This manual represents a progress report on the state of our knowledge of the intertidal and selected planktonic and shallow-water invertebrates of a portion of the Pacific coast of North America. Since the third edition, 30 years have passed, and one of many results is that less than 10 percent of the previous book has been carried forward to this new edition. The book continues to grow, roughly doubling in size every edition; the much-increased length of the present book over the last edition is in part disguised by the larger format you hold in your hands. More phyla are treated now, and groups once passed over in a paragraph, such as nematodes, now properly constitute an entire chapter. Formally founded in 1941 as a class syllabus for undergraduates in invertebrate zoology, this manual has become a guidebook for many users including graduate students, professional zoologists, and ecologists. As noted in the previous edition, we cannot go backward, we cannot make it simpler or easier to use, but we hope we have made it better.

The team of authors has likewise grown with each edition: From 22 (second edition, 1954) to 43 (third edition, 1975) to 120 (in this fourth edition). Five authors from the second edition are still represented, four posthumously (Donald Abbott, Cadet Hand, Joel Hedgpeth, and Irwin Newell), and 25 authors from the third edition rejoin this new effort; of these, in addition to Abbott, Hand, Hedgpeth, and Newell, John and Dorothy Soule, the bryozoologists, have also passed away. We are saddened to note that none of the previous editors are still with us; S. F. Light died in 1947, Don Abbott in 1986, Ralph Smith in 1993, Frances Weesner in 2002, and Frank Pitelka in 2003. We present a memorial to Light and Smith following this preface. Joel W. Hedgpeth, who died at 94 in July 2006, contributed to Light’s unpublished class syllabus in 1937, and authored or coauthored the sea-spider chapter in 1941, 1954, 1975, and 2007. We also note the passing of contributors Denton Belk and Peter Bellinger while this edition was in preparation.

The previous editions focused on the central California region encompassed by the radius of teachings of Dr. Light based in Berkeley and on the regions most useful for those working at and between Hopkins Marine Station on the Monterey Peninsula and Bodega Marine Laboratory on Bodega Head. For the present work, we have sought to expand the coverage south to Point Conception and north to the Oregon-Washington border. North of Oregon, the monographic works of Eugene Kozloff and colleagues document the Pacific Northwest fauna. South of Point Conception, a warmer-water biota adds many hundreds, if not thousands, of species that could not be treated here. Thus, the utility of this manual will lessen with distance from these boundaries. Some chapters, however, treat species north and south of the book’s limits, especially if the addition of several more species essentially completed the treatment of the genus, family, or other group in question. In all, over 3,700 species are keyed or discussed in this fourth edition. Distributions are shown for species whose ranges are limited or unusual and for groups that are poorly known. We have generally (but without complete consistency) not shown the distribution for the many species ranging from Alaska or British Columbia to Mexico.

The treatment of planktonic organisms has expanded since the previous edition for the benefit of those working with a dipnet around piers or floats or in a small boat in places such as Monterey Bay, San Francisco Bay, or Coos Bay. However, the treatment has not been exhaustive across the phyla, nor intended to cover all nearshore or deeper waters, nor enough to change the title of the book. Also included are more species found just below the tides—additions Ralph Smith referred to as the contributions of long-armed and water-resistant intertidal collectors. Gone are chapters on intertidal seaweeds and fishes, represented in previous editions, but now replaced by large and readily available monographs and books.

We have permitted the authors a good deal of nomenclatural and systematic flexibility, although no new species are described. We are given to understand that most of the taxonomic changes shown here will, in due course, be published in the journal literature, and our judgment was to proceed with expert opinion such that this work would not go out of date too quickly.

As is true for all works of this kind, and by nature of the animals themselves and those who study them, the user of this book will find the treatment of groups uneven and, very likely, will wish for more. The keys will be found to vary in their completeness of coverage, geographical range of usefulness, ease of use, and accuracy, an inevitable result of the differences in the numbers of species in various groups, the ease of separating species from each other, the completeness of knowledge of the
group, the professional background of each author, and his or her success in constructing the key. Only use by students and investigators will tell us how suitable a given key may be: The editor and contributors welcome comments and information leading to improvements, corrections, and revisions.

Species lists follow most keys. These lists are of species reliably reported from central California to Oregon, although we have no doubt that some species have been inadvertently omitted. Taxa not included in the keys are noted in the lists by asterisks. Some lists and species have been annotated with general information about habitat, ecology, or references that may be interesting or helpful; no collection of references can now be complete, and most users will turn to electronic resources for additional information and journal literature. Users of this book will doubtless add to these notations, and such marginalia will be of great value in future revisions.

Finally, because of the much more extensive treatment of most invertebrate groups in this edition, because the systematics and classification of the invertebrates of coastal California and Oregon are better documented for some groups than others, and because of the very wide variety of taxonomic hierarchies employed in some chapters and not others, we have not formatted the same taxonomic levels (such as classes, orders, or families) in the same manner across all phyla. In the previous edition, family names were presented in all capital letters in all chapters. Family names—and most other hierarchical levels—across phyla are not biologically co-equal. In this edition, taxonomic levels are formatted within the context of the surrounding hierarchies.

The second and third editions of this book carried on a tradition, not previously mentioned in these pages and born at Hopkins Marine Station in Pacific Grove, that we would be remiss not to mention, and which readers who have a hand lens and a copy of either edition can discover for themselves. In the late 1940s, an intertidal rock near Hopkins, with a peculiarly prominent proboscis-like portion, became popularly known among students as “Snadrock.” The rock was the subject of a study on vertical zonation of barnacles by Don Abbott, John Davis, and Cadet Hand. “Snadrock,” whose name (as “Professor Snadrock”) would appear on the blackboard of the invertebrate zoology teaching lab in the Agassiz Building at the station, became a mythical figure.

If one takes a hand lens to the drawing of the tusk shell (which has not been reproduced in this fourth edition), on page 213 of the second edition or on page 498 of the third edition, and looks carefully on the line representing the sediment surface, the word “Snadrock” can be found written as part of the mud ripple. The drawing was made by Ralph Smith. A small sketch (drawn by Abbott) itself forms the chapter head block on page xi, and the word “Snadrock” appears on a book spine in the chapter block on page 685 of the third edition. While Ralph permitted us to index the word “mermaid” in the third edition (although no one has inquired about it in the past 30 years)—amazing us by actually reading the draft index for the last edition—he removed the entry for “Snadrock.”

While this book was in press, we learned of several dozen additional changes that would alter treatments here, only a few of which we were able to capture. This is a cause for celebration: While larval recruitment to systematics and taxonomy has steadily declined (only 20 percent of our authors are under the age of 50), such changes indicate that work continues. As Ralph Smith remarked near the completion of the previous edition, “the job will never really be ended.” Much remains to be learned about the thousands of species of invertebrates that live along the shores of the northeastern Pacific Ocean.

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