chemistry, biology and engineering of all the chapters, and so it becomes a book for selective reading. And then who is the audience? If you are not familiar with the subject of a chapter, then you are unlikely to gain a detailed or simple enough introduction. If you are familiar with the material, then you are unlikely to gain anything by reading the reviews.

The greatest value is to be one of the select few participants. Professor K.R. Rushton, University of Birmingham, UK, was there, and at least enjoyed the expedition to the National Park. (Incidentally, his chapter, the last, stands out as being the easiest to read and most useful to practising hydrologists. It contains some examples I have not seen before. However, I suspect he was outside the main thread of the meeting, a view which the frontispiece hints at).

I did not read the three chapters on momentum transfer, which deal with wave propagation and deforming materials. Frozen and heated porous media was skipped too. Jacob Bear shows off his mathematical skills again, managing to write Darcy’s Law with twelve variables (including delights like $V_d$), and using twelve different dimensionless ratios to show us that insignificant effects are insignificant. The two chapters on fractals were a disappointment, with no sign of a practical application.

Some positive comments are called for. Kinzelbach and Uffink review the random walk method usefully. The three chapters on chemical and biological processes clarified a number of issues. Schiegg and Schwille present a lot of material (130 pages) on hydrocarbons in aquifers. Much of it has not appeared before in English, including a field example of tar oil moving along the base of an aquifer. Six authors from the Lawrence Berkeley laboratory give a clear view of the progress made in modelling fracture rocks and the problems yet to be solved.

Overall this is a book for libraries, for PhD students, and for researchers to dip into when writing their own reviews or lectures.

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Reservoir Limnology: Ecological Perspectives
edited by Kent W. Thornton, Bruce L. Kinnel & Forrest E. Payne
A Wiley-Interscience publication, published 1990 by John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex PO19 1UD, UK; 246 + ix pp; price £39.80, US $60.45; ISBN 0-471-88501-0

This book is a collaborative effort by 12 authors. The aim is to draw attention to the unique qualities of the reservoir environment by discussion of the similarities and differences with lakes.

In the Introduction, the editors stress that the book is not intended to be used as a textbook but rather to stimulate ideas about the mechanisms controlling biological, chemical and physical processes in reservoirs. This is a timely warning as the coverage of reservoir topics is far from comprehensive.

Like many multi-author books the standard is patchy. Chapter 1 (Perspectives on limnology) by Thornton is among the less successful efforts. It attempts to show the major differences between reservoirs and lakes and to show how these are connected to patterns at macro-, meso- and micro-scale. It contains some useful insights but these are often obscured by systems analysis jargon.

Chapter 2 defines and reviews the processes responsible for transport in a reservoir. The explanations, so far as they go, are clear and well illustrated but stop short of giving an understanding of the calculation of numerical concepts like energy budgets.

Chapter 3 discusses sediment transport in reservoirs showing analogies with delta formation in rivers. Some of the inevitable generalizations, such as "Lakes are generally located in the upper part of drainage basins, while reservoirs are generally located near the mouth" would not necessarily apply around the world. The conclusions about transport mechanisms need, therefore, to be treated with caution.
Chapter 4, 5 and 6 constitute the bulk of the material in this book. They vary in treatment and standard. Chapter 6 is an excellent discussion of the voluminous literature on primary production. It highlights the differences in production rates between reservoirs and lakes and attempts to account for these differences. Chapter 5 deal with the related topic of nutrient budgets but the coverage is less comprehensive and the discussion eschews any numerical treatment. Chapter 4 has many useful and interesting ideas on the oxygen dynamics of reservoirs but assumes a good background knowledge by the reader.

Chapter 7 has some interesting speculation on the influence of feeder streams on the zooplankton content of reservoirs. Nevertheless much of the dynamics of zooplankton and their relation with phytoplankton are missing, not is there any indication of species diversity and trophic status.

Chapter 8, dealing with fish populations in reservoirs, is even briefer. It deals solely with North American conditions and ignores many of the concerns of European fish biologists such as eutrophication, speciation and stocking policy.

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Assuming a basic knowledge of both numerical models and hydrogeology, one can find in this book a very easy-to-read guidance for the applied modelling of groundwater flow. With understandable accounts it takes one through the process from the formulation of a conceptual model to its final application for prediction or for particle tracking.

Even though the book focusses on the finite difference flow models PLASM and MODFLOW and on the finite elements model AQUIFEM-1, the valuable hints and rules are useful in any model application to groundwater problems.

Extensive use of examples, case studies and specific applications is made. Also, very valuable references are given for those aspects not covered by the book, but which may be of interest to the reader.

After establishing the basic equations and concepts assumed to be known by the reader in the first two chapters, the book describes the process of modelling, divided into twelve steps. Conceptual models and their adaption to numerical models through grid design, boundary conditions settings, treatment of sources and sinks, and special needs for transient simulations are the subject of Chapters 3 to 7. The important aspects of model verification, calibration and validation are discussed in Chapter 8. Chapter 9 is devoted to hints for documenting and reporting a modelling study. Lessons from a post-audit of modelling are presented in Chapter 10. Finally, the last two chapters deal with particle tracking, advective transport of contaminants and advanced topics, but the discussion is not as deep as it is in the preceding chapters, due to the number of subjects covered.

In summary, this is a book on the practical aspects of groundwater modelling which contains a great deal of common sense. It sticks to the reality, giving a feeling about what one can expect from a mathematical model. Following the methodology and principles contained in the book will help the practitioner to avoid pitfalls generally due to the lack of a comprehensive vision of the problem of groundwater modelling.

Without doubt the book can be recommended as a complementary textbook for courses on applied aquifer modelling and also as a book to be consulted for real world applications.

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