

mentary and metamorphic rocks are discussed, and meteorite compositions and cosmic abundances. These five chapters, however, do not greatly exceed the text of a single chapter on geophysical aspects of the structure and composition of the Earth which, while a valuable discourse, seems too lengthy in the context of the handbook. A more extended consideration of the chemical properties of oceans, streams and atmospheres would also have been rewarding. Tables, which are mainly of geochemical relevance, are also included and the chapter on evaluation of data, although it contains much of what may be found in a standard text on statistics, is convenient, while it also briefly considers interpretation of chemical analysis of silicates.

Volume two is organized into a series of chapters, each of which is devoted to an element. Authors have had to adhere strictly to a scheme in which chapters are subdivided into a number of sections. One author is normally

responsible for section *A* (crystal chemistry) and occasionally for section *B* (isotopes). The remaining sections (*C-O*) deal with subjects as diverse as the abundance of the element in different rock types, natural waters and the atmosphere, its behaviour in various earth processes, its solubilities and biogeochemistry, all of which are mainly the concern of a second author. Within the scheme only the elements polonium, radon, radium, actinium and proactinium are excluded. Closely related elements (the platinum group, noble gases and lanthanides) are to be gathered under the most important element of the particular group. Data have so far been published in the first instalment of volume two for seventeen elements (beryllium, boron, carbon, oxygen, vanadium, iron, zinc, arsenic, silver, tin, antimony, rhenium, platinum metals, mercury, bismuth, thorium and uranium), but most of these chapters are incomplete and sections on crystal chemistry are available for only six of these elements. It is unfortunate that all the material for one element was not collected before publication of that particular chapter. While the task of coordinating publication of such voluminous data is formidable, the editors may find they have been over generous in acknowledging that authors work at different rates and would not be able to deliver their manuscripts on the same date!

Much use is made of clear and well-presented tabulated material, particularly in volume two, and the numerous line diagrams in both volumes are of high quality. There are some proof errors—errors which seem mainly to be connected with translation. The loose-leaf format for volume two is probably the most successful for a compilatory work of this scale. With three further instalments to appear at intervals of about one year, the second volume will ultimately contain approximately 2,000 pages which can be bound in three or four loose-leaf binders. The binders are strong, and individual pages are of a quality and thickness that should stand up to a considerable usage. Not the least useful feature of the handbook is the large number of references it contains. Coverage of world literature has been wide and for the completed chapter on carbon, for example, there are as many as 468 citations.

Both editors and authors are to be congratulated on collecting and organizing so much relevant geochemical data from world sources into a single comprehensive text. With the bulk of material still to appear, a final judgment on the handbook is impossible, but if the present standard is maintained and revisions are incorporated with the passage of time, then an authoritative source book of geochemical information and reference will be available for many years to come.

DUNCAN MURCHISON

COASTAL TOPOGRAPHY

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The mudflats of the Medway as photographed by Aerofilms Ltd, one of the many examples of Britain's varied coastline described by Professor J. A. Steers in his book *The Sea Coast*, now published in a fourth edition in the "New Naturalist" series (Collins: London, October 1969, 36s).

Biological Sciences

WITH AND WITHOUT PHYSICS

Theoretical Physics and Biology

Edited by M. Marois. (Proceedings of the First International Conference on Theoretical Physics and Biology, June 26–30, 1967, convened by the Institut de la Vie.) Pp. viii + 443. (North-Holland: Amsterdam and London, 1969.) 117s.

A WIDE range of topics is covered in this book, largely by short review papers or provocative introductions, followed by vigorous reported discussion. About half the volume is written in French. Various aspects of theoretical physics are explored in their relationship to biological function rather than structure, and various biological topics are considered which have quantitative or physical foundations or connotations.

This is a fascinating collection but the great diversity of material discussed prevents any very coherent picture arising of the relationship between theoretical physics and biology. The point is made several times that biology has got on quite well up to the present without theoretical physics (at least as both were defined at the conference); it was in the thermodynamic contributions that the connexion came through most clearly.

In spite of the inevitable lack of coherence, this book is, however, stimulating and readable. Its value probably arises from the great diversity of topics and their general unfamiliarity to both sides involved in the discussion. Refreshing new ideas or approaches to old ones are thrown up repeatedly in discussion and the assumptions behind, and validity of, the various propositions examined in detail. For example, in Fröhlich's talk on quantum