

## BOOK REVIEWS

**GROUNDWATER RESOURCE DEVELOPMENT** — by L. Hamill and F. G. Bell : Butterworth Publication, London, 1986.

The book has been written keeping in view the requirement of geologists, civil engineers, environmental scientists, mathematicians, chemists and water well contractors engaged in the profession of ground water development and management.

The authors deserve commendation for explaining the subject matter in a simple and coherent manner. Reader with a background knowledge of some geology, hydraulics and calculus shall be able to follow the book clearly. Figures and diagrams have been profusely used to explain the subject matter as well as to provide some relevant design data.

The book contains ten chapters, two appendices and one index spread over 344 pages. The space coverage given to various topics is as given below :

1. Development of groundwater resources (2.9%)
2. Groundwater fundamental (9.6%)
3. Groundwater exploration (11.34%)
4. Assessment of aquifer recharge and potential well yield (10.5%)
5. Groundwater Quality (8.4%)
6. Well design and construction (15.4%)
7. Aquifer hydraulics and pumping tests (15.4%)
8. Groundwater pollution (7.56%)
9. Groundwater management (7.85%)
10. Groundwater modelling techniques (9.3%)

Conjunctive use of surface and groundwater has been discussed rather briefly in the context of ground water management. Keeping in view the significance of water quality management and environmentally sound design of W.R. Projects (as stated in preface) further explanation of planning and design aspects of Conjunctive Use Project would have been more useful.

The book describes the basic steps such as investigation of productive aquifers, their exploration, construction and testing, water quality and pollution considerations.

Efficient ground water management requires adoption of models to predict, identify, and manage the groundwater resources. Hence groundwater management and modelling techniques

are significantly interrelated and could have been given more coverage. It would have been useful to include some applications of ground water models particularly those dealing with groundwater quality and pollution.

In order to increase usefulness of book as a text and to make subject matter more clear, perhaps more numerical examples and case studies could have been incorporated.

On page 286 and 287 scale of the map is given in miles. Since metric units have been used throughout the book, the scale could have also been mentioned in kms. instead of miles.

Fluoride content of groundwater should also be examined in detail as several diseases (bone crippling, teeth disorder) are caused by the presence of fluoride. It may be useful to explain necessary tests for fluoride detection specifying WHO norms regarding acceptable quantity of fluoride might be useful to the readers.

For the detection of ground water pollution only half page (page 275) is devoted. A little elaboration giving text procedure and testing instruments required for this purpose could be more useful.

A.S. Chawla  
Director  
W.R.D.T.C.  
University of Roorkee  
Roorkee-247667 (U.P.)

**WATER RESOURCES PLANNING** — by Neil S. Grigg., McGraw-Hill Book Company, 1985, 328 Pages.

The water planning is aimed at solving the many problems that arise due to development and urbanization. This book covers a wide variety of water problems : water supply, waste water management, flood control, urban storm-water management, nation programs, and water quality management, among others. The problems are viewed from the perspectives of local, state, and federal government, as well as from the perspective of the private sector. The text explores pragmatically the real environment in which water planning is done - linking technical, financial, and political factors.

The book is divided into two parts : principles and techniques of planning, and case studies. In the first part of the book, principles and techniques of planning have been described which include the importance of planning to the management process, how planning should work, different approaches to organising for water planning in government, how to use economics and evaluations to prepare useful decision information, financial analysis, computers and modelling, and the place of environmental planning in water resources management. The second part of the book consists of case studies that demonstrate the above principles in action.

The whole book has been divided into 17 chapters. In the first chapter importance and benefits of water planning are mentioned. Second chapter deals with management principles, role of the planner and some political aspects of water management. In the third chapter classifications and effectiveness of planning process and the problem-solving process are presented. In the fourth chapter the concept of a water industry, the water crisis and emerging areas are discussed. Fifth chapter deals with the multiple-objective analysis and the economic development objective and benefit-cost analysis. Financial planning in water resources is discussed in sixth chapter. Seventh chapter contains data management in water resources, computers and modelling in planning. Eighth chapter deals with environmental planning in water resources. Chapters 9 to 17 present the case studies related to national and state water planning, multipurpose project planning, regional water supply, wastewater management planning, flood control planning, storm-water management planning, water quality planning for an estuary, ground water planning and river basin planning.

The discussion of principles is somewhat more detailed than the case studies, however, readers can introduce their own case study experiences to supplement the ones offered. The book is intended for students and practitioners in engineering, natural resources management, public administration and the various policy sciences.

P.V. Seethapathi and C.P. Kumar  
Scientists  
National Institute of Hydrology  
Roorkee (U.P.)

**MONSOONS (Ed)** Jay S. Fein and Pamela L. Stephens, \$ 75.00, John Wiley & Sons, 1985

Monsoon has fascinated mankind in this part of the world since times immemorial. It is the life line for farmers and enigma to the economists and administrators. This book on monsoons as the editors claimed provides a multifaceted view of the monsoon. Though major portion of the book is devoted to the physical aspects of the monsoon, the editors endeavoured to cater to a wide section of administrators, policy makers, researchers and also the general reader.

The articles of interest to the common man include 'Indian Monsoon in Literature' by Mr. Kushwant Singh, 'Monsoon in Traditional Culture' by Dr. Francis Zimmermann. The economic aspects of monsoon were dealt with by Dr. M.S. Swaminathan and Prof. Raaj Kumar Sah.

For those who would like to have an insight into the phenomenon of monsoon, the chapter on 'Physics of monsoons' by Prof. John Young would be beneficial. From the hydrometeorologists and hydrologists point of view, however, the articles on 'Long range forecasting of monsoons' by Prof. J. Shukla and 'Short and Long range monsoon prediction in India' by Prof. R.K. Das are of immense value.

To a researcher and student of monsoon meteorology, the articles by Prof. T.N. Krishnamurti and Prof. Takio Murakami on 'Monsoon Models' and 'Orography and Monsoons' would be very helpful in providing a state of art on the subject. The book would have been more exhaustive had

the synoptic meteorologists view points were also presented. Likewise an article on the phenomenon of floods and droughts during the monsoon season would have made the book more purposeful.

After the books by Dr. P.K. Das (India Book House) and Dr. Y.P. Rao (India Met. Dept.) on the same theme, this collection of articles by eminent Meteorologists, Agricultural Scientists, Economists and Literatures on Monsoons would be a good reference material and should certainly be read by all those interested in monsoons one way or other.

K. S. Ramasastri  
Scientist 'E'  
National Institute of Hydrology  
Roorkee-247 667

**PRINCIPLES OF WATER QUALITY** — by Thomas D. Waite, Academic Press Inc., Year 1984, Pages 289

The book 'Principles of Water Quality' has been written with two specific purposes. First, it attempts to introduce engineering and science students to the fundamental environmental processes that regulate the movement of material in natural systems. With this in mind the book details, the constituents that have become water quality problems, for example toxic metals, inorganic nutrients and various organics so as to enable the students to understand which contaminants are true water pollutants and which do not pose severe threats. The second purpose of the book is to introduce practical approaches for water quality improvements other than sewage treatment. It has been attempted to quantify as much as possible so that the predictions regarding water quality can be made. Micro-biological and chemical kinetics are described for many phenomena and the empirical data required for their determination are also given.

The book opens with a chapter on introduction to water quality concepts. Under this chapter the need for water quality studies, water quality problems and an approach to developing water quality standards have been discussed. Understanding the water quality of natural water systems requires knowledge of the disciplines of chemistry, microbiology, ecology and their interaction. This chapter briefly touches upon this aspect. The example of United States of America have been cited. The second chapter deals with the natural environmental processes. Though the terms pollution has been described as a vague term, however, an attempt has been made to link it with water quality. Various energy transfer processes in ecosystems have been brought out. The dynamics of organic carbon and the dissolved oxygen systems has been explained in some details. The third chapter is devoted to the toxic metals - the properties and behaviour of mercury and lead have been described in details. The chemical and biological alterations of toxic metals in relation to solubility and precipitation, chelation, oxidation - reduction equilibrium etc. have been enumerated. Measurement of toxicity, interpretation of toxicity data, threshold values etc. have also been given.

The fourth chapter on 'refractory organic compounds and their influence on water quality' takes into account health effects, pesticides, petroleum, hydrocarbons, detergents and PCBs. The

next chapter covers the nutrients productivity and eutrophication. The carbon cycle, the nitrogen cycle, the phosphorus cycle and the sulphur cycle have been discussed with schematic diagrams and figures. Stress has also been laid on plant growth and eutrification. Chapter sixth brings out the effects of micro-organism on water quality. It has been attempted to show how these organisms can modify the environment to either produce toxic products or purify polluted streams. The effects of algae, protozoas, fungi, blue green algae, bacteria and viruses on water quality have been spelled out. Relationship between bacteria and other micro-organisms and their impacts on public health have been described in details. Various indicators of pollution have also been identified.

Chapter 7 describes the thermal effects on water quality. A description has been given on the various sources of heated effluents, the effects of temperatures on biological systems and the beneficial uses of thermal discharges. Chapter 8 deals with the potential impacts of air contaminants on water quality. The chapter 9 has been devoted to water quality modelling. The chapter opens with material transport and closes with mathematical model development. A case study of phosphorus model has been presented. The last chapter deals with the water quality standards and management approaches. This issue of setting water quality standards for various water uses has been discussed with drinking water quality standards, recreational water quality standards as the main theme. A part of the chapter has been directed to water quality control measures.

The book may find favour with advanced graduate students in environmental engineering and science and in health related disciplines. However, the basic knowledge of chemistry and micro-biology seems to be a pre-requisite for the book. In parts the book may prove to be useful to research works. The book may find little use for undergraduate students.

Dr. K. K. S. Bhatia  
Scientist 'E' & Head  
Man's Influence Division  
National Institute of Hydrology  
Jal Vigyan Bhawan  
Roorkee-247 667

