

PREFACE

In April 1999, I was in Fort Lauderdale, Florida, attending a scientific conference hosted by the newly formed National Coral Reef Institute at Nova Southeastern University. About five hundred coral reef scientists were gathered to explore the science of assessing, monitoring, and restoring coral reefs. There were the usual plenary talks, contributed papers, and lively poster sessions, where enthusiastic students and professors display posters describing their current research and try to entice other participants with their elevator pitches: “My work is really exciting because . . .”

Poster sessions are great times for conversation, about the posters and about a host of other topics. The coral reef science community is a widely scattered but closely knit community of colleagues, collaborators, and friends. In the best conferences (and this was one) the conversations are helped along by a liberal supply of alcohol and snacks. I don’t remember my paper, or much else about that conference, but I do remember those conversations, because so many of them centered on the circumtropical bleaching event that had just ended late the year before.

A mass bleaching event is a rapid and conspicuous change on a reef, caused by physiological stress being experienced by the corals. The stress leads to a breakdown of the most important symbiotic relationship on reefs, that between the corals and their microscopic algal symbionts. The algal cells (hundreds of thousands to millions per square centimeter of coral tissue) are pigmented, and as they are expelled the coral turns a ghostly white.

This can happen overnight. In 1997–1998, during the then strongest El Niño event on record, coral reefs had turned white around the world. It was the first time bleaching had occurred on such a massive scale. Over the weeks after bleaching, many of those corals had died, and there were reports of reefs in all oceans that had suffered extremely high die-offs of coral. The Fort Lauderdale conference was the first opportunity many of us had to talk with colleagues who had witnessed this destruction. We all understood the seriousness of what had happened, and I remember that we all anticipated that a signal as conspicuous as what had just occurred would surely be a sign to the world that we had to deal with climate change, and quickly. We found that expectation comforting. Except that it did not happen. Most of the world just did not care.

This situation is deeply unfortunate, because as well as being ecologically and economically valuable ecosystems, coral reefs are a supremely magnificent feature of our planet, majestic oceanic realms with amazing stories to tell. Their stories can bring pleasure, open us to new perspectives, and delight our minds and senses while revealing intricacies in the way this world we inhabit is assembled. Reefs offer stories of sublime beauty and of great power, as well as stories that can help us understand our current predicament as we alter our world in ways that will do harm to us and those we love. Remembering the conversations in Fort Lauderdale, I knew I needed to write, because I believe we need those stories. This book is about coral reefs and what they say to me. It is also about what is happening to reefs, about why, and about what this says about us. But it is mainly about what reefs are and how we need to appreciate them.

Why need and appreciate? I say “need” because I am convinced that humanity must relearn something most of us have long forgotten—that we are a part of the biosphere on this planet, not external to it. Connecting with natural ecosystems can help us do that, and reefs offer many ways in which we can connect. I say “appreciate” because, despite being regularly deluged with stunning images, evocative videos, and detailed descriptions in the media and all over the web, we remain largely ignorant of what reefs are or why they are worth caring about at all. Reefs are part of the Other, not part of our world, and one brief snorkel tour during a beach vacation doesn’t

build an emotional connection. My goal is to get at least some few more of us to know reefs a whole lot better. Only by knowing them better will we truly understand the important messages they bring. Understand, and care about, those reefs and their messages. Appreciate them.

Despite having been around for a very long time, coral reefs are perhaps the most sensitive of all ecological systems, easily disrupted or destroyed by changing circumstances or human action. Coral reefs are being very substantially altered by the stresses we are causing today. In 2011, I detailed this story in *Our Dying Planet*, stating that by 2050 coral reefs as I knew them in the late 1960s will simply not be present anywhere on this planet.

Think what that statement means. I wasn't saying that *some* coral reefs will be degraded. I was saying that *all* coral reefs could be lost. It's like saying that *all* rain forests around the world will soon be pastures. We have never yet had that profound a global impact on any major ecosystem, yet we could eliminate coral reefs in just three more decades! I still fear that. There remains a vanishingly small window of opportunity for us to alter our behavior, reduce the impacts we are having on the planet, and help a few lucky reefs to persist and maybe to flourish, but we show little sign of wanting to take advantage of that window.

I was not the first reef scientist to warn of the loss of coral reefs. One of the plenaries at that 1999 conference was titled, "Is It Time to Give Up?" It was subsequently published (R. W. Buddemeier, *Bulletin of Marine Science* 69 [2001]: 317–326). In it, Bob Buddemeier of the University of Kansas argued that we needed to practice triage to prioritize where to put our science and conservation efforts because we had to face the fact that most reefs were now toast. Several of us have done our best since to try and articulate just what we humans are doing and the likely consequences. Our efforts have failed.

Since 2011, I've reached the conclusion that patiently explaining the cost of continuing our present patterns of behavior is just not working to get us to move. Like deer in the headlights, we stand, and we wait, and we watch, and then we take token steps or continue as before.

And so, I turn to stories from a coral reef. Because I believe that, if we can reconnect with the natural world, then maybe we can come to actually ap-

preciate, in a visceral way, that our civilization cannot survive on this glorious rocky planet hurtling through the universe if we go on as we have been. We must take care to preserve the capacity of ecological systems to sustain their integrity and resilience.

The biosphere is not simply here, one fact about our world; the biosphere makes it possible for us to be here, and reefs are sublime portions of the biosphere. In fact, reefs are so sublime, fascinating, and marvelous they make connection easy. But first we need the stories. I believe that the wonder that reefs can inspire can lift our spirits and drive the reforms that we must make. Just possibly, reefs might help us act sufficiently fast to save them too.



Apart from a brief account of my own awakening, this book proceeds from accounts of coral reefs as natural phenomena, to aspects of how reef ecosystems function, and to how we perceive and value reefs. The final chapters deal with the important message that reefs have been trying to send, why we have failed to notice, and what we need to do to right the damage we have been doing to the biosphere. I am hopeful that we will be inspired to act forcefully and soon. My stories are mostly ones of how our comprehension of coral reefs has grown with the growth in reef science. Many of the stories also have a chronology driven by the way in which scientists pursued them over many years, and some of the later tales are more recent in the sense that the underlying science began to be explored more recently. In telling these stories, I have tried to tell of the discovering as well as the discoveries, because I find accounts of how science is done far more compelling than an enumeration of the results. Some of the science discussed is my own but most is not, and the focus on scientific understanding is simply a consequence of how I have always approached the natural world. This book is my effort to reveal the wonder that coral reefs can inspire. Come with me on this journey!

CORAL REEFS

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