

structural picture has been built up and the Irish Sea divided into a number of sedimentary basins, while, as a postscript almost, Dr Worzel, in an abstract, illustrates the various types of continental margin.

Although the title of the book does not convey it, this is the most up to date résumé of the North Sea geology presently available. JOHN R. V. BROOKS

## CLIMATE ON THE GROUND

### Ground Level Climatology

Edited by Robert H. Shaw. (A Symposium presented at the Berkeley Meeting of the American Association for the Advancement of Science, December, 1967. Publication No. 86.) Pp. xii+395. (American Association for the Advancement of Science: Washington, DC; Bailey Bros and Swinfen: London, 1967.) 150s.

THIS neat and unostentatious publication of twenty papers contains a great deal of interesting information. It is likely to be found welcome by ecologists who want to know what their American colleagues are doing; and useful, as the papers are characteristically well furnished with references. Seven authors are concerned with the relationship between ground-level climate and plants; seven with animals; and five explore various aspects of weather modification.

R. H. Whittaker's review of ecological implications of weather modification is noteworthy. To him it appears that technological enthusiasm has prevailed over thoughtful consideration of consequences; and, for example, it seems unlikely that reasonable increases in mean temperature could provide economically useful increases in production of temperate-zone communities. A philosophy of conquest of nature and unlimited modification of environment is already outmoded. H. C. Fritts provides a physiological basis for correlation of tree-ring width with climate; such studies have become acceptably sophisticated. J. M. Caprio finds value in phenology. N. J. Rosenberg on wind breaks in dry regions does not overlook the meteorological effects arising from the growth of crops under their shelter; there appears every reason to believe that windbreaks increase the efficiency of water use. Results of interesting experiments on the yield of animals under climatic stress are described. It begins to look as if one of the major American concerns is to maintain productive efficiency under what, to Europeans, are impossibly hot conditions, not only for man. One sympathizes with the pigs who begin to show the effects of stress above 70° F, whereafter a rapidly increasing percentage finds its way to the air-conditioned shelter. From other papers it is evident that the use of plants as climatic indicators with a view to conservation of resources has been effectively developed in California. Elsewhere, there is some good ground-layer meteorology and critical comment on the utility of accumulated temperatures; and relationships between climate, diseases of plants, physiological functions of animals are discussed. D. M. Fuguay discusses weather modification and forest fires; effects of lightning from clouds of varying height make interesting applied meteorology.

Citations are preponderantly American but, for example, Sutton on micrometeorology, British work on potato blight and Russian work on the limited effects of water bodies in semi-arid climates are appropriately noted. Papers are generally clear, tending generally to be somewhat factual rather than argumentative; production is excellent, if expensive; and there is a good index. This book is a very useful general reference for ecologists and conservationists, and for exponents of applied meteorology; it could also be read by many who will appreciate the research that must be done in order that men can live in harmony with their environment.

GORDON MANLEY

## CRYSTAL STRUCTURE

### Crystal Structure Determination by Electron Diffraction

By J. M. Cowley. (Progress in Materials Science, Vol. 13, No. 6.) Pp. 267-321. (Pergamon: Oxford, London and New York, 1968.) 21s.

WITH the notable exception of groups in the Soviet Union and in Australia, crystallographers have rarely exploited electron diffraction with great zeal as an aid to structure determination. Their reluctance is often a result of a feeling that there is little to be discovered using electrons which cannot more easily be found using X-rays or neutrons, and of the expense of the equipment needed to proceed beyond rudimentary studies of powder rings. Now that electron microscopes with facilities for selected-area diffraction have become relatively commonplace and easy to operate, and now that high voltage instruments are being developed, a review such as Professor Cowley's is most timely.

He begins by using the kinematic approximation to draw analogies between the diffraction of X-rays and electrons, but emphasizes from the start that the approximation is far less valid for electrons, the interaction with atoms of which is so much stronger. He then devotes a chapter to dealing in outline with the dynamical theory and with approximations to it which are more amenable to computation. After this there is a critical outline of structure analysis using polycrystalline and single crystal patterns together with a most valuable summary of structural information available from specifically dynamic effects. He ends with a survey of the present state of the art and with references both numerous and up to date.

This is a review which can be recommended to crystallographers, not only for its clarity of exposition and its authority, but also for its impartiality in revealing both the merits and limitations of a method in the development of which Professor Cowley has himself played such a notable part. W. J. DUFFIN

## INORGANIC PROBLEMS

### Physical Methods in Advanced Inorganic Chemistry

Edited by H. A. O. Hill and P. Day. Pp. 627. (Interscience (Wiley): London and New York, 1968.) 120s.

WITH the exception of chapters on thermochemistry and structural analysis this book is essentially about the spectroscopy of transition metal complexes. In general, the approach adopted in most of the chapters is that usually associated with books on chemical physics, and the reader who is not particularly inclined towards this approach may find the exposition rather too formal. If this is accepted, however, the book is good and will prove useful to those who wish to use modern techniques of inorganic chemistry. Each chapter gives a brief introduction about the physical basis of the phenomenon and then goes on to show the applications of the technique to particular inorganic problems. The editors have been remarkably successful in bringing together such a wide variety of authors and producing a book with a consistent approach and exposition.

The book consists of twelve chapters beginning with diffraction methods (C. K. Prout), X-ray spectroscopy (C. Bonnelle) and molecular photoelectron spectroscopy (D. W. Turner). The chapter on diffraction methods is not devoted to introducing the reader to the method but rather to highlighting the methods involved in structural analysis and the problems and ambiguities that can arise. In this it is successful and should prove useful. X-ray emission and absorption is not a technique that is usually associated with inorganic chemistry, but the short chapter by C. Bonnelle shows clearly that certain valuable information about the energy distribution of