Book Reviews

EXPLOITING WATER RESOURCES

The Range and Choice in Water Management

A Study of Dissolved Oxygen in the Potomac Estuary. By Robert K. Davis. Pp. xviii + 196. (Johns Hopkins Press: Baltimore, Md.; Oxford University Press: London, March 1969. Published for Resources for the Future.) 66s 6d.

DETERMINATION of the optimum strategy for the development and protection of water resources involves problems that are common to the planning of many other types of large public utility. Because of continually changing social attitudes and the frequent but often unpredictable occurrence of technological innovations, the exercise must inevitably involve an element of crystal gazing and must rely to a degree on intuitive judgment. Nevertheless, the techniques for reducing to a minimum the unquantifiable element in the decisions which have to be made, so as to select the best from a frequently bewildering variety of options, are being steadily improved. Nowadays, the preferred approach consists in simulating the real system in terms of a mathematical model, in checking its validity by reference to existing data, and then in using it to predict the response of the real system to any new measures that may be of interest. The costs of such measures can then be estimated and compared against the benefits that are expected to accrue. A central source of difficulty, however, is to decide how far to try to encompass the interactions of proposed new developments in the special field under consideration with other domestic and industrial activities—how far to move in the direction of “total planning”. Also a particularly intriguing problem, especially in the field of water resource development and pollution control, is that of deciding whether it is possible to make realistic assessments of the financial value of any improved recreational amenities that would result from schemes under consideration, for inclusion in the cost-benefit analyses used to aid their selection.

This book gives an account of the modern approach to such problems against the background of the specific task of planning the development of water resources in the Potomac Basin in the United States and of a system of pollution control for the Potomac Estuary. The author stresses that, in the past, planning decisions have been much less effective than need have been the case because, for various reasons, including political constraints, the full range of options was never considered; he illustrates his argument by dissecting an earlier analysis of the situation in the Potomac by the US Corps of Engineers. He rightly lays emphasis on the importance in pollution control of assessing the tolerable risk of the condition of water falling below some desired figure, and then of determining the effectiveness of alternative options in terms of the costs of ensuring that the acceptable level of risk is just not exceeded.

The book seems to have been written primarily with the object of demonstrating the advantages of the author's approach to those concerned with water resource development in the United States. To urge these advantages on British specialists in the field would in a sense be “preaching to the converted” because a predictive mathematical model for the Thames Estuary comparable with but more complex than that described for the Potomac had been largely completed by the mid-fifties; moreover, an investigation begun over a year ago to develop an economic model for determining the best means of exploiting the water resources of the River Trent is probably more comprehensive in its scope than any other study that has yet been reported. Nevertheless, anyone technically involved in work in this broad field will be sure to find something of interest in both the main text and in the appendices which deal in detail with some of the techniques made use of by the author.

A. L. DOWNING

PACIFIC CRUST AND MANTLE

The Crust and Upper Mantle of the Pacific Area

Edited by L. Knopoff, C. L. Drake and P. J. Hart. (International Upper Mantle Project: Scientific Report No. 15.) Pp. xi + 552. (American Geophysical Union: Washington DC, 1968.) n.p.

It is difficult to make a unified judgment on a collection of papers presented at a symposium and then published as a set. And yet so many books that appear now are of this form that somehow one has to decide whether they are of value as a whole or whether separate publication of individual papers would have been more advisable. This volume, after skimming through the contents, I decided to put on my shelves for three weeks and see whether, as a practising geophysicist, I ever felt the need to consult it. To my pleasant surprise, I now find the covers slightly worn and something like one third of the forty articles read in detail. It has proved an invaluable work of reference, and one which I expect to continue using for a long time. I strongly recommend it.

The words “Pacific Area” in the title are a little misleading: work in India is reported in three papers; a further substantial paper is devoted to long geophysical profiles across the continental United States. On the other hand, there is very little about the parts of the Pacific far from land and in particular about the East Pacific Rise. A large portion of the book, however, is devoted to the nature of the boundaries between the Pacific and surrounding continents, and of particular note are the extensive Russian papers on the transition between the Asian continent and the Pacific Ocean. The amount of information contained in these papers is formidable, and this is generally true of the book—very well documented and positively teeming with diagrams.

Most of the papers were written in 1966 (in view of the high quality of presentation a delay of two years in production seems not unreasonable). Since then our understanding of the Pacific Ocean, and particularly of the fringing features, has grown substantially with the “plate tectonics” theory so widely accepted in the past year. This does not seem to me to detract from the value of the book at all. Such an extensive collection of valuable information is perfectly capable of standing by itself and, indeed, the lack of committedness to a unifying theory is in some ways positively valuable. Needless to say, Professor Belousov weighs in with his anti-continental drift piece. Many other authors contribute from a non-committed standpoint. The whole is a worthy collection—one which students could with profit read in its entirety to learn what geophysics is about in all its aspects before choosing a particular field of research.

D. DAVIES