

This Week's Citation Classic

Wetzel R G. *Limnology*. Philadelphia: Saunders, (1975) 1983. 860 p. [Freshwater Ecology Program, Dept. Biological Sciences, Univ. Alabama, Tuscaloosa, AL]

This book presents a comprehensive, integrated overview of the functioning of inland aquatic ecosystems. [The SC^R indicates that this book has been cited in more than 1,410 publications.]

Limnology: An Overview

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During graduate studies in aquatic ecology at the Universities of Michigan and California, I was disturbed by the descriptive nature of textbooks on limnology, the ecology of freshwater and saline inland waters. The paucity of modern syntheses of the beautiful integration of biota in aquatic ecology became increasingly evident as I taught the subject while a longtime faculty member of Michigan State University. I found myself increasingly supplementing texts with recent information from the literature and generalized figures of temporal and spatial dynamics among organisms and environmental parameters.

Although I had prepared many data sets over the years, time was needed to undertake a moderately complete synthesis. A sabbatical leave at my home institution helped because of the excellent library facilities, colleagues for discussions, and general support. A rigorous schedule of evaluating the literature in a narrow topic consumed much of each morning; afternoons were devoted to synthesizing the information in a few paragraphs, or occasionally mastering several pages on a great day. Evenings were devoted to organizing literature sources for the next day's subject and to personally typing (before computers) the nearly 3,000 references from the original sources, because I was determined not to repeat the appalling number of major errors that exist in the references cited in the literature. I found myself in my laboratories and the library in the evenings, meeting with graduate students and technicians, since the research programs continued in spite of my daylight absences. This routine sequence continued six days a week for a year with few interruptions. I was euphoric, as I constantly learned from being forced into great stores of data and information that were far from my areas of speciality. This renaissance learning made me a better teacher but, more importantly, honed my perceptions of the integration and coupling of the components of aquatic ecosystems. Dur-

ing this time, my perspectives of functional commonality in these ecosystems emerged and were synthesized on paper.

A number of characteristics of *Limnology* have contributed to its wide usage (now translated or being translated into six languages) and its frequency of citation. First, I have always sought functional commonality, rather than differences among aquatic ecosystems. All inland waters are different, but functional similarities allow assimilation and integration of the enormous diversity into general operational groups. Secondly, strong assets of the book are the constant integration of environmental parameters with regulation of population and community productivity and how the biotic metabolism influences freshwater ecosystems and their collective resiliencies to change.

Thirdly, I advocated two major views that were not popular when first published. I emphasized that most inland waters are small and shallow and that much of the organic productivity emanates from higher aquatic plants and attached microorganisms of the land-water interface zones. I further emphasized that detrital organic matter, particularly in dissolved form and often derived largely from terrestrial and littoral/wetland sources, is often the major source of organic matter that supports ecosystem metabolism, particularly in the sediments and higher trophic levels in most inland waters. These concepts emanated from our extensive studies of the organic carbon dynamics of a small, temperate lake which demonstrated the major metabolic roles of littoral producers as well as bacterial metabolism of detrital dissolved organic matter.^{1,2} I acknowledge the particularly perceptive insights of one of my students and colleagues, Peter H. Rich, in those early years.³ Both of these topics are now primary research areas in limnology and are being demonstrated to be quantitatively dominant in most waters.⁴

Lastly, this book has sufficient diversity and detail to serve as a moderately comprehensive reference work. Alternative textbooks tend to be superficial and inadequate, even for many non-specialists. Limnology is a complex, rigorous discipline that integrates numerous facets of geology, hydrology, physics, and chemistry, as well as biology from biochemistry to community and ecosystem analyses, and should not be treated more lightly than much more specific subjects such as organic chemistry. The third edition, now nearing completion, is a further attempt to provide a comprehensive but balanced modern overview of limnology.

1. Wetzel R G, Rich P H, Miller M C & Allen H L. Metabolism of dissolved and panicle detrital carbon in a temperate hard-water lake. *Mem. Ist. Ital. Idrobiol.* 29(Supp.): 185-243, 1972. (Cited 125 times.)

2. Wetzel R G. The role of the littoral zone and detritus in lake metabolism. *Arch. Hydrobiol. Beih. Ergeb. Limnol.* 13:145-61, 1979.

3. Rich P H & Wetzel R G. Detritus in lake ecosystems. *Amer. Naturalist* 112:57-71, 1978.

4. Wetzel R G. Land-water interfaces: metabolic and limnological regulators. Baldi Memorial Lecture.

Verh. Internat. Ver. Limnol. 24:6-24, 1990.

Received July 1, 1993