
Preface

The genesis of this book lies in a research project that began 30 years ago. In 1982, I was one of an Australian university team beginning a study of the ecology of sea snakes in the Swain Reefs, the southernmost complex of the Great Barrier Reef some 220 km out to sea. Our days underwater took place in a wonderland of biological diversity with fish in a seemingly infinite variety of colour and species darting in and out of forests of branching, plate and clustering corals, and where Christmas-tree worms and small clams had burrowed into the *Porites* boulder corals. Squid passed overhead occasionally, the inevitable curious reef shark at times stationed itself nearby for a few minutes, later to disappear with a flick of its tail, while with some regularity came the startling experience of a metre-long venomous olive sea snake suddenly rising from below and peering intently into my facemask. Green algae waved in the current and anemone fish kept retreating into their protective refuges. The sandy coral cays, some hundreds of which comprise the Swains, were alive with nesting terns, shearwaters and boobies, and during the warm summers at the time of the full moon, green turtles clambered up the dunes to excavate depressions in which to lay their clutch of some 90 eggs.

Even after decades of diving, I remain fascinated by the beauty and complexity of the marine world, and particularly by the Great Barrier Reef. Throughout the 1970s, it became the scene of the greatest environmental protest movement ever witnessed in Australia after a corrupt Queensland Government had clandestinely leased its entire length in 1968 to six oil corporations for exploratory drilling. As my academic interests lie in the history of philosophical and scientific thought, it was with considerable enthusiasm that I joined the ecology project on the RV *Australiana* to begin research into the complex history of the Great Barrier Reef from its initial charting by James Cook in 1770 to the present day and the later revelations of the Royal Commission that swept the government from office.

As our ship navigated the complexity of islands, cays and shoals, cruise after cruise every semester vacation for several years, I became intrigued to discover that little in the literature dealt specifically with the exciting saga of the scientific quest to investigate and solve the centuries long coral reef enigma. How had dangerous reefs and atolls appeared across the great empty expanses of the Indian and Pacific oceans with their astonishingly diverse range of plants and animals?

By the time my study of the Great Barrier Reef was published in 2002, it had also become distressingly obvious wherever I travelled and dived, and from an increasing volume of disturbing reports appearing in the journals, that coral reefs had been silently but relentlessly degraded during the previous 20 years from rising water temperatures, disease, bleaching and often death. As a result, I believed it was imperative to record those alarming developments during the final decades of the 20th century, and to set them into the broader political context of today.

Essentially, the study is interpretive and begins with the discovery of coral reefs by Europeans, in the sense that “discovery” here means “revealed to knowledge” by early navigators, particularly their natural beauty. In “A Voyage to *Terra Australis*” of 1802, Matthew Flinders

described reefs on its eastern coast “glowing under water with vivid tints of every shade betwixt green, purple, brown and white; equalling in beauty and excelling in grandeur the most favourite *parterre* [floral arrangement] of the curious florist”. That sense of wonder led investigators over three centuries in Part I into a virtual scientific crusade to uncover every link in the chain of natural creation.

In Part II, the narrative moves to a phase marked by the suggestion of a Swedish chemist in 1896 that noticeable changes in surface temperature apparently affecting climate had been caused by increases in atmospheric carbon dioxide. With the rapid development and employment of carbon fuel technology in the 20th century, the entire world is now becoming overwhelmed by the inexorable processes of climate change. The concluding chapters therefore examine seminal evidence for our unprecedented global predicament, characterized by the progressive disturbance of the biosphere with coral reefs moving into a state of possibly terminal decline in what future generations will know as the Anthropocene Epoch. As civilization has only recently developed in the relatively warm interglacial Holocene Epoch beginning 10,000 years ago, and coral reefs entered our consciousness barely 400 years ago after a few western nations initiated the Age of Discovery, in less than 400 years we may be destroying an irreplaceable natural creation reaching back millions of years.

The Great Barrier Reef lost 50% of its coral cover during the past 27 years, and although, like so many well-promoted holiday resorts, the atolls of the Tuomotu Archipelago and the volcanic eruptions of the Marquesas Islands of French Polynesia are enticingly beautiful in tourist brochures, beneath the waves are heartbreaking scenes of impoverished marine habitats. The seas of Indonesia, the Philippines, New Caledonia and the Caribbean are an even greater shock to the senses, human pressure in many places having created underwater wastelands. Present evidence indicates that if not by 2050, certainly by the 22nd century, coral reefs as we have known them, and the Great Barrier Reef in particular, may no longer exist, having possibly succumbed to an anthropogenic extinction.

Optimism, however, is still entertained by those scientists who believe that corals have an inherent capacity for survival and evolutionary adaptability, as demonstrated after the Permian Extinction that ended 225 million years ago when tabulate and rugose corals perished, and today’s reef-building *Scleractinia* and other hermatypic genera succeeded them. Similar surprises may yet lie ahead, because the “coral reef enigma” was not simply an early impression of investigators, but a characteristic also of the unpredictable repertoire of coral polyp responses themselves.

As we ponder the evidence in the follow pages, it is necessary to remain aware that reefs have become indicators that in present decades signal the end of an environmental era. Consequently, the story of human impact on coral reefs over the past century becomes highly relevant to the need for informed decisive action on the entire range of global issues, because the time most assuredly will soon come when we can procrastinate no longer.

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