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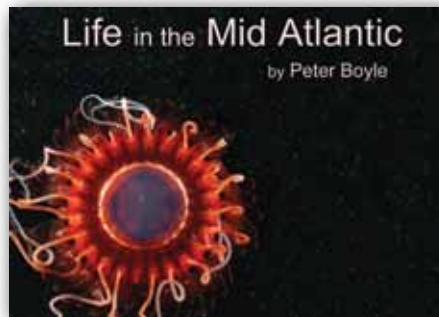
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Life in the Mid Atlantic

By Peter Boyle, Bergen Museum Press,
2009, 240 pages, ISBN 82-7887-038-1,
Hardcover

REVIEWED BY CLYDE F.E. ROPER

A quick summary of Peter Boyle's *Life in the Mid Atlantic* is revealed in the subtitle: "An exploration of marine life and environment in the middle of the North Atlantic Ocean from sea surface to the sea bed." This book presents detailed, authoritative, and broad coverage of an international expedition designed to explore the sea life that inhabits the northernmost section of the Mid-Atlantic Ridge. Part of the global mid-ocean ridge system that defines divergent plate boundaries, the Mid-Atlantic Ridge rises to a height of 3,000 to 4,000 meters above the deep seafloor, occasionally even higher to break the sea surface as volcanic islands such as Ascension and Tristan da Cunha, far to the south, and Iceland to the north. The expedition to explore the Mid-Atlantic Ridge was a part of the international Census of Marine Life program whose goal was to assess the species of marine organisms living in the world ocean. The concept for the Census grew out of the recognition by marine scientists around the world that life in the deep sea was extremely poorly known. Numerous workshops and discussions among hundreds of marine scientists (e.g., see *Oceanography* volume 12, number 3 at http://tos.org/oceanography/issues/issue_archive/12_3.html) resulted in the awarding of very significant Sloan Foundation funding for the



establishment and execution of the Census of Marine Life. In all, 17 major field programs were designed to answer the very broad questions: What lives in the ocean? What lived in the ocean? What will live in the ocean?

One of the first endeavors to seek answers to these questions was the Mid-Atlantic Ridge Program, nicknamed "Mar-Eco." The Norwegian research vessel *G.O. Sars*, equipped with the most modern instrumentation and technology, provided the very able platform from which a team of marine researchers from 13 countries could conduct their sampling and studies. *G.O. Sars* explorations covered three major areas: the "Northern Zone," just southwest of Iceland; the "Southern Zone," just north of the Azores; and the "Central Zone," located halfway between the two. The cruise track extended nearly 5,000 km out and back along the Mid-Atlantic Ridge, over depths as great as 4,500 m to as shallow as 700 m.

Boyle describes the broad objectives of the Mar-Eco program: to identify the species captured, to map their distributions both geographically and vertically, and to estimate the abundance of these species and to compare it with the same or closely related species from other regions. Further, program participants expected to determine prey-predator relationships among species, enhance

understanding of distribution and abundance in relation to biological and physical factors, and model the way overall environmental conditions affect these organisms and patterns. To help achieve these ambitious goals, 35 scientists from 13 countries participated in the expedition.

The stage is set for the presentation of expedition results by a detailed description of the research platform *G.O. Sars*. With a total length of 77.5 m, a beam of 16 m, quiet but powerful diesel-electric engines, and a towing capacity of 50 tonnes of submerged gear, the research vessel is ideally capable of conducting explorations in any ocean, to any depth and any niche. Boyle provides excellent descriptions of the modern equipment and instrumentation available to sample the physical, chemical, and biological parameters of the target depths and regions. Among them are remotely operated vehicles (ROVs) and autonomous landers, each carrying an array of instruments and camera equipment.

While modern instrumentation, including advanced sonic devices that virtually "see" remote habitats and organisms, can be highly effective, nothing quite stirs the blood of a marine biologist as does seeing, handling, examining, dissecting, and identifying the myriad animals of the great depths. The traditional method of using nets to sample the ocean, from the shallowest surface waters to the expansive realm of the very deep sea, still proves to be the most effective way to obtain organisms from their natural habitats. However, modern deep-sea sampling has been greatly enhanced by clever net design, from extremely fine-meshed

plankton nets to massive mid-water trawls with vertical mouth openings of 90 to 180 m and horizontal trawl door openings of 150 m.

The body of the book describes the results of the expedition in the logical sequence of the biological (and sampling) regime: the upper layers, the mid-depths, and the near-bottom deep sea. Each section is engagingly written and lavishly illustrated with stunning photographs of the inhabitants of that zone, from tiniest plankton and candy-apple red jellyfish to leaping dolphins and satellite-tagged whales in the epipelagic zone; from toothy, prognathic-jawed angler fishes and pearly-speckled bioluminescent squid to dumbo-like, orange octopuses in the mesopelagic (mid-depths) zone; and finally from fragile, lacy horny coral and sharp-bristled scale worms to pipe-cleaner legged serpent stars in the deep sea. While images alone don't tell the whole story, the exquisite photos and illustrations in this book significantly enhance the lucid text so that it is just as appropriate for the lay reader as it is for the professional marine scientist.

A short chapter is devoted to a discussion of the book's very significant contributions from artists, illustrators, and photographers, particularly those

who provided the myriad images that so elegantly grace the pages of *Life in the Mid Atlantic*. Such melding of art and science leads to a richer understanding and appreciation for the boundless realm of the three-dimensional ocean.

The final chapter looks at what lies ahead as a result of the expedition. Thousands of specimens need to be identified. Many of them will represent new species, never before seen or distinguished by scientists; they will be described as well as compared and contrasted to their better-known relatives. The faunal components of the zones will be examined to determine where each species fits into the grand scheme of the ecosystem. The thorough study and analyses of the specimens and data collected during the Mar-Eco expedition will take years, perhaps in some cases decades, to complete.

To read this captivating, magnificently illustrated book is to vicariously experience the wonder and majesty of the deep ocean, to appreciate the rich diversity of life and lifestyles far below the light-splashed sea surface, and to sense the camaraderie and the tension of working in an intensely driven atmosphere to accomplish heady, valuable goals in a short period of time. Read it, and enjoy the assessment justifiably given: "Mission accomplished!"

Through this book, Peter Boyle, a very accomplished, prolific, and thoughtful marine scientist, invited us along on the Mar-Eco expedition, from the origins of its conception and design, to the ship and its equipment and instrumentation, and down through the life zones of the sea, from the sunlit layers to the inky blackness of the deeps. His text describes the illustrative and photographic techniques employed to represent and enliven the broad diversity of organisms encountered throughout the expedition. The final chapter examines the impact and legacy that the *G.O. Sars* expedition will have on furthering our knowledge and understanding of the grandest ecosystem on planet Earth, or should that be planet Ocean?

Note: Shortly after the book was completed and submitted to the publisher, Peter Boyle passed away, having worked and struggled valiantly throughout the preparation of this lavish volume. While Peter's family, friends, and colleagues mourn his passing, all of them can celebrate his broad, significant contributions to marine sciences, which have culminated in his final, worthy contribution, Life in the Mid Atlantic.

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Photos courtesy of David Shale

