

COMMISSION ON POWDER DIFFRACTION

INTERNATIONAL UNION OF CRYSTALLOGRAPHY

NEWSLETTER No. 6

MAY 1991

EDITORIAL

In this issue we describe plans for the powder diffractometers at the ESRF European Synchrotron laboratory in Grenoble, France. One powder beam line will be built by the ESRF itself, and a second beam line by a Swiss-Norwegian consortium. The construction of the ESRF is going ahead at a rapid rate, and is 6 months ahead of schedule. The photograph shows the almost complete building around the ring, for which the pre-accelerator has already arrived.

Behind the ESRF ring, the dome of the ILL European high flux reactor is visible. The ESRF and ILL are on a common fenced site, and will share several services and buildings, including a common library and cafeteria, and a common building for theoreticians. Work on this common building is going on below my window as I write.

The photograph also shows just how close the synchrotron and neutron sources are to the city of Grenoble - just a short bus ride or a 15 minute walk away, with the major CNRS and CEA laboratories even closer. The mountains behind the city are only 45 minutes away by car. These proximities are deliberate; scientists from the different laboratories can talk over coffee, and go for dinner in town or walk in the hills to break the hectic round of sample changes. Science *and* civilisation !

In this issue we also report on an exciting round of powder diffraction meetings. From France to Germany and Poland, and from Africa to Australia and even America. The young IUCr-Commission on Powder Diffraction already has a *high profile*.

Alan Hewat, Editor.

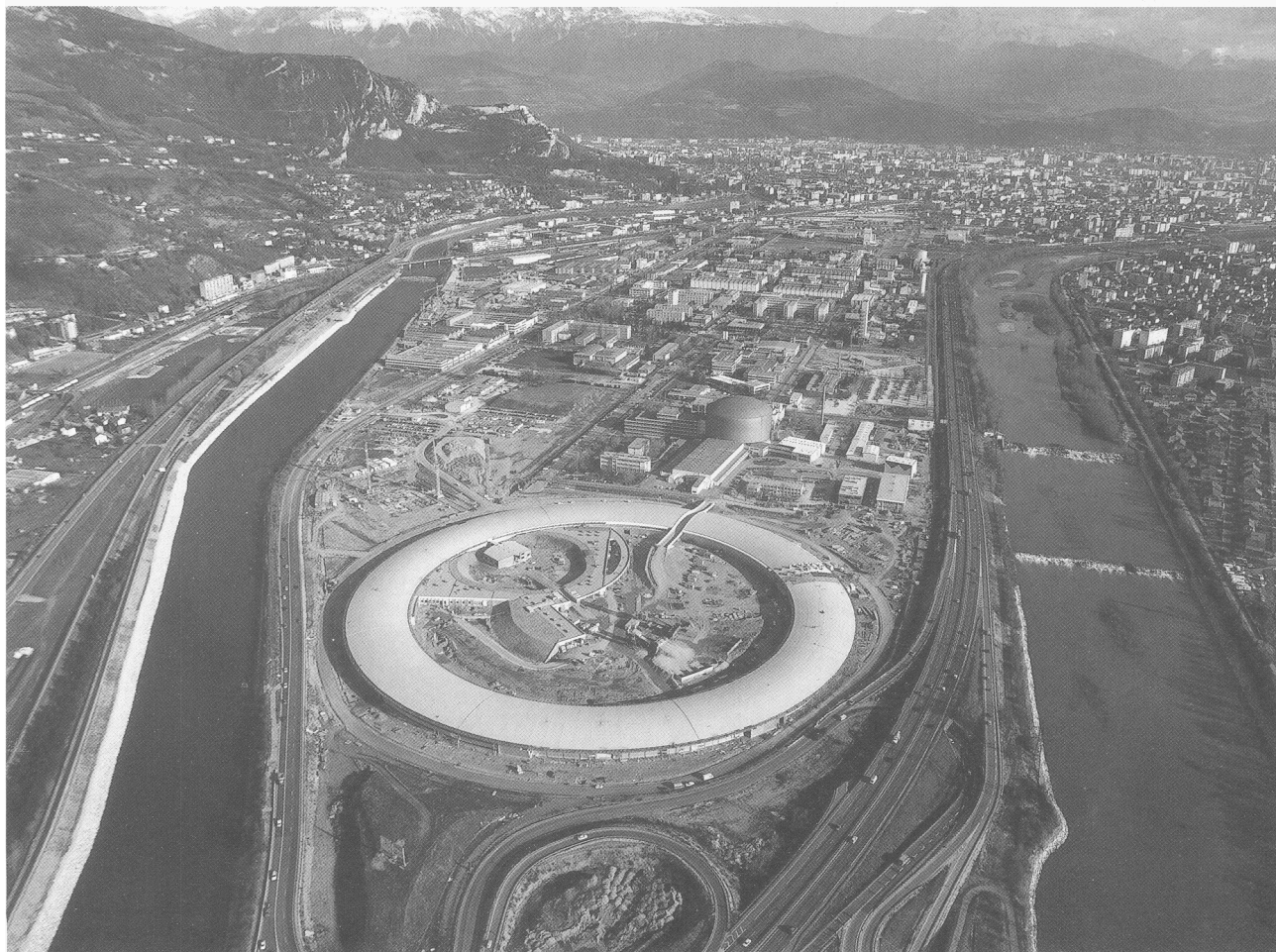


Photo: A.M. Freund / A. Childéric, courtesy of J. Hornemann, ESRF Grenoble

POWDER DIFFRACTION WORKSHOP AT THE ESRF EUROPEAN SYNCHROTRON RADIATION FACILITY, GRENOBLE, MARCH 27-28, 1991

The European Synchrotron Radiation Facility is a third generation synchrotron radiation facility presently being built as a joint venture among 12 European countries in Grenoble, France. The ESRF will be a low emittance 6 GeV storage ring aimed at producing high-brilliance synchrotron radiation from 29 insertion devices and from 27 bending magnet ports. The general user program is scheduled to start in the fall of 1994 with 7 ESRF facility beamlines.

A second wave of 11 facility beamlines is scheduled for operation in 1995. Included in this group is a Powder Diffraction Beamline based on a bending magnet port. A Workshop on Powder Diffraction was held in Grenoble, March 27-28, under the auspices of the ESRF to define priorities and technical guidelines for the design of this beamline. The Workshop was limited to about 25 members of the Powder Diffraction Community to ensure a productive session.

The meeting was opened by Dr. M. Altarelli, Research Director at the ESRF, who gave a general background to the ESRF and an up-to-date progress report.

Drs. D.C. Cox, Brookhaven National Laboratory, A.N. Fitch, University of Keele, and P.U. Pennartz, TH Darmstadt, gave talks describing the present powder diffraction facilities at the National Synchrotron Light Source, Brookhaven, the SRS in Daresbury and at HasyLab, Hamburg respectively. Their talks also included discussions on the improvements possible at the new ESRF station.

Prof. A.K. Cheetham, Oxford University, discussed the scientific scope of the powder diffraction research at the ESRF.

Prof. A. Kvik, ESRF, gave an overview of the bending magnet characteristics, the beamline layout boundary conditions and the electronics and computer standards adopted by the ESRF.

Prof. M. Hart, Manchester University, discussed powder diffraction optics and diffractometer requirements for synchrotron radiation installations. Dr. J. Susini, ESRF, described the optics developments presently under way at the ESRF.

Dr. C. Baerlocher, ETH, Zurich, outlined the plans for powder diffraction at a planned Swiss-Norwegian Collaborating Research Group (CRG) bending magnet beamline at the ESRF. A proposal for a possible powder diffraction beamline design was presented by Dr. P. Bordet, CNRS, Grenoble. This talk was illustrated with recent powder diffraction results on superconducting materials by Dr. M. Marezio, CNRS.

The formal presentation section was concluded by a talk on ESRF detector developments by Dr. J. Morse, ESRF.

The second day was devoted to discussions on specifications of scientific priorities, beam characteristics, diffractometer and detector needs as well as on questions concerning the necessary general infrastructure for the powder diffraction community.

The meeting was concluded by a visit to the ESRF building site.

A written report of this workshop will be available shortly from the author.

A. Kvik, ESRF,
BP 220,38043 Grenoble Cedex, France

PROPOSALS FOR INTERNATIONAL POWDER DIFFRACTION MEETINGS

The IUCr-CPD is always interested in receiving proposals for international conferences on powder diffraction, and in having the opinions of the powder diffraction community on proposals already received. Of course, the CPD often cannot help financially with such meetings, but can help with planning, to avoid clashes with meetings in other countries, with publicity, and with advice about content and speakers if necessary. In some cases, the CPD will propose such conferences to the IUCr for International Union sponsorship, and can sometimes help in finding other sponsors and money for lectures and student travel (for example, see the report in this issue on the Summer School for Beginners in Poland).

Recent conferences thus sponsored by the IUCr-CPD include the *International Workshop on the Rietveld Method (June 1989, Petten, The Netherlands)*, the *Powder Diffraction Satellite Meeting (July 1990, Toulouse France)*, and the *Summer School for Beginners with the Rietveld Method (August 1990, Cieszyn Poland)*. The next major meeting will be held in the USA in 1992, with the theme *Accuracy in PD* (see opposite). It is hoped that the High Pressure Group within the Apparatus Commission of the

IUCr will organize a workshop in conjunction with this meeting. (Prof. R.J. Nelmes, UK and Dr L. Finger, USA).

In addition, the CPD will soon apply to the IUCr for support for the following meetings; a second Summer School on Rietveld Refinement in Cieszyn, Poland in August 1992 (see the report on the first school in this issue), a School/Workshop in Egypt in January 1993 (Dr Karimat El-Sayed), and a workshop in South Africa in March 1993 (Professor Boeyens).

Suggestions for the IUCr Congress Satellite Meeting on Powder Diffraction (1993)

As usual, the 1993 International Congress of the IUCr (in Beijing China) will be associated with a satellite meeting on Powder Diffraction. The IUCr-CPD would be interested in suggestions for the theme of this meeting, to be sent to the secretary, Dr R. Hill at the address given at the back of this newsletter.

INTERNATIONAL CONFERENCE ON ACCURACY IN POWDER DIFFRACTION-11, NIST, USA MAY 26-29 1992

An International Conference, "Accuracy in Powder Diffraction 11", will be held May 26-29, 1992, at the National Institute of Standards and Technology, Gaithersburg, Maryland, USA. Topics to be discussed will include phase identification and quantitative phase analysis; profile fitting and total pattern decomposition; hardware and software for powder diffraction; and microstructural and preferred orientation effects. This conference is organized by the Commission on Powder Diffraction of the International Union of Crystallography and co-sponsored by

the National Institute of Standards and Technology and the JCPDS-International Centre for Diffraction Data (Co-sponsorship by the International Union of Crystallography has been applied for.) The program chairman is Dr. R. J. Hill, CSIRO Division of Mineral Products, 339 Williamstown Rd., Port Melbourne, Victoria 3207, Australia. For further information, contact E. Prince, Reactor Radiation Division, National Institute of Standards and Technology, Gaithersburg, MD 20899. (E-mail: prince@nbsenh or prince@enh.nist.gov.)

SUMMER SCHOOL FOR BEGINNERS WITH THE RIETVELD METHOD (9-11 AUGUST, CIESZY, POLAND)

The Summer School for Beginners with the Rietveld Method (RSSB-90) was held 9 - 11 August 1990 in Cieszyn, Poland in facilities belonging to the Silesian University. Hugo Rietveld took part in the opening ceremony to declare the School officially in session. The local organizer was Prof. Dr. Bojarski, with Prof. R.A. Young as the academic organizer (Course Director).

There were some 60-plus students. The majority were from Eastern Europe but there were many from Western Europe (e.g., The Netherlands, Sweden, W. Germany, Italy, etc.) and some from Africa. There were about twice as many applicants as could be accommodated.

The general plan of the School was one of lectures in the morning in Aula lecture hall with the afternoon being devoted to hands-on work with PC-type computers, on set Rietveld refinement (RR) problems, plus tutorials. As Professor Bojarski and his staff had managed to make available 15 PC's of AT and XT style (most with coprocessors), about half of the students could work comfortably on the computers while the other half went to the current tutorial session.

The tutorial sessions were very popular, no doubt because they were handled by the team of Tony Cheetham and Bob Von Dreele. The general, loose structure was that of selection of a particular topic (e.g., x-rays vis-a-vis neutrons for RR studies, or synchrotron x-rays and TOF neutrons) to which Bob and Tony each spoke briefly and extemporaneously, followed by questions from and general discussion with the audience. The discussions could be far ranging and the questions were often of very high caliber. (The 'students' all had substantial scientific background, most with Ph.D.'s.)

The fourth lecturer, Dr. J. Paul Attfield, assumed duties as de

facto master of the practical, making sure that appropriate problems were set and adequately presented to the students with all necessary files each day. He then became their principal individual advisor about how to run the problems. He also took responsibility to see to it that there were always enough assistants present in the computer room.

The School was well staffed. In addition to the 4 lecturers, all of whom also helped in the practical sessions, we had 5 Ph.D. 'laboratory assistants'. Four were provided from Prof. Bojarski's staff or contacts in Poland. Two of them (Dr. Frackowiak and Dr. Stróz) handled all problems the students had with the use of the computers and printers and the other two (Dr. Bogdan Palosz and Dr. Hanna Krzton) gave individual assistance to the students in the use of the Rietveld refinement program for the solution of the set problems.

The fifth laboratory assistant was Dr. Julius Schneider (Munich). We are grateful to him for coming at his own expense to give his very able help in the laboratory (i.e., the 'practical' sessions). He is very experienced with RR and has made his own adaptation of a DBW program for the PC. It has much better graphics than does the one we were using. He kindly demonstrated the program one evening, gave a copy to Prof. Bojarski's group, and is considering making a special offer to the students at a heavily discounted price.

Through the CPD, the IUCr provided partial financial support for the school in the form of \$4,000 for assistance to young scientists to attend ('scholarships' of \$200 each) and incremental in-Europe travel costs for the lecturers. This support was crucial to the existence of the RSSB-90.

R.A. Young

A NEW HIGH RESOLUTION NEUTRON POWDER DIFFRACTOMETER AT BNL

A high resolution neutron powder diffractometer under construction at the Brookhaven HFBR is expected to be in operation by mid-1991. The new machine will have a Ge(511) monochromator with a take-off angle of 120° ($\lambda \approx 1.89 \text{ \AA}$) and $64 \text{ }^3\text{He}$ counters in the detector bank. There will be interchangeable collimators before the monochromator allowing a choice of 5 or 11' horizontal divergence, and 10cm high 5' collimators in front of the detectors. In the higher resolution mode, $\Delta d/d$ is expected to be about 6×10^{-4} at the resolution minimum.

The diffractometer is generally similar to D2B at the Institute Laue-Langevin except for the monochromator. This will consist of a vertically focussing array of segments $5 \times 1 \text{ cm}$ in dimensions cut from stacks of $20 \times 0.3 \text{ mm}$ wafers that have been pressed and brazed together. Preliminary measurements indicate that a mosaic width of $0.1-0.15^\circ$ and reflectivity of 25% can be achieved in this way.

L. Passel, S. Bar-Ziv, D.W. Gardner, D.E. Cox, and J.D. Axe

FIRST EUROPEAN POWDER DIFFRACTION CONFERENCE, MUNICH 14-16 MARCH

This meeting was associated with the first all-German crystallography meeting, and attracted more than 350 participants, including many from Eastern Europe, as well as several from the USA and other parts of the world. It was a huge success, owing much to the attractive city of Munich at the time of one of their 'beer-fests', and especially to the local organizing committee, chaired by Dr H.E. Göbel of Siemens, and the programme committee headed by Dr Jan Visser from Delft. Sponsors included German Scientific and Government organisations and local industry, the IUCr, JCPDS-ICDD, Huber, Enraf-Nonius, Stoe, IBM and Siemens.

Munich was of course the city where von Laue, Friedrich and Knipping discovered X-ray diffraction in 1912. Professor H. Jagodzinski gave an entertaining account of these early days in the Plenary lecture. The list of Munich scientists at that time included Röntgen, Debye, Scherrer, Ewald and other famous names. Even the spot on the street where von Laue first understood X-ray diffraction while walking home, is marked, and the original X-ray apparatus, with lead shielding for the film but not the operator, is preserved.

Munich is also the city that provided much of the driving force for modern neutron diffraction, including all-important innovations such as neutron guide tubes, much of the instrumentation at ILL Grenoble, and two Directors.

The meeting was so large that it was divided into two or three parallel sessions, on subjects such as Profile analysis, Minerals and Inorganics, and Synchrotron Radiation. There was also a

large commercial exhibition, and of course poster sessions. There were continuous demonstrations of X-ray diffractometers and powerful micro-computer systems, including demonstrations of the JCPDS-ICDD data file by Jan Visser, who organised a special workshop on the last day.

Many CPD members were there, including Jaroslav Fiala, who talked on 'Quo Vadis Quantitative Powder Diffraction', Dave Cox, who talked about a new *neutron* powder diffractometer at Brookhaven (leaving Michael Hart to talk about synchrotron diffraction), and Daniel Louer and Per-Erik Werner, who showed the superb results that can already be obtained with laboratory X-ray equipment for indexing and solving crystal structures.

The highlight of the meeting was the conference dinner in one of the larger beer-halls, for which Bob Snyder claimed much of the credit! It coincided with the festival celebrating the brewing of a particularly potent brown beer, with the 2000 or more celebrants in the hall joining in lusty singing and laughing at bawdy jokes, though northern Germans claimed not to understand some of the local dialect.

Future EPDIC meetings will be held in conjunction with European Crystallography meetings; that is in all years in which there is not an IUCr meeting. EPDIC-2 is already planned for July 30 - August 1, 1992 in Enschede, The Netherlands. The local organiser, Dr T. Ryan of Philips will have a difficult job competing with the most enjoyable meeting of Dr Göbel and Siemens Munich.

A.W. Hewat

CRYSTAL XVII - ARMIDALE AUSTRALIA, 2-5 APRIL

Crystal XVII was the annual meeting of the Society of Crystallographers in Australia, presided over by Professor John White, and organized at the University of New England NSW by Dr Mark Spackman and his colleagues. Armidale is 550 km north of Sydney, in the rich pastoral plains of New England, NSW, not far from the famous Australian wine producing area of the Hunter valley. Almost 100 participants from Australia and New Zealand, but also from the USA, Japan, the UK, Switzerland, Italy and France were accommodated very comfortably in Mary White College, on one of the most attractive of Australian campuses.

Of particular interest to powder diffractionists was the Australian plan for a beam line at the Tsukuba "Photon Factory", reported by Dudley Creagh and Steve Wilkins, and the Swiss-Norwegian plan for a beamline at ERSRF Grenoble, reported by Mel Fehlmann. (The latter would be in addition to the dedicated ESRF powder beam line described in this newsletter by Åke Kvick). Funding for both of these beam lines has been approved. The Australian beam line would be for high resolution powder diffraction with either single counter and crystal analyser or in Debye-Scherrer mode with imaging plates. As well, it would have provision for small angle X-ray scattering, protein crystallography, and two-

axis single crystal diffraction. The Norwegian-Swiss line would also be multi-purpose, for small and large molecules, low and high temperatures, high pressure, topography and XAFS in addition to powder diffraction.

Other contributions covered most of crystallography. Perhaps the papers on electron diffraction were of most interest to powder diffractionists, especially those of John Spence (Arizona) and Peter Goodman (Melbourne) on the determination of space groups using convergent beam electron diffraction. Although automatic powder indexing programs now usually work with good data, the determination of the symmetry elements is still a problem en route to direct structure solution from powders.

Finally, Bruce Forsyth gave a lively resumé of the diffraction equipment at the ISIS pulsed neutron source in the UK, demonstrating the source with the aid of a convenient fire extinguisher!

The participants were extremely well wined and dined in Armidale, as might be expected in such a rich pastoral and wine producing area. However they decided that the next meetings should be outside Australia, in Singapore in '92 and in New Zealand in '93, to draw in participants from the whole Australasian region.

A.W. Hewat

ELECTRONIC STORAGE AND RETRIEVAL OF CRYSTALLOGRAPHIC DATA

High Tc superconductor research saw the birth of 'Fax' publication, where important results became instantly available to other workers via facsimile machines. With personal computers or workstations on everyone's desk, in the East as well as the West, the age of electronic publication and information retrieval is finally here, after being merely an idea for several years. A number of concrete examples of major importance for the crystallographic community have appeared recently:

ICDD Powder Diffraction File on CD-Rom

The PC-PDF is a low cost, high density data storage/retrieval system for use on personal computers with CD-Rom drives (\$5,750 plus \$1,050 per year with substantial discounts for current PDF and academic users). It contains the entire PDF-2 powder diffraction file database and index files together with retrieval/display software. It was designed to run on an IBM-XT, but versions for Vax, Macintosh, NEC and Hitachi PC's are also available. It is also possible to obtain the NIST crystal data and the NIST-Sandia electron diffraction database on the same CD-Rom. Workshops are organised regularly by the ICDD on the use of this data base, most recently at the European Powder Diffraction meeting, Munich 1991. For further information, contact:

International Centre for Diffraction Data,
1601 Park Lane,
Swarthmore, PA 19081 USA.
Tel. (1-215) 328-9400
Fax. (1-215) 328-2503.

ICSD Inorganic Crystal Structure Database on CD-Rom.

ICSD is a comprehensive compilation of data defining crystal structures of inorganic compounds. All information was taken from the original sources and was checked to assure high quality. The literature is covered back to 1915. The compilation will be updated with approximately 1200 new entries per year. At present it contains 30,000. Access to the data base is either via an on-line service, or as a licence for in-house use on a variety of systems including main-frames and IBM-AT personal computers (DM 9200 for the first year, then DM 4600 per year with 50% academic discounts). This database is usually demonstrated at powder diffraction meetings, such as Munich 1991. For further information contact:

Fachinformationszentrum Karlsruhe,
W-75 14 Eggenstein-Leopoldshafen 2,
Germany.
Tel. (49) 7247/808-330
Fax (49) 7247/808-666

DR WILLIAM PARRISH

With deep regret we learned as this newsletter went to press of the sudden death of Dr William Parrish on March 19. Bill Parrish was an outstanding and energetic pioneer of X-ray powder diffraction techniques, and more recently of techniques for synchrotron radiation. We are all saddened by his passing.

CIF Crystallographic data file format for storage and electronic publication of crystallographic data

Prof. Brian Toby is chairman of the PDF-3 Task force defining specifications for storing powder diffraction data electronically. For general crystallography, the IUCr Executive at the Bordeaux Congress has endorsed the CIF format (Crystallographic Information File) proposed by Prof. Sydney Hall. For information about these formats, contact:

Prof. Brian H. Toby,
Laboratory for Research on the Structure of Matter,
University of Pennsylvania,
3231 Walnut Avenue,
PA 19104-6272 USA.

and: Prof. Sydney R. Hall,
Crystallography Centre,
University of Western Australia,
Nedlands 6009,
WA, Australia.

Powder Diffraction Computer Program Information

At the request of the IUCr-CPD, Professor Deane Smith has prepared a list of computer programs for powder diffraction analysis of materials. Personal computer as well as main frame programs are listed, together with the programming language, the form, costs (if any) and conditions of distribution, and the type of documentation and support available from the author. This compilation has been presented at the International meeting in Toulouse (1990), and the European Meeting in Munich (1991), and has been accepted for publication in the Journal of Applied Crystallography.

Lazy Pulverix for the Macintosh

One program not yet registered on Deane Smith's excellent list is Lazy Pulverix for the Macintosh personal computer, though the IBM-PC version is listed. Lazy Pulverix is the famous program of Yvon, Jeitschko and Parthé for calculating powder diffraction patterns from crystal structure data. The new Macintosh version implements the interactive windowing environment, allowing easy entry of the data, display of the calculated pattern and high resolution laser printing. It works for neutron and synchrotron data as well as for standard X-ray geometries. The Macintosh version will be available from June 1991 from:

Professor K. Yvon,
Institut de Cristallographie,
Université de Genève, Physique,
24 Quai Ernest-Ansermet,
CH-1211 Genève 4, Suisse. Fax: (41) 22 781 21 92

ACTIVITIES OF THE JCPDS-ICDD

I. General information.

The JCPDS-ICDD is a non-profit organization which exists for the purposes of serving the data-base needs of the (powder) diffraction and allied communities worldwide. It also has an educational purpose. It consists of 120+ elected members and a paid staff of about 25 persons working in its own headquarters building (which has outgrown) at 1601 Park Lane in Swarthmore, a suburb of Philadelphia, Pennsylvania. The income which allows the ICDD to operate arises from leasing and sales of the x-ray and electron powder diffraction data bases, packaged in various ways, which are an outgrowth of the early work of Hanawalt, Rinn and Frevel at the Dow Chemical Company. Twenty-five years ago the packaging was done on 3 x 5 inch cards and we still speak today of 'card images'. Each card provided one X-ray diffraction powder pattern in the form of 'd's and I's' (d values and intensities—peak intensities, not integrated intensities), the source of the pattern, and some additional information (lattice parameters, optical data, density, ...) if available. Card images in book form were made available for the older sets, only. The media for the PDF (Powder Diffraction File) have changed and multiplied in response to technological possibilities. First came microfiche, then magnetic tape, and now CD-ROM (compact discs - read only memory) are nearly totally replacing the cards. There are currently about 50,000 patterns in the PDF (see previous page).

11. Current news items.

- 1) About 600 patterns per year are generated through the Grants-in-Aid program. About 60% of the Grants go outside of the USA.
- 2) The ICDD has set up a Scholarship program to encourage student interest in crystallography. Details are given below.

3) The ICDD is continuing the annual X-ray Diffraction and X-ray Fluorescence "Clinics" which Professor H. Chessin, now retired, operated for many years at SUNY-Albany. The first XRD clinics are sited at Pennsylvania University. The 2nd will take place in June 1991.

4) In recent years, the ICDD has started archiving full, digitized, powder diffraction patterns and now has nearly 500 on hand. Reports at the March 1991 ICDD Annual Meeting demonstrated that the digitized patterns offered many advantages over the old style "d's and I's" listings. One was improved phase analysis, both qualitative and quantitative, in multiphase specimens. Successful identification of up to 10 phases was reported. Another advantage is much better representation of 'imperfect' materials, such as clays and polymers, for which such things as asymmetry of the diffraction profiles is an important part of their characterization.

5) ICDD-IUCr. The ICDD and IUCr are starting to explore the possibility of a closer working relationship between the journal "Powder Diffraction" and the IUCr journals. The JCPDS-ICDD gave significant financial sponsorship to the 1990 CPD-organized Satellite Meeting on Powder Diffraction in Toulouse and will give similar sponsorship to the 1992 CPD-organized meeting at NIST on "Accuracy in Powder Diffraction II".

6) The JCPDS-ICDD currently have five Round Robins in progress: a) Peak hunting, b) Instrument Parameters, c) Statistical Process Control, d) Indexing (sensitivity to various experimental factors), and e) Profile fitting. These Round Robins are being carried out by the Data Collection and Analysis Subcommittee under the chairmanship of Dr. Walter Schreiner, Philips Laboratories, Briarcliff Manor, NY.

R.A. Young, IUCr representative to the ICDD

CRYSTALLOGRAPHY SCHOLARSHIP FUND OF JCPDS-ICDD

To encourage promising graduate students to pursue crystallographically-oriented research, the International Centre has embarked on establishing a Crystallography Scholarship Fund. The ICDD Chairman has initiated the solicitation of funds from private and industrial sectors to reach the goal of \$250,000. Approximately one-third of this goal has been reached and the Board of Directors of ICDD has decided to initiate this program by offering two scholarships for the calendar year 1992.

Qualifications for the applicants: graduate student with major interest in crystallography (crystal structure analysis, crystal morphology, modulated structures, correlation of atomic structure with physical properties, systematic classification of crystal structures, phase identification and materials characterization).

- a. Submission of one-page proposal by graduate student describing type of crystallographic research to be partially supported by scholarship.
- b. Supportive letter from sponsoring professor from an accredited university or an institute of technology.
- c. No restriction on country, race, age or sex.
- d. Term of scholarship: one year with only one renewal if approved at the end of the first year on the basis of the student's written accomplishments during the first year.

Restrictions on the scholarship fund:

- a. The scholarship stipend of \$2,000 is to be paid to the graduate student to help defray tuition, laboratory fees, and registration fees to accredited scientific meetings related to crystallography.
- b. Distribution of scholarships: No more than one scholarship per year to any accredited institution.
- c. The funds of the scholarship are not to be used for travel.
- d. Every five years a Cost-of-Living Adjustment (COLA) may be applied to the annual stipend of \$2,000.
- e. The awarding of the scholarships is to be administered by a committee consisting of the ICDD Chairman, Chairman of the ICDD Technical Committee, and the Chairman of the ICDD Education Subcommittee. One or more accredited professors (with no conflicts of interest) may be invited to assist in the selection of successful candidates.

Applications should be mailed, prior to October 31, 1991, to:

Secretary, ICDD
1601 Park Lane
Swarthmore, PA 19081-2389, USA

Ludo K. Frevel, Chairman, ICDD.

FUTURE MEETINGS OF INTEREST TO POWDER DIFFRACTIONISTS

Powder diffractionists are invited to send notices of forthcoming meetings to the next editor of the CPD Newsletter, Prof. R.A. Young, at the address given on the back cover.

8-9 July 1991	ESRF Users' Information Meeting, Alpes Congrès Centre, Grenoble. (Mrs R. Mason, ESRF 02, BP220,38043 Grenoble Cedex, France)	23-24 Oct. 1991	Int. Center for Diffraction Data Technical Meetings, Concordville, Pennsylvania (Ms J. Felizzi, JCPDS-International Center for Diffraction Data, 1601, Park Lane, Swarthmore, PA 19081, USA)
15-19 July 1991	14th International Conference on Synchrotron Radiation Instrumentation (SRI-91), Chester. UK (SRI-91 Conference Office. SERC Daresbury Laboratory, Warrington WA4 4AD, UK)	20 Nov. 1991	Getting the Best from Diffraction Intensities. BSG Autumn Meeting. Birbeck College, London (Dr P. Lindley Dept. Crystallography, Birkbeck College, London, UK).
21-26 July 1991	ACA meeting, Toledo, Ohio, USA (Alan Pinkerton. Department of Chemistry, University of Toledo. OH 43606, USA)	2-7 Dec. 1991	Materials Research Society Fall Meet. Boston, Massachusetts, USA. (M. Gell, MRS, 9800 McNight Road, Suite 327, Pittsburgh, PA 15237, USA).
12-16 Aug. 1991	Pacific-International Congress on X-ray Analytical Methods (PICXAM), Honolulu, Hawaii Organized by the Australian X-ray Analytical Association, the Denver X-ray Conference and X-ray Analysis Group and the Japanese Society for Analytical Chemistry (Lynne Bonno, Department of Engineering, University of Denver, Denver, CO 80208, USA)	31 March 1992	British Crystallographic Assoc. Spring Meeting, Liverpool, UK. (Dr Marjorie Harding, Chemistry Dept., Liverpool Uni., PO Box 147, Liverpool L69 3BX).
25-30 Aug. 1991	13th European Crystallographic Meeting, Ljubljana, Yugoslavia (Prof. L. Golic, Department of Chemistry, E. Kardelj University, PO Box 537, 61001 Ljubljana, Yugoslavia)	9-12 April 1992	12th European Physical Society General Conf. Condensed Matter, Prague, Czechoslovakia. (Dr V. Smid, Institute of Physics, Czech. Acad. Sciences, Cukrovamicka 10, 162 00 Praha 6, Czechoslovakia).
27-30 Aug. 1991	International Conference on Neutron Scattering, Oxford, UK (Mrs M Sherwen, Rutherford Appleton Laboratory, Chilton, Didcot, Oxon OX110QX, UK)	26-29 May 1992	Accuracy in Powder Diffraction II, National Institute of Standards and Technology, Gaithersburg, Maryland, USA (Dr E. Prince, Reactor Radiation Division, NIST, Gaithersburg, MD 20899. E-mail: princ@enh.nist.gov)
2-3 Sept. 1991	Synchrotron Radiation in Crystallography, Trieste, Italy (L. Randaccio, Dipartimento di Scienze Chimiche. Università di Trieste. Piazzale Europa I, 1-34127 Trieste, Italy)	30 July 1992	EPDIC-2, Second European Powder Diffraction Conference, Enschede, The Netherlands. (Dr T. Ryan, Philips Analytical, Lelyweg 1, NL-7602 AE Almelo, The Netherlands).
18-29 Sept. 1991	Summer School on Neutron Scattering, Oxford. UK (Prof. B.T.M. Willis, Chemical Crystallography Laboratory. 9 Parks Road, Oxford OX1 3PD, UK)	2-7 Aug. 1992	14th European Crystallographic Meet. (ECM-14) Twente, The Netherlands. (Dr H.J. Bruins Slot, CAOS/CAMM Center, University of Nijmegen, Toernooiveld, 6525 ED Nijmegen, The Netherlands).
		9-14 Aug. 1992	American Crystallographic Assoc. Annual Meet., Pittsburgh, PA, USA. (Marcia J. Vair, ACA, P.O. Box 96, Ellicott Station, Buffalo, NY 14205-0096, USA).

MAILING LIST FOR CPD NEWSLETTERS

If you would like to receive a personal copy of this newsletter beginning with the next issue, please make sure that your name is on our mailing list by completing a copy of the this form and returning it to the CPD Secretary, Dr R.J. Hill at the address below:

To the International Union of Crystallography Commission on Powder Diffraction

Please add my name to your mailing list for future issues of the CPD Newsletter

My address has changed to that given below

The following person might appreciate receiving the CPD Newsletter

Name Title

Address

.....

.....

.....

Please return to: Dr R.J. Hill, Division of Mineral Chemistry, CSIRO, P.P. Box 124, Port Melbourne, Victoria 3207, Australia.

CALL FOR CONTRIBUTIONS TO CPD NEWSLETTERS

The next Commission on Powder Diffraction Newsletter will be edited in autumn 1991 by Prof. R.A. Young. He would greatly appreciate contributions from readers on matters of interest to the powder diffraction community, in particular reports on meetings, plans for future meetings, developments in instruments, techniques and computer programs, and news of general interest. Please send articles and suggestions directly to R.A. Young at the address given below.

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