

CRYSTALLOGRAPHY NEWS

BRITISH
CRYSTALLOGRAPHIC
ASSOCIATION

No. 4 MARCH 1983

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When we gather together again at Royal Holloway College for the Spring Meeting, a year will have passed since the foundation of the BCA. The year will have seen the attainment of charitable status, the securing of a firm financial base for the Association, and at the Spring Meeting a further important step forward - the inauguration of two new subject groups. The Industrial Group and the Biological Structure Group will increase the number of BCA subject groups from two to four, and will give the Association a more balanced and representative base.

As regards the Spring Meeting itself, the organisers, led by Dr Moreton Moore, have put together an excellent programme with some eminent invited speakers. To cap it all, crystallography's latest Nobel-prizewinner, Dr Aaron Klug, has agreed to give the Plenary Lecture which will follow our AGM. I hope to see you all there (well, "all" might cause an embarrassing congestion, but nearly all would do nicely!)

The open meeting on "Safety Regulations for X-Ray Crystallography" was held at Imperial College on Tuesday, 11th January. It was organised at very short notice, and a delay in the appearance of the December issue of the newsletter meant that some members had little, if any, warning. Nevertheless, a blitz of letter writing and a fairly efficient bush-telegraph, resulted in almost one hundred people attending what proved to be an interesting and useful meeting. Mr Beaver and his colleagues from the HSE took part, and there was some lively debate. One feature of the meeting was the attendance of a number of Health Physicists and Radiation Safety Officers - so hopefully, not only crystallographers benefited from this initiative.

The BCA is beginning to be recognised as a national organisation, and one to be consulted in appropriate cases by official and quasi-official bodies. For instance, I have recently been asked to submit evidence on behalf of the BCA to Committee I of the Industrial Injuries Advisory Council, and with the advice of our Radiation Safety Committee will be drafting a response.

The other permanent BCA committee is the Coordinating Committee. Its function is to act as an informal inter-society liaising body, to help prevent clashes of meetings etc, and generally to keep societies aware of what other kindred societies are organising. The Committee's role is to take over one of the main functions of the UKCC, which dissolved itself soon after the BCA was formed. The chairman of the Coordinating Committee is Dr S.C. Wallwork of the Department of Chemistry, University of Nottingham, who is a co-opted member of the Council, and was the last chairman of the UKCC.

Last call for your logos!

Andrzej Skapski

2.

DONATIONS TO THE BCA

The following generous donations from Industry are gratefully acknowledged

Beecham Group plc	£500
The Rio Tinto Zinc Corporation	
plc	£500
Shell Research Limited	£500
English Clays, Lovering, Pochin and Co. Ltd	£50

This fourth list records donations received in the period December 1982 - February 1983.

The total number of Founder Members stands at 51.

3.

CRYSTALLOGRAPHERS IN THE NEWS

Professor Sir David Phillips is now Chairman of the Advisory Board for the Research Councils (ABRC):
New Scientist, 20 January 1983, p. 179.

Professor Charles Taylor has been awarded the Bragg Medal and Prize of the Institute of Physics for his many contributions to physics education:
Physics Bulletin, 2 February 1983, p. 74.

4.

THE ANNUAL GENERAL MEETING
OF THE
BRITISH CRYSTALLOGRAPHIC ASSOCIATION

To be held in the Main Lecture Theatre, Royal Holloway College,
Egham Hill, Egham, Surrey TW20 OEX, at 5 pm on Wednesday, 30th March, 1983.

AGENDA

- 1) Approval of the agenda.
- 2) Minutes of the Inaugural General Meeting held on Tuesday, 6th April, 1982.
- 3) Report of the Council.
- 4) Report of the Treasurer.
- 5) Consideration and approval of accounts.
- 6) Annual subscription for Ordinary Members - no change.
- 7) Establishment of the Industrial Group.
- 8) Establishment of the Biological Structure Group.
- 9) Election of Officers - a) Vice-President
b) Secretary.
- 10) Election of one other Member of Council.
- 11) Appointment of Auditors.
- 12) Any other business.

5.

ELECTIONS TO THE COUNCIL

The terms of office of the following Officers or Members of the Council end at the AGM to be held on 30th March, 1983:-

Vice-President - Professor D.C. Hodgkin OM FRS

Professor Hodgkin has indicated that she will not be seeking re-election.

Secretary - Dr A.C. Skapski (Has been nominated by the Council, and will seek re-election.)

Member - Mr J.W. Harding (Will seek re-election.)

Nominations are invited for the above vacancies. They should reach the Secretary by Friday, 25th March, 1983, at the Department of Chemistry, Imperial College, London SW7 2AY, or on Monday, 28th March, at the BCA Spring Meeting. The nominations should be signed by two members of the BCA, and be accompanied by the written consent of the candidate to serve if elected.



BRITISH CRYSTALLOGRAPHIC ASSOCIATION



Spring Meeting
28-31 March 1983

ROYAL HOLLOWAY COLLEGE, UNIVERSITY OF LONDON
EGHAM, SURREY, TW20 0EX

PROGRAMME

Monday morning, 28 March REGISTRATION (10.30 - 12.30) followed by
BUFFET LUNCH (1 pm)

Monday afternoon BIOLOGICAL STRUCTURES (2 - 6 pm).

Dr U. W. Arndt: Sources and instrumentation

Prof D. M. Blow: Heavy atom location and phasing

Dr D. S. Moss: Interpretation and refinement

Prof Sir David Phillips: Crystallographic contributions to an
understanding of enzymes.

Dr. O. Kennard: Crystallographic contributions to an understanding
of nucleic acids.

Dr Anne C. Bloomer: Crystallographic contributions to an understanding
of viruses.

Monday evening RECEPTION (6.45 pm) DINNER (7.30 pm).

Tuesday morning, 29 March PHYSICAL CRYSTALLOGRAPHY (9 am - 1 pm)

Prof Michael Hart: X-ray anomalous dispersion

Dr Paul Durham: X-ray absorption near edge structure (XANES)

Prof Jerome Karle: Direct methods

Dr Colin Windsor: Use of spallation neutron sources in diffraction.

Tuesday afternoon: POSTERS (2 - 5 pm) Biological Structures and
Physical Crystallography.

Tuesday evening: DINNER (6.30 pm) ORGAN RECITAL by Dr Lionel Pike, FRCO
(7.30 pm)

Wednesday morning, 30 March INDUSTRIAL CRYSTALLOGRAPHY
(9 am - 1 pm)

- C. Baxter: Production control of single crystal castings
Mary Helliwell
& M. Lyons: X-ray topography of semiconductor crystals
using the Hirst Camera.
- B. Isherwood: Crystallography of Bragg cells
- W. Gutteridge: Analysis of Portland cement
- P. B. McAllister
& T J Carter: Use of powder diffractometry for determination of
polymer morphology
- D. G. Puxley: Faults and errors in the crystallography of
catalysts
- D. Rendle: Powder diffractometry in a forensic science
laboratory

Wednesday afternoon LUNCH (1 pm)
POSTERS (2 - 5 pm): Industrial and Chemical
Crystallography.
B.C.A. AGM (5 pm)

Wednesday evening: PLENARY LECTURE (6 pm)

Jan
Lee
Dr Aaron King: Structural Analysis of Macromolecular Assemblies
CONFERENCE DINNER (7.30 pm)

Thursday morning, 31 March CHEMICAL CRYSTALLOGRAPHY (9 am - 1 pm)
Practices and problems of crystal structure determination

- Dr M B Hursthouse : Introduction
Dr W Clegg : Data collection procedures
Dr C J Gilmore : Problems in direct methods
Prof G M Sheldrick : Techniques in structure refinement
Discussion panel : the above speakers together with Dr M G B Drew
and Dr D J Watkin.

END OF CONFERENCE and BUFFET LUNCH (1 pm).

Throughout the Conference there will be a commercial EXHIBITION
in the Picture Gallery.

7.

CONFERENCE FEE HALVED FOR STUDENTS

The BCA Council, at its meeting on 14 February, agreed that students attending the Spring Meeting need pay only half the conference fee. A new booking form is enclosed and the registration deadline has been extended so that students may take advantage of this opportunity.

8.

Chemical Crystallography Group

Annual General Meeting

Papers for this meeting, which will be held on 29 March 1983 at 16.30 h. in Royal Holloway College, are being circulated to members with this newsletter.

Autumn Meeting 1983 - preliminary notice.

This meeting, to be held in conjunction with the RSC Autumn Meeting at Swansea, will take place on Wednesday 21 September (p.m.) and Thursday 22 September (a.m.). The topic 'Chemical Processes in the Solid State' has been chosen to emphasize the relation between structural crystallography and the increasingly important study of solid state reactions. The first session will be devoted to a poster session; for the second session, the invited speakers are Dr. W. Jones (University of Cambridge), Dr. C.R.A. Catlow (University College London) and Dr. P. Day (University of Oxford).

Contributed papers are now invited on any area of structural crystallography; as there is only time for a limited number of oral presentations, preference will be given to those relevant to the topic. The remainder will be presented as posters. Titles and a short synopsis (maximum 250 words) should be sent to Dr. John F. Gibson, The Royal Society of Chemistry, Burlington House, London W1Y 0BN, by Monday 9 May 1983. Full details of the whole RSC Autumn Meeting (for which part attendance is possible) will be available later and may be obtained by sending a request and a self-addressed label to Dr. Gibson at the above address.

R.W.H. Small
(Secretary)

9. PHYSICAL CRYSTALLOGRAPHY GROUP A.G.M.

Papers for this meeting are being circulated to members with this newsletter. It will take place at 5 o'clock (and not 2 o'clock) on Tuesday, 29 March at Royal Holloway College.

10.

The Ionising Radiations Regulations 198-
(HMSO £6.50, ISBN 0 11 883466 5)

This publication runs to some 130 pages, and that indicates one of our major problems. Safety organisation for X-ray crystallography and X-ray optics work has become integrated into the regulations for nuclear engineering, radiography and the use of radiochemicals. This document is a draft of the Regulations and Code of Practice. I was asked to produce a synopsis for Crystallography News, but I find this impossible. Anyone who really needs to know the regulations must work through them to the end.

In Regulation 20 there is an exhortation that all exposure to radiation should be "as low as reasonably practicable", but elsewhere the concern is with levels of whole-body radiation which trigger some administrative action, far above the levels to which any crystallographer is exposed, I hope. The very brief Part 4 of the Code of Practice is of more specific interest. Any crystallographer who can conceivably gain access to an X-ray beam is at "risk of overexposure", because the whole-body equivalent of that beam would rapidly bring him above one of these trigger levels. Part 4 describes measures to prevent access to the beam, and outlines arrangements for defining a "system of work" to avoid overexposure. Regulation 20 with a couple of explanatory paragraphs, and the relevant section of Part 4 of the Code are reproduced on the following pages. But these do not give adequate information about the Regulations as a whole.

The publication also refers to eight sets of Notes for Guidance which will amplify the Regulations and Code, of which the one most relevant for us will be the Notes for Guidance in Research and Teaching. In addition, not mentioned anywhere in the present publication, a set of Notes for Guidance on X-ray crystallography and X-ray Optics, is being prepared.

Responses to and comments on the Regulations and Code are required by April 18th, but it is evident that they cannot be fully interpreted without the Notes for Guidance which are not yet available. The BCA has set up a committee which will recommend what response the Association should make, but this should not deter individuals, or groups, from submitting comments of their own.

David Blow,
February 1983.

Control of sources of ionising radiation and provision of safety features and warning devices

Regulation 20

(1) The responsible person shall provide such control measures, not being protective clothing or respiratory protective equipment, for all sources of ionising radiation, as will restrict, so far as is reasonably practicable, the extent to which persons are exposed to ionising radiation.

(2) The responsible person shall provide appropriate safety features and warning devices or, in appropriate circumstances, make such other effective arrangements, as will, so far as is reasonably practicable, enable persons to avoid being exposed to ionising radiation to a significant extent.

130 All sources of ionising radiation should be controlled in order to keep radiation and contamination levels in the working environment as low as reasonably practicable. Only insofar as it is not reasonably practicable to achieve adequate control of the source of ionising radiation should resort then be had to the use of personal protective equipment.

Safety features and warning devices

140 The safety features and warning devices referred to in this regulation include the following:

- (a) suitable means of initiating and terminating the output of ionising radiation and the exposure of radioactive sources;
- (b) devices that under certain specified conditions (e.g. when a door is open or a beam intercepting device is not in place) prevent the energising of machines to emit ionising radiation or the exposure of radioactive sources;
- (c) devices that under certain specified conditions (e.g. when a door is opened or a beam intercepting device is removed) bring about the termination of output of ionising radiation or exposure of radioactive sources;
- (d) devices that prevent access to certain areas while machines are energised to emit ionising radiation or radioactive sources are exposed;
- (e) 'search and lock-up' systems designed so that areas in which machines are about to be energised to emit ionising radiation or radioactive sources are about to be exposed are searched and the search is confirmed by operation of 'search buttons' before the area is closed and irradiation begins;
- (f) automatic or manually operated warning signals designed to convey specific warnings to persons in the vicinity of installations or equipment that can produce ionising radiation;
- (g) devices, placed in appropriate locations, by means of which persons may be able to prevent, or quickly interrupt, the emission of ionising radiation from machines, or the exposure of radioactive sources;
- (h) labels, notices etc., that convey specific information to persons in the vicinity of installations or equipment that can produce ionising radiation (see also the Safety Signs Regulations 1980 (S.I. 1980 No. 1471) and British Standard No. BS 5378: 1980);
- (i) radiation detectors that are used to locate or to confirm the location of sources or beams of ionising radiation or to operate radiation alarms; and
- (j) devices that prevent the useful beam from a source of ionising radiation being aligned in certain directions.

The list should not be considered as being exhaustive.

141 In most situations it is not necessary to provide all the features listed in para 140 and there will be some processes where the nature and scale of the work with ionising radiation is such that the provision of safety features and warning devices is unnecessary. The circumstances in which it may be appropriate to provide such features and devices are those in which processes are carried out as a result of which significant radiation dose rates are or may be produced, or significant levels of airborne contamination can arise. For many such processes specific guidance on the provision of safety features and warning devices, or on the making of other effective arrangements, is given in Parts 2-4 of this code.

144 The provision of safety features and warning devices should be adopted in preference to the application of administrative arrangements. However, where it is necessary to make administrative arrangements to enable persons to avoid being exposed to ionising radiation to a significant extent, those arrangements should be drawn up and included in the local rules and where appropriate in the form of a written permission as described in para 91.

Part 4

The protection of persons against ionising radiation arising from the use of equipment and machines covering X-ray optics, gauging and detection devices and sources of incidental ionising radiation

1 This part of the code gives guidance on Regulation 20 for those processes listed in para 2. This guidance is additional to the guidance given in Part 1 of the code, and the regulations and Part 1 of the code still apply to the processes covered by this part of the code.

Scope

2 This part of the code applies to the following processes.

- (a) Any use of and testing of a machine (as defined in para 3) generating ionising X-ray crystallography, diffraction, emission and absorption spectrometry.

3 In this part of the code:

'machine' means a device in which charged particles are accelerated through a total potential difference (whether in one or more steps) of more than 5 kV;

'use and testing' means use and testing of equipment containing radioactive sources or machines or specific items of apparatus entailing exposure of or generation of ionising radiation.

4 The objectives to be achieved by the provisions of this part of the code are:

- (a) to keep doses of radiation to persons as low as reasonably practicable and in any event below dose limits; and
(b) to prevent exposure to beams of radiation from equipment leading to significant doses being received by parts of the body (e.g. hands, areas of skin, eyes).

Provisions relating to the processes covered by para 2(a) involving X-ray machines

5 The objectives of paragraph 4 should be met by fully enclosing any X-ray beam produced by the equipment and by preventing access by parts of the body to any X-ray beam within the equipment, by using the methods of paragraphs 6-9. An alternative to this provision is given in paragraphs 19-22.

6 The machine and its associated equipment should be provided with shielding sufficient to prevent the emergence into the working area of beams or fields of radiation which might otherwise lead to an overexposure; and to reduce doses to persons to as low a level as is reasonably practicable. This might be achieved by providing every aperture from an X-ray tube housing with an accessory, or a cover, or a closed shutter, or a collimator plus backstop, or some other piece of apparatus which incorporates or provides the appropriate shielding.

7 Effective barriers should be provided. Unless integral parts of the equipment afford such barriers, they should take the form either of a structure totally or partially enclosing the equipment, or of a fence, or of a beam of light, interruption of which operates the effective devices referred to in para 8.

8 *Effective devices.* In order to reinforce the methods outlined in paras 6 and 7 further safety features should be provided. Some effective device or devices should close a shutter or cover, or de-energise the X-ray tube to prevent a beam emerging into the working area or to prevent access by a part of the body into a radiation beam. This device should operate whenever any accessory or cover is removed from an X-ray tube port or a structure or part of a structure is removed or opened. The effective devices need only be provided for those accessories or covers or shutters which are readily removable and are the last means of preventing a beam of radiation escaping into the working area, or for those parts of the structure the removal of which would permit access of parts of the body.

9 *Automatic indications.* All persons in the immediate vicinity of the equipment should know when an X-ray tube is energised. Automatic means of indicating when an X-ray tube is energised should be provided; and means should be provided to indicate clearly, and, where reasonably practicable, automatically, whether any shutter is open or closed whilst an X-ray tube is energised.

Alternative provisions for achieving protection

19 It is preferable for the provisions described above to be followed in order to achieve the objectives in para 4. However, in certain situations described in paras 20-22 an alternative approach may be adopted to the methods outlined in paras 5-8 (which relate to the processes covered by paras 2(a)), 10-13 (para 2(b), (c) and (e)) and 17 (para 2(d)).

20 In work situations involving intense beams of radiation, i.e. where foreseeable exposure might result in an overexposure, departure from the preferred provisions described in paras 5-8, 10-13, and 17 should only be considered if it is not practicable to provide the protective measures and keep them in use during the work. In substitution for those measures a system of work should be introduced based on the protective measures that it is practicable to provide and use, together with a set of administrative controls and procedures. Taken together, these should ensure that the work can be done whilst still meeting the objectives in para 4.

21 The system of work should be drawn up by, or under the authority of, the responsible person, who should consult the radiation protection adviser. The system should be specified in a certificate, and the work should be done only by persons named in the certificate and should be supervised to ensure that it is being done in accordance with the specified system.

22 In work situations where the radiation hazard is not so extreme, i.e. where even with some of the safety features of paras 5-8, 10-13 and 17 omitted, the chance of an overexposure occurring is most unlikely, the work can be done despite these omissions. The radiation protection adviser should be involved in the assessment of the potential radiation hazard and of the risk of an overexposure. The local rules which apply to this work should incorporate important points of procedure identified by the radiation protection adviser. The relaxation in the provision and use of any of the protection features should be borne in mind when posting any appropriate warning notices. Supervision of the work, where appropriate, should also take account of any relaxation.

Professor A. J. C. Wilson has been appointed Chairman of the Union's Commission on International Tables, and Editor in charge of a proposed revision of Volumes II, III and IV. Following his recent retirement as Professor of Crystallography at the University of Birmingham he has moved to Cambridge. His new address is Crystallography Data Centre, University Chemical Laboratory, Lensfield Road, Cambridge CB2 1EW, England.

Professor U. Shmueli, Chemistry Department, Tel-Aviv University, has been appointed Editor of a new volume of International Tables on reciprocal space.

Since 1973 the Commission has been preparing the material for a totally revised and extended edition of the tables of symmetry groups. The results of three years of collaborative effort have led to the production of completely new tables on the 17 plane groups and 230 space groups, comprising about 360 pages. This work is complemented by a comprehensive introduction of about 200 pages in which symmetry is discussed and the theory and use of the tables is described in detail. It is edited by Th. Hahn and will be published for the Union by D. Reidel Publishing Company. The publication of this volume was scheduled for the end of 1982 but because of various delays it is not now expected to be available before mid 1983.

Table of Contents: Foreward. Preface. Part I: Tables for Plane Groups and Space Groups. 1. Symbols and Terms Used in this Volume. 2. Guide to the Use of the Space-Group Tables. 3. Space-Group Determination and Diffraction Symbols. 4. Snotic Tables of Space-Group Symbols. Group- Subgroup Relations. 5. Transformations in Crystallography. 6. The 17 Plane Grups (Two-dimensional Space Groups). 7. The 230 Space Groups. Part II: Symmetry in Crystallography. 8. Introduction to Space-Group Symmetry. 9. Crystal Lattices. 10. Point Groups and Crystal Classes. 11. Symmetry Operations. 12. Space-Group Symbols and Their Use. 13. Isomorphic Subgroups of Space Groups. 14. Lattice Complexes. Subject Index.

The volume costs 385 Netherlands Guilders. Personal copies may be obtained at the reduced price of 215 Netherlands Guilders.

The remaining stocks of Volumes II (Mathematical Tables) and IV (Revised and Supplementary Tables to Volumes II and III) of International Tables for X-ray Crystallography have been transferred from The Kynoch Press to Reidel, who are currently reprinting Volume III (Physical and Chemical Tables). Volume II costs 130 Guilders and Volumes III and IV 155 Guilders. Personal copies may be obtained at the reduced prices of 77 Guilders (Volume II) and 105 Guilders (Volumes III and IV).

Copies of all these publications may be ordered direct from the publisher, D. Reidel Publishing Company, P.O. Box 17, 3300 AA Dordrecht, The Netherlands, from Polycrystal Book Service, P.O. Box 27, Western Springs, Illinois 60558, USA, or from any bookseller.

J. N. King

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SURPLUS TO REQUIREMENTS

The following volumes of Acta Crystallographica and card sets of the JCPDS X-ray powder file

1. Acta Cryst Vol 1-23 (1948-1967)
2. Acta Cryst A, Vol 24A-37A (1968-1981)
3. J. Appl. Cryst, Vol 1-14 (1968-1981)
4. JCPDX Card X-ray file No 1-26.

Any offers?

Enquiries to:- Dr D J Blundell
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PO Box 90
Wilton
Middlesbrough
Cleveland

Tel: Eston Grange (0642) 455522

Joint Meeting:

**41st INTERNATIONAL PITTSBURGH DIFFRACTION CONFERENCE
and
ASSOCIATION OF CANADIAN CRYSTALLOGRAPHERS**

*October 5-7, 1983
Toronto, Ontario*

The Pittsburgh Diffraction Conference is being held for the first time in Canada, jointly with the meeting of the Association of Canadian Crystallographers. Five mini-symposia are featured:

- ▶ Molecular Graphics and Structural Predictions
- ▶ Solid State NMR and Crystallography
- ▶ Structural Relationships: Small Molecules/Polymers
- ▶ Diffraction in Materials Science
- ▶ Biological and Medical Crystallography

For information, contact:

*Drs. R. H. Marchessault and P. R. Sundararajan
Xerox Research Centre of Canada
2480 Dunwin drive
Mississauga, Ontario L5L 1J9
CANADA*

Telephone: (416) 828-6200

14.

A postdoctoral position is available for work on the metallo-enzyme rabbit phosphoglucomutase. A 3.5 Å map based on a single isomorphous derivative, anomalous dispersion measurements and real-space molecular replacement averaging will shortly be available. The amino acid sequence is known. Improvement in resolution, substrate studies and refinement are to follow. The work is in collaboration with Prof. W. J. Ray, Jr. of Purdue University.

Assistance is also needed in the work on B. stearotherophilus lactate dehydrogenase as well as beef liver and human catalase.

Purdue University is an equal opportunity, affirmative action employer.

Apply to: Michael G. Rossmann, Department of Biological Sciences, Purdue University, W. Lafayette, Indiana 47907.

A Postdoctoral position is available for from one to two years in the area of X-ray diffraction/chemical crystallography, principally to work on novel compounds from the Department of Inorganic Chemistry, but with opportunities for collaboration with other departments. The group is well equipped with two automated 4-circle diffractometers, both fitted with low temperature facilities and also has its own S230 Data General Eclipse computer with peripherals. There is scope for program development and involvement in designing a new low temperature apparatus. Send C.V. and the names of 3 referees.

Dr. Judith A. K. Howard, School of Chemistry, University of Bristol, Cantock's Close, Bristol, England BS8 1TS.

Applications are invited from both small- and large-molecule crystallographers for a post-doctoral position to work on X-ray crystallographic studies of oligonucleotides and their complexes with drugs. The post is funded by the Medical Research Council for three years, and is available from 1 January 1983, or as soon as possible thereafter, although anyone who will not be available until later in 1983 is nonetheless still encouraged to apply. Initial salary will be within the range £6375-L8510 (plus £1035 London Allowance). The post involves the crystallization and subsequent structural analysis of these medium-sized systems. It would suit a practically-oriented rather than a computer-oriented crystallographer. Crystallographic facilities are excellent, and include a CAD4 diffractometer, in-house computing and graphics facilities, and rotating-anode X-ray sources. Please send applications, in the form of a C.V. and the names and addresses of two referees.

Dr. S. Neidle, Department of Biophysics, King's College, 26-29 Drury Lane, London, WC2B 5RL, UK.

15.

FORTHCOMING MEETINGS AND COURSES,
additional to those listed in the December issue.

18-27 July 1983: Brasilia, Brazil. International School on
Change of date Teaching Crystallography for Materials Science.

07w
20-23 September 1983: Hamburg, Federal Republic of Germany.
15th Europhysics Conference on Macromolecular
Physics: the characterization of polymers
in the solid state.
Prof. Dr. H G Zachmann, Abteilung Angewandte
Chemie, Universität Hamburg, Martin-Luther-
King-Platz 6, D-2000 Hamburg 13, Federal
Republic of Germany.

26 September -

1 October 1983 Madrid, Spain. IX International Vacuum
Congress and V International Conference on
Solid Surfaces.
IX IVC - V ICSS, Secretary, Instituto de Fisica
de Materiales, CSIC, Serrano 144, Madrid 6, Spain.

14-16 December 1983: Oxford, England. Solid State Physics
Conference: Twentieth Annual Meeting on Solid
State Physics of the Institute of Physics, London.
Dr B T M Willis, AERE, Harwell, Oxon OX11 0RA
England.

1984 7-19 April 1984: Erice, Italy. International School on Direct
Change of date Methods of Solving Crystal Structures.

21-25 May 1984: Lexington, Kentucky, USA. American
Crystallographic Association Spring Meeting.
Prof. D E Sands, Dept. of Chemistry, University
of Kentucky, Lexington, Kentucky 40506, USA

3-6 July 1984: Marseilles, France. International Conference
on Crystal Growth and Characterization of
Polytype Structures.
Dr A Baronnet, CRMCC, CNRS, Campus Luminy,
Case 913, 13288, Marseille Cedex 9, France.

BCA SPRING MEETING : RHC 28-31 MARCH 1983

REGISTRATION FORM FOR STUDENTS

To be returned to Dr M Moore, Department of Physics
Royal Holloway College, Egham, Surrey, TW20 0EX as soon as possible please and to reach him no later than 17 March.

Name (Mr/Mrs/Miss)

University/College

Postal Address:

.....

Address for correspondence (if different from above)

..... Amount enclosed

1(a) Half-price Conference fee, including refreshments, reception and four lunches @ £16 £

or Half-price one day conference fee with lunch @ £8 £

Date March 1983

(b) Fee for non-members of BCA @ £10 £

(c) Conference dinner @ £7 £

CHEQUE PAYABLE TO THE BRITISH CRYSTALLOGRAPHIC ASSOCIATION TOTAL _____

2. Accommodation, three nights, bed and breakfast, and two dinners @ £33.50

CHEQUE PAYABLE TO THE ROYAL HOLLOWAY COLLEGE £ _____

Signature of research supervisor
or head of department