

Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England).

European Crystallographic Committee

The European crystallographers, through the European Crystallographic Committee, invite colleagues in developing countries to join in co-operation schemes. The purpose of the co-operation is to exchange information, teaching material and staff, to share facilities such as data collecting apparatus, to assist potential buyers of equipment to contact the main suppliers and to set up joint research programmes.

Active crystallographers and/or departments with crystallography groups, who are interested in such a co-operation scheme are invited to contact either Professor Dr D. Feil, Chemical Physics Laboratory, Twente University of Technology, P.O. Box 217, Enschede, The Netherlands or the President of the European Crystallographic Committee, Dr O. Kennard, University Chemical Laboratory, Lensfield Road, Cambridge CB2 1EW, England.

Status and Future Potential of Crystallography

An in-depth review of the status and further potential of crystallography in the USA has been produced by the US National Research Council in the form of a 74-page report prepared by the US National Committee on Crystallography. The report is based on the proceedings of a two-day conference sponsored by the National Committee and held in February 1975 and on the results of a postal survey.

One objective of the report is to point out the vitality and extensive range of crystallographic studies. This is done by emphasizing the broad relationship of crystallography to numerous other scientific disciplines, by describing its inherent diversity of subject matter for experimental and theoretical investigation, and by outlining numerous promising areas for future research. Recent advances in analytical capabilities have cleared the way for more effective and far-reaching applications.

The areas considered in the report are biological macromolecules, chemical crystallography, diffraction physics, earth sciences, and materials research. In addition, there are parts devoted to the results of the chemical crystallography

questionnaires, the teaching of crystallography, and a brief discussion of crystallographic computing.

A limited number of copies of *Status and Future Potential of Crystallography* are available from the Office of Chemistry and Chemical Technology, National Research Council, 2101 Constitution Avenue, N. W., Washington, D. C. 20418, USA.

International Conference to Mark the 50th Anniversary of the Discovery of Electron Diffraction

This conference will be held at the Imperial College, London, 19–21 September 1977. It is intended to cover all aspects of electron diffraction, with special emphasis being given to specific topics such as crystal structure determination and surface structure studies. The following speakers have agreed to present papers: S. Y. Tong on Dynamical Methods for Surface Structure Determination; J. B. Pendry on Advances in LEED Theory; D. Aberdam on Medium/Low Energy Electron Diffraction; J. M. Cowley on Crystal Structure Determination Using Electron Diffraction; P. Goodman on Accurate Structure Factor and Symmetry Determination; A. Howie on Dynamic Diffraction Theory; D. Watanabe on Short Range Order Diffuse Scattering from Disordered Alloys; P. Hirsch on Crystal Defect Structure by Electron Diffraction; T. Mulvey on Instrumentation for Electron Diffraction. In addition, depending on support, a session will be held on applications of electron diffraction to industrial research. Contributions are invited on any of the above topics and titles should be sent to the Conference Secretary, Dr P. J. Dobson, Department of Physics, Imperial College, Prince Consort Road, London SW7 2BZ, England, by 31 January 1977. Abstracts will be required by 31 May 1977.

It is hoped to arrange an exhibition of photographs of historical and current interest. Photographs are invited that reflect either historical aspect, *e.g.* instruments, portraits *etc.* or novel aspects to current interest. Offers should be sent to the Conference Secretary. It is hoped to publish the proceedings of the conference. For further information and application forms write to the Meetings Officer, The Institute of Physics, 47 Belgrave Square, London SW1X 8QX, England.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.

Liquid crystals. (Proceedings of the International Conference, the Raman Institute, Bangalore, India, December 1973.) Edited by S. CHANDRASEKHAR. Pp. 570. Indian Academy of Sciences, 1975. Price \$27.00.

This book is the published proceedings of the International Conference on liquid crystals held in December 1973 to mark the 25th anniversary of the founding of the Raman

Research Institute. It is an impressive volume – in both scope and authority. Most of the internationally famous names are represented and the 47 papers span the full range of the physical sciences.

Two decades ago liquid crystals were virtually chemical curiosities. Since then the subject has expanded explosively and the reasons are not difficult to see. The unique physical properties of liquid crystals offer a challenge to both practical and theoretical research workers. The electro-optical

properties offer a new range of display devices. The temperature-sensitive colours of some liquid-crystal phases offer a direct form of thermography. Lyotropic liquid crystals offer an understanding of the state of membranes in living systems as well as explaining the properties of commercial surfactants and foams. In short the subject has something to offer virtually everybody.

The pace and diversity of the subject makes frequent reappraisal desirable and the proceedings of the series of international meetings have provided a valuable and necessary record. This volume is amply fitted to stand beside its predecessors. It contains both state-of-the-art surveys and original research papers. There are papers dealing with almost every conceivable physical approach: hydrodynamics, light scattering, electrical, magnetic and electro-optical properties, phase-diagram investigations, thermodynamic properties, surface-tension measurement, circular dichroism and a variety of spectroscopic techniques. A single biological paper by Professor Ambrose of the Chester Beatty Research Institute on the organizational role of liquid crystals in living systems appears to point to an awakening of interest in liquid crystals in molecular biology also.

There are two classic papers of special interest to crystallographers. Both deal with thermotropic phases. The one by de Vries is very much the sort of paper one has come to expect from this author. It gives a survey of the contemporary structural knowledge of thermotropic phases, discusses the interrelations between different phase types and argues in favour of the scheme of nomenclature proposed by the author. The other paper by Vainshtein & Chistyakov is complementary in character. It relates the X-ray diffraction patterns of nematic and smectic phases to the statistical distribution functions describing the molecular arrangement. The relevant calculations are described and the concepts are elegantly illustrated by a series of optical diffraction patterns. It is a pity that an account of the third X-ray paper presented at the conference did not materialize in this volume. In dealing with the lyotropic phases it would have completed the structural survey of mesophase types.

The book is well presented and adequately illustrated with black and white photographs and line drawings. Although the 570 pages of the volume make it appear of daunting size, the individual papers are all concise and readable, and the uniformity of style in the presentation makes one suspect a good deal of effort has been expended by the editor to achieve this.

This is an interesting and useful reference volume. It is available at reasonable cost and can be warmly recommended both to those with an interest in liquid crystals and those on the periphery of the subject.

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NMR basic principles and progress. Vol. 9. Lyotropic liquid crystals. By C. L. KHETRAPAL, A. C. KUNWAR, A. S. TRACEY and P. DIEHL. Pp. 11+85, Figs. 18, Tables 5. Springer-Verlag, 1975. Price \$15.60.

In this short monograph the authors give a concise yet comprehensible survey of the literature on NMR studies of

lyotropic liquid crystals up to 1974. Following a short introduction, the review is divided into two sections: the first describes investigations of the structures of the mesophases themselves, while the second is concerned with studies of the geometry of molecular and ionic species dissolved in the so-called 'nematic' mesophases which may be macroscopically orientated in magnetic fields to provide an ordering matrix for the solute. This latter subject reflects the research interests of the authors and will be of little interest to those concerned with the properties of liquid crystals as discussed in the first section. Each section is appended with a useful, referenced table of the systems reported.

The book should be particularly useful as a source of references for NMR spectroscopists working in either of the fields described, but has little to offer the general reader with an interest in liquid crystals.

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Advances in liquid crystals. Vol. 1. Edited by GLEN H. BROWN. Pp. xi + 320, Figs. 243, Tables 19. Academic Press, 1975. Price \$31.50.

We are at present witnessing an intensive, multidisciplinary attack on the properties of liquid crystals, albeit their discovery by Reinitzer and Lehmann dates back to 1888. The combination of molecular order and fluidity confer on these materials fascinating properties which find a diversity of applications ranging from their use in electro-optic devices to their role in the lipid membranes of biological structures. The introduction of this new series is therefore timely and will be welcomed by research workers in the field.

There are five chapters in this first volume; all authoritatively written and beautifully illustrated. The first, by Per Ekwall, is by far the most substantial (142 pages, 140 figs., 7 tables, 134 references); it is an exhaustive review of the composition, properties and structures of aqueous lyotropic liquid crystalline phases formed by amphiphilic compounds. The collection of phase equilibrium diagrams for binary and ternary systems will be particularly useful to workers in this field. In Chap. 2 (23 pages, 14 figs., 2 tables, 65 references), Christyakov describes the structure of thermotropic liquid crystals as derived from X-ray diffraction studies. Next Skoulios gives an intelligible account (19 pages, 14 figs., 53 references) of how block copolymers may form mesomorphic phases with structures similar to those exhibited by soap-water mixtures. Smith, in Chap. 4 (77 pages, 37 figs., 9 tables, 320 references) discusses the complementary nature of the disorder in plastic and liquid crystals and their significance for the melting of molecular crystals; this article should interest the general reader. In the final chapter (44 pages, 38 figs., 1 table, 45 references), Kleman gives a lucid account of the structural defects encountered in liquid crystals.

These articles are written for the specialist and as they cover a diverse range of topics it is doubtful if they would all interest a single reader. The series is, therefore, more likely