

BOOK REVIEWS

SYSTEM SIMULATION IN WATER RESOURCES, edited by G.C. Vansteenkiste, published by North-Holland Publishing Company, 1976.

Between 3 and 5 September 1975 the International Federation for Information Processing held a conference at Bruges in Belgium on the topic of Biosystems Simulation in Water Resources and Waste Problems. This book represents the edited proceedings of the conference. Besides the actual papers that were presented there are lists of conference participants and their addresses, the authors and the contributors.

The list of contributors gives the names and addresses of those who actually presented the paper and who then answered questions from the participants. It must always be a problem for editors to know what to do with discussions on papers when preparing the proceedings of a conference for publication. Three choices offer themselves: omit the discussions altogether and have the book labelled as incomplete; edit them and be accused of misrepresentation; include them verbatim (as here) and set the reviewer wondering how much their frequently negligible contribution has added to the cost of the book.

While inclusion of all the discussion in a book of this nature is debatable, that of the papers is not. These have been reproduced in more or less the form in which they were submitted, so that changes in type face occur frequently. However, with few exceptions, all the manuscripts are of a good standard of clarity and few typographical errors have slipped in. It would seem to the reviewer that the inconvenience of adjusting to changes in type face is more than compensated for by the knowledge that subtle changes are unlikely to have been introduced into equations by typesetting operations.

The actual papers have been divided into six sections based on a systems classification relating to the exactness with which the various problems discussed can be described mathematically. After section 1, which contains four "state of the art" papers including one by the editor in which he sets the rationale for the classification, mathematical exactness decreases with increasing section number.

To those more familiar with a hydrological/water resources system style of classification some of the groups of papers must look, at first sight, rather unusual because of odd papers being incorporated in what would otherwise appear to be a coherent group. For example, of the five papers in section 2, four deal with rainfall –

runoff modelling, one dealing with quality as well as quantity, while the fifth deals with the movement of a glucose solution in soil.

In section 3, five of the seven papers deal with the movement of water through unsaturated porous media (i.e. the soil moisture zone), while the remaining two deal with the movement of pollutants in estuaries.

Section 4 deals predominantly with the movement of pollutants (mainly salts) in both saturated and unsaturated ground. The remaining papers deal with modelling the movements of pollutants in surface waters, and in one case seeks to assess the effects of land-use changes on the process.

In section 5 some of the more challenging problems relating to both chemical and biological pollution in natural waters are dealt with.

The final section contains only two papers, which perhaps represent the goal at which much of the work described in earlier sections is aimed, i.e. the use of models to control prototype behaviour.

The fact that the sectioning of material may be difficult for hydrologists to live with should not be regarded as detracting from the value of the material presented in the papers, many of which form stimulating reading. For anyone seriously involved in modelling, particularly of "dirty water" systems, this book will be essential reading.

R.P. IBBITT

DISCHARGE MEASUREMENT STRUCTURES, edited by M.G. Bos, published by the International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands, 1976. 464 pp.

Accurate and reliable methods for measuring and regulating streamflow are essential if water resources are to be efficiently managed. Considering the important role hydraulic structures play in this area, a book of this type is long overdue. It concerns the selection, design and use of a wide variety of discharge-measuring structures, and presents the results of an extensive survey of current literature and some additional research carried out by the authors.

Chapter 1 deals with the basic principles of fluid flow (as applied to gauging structures), and gives descriptions and fundamental design theory of the basic control types. This section is very well written, and in addition to refreshing the memories of experienced engineers it should also serve as a valuable introduction to those

less conversant with fluids theory. Chapter 2 describes "auxiliary equipment" and essentially discusses the measurement of head and various aspects of approach and tailwater channels. Since the application of a gauging structure relies on the relationship between discharge and water level, the importance of this subject cannot be over stressed. Chapter 3 is also an important inclusion dealing with structure selection. The factors dictating choice are discussed, followed by flow diagrams indicating selection procedure, and a tabular presentation of the properties and limits of application of 37 structures. Most aspects are covered well, some very well, and this chapter should prove extremely valuable to many designers. However, some improvements could be made. A most useful addition would be an indication of any major deficiencies a structure may possess. For example, although it is quite rightly pointed out that trapezoidal long-throated flumes are "very good" at passing debris and sediment, their possible unsatisfactory performance because of the formation of surface waves through the structure is not mentioned. The advisability of carrying out check calibrations after construction could also be stressed. Chapters 4 to 9 describe individual control types and cover broad-crested, sharp-crested and short-crested weirs, flumes and orifices, plus seven "miscellaneous structures" including divisors, pipes and mechanical meters. In most cases a verbal description and photograph or diagram are presented followed by information relating to the evaluation of discharge, modular limit and limits of application. These chapters contain much useful information, and perhaps more to the point, it is all contained in one book. However, an additional chapter on the particular problems associated with compound structures might be considered in future editions.

Four appendices complete the text. Appendix 1 discusses some of the basic laws of fluid mechanics, and is intended to emphasize those of importance in the analysis of discharge-measuring structures in open channels. Appendix 2 concerns accuracy of measurement, explaining the nature, sources, propagation and evaluation of errors. Appendix 3 deals with side weirs and oblique weirs, while Appendix 4 describes some suitable stilling basins. All chapters and appendices are complemented by lists of selected references which, with the exception of the chapter on structure selection, provide an adequate springboard for further reading.

In the Preface the editor, M.G. Bos, explains that the authors' intention was to produce a book to serve as a guide to good practice for engineers concerned with the design and operation of small control structures. They have succeeded admirably, and should attract an even wider audience than intended. The layout and

general presentation are obviously the result of much thought, being refreshingly simple and logical. However, the search for a particular piece of information would be made easier if subjects were indexed by page rather than paragraph. In addition to the many pages of tables and graphs, an inevitable consequence of writing on this topic, a large number of excellent photographs and diagrams are included. The book is very easy to read, owing to a combination of good writing and clean offset reproduction. The covers are perhaps somewhat flimsy to withstand the rigours of extended design-office use, but were no doubt employed to minimize production costs.

This book should undoubtedly form part of the collections of design offices and technical libraries. At the time of writing the purchase price was not available, but in these days of financial stringency it is probable that the outlay will be minimal compared with the consequences of producing an unsuitable or poorly designed discharge-measuring structure. Such an occurrence will be less likely if this book is on hand.

P.H. JOHN