

tion to the new art of nuclear snooping—the fine tooth-combing of the nuclear haystack to make sure that potential bomb-stuff does not fall into a black market.

RALPH LAPP

## Crystallographic History

*Early Papers on Diffraction of X-rays by Crystals.* Edited by J. M. Bijvoet, W. G. Burgers and G. Hagg. Volume II. Pp. xix+484. (A. Oosthoek's Uitgevermaatschappij: Utrecht, 1972.) (Published for the International Union of Crystallography.) £10.80.

THE two volumes of this collection of papers cover the period from the birth of the subject in 1912 to the year 1935; but the papers are not in chronological order: they are arranged in such a way as to display the development of each facet of the subject separately. Volume I, published in 1969, contained the papers in which, following the initial discoveries by von Laue and the Braggs, the theoretical foundations were laid, the first crystal structures were revealed, and the analysis of the several factors affecting the intensities of diffracted beams put crystal structure determination on a firm quantitative basis. Volume II covers the rich harvest of structures which grew from these firm foundations, and the growing knowledge of atomic radii and building principles during the twenties and early thirties.

The papers, not always in complete form but sometimes represented by an excerpt, a paragraph or only a few sentences, are given in the original languages; they are grouped in sections, each covering a particular facet, ranging from space groups and building principles to experimental methods and the various types of structures of increasing complexity which were successfully revealed in this period by the indirect puzzle-solving trial method. The book ends with Patterson's paper of 1935 which, by showing that a vector distribution can be calculated unambiguously from the X-ray data, inaugurated the era of semi-direct methods. The development of the subject is displayed admirably, not only by this arrangement in sections but also by page headings which give on the left the authors and on the right the topics dealt with in the open pair of pages.

A slightly inconvenient feature is that each contribution is preceded only by a number; the author and subject can be gathered from the page headings, but to find the date we have to refer back to the beginning of the section, while the journal reference is given only in the contents list at the beginning of the book. I noticed a few typographical errors, the most serious of which are dates with figures transposed, in the

lists of contributions at the beginnings of sections; however, the dates are given correctly in the contents list at the beginning of the book.

But these are small blemishes in an admirable production. All crystallographers interested in the history of their subject will find these volumes of enormous interest; the editors have performed a most valuable service in arranging the significant contributions in this way. The experienced worker can savour again the drama and excitement of the early days, or perhaps (I speak here for myself) can fill in gaps and correct his perspective of the development of the subject; and the teacher will appreciate the convenience of having the early documents of the subject collected together in this way. As for the student, the book is intended "not only to serve as a pedagogic aid, but also to make the student aware of the history of his science". The reviewer of Volume I (*Nature*, 224, 984; 1969) was doubtful of its pedagogic value, but I would urge that students should be encouraged not to rely only on textbooks but to go to original papers to get the feel of fundamental research, the struggle to understand novel phenomena. Lastly, the historians and philosophers of science will find that, read in conjunction with the personal reminiscences of the chief protagonists collected together in 1962 by Ewald in *Fifty Years of X-ray Diffraction*, these volumes will provide most of what they want to know about the early development of this subject which has played such a crucial role in twentieth century science.

C. W. BUNN

## Blood

*Modern Concepts in Hematology.* Edited by G. Izak and S. M. Lewis. Pp. 278. (Academic: New York and London, August 1972.) \$26.

THIS book gives an account of views expressed by four invited panels of the International Committee for Standardization in Haematology to consider various aspects of quality control. The work was presented at symposia held at the XIII Congress of the International Society of Haematology and is edited by Professor G. Izak and Dr S. M. Lewis.

The first part of the book is devoted to various aspects of measuring haemoglobin concentration, and includes an account of the spectral characteristics of haemoglobin derivatives, reagents used in the cyanmethaemoglobin method, and the value of Ringbom curves in haemoglobinometry. The second part concerns the studies of standardization of serum iron and iron-binding capacity assays and includes results of inter-laboratory trials. The

third part is devoted to haemocytometry and includes an account of the chemical and physical aspects of electronic cell counting, electronic cell sizing; evaluation of various cell counting instruments and methods of quality control applicable to such instruments. The final part describes certain of the computer aspects of data processing in haematology, interphasing with general hospital systems and computer-aided differential diagnosis.

The title appears somewhat misleading, but this volume will prove of interest to all those concerned with standardization and quality control in haematological laboratories.

J. D. M. RICHARDS

## Rays in Space

*Cosmic Rays.* By A. M. Hillas. (The Commonwealth and International Library of Science, Technology, Engineering and Liberal Studies: Selected Readings in Physics.) Pp. x+297. (Pergamon: Oxford and New York, August 1972.) £4.

IN spite of the vastness of the subject (or perhaps because of it) there have not been many books on cosmic rays and Dr Hillas's addition is very welcome. The author is an international authority on the analysis of complex air shower data with the object of determining primary characteristics of astrophysical interest and his ability in interpreting the many and varied phenomena encountered in cosmic rays shines through very clearly in this volume.

The subject is treated very largely in historical fashion and in fact half the book is devoted to reprints of some of the key papers which have marked turning points in the development of the subject. The theme is the development of ideas about the nature of the various particles encountered in the radiation, and their interactions, leading to an examination of the problem of the primaries, their origin and their relationship to other extra-terrestrial radiations.

This book, attractively produced, will be read with profit by physics undergraduates and must surely become prescribed reading for postgraduate students entering research fields in the space sciences in general.

A. W. WOLFENDALE

## Addendum

IN the bibliography to the review of the *UFO Experience* (*Nature*, 239, 529; 1972), the publisher was given as Henry Regnery: Chicago. The book is also published by Abelard-Schuman: London.