

The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment. Edited by Helen M. Rozwadowski and David K. van Keuren. (Sagamore Beach: Science History Publication, 2004. xxviii + 371 p., ill., index. isbn 0-88135-372-8 \$49.95)

Erik Ellis

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Scholarship on the history of marine sciences has proliferated in recent years, in part as historians have looked for new ways to approach their subjects. As a borderland topic by necessity, the study of the evolution of marine sciences provides an attractive area of research since it brings into focus diverse peoples, disciplines, technologies, politics, etc. This edited volume, with contributions by both established and newer scholars to the field, is a solid addition to the literature on the disparate marine sciences. By addressing the central role of technological interventions in the history of oceanography, the authors have provided a unifying thread.

The volume is a result of a recurrent conference—the Matthew Fontaine Maury Workshop—held in 2001 by historians concerned that history of science and technology traditions have neglected the marine sciences. It is not surprising that historians of science largely ignored such “disciplines” as oceanography or fisheries science, owing to their derivative intellectual nature or their inescapable tie to industry. But as historians have become ever more intrigued by these kinds of amalgamated enterprises, the convoluted disciplinary makeup of the marine sciences, their dependence on corporate interests, and their inescapable political connections, make them ever more fascinating for deep examination.

Borrowing inspiration from Leo Marx's classic work on the place of technology in American history but taking a less pessimistic tack, *The Machine in Neptune's Garden* explores the ways in which technology has been a necessary part of recent Western knowledge of the ocean environment. The volume begins with a very useful historiographical introduction, placing this work at an intersection of science and technology studies scholarship and environmental history. Any reader new to the history of oceanography would do well to consult the endnotes to the Introduction.

The essays begin with Michael Reidy's analysis of the interplay and tension between theoretical science and practical technology in the development of early nineteenth century British tide measuring instruments. The bifurcation of science and technology, Reidy shows, is as much a part of this story as is the development of a measuring

instrument. Next, Eric Mills describes an episode in the development of ocean circulation theories centered on the Norwegian meteorologist Henrik Mohn in the 1870s. These two essays represent the volume's contributions to the history of the marine sciences before the twentieth century. The lack of emphasis on earlier periods is a shortcoming, but representative of current scholarship which tends to focus on mid-twentieth century oceanography due in part to the wealth of information readily available in archives.

The eight remaining essays, all describing events from the Second World War through the 1980s, can be roughly grouped into those that address military or political concerns and those that illustrate economic or industrial influences on ocean science. In the former category, Gary Weir writes on the life of Columbus Iselin, director of the Woods Hole Oceanographic Institute during the war. In Weir's words, Iselin acted as a "cultural translator" by bridging the gap between military men and oceanographers. Kathleen Williams shows that oceanographers became crucial participants in the war effort (and thereafter) through providing accurate information about ocean conditions to military planners. Williams also hints at the cultural traditions within oceanography, a militarized and masculine culture that long denied inclusion to all but the most determined women.

The spectre of atomic weapons structured much of the post-war world, not least oceanography. Ron Rainger explains how atomic weaponry and the radio-nuclides produced by them were, for the most part, welcomed as a great opportunity for oceanographers to expand their view of the oceans. Like many other disciplines, the technology at the heart of the Cold War helped oceanography justify its existence and expand its claim on resources. Finally, Gregory Cushman argues that El Niño research, based on buoy deployment in various parts of the Pacific, was significantly affected by political and ideological issues between the United States and countries in Central and South America. Geopolitics played an important role in preventing the southern Pacific Ocean from becoming a central locus of research.

The papers oriented around commercial issues include David van Keuren's essay on the migration of drilling technologies from the petroleum industry to science. The prime example of deep earth drilling—the Mohole project—ultimately died before reaching the earth's mantle, but the episode well illustrates the tight alliances between industry and the scientific community in geophysical oceanography. Vera Schwach describes the development and utilization of sounding technologies in the Norwegian fishing industry. The ability to "see" underwater has been a significant development for those working in the

ocean environment, and Christine Keiner tells of the Army Corps of Engineer's ultimately futile effort to build a scale model of the Chesapeake Bay in an effort to visualize the working of this complex and economically important body of water. In this case the dramatically improving ability of computers to model complex systems, from the 1960s to 1980s, proved to be a far more effective tool than any concrete-and-water physical model could hope to be. Finally, Helen Rozwadowski adeptly handles cultural, commercial, and scientific threads in her telling of efforts to build underwater research structures in the 1960s. Like other episodes in this history of oceanography, Scripps Island existed in the somewhat fantastic visions of 1960s scientists but for various practical reasons failed to become reality.

The editors and publisher can be commended for producing a readable and visually interesting volume. Useful illustrations have been included in the text, and though differences in writing style are inevitable, the essays are generally well-written. The index, however, could be improved. And it is not clear why Reidy's essay, and no other, includes a bibliography of "Further Reading." While not without value, it would have been of greater value to include a comprehensive section of further reading with the introduction or at the end of the volume.

This important collection of essays about technology and the marine environment tells of the undoubtedly impressive advances in knowledge about the oceans. It is also a troubling history of shortsighted use of the marine environment. And, as historians of technology have repeatedly shown, it is the ever optimistic view of technology's unlimited potential and the inevitable inadequacy of that vision which makes this compelling history.

ERIK ELLIS
Arizona State University