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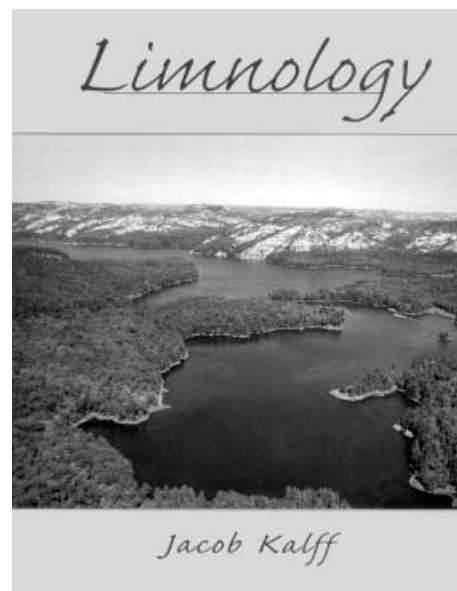
## Jacob Kalff: *Limnology*

Prentice Hall, Upper Saddle River, NJ, 2002. 608 pp, 25.2 × 20 cm  
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Publication of new textbooks in areas of ecology or environmental sciences is not a common phenomenon. In the integrated study of freshwater ecosystems, however, there is a new and relevant addition: the limnology textbook by Jacob Kalff. This is an advanced textbook addressed more to the graduate level, or advanced undergraduate level, than to the first-time student of freshwater ecosystem ecology. Kalff's *Limnology* has a large number of references embedded into the text, many very well-designed illustrations, and extensive footnotes and quotations to explain concepts or expanding ideas. Interestingly, the book also has two levels of information so that students and teachers can select the extent of their reading. The production design and the content of this book make it a strong competitor to the new edition of Wetzel's classic limnology textbook (2001). And in my opinion, the competition is easily won by Kalff, who has produced a more balanced, shorter, clearer and better-looking book.

Kalff has achieved a synthesis of many years of teaching and research experience as director of the Limnology Research Center of McGill University in Montreal. After the traditional divisions of lake origin and typology, the book deals with the physical determinants of water characteristics, the chemical composition of waters, and a functional approach to freshwater biota. The effort at presenting topics that had been given little attention by previous authors of limnology textbooks (i.e. water acidification, contaminant fluxes, water pollution, water-quality remediation techniques, and even water birds) is quite remarkable. Using a few integrating variables, such as drainage basin characteristics, water retention time, or nutrient load, to explain most of the variability between different ecosystems is a welcome approach. In this sense, this is a book of pat-



terns: the generalities that data show about any given phenomenon, why the pattern exists and the implications of those generalities. The recognition that limnology has been dominated mostly by studies in northern temperate lakes, even though these are not the most common freshwater environments on Earth, is also remarkable. Kalff tries to correct this bias by drawing examples from many types of water bodies located in as diverse geographical settings as possible. Indeed, the cover shows a typical Canadian shield lake, but the reader will find in the text examples from karstic lakes, high-mountain lakes, African rift lakes, and coastal lagoons or even temporary lagoons. Diversity exists within limnology and is quite well-represented here.

Kalff has done an excellent job at presenting both a historical perspective and a good selection of recent and relevant references. I particularly recommend Chap. 1, which discusses the general principles of limnology, the contribution that limnology has made to general ecolo-

gy, the way in which limnologists perform their science, and the balance between applied and basic (limnological) science. This introductory chapter also deals with other relevant aspects, such as whether a textbook should provide the information as if the results and interpretations were the final word on a subject, or rather show clearly the incompleteness of science and the different opinions that researchers may have. This chapter is a must for everyone interested in limnology.

I would argue here that this is a textbook which is also of interest to senior microbial ecologists. And this is so because it provides most of the physical, chemical, geographical, geological and hydrological information needed to understand the presence and diverse metabolisms of microbes. Furthermore, Kalff dedicates a chapter to oxidation-reduction potentials and the role of bacteria in organic matter and nutrient cycling, recognizing that, unless we understand microbial mediation in chemical cycles, we will not be able to understand any

biogeochemical cycling at all. He also describes extensively the different types of bacterial metabolism, and why microbes are thus relevant characters in iron, manganese, sulfur, phosphorus and nitrogen cycles. Probably it would have been too much to ask for a chapters' organization based on organism metabolism instead of on the classical division of phytoplankton, zooplankton and bacteria. But a remarkable good characterization of the role of photosynthetic bacteria is presented in this limnology book. Similarly, molecular techniques and how they can help limnologists to advance their knowledge are very briefly dealt with in the bacteria chapter. In only a few years these techniques have overwhelmed aquatic microbial ecology literature, but it is perhaps too early to treat them extensively in a general limnology textbook. However, Kalff's is probably the only general limnology book in which microbes are well-represented and the hideous term "microflora" is not used at all.