

## Scientific Diving Techniques, A Practical Guide for the Research Diver

John N. Heine

225 pages. Best Publishing Company

ISBN: 0-941-33269-1

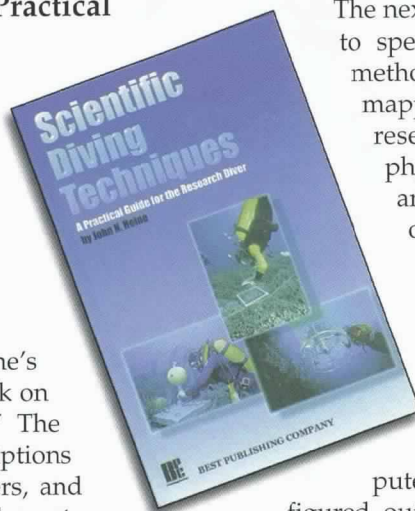
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The key word in the title of John Heine's thorough and extensively referenced book on scientific diving techniques is "practical." The book is not only packed with clear descriptions of the huge variety of methods, samplers, and instruments developed by underwater researchers over the last half century but also provides extensive citations to the scientific literature describing each technique and specific contact information for manufacturers and suppliers of everything from underwater transect tapes, epoxy, and pneumatic drills to diver-held fluorometers. Heine, himself a veteran researcher and dive officer at Moss Landing Marine Lab for 20 years, has produced a treasure house of information for novice and experienced scientific divers alike.

The book begins with a brief description of the history of scientific diving and of the role of the American Academy of Underwater Sciences (AAUS), the nationally recognized scientific diving organization through which the scientific diving community maintains high standards of safety and diving reciprocity. It then summarizes the variety of aquatic habitats in which scientific divers work including everything from reefs and rivers to offshore platforms, caves, and the open sea. The third chapter describes specific underwater diving equipment, including Nitrox and rebreathers. It particularly focuses on the special equipment needed in severe conditions including very cold, turbid, dark, caustic, or polluted waters. In some cases Heine makes specific recommendations for types and even brands of equipment known to operate reliably under extreme conditions and cites studies documenting his recommendations.



The next three chapters of the book are devoted to specific techniques. Chapter 4 describes methods of underwater location, marking, and mapping. Chapter 5 presents the underwater research techniques used by geologists, physical oceanographers, and archeologists and Chapter 6 focuses on measurements of biotic factors and processes. I found myself absolutely fascinated by the versatility, ingenuity and cleverness of scientific divers. They have invented devices to measure the shear strength of sediments, generated seismic waves with spear guns, mapped sunken ships with underwater computers, performed surgery underwater, and

figured out how to attach temperature probes to wild dolphins. Perusing the literally hundreds of techniques Heine describes and thoroughly references, including new high tech instruments being developed for diver use, actually gave me a number of new ideas for my own underwater research.

The final chapter is devoted to underwater photography and video. It references protocols for making video transects and photographs for quantitative assessment. Many color photographs of instruments, equipment, and divers working underwater illustrate techniques throughout the book. The book is also enhanced by brief outlines of suggested training exercises aimed at familiarizing scientific diving certification classes with underwater scientific techniques.

Although laudably comprehensive, a few helpful topics are missing including a discussion of high altitude diving and tips for scientific divers asked to untangle lines from ship propellers or search for and recover lost equipment. The book would also be enhanced by the addition of an index although each chapter is divided into clearly labeled subsections. Overall this is a well organized, clearly written, engrossing, and above all "practical" guide for scientific diving techniques sure to provide a valuable reference source and stimulate the research creativity of even the most experienced underwater scientist.

### *Books Undergoing Review:*

\*El Niño and the Southern Oscillation,

Edited by Henry F. Diaz and Vera Markgraf, Cambridge University Press

\* Ice in the Ocean, by Peter Wadhams, Gordon and Breach Publishers

\* Seas at the Millennium, Edited by Charles Sheppard, Elsevier Science

\* Under Southern Seas, Edited by Neil Andrew, Krieger Publishing Company