

BOOK REVIEWS

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TALLING, JACK F., AND JACQUES LEMOALLE. 1998. **Ecological dynamics of tropical inland waters**. Cambridge University Press. x + 441 p. \$100.00. ISBN 0-521-62115-1.

Tropical limnology has a history as long, if not as replete, as that of temperate limnology. At the time that Forel's pioneering work on Lac Léman (Geneva) was being published (1892–1904), Moore (in Beadle 1981) was conducting expeditions to determine the origin of Lake Tanganyika's unique fauna, the Fülleborn expedition was actively studying Lake Nyasa (Malawi) (Fülleborn 1900), and Bogert was collecting plankton samples from lakes in Ceylon (Sri Lanka) (Apstein 1910). Most early limnological studies were descriptive; this was particularly true in the tropics, where many of the organisms that were encountered were new to science, and most research took the form of exploratory expeditions. While the development of methods and concepts progressed more rapidly in temperate regions, some important conceptual advances originated in the tropics. Following the Sunda Expedition to Indonesia, Thienemann (1932) realized that the hypolimnetic oxygen deficit was not a reliable indicator of lake trophic status (as it was in temperate lakes). This was due to the difference in hypolimnetic temperature between temperate and tropical lakes, and the variable duration of stratification in tropical lakes. These observations underlined the significance of physical–chemical–biological interactions, and Elster (1974) has pointed out that it was largely as a result of tropical work that the importance of the dynamic aspect of lakes was realized. *Ecological dynamics of tropical inland waters* distinguishes itself from other books on tropical limnology (Beadle 1981; Payne 1986; Schiemer and Boland 1996) by focusing on this theme of ecological dynamics.

The authors have done an impressive job of reviewing the literature, citing well over 1,000 literature sources, including journal articles, obscure reports, and graduate theses. Considering the scattered nature of tropical limnology literature, this alone makes the book a useful reference source. In addition to discussing lakes and rivers, the authors provide a thorough review of literature on tropical swamps, reservoirs, and flood plains. Asia, South America, and Central America are well covered, but African studies receive the lion's share of attention, reflecting the greater amount of work that has been done there and the authors' experience on that continent.

In some sections, the text tends to read more like a checklist of reviewed literature than a coherent theme that is supported by the literature. However, the overall organization of the book follows a logical development of concepts. Following a brief history of tropical limnology, the first chapter outlines basic forcing factors that ultimately cause tropical distinctiveness. The next two chapters deal with fundamental limnological concepts, from heat flux to food webs, from a tropical perspective with numerous examples. The discussion of phytoplankton photosynthesis is especially thorough and is one of the few sections of the book that involves modeling. Chapter 4 deals with temporal patterns and trends of meteorological variables and hydrodynamics over diel to geologic timescales. The dynamic interplay of physics, chemistry, and living organisms (from bacteria to hippopotamuses) is treated in Chapter 5. The final chapter returns to the theme of tropical distinctiveness presented at the beginning of the book, emphasizing that latitudinal differences in

solar radiation and geostrophic effects are ultimately responsible for latitudinal trends in the physical, chemical, and biological properties of inland waters.

Either explicitly or by omission, the book indicates where more work is needed. The discussion of how aquatic processes are affected by latitude deals almost exclusively with the thermal structure of lakes, the links between hydrodynamics and nutrient fluxes, algal production, and fish production. Microbial and trace metal dynamics receive scant attention, despite the fact that the high temperatures and anoxia so often found in tropical waters lend themselves to the study of these processes. Periphyton has also been almost completely ignored (the book contains a little over two collective pages on the subject); this is surprising considering the importance of periphyton as a food source for the species-rich, near-shore fish communities in the African great lakes. Even on the more well-studied subject of phytoplankton dynamics, the authors point out that although there are a number of studies relating phytoplankton abundance and composition to physical and chemical observations, the actual gain and loss processes that lead to changes in phytoplankton abundance have received little attention.

If tropical limnology has not advanced as far as temperate limnology in the above areas, it arguably has provided more integrated data on physical, chemical, and biological dynamics. This is because tropical limnologists have tended to be less specialized and more ecosystem oriented. This book's theme of ecological dynamics provides a good perspective from which to review this literature. The progression from basic limnological concepts to a discussion of the interaction between physical, chemical, and biological processes makes it useful reading for undergraduate and graduate students interested in aquatic ecology (tropical or otherwise). Moreover, because its discussion of latitudinal trends is fundamentally about how climate affects ecological dynamics in aquatic ecosystems, it is relevant to the interests of most limnologists.

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