

## BOOK REVIEWS

HARBURN (G.), TAYLOR (C. A.), and WELBERRY (T. R.). *Atlas of optical transforms*. London (G. Bell and Son Ltd.), 1975. 33 pp., 64 plates. £6 (hardback), £3.25 (paperback).

This book will interest any mineralogist or crystallographer concerned with the determination of crystal structures by the use of X-ray, electron, or neutron diffraction. It illustrates the use of optical diffraction from a 2-dimensional model as an analogue for the atomic-scale diffraction phenomena. It also has considerable relevance to the recently developing technique of high-resolution electron microscopy for 'seeing' approximations to mineral structures.

Nearly 400 matching pairs of photographs are presented, each pair being a diffracting mask and its optical transform. The examples are chosen carefully to illustrate various principles of Fourier transformation including the effects of shape and size of diffracting aperture, the spacing between two or more apertures, the superposition of sets of fringes, the orientation of a diffracting unit, symmetry operators, lattice repeats, and lattice defects of various kinds.

Sixty-four pages of plates are accompanied by a brief text in English and French. This describes the apparatus used for producing the masks and their optical transforms, and gives explanatory notes for each of the plates.

The compilation should have value for teaching others as well as one's self.

J. ZUSSMAN

DAVIS (J. C.). *Statistics and data analysis in geology* (with Fortran programs by R. J. Samson). New York and London (John Wiley and Sons), 1973. xiii+550 pp., 159 figs. Price £9.45.

The author of this comprehensive textbook takes it as axiomatic that the statistical analysis of geological data will involve computer techniques, allowing the handling of large amounts of data and the use of sophisticated numerical procedures. The first fifty pages of the book are therefore devoted to an introduction and an abbreviated guide to FORTRAN. Treatment of 'background material' continues with chapters on elementary statistics and matrix algebra. The major part (p. 170 onwards) of the book contains the more advanced material with sections on sequence data, map analysis, and multi-variate data.

Treatment throughout is extremely lucid, although the sections of programming and elementary statistics are very condensed. A large number of FORTRAN computer programs are included. These are written in a simple and straightforward way so that the mathematical basis of the method is not obscured in the translation into FORTRAN. Experience suggests that in general the programs work and are free from errors. They are written in such a way that they can be readily implemented at any normal computer installation.

The book is a welcome and valuable addition to the library of the senior student or practising earth scientist. It will have served its purpose if it assists in a more critical and rigorous treatment of the wealth of numerical data that at times threatens to drown geosciences.

I. L. GIBSON

JEFFERY (P. G.). *Chemical methods of rock analysis*. Second edition. Oxford and New York (Pergamon Press), 1975. xx+525 pp., 104 figs. Price £16.00.

The second edition of this book will be welcomed by many geochemists working in the field of rock and mineral analysis. Although there are no radical changes from the first edition [M.A. 72-816], which appeared in 1970, many of the instrumental methods are now more comprehensively covered. One of the strongest recommendations in favour of this book is that it describes methods of analysis in detail, with appropriate references, unlike some recent books, which have confined themselves to vague generalizations. Methods for a very wide range of elements are given. One criticism, in view of the current widespread use of atomic absorption analysis for rock analysis, is that more details could have been given of this method. The determination of aluminium by atomic absorption using the nitrous oxide flame is dismissed in only a few lines, for example.

J. N. WALSH

JONES (M. J.) Editor. *Minerals and the environment*. London (Inst. Mining and Metall.). xii+803 pp., 236 figs., 1 pl., 1975. Price £25.00.

Forty-one papers, together with discussion and authors' replies, are the proceedings of a symposium organised by the Institution of Mining and Metallurgy with the cooperation of the Institute of Quarrying and the Institution of Mining Engineers. The overall theme relates to ways of reducing and ameliorating the impact that the production of raw materials for the world's industries has on the human environment. Minerals are considered as the means by which energy is channelled to uses that raise human living standards above subsistence levels and ores in terms of their utilization and benefit/cost ratios rather than their genesis and detailed mineralogical constitution. The environment is mainly considered in relation to regions where mining, quarrying, and metallurgical extraction takes place.

Topics covered include rehabilitation of open-cast mines and mine tips, revegetation of toxic mining wastes, the role of microorganisms in the recovery of polluted areas, disposal of wastes, and control of pollution of rivers. The section relating to dust in mines and quarries deals with control and collection methods, not the mineralogy of dusts. Here, as in other parts of this volume, the environmental aspects exclude those relating to biological effects on people working in, or living in the vicinity of mining, quarrying, and metallurgical industrial establishments.

The demonstration in this well-produced and illustrated book of what can be achieved in the environmental field if money is available may have a considerable