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James Bowen and Margarita Bowen
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THE GREAT BARRIER REEF
HISTORY, SCIENCE, HERITAGE

One of the world's natural wonders, the Great Barrier Reef stretches more than 2000 kilometres in a maze of coral reefs and islands along Australia's north-eastern coastline. This book unfolds the fascinating story behind its mystique, providing for the first time a comprehensive cultural and ecological history of European impact, from early voyages of discovery to the most recent developments in Reef science and management. Incisive and a delight to read in its thorough account of the scientific, social and environmental consequences of European impact on the world's greatest coral reef system and Australia's greatest natural feature, this extraordinary book is sure to become a classic.

After graduating from the University of Sydney and completing a PhD at the University of Illinois, **James Bowen** pursued an academic career in the United States, Canada and Australia, publishing extensively in the history of ideas and environmental thought. As visiting Professorial Fellow at the Australian National University from 1984 to 1989, he became absorbed in the complex history of the Reef, exploring this over the next decade through intensive archival, field and underwater research in collaboration with **Margarita Bowen**, ecologist and distinguished historian of science. The outcome of those stimulating years is this absorbing saga.

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*To our grandchildren,
with hope for the future in the hands of their generation*

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JAMES BOWEN

AND

MARGARITA BOWEN



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ABBREVIATIONS AND ACRONYMS

AAO	Australian Associated Oilfields
ABARE	Australian Bureau of Agricultural and Resource Economics
ACC	Aboriginal Co-ordinating Council
ACF	Australian Conservation Foundation
ACSI	Australian Council for Science and Industry
AFZ	Australian Fishing Zone
AIMS	Australian Institute of Marine Science
AMPOL	Australian Motorists Petroleum Organisation Limited
AMS	Australian Museum Series archives
AMSA	Australian Maritime Safety Authority
AMSTAC	Australian Marine Scientific and Technology Advisory Committee
ANZAAS	Australia and New Zealand Association for the Advancement of Science
APEA	Australian Petroleum Exploration Association
ASN	Australasian Steam Navigation Company
ASTEC	Australian Science and Technology Council
Au.Arch.	Author's Archives: documents held in the author's possession
AUC	Australian Universities Commission
BA	British Association (for the Advancement of Science)
BISN	British India Steam Navigation Company
BRIAN	Barrier Reef Imaging Analysis
CCD	Correspondence of Charles Darwin
CFC	chlorofluorocarbons
CISI	Commonwealth Institute of Science and Industry
COAG	Council of Australian Governments
COTSAC	Crown of Thorns Starfish Advisory Committee
CRC	Cooperative Research Centre
CSIRO	(Archives of) Commonwealth Scientific and Industrial Research Organisation
DITAC	(Commonwealth) Department of Industry, Technology and Commerce
dwt	deadweight (total tonnage mass of a ship and all contents)
ENSO	El Niño Southern Oscillation
EEZ	Exclusive Economic Zone
EMBL	Enewetak Marine Biological Laboratory
FAO	(United Nations) Food and Agriculture Organisation

ABBREVIATIONS AND ACRONYMS

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GBRC	Great Barrier Reef Committee
GBRMPA	Great Barrier Reef Marine Park Authority
GEEP	Group of Experts on the Effects of Pollution
GPS	Global Positioning System
HRA	Historical Records of Australia
HR.NSW	Historical Records of New South Wales
IDC	(Commonwealth) Interdepartmental Committee
IMO	International Maritime Organisation
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature and Natural Resources, now the World Conservation Union
LIE	Low Isles Expedition. The six Reports to the GBRC by Yonge in the author's archives are catalogued as follows: Yonge:LIE, followed by the sequence in Roman numerals from I to VI, followed by month and year, and finally page number
MPBL	Mid-Pacific Marine Laboratory
mya	million years ago
NOAA	National Oceanic and Atmospheric Administration
NPA	National Parks Association (of Queensland)
OPEC	Organisation of Petroleum Exporting Countries
PPC	Pan-Pacific Congresses, 1923, 1926
PPSC	Pan-Pacific Scientific Conference, 1920
PSA	Prices Surveillance Authority
QDoE	Queensland Department of the Environment
QFBP	Queensland Fisheries and Boating Patrol
QFMA	Queensland Fisheries Management Authority
QNPWS	Queensland National Parks and Wildlife Service
QPD	Queensland Parliamentary Debates
QPWS	Queensland Parks and Wildlife Service
RAP	Representative Areas Program
RGSAQ	Royal Geographical Society of Australasia, Queensland
TrawlMAC	Trawl Management Advisory Committee
UQA	University of Queensland archives
UNESCO	United Nations, Educational, Scientific and Cultural Organisation
VLCC	Very Large Crude Carriers (ships over 60,000 tonnes dwt)
VMS	Vessel Monitoring system
VOC	United East India Company (Vereenigde Oostindische Compagnie)
WCU	World Conservation Union

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PREFACE

The Great Barrier Reef, Australia's most outstanding natural feature, has captured the interest of scientists and tourists from around the world. Yet surprisingly, despite its immense attraction, scientific importance and heritage value, no single, comprehensive account of its fascinating history has ever been published.

My own interest in the Reef, arising from a lifetime of involvement with coastal and marine environments, was initially aroused by the Great Barrier Reef conservation conflict of the 1960s. During an academic career that included extensive publishing in the history of ideas and environmental thought, the present study was commenced as a visiting Professorial Fellow in the Centre for Resource and Environmental Studies of the Australian National University from 1984 to 1989. In that stimulating context the task was conceived as a project to bring into the public record the history of the Great Barrier Reef since its discovery by Europeans.

This became a challenging collaborative research project with Dr Margarita Bowen, scientist and historian. Following the original conception we worked closely together, guided by her wide experience in ecological studies and competence in the study of the development of scientific thought, originally presented in her impressive study of scientific ideas in the eighteenth and nineteenth centuries in *Empiricism and Geographical Thought* (1981). Published in the prestigious Cambridge Geographical Studies series, that work still challenges much ecological theory today. The conceptual structure for this book has also depended on her concern to ensure indigenous justice, and understanding of heritage issues gained while working in the Commonwealth Department of the Environment in Canberra.

Throughout the following decade this led us to undertake extensive and memorable field studies over the entire Reef area: on research vessels and patrol boats; in aerial surveys, and scuba diving with scientific colleagues and Marine Park rangers on reefs from Lady Musgrave and the outer Swains complex in the south to Lizard Island in the north; with further travel on ships to Torres Strait, the Great North East Channel and reefs in Papua-New Guinea, New Britain and across the Coral Sea to New Caledonia and Vanuatu. Margarita, however, drew the line at joining me on several expeditions to the outer Swain Reefs to catch sea snakes for ecological surveys, perhaps a wise precaution since on one occasion I was struck on the leg by an aggressive olive sea snake, whose fangs fortunately did not penetrate my wetsuit. A significant part of our time was spent with research teams at the field stations of Heron, One Tree and Orpheus Islands, and in residence for numerous periods at the Australian Institute of Marine Science and at the Sir George Fisher Centre for Tropical Marine Studies of James Cook University in Townsville. In

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every case our inquiries met with an encouraging enthusiasm for this project and a generous sharing of information.

As research on this study progressed, it was dismaying to discover how little of the historical record was freely available: the numerous scientists with whom we had sustained contact knew almost nothing of the background to their own specialties. Modern science is characterised by the dominant ethos of what I call ‘presentism’: ten years ago for many is ancient history and considered of no use in current research. It is perhaps a sad irony that the very nature of the sciences as they developed in the nineteenth century – reductionist, specialised, materialist and with a pronounced rejection of the past in favour of progress – has frequently resulted in a loss of knowledge, with an exclusion of history and the search for a broader vision. That is a deprivation for science, and for the human spirit: without knowledge of the past we lack any sense of continuity with it and with the world of ideas where our minds can travel, survey and enjoy the incredible richness of human experience.

The quest then, became one of attempting to return that historical heritage, in a coherent, integrated account, to public view. Along with extensive field experience this led me to the equally fascinating search for early primary sources, including travel journals, archive records and in many cases the personal recollections of key figures in reef research and management since 1975. On many occasions I was evidently the first person to open boxes long stored on repository shelves, or to ask questions of significant participants in more recent events. Those searches have enabled the later chapters to be documented from previously unpublished archival material covering the period from the late 1890s to the Low Isles Expedition of 1928–29. The chapters recounting the final decades of the twentieth century are based, in part, on previously obscure Commonwealth records, and valuable interviews with persons directly involved in the formation of the Great Barrier Reef Marine Park Authority and subsequent events leading to its World Heritage listing by UNESCO. In the case of several of those distinguished men and women who entrusted me with their records and documents, their voices, regrettably, are now silent.

As the book developed Margarita Bowen undertook the demanding task of scientific revision and editing to ensure the highest standard of accuracy. Throughout the text she wrote new sections and substantially revised others to correct errors of fact or interpretation and provide greater clarity of expression, particularly in regard to the conceptual framework of current theory of science, ecological debate and heritage issues. Her expertise has brought the narrative to a standard that otherwise could not have been attained.

During the process of editing the very lengthy draft, due to limitations of space, had to be extensively abridged for publication. As a result a large amount of contextual detail had to be removed, including a number of topics closely related to Reef history, notably the century long quest for an Australian marine research centre as revealed in the fascinating story of the Miklouho–Maclay station of the 1880s and Sydney’s aborted Watsons Bay station of the 1930s. Likewise excluded were fuller accounts of MacGillivray’s untimely

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dismissal from the survey by the Herald, and the furious continuation of the controversy on coral reef formation with the defence of Darwin by the great American geologist James Dana in the late nineteenth century. Moreover, given the explosion in scientific investigation of coral reefs worldwide, and associated conservation activity, it has been possible to report only selectively from the huge quantity of publications.

From the extensive literature of relevant studies – in addition to numerous colourful travel books on the wonders of the Reef – many informative works have been consulted. These, however, invariably concentrated on a single issue such as exploration, settlement, resource extraction, or on scientific aspects, chiefly topics in biology and geology. Despite the considerable volume of publications, the Great Barrier Reef so far has not had the fascinating saga behind its complex tapestry of history brought together in a composite narrative. This book, then, is our pioneer project to provide a continuous – but by no means complete – contextual history of the Reef in a single volume.

James Bowen
Research Fellow
Environmental Science & Management
Southern Cross University

ACKNOWLEDGMENTS

This project has depended on many persons and institutions: it is both a pleasure and responsibility to acknowledge the valuable help received. Initial support was generously provided by the Centre for Resource and Environment Studies (CRES) at the Australian National University, with an appointment as Visiting Professorial Research Fellow 1984-89. The encouragement given by former Directors, Professor Stuart Harris and Professor Henry Nix, and by distinguished colleagues such as Professor Stephen Boyden and the late Dr H. C. ('Nugget') Coombs, is deeply appreciated.

Much subsequent field work was undertaken during periods of residence at the Australian Institute for Marine Science (AIMS) near Townsville, and thanks are extended to former Director, Dr Joe Baker OBE and to many staff members, including Dr John (Charlie) Veron, Dr Paul Sammarco and Dr Barry Clough who gave freely of their expertise and provided opportunities to join them in reef research at sea and in mangrove restoration projects on Hinchinbrook Island and in the Daintree River. Professor David Hopley, Director of the Sir George Fisher Centre for Tropical Marine Studies at James Cook University, kindly arranged a year as Visiting Research Fellow in 1990, with invaluable access to their Orpheus Island Research Station and surveys aboard the RV *Kirby*. Professor Hal Heatwole of the University of New England provided opportunities to join several voyages to the outer Swain Reefs to assist in projects such as ecological surveys of sea snakes, and Dr Ove Hoegh-Guldberg of Sydney University facilitated a period of research residence on One Tree Island and Heron Island Research Stations.

Acknowledgment must be made of the valuable assistance received throughout from the Great Barrier Reef Marine Park Authority: in particular from former Chairman of the Authority, Professor Graeme Kelleher AO; former Chief Executive Officers Dr Don Kinsey AM and Dr Wendy Craik, and Education Officer, Mr Ray Neale. Mr Jon Day, as Director of its Conservation, Biodiversity and World Heritage Group kindly helped revise sections on current management, while many staff were helpful in providing ready access to recent data.

The Queensland Parks and Wildlife Service also generously provided field experience in aerial surveying of the Marine Park northern Section and with QNPWS Rangers on visits to Lizard Island. In the Cairns area Rangers Robert Zigterman and Gary Barnes arranged both informative discussions with staff on joint management of the Reef, and valued opportunities to observe monitoring of reefs and islands in the patrol boat *Caretta*. Dr Col Limpus welcomed participation in the Turtle Research and Conservation Program at the Mon Repos research station; and Peter Ogilvie, Manager of the World Heritage Unit of QPWS contributed valuable advice on recent developments in Reef management.

ACKNOWLEDGEMENTS

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Important insights into problems of navigation in Reef waters were gained from seamen on traverses across the Coral Sea past Willis Island to Townsville, and through the North East Channel to Torres Strait. On MV *Norwegian Star*, Captain Konstantinos Fafalios and his officers were most helpful in assisting studies from the bridge, and the Torres Strait pilot on board, Captain John Foley, generously shared his considerable navigational expertise and knowledge of Reef maritime history. Expert assistance on historical aspects and current procedures in Reef hydrography was willingly provided at the Australian Hydrographic Office of the Royal Australian Navy by Hydrographer Captain Bruce Kafer, assisted by Nautical Information Officer Kevin Slade and archivist Arnie Larden. Former RAN Deputy Hydrographer, Commander Reg Hardstaff, author of *Leadline to Laser*, was particularly generous in sharing his extensive surveying experience.

This project has also benefited from the assistance of many persons who were centrally involved in the development of Reef science and conservation in Australia and who courteously gave time for lengthy interviews, throwing new light on recent decades. It is a pleasure to express appreciation for the kind cooperation of: Dr Max Day AO, FAA, chairman of the Interim Council of AIMS; Professor Ken Back AO, Foundation Vice Chancellor of James Cook University; the late Mr Henry Higgs, and Dr Donald McMichael CBE, former Chairs of the Great Barrier Reef Marine Park Authority; Professor Malvern Gilmartin, Foundation Director of AIMS; the late Emeritus Professor Dorothy Hill AC and the late Dr Robert Endean of the University of Queensland; Dr Patricia Mather AO at the Queensland Museum, and Emeritus Professor Burdon-Jones, formerly Foundation Professor of Biology at James Cook University; Professor John Coll, formerly of James Cook and now Vice Chancellor of the Australian Catholic University. Valuable advice was also provided by Emeritus Professor Frank Talbot of Macquarie University, formerly Director of the Australian Museum and then of the Smithsonian National Museum of Natural History, and by Dr Ian McPhail, a former Chair of GBRMPA and now Deputy Director-General of the Queensland Environmental Protection Agency.

As in all historical research this study, which often required access to rare or obscure materials, has relied constantly on libraries and the dedicated service so willingly given by their staff – in every case with skill and enthusiasm. In Canberra valuable information and archival assistance came from the National Library of Australia and the Australian National University libraries, including the library of the Australian Institute of Aboriginal and Torres Strait Islander Studies and its bibliographer Mr Barry Cundy; while interesting and highly relevant archives from 1900 to 1920 were located with the kind help of CSIRO archivist Mr Rodney Teakle.

Courteous and expert assistance was also provided in Sydney by the Mitchell Library; by Mr Julian Holland of the Macleay Museum in the University of Sydney; and by Ms Jan Brazier, archivist of the Australian Museum, with Ms Carole Cantrell and Ms Ann Pinson, current Records Officer. In Lismore the librarians of Southern Cross University kindly provided access to early Australian materials in the Manning Clark collection.

ACKNOWLEDGEMENTS

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Likewise, in Brisbane thanks are extended to: Ms Megan Lyneham, archivist in the University of Queensland; Mss Kath Buckley and Megan Lloyd, librarians of the Queensland Museum; and the staff of both the Oxley Library and State Library of Queensland. In Townsville excellent assistance was provided by the superb library at AIMS with its Yonge historical collection, under the skilled attention of former librarian Inara Bush; and by the library of James Cook University, particularly its rare book collection. The most sustained support in Reef research documents over a number of years came unfailingly from Ms Suzie Davies, librarian of the Great Barrier Reef Marine Park Authority.

In addition, grateful acknowledgment is made to the Great Barrier Reef Marine Park Authority for their generous provision of the colour illustrations, to the photographers who are acknowledged within the captions, and to Julie Jones and Holly Savage, GBRMPA Image Collection officers, for their competent assistance. Sincere appreciation is also extended to Cambridge University Press for their enthusiasm and guidance through the process of publication.

