weeks in December, accompanied by W. & J. Talbot who assisted him with his on-going studies on foraging behaviour and movement in coral reef predatory fishes using ultrasonic transmitters.
DR C. HICKMAN, University of California, Berkely: a two week study in December investigating radular adaptive morphology, systematics and evolution of Trochacea (gastropod molluscs).
MR P. PARKS & DR D. SHALE, Oxford Scientific Films, London: came for their third visit to the Station, again for three months (December through February) to produce scientific documentaries on larval life and plankton in tropical reef waters.
DR YANG, Institute of Oceanography, National Taiwan University: One week visit in February to study distribution and abundance of soft corals in a 'pristine' area prior to monitoring changes in these animals near a power plant in Taiwan.
DR D. DUNN, California Academy of Science, accompanied by DR J. OTTAWAY of James Cook University, returned for a week in February to continue her studies on the symbiotic relationship between anemones and anemonefishes.
DR E. DENTON, Plymouth Marine Laboratory: visited for 2 weeks with his wife while on a Senior Queens Fellowship: studies on the mechanics and morphology of lateral line systems in fishes.
DR I. CORNMAN, Mary Washington College, Virginia: a one-week visit in May, accompanied by his wife, to investigate methods, and suitable locations, to rapidly assay pharmacologically active substances.
DR ten HOVE, Zoology Department, Utrecht University, Netherlands: two weeks studying the biology, ecology and taxonomy of serpulid polychaetes (tube-worms) prior to attending the International Polychaete Conference at the Australian Museum.
DR P. HOCHACHKA, Zoology Department, University of British Columbia, spent 3 days at the Station as a Senior Queens Fellow, to investigate the Station's potential to support research into the biochemistry of energy metabolism in marine animals.

DOCTORAL STUDENTS:

P. BOONE, Griffith University: accompanied Dr Moriarty's team in January to investigate the role of bacteria in coral reef sediments and lagoon waters.
R. SMITH, James Cook University, one week in July: work on the ultrastructure of receptors in serpulid polychaetes (worms) and also assisting Dr.G. Denton in his survey of bioaccumulation of heavy metals.
L. VAIL, James Cook University, visited 3 times during the year in August (2 weeks), October (8 weeks) and February (6 weeks) continuing his field work on the general biology, reproduction and taxonomy of crinoids. Some of this work is in collaboration with Dr D. Meyer.
G. ANDERSON, Macquarie University (on leave from the Australian National Parks and Wildlife Service) spent a total of 24 weeks in four visits during the year. Studies are continuing on the effects of predation on the dynamics of coral reef fish communities.
K. FIJUWHARA, James Cook University, continuing fieldwork for 5 weeks on the ecological distribution of hermatypic corals and crustose coralline algae.
H. SWEATMAN, Macquarie University: final visit of 17 weeks (October through February) to complete his studies on the relationship between existing populations and juvenile recruitment in coral reef fishes.
W. GLADSTONE, Macquarie University, three months from July through October then a final three months from November through March to complete his field studies on the social biology, breeding behaviour, habitat requirements and feeding in the pufferfish Canthigaster valentini.
G. SMITH, Queensland University, three weeks in April studying feeding behaviour and efficiency in relation to nesting success in sea birds around Lizard Island.
F. DOUJAK, R.S.B.S., Australian National University: neurobiology of opto-motor responses in crustacean eyes.
D. BELLWOOD, James Cook University, one week in July and 13 weeks from November through February continuing his field studies on the biology of parrotfishes - juvenile settlement, habitat requirements and feeding behaviour in relation to mouth morphology.
R. OLSON, Harvard University: Competition for space, sun-shade relationships, reproductive ecology and larval dispersal in the algal-bearing ascidian Didemnum molle.

In addition, two graduate students visited to seek out projects suitable for higher degrees:
N. ANDREWS from Auckland University (who also assisted Dr. H. Choat for 2 weeks in July on his parrot fish survey), and
L. NEWMAN spent 10 days in September looking at mollusc biology.

WORK EXPERIENCE:

J. DOWNES (St. Theresa's Agricultural College, Ingham);
M. KESTERTON (Knox Grammar School);
B. DASH (Farm Life Holdings, Victoria) and
G. WONG (Cairns State High School) spent periods of 10 to 14 days at the Station on work experience programs. Miss G. Wong was the winner of the Far North Queensland Promotions Bureau essay competion on the Barrier Reef and her 'prize' was a week working with visiting scientists at the Lizard Island Research Station.

NON SCIENTIFIC VISITORS:

Barney and Bev LYNN visited the Station for three days in July to discuss the Station's development plans with the Director. Mr. Lynn is a Cairns based architect and has been commissioned to design the new laboratory extensions.

R. PREIST and a party of 5 surveyors and draftsmen spent 4 weeks in October mapping the underwater regions around Lizard Island on a contract to the Great Barrier Reef Marine Park Authority.

C. O'NEIL and a party of 5 surveyors and draftsmen came shortly after for two weeks to survey the foreshores to high water mark for the Queensland Government.

Z. FLORIAN of James Cook University returned again for a week in January to service the Station's microscopes and assist other researchers around Lizard Island. Zolly also crewed the R.V. SUNBIRD from Cairns to Lizard after her commissioning on April 16th.

MR & MRS REID of the Lizard Island Reef Research Foundation visited in June to inspect the Station's development and discuss fund-raising possibilities with the Director.

DICK SMITH overnighted at the Station on May 27th., landing his helicopter right in front of the office. He was on the final leg of his 'solo round the world helicopter flight'.

Other notable visitors were PRESIDENT SAJI (of Suntory Ltd.) who was accompanied by Dr. Griffin and Dr. Baker for three days in November; MR. JOHN GAYLOR (Federal Member of Leichhardt) and MR. MICK YOUNG (special Minister for State), accompanied by their wives, visited the Station on May 30th.; and MR. BOB SCOTT (State Member for Cook) inspected the Station on June 3rd.

BUDGET:

Many visiting researchers have expressed the concern that the development of the facilities will add unduly to the costs of operating the Station, and hence put up the costs to them of visiting. During the period 1976 to 1983-84, annual recurrent expenditure to operate the Lizard Island Research Station has risen from $80,000 to $125,000. This is an increase of only 56% - much less than the rate of inflation. Furthermore, 75% of this goes in salaries, fees, insurance, freight and, quite significantly, fuel costs.

The justification is that a greater number of researchers, with a wider range of interests, are now able to use these facilities.

PUBLICATIONS:

Seventeen new publications resulting from work done at the Lizard Island Research Station have been received during the year bringing the total for 9 years to 104.

LIST OF PUBLICATIONS FROM WORK DONE AT THE LIZARD ISLAND RESEARCH STATION

The following papers have been received during 1982-83.

Banner D M and A H Banner, 1982. 88
The Alpheid Shrimps of Australia, Part III.
Rec. Aust. Mus., 34(1-2):1-357

Buckley R C, 1981. 89
Scale-dependent equilibrium in highly heterogeneous islands: plant geography of the northern Great Barrier Reef sand cays and shingle islets.
Aust. J. Ecol., 6:143-147.

Buckley R C, 1982. 90
Short note: Patterns in north Queensland mangrove vegetation.
Aust. J. Ecol., 7:103-106

Cheng L and P D Schmitt, 1982. 91
Marine insects of the genera *Halobates* and *Hermatobates* (Heteroptera) from neuston tows around Lizard Island, Great Barrier Reef.
Aust. J. Mar. Freshwat. Res., 33:1109-1112.

Crossland C J, 1980. 92
Release of photosynthetically-derived organic carbon from a hermatypic coral, *Acropora* cf. *acuminata*.
In: Schwemmler W and H E A Schenk (Eds.) Endocytobiology Endosymbiosis and Cell Biology, Vol I. Walter de Gruyter, Berlin. pp 163-172.

Crossland C J, D J Barnes, T Cox and M Devereus, 1980. 93
Compartmentation and turnover of organic carbon in the staghorn coral *Acropora formosa*.
Marine Biology 59:181-187.

Jones A R, 1981. 103
Crustacean community ecology of sublittoral sedimentary areas of Lizard Island, Great Barrier Reef. (Abstract).
Bull. Mar. Sci., 31(3):809.

Luong-Van Thinh and D J Griffiths, 1982. 94
In vivo absorption spectra for the prokaryotic algal symbionts in a range of didemnid ascidians of the Great Barrier Reef.
Phycologia (in press).

Meyer D L and D B Macurda Jr., 1977. 95
Adaptive radiation of the comatulid crinoids.
Paleobiology, 3:74-82.

Moyer J T and Y Yogo, 1982. 96
The lek-like mating system of *Halichoeres melanchir* (Pisces:Labridae) at Miyake-jima, Japan.
Z. Tierpsychol., 60:209-226.

Thompson G B and C Thompson, 1982. 97
Movement and size structure in a population of the blue starfish *Linckia laevigata* (L.) at Lizard Island, Great Barrier Reef.
Aust. J. Mar. Freshwat. Res., 33:561-573.

Thompson R D and T J Golding, 1982. 98
Tidally induced 'upwelling' by the Great Barrier Reef.
J. Geophys. Res., 86(C7):6517-6521.

Thresher R E and J T Moyer, 1983 104
Male success, courtship complexity and patterns of sexual selection in three congeneric species of sexually monochromatic and dichromatic damselfishes (Pisces: Pomacentridae).
Anim. Behav., 31(1):113-127.

Wass R E and L Vail, 1981 99
Early growth of Bryozoa at Lizard Island, Great Barrier Reef.
In: Larwood G P and C Nielsen (Eds.), Recent and Fossil Bryozoa.
Olsen & Olsen, Denmark. pp.299-303.

Wolanski E, 1982. 100
Low level trade winds over the western coral sea.
J Applied Meteorology, 21:881-882.

Wolanski E and A F Bennett, 1983. 101
Continental shelf waves and their influence on the circulation around the Great Barrier Reef.
Aust. J. Mar. Freshwat. Res., 34:23-47.

Wolanski E and D van Senden, 1983. 102
Mixing of the Burdekin River flood waters in the Great Barrier Reef.
Aust. J. Mar. Freshwat. Res., 34:49-63.