PREFACE TO THE SECOND EDITION

Scientific scholarship has changed markedly in the nine years since writing was finished on the first edition. Our journals are no longer printed on paper and studied in a library. Rather journals come to us as computer files. Only ten years back, papers printed adjacent to those suggested to us by colleagues or indexing services were often interesting and took us afield to exciting and divergent facts and ideas. Now the indices can find almost everything written about almost anything (metagenomics of arctic archaea, growth rings in whale teeth, swimming mechanics of amphipods, . . .); but the leaps into unrelated subjects are rarer. Moreover, the shear quantity of oceanographic (and biological!) literature is intimidating. There are more scientists everywhere and virtually all of them are publishing in English. Many long-standing journals now run to thousands and tens-of-thousands of "pages" yearly, and to that has been added a layer of new open access, on-line only journals. Thus, it is difficult to keep up with even sub-subspecialties (say, replacement of phosphorus in *Prochlorococcus* metabolism). We suspect that you prospective oceanographers, for whom this book is intended, will need to become extremely specialized, descending into the narrow wells you will drill into the expanding array of biological and oceanographic problems. Nevertheless, starting with a fairly wide perspective in your field will serve you well, and maintaining a usable introduction across the diverse aspects of biological oceanography has been our goal in revising *Biological Oceanography*.

Our perspective in this book is resolutely organismal: what are the prokaryotes, algae, protists and animals living in the seas and how do they make their way in the water, survive through generations, feed themselves and each other? How are these organisms distributed and why? What specific adaptations are required to live in blazing surface sunshine, dark deep waters, in bottom mud and near hydrothermal vents? How will those adaptations serve and change as the oceans warm and grow more acidic from dissolving carbon dioxide? We take this approach for the lighted upper layers, dim mesopelagic zone and the seafloor, emphasizing for each some aspects of ecological studies conducted in them. There are other perspectives, particularly an emphasis on biological-physical interactions. Those are mentioned many times here, but a more directed treatment in that vein is provided in a third (2006) edition of *Dynamics of Marine Ecosystems* by K. H. Mann and J. R. N. Lazier, also published by Wiley-Blackwell. We recommend it when that emphasis is sought.

We have tried to select exemplary studies for many types of organism-organism and organism-habitat interaction. Some are recent. Many were left in from the first edition; not all topics have been studied recently and there is value in avoiding the impression that ocean ecology began in 2003. On the other hand, many topics have been "hot" in this decade, and for those we have chosen new examples. There is more molecular genetics, which has swept across all aspects of biology, including biological oceanography. A new first chapter considers some basic aspects of living in water, especially salt water. An updated discussion of spring blooms has been moved to Chapter 11 on pelagic biomes, and that discussion is greatly expanded. There is a new chapter on pelagic food chains, including identification of trophic levels from gut contents and from stable isotope ratios.

If you have been active in biological oceanographic research, your study may be shown or at least cited, but only a very small fraction of useful studies could be cited. Yours could be "on the cutting room floor", or likely we never found it at all. Not being included is not to be taken as judgment about your work. Some specialists found their fields under-represented in the first edition. That will happen again with the second edition, and we recommend to those who are teaching to fill gaps for their students with their own knowledge and distribution materials.

Like other scientists we are at least moderately opinionated about our subject matter and that of others. Much of that opinion has been allowed out on parade here. As you students and teachers find things to disagree with us about, perhaps something that can be explained better, let us know about it. For the moment we are still working and would like the communication to go both ways. Let us hear from you. Thanks.

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