International scientific organizations. A guide to their library, documentation, and information services. Pp. xii+794. Prepared under the direction of K. O. MURRA. Washington: Library of Congress, 1962. Obtainable from U.S. Government Printing Office, Washington 25, U.S.A. Price $3·25.

The main part of this book, over 700 pages, consists of descriptions of 449 international organizations. The organizations are arranged alphabetically by their names in English, and the information given is a description of the library of the organization; its documentation and information services; and other relevant activities. A list of publications of the organization (up to about 1959) and a short resumé of the origin, purposes, administrative structure, and similar data concerning the organization are also given.

The entry for the International Union of Crystallography occupies just over a page and a half, and seems generally accurate, though three years out of date. The length of the entries varies considerably: the Bee Research Association has over three pages, the Organization of American States fifteen pages, the United Nations and Unesco 30 each, and the Society of Chemical Industry four lines. There is a useful list of acronyms (abbreviations such as IUCr, BRA, UN) and an index occupying thirty-four pages.

The book will clearly be a most useful reference work. Certain information concerning U.S. library holdings is only of local interest.

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Crystal data. Determinative tables. 2nd ed. By J. D. H. DONNAY (General Ed.), GABRIELLE DONNAY (Assistant Ed.), E. G. COX (Inorganic compounds), OLGA KENNARD (Organic compounds) and MURRAY VERNON KING (Proteins). 1302 pages. A.C.A. monograph No. 5, 1963. Price $20.

The value of a handbook giving numerical data increases strongly with the number of entries and — inversely — with the number of omissions, misprints and errors. Already a mere glance at the impressive dimensions of Donnay's new *Crystal Data* tells us that this volume, containing also Nowacki's classification tables by space groups,* must mean a considerable improvement in comparison with the first edition.

This second edition has more than doubled its entries, giving X-ray data and other auxiliary properties of about 13000 crystalline substances, now collected and supervised by a great number of collaborators who also covered Russian and Japanese literature. As Donnay ends his preface with the rather mocking remark: 'Having found by sad experience how little I could trust other compilations (the first edition of *Crystal Data*, for example), I have no illusion about the faultlessness of this one,' we certainly can be sure that all shortcomings indicated by users of the first edition have been corrected.

The principle of choosing axial ratios as determinative numbers has been maintained, so that the data can even be used when only preliminary measurements with the optical goniometer have been done, but the choice of the unit cell to define the lattice has been modified. It is based now on the true reduced cell showing the shortest possible lattice translations instead of the Delaunay cell having the shortest possible translations that enable all three inter-edge angles to be non-acute. Though this is certainly an improvement from a practical point of view, it is a pity that Donnay's lucid treatment of the Delaunay reduction procedure has disappeared from his book.

The handling of the determinative tables is improved by a thumb index, distinguishing the different crystal systems, while the policy of avoiding misprints by off-set printing from typewritten sheets has been maintained in this edition. Though the size of the type *o, e, a, n, u etc.* is only 1 mm (compare the type in this review which is $1\frac{1}{4}$ mm!) the text is surprisingly clear and easily readable. Workers in the field of crystalline proteins will greatly welcome the Protein Crystal Data by Murray Vernon King giving 5 anorthic, 81 monoclinic, 98 orthorhombic, 15 tetragonal, 23 hexagonal and 24 cubic entries. Record holder in cell dimensions is a virus described by Klug *et al.* giving visible-light diffraction with a cubic unit cell of 3580 Å.

As the first edition — in spite of its imperfections — has already been a very useful source of information on crystalline substances and a great help in identifying unknown compounds, this new handbook certainly will gain a reputation as an authoritative reference work on crystal data. The editors and their collaborators are to be congratulated on the impressive result of a long period of painstaking labour: the close family of scientists covered by the International Union of Crystallography is greatly indebted to them all. This well-bound monograph, at such a reasonable price considering its valuable contents, is a 'must' on the shelves of every science library.

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* A second edition of Nowacki's tables, based on these new data, is in preparation.

Proteins and nucleic acids. Structure and function. By MAX F. PERUTZ. Pp. x+211. Amsterdam: Elsevier, 1962. Price £2·10·0.

'Molecular genetics is approaching a stage similar to that reached by atomic physics thirty years earlier, when the imaginative hypotheses which formed the background of research will have become established scientific truths.' This book, which is a slightly expanded version of the Weizmann Memorial Lectures given in 1961, surveys the position already reached in some rapidly advancing fields of molecular biology.

Great progress has recently been made in our understanding at a molecular, or atomic, level, of each step

in the biosynthesis of a protein molecule. In the living cell, three different forms of ribonucleic acid (RNA) take their parts in this synthesis; one is the 'messenger' carrying instructions for the amino-acid sequence from the deoxyribonucleic acid (DNA) of the nucleus to the site of protein synthesis. The DNA carries the hereditary information of the cell and is copied at every cell reproduction. Our understanding of these processes is being built up from very diverse experimental studies. X-ray studies of DNA fibres have shown the helical structure of the molecules with paired purine and pyrimidine bases, and allowed Watson & Crick to suggest the mechanism of replication — so that the information contained in the sequence of bases may be passed on from parent to daughter cell. Suitably crystalline RNA fibres have more recently been obtained and have shown these molecules to be largely helical too. Isotopic tracer experiments have been used to follow the fate of different components of the protein and nucleic acid synthesising systems both *in vivo* and *in vitro*. Genetic studies on bacteria, with chemically induced mutations, have shown that the code word for one amino acid consists of three bases in the DNA chain; biochemical experiments are beginning to show which three bases constitute each code word.

Dr Perutz, in his second and third lectures, has drawn together and described in outline many of the key experiments in these different fields, and showed what is proved by each. It is a most useful survey, and fascinating to read; each argument must be closely and carefully followed, and probably much more material has been presented in this short space than the newcomer can hope to appreciate fully in one reading.

The first of the three lectures describes the results of the X-ray analyses of the crystal structures of the protein molecules myoglobin and haemoglobin, the interpretation of the electron-density maps at limited resolution, the detailed architecture of these large and biochemically important molecules, and the dependence of this architecture on their chemical constitution. The methods of the X-ray analysis are not discussed at all; in fact very little indication is given of the years of toil, on the part of Dr Perutz and his colleagues, which preceded these beautiful results, years during which the intermediate results were of interest to crystallographers but had very little significance for biologists. But now there is a wealth of information of great interest to biologist, chemist, and crystallographer, and it is a pleasure to hear (or read) Dr Perutz's account of this.

The book provides, therefore, an exciting introduction to molecular biology (for the beginner who already has some background of chemistry and biology), or, for the reader already familiar with a part of it, a good survey of the wider field and the relation of one development to another. (It is not intended, however, to be an exhaustive review.) There is an appendix outlining a few advances made since the lectures were given, and a useful list of references up to mid 1962.

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Dana's System of Mineralogy, Vol. III. 7th ed.

By C. FRONDEL. Pp. 334, with 114 figs. and 50 tables. New York, London: Wiley 1962. Price $7·95.

Volume III of *Dana's System of Mineralogy* contains a detailed description of the silica minerals, especially of quartz, which occupies about three-quarters of the contents. The rest of this volume is devoted to the remaining polymorphs, including the new synthetic high-pressure modifications, some of which have subsequently been discovered as natural minerals. The main concern of this handbook is the detailed description of the morphological, physical and chemical properties of the minerals in question. The crystal forms observed are broadly discussed. There is no doubt that this collection of data on a single chemical compound is most valuable for all scientific research on this subject. On the other hand the reviewer feels that the structural data are not treated quite in accordance with their general importance for all properties here discussed. The description of the structures and the mutual relations of the polymorphs is discussed in a formal manner only, *e.g.* the parameters of the atomic positions are given, but the important bond angle Si–O–Si is not mentioned. A more detailed crystal-chemical consideration of the minerals in question would therefore be highly desirable in the next edition.

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Globular protein molecules: their structure and dynamic properties.

By JACOB SEGAL, KÄTE DORNBERGER-SCHIFF and ANGEL KALAIDJIEV. Translated by ANTHONY WOOSTER. Pp. xiii+150. Berlin: VEB Deutsche Verlage der Wissenschaften. 1960. Price DM 19·80.

Many of us working on protein crystals have in the past speculated on the structure of protein molecules and have built models, more or less precise, which seemed to us to fit the known experimental properties of proteins. This book describes the development of one such model, 'the Faltentrommel' model, by a biologist, Jacob Segal, an X-ray crystallographer, Käte Dornberger-Schiff, and a biochemist, Angel Kalaidjiev. In this model, the peptide chains are imagined to occur in comparatively short lengths in proteins, packed anti-parallel to one another and connected by diketopiperazine bridges which involve the diamino and dicarboxylic acid residues. The sheet-like structure that results is folded round to form a drum, giving a central hole, which may have a quite irregular shape, in the molecule. Large molecules are thought to consist of a number of drum-like regions. Physical and chemical evidence, enzymatic behaviour and X-ray analytical data are discussed in relation to the model.

It seems to me, as I imagine it must to many other