CRYSTALLOGRAPHY NEWS

BRITISH
CRYSTALLOGRAPHIC
ASSOCIATION

No. 1 JUNE 1982

Contents

1. The British Crystallographic Association

X-ray crystallography began just seventy years ago, at this time of year in 1912, when Friedrich and Knipping first observed the diffraction of X-rays by a crystal. The results were announed by von Laue on 8 June 1912 and we all know that within a year W.L. Bragg had exploited the new phenomenon to solve the first crystal structure. The record since then has been one of continuous expansion into new fields so that crystallography and the study of diffraction effects have transformed physics, chemistry, mineralogy, metallurgy and, most recently, biology.

During these developments crystallographers were drawn together by their use of common methods and formed a closely integrated community, internationally as well as in this country. In recent years, however, we have tended increasingly to think of ourselves as physicists, chemists, mineralogists, metallurgists, biochemists, and so on, who happen to use crystallographic and diffraction methods in our researches, and many of us have concentrated on our contributions to these sciences and neglected our continuing common interest in crystallography. In part this is surely a natural and a healthy development, but we neglect our base in crystallography at our peril. Hence the need for the BCA.

The enthusiasm with which the formation of a British Crystallographic Association was welcomed at the Durham meeting in April shows that many of us see the need to renew and extend our contacts with our fellow crystallographers in all branches of science. We are united in the belief that the BCA will provide a framework within which that will be possible without disturbing the existing groupings of like-minded crystallographers that have flourished for so many years in association with the Institute of Physics and the Royal Society of Chemistry. Indeed these groups, and new ones helping to focus other interests, have important parts to play in the BCA and we must all work together to develop the activities of the new association.

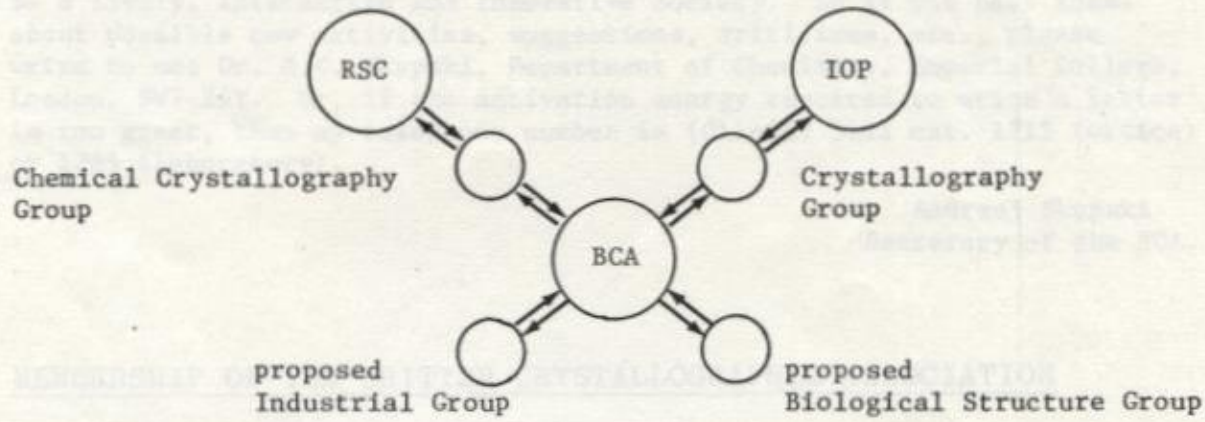
Let us all resolve to meet with our fellow crystallographers every year at the Spring Meeting of the BCA. There we shall find out what new advances in another branch of the subject might help to solve our problems, hear about the most recent developments, see the latest apparatus, and enjoy the triumphs and share the difficulties of old and new friends. I shall look forward to seeing you at Royal Holloway College, 28-31 March, 1983.

D. C. Phillips.

BCA - Its Structure and Aims for 1982-83.

After a long gestation period the BCA was born in Durham in April of this year. It is now the second largest crystallographic society in the world.

For historical reasons, its organisation is somewhat unusual, and this can still cause confusion. I have, therefore, shown below in a schematic diagram the relationship of the various groupings. (Also included are the two new Groups which are in the process of being formed, and about which more is written in other parts of this issue).



The BCA is an independent scientific society, governed by the Statutes and By-Laws which were adopted in Durham on 6th April, 1982, and its Council has the following composition:

President	Professor Sir David Phillips FRS
Vice-President	Professor Dorothy C. Hodgkin OM FRS
Secretary	Dr. A.C. Skapski
Treasurer	Professor C.A. Taylor
Ordinary members	Mr. J.W. Harding
	Dr. Olga Kennard
	Professor J. Zussman
Group representatives	Dr. R.H. Fenn (Crystallography Group)
	Dr. R.W.H. Small (Chemical Crystallography Group)
Co-opted members	Dr. B.J. Isherwood
	Dr. A.M. Moore (Editor of Crystallography News)
	Dr. S.C. Wallwork
	Professor A.J.C. Wilson FRS
ex-officio	Professor D.M. Blow FRS (Chairman of BNCC)

When the two new Groups are formally established, their Group representatives will also join the Council.

Apart from organising a successful conference at Royal Holloway College in spring of 1983, the BCA will have much to do in the first year of its existence. Some of the more important tasks will be:

a) To successfully launch the Industrial Group and the Biological Structure Group, so as to ensure that these important interests in the crystallographic community have a Group with which they can identify.

b) To put the BCA on a sound financial basis, by encouraging crystallographers to become Founder Members, and by seeking donations from Industry. To further the latter aim, a programme of appeals to science- and technology-based companies is already in progress.

c) To attract as many new Ordinary Members as possible, both in the U.K. and abroad. Here you can help the Association a great deal - by publicising the BCA, by passing information to friends and colleagues who might be interested in joining, and by suggesting possible names of people to whom information and application forms can be sent.

These are important aims, but not the only ones. We want the BCA to be a lively, interactive and innovative society. So if you have ideas about possible new activities, suggestions, criticisms, etc., please write to me: Dr. A.C. Skapski, Department of Chemistry, Imperial College, London, SW7 2AY. Or, if the activation energy required to write a letter is too great, then my telephone number is (01)-589 5111 ext. 1212 (office) or 1285 (laboratory).

Andrzej Skapski
Secretary of the BCA.

3. MEMBERSHIP OF THE BRITISH CRYSTALLOGRAPHIC ASSOCIATION

Members of the Crystallography Group of the Institute of Physics or of the Chemical Crystallography Group of the Royal Society of Chemistry are automatically joint members of the British Crystallographic Association without further application or subscription.

They may, however, wish to become Founder Members or Ordinary Members of the B.C.A. in addition, or they may wish to join further groups; in these cases the appropriate sections of
* the forms should be completed and sent to the treasurer with the relevant remittance or banker's order.

Overseas applicants for membership should ignore the section relating to covenants unless they are proposing to subscribe out of funds held in the U.K. on which U.K. Income Tax is paid.

In addition to the two founding groups - The Chemical Crystallography Group of the Royal Society of Chemistry and the Crystallography Group of the Institute of Physics - two new groups are being launched, one dealing with Biological Structures and the other with Industrial Applications.

4. DONATIONS TO THE B.C.A.

The following generous donations from industry are gratefully acknowledged:

G.E.C. Hirst Research Centre	£750
Nicolet Instruments Ltd.	£500
Pye-Unicam Ltd.	£500
Enraf-Nonius Ltd. (England)	£250
B.V. Enraf-Nonius (Delft)	£250

In addition, twenty-three Founder Members have each subscribed £100.

5. A HUNDRED YEARS AGO: THE CRYSTALLOLOGICAL SOCIETY

Professor N. Story-Maskelyne of Oxford and W. H. Miller of Cambridge, together with others, formed a Crystallometric Association on 14 June 1876: the same year as the formation of the Mineralogical Society. (See W. Campbell-Smith, Min. Mag. 40, 429, 1976.) The name was soon changed to the Crystallological Society. Altogether thirty-four members were elected, including a number of foreign members: with W. J. Lewis elected Secretary, Story-Maskelyne Treasurer and Miller the first President. The first meeting was in Story-Maskelyne's London house, and the papers read were published in the Philosophical Magazine and subsequently issued as two volumes of Proceedings of the Society: one published in 1877 and the other in 1882.

By 1881 the Mineralogical Society had 127 members and in December of that year Thomas Davies suggested that the two societies should amalgamate. On 11 December 1888, members of the Crystallological Society who were willing to join the Mineralogical Society were elected en bloc without entrance fee.

6.

A Biological Structure Group for the BCA

At its inaugural meeting, the BCA endorsed the proposal that a working party should be set up for the formation of a Biological Structure Group. The group will be launched next March with a symposium as part of the BCA annual meeting at Royal Holloway College. Bob Diamond (MRC Laboratory of Molecular Biology, Cambridge) will be chairman of the working party and David Moss (Birkbeck College) will be secretary.

There has never before been a scientific society in the UK which caters fully for the crystallography of biological molecules. When this subject took off in a big way in the 1960's, Max Perutz and Walter Hoppe somehow found the money to organise a series of meetings in ski resorts near Munich - at Hirschegg and Alpbach. These meetings were international and their popularity made it impossible to continue them because no resort was large enough: had they continued, they would soon have become too expensive.

The British Biophysical Society has always included protein crystallography amongst its interests, and has organised many valuable meetings at which the implications of structural results have been discussed. Technical problems of crystallography, however, would have been out of place in these meetings. The same applies to the Biochemical Society. Both the Institute of Physics and Royal Society of Chemistry Crystallography Groups have on occasion organised meetings which included biological structure papers, but these are rather peripheral to the main activities of the Groups.

The nearest we have come to national meetings on these subjects have been occasions sponsored by the SERC. Tom Blundell organised an excellent conference at Wye College in 1979 on New Techniques in Protein Crystallography; more recently the SERC's Collaborative Computing Project in Protein Crystallography has arranged valuable meetings on special topics.

The lack of any national scientific society which covers this field has gradually become more irksome as the numbers of people involved have increased. The creation of a new Group within the BCA will integrate crystallographic work on biological structure into other national activities in crystallography.

* Requests for <u>further information</u>, membership enquiries, and suggestions about the Group's initial meeting next March should be addressed to the secretary of the working party, Dr. David Moss, Crystallography Department, Birkbeck College, Malet Street, London WC1E 7HX.

David Blow.

7.

Formation of the Industrial Group of the BCA

The recent "Durham Crystallographic Meeting" will always be associated with the highly successful launch of the BCA. Detailed reports on this meeting will, no doubt, be prominent in this issue of Crystallography News. It was particularly gratifying, however, for the organizers of the Industrial Symposium to note that of the 175 delegates, approximately 50 were from Industrial or Applied Research Institutions, a response unprecedented in recent years. Furthermore, from discussions with participants it was apparent that the papers and numerous posters presented during the Symposium aroused significant and genuine interest. It was perhaps, not surprising therefore that the announcement by Council of its intention to form an Industrial Group was received with enthusiasm by the delegates.

In broad terms the aim of this new Group will be to promote the development, introduction and exploitation of crystallographic techniques and concepts in an Industrial or Applied context. It is envisaged that this will be accomplished primarily by providing an interdisciplinary forum and an improved dialogue between the Industrial and Academic sectors.

A four man Working Party comprising John Harding (British Rail, Derby), Glen Smith (BP Research Centre, Sunbury) and Colin Dineen and Brian Isherwood (Hirst Research Centre, Wembley) is at present attempting to formulate the Constitution and Rules of the new Group. The aim is to submit a draft document for consideration by Council at their next meeting, scheduled for July. However, the Group cannot be formally constituted until the next AGM of the BCA, which will be held during the Spring 1983 meeting at Royal Holloway College. Before then it will be necessary to circulate all potential Group members with the proposed constitution and to solicit nominations for Officers and Committee Members. Hopefully, this will be done during November-December.

* If you know of any colleagues who are not members of the BCA, then get them to join <u>now</u> so that they can be added to our circulation list.

If Durham is regarded as the prototype, then we can look forward to some stimulating productions and a lively Group.

B J ISHERWOOD

8.

DEMISE OF THE UKCC

When the United Kingdom Crystallographic Council met in May 1981, it was informed that plans were by then well under way for the formation of the British Crystallographic Association. The UKCC felt then that its own functions would be better carried out in the future by the BCA and it was suggested that, as soon as possible after the BCA had been formed, it should be asked to set up a Coordinating Committee which would take over the UKCC's main task of coordinating all meetings of crystallographic interest arranged by all societies that wished to be associated with the scheme.

This request was considered by the BCA Council at its meeting on 7th April 1982, and it agreed that, if the UKCC decided to dissolve itself, it would set up such a Coordinating Committee, chaired by a member of the BCA Council, through whom the Committee would report to the Council. The BCA was also willing to take over the other functions of the UKCC - providing a UK representative for the European Crystallographic Committee, organising the UK contributions to, and UK distribution of, future editions of the World Directory of Crystallographers, and representing crystallography at the national level in other matters such as in discussions with the Health and Safety Executive.

The meeting of the UKCC on 19th May 1982 welcomed this decision of the BCA and confirmed its desire that the BCA should take over all its functions. It therefore dissolved itself and agreed to transfer its small balance of funds to the BCA with the request that they should be used for similar purposes to those for which they had been used by the UKCC. Dr. Dent Glasser agreed, however, to continue to handle the sales of the remaining copies of the current edition of the World Directory of Crystallographers.

The UKCC was founded in 1969 as a first attempt to organise crystallography in the UK at a national level without interfering with the autonomy of the IOP Crystallography Group and the Chemical Crystallography Group, or encroaching on the special responsibilities of the British National Committee for Crystallography. Although it fulfilled the functions outlined above and therefore satisfied the immediated requirements, its weaknesses as a national organisation soon became apparent. These resulted from the fact that membership of the UKCC was by societies and not by individual membership, so contact with crystallographers was indirect. It also, as a consequence, never had sufficient funds to act as a guarantor for conferences or to promote any major development in crystallography. In forming the BCA, these weaknesses have been overcome, and that Association is in a strong position as a national body representing all UK crystallographers. The UKCC was an important step on the road to the formation of such a body and it can now step down gracefully, knowing that its functions will be more efficiently continued.

S. C. Wallwork.

The Durham Crystallographic Meeting, 1982

The Spring Crystallography Conference held this year in the Physics Department of the University of Durham, April 5-8, was deemed to be a timely occasion for the founding of a new association to link the two existing Crystallography Groups into a formal organisation. This prospect and a programme designed to appeal to a wide range of interests, attracted the support of one hundred and seventy participants. Dr. Brian Tanner was Convenor of the well balanced sequence of scientific sessions and the duties of Conference Secretary were efficiently performed by Dr. Joan Halfpenny.

The Conference made an excellent start with the opening paper given by Professor Sir David Phillips who explained how the dynamical properties of proteins had been deduced from certain common features of the thermal vibration pattern of three different forms of lysozyme. In further papers on protein structures Dr. J.R. Helliwell described experiments with the use of controlled anomalous dispersion and Dr. G.G. Dodson derived general conclusions on the effective use of data of limited resolution for protein structure refinement. In a highly original and stimulating paper on superspace groups Professor A. Janner described how certain types of structural features are most effectively described in terms of superspace. Problems of symmetry representation also featured in the following paper on bicrystals and other planar crystal boundaries by Dr. R.C. Pond. With Dr. O. Kennard's contribution on the structure of an octanucleotide there was a return to protein systems and the session ended with a paper on the combined use of X-ray and Rietveld neutron data for structures of mixed heavy and light atoms given by Dr. A.G. Orpen.

Over recent years the interests of industrial crystallographers have become neglected at Conferences. One session, devoted to an Industrial Symposium designed to remedy this situation, proved to be an outstanding success. Five excellent speakers from extablishments with quite diverse interests gave the meeting an insight into the progress of real-world crystallography. The range of topics and supporting techniques given by the contributors were nicely balanced and the whole session was full of interest. The speakers and their establishments were :- Mr. J.W. Harding (British Rail), Mr. C. Dineen (G.E.C.), Dr. S.R. Fletcher (I.C.I.), Dr. I.F. Ferguson (U.K.A.E.A.) & Mr. G.W. Smith (B.P.)

At the Inaugral Meeting of the British Crystallographic Association, the constitution was adopted and officers elected (these are detailed elsewhere in this issue). The formalities over, the Meeting was treated to the Inaugral Address in two parts, given successively by Professor H. Lipson and Professor Dorothy Hodgkin, who in their different, but inimitable ways entranced the audience with recollections of earlier crystallographic occasions. The formation of the original X-ray Analysis Group was referred to and another of its originators, Professor A.J.C. Wilson gave an impromptu account of the inception of the Powder Diffraction File.

One session was entitled Materials Science, it was opened by Professor J. Zussman who gave an account of the way in which XRD continues to influence not only understanding of the structures of minerals but also their genesis. We were pleased to welcome Professor I.M. Ward again to our meetings to give an account of how wide and small angle diffraction linked with other techniques could give vital information on highly stressed synthetic polymers. In his paper on the study of cartilage structure, Dr. R.S. Aspden gave a timely reminder that optical crystallography can still supplement diffraction work. Dr. K. Ibell had come from Grenoble and was able to impress the Conference with his description of perhaps the largest diffractometer on record; designed to explore, with neutrons, the inner regions of reciprocal space. The session was wound up by Professor A.R. Lang on the role played by X-ray topography in the revelation of lattice defects, the talk was superbly illustrated by examples of this technique.

Interleaved among the spoken sessions were two periods devoted to a poster exhibition of papers; in this way an additional forty six papers were presented and discussed informally.

On the final day Dr. J.A.K. Howard illustrated the theme 'Crystallography in Chemistry' with examples of structures involving platinum and other transition metals. We can always expect something original from Professor J.D. Dunitz and this time it was on the use of weighted X-ray data from low temperature studies to give bonding electron densities. These results obtained without the use of neutrons were interpreted in terms of bonding theory. In the two short papers that followed computer simulation techniques were used; in one, by Mr. S.C. Parker to predict mineral structures and in the other, by Dr. S. Neidle, models of drug-nucleic acid interaction were compared with experiment. We were fortunate in having Professor C. Giacovasso trace something of the history of direct methods and to give a pointer to future developments involving multisolution and randomly generated starting phase methods. In his paper on non-normal probability distributions of structure factors Professor A.J.C. Wilson indicated some of the ways in which non-normality can arise and how the consequent errors can be evaluated. The final paper was from Mr. K. Burns in which a number of studies on one particular chemical group were compared.

It was gratifying to see such a good attendance at this well-organised Meeting, in many ways it was a milestone in the organisation of Crystallography. It is hoped that future Conferences will emulate its success.

R.W.H. Small

10. APPLICATIONS OF MICROPROCESSORS IN CRYSTALLOGRAPHY

25 NOVEMBER 1982

AT THE

GEOLOGICAL SOCIETY BURLINGTON HOUSE LONDON

Crystallographers were amongst the first scientists to automate and control their experiments with mini-computers and to require large scale computers for data reduction and analysis. During the last few years micro-processors have been used in some of these traditional tasks and in many new situations. The autumn meeting will be devoted to discussions of the hardware requirements foreseen by users and to exchanges of experience.

The meeting is sponsored by the Crystallography Group and the Electronics Group of the Institute of Physics.

* Organisers, from whom the further information will be available in September, are Professor M Hart King's College London; Dr M Glazer Clarendon Laboratory Oxford, and Dr A Holmes-Seidle, Fulmer Research Laboratories.

11. NEW COMMITTEE OF THE CHEMICAL CRYSTALLOGRAPHY GROUP

At the Annual General Meeting of the Group, held at the University of Durham, on 7th April 1982, Professor T.J. King retired from the office of Deputy Chairman and Dr. S.C. Wallwork retired from the office of Secretary/Treasurer. Dr. C.D. Garner, Dr. J.A.K. Howard and Dr. O. Kennard also retired from the Committee.

After the elections to fill these vacancies, the new Committee of the Group is as follows:-

Chairman	Professor G.A. Sim
Deputy Chairman	Dr. M.B. Hursthouse
Secretary/Treasurer	Dr. R.W.H. Small
Ordinary Members	Dr. Brian Beagley
	Dr. A.J. Geddes
	Dr. P. Murray-Rust
	Dr. Stephen Neidle
	Dr. C.H.W. Schwalbe
Co-opted (Secretary of the IOP Crystallography Group)	Dr. R.H. Fenn

Autumn Meeting 1982

This will take place at Heriot-Watt University, Edinburgh as part of the Royal Society of Chemistry Autumn Meeting. The Chemical Crystallography Symposium which will be entitled 'Neutron and Electron Diffraction including Accurate Electron Densities' will commence at 2.30 on Wednesday 22 September and end at 1.00 on Thursday 23 September. The programme will include the following papers.

"Results and pitfalls in accurate electron density studies". Aafje Vos, Department of Chemical Physics, Groningen, The Netherlands.

"The low temperature X-ray and neutron diffraction experiments on $[Co_2(CO)_6(C_2R_2)]$: an electron density study of $[Co_2(CO)_6(C_2Bu^t_2)]$". Judith A.K. Howard and David Gregson.

"The role of d functions in ab-initio computations of electron densities for molecules containing sulphur". M. Eisenstein and D.W.J. Cruickshank, UMIST.

"Floppy molecules - the influence of phase on apparent geometry". D.W.H. Rankin, University of Edinburgh.

"EXAFS studies of Zn and Cu centres in biological and chemical systems". C.D. Garner, University of Manchester.

"Electron diffraction least-squares techniques applied to EXAFS studies". B. Beagley, UMIST.

"Neutron diffraction in Chemistry". M.S. Lehman, Institut Lane-Langevin, Grenoble.

* Further details and registration forms may be obtained by sending a self-addressed label to :-

Dr. John F. Gibson, The Royal Society of Chemistry, Burlington House, London W1Y OBN.

12.

Blackett Laboratory,
Imperial College,
London SW7 2BZ

Ph.: (01) 589 5111, Ext. 2396

I have accepted an invitation to take part in a Working Party of the Health and Safety Executive which is drawing up Notes for Guidance in X-ray Optics. The Notes for Guidance are at a lower level than the Code of Practice, and are intended to give X-ray workers simple methods of arranging their equipment and operating procedures so that they may conform to the Code of Practice. Nobody is obliged to follow the Notes for Guidance, but if he can show he is doing so, no Inspector can complain.

I am anxious that the Notes should offer straightforward, cheap and unfussy proposals which allow safe and simple methods of using a wide range of experimental techniques. I have already consulted widely amongst colleagues who
* use different types of equipment. However, I am still anxious to hear from crystallographers who have encountered particular difficulties, or who feel their Inspectors have made unreasonable demands - and also from those who have introduced a new gadget or idea to simplify safety precautions, which is not widely known.

* I am particularly keen to hear from anyone with experience of using safety covers on open-beam cameras such as Weissenberg and Precession cameras. The HSE have some proposed designs for such covers, but they look as if there may be a number of practical snags in using them.

D.M. Blow.

13.

FIFTY YEARS OF ELECTRON DIFFRACTION

This book, edited by Dr Peter Goodman, has recently been produced on behalf of the International Union of Crystallography to commemorate 50 years of achievement in solid state and gas molecular diffraction. The book is both a collectors item and a valuable reference source.

Part I is a newly researched account of the initial period 1924 - 1928. It opens with an article by Louis de Broglie. Part II completes the history with 36 articles from 9 countries. British scientists have been heavily involved in the development of electron diffraction starting with the pioneering work of G. P. Thompson. Part III is a state-of-the-art account of important topics in electron diffraction ranging from scattering theory through to structure analysis.

In a review of this book Professor Henry Lipson writes 'This is physics as it is really done and not as the text books think that it ought to be done. All aspiring research students should read it'.

Arrangements have been made for this book to be ordered directly from
* Blackwells. Please use the enclosed order form to place your order.

C J Humphreys

14.

UNIVERSITY OF YORK

DEPARTMENT OF PHYSICS

Post-doctoral Appointment

A post-doctoral Research Assistantship is available to work on Phase Extension and Refinement for Macromolecules. The work will involve a heavy use of computers and some experience in big-molecule work is desirable but not essential. The appointment carries an initial salary of £6,070 pa and is available on 1 July 1982, although the starting date can be delayed up to six months.

* Applications including a C.V. and the names of two referees should be sent to Professor M M Woolfson, Physics Department, University of York, Heslington, York YO1 5DD.

15.

CRYST-PACKS

(Crystal Chemistry Teaching Modules)

It is hoped to offer, at a modest price, self-teaching modules for undergraduates, based on the system used in the chemistry practical course at Aberdeen University (described at the IOP Group Autumn 1979 Meeting on 'Techniques of Teaching Crystallography'). Several modules, illustrating different structures, are available. Each will comprise materials and instructions for assembling a packing model, together with a description of important features of the structure and exercises based on it. The assembled models are quite small (usually less than 2" in any direction), attractive in appearance, and have proved very popular with the students because the cost is low enough that they can keep what they have built.

Topics covered include closest-packing of spheres and the structures of metals, halides, oxides and sulphides. Selection of different combinations of modules could provide material for courses in chemistry, metallurgy, materials science or mineralogy.

* Further details from:

Dr L S Dent Glasser
Department of Chemistry
University of Aberdeen
Aberdeen AB9 2UE, Scotland.

16. ELECTION OF NEW FELLOWS OF THE ROYAL SOCIETY

Our congratulations go to all those elected FRS on March 18; and especially to those working in the fields of crystallography and X-ray diffraction.

Dr U. W. Arndt (MRC Laboratory of Molecular Biology, Cambridge): distinguished for his contributions to studies of proteins, nucleic acids and viruses through the design of instruments to measure X-ray diffraction.

Professor J. D. Birchall (ICI Runcorn and University of Surrey): distinguished for his fundamental studies of crystal growth and for his major contributions to the development of industrial products.

Dr L. M. Brown (Lecturer in Physics, Univeristy of Cambridge): distinguished for his contributions to our knowledge of the plasticity of metals and for his research in electron microscopy.

Dr J. T. Finch (MRC Laboratory of Molecular Biology, Cambridge): distinguished for his application of electron microscopy and X-ray diffraction to biological assemblies, especially viruses and chromatin.

Professor M. Hart (Wheatstone Professor of Physics at King's College, University of London): distinguished for his work in the area of X-ray optics and interferometry and applications in the field of semiconductors.

17. BRAGG LECTURE 1982

* Professor M. M. Woolfson will give the Sixth Bragg Lecture at 5.30 pm on Wednesday, 27 October in Manchester (Renold Building, UMIST) and at the same time on Thursday, 28 October in Cambridge (Chemical Laboratories, Lensfield Road). His subject will be "Structural Crystallography in the 1980's". Admission free, without ticket.

The Bragg Lectures, founded in 1962, are given at intervals to commemorate the work of Sir William Bragg and his son, Sir Lawrence Bragg. Eminent crystallographers lecture on subjects of their own choice, in the places where the Braggs worked. The Seventh Bragg Lecture will probably be in 1985.

18. CRYSTALLOGRAPHY NEWS

* Camera-ready copy for the ~~October~~ September issue should reach the Editor no later than ~~September~~ August 20 : Dr Moreton Moore, Department of Physics, Royal Holloway College, Egham, Surrey, TW20 0EX. Telephone number: Egham 35351, extension 36. (The code from London is 87-, from afar it is 0784-.) The number has been changed since publication of the Sixth World Directory of Crystallographers!

FORTHCOMING MEETINGS (M) and COURSES (C)

6-9 July 1982 Internat. conf. on inorganic stereochemistry (M) Reading Dr J F Gibson, RSC, Burlington House, London W1V 0BN.

8-9 July 1982 Materials & testing- the interrelationships First Biennial Conf. (M) University of London Dr G. Curtis, Bldg 451.4, AERE Harwell, Didcot Oxon, OX11 0RA.

12-16 July 1982 Workshop on X-ray measurement of residual stresses (C) Evanston, Illinois. Continuing Engineering Studies (CES 8283), 2804 Technological Institute Northwestern University, Evanston, Illinois 60201 USA

12-16 July 1982 Gordon Research Conf. on Crystal Growth (M) Holderness, New Hampshire, USA Dr E A Giess, IBM Thomas J Watson Research Center, P O Box 218, Yorktown Heights, New York 10598, USA.

12-21 July 1982 Workshop of Crystal Structure determination (C) Georgetown, Washington, D.C. J. Karle, 6030, Lab. for the Structure of Matter, Naval Research Lab., Washington DC, 20375 USA.

14-16 July 1982 Biochemical Society Meeting: Structure and Function of Proteins and Nucleic Acids (M) Oxford Biochemical Society, 7 Warwick Court, High Holborn London, WC1R 5DP

2-6 August 1982 Denver Conf. on Applications of X-ray Analysis (M &C) Denver, Colorado, USA Mrs M Cain, Denver Research Institute, University of Denver, Colorado 80208, USA.

6-12 August 1982 Internat. Conf. and summer course on Martensitic transformations (M & C), Leuven, Belgium. Prof. L. Delaey, Dept. Metaalkunde, Katholieke Universiteit Leuven de Croylaan 2, B-3030 Heverlee, Belgium.

9-13 August 1982 Int. Conf. on X-ray and VUV Synchrotron Radiation Instrumentation. (M) Hamburg, Fed. Rep. Germany. Prof. B. Buras, Risø National Lab., DK-4000 Roskilde, Denmark.

10-14 August 1982 Internat. Sch. on Electron Microscopy of Magnetic Materials (C) Vienna, Austria. Dr J. Fidler, Inst. f. Angewandte und Technische Physik, Technische Universität Wien, Karlsplatz 13, A-1040 Wien, Austria.

15-18 August 1982 Advances in Materials characterization (M), Alfred, New York. Materials Characterization Conference, NY State College of Ceramics, Alfred Univ., Alfred, New York 14802.

15-20 August 1982 ACA Meeting (M) San Diego, California, D. Matthews, Dept. of Chemistry, San Diego, La Jolla, CA 92093, USA

17-24 August 1982 Intern. Congress on Electron Microscopy (M) Hamburg, Germany
Deutsches Reisebüro GmbH, Dammtorstrasse 12, 2000 Hamburg 36, Fed. Rep. of Germany.

21-26 August 1982 11th Hungarian Diffraction Conf. (M) G ÿor, Hungary. Mrs E Nagy, Roland Eötvös Physical Society, H-1368, Budapest, P O Box 240, Hungary.

23-27 August 1982 22nd Internat. Conf. on Coordination Chemistry (M) Budapest, Hungary
Prof. M. T. Beck, Kossuth Lajos Univ., Dept. Phys. Chem., P O Box 7, Debrecen 10, Hungary 4010.

23-27 August 1982 X-ray and Atomic Inner Shell Physics (M) Eugene, Oregon Prof. B. Crasemann, Physics Dept., Univ. of Oregon, Eugene, Oregon 97403, USA.

23-28 August 1982 Europ. Mtg. on Crystal growth 82: materials for electronics (M) Prague, Czechoslovakia
J. Zemlicka, EMCG 82, Cukrovarnická 10, 16 253 Prague, Czechoslovakia.

25-30 August 1982 Sagamore VII Conf. on Charge, Spin and Momentum Densities (X-ray, neutron & electron diffraction and scattering). (M) Nikko, Japan.
Prof. Y. Saito, Chemistry Dept., Univ. of Keio, 14-1 Hiyoshi, 3 chome, Kohokuku, Yokohama, Japan.

29 August -2 Sept 82 Interrelations between processing, structure and properties of polymeric materials (M) Athens, Greece. Prof. E. Dilari, Greek Chemists Association, 27, Kaningos Str., Athens 147, Greece.

29 Aug - 3 Sept 82 7th European Crystallographic Meeting ECM-7 (M) Jerusalem, Israel. Prof. J. Bernstein Dept. Chemistry, Ben-Gurion University of the Negev, Beer Sheva 84120, Israel.

30 Aug. - 3 Sept 9th Int. Liquid Crystal Conf. & Exhibition (M) Cracow, Poland.
Dr W. Witko, Inst. of Nuclear Physics, ul. Radzikowskiego 152, PL-31-342 Crakow, Poland.

30 Aug.-3 Sept '82 4th Europhysical Topical Conf: Lattice Defects in Ionic Solids. (M) Dublin, Ireland.
Dr J Corish, Dept of Chem., Univ. College, Belfield, Dublin 4, Ireland.

31 Aug.- 3 Sept 1982 12th Int. Conf. on Defects in Semiconductors (M) Amsterdam Municipal Congress Bureau Oudezijds Achterburgwal 199 1012 DK Amsterdam, The Netherlands.

1-3 Sept 1982 Yamada Conf. on Neutron Scattering of Condensed Matter (M) Tokyo, Japan Prof. Y. Itoh, Inst for Solid State Physics, Univ. of Tokyo, Toppongi, Minato-ku, Tokyo 106 Japan

5-9 Sept 1982 Int. Symp. on Structure and dynamics of nucleic acids and proteins La Jolla, California Prof. E Clementi, IBM Corp., P O Box 390, Dept. D55, Bldg 996-2, Poughkeepsie, New York 12602, USA

6-9 Sept 1982 4th Symp. on Organic Crystal Chemistry (M) Poznán, Poland Prof. Z Kaťuski, Inst of Chemistry, UAM, 60-780 Poznán, Grunwaldzka 6, Poland.

6-9 Sept 1982 4th Europ. Symp. on Chemical Structure - Biological Activity (M) Bath, UK. Dr J. C.Dearden, School of Pharmacy, Liverpool Polytechnic, Byrom St., Liverpool L3 3AF.

6-10 Sept 1982 Brit. Assoc. for the Advancement of Science (M) Liverpool, BAAS, Fortress House, 23 Savile Row, London, W1X 1AB

6-10 September 1982 16th Int. Conf on Physics of Semiconductors plus six associated meetings. (M) Montpellier France. Prof. B. Pistoulet, Centre d'Études d'Electronique des Solides, Université des Sciences et Tecniques du Langedoc, Place E. Bataillon, 34060 Montpellier, Cedex, France.

13-15 Sept 1982 Int. Conf. on Semiconductors in the VUV: Applications of Synchrotron Radiation (M) Berlin, Frau L. Schulz, BESSY, Lentzeallee 100, 1000 Berlin 33, Fed. Rep. Germany.

13-17 Sept 1982 The Neutron and its Applications (M) Cambridge Dr Peter Schofield, AERE, Harwell, Didcot, Oxon OX11 0RA

16-17 Sept 1982 Molecular beams and molecular structure (M) Univ. of Bristol. Dr J. C. Whitehead, Dept of Chemistry, Manchester University, Manchester M13 9PL.

20-24 Sept 1982 10th Molecular Crystal Symposium St. Jovite, Canada, D. Chartrand, National Research Council Ottawa, Canada K1A 0R6.

21-24 September 1982	14th Europhysics Conf. on Macromolecular Phys. Polymer Crystals: structure & morphology (M) Vilafranca del Penedes, Barcelona Dr F. J. Baltá Calleja, Inst. Estructura de la Materia (CSIC), Serrano 119, Madrid, Spain.
22-23 Sept 1982	Chemical Crystallography Group Autumn Mtg Neutron & electron diffraction, including accurate electron densities (M) Heriot-Watt University, Edinburgh. Dr John F Gibson, The Royal Society of Chemistry Burlington House, London, W1V 0BN
22-24 Sept 1982	British Association for Crystal Growth (BACG) annual meeting (M) Oxford Dr P Dryburgh, Electrical Engineering Dept Univ of Edinburgh, King's Building, Edinburgh EH9 3JL
22-26 Sept 1982	5th Mtg of the Geological Societies of the British Isles (M) Univ of Glasgow. Dr W E Tremlett, Dept of Geology, The University Glasgow G12 8QQ
18-23 October 1982	French Radiation Protection Society Mtg (M) Avignon, France Secrétariat Général SFRP, B.P. No. 72, F-92260, Fontenay-aux-Roses, France.
27 October 1982	Bragg Lecture: Structural Crystallography in the 1980's: Professor M. M. Woolfson: (5.30 pm). Manchester (UMIST). Dr M Moore, Dept. of Physics, Royal Holloway College, Egham, Surrey TW20 0EX.
28 October 1982	Bragg Lecture: (see above). Cambridge (Chemical Laboratories).
5 November 1982	Clay minerals - iron oxide topics (M) Queen's Gate, London Mineralogical Society, 41 Queen's Gate, London SW7 5HR.
8-12 November 1982	Deformation & recrystallization of metals and alloys (C) Aachen, Fed. Rep. Germany. Deutsche Gesellschaft für Metallkunde E.V. Adenauerallee 21, D-6370 Oberursel, Fed. Rep of Germany.
11 November 1982	Mineralogical Society General Mtg (M) Burlington House, London. Mineralogical Soc., 41 Queen's Gate, London SW7 5HR.
24 November 1982	Electron microscopy in geology (M) Burlington House, London. Dr K H Brodie, Dept of Geology, Imperial College, London SW7 2BP
25 November 1982	Microprocessors in crystallography, London Prof. M Hart FRS, Dept of Phys., King's College, Strand, London. WC2R 2LS.

1983

13-14 January 1983	Sulphide mineralogy and petrology with special reference to metamorphic rocks. Burlington House, London. Dr D J Vaughan, Dept of Geological Sciences, University of Aston, Birmingham B4 7ET
7-11 February 1983	Material Structure and Electron Microscopy (C) Bochum, Fed. Rep. Germany. Deutsche Gesellschaft für Metallkunde e.V., Adenauerallee 21, D-6370 Oberursel, Fed. Rep. Gery.
14-18 March 1983	ACA meeting (M) Columbia, Missouri Jack Williams, Division of CHemistry, Bldg 200-A113, Argonne National Laboratory, 9700 S Cass Ave., Argonne, Illinois, 60439, USA
21 Mar-1 Apr 1983	X-ray Crystallography & Drug Action (C) Erice, Sicily Prof. L Riva di Sanseverino, Istituto di Mineralogia, Piazza San Donato 1, 40127 Bologna, Italy.
28-30 March 1983	EPS Condensed Matter Conf. (M) Lausanne Dr E Mooser, Institut de Physique Appliquee, EPFL-Ecublens, P O Box 96, CH-1015, Lausanne Switzerland.
28-31 March 1983	BCA Spring Meeting (M), Royal Holloway College Egham, Surrey. Dr M Moore, Dept of Phys., Royal Holloway College, Egham, Surrey, TW20 0EX.
11-13 April 1983	RSC Dalton Div. Annual Congress: Polyhedral Clusters of Main Group Elements (M) Univ. of Lancaster Dr John F Gibson, RSC, Burlington House, London W1V 0BN
16-20 May 1983	5th National School & Conf on X-ray analysis (M) Melbourne, Australia Mr R A Coyle, P O Box 90, Parkville 3052, Victoria, Australia.
4-8 July 1983	4th Int. Conf. on solid state ionics (M) Grenoble, France. M. Kleitz, SSI 83, ENSEEG, BP 44, 38401 Saint Martin d'Heres, France.
11-15 July 1983	Gordon Conf. on electron distribution & chemical bonding (M) Plymouth, New Hampshire, USA Prof. G A Jeffrey, Dept of Crystallography, Univ of Pittsburgh, Pittsburgh, PA15260, USA.
19-21 July 1983	Inter/Micro 83 (M), King's College, Cambridge McCrone Research Institute Ltd, 2 McCrone Mews, Belsize Lane, London NW3 5BG
1-5 August 1983	ACA Meeting and Denver diffraction conf. (M) . Snowmass, Colorado, USA Prof. R D Witters, Dept of Chemistry, Colorado School of Mines. Golden, Co 80401, USA

6-9 August 1983	2nd USA-French Cooperative Science Seminar on Topography (M) Snowmass, Colorado, Prof. Sigmund Weissman, Rutgers Univ., Mechanics and Materials Science Dept., Piscataway, NJ 08854, USA
8-12 August 1983	8th European Crystallographic Mtg (M) Liège M. Léon DUpont, Institut de Physique B5 Université de Liège au Sart-Tilman, B-4000 LIÈGE, Belgium.
18-27 August 1983	Int. School on Crystallographic computing (C) Kyoto, Japan Prof T Ashida, Dept of Applied Chemistry, Faculty of Engineering, Nagoya Univ. Furo-cho, Chikusa-ku, Nagoya 464, Japan.
30 Aug - 2 Sept	14th Mtg of Crystallographers in Australia (M) C. B. Alexander Agricultural College, Tocal, Paterson, NSW H. R.Tietze, Dept of Chemistry, Univ. of Newcastle NSW, 2308, Australia.
30 Aug-2 Sept 83	Electron Microscopy - EMAG 83 Guildford. Meetings Officer, IoP, 47 Belgrave Sq., LONDON, SW1X 8QX
3-10 Sept 1983	5th Internat. Summer School of Crystal Growth (C) Riederalp, Switzerland Dr H Arend, Lab. für Festkörperphysik ETH, CH-8093, Zürich, Switzerland.
5-9 Sept 1983	IUPAC 29th Int. Symp. on Macromolecules (M) Bucharest IUPAC MACRO '83, Calea Plevnei 139, R-77131 - Bucharest, Romania.
12-16 Sept 1983	7th Internat. Conf. on Crystal Growth (M) Stuttgart, Fed. Rep. Germany Dr K W Benz, Kristallabor., Physikalisches Institut der Universität, Pfaffenwaldring 57, 7000-Stuttgart-80, Fed. Rep. Germany.
13-16 Sept 1983	13th Europ solid state device research conf & 8th symposium on solid state device technology (M) Canterbury. The Meetings Officer, IoP, 47 Belgrave Square, London, SW1X 8QX
25-30 Sept 1983	5th Europ. Mtg. of Ferroelectricity (M) Torremolinos, Spain Dr B Jiménez, Centro de Física Aplicada "L. Torres Quevedo", Serrano 144, Madrid-6, Spain.

1984

9-18 August 1984	XIII I.U.Cr Congress (M) Hamburg Prof. Dr H Saalfeld, Mineralog-Petrogr. Institut, Universität Hamburg, Grindelallee 48, D-2000 Hamburg 12, Fed. Rep. Germany.

20. WORLD DIRECTORY OF CRYSTALLOGRAPHERS (See October 1981 Newsletter)

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