

International Union of Crystallography

Report of the Executive Committee for 1988

Meetings

The Union sponsored the following meetings held during 1988: School on Crystallography of Molecular Biology, Erice, Italy, 30 May–7 June 1988; Conference on Charge, Spin and Momentum Densities, Luso-Buçaco, Portugal, 26 June–2 July 1988; Second International Conference on Biophysics & Synchrotron Radiation, Chester, England, 4–8 July 1988; Symposium on Materials Research under Microgravity, Espoo, Finland, 19–20 July 1988; Symposium on Molecular Recognition: Its Role in Chemistry and Biochemistry, Sopron, Hungary, 24–27 August 1988; Workshop: Introduction to *International Tables for Crystallography*, Volume A, Vienna, Austria, 26–27 August 1988; Eleventh European Crystallographic Meeting, Vienna, Austria, 28 August–2 September 1988; International Conference on Defects in Insulating Crystals, Parma, Italy, 29 August–2 September 1988; Summer School on Crystallography and Its Teaching, Tianjin, People's Republic of China, 15–24 September 1988; International Summer School on Neutron Scattering, Oxford, England, 20–30 September 1988; Conference on Radiation Physics, São Paulo, Brazil, 3–7 October 1988; International Symposium on Computational Methods in Chemical Design: Molecular Modelling, Theory and Experiment, Schloss Elmau, Federal Republic of Germany, 10–14 October 1988; Meeting on the Crystal Structure and Chemistry of Ribonucleases, Moscow, USSR, 28 November–2 December 1988.

The Executive Committee met at Vienna, Austria, in September on the occasion of the Eleventh European Crystallographic Meeting. The most important items of business were: (1) subscription rates and other matters concerning the journals, including the establishment of a Fast Communications Section in *Acta Crystallographica* Section A; (2) progress with Volumes B and C of *International Tables for Crystallography* and plans for Volume D; (3) other publications; (4) sponsorship of meetings; (5) free circulation of scientists; (6) databases and the Cambridge Crystallographic Data Centre; (7) recommendations of the Working Party on Crystallographic Information; (8) review of the work of the Union's Commissions; (9) XV General Assembly and Congress in Bordeaux, 19–28 July 1990; (10) XVI General Assembly and Congress in Beijing, 1–8 September 1993.

The Finance Committee met in the Chester office in March and at Vienna in August immediately prior to the Executive Committee meeting.

Publications

Volume 44 of *Acta Crystallographica* and Volume 21 of the *Journal of Applied Crystallography* were published, as were Volumes 50A and 53A of *Structure Reports* and a reprint of the *Brief Teaching Edition* of Volume A of *International Tables for Crystallography*.

Adhering Bodies

The latest list of Adhering Bodies of the Union, and the names and addresses of the Secretaries of the National Committees for Crystallography, is given in Table 1.

Work of the Commissions

Commission on Journals

Volumes 44 of *Acta Crystallographica* (*Acta*) and 21 of the *Journal of Applied Crystallography* (*JAC*) were produced and published in 1988. The total number of papers published in *Acta* decreased 5% as compared with 1987, and those in *JAC* increased by 20%. Overall, 4024 *Acta* pages were published in 1988 compared with 3896 in 1987. For *JAC*, the number of pages increased from 538 in 1987 to 691 in 1988. In addition, 43 papers (305 pages) contributed to the International Conference on Small-Angle Scattering, Argonne, 26–29 October 1987, were published in the December issue of *JAC*.

The average length of full articles in *Acta* increased from 3.4 pages in 1987 to 3.5 pages in 1988. The average length of *JAC* papers was 5.7 pages in 1987 and 1988 (see Table 2). Median publication times for full articles, the average elapsed time in months between the published acceptance and nominal publication dates, were 5.0 months for *Acta* A, 5.3 months for *Acta* B, 4.0 months for *Acta* C and 5.9 months for *JAC*. Corresponding publication times in 1987 were 5.4, 5.5, 4.7 and 5.0 months. Median publication times for Short Communications were 4.2 months for *Acta* A, 5.2 months for *Acta* B, 2.1 months for *Acta* C and 5.8 months for *JAC* in 1988. The median publication time for Short Format papers in *Acta* C was 3.9 months.

A total of 37 inorganic, 15 metal-organic and 42 organic related papers appeared in Section B in 1988 compared with 53, 10 and 31 respectively in 1987. By contrast, the distribution of papers in Section C was 110 inorganic, 266 metal-organic and 520 organic in 1988, compared with 119 inorganic, 288 metal-organic and 584 organic articles in 1987.

Acta papers were received from 50 countries in 1988, compared with 57 countries in 1987. *JAC* papers were received from 26 countries in 1988 compared with 25 countries in 1987.

The indexes that accompany *Acta* papers have been expanded to include a monthly 'List of Contributing Authors' in Section C. Cumulative abbreviated author indexes are included in final issues of *Acta* A, B and C. The index to Volume 21 of *JAC* was included in the final issue of the journal.

The Commission on Journals approved a new section of the IUCr's journals, which will include Fast Communications, Letters to the Editor and reports from IUCr Commissions. This section will be included at the back of

Table 1. *Adhering Bodies*

<i>Country</i>	<i>Category*</i>	<i>Adhering Body</i>	<i>Secretary of National Committee</i>
Argentina	I	Consejo Nacional de Investigaciones Científicas y Técnicas	M. A. R. DE BENYACAR, División Física del Solido, Comisión Nacional de Energía Atómica, Av. del Libertador 8250, 1429 Buenos Aires
Australia	III	Australian Academy of Science	The Executive Secretary, Australian Academy of Science, GPO Box 783, Canberra City, ACT 2601
Austria	I	Österreichische Akademie der Wissenschaften	A. PREISINGER, Institut für Mineralogie, Kristallographie und Strukturchemie, Technische Universität Wien, Getriedemarkt 9/171, A-1060 Vienna
Belgium	II	Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique	G. EVRARD, Groupe de Chimie Physique, FNDP, Rue de Bruxelles 61, B-5000 Namur
Brazil	III	Conselho Nacional de Desenvolvimento Científico e Tecnológico	S. CATICHA ELLIS, DESCM, Instituto de Física, Universidade Estadual de Campinas, Campinas, São Paulo 13100
Bulgaria	I	Bulgarian Academy of Sciences	J. MACÍČEK, Bulgarian Academy of Sciences, Institute of Applied Mineralogy, Rakovskyst. 92, 1000 Sofia
Canada	III	National Research Council	J. T. SZYMAŃSKI, CANMET, Department of Energy, Mines and Resources, 555 Booth St, Ottawa, Ontario K1A 0G1
Chile	I	Comision Nacional de Investigación Científica y Tecnología	D. BOYS, Departamento de Física, Universidad de Chile, Casilla 5487, Santiago
China, People's Republic of	IV	Academia Sinica	XU XIAO-JIE, Department of Chemistry, Peking University, Beijing 100871
Czechoslovakia	I	Československá Akademie Věd	V. PETŘÍČEK, Institute of Physics, Czechoslovak Academy of Sciences, Na Slovance 2, 180 40 Praha 8
Denmark	I	Royal Danish Academy of Sciences and Letters	N. THORUP, Structural Chemistry Group, Chemistry Department B, DTH 301, The Technical University of Denmark, DK-2800 Lyngby
Egypt, Arab Republic of	I	Academy of Scientific Research and Technology	S. A. ABDEL-HADY, Physics Department, Faculty of Science, Helwan, Cairo
Finland	I	Suomen Tiedeakatemiain Valtuuskunta	A. VAHVASELKÄ, Department of Physics, University of Helsinki, Siltavuorenpenger 20 D, SF-00170 Helsinki 17
France	IV	Académie des Sciences (Institut de France)	Y. EPELBOIN, Association Française de Cristallographie, Tour 26, 4 place Jussieu, 75230 Paris CEDEX 05
German Democratic Republic	I	Vereinigung für Kristallographie in der GGW der DDR	P. RUDOLPH, Sektion Physik, Humboldt-Universität-Berlin, Invalidenstrasse 110, 1040 Berlin
Germany, Federal Republic of	IV	Arbeitsgemeinschaft Kristallographie	K. F. FISCHER, Fachrichtung Kristallographie, Universität des Saarlandes, 6600 Saarbrücken 11
Hungary	I	Magyar Tudományos Akadémia	K. SIMON, Physical Chemistry Department, Chinoin Pharmaceutical and Chemical Works, POB 110, H-1325 Budapest
India	II	Indian National Science Academy	G. R. DESIRAJU, School of Chemistry, University of Hyderabad, P.O. Central University, Hyderabad-500 007
Israel	I	Israel Academy of Sciences and Humanities	M. HAREL, Weizmann Institute of Science, Rehovot
Italy	III	Consiglio Nazionale delle Ricerche	G. FILIPPINI, CS Relaz. Strutt. Reatt. Chim., CNR, Via Golgi 19, 20133 Milano
Japan	IV	Science Council of Japan	J. HARADA, Department of Applied Physics, Faculty of Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464
Mexico	I	Consejo Nacional de Ciencia y Tecnología	L. E. RENDÓN DÍAZMIRÓN, Instituto de Investigaciones en Materiales, UNAM, Delegación Coyoacán, 04510 Mexico D.F.

* Adherence to the Union is in one of five Categories I-V, with corresponding voting powers and contributions as set out in Statutes 3-6, 5-5 and 9-4.

Table 1 (*cont.*)

<i>Country</i>	<i>Category*</i>	<i>Adhering Body</i>	<i>Secretary of National Committee</i>
Netherlands	II	Stichting voor Fundamenteel Onderzoek der Materie met Röntgen- en Elektronenstralen	The Executive Secretary, FOMRE, Koningin Sophiestraat 124, 2595 TM's-Gravenhage
New Zealand	I	The Royal Society of New Zealand	J. SIMPSON, Chemistry Department, University of Otago, PO Box 56, Dunedin
Norway	I	Det Norske Videnskaps-Akademi	B. F. PEDERSEN, Institute of Pharmacy, University of Oslo, PO Box 1033, Blindern, 0315 Oslo 3
Poland	I	Polska Akademia Nauk	A PIETRASZKO, Institute of Low Temperature and Structure Research, Polish Academy of Sciences, PO Box 937, 50-950 Wrocław 2
Portugal	I	Sociedade Portuguesa de Física	M. M. R. R. COSTA, Departamento de Física, Universidade de Coimbra, 3000 Coimbra
South Africa	II	South African Council for Scientific and Industrial Research	E. P. DU PLESSIS, FRD, South African ICSU Secretariat, PO Box 395, Pretoria 0001
Spain	III	Consejo Superior de Investigaciones Científicas	M. MARTINEZ RIPOLL, Instituto Rocasolano - CSIC, Serrano 119, 28006 Madrid
Sweden	II	Kungliga Vetenskapsakademien	P. KIERKEGAARD, Department of Structural Chemistry, Arrhenius Laboratory, University of Stockholm, S-106 91 Stockholm
Switzerland	II	Schweizerische Gesellschaft für Kristallographie	H.-B. BÜRGI, Laboratorium für Chemische und Mineralogische Kristallographie, Universität Bern, Freiestrasse 3, CH-3012 Bern
UK	V	The Royal Society	The Executive Secretary, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG
USA	V	National Academy of Sciences-National Research Council	C. P. BROCK, Department of Chemistry, University of Kentucky, Lexington, KY 40506
USSR	V	Akademija Nauk SSSR	N. I. SOROKINA, Institute of Crystallography, Academy of Sciences of the USSR, Leninsky prospekt 59, Moscow 117333
Yugoslavia	I	Jugoslavenska Akademija Znanosti i Umjetnosti	B. KAMENAR, Laboratory of General and Inorganic Chemistry, Faculty of Science, The University, Ulica Soc. Revolucije 8, 41 000 Zagreb

* See footnote on preceding page.

Acta A, which became a monthly publication from January 1989. This new section will be prepared on a desk-top publishing system in Chester for onward transmission to the printer as camera-ready copy. The average publication time from receipt of a paper by a Co-editor until it appears in print will be about three months.

A. Gavezzotti and C. Pascard were appointed new Co-editors of *Acta* in 1988. J. Drenth, G. Ferraris, M. Hospital and M. Nardelli retired as Co-editors of *Acta*, and G. Kostorz retired as Co-editor of *JAC*. The Commission extends its warm thanks to the retiring Co-editors who have committed so much energy and time to their duties with the Commission.

Commission on Structure Reports

Volumes 50A (381 pp.) and 53A (287 pp.) (Metals and Inorganic Compounds for 1983 and 1986, respectively) were published in 1988. Work has been completed on Volumes 49A and 54A (Metals and Inorganic Compounds for 1982 and 1987, respectively) and both volumes will be with the publisher early in 1989. With the publication of these volumes, the Inorganic and Metals volumes are now

up to date. Ways of using the various crystallographic databases to facilitate the production of the Inorganic and Metals volumes are being investigated.

Volume 49B (Organic compounds for 1982) has been assembled in camera-ready form and index preparation is in progress prior to delivery to the publisher. Co-editorial work is in progress for Volumes 50B, 51B and 52B (Organic Compounds for 1983, 1984 and 1985, respectively). Preparation of the 10-year index for 1971-1980 (Volume 47B) continues.

Commission on International Tables

A volume of *International Tables for Crystallography* on physical properties of crystals (Volume D) has been under discussion for many years. In September 1988, after considerable preparatory work, the Executive Committee formally authorized the preparation of this volume, with B. T. M. Willis as Editor.

No meeting of the Commission took place during 1988, but the Editors of Volumes B, C and D met in September to review the content and problems of their respective volumes. The Chairman of the Commission has had much

Table 2. *Survey of the contents of the Union Journals
Acta Crystallographica*

Vol.	Year	Number of Pages*	Number of Papers	Full Articles		Short Format Papers		Short Communications	
				Number	Average Length	Number	Average Length	Number	Average Length
A40	1984	728	123	109	6.2	—	—	14	1.1
B40		616	99	99	6.2	—	—	—	—
C40		2126	811	789	2.7	—	—	22	0.8
A41	1985	624	114	108	5.4	—	—	6	0.8
B41		456	67	66	6.4	—	—	1	0.6
C41		1836	703	686	2.6	8	1.5	9	0.7
A42	1986	588	98	85	6.3	—	—	13	1.1
B42		640	90	89	7.0	—	—	1	2.2
C42		1892	732	648	2.7	75	1.6	9	0.9
A43	1987	840	128	114	6.5	—	—	14	1.3
B43		584	100	91	6.3	—	—	9	0.9
C43		2472	995	817	2.7	174	1.7	4	0.9
A44	1988	1104	159	150	6.3	—	—	9	1.1
B44		680	104	100	6.4	—	—	4	0.3
C44		2240	897	712	2.5	174	1.5	11	0.3

Journal of Applied Crystallography

Vol.	Year	Number of Pages*	Number of Papers	Full Articles		Short Communications		Crystal Data		Computer Programs		Short Items§	
				Number	Average Length	Number	Average Length	Number	Average Length	Number	Average Length	Number	Average Length
17	1984	488	104	66	6.2	11	1.5	7	0.5	7	2.4	14	0.9
18	1985	546	108	80	5.5	9	1.8	5	0.4	7	3.3	7	0.8
19	1986	492	104	71	6.1	12	1.6	10	0.4	7	1.9	8	0.8
20	1987	538	105	70	5.7	12	2.0	4	0.5	15	3.1	4	0.6
21¶	1988	996	169	139	5.7	6	1.5	1	1.0	10	2.7	13	0.6

* Excluding indexes.

† Volume A40 includes, in addition, 542 pages of abstracts communicated to the Hamburg Congress.

‡ Volume A43 includes, in addition, 360 pages of abstracts communicated to the Perth Congress.

§ Excluding Union Announcements, Crystallographers, New Commercial Products and Book Reviews.

¶ Volume 21 includes 303 pages of 43 papers presented at the International Conference on Applications and Techniques of Small-Angle Scattering, Argonne, 1987.

correspondence and some personal discussions concerning several volumes that have been proposed, including Sub-periodic Groups, *N*-Dimensional Crystallography ($N > 3$), and Crystallographic Computing. The Commission is not yet able to make firm recommendations about any of these.

Detailed reports on Volumes A, B, C and D are given in the following paragraphs.

Volume A (Space-Group Symmetry; Editor Th. Hahn)

Preparations for the Third Edition of Volume A have continued, mainly along two lines.

1. Preparation of new space-group diagrams. The Second Edition (1987) contains improved diagrams for the plane groups and the trigonal space groups. Diagrams for the hexagonal space groups and the tetragonal space groups of crystal class $4/mmm$ were completed in 1988. They will be incorporated in a reprint of Volume A due to appear in the spring of 1989. Work on the diagrams for the other space groups is continuing.

2. There will be a more detailed characterization of the subgroup data of the plane and space groups, including

conjugacy relations, the conjugating elements, and the transformation to the conventional coordinate system where applicable. These data are of interest for phase transitions, domain structures *etc.*

The Second Edition of the *Brief Teaching Edition* of Volume A was published in February 1988. A reprint is scheduled for mid 1989. Preparations for a revised and enlarged Third Edition have begun; it is planned to include the seventeen plane groups because of their great teaching value.

Volume B (Reciprocal Space; Editor U. Shmueli)

In September 1987 the Editor wrote to the prospective authors of all contributions to Volume B, informing them of his intention to 'close' the volume by the end of May 1988. Authors whose typescripts had not yet been received were requested to submit their contributions by the end of January 1988. Authors whose contributions had already been submitted were asked to consider whether any updating would be desirable. This request was honoured by the authors to various extents but nevertheless 1988 was a very fruitful year for contributions to Volume B.

Five chapters are still missing, and some specific comments are in order. Chapter 1.3 (Fourier Methods) was commissioned only after the Perth Congress in 1987. It is in draft, and the final version is expected soon. Chapter 4.4 (Small Particle Size and Texture) is also in draft, but its prompt completion is less certain. If necessary, it will be postponed to the second edition. The authors of Chapter 4.5 (Diffraction by Polymers) and Chapter 4.7 (Small-Angle Scattering) have resigned, formally in one case, informally in the other, and these subjects will of necessity be postponed. The theoretical section of Chapter 5.1 (Dynamical Theory of X-ray and Neutron Diffraction) is in draft, and the section on applications is awaited.

Volume C (Mathematical, Physical and Chemical Tables; Editor A. J. C. Wilson)

Most authors have submitted final drafts, and several have provided machine-readable floppy disks or tape. Two substantial contributions and one extensive table have been successfully photocomposed from these submissions; trials with others continue. A great part of the Volume is in first proof.

It is proposed to 'close' the volume when certain topics now in draft are received in final form. These are Chapter 2.3 (X-ray Powder Techniques), Section 4.2.2 (X-ray Wavelengths), Chapters 5.1 and 5.2 (Determination of Lattice Parameters by X-ray Powder Methods), and Chapters 1.4 and 9.5 (Commensurate and Incommensurate Superstructures). The volume will not be delayed for other planned topics.

Volume D (Physical Properties of Crystals; Editor B. T. M. Willis)

It is intended that Volume D will be concerned primarily with the macroscopic properties of crystals. For each property, examples will be given of crystals exhibiting that property and of the corresponding measured coefficients, but it is not intended to include extensive tables of measured physical quantities. The proposed Table of Contents, approved by the Executive Committee of the Union in September 1988, is:

1. Mathematical Introduction
2. Mechanical Properties
 - Elasticity
 - Thermal expansion
 - Propagation of elastic waves
 - Brillouin zones
 - Density
3. Electrical Properties
 - Electric polarization
 - Ferroelectricity
 - Antiferroelectricity
 - Electrostriction and piezoelectricity
4. Magnetic Properties
 - Dia- and paramagnetism
 - Ferromagnetism
 - Antiferromagnetism
 - Magnetostriction
5. Transport Properties
 - Electrical conductivity
 - Thermal conductivity
 - Hall effect

6. Optical Properties
 - Optical birefringence
 - Optical activity
 - Electro-optical effect
 - Photo-elastic effect

The first draft of Chapter 1 is complete.

Commission on Biological Macromolecules

The field of biological macromolecules continues to be very active. There have been no formal meetings of the Commission itself but support was arranged for an international meeting on the Chemistry, Structure and Function of Ribonucleases in Moscow during December. This was a very timely meeting, bringing together for the first time crystallographic groups in this field from Eastern and Western Europe. Other meetings for 1989 are now under consideration. The tradition of the Erice conferences was successfully repeated in 1988, with a wide spectrum of research achievements being reported and discussed. The Commission is anxious to get as many students and young scientists as possible to these meetings and is pleased at the numbers of such people attending them.

The Commission has finalized a policy on the deposition of crystallographic data, which it is hoped will ensure uniform and fair practice throughout the community. In this policy, atomic parameters and structure amplitudes used in the construction of figures and in the arguments presented in a paper are required to be deposited in the Protein Data Bank at Brookhaven. Release of these data can however be delayed following publication of the paper if the author(s) so wish. Atomic coordinates can be delayed for one year and structure factors for four years.

Commission on Charge, Spin and Momentum Densities

Together with Professor L. Alte de Veiga and his colleagues, the Commission organized the Sagamore IX Conference in Luso, Portugal, which was considered most successful by the approximately 100 participants. 18 invited lectures and about 60 posters were presented covering all modern aspects of electron density studies. The emphasis of the meeting was on transition metals. For the first time magnetic scattering of photons from solids and new trends in surface studies were discussed extensively at a Sagamore Conference.

In preparation for a possible new project the Commission organized, in collaboration with Professor Alte da Veiga and his colleagues, a two-day workshop on 'Density Matrices as Intermediates between Wavefunctions and Experiments' at Coimbra, Portugal, prior to the Sagamore Conference. 9 invited lectures were presented which stimulated extended discussions on the subject. The Proceedings of the workshop and the Sagamore IX Conference will be published in *Portugaliae Physica*.

The Commission held two Closed Meetings during the Sagamore IX Conference. It was decided to publish once a year a Newsletter which is intended to inform the community interested in charge, spin and momentum densities about the activities of the Commission, especially about new scientific projects and related meetings. Newsletter No. 1 has been published in *Acta Cryst.* (1989). A45, FC15-FC17. The Sagamore X Conference will be held in

Konstanz, Federal Republic of Germany, at the end of August 1991.

Commission on Crystal Growth and Characterization of Materials

No formal activity was carried out by the Commission during this year, mainly because work on organizing an international school in India in 1988 had to be stopped abruptly at an advanced stage when no assurance could be obtained by the local organizers that the ICSU principles of free circulation would be adhered to. For the same reason, the Commission could not recommend Union sponsorship of the International Conference on Crystal Growth (ICCG-9) and the International Summer School on Crystal Growth (ISSCG-8) to be held in Japan in 1989. These facts created (and will continue to create in the future) a difficult situation for the Commission as no further activities can be undertaken with the two largest crystal-growth communities in the world, in developing and developed countries respectively.

In the course of 1988 work was started on the organization of two international events that, first planned for 1989, are now scheduled for early 1990. The First International Conference on Epitaxial Crystal Growth will be held in Budapest, Hungary, 1–7 April 1990. The main sponsors of this conference will be the IUCr, the International Organization of Crystal Growth (IOCG) and the Hungarian Academy of Sciences. An International School on Crystal Growth and Crystallographic Assessment of Industrial Materials will be held in Barcelona, Spain, in early 1990. The IOCG, Unesco and the IUCr are expected to be among the main sponsors. This school continues the series of schools organized by the IUCr for the benefit of developing countries, with particular reference to the transfer of knowledge and expertise of applied crystallography and materials science to young scientists of Latin-America, North Africa and the Middle East.

During 1988 the proceedings of two international schools organized by the Commission were published. They are *Epitaxial Electronic Materials*, edited by A. Baldereschi & C. Paorici; Proc. Int. School on Technology, Characterization and Properties of Epitaxial Electronic Materials, Trieste, 13–24 January 1986; World Scientific, Singapore, London (1988), and *Crystal Growth and Characterization of Advanced Materials*, edited by A. N. Christensen, F. Leccabue, C. Paorici & O. Vigil; Proc. Int. School held in La Habana, Cuba, 30 November–10 December 1987; World Scientific, Singapore, London (1988).

Commission on Crystallographic Apparatus

During 1988 work has proceeded on a number of projects in which the Commission has an interest. Progress has been, in the main, satisfactory.

(i) The X-ray Attenuation Project (D. C. Creagh) continues. During 1988 experiments were undertaken on carbon specimens to characterize properly their small-angle X-ray scattering distributions. The results of these experiments will be reported in *Acta Cryst.* Section A in 1989.

(ii) In the Single-Crystal Lattice-Constant Project (G. T. de Titta and S. Martinez-Carrera), which had its origin in a request for help from the Commission on Journals, questionnaires on techniques of measurement have been sent

to those laboratories which expressed interest in participating in the project. About thirty laboratories are expected to take part.

(iii) The Accuracy in XAFS Project (G. Materlik, D. C. Creagh, R. Frahm and G. Langelier) is an extension of the existing X-ray Attenuation Project with the aim of creating standard procedures for the collection, analysis and interpretation of XAFS spectra. At a meeting in August 1988 the XAFS community decided to set up a committee to monitor standards within the XAFS community. The Chairman attended the conference and enlisted the support of XAFS users for the project the Commission has undertaken. R. Frahm and D. C. Creagh are members of the XAFS Standards Committee. The latter has acquired specimen materials for use in this project to send to participating laboratories when they have been properly characterized.

(iv) The Chairman of the Commission on *International Tables* raised the question that the wavelength tables contained in *International Tables for X-ray Crystallography* Volume IV (1974) may contain errors, and that these may be propagated into the forthcoming *International Tables for Crystallography* Volume C. Unfortunately it was not possible to act quickly enough to correct errors in these tables. However, there has been correspondence with R. Jenkins of the Joint Committee on Powder Diffraction Standards (JCPDS) and staff at the US National Institute of Standards and Technology (formerly the National Bureau of Standards) with a view to obtaining funding and use of facilities to pursue a project to re-measure the contentious wavelength values.

(v) G. Materlik is investigating the possibility of holding an Inter-Congress Conference on Anomalous Scattering. A conference on this topic was held in Madrid in 1974 and it is felt that, because of the improvements in techniques of measurement and in computation, to hold another meeting would significantly benefit the X-ray community.

(vi) The Commission has two special committees, a High Pressure Group and an Inter-Commission Committee on Synchrotron Radiation, the latter in conjunction with the Commission on Neutron Diffraction.

The High Pressure Group (Chairman: H. Schulz) has been most active and has had several group meetings. It is already organizing a workshop, in Munich in 1989 as a satellite meeting to AIRAPT-XII, on Accurate Crystal Structure Determination at High Pressure.

Two members of the four-man Inter-Commission Committee on Synchrotron Radiation, with two nominees from the Commission and two from the Commission on Neutron Diffraction, met in August 1988 with the Chairman of the Commission on Crystallographic Apparatus. Discussions were held on the nature, aims and activities of the Committee. Regrettably uncertainty concerning its future, with the possibility that a Commission on Synchrotron Radiation might be created, precluded any significant decisions being taken by the Committee.

Commission on Crystallographic Computing

The activities of the Commission were limited in 1988. The reason may be that computers are nowadays commonly found throughout the world and interesting experiments show that the present microcomputers are adequate for most of the common crystallographic calculations. This reduces the need to be active in these directions. However,

discussions amongst the Commission members and with others give rise to a firm warning: we have to be careful that none of the present public domain software becomes commercially exploited, because expensive software may be a greater problem than expensive hardware.

Some members of the Commission participated in joint inter-Commission activities, in particular for data structures. The Commission is also looking into the possibility of running a bulletin board with downloading of software using EARN or BITNET. The Commission has started to work on an International School on Crystallographic Computing, to be held 29 July–5 August 1990, near Strasbourg, as a satellite meeting of the Bordeaux Congress.

Commission on Crystallographic Data

A meeting of available Commission members was held in conjunction with the XI European Crystallographic Meeting in Vienna. A paper 'Recommendations for the Standardization of Crystallographic Unit Cells' was discussed; this has now been circulated to all members of the Commission, the Commission on Journals, and other interested parties. A revision is now being prepared. Over 330 copies of the Commission monograph *Crystallographic Databases* have now been distributed since its publication in August 1987. An updated version of the monograph is planned to coincide with the 1993 IUCr Congress. The Commission made a strong recommendation that FAX numbers and electronic mail addresses be included in the next edition of the *World Directory of Crystallographers*.

The Commission has been deeply involved in proposals for the direct machine-readable submission of information for publication in *Acta Crystallographica*, and its onward transmission to the relevant data base. A self-defining free-format file structure has been proposed by S. R. Hall (University of Western Australia) as an alternative to the Standard Crystallographic File Structure (SCFS). In conjunction with the IUCr Working Party on Crystallographic Information, the Commission has been considering the definition of information fields required for direct input, in consultation with the Commission on Journals. It is hoped that complete proposals can be circulated, and some testing can begin, during 1989.

Commission on Crystallographic Nomenclature

The primary work of the Commission in 1988 was again performed by its *ad hoc* Committee on the Nomenclature of Symmetry, its Subcommittee on Statistical Descriptors in Crystallography and its Subcommittee on the Nomenclature of Inorganic Structure Types. Communications within the Commission were conducted entirely by correspondence during this period.

The report entitled 'Statistical Descriptors in Crystallography' was accepted by the Commission and the IUCr Executive Committee and has now been published in *Acta Cryst.* (1989). A45, 63–75. Conformity with accepted international convention was maintained with the help of valuable advice from the International Statistical Institute. The recommendations in this Report, although nonmandatory, are expected to improve the present nonuniform use of statistical terminology and methodology as applied to crystallography.

The two reports entitled 'Definition of Symmetry Elements in Space Groups and Point Groups' and 'Nomenclature of Inorganic Structure Types', following many rounds of revision, were each submitted to the Commission for approval late in 1988.

Commission on Crystallographic Teaching

The Commission met informally, depending on which members could attend, at the ACA meeting, the European Crystallographic Meeting and the Commission's Summer School in Tianjin. Suggestions for possible roles of the Commission at the Bordeaux Congress were transmitted to the Programme Committee.

The Summer School in Tianjin, People's Republic of China, was held 15–24 September 1988. There were approximately 20 teachers and 90 students (80 from China) at this school. This meant that each student received as much attention as he or she wanted. Unfortunately, due to illness, the organizer, H. Schenk, could not attend and the meeting was opened and chaired by J. P. Glusker with the assistance of H. Hauptman. The Local Chairman was Fangming Miao of Tianjin Normal University. The teachers each prepared detailed accounts of their lecture material which were bound into a workbook for use by students during lectures or work sessions. Thus, those whose understanding of spoken English was not great could read the general trends of the lectures. References were provided for those who wanted to study further. The VAX computer at Tianjin Normal University made it possible for students to access both the Cambridge Crystallographic Database and the Inorganic Database; many students availed themselves of the opportunity to learn about the use of these databases and the support from computer personnel was excellent. Lectures were given in the main hall of a large hotel where all the teachers and students stayed. Several small rooms in the hotel were used for informal discussions and work sessions. The students enjoyed these and did not attend evening social programmes (dancing *etc.*) until their discussion groups had finished. The school was conducted entirely in English and there was a great variability in the extent to which the students understood the oral presentations. However, with the good lecture notes provided and the possibility of one-to-one discussions, it was felt that each student received adequate instruction; it is important that a teaching school reach all students.

The Pamphlet Series, to be continued under the Editorship of H. Schenk, will provide material for the teaching of specific areas in crystallography. It is planned to print the material with Polycrystal Book Service in the USA as the distributor. An overall plan for contributions, in order to achieve a balance of the many different aspects of the field, is under consideration. Invitations should be extended in the near future.

The Visiting Professorship programme is also progressing. Several locations and possible lecturers are under consideration. The host countries may need funds for the accommodation of the visiting lecturers. Many countries, however, still prefer to have schools rather than professorships. Therefore, a Winter School is being planned in Bangkok for February 1990, organized by P. Phavanantha with the assistance of C. Gramaccioli, a Commission member. The themes will be mineralogy and natural products. In

addition, a school in Brazil organized by Y. M. Mascarenhas is under preliminary discussion.

Commission on Electron Diffraction

During the year, the Commission examined the feasibility of the proposal for a book on Electron Diffraction Techniques. Support for the proposal was sufficient to encourage the planning of a multi-author volume for publication in the IUCr/Oxford University Press series. The editor will be J. M. Cowley and a publication date in 1990 is anticipated. The emphasis will be on the experimental and interpretive techniques for high-energy electron diffraction in the transmission, convergent-beam and reflection modes, with brief sections on low-energy electron diffraction and gas electron diffraction.

It was proposed at the Commission meeting at the XIV Congress that a survey should be conducted of the computer programs now being used for the calculation of intensities for high-resolution electron-microscope images and electron diffraction patterns. D. Van Dyck, Antwerp, Belgium agreed to coordinate this project and will present proposals for discussion at the Symposium on Computer Simulation of Electron Microscope Diffraction and Images to be held at the Annual Meeting of the American Metallurgical Society in Las Vegas, March 1989.

The sections relating to electron diffraction in Volumes B and C of *International Tables for Crystallography* are now approaching completion and members of the Commission have continued to assist the editors and the technical editor with these sections.

Surveys of the Commission members and others have led to the formulation of proposals regarding the programme for the XV Congress.

Commission on Neutron Diffraction

Two issues of the Commission's newsletter were distributed in 1988. The first issue was edited by B. M. Powell and was devoted to 'The Industrial Applications of Neutron Diffraction'. There were contributions from 22 laboratories around the world and it was widely received. The second issue was edited by S. A. Mason and was devoted mostly to the instrumentation upgrade at Institut Laue-Langevin. Copies may be obtained either from the respective editors or from the Commission Chairman.

Two Summer Schools on neutron scattering were held in 1988; in June at Chalk River and in September at Oxford University. Both were well attended and attracted students from numerous countries. A brief summary of the schools activities is reported in the second newsletter.

Deliberations on the creation of a Commission on Synchrotron Radiation are under way by members of the joint subcommittee of this Commission and the Commission on Crystallographic Apparatus, who will make recommendations to the Executive Committee on the desirability of such a Commission.

That neutron scattering is alive and well was exemplified by the high attendance at the Neutron Scattering Conference in Grenoble in July 1988; approximately 450 scientists participated in a very active programme.

Preliminary plans are under way for the Satellite Meeting to the XV Congress in Bordeaux in July 1990.

Commission on Powder Diffraction

The Commission's first newsletter was prepared under the very able editorship of R. J. Hill and some 2000 copies were distributed. Under the excellent editorship of Professor Z. Bojarski, the second newsletter was prepared for printing and distribution early in 1989. Extracts of Newsletter No. 2 have been published in *Acta Cryst.* (1989). **A45**, FC19-FC23.

D. Louer was appointed a consultant to the Commission.

The location, the local organizing committee and the programme committee were selected and sponsorship was obtained for an International Workshop on the Rietveld Method to be held 13-15 June 1989 in Petten, the Netherlands, under the joint sponsorship of the Netherlands Energy Research Foundation (ECN) and the IUCr. The Chairman of the Local Committee is C. van Dijk. The Chairman of the Programme Committee is A. W. Hewat. A coherent programme is planned in which all oral presentations will be made by invited speakers. A generous number of contributed posters will be accepted. The IUCr has made funds available for young scientists wishing to attend. More than 200 persons responded to the first circular, which suggests that the workshop may not be able to accommodate all who wish to participate.

Preparatory work was done for a Satellite Meeting on Powder Diffraction, to be held 16-19 July 1990, just prior to the XV IUCr Congress. Toulouse was selected for the location with J. Galy Chairman of the Local Organizing Committee and D. Louer Chairman of the Programme Committee.

Preparatory work was undertaken, mostly by R. J. Hill, for a Round Robin on Rietveld Refinement. Both X-ray and neutron facilities are to be involved. A difficulty is being encountered in finding a source, or sources, of adequate quantities of sufficiently well characterized sample materials. It is hoped to start the project in 1989.

Some initial actions were taken toward realization of a Program Information Exchange Bank (or Centre) for computer programs useful to powder diffractionists.

The Commission will help organize a Summer School for Beginners with the Rietveld Method in August 1990 in Poland.

Commission on Small Molecules

Members of the Commission were involved in varying degrees in several meetings, workshops and symposia. These included a symposium on The Use of X-ray Crystal Structures and Databases in Drug Design at the meeting of the Medicinal Chemistry Division of the American Chemical Society in June, symposia on Computational Chemistry for Drugs and Macromolecules and on Novel Uses of Structural Databases at the meeting of the American Crystallographic Association in June/July, a symposium on Use of X-ray Crystallographic Data in Medicinal Chemistry at the X International Symposium on Medicinal Chemistry, a symposium on Molecular Recognition: Its Role in Chemistry and Biochemistry at Sopron, Hungary, in August, a workshop on Inorganic Databases held in connection with the European Crystallographic Meeting, at which there were also microsymbiosia on Structure Systematics of Organic Molecules and on Studies of Biologically Interesting Small Molecules, a meeting on

Computational Methods in Chemical Design: Molecular Modeling, Theory and Experiment at Schloss Elmau, Federal Republic of Germany, in October, and the IV Chinese National Symposium of Structural Chemistry, Fuzhou, People's Republic of China, in November.

The Commission has developed its programme to establish contacts between crystallographers lacking facilities for intensity data collection and crystallographers with such facilities and willing to collect data for those without these facilities. Data for at least 28 structures have been collected by 16 crystallographers. In most of these cases the structures have been solved and the results have been published or are in preparation for publication.

A business meeting of some members of the Commission was held on the occasion of the symposium on Molecular Recognition in Sopron. The main topics were future meetings, the appointment of consultants and the annual report of the work of the Commission.

One issue of the Commission's newsletter was distributed to 250 persons.

Ad interim Commission on Modulated Structures, Polytypes and Quasi-crystals

No report has been received from the Chairman of the Commission.

Sub-Committee on the Union Calendar

The Sub-Committee receives and considers requests for IUCr sponsorship and nominal financial support, and makes recommendations to the Executive Committee. Acting on the recommendations made by the Sub-Committee, during 1988 the Executive Committee approved sponsorship of the following schools and meetings, mostly with financial support:

1. Second International Conference on Biophysics & Synchrotron Radiation, Chester, England, 4–8 July 1988.
2. Workshop: Introduction to *International Tables for Crystallography*, Volume A, Vienna, Austria, 26–27 August 1988.
3. Meeting on the Crystal Structure and Chemistry of Ribonucleases, Moscow, USSR, 28 November–2 December 1988.
4. International Conference on the Use of X-ray Crystallography in the Design of Anti-viral Agents, Hawaii, USA, 6–8 February 1989.
5. International Workshop on the Rietveld Method, Petten, The Netherlands, 13–15 June 1989.
6. International Workshop on Accurate Crystal Structure Determination at High Pressure, Munich, Federal Republic of Germany, 24–25 July 1989.
7. Symposium on Organic Crystal Chemistry, Poznań, Poland, 14–17 August 1989.
8. Twelfth European Crystallographic Meeting, Moscow, USSR, 20–29 August 1989.
9. Ninth International Hydrogen Bond Conference, Utrecht, The Netherlands, 10–15 September 1989.
10. First International Conference on Epitaxial Crystal Growth, Budapest, Hungary, 1–7 April 1990.

Other meetings held in 1988 which received Union support before 1988 have been listed earlier in this Report.

The Executive Committee reaffirmed that specific attention be paid to publication in *Acta Cryst.* or *J. Appl. Cryst.*

of original papers presented in any meeting sponsored by the IUCr. Therefore the organizers of all IUCr-sponsored meetings are requested to recommend the journals of the IUCr as a suitable channel of publication for the original papers presented at the meeting. 43 papers presented at the International Conference on Applications and Techniques of Small-Angle Scattering, held at Argonne, 26–29 October 1987, were published in the December 1988 issue of *J. Appl. Cryst.* Vol. 21, pp. 582–885. If they intend to publish proceedings they should consider the *IUCr Crystallographic Symposia* series, which is published jointly by the IUCr and Oxford University Press.

Organizers of meetings wishing to seek IUCr sponsorship should submit applications at least six months in advance of the date of the meeting, writing to the Chairman of the Sub-Committee: Dr E. N. Maslen, Crystallography Centre, University of Western Australia, Nedlands 6009, Western Australia, Australia.

Applications for sponsorship of satellite meetings must be submitted through the Chairman of the Organizing Committee of the main meeting.

Representatives on Other Bodies

International Council for Scientific and Technical Information (ICSTI)

The International Council for Scientific and Technical Information (ICSTI) held its 1988 Council Meeting and associated technical meetings in Rennes, France, 15–19 May 1988. Overlapping of competing meetings of committees and groups has been a problem at meetings of ICSTI for several years. Careful scheduling by the Secretariat alleviated the situation somewhat on this occasion.

Numeric Data Group. The main current activity of the Group is the compilation of a Directory of Numeric Databases. Several of the crystallographic databases had not returned the Group's questionnaire, and A. J. C. Wilson was asked to send personal reminders to the six 'delinquents'. A further meeting of the group was held in Karlsruhe on 26 September 1988, by which time most of the six had replied.

Group on Education and User Needs. Attendance at the meeting of the group was good. R. Hsieh spoke on the educational programme of the US National Library of Medicine, and A. J. C. Wilson described the programme of the IUCr. Attention was drawn to a report 'Education and Training for Database Use in Japan' submitted by K. Kawano.

After a general discussion of these papers the Group considered its future programme, and decided to continue with two projects: collating educational material of general applicability prepared by ICSTI members, and planning a Technical Session on Education and User Needs at a future ICSTI meeting. Supplementation of the existing educational material might be undertaken if substantial gaps were found. Two projects originally proposed by the Group (Directory of Numeric Databases and User-Friendly Software) have been taken over by the Numeric Data Group.

Other Committees and Groups. Other committees and working groups met. Because of the overlapping of sessions,

the IUCr representative was able to attend only the Finance Committee, the Chemistry Working Group, and the Technical Activities Coordinating Committee. The latter is being reorganized, and it was decided to postpone any action on the Statutes and By-Laws until its future constitution had been settled.

Council. The Council met twice. The International Union of Pure and Applied Physics (IUPAP) was welcomed as a 'new' member in Class A. It had been a member of ICSTI's predecessor, the ICSU Abstracting Board, but had not agreed to automatic transfer to membership of ICSTI. Action on other applications was deferred until fuller information could be obtained.

Committee on Data for Science and Technology (CODATA) of the International Council of Scientific Unions

The 16th CODATA General Assembly was held in Karlsruhe, Federal Republic of Germany. It was attended by representatives of 19 countries and 20 international scientific Unions and organizations. Some of the most important items were the mutual information by reports of national and Union members, task groups and commissions. During the 11th International CODATA conference on 'Scientific and Technical Data in a New Era' about 220 participants presented and discussed 160 papers.

There is broad activity in almost all fields of science. Because databases form the basis for systematic studies on mutual relations between these fields the IUCr should watch the developments of databases for mineralogy, material properties, structural data, molecular biology, chemical analysis etc. CODATA is also the forum in which to discuss the necessity of meeting the requirements of computer programming in nomenclature and publication.

Further topics worthy of mention are the CODATA Referral Database which will be a current guide to all databases (e.g. about 800 in biology) (Chairman: D. G. Watson); a new CODATA task group on artificial intelligence and computer graphics (Chairman: J. E. Dubois); the start of a chemical information network by Unesco; and the activity of the CODATA European Commission which promotes several projects in information technology.

Committee on Space Research (COSPAR) of the International Council of Scientific Unions

The Second Symposium on Materials Science in Space was held in the framework of the COSPAR meeting in Helsinki and was organized by the IUCr representative. Since the first one, held in 1976, the scientific level of microgravity research has increased tremendously, for at least three reasons: strict refereeing of the submitted proposals; appreciable, if not yet adequate, funding for ground-based research by some national space agencies; and the possibility of using specially designed hardware for experimentation in space. Even with the small number of hours of experimentation under microgravity up to now many interesting results have been obtained. The nature of these first investigations had to be exploratory so that scientifically (and to some degree also industrially) interesting areas could be identified. Many interesting results were presented at the Helsinki Symposium.

Following on from these exploratory investigations, the second generation of experiments must use much more sophisticated equipment, to make in-depth scientific investigations of materials under microgravity conditions. This requires that the scientifically important parts of the equipment are developed and tested in the laboratory and then the flight models are designed and developed by industry, in strong collaboration with the scientists. Several such ground-based projects are or soon will be at the flight-hardware-construction stage. For several years to come, the main problem for microgravity research will be the lack of possibilities for experimentation in space.

Committee on the Teaching of Science (CTS) of the International Council of Scientific Unions

The CTS had no formal meeting in 1988. Nevertheless there were many activities going on, most of them suffering more from lack of money than from enthusiastic cooperation. Most of the activities of the CTS are aimed at the teaching of science in developing countries. A major task is the development and maintenance of low-cost equipment. The training of technicians is another important permanent activity of the CTS, as well as the teaching of science at the primary level, including the education in science and mathematics of future elementary school teachers throughout the world.

The CTS is also setting up activities as part of the Global Change Programme of ICSU.

The pilot project of Unesco on the use of microcomputers for crystallographic applications has been finalized. Unesco also expressed interest in university science teaching but has restricted this for the time being to the basic disciplines, such as chemistry and physics. Crystallography may be added later.

Committee on Science and Technology in Developing Countries (COSTED) of the International Council of Scientific Unions

COSTED contributed US\$2000 towards the travel costs of participants at the Tianjin Summer School (see the report on the Commission on Crystallographic Teaching).

The IUCr representative received no communications from COSTED during 1988.

Interdivisional Committee on Nomenclature and Standards (IDCNS) of the International Union of Pure and Applied Chemistry

All nomenclature and standards recommendations initiated by IUPAC divisional committees or commissions are required to be submitted to IDCNS for review. The IUCr representative receives a copy of each provisional recommendation of this sort and comments on it, following consultation, in appropriate cases such as the proposed 'Definition of Terms Relating to Crystalline Polymers'. An important principle noted by IDCNS is that no rule in science should be regarded as sacrosanct, and that those who draft new recommendations are free to transgress any rule if two conditions are met: (1) they must be aware of the former rule and quote it; (2) full rationale must be given for the new or modified proposed rule or usage. Among

IDCNS publications in 1988 of interest to crystallographers is the revised 'Nomenclature of Inorganic Chemistry', the IUPAC 'Red Book'. Revised editions of the 'Blue Book' (Organic Chemistry) and 'Green Book' (Physical Chemistry) were completed during the year.

Valuable comments on provisional recommendations by committees of the IUCr Commission on Crystallographic Nomenclature are in turn provided by IDCNS. The IUCr was represented at the annual meeting of IDCNS in Oxford, 9-10 September 1988.

Commission on the Structure and Dynamics of Condensed Matter of the International Union of Pure and Applied Physics

The main activity of this Commission is to give preliminary examination to applications for sponsorship by IUPAP of conferences within its field of interest, and to make appropriate recommendations to IUPAP. The work is done by correspondence.

Advisory Committee on Conferences of the European Physical Society

The Committee met on 21 March in Dresden, German Democratic Republic. Several members expressed concern at the low impact of the European Physical Society (EPS) on industry, and the wide disparity between research and industry. It was suggested that this gap might be bridged by well organized workshops on suitable topics.

Evaluation of the 7th EPS General Conference, held in 1987, concluded that the many parallel sessions diminished their usefulness but no solution was evident if the wide spectrum of interests of physicists are to be given coverage.

The Committee considered the long list of meetings seeking EPS sponsorship, and noted with regret the proliferation of overlapping meetings. The only way to reduce the number of meetings was to withhold sponsorship but, since this did not include any financial support, this was not considered to be a realistic deterrent.

The IUCr representative, A. Kálmán, also attended a meeting of the Condensed Matter Division of the EPS on 12 December in Pisa, Italy. He drew the Committee's attention to the activities of those IUCr Commissions of particular relevance to the interests of the Division and requested that all members inform the IUCr Executive Secretary of meetings for announcement on the Forthcoming Meetings section of the *Journal of Applied Crystallography*.

International Organization of Crystal Growth (IOCG)

The main activity of the IOCG during 1988 was on the organization of the International Conference on Crystal Growth (ICCG-9) and the International Summer School on Crystal Growth (ISSCG-7) to be held in Japan in 1989. ICCG-9 will be held 20-25 August 1989 at Sendai. During this conference, the General Assembly of the IOCG will take place. The agenda will include the election of officers and a discussion on ICCG-10, which is planned in the USA in 1992, and ICCG-11, for which the IOCG is asking for nominations in Europe in 1995. ISSCG-7 will take place soon after ICCG-9, at Yamagata, 27-31 August 1989. It will be directed by H. Komatsu, who is also a member of

the IUCr Commission on Crystal Growth and Characterization of Materials.

During 1988 three national associations joined the IOCG, bringing the number of national organizations affiliated to the IOCG to fifteen. The new national associations belong to the German Democratic Republic (Crystal Growth Section of the Association of Crystallography), Spain (Spanish Group of Crystal Growth) and Hungary (a branch of the Physical Society).

Joint Committee on Powder Diffraction Standards-International Centre for Diffraction Data (JCPDS-ICDD)

The JCPDS-ICDD operates a substantial programme of grants which directly generates powder diffraction patterns deemed wanted but not otherwise available. This programme is very international in scope and is not small. In early 1988, there were 28 currently active grants in 9 countries. The grant amounts ranged from \$3000 to \$60 000 per year with a total budget in 1988 of \$450 000. Anyone may apply. There are four types of grants, including one intended to support non-pattern-producing projects which nevertheless advance the quality of the Powder Diffraction File (PDF) or improve retrieval techniques. For more information about the programme and how to apply, write to Mr J. Messick, General Manager, JCPDS-ICDD, 1601 Park Lane, Swarthmore, PA 19081, USA.

There is a constant emphasis on improvement of pattern quality, on improvement of search-match and other retrieval techniques, and on expansion of the file both in number of patterns and in amount of related information encoded with each pattern. There are currently some 48 000 patterns in the file. When a manuscript containing powder-pattern data is accepted by an IUCr journal, the powder data are normally then sent to the JCPDS where they are put on a 'fast track' to get into the PDF. CD ROM technology is found to be highly suited to this information storage and retrieval task.

At the March 1988 meeting the Diffraction Problems Subcommittee reported on a well advanced project to test instrumental profile breadth and samples needed to reveal it, i.e. samples with intrinsic reflection profile breadths much less than the instrumental profile breadth. This search had covered Al_2O_3 , SiO_2 , Si, and several other candidates. The best one yet found is LaB_6 (now available from the Standard Reference Materials programme of the US National Institute of Standards and Technology - formerly the National Bureau of Standards).

The JCPDS-ICDD put on at least four short courses each year on phase identification methods with powder patterns. The courses usually last three days. One important part of each short course is instruction on how to take optimum advantage of the Powder Diffraction File. Five such courses were scheduled for 1988, of which four were held in Europe.

The JCPDS-ICDD publish the journal *Powder Diffraction*. The Editors of it and the Editors of the *Journal of Applied Crystallography* attempt to exchange, or transfer, manuscripts submitted to one journal which might better belong in the other. The IUCr representative would be glad to receive any comments about the success of this programme which, as far as he knows, is working well.

Asian Crystallographic Association (AsCA)

The primary function of the Asian Crystallographic Association, in the early years of its development, is to communicate information of research activities in the region. In 1988 two AsCA Newsletters were distributed to crystallographers in the region; one in January and one in July. These contained details of meetings and research activities in the area during the preceding six months, and a summary of crystallographic news from North America and Europe. For many members of AsCA, especially for those in countries without national societies, these newsletters represent an important source of general crystallographic news.

Some consideration was given to carrying out a survey of diffraction equipment in the region during 1988/89 but it was decided that this would be ineffective without a very carefully prepared questionnaire. The preparation of this questionnaire will be one of the topics of discussion for the AsCA Executive at the XV IUCr Congress.

European Crystallographic Committee

The Eleventh European Crystallographic Meeting was held in Vienna, Austria, 28 August–2 September, 1988. This successful meeting was attended by about 780 active and 160 accompanying participants from 35 countries, which is the largest attendance since ECM-4 in Oxford in 1977.

During ECM-11, a meeting of the European Crystallographic Committee was held on 31 August. This meeting considered the progress of ECM-11 thus far and reviewed plans for ECM-12 in Moscow (20–29 August 1989). ECM-13 will be held in Ljubljana, Yugoslavia, 25–30 August 1991. Those in 1992 and 1994 will be held in Twente, The Netherlands and in Leipzig, German Democratic Republic, respectively.

International Council of Scientific Unions

The 22nd General Assembly of ICSU took place 11–16 September 1988 in Beijing, People's Republic of China, with the General Committee meeting immediately before and after. These meetings were the last ones to be organized by the ICSU Executive Secretary, Mr F. W. G. Baker, who will retire in April 1989 after more than 30 years with ICSU.

Currently there are hardly any fundamental or far-reaching activities of ICSU to which the IUCr can usefully contribute. As in the past, ICSU places emphasis on science in developing countries but their projects are not relevant to crystallography. The lectureship programme, a joint venture between ICSU and the Third World Academy of Science, is proceeding very slowly. There will be a second Ringberg-type conference with the title 'International Science and its Partners'. The problems of the free circulation of scientists led to lengthy and heated debates, with little real progress. It seems that the IUCr and IUPAC are among the strongest supporters of the free circulation principle; other scientific unions and national representatives adopt softer attitudes. The new President of ICSU is Professor M. G. K. Menon, from India.

Finances

The audited accounts for the year 1988 are given at the end of this Report. For comparison, the figures for 1987 are

provided in *italics*. The accounts are presented in Swiss Francs.

The Unesco rates of exchange, as issued by the ICSU Secretariat, have been used in the preparation of these accounts. As a consequence of the many fluctuations in exchange rates during the year, the following procedure has been adopted for the accounts. Assets and liabilities in currencies other than Swiss Francs at 31 December 1988 have been translated into Swiss Francs in the balance sheet at the rate operative at that date. For the income and expenditure accounts, transactions have been translated into Swiss Francs by applying the rates of exchange appropriate to the individual dates of these transactions. As a consequence of the fluctuations in exchange rates, a gain has arisen on the assets of the Union, in terms of Swiss Francs, amounting to SwFr 251 319. This gain has been divided amongst the Fund Accounts in direct proportion to the balances on these accounts at 31 December 1988. It should be noted that this gain in Swiss Francs is not a real gain of money, but rather a gain on paper resulting from the accounts being expressed in Swiss Francs. It should also be noted that the gain in 1988 is comparable with the loss of SwFr 223 540 suffered in 1987.

As on previous balance sheets, the investments have been valued according to their quotations at the end of the year. Their appreciation in value, together amounting to SwFr 77 579, has not been entered in the General Fund but has been included in the assets on the balance sheet, to avoid annual fluctuations in value influencing the General Fund account. At the end of 1988 the Union held investments of £555 504 and US\$1 212 270 in bonds.

The total of SwFr 1 393 153 with the banks at the end of the year was represented by Dfl 75 653 and US\$258 with the Amsterdam–Rotterdam Bank, US\$10 908 with the National Westminster Bank USA, US\$140 732 with Merrill Lynch, £189 987 with the National Westminster Bank and SwFr 51 078 with the Union Bank of Switzerland.

The balance sheet shows that the assets of the Union, excluding stocks of unsold publications but including the gain of SwFr 251 319 resulting from fluctuations in rates of exchange, have increased during the year, from SwFr 4 011 504 to SwFr 4 491 458.

No new fund accounts were established in 1988. Transfers of SwFr 60 000 and SwFr 15 000 were made to the Publications and Journals Development Fund from the *Acta Crystallographica* Fund and the *Journal of Applied Crystallography* Fund, respectively, and a transfer of SwFr 60 000 was made to the Research and Education Fund from the *Acta Crystallographica* Fund.

Beneath the detailed figures of the expenditure and income for each fund account, the balance at 1 January, the difference between income and expenditure for the year and the fluctuations in rates of exchange during the year are given, showing how the balance at 31 December is obtained.

The General Fund account shows a surplus of SwFr 123 784, as compared with a surplus of SwFr 27 831 in 1987 before the transfer of SwFr 62 000 to the Ewald Fund. The administrative expenses were SwFr 214 911 in 1988 as compared with SwFr 182 953 in 1987. Of this amount, SwFr 65 030 was charged to the publications of the Union. The significant increase in the expenses of the Executive Secretary's office results mainly from the purchase of an Apple Macintosh computer and peripherals.

SwFr 36 500 was spent on supporting scientific meetings, SwFr 7 531 was required for expenses of non-publishing Commissions and SwFr 4 868 for travel expenses of Union representatives on other bodies. The cost of the two Finance Committee meetings held in 1988 was SwFr 21 588, whilst the Executive Committee meeting cost SwFr 33 251. The Union received SwFr 14 333 from the Unesco subvention to ICSU. The subscriptions from Adhering Bodies were SwFr 133 500. Interest on bank accounts and investments credited to the General Fund was SwFr 241 884.

The President's Fund account received no donations and no grants were paid from the fund.

The *Acta Crystallographica* account for 1988 shows a surplus of SwFr 239 829 before the transfer of SwFr 120 000 to other fund accounts, as compared with a surplus of SwFr 348 171 in 1987 before similar transfers of SwFr 200 000.

The subscription rates were maintained unchanged from 1987 and have now been unchanged since 1984. More pages were published in 1988 than in 1987 and the costs per page have hardly increased, when expressed in Swiss Francs, because of falls in the value of the Pound Sterling and the US Dollar as compared with the Swiss Franc. In 1987 and 1986 the costs per page were actually less than for the previous year but, of course, this cannot always be the case.

The number of paid subscriptions to all sections of *Acta*, including 121 personal subscriptions in 1987 and 113 in 1988, decreased from 1 144 in 1987 to 1 113 in 1988. However, the number of paid subscriptions to the separate sections of the journal increased from 237, 146 and 124 in 1987 to 244, 163 and 125 in 1988 for Sections A, B and C, respectively. As usual, the cost of the technical editing office has been divided between the *Acta Crystallographica* and the *Journal of Applied Crystallography* accounts in percentages based on the number of text pages published during the year, namely 80 and 20% respectively for 1988. For 1987 the percentages were 88 and 12%. The technical editing costs for *Acta Crystallographica* were SwFr 277 820, excluding the costs of office refurbishment, as compared with SwFr 270 873 in 1987. The journal's accounts have also been charged with administrative expenses as in previous years and as shown in the General Fund.

The *Journal of Applied Crystallography* account shows a surplus of SwFr 11 637 before the transfer of SwFr 15 000 to the Publications and Journals Development Fund, as compared with a surplus of SwFr 105 339 in 1987 before transfers of SwFr 50 000 to other accounts. The number of pages published in 1988 was almost twice that in normal years; 996 pages compared with 538 pages in 1987. This was the result of publishing in the December issue the proceedings of the International Conference on Applications and Techniques of Small-Angle Scattering, Argonne, USA, 26–29 October 1987. The number of subscriptions, including 106 personal subscriptions in 1987 and 107 in 1988, decreased from 1 044 in 1987 to 1 026 in 1988.

The *Structure Reports* account shows a deficit of SwFr 34 575 as compared with SwFr 5 941 in 1987. Sales were comparable with 1987, with only two A Series volumes

being published. Editorial expenses were nearly twice those of 1987 but the level of these expenses does fluctuate from year to year. Publishing and editorial expenses in 1988 were SwFr 23 261 and SwFr 61 619 respectively, as compared with SwFr 23 081 and SwFr 32 672 in 1987. The net income from sales was SwFr 50 305 in 1988 as compared with SwFr 49 812 in 1987. Much higher sales are expected in 1989 when one or two B Series volumes are scheduled for publication, as well as two A Series volumes.

The *International Tables* account shows a surplus of SwFr 33 706, as compared with a surplus of SwFr 3 958 in 1987, because of lower publication expenses and higher sales. Editorial expenses were SwFr 25 448. The net income from sales of SwFr 91 641 derived mostly from the sale of 455 copies of Volume A, but 591 copies of the Teaching Edition of Volume A were also sold.

The Book Fund includes the sales of the remaining publications of the Union. SwFr 3 352 was received from the sales of *Escher Kaleidozyklen*, the remaindered stock of which was purchased by the Union in 1988. SwFr 4 986 was received from the sale of *Crystallographic Databases*, compiled by the Commission on Crystallographic Data and published in 1987. This publication has proved to be extremely popular. SwFr 110 was received from the sales of nine copies of *Fifty Years of X-ray Diffraction*. SwFr 342 was received from the sale of 23 copies of *Symmetry Aspects of M. C. Escher's Periodic Drawings*, as well as SwFr 593 royalties for the Japanese edition of this book. SwFr 86 was received from the sale of *Early Papers on Diffraction of X-rays by Crystals*. SwFr 187 was received from the sale of four copies of *Fifty Years of Electron Diffraction*. SwFr 910 was received from the sale of 26 copies of the Seventh Edition of the *World Directory of Crystallographers*, which was published in 1986. Sales of sundry publications yielded SwFr 133.

As usual, the *Molecular Structures and Dimensions* account shows no surplus, because this account was charged with a contribution (SwFr 305) towards the publication costs of Volume 15, the last volume to be published. Because no volume has been published since 1984, the sales income has fallen even lower than in previous years, being SwFr 1 100 as compared with SwFr 3 966 in 1987.

The income for the Publications and Journals Development Fund account and for the Research and Education Fund account came entirely from transfers from other fund accounts. The expenses of SwFr 98 267 in the former account for computer expenses, including the purchase of a new computer for the Chester office, all relate to the technical editing of the journals. For the latter account the main expense was SwFr 74 189 for financial support to young scientists, to enable them to attend scientific meetings sponsored by the Union.

The only expense for the Ewald Fund in 1988 was the final payment for the stock of Ewald medals. The remaining bequest from the Ewald family was received and the fund was credited with interest at a nominal rate of 8% on the balance in the fund during the year, as decided by the Executive Committee in 1986. The balance in the fund at 31 December 1988 was SwFr 196 224.

International Union of Crystallography

Balance Sheet as at 31 December 1988

	Swiss Francs		1987		1988		1987	
	As at 1 January 1988	Fluctuations in rates of exchange (Note 2)	Excess of income over expenditure for the year	Balance at 31 December 1988	CURRENT ASSETS			
FUND ACCOUNTS					Cash at banks			
General Fund	726,428	50,393	123,784	900,605	Current accounts	68,268	118,228	
President's Fund	15,137	897	—	16,034	Deposit and savings accounts	1,324,885	1,413,210	1,531,438
<i>Acta Crystallographica</i>	1,634,964	104,009	119,829	1,858,802				
<i>Journal of Applied</i>					Cash with Union officials	8,660		4,097
<i>Crystallography</i>	364,612	21,412	-3,363	382,661	Debtors, accrued income and	121,310		117,690
<i>Structure Reports</i>	99,002	3,819	-34,575	68,246	payments in advance			
<i>International Tables</i>	170,896	12,127	33,706	216,729	Subscriptions from Adhering	6,025		8,695
Book Fund	8,170	618	2,265	11,053	Bodies, due for 1988			
<i>Molecular Structures</i>						1,529,148		1,661,920
<i>and Dimensions</i>	5,552	329	—	5,881	<i>Deduct</i> Creditors, accrued			
Publications and					charges and income received			
Journals					in advance	232,610		123,229
Development Fund	489,170	27,615	-23,267	493,518		1,296,538		1,538,691
Research and	336,867	19,120	-14,282	341,705	NET CURRENT ASSETS			
Education Fund	160,706	10,980	24,538	196,224	INVESTMENTS (Note 4)			
Ewald Fund					At market value	3,254,803	2,477,752	
					Change in value	-77,579	-23,248	
	4,011,504	251,319	228,635	4,491,458				2,454,504
					At cost	3,177,224		
					FIXED ASSETS			
					Office equipment at cost,			
					less depreciation	17,696		18,309
						4,491,458		4,011,504

Report of the Auditors to the International Union of Crystallography

We have audited the financial statements on pages 752-764 in accordance with approved Auditing Standards.

We have not been requested by the Union to consider the requirements of Swiss Company Law as regards these financial statements.

In our opinion, the financial statements give a true and fair view of the state of affairs of the Union at 31 December 1988 and of its excess of income over expenditure and source and application of funds for the year then ended.

2 May 1989 Manchester, England

Signed: TOUCHE ROSS & CO

Chartered Accountants

General Fund Account for the year ended 31 December 1988

	Swiss Francs		1987		1988		1987		1988		1987	
	1988		1988		1987		1987		1988		1987	
Subscriptions to ICSU and ICSU bodies												
Administration expenses:												
General Secretary and Treasurer: honorarium and secretarial assistance	5,740		4,010		11,374		4,238		3,000			
Audit and accountancy charges	18,430				15,441				14,333			8,814
Legal and professional fees	5,764				4,104				133,500			131,720
Postage and sundries	2,417				2,944				136,199			88,749
Travelling expenses	3,225				3,555				105,685			101,014
Bank charges	1,931				3,006							
Executive Secretary's office: Salaries and expenses	176,066				140,481				48,176		41,164	
Office refurbishment	—				1,059				16,059		13,721	
Depreciation of office equipment	1,338		214,911		989		182,953		795		735	55,620
Thirteenth General Assembly and Congress:												
Publication of Report			—				7,137					
Fourteenth General Assembly and Congress:												
Finance Committee expenses	—				7,102							
Programme Committee	—				—							
Executive Committee	—				42,749							
Travel grants	—				59,655							
Travel grants to Commissions	—		—		22,088		131,594					
Meeting of the Executive Committee												
Finance Committee expenses	33,251						—					
Travel Expenses of IUCr	21,588						9,753					
Representatives on other bodies												
Working Party on Crystallographic Information	4,868						3,658					
Commission expenses	1,530						—					
Sponsorship of meetings	7,531						851					
Loss on disposal/redemption of investments	36,500						16,642					
Logo competition	7,034						1,260					
Transfer to other Funds:	2,740						—					
Ewald Fund	—						62,000					
Excess of income over expenditure			123,784				—					34,169
Excess of income over expenditure carried to balance sheet			457,747				420,086					420,086
Excess of expenditure over income carried to balance sheet												

Figures showing how the balance at 31 December is obtained are given on the following page.

Calculation of the balance of the General Fund Account at 31 December 1988

	1988	1987
Balance at 1 January	726,428	801,077
Difference between income and expenditure	123,784	-34,169
Fluctuations in rates of exchange	50,393	-40,480
Balance at 31 December	<u>900,605</u>	<u>726,428</u>

President's Fund Account for the year ended 31 December 1988

	Swiss Francs		Donations received	
	1988	1987	1988	1987
Grants	—	—	—	408
Excess of income over expenditure carried to balance sheet	—	408	—	—
	<u>—</u>	<u>408</u>	<u>—</u>	<u>408</u>
Balance at 1 January	15,137	15,573		
Difference between income and expenditure	—	408		
Fluctuations in rates of exchange	897	-844		
Balance at 31 December	<u>16,034</u>	<u>15,137</u>		

***Acta Crystallographica* Account for the year ended 31 December 1988**

	Swiss Francs			Swiss Francs	
	1988	1987		1988	1987
Publication expenses:			Subscriptions to Volume 44 (1987 Volume 43)	1,309,567	1,396,249
Printing and binding Volume 44 (1987 Volume 43)	473,815	479,154	Sale of back numbers and single copies	38,398	24,159
Distribution and postage	96,150	67,625	Airfreight charged to subscribers	36,998	37,419
Airfreight costs	20,020	19,100	Royalties and copyright fees	—	1,328
Net loss on reprints	589,985	565,879		1,384,963	1,459,155
Printing <i>Acta</i> Supplement to Volume A43	11,538	18,414	Less Publisher's commission on sales	94,341	99,429
Printing Index to Volume 43	—	17,813	Income from advertisements (net)	3,500	379
Printing Index to Volume 42	15,165	—			
Microfiche back volumes	24,843	17,261			
Editorial expenses:					
Editorial honoraria	33,157	27,794			
Secretarial assistance	18,854	11,003			
Postage and sundries	29,691	19,770			
Commission meeting	—	14,673			
Technical Editing:					
Salaries and expenses	266,725	261,017			
Computer expenses	11,095	9,856			
Office refurbishment	—	2,795			
Depreciation of office equipment	5,064	4,495			
Administration expenses					
Transfers to other Funds:					
Publications and Journals					
Development Fund	60,000	120,000			
Research and Education Fund	60,000	80,000			
Excess of income over expenditure carried to balance sheet					
	119,829	148,171			
	1,294,122	1,360,105		1,294,122	1,360,105
Balance at 1 January	1,634,964	1,577,901			
Difference between income and expenditure	119,829	148,171			
Fluctuations in rates of exchange	104,009	-91,108			
Balance at 31 December	1,858,802	1,634,964			

Journal of Applied Crystallography Account for the year ended 31 December 1988

	Swiss Francs	
	1988	1987
Publication expenses:		
Printing and binding Volume 21 (1987 Volume 20)	127,562	77,160
Distribution and postage	12,322	8,996
Airfreight costs	5,015	3,985
	<u>144,899</u>	<u>90,141</u>
Net loss on reprints	7,542	2,745
Microfiche back volumes	2,760	—
	<u>155,201</u>	<u>92,886</u>
Editorial expenses:		
Editorial honoraria	7,022	5,513
Secretarial assistance	1,602	1,367
Postage and sundries	4,235	5,433
Commission meeting	—	9,562
Technical Editing:		
Salaries and expenses	66,681	35,593
Computer expenses	2,774	1,343
Office refurbishment	—	381
Depreciation of office equipment	1,266	601
	<u>83,580</u>	<u>59,793</u>
Administration expenses	16,059	13,721
Transfers to other Funds:		
Publications and Journals	—	—
Development Fund	15,000	30,000
Research and Education Fund	—	20,000
	<u>15,000</u>	<u>50,000</u>
Excess of income over expenditure carried to balance sheet	—	55,339
	<u>269,840</u>	<u>271,739</u>
Balance at 1 January	364,612	329,591
Difference between income and expenditure	-3,363	55,339
Fluctuations in rates of exchange	21,412	-20,318
	<u>382,661</u>	<u>364,612</u>
Balance at 31 December		

	Swiss Francs	
	1988	1987
Subscriptions to Volume 21 (1987 Volume 20)	255,501	273,603
Sale of back numbers and single copies	12,989	11,368
Airfreight charged to subscribers	5,526	5,697
Royalties and copyright fees	—	573
	<u>274,016</u>	<u>291,241</u>
Less Publisher's commission on sales	18,339	19,932
	<u>255,677</u>	<u>271,309</u>
Income from advertisements (net)	—	430
Contribution toward cost of printing Conference Proceedings	10,800	—
	<u>3,363</u>	<u>271,739</u>
Excess of expenditure over income carried to balance sheet		
	<u>269,840</u>	<u>271,739</u>

Structure Reports Account for the year ended 31 December 1988

	Swiss Francs	
	1988	1987
Publication expenses:		
Printing and binding		
Volumes 50A and 53A	14,761	16,619
(1987 Volume 51A and 52A)	8,500	6,462
Typing of manuscripts		23,081
Editorial expenses:		
Editorial honoraria	61,318	30,304
Travel and sundry expenses	301	2,368
	84,880	55,753
Balance at 1 January	99,002	110,460
Difference between income and expenditure	-34,575	-5,941
Fluctuations in rates of exchange	3,819	-5,517
Balance at 31 December	68,246	99,002

	Swiss Francs	
	1988	1987
Sale of copies		
Volume 50A and 53A	57,387	41,762
(1987 Volume 51A)	12,123	25,549
Earlier volumes and indexes	69,510	67,311
Less Publisher's commission on sales	19,205	17,499
Excess of expenditure over income carried to balance sheet	34,575	5,941
	84,880	55,753

Book Fund Account for the year ended 31 December 1988

	Swiss Francs	
	1988	1987
Publication Expenses:		
<i>Escher Kaleidozyklen</i>	9,173	—
<i>Crystallographic Databases</i>	1,236	5,795
Book series expenses	86	—
<i>Excess of income over expenditure</i>	2,265	—
<i>carried to balance sheet</i>		
	<u>12,760</u>	<u>5,795</u>
Balance at 1 January	8,170	11,440
Difference between income and expenditure	2,265	-2,815
Fluctuations in rates of exchange	618	-455
Balance at 31 December	<u>11,053</u>	<u>8,170</u>

	Swiss Francs	
	1988	1987
Sale of copies, net of		
Publisher's commission on sales		
<i>Escher Kaleidozyklen</i>	3,352	—
<i>Crystallographic Databases</i>	4,986	648
<i>Fifty Years of X-ray Diffraction</i>	110	103
<i>Escher Drawings</i>	342	164
<i>Early Papers</i>	86	163
<i>Fifty Years of Electron Diffraction</i>	187	373
<i>World Directory of Crystallographers,</i>		
7th Edition	910	1,234
Sundry Publications	133	18
Royalties		
<i>Escher Drawings</i>	593	277
Book series - IUCr		
<i>Crystallographic Symposia</i>	2,061	—
<i>Excess of expenditure over income</i>		
<i>carried to balance sheet</i>		
	<u>12,760</u>	<u>2,815</u>
	<u>12,760</u>	<u>5,795</u>

Molecular Structures and Dimensions Account for the year ended 31 December 1988

	1988	Swiss Francs	1987	1988	Swiss Francs	1987
Publication expenses:						
Salaries		305	3,231	1,487	5,360	
Administration expenses		795	735			
<i>Excess of income over expenditure for the year:</i>				387	1,100	3,966
University of Cambridge	—	—	—			
IUCr carried to balance sheet	—	—	—			
		<u>1,100</u>	<u>3,966</u>		<u>1,100</u>	<u>3,966</u>
Balance at 1 January		5,552	5,861			
Difference between income and expenditure		—	—			
Fluctuations in rates of exchange		329	-309			
Balance at 31 December		<u>5,881</u>	<u>5,552</u>			

Publications and Journals Development Fund Account for the year ended 31 December 1988

	1988	Swiss Francs	1987	1988	Swiss Francs	1987
Expenses:						
Compuscripts		—	—			
Communication with databases		—	222			
Computer expenses:						
Purchase of computer equipment and software	88,126	—	—			
Programming and development	10,141	98,267	—			
<i>Excess of income over expenditure carried to balance sheet</i>		—	149,778			
		<u>98,267</u>	<u>150,000</u>		<u>98,267</u>	<u>150,000</u>
Balance at 1 January		489,170	366,651			
Difference between income and expenditure		-23,267	149,778			
Fluctuations in rates of exchange		27,615	-27,259			
Balance at 31 December		<u>493,518</u>	<u>489,170</u>			

Transfers from other funds:
Acta Crystallographica
Journal of Applied Crystallography
Excess of expenditure over income
carried to balance sheet

1988 60,000 120,000
 15,000 30,000
 23,267 —

Research and Education Fund Account for the year ended 31 December 1988

	Swiss Francs			Swiss Francs	
	1988	1987		1988	1987
Expenses:			Transfers from other Funds:		
History of the Union	93	1,149	<i>Acta Crystallographica</i>	60,000	80,000
Young Scientists' Support	74,189	35,212	<i>Journal of Applied Crystallography</i>	—	20,000
			<i>Excess of expenditure over income</i>	14,282	—
<i>Excess of income over expenditure</i>			<i>carried to balance sheet</i>		
<i>carried to balance sheet</i>				<u>74,282</u>	<u>100,000</u>
Balance at 1 January	336,867	292,000			
Difference between income and expenditure	-14,282	63,639			
Fluctuations in rates of exchange	19,120	-18,772			
Balance at 31 December	<u>341,705</u>	<u>336,867</u>			

Ewald Fund Account for the year ended 31 December 1988

	Swiss Francs			Swiss Francs	
	1988	1987		1988	1987
Prize	—	28,701	Bequest and donation	13,900	17,288
Cost of medals	2,912	12,514	Interest	13,550	14,506
Administration and expenses	—	3,802	Transfers from other funds:	—	62,000
<i>Excess of income over expenditure</i>	24,538	48,777	General Fund		
<i>carried to balance sheet</i>				<u>27,450</u>	<u>93,794</u>
Balance at 1 January	160,706	120,884			
Difference between income and expenditure	24,538	48,777			
Fluctuations in rates of exchange	10,980	-8,955			
Balance at 31 December	<u>196,224</u>	<u>160,706</u>			

**Statement of Source and Application of Funds
Year ended 31 December 1988**

	Swiss Francs	
	1988	1987
Source of funds		
Excess of income over expenditure for the year	228,635	427,145
Fluctuations in rates of exchange	251,319	-223,540
	<hr/> 479,954	<hr/> 203,605
Adjustment for items not involving the movement of funds:		
Depreciation	7,669	6,084
Fluctuations in rates of exchange on office equipment and investments	-131,667	128,511
Loss on sale/redemption of investments	7,034	—
	<hr/> 362,990	<hr/> 338,200
Total generated from operations	362,990	338,200
Decrease in debtors and accrued income (including subscriptions)	—	223,261
Increase in creditors, accrued charges and income received in advance	109,381	—
Proceeds of sale/redemption of investments	2,214,935	69,259
	<hr/> 2,687,306	<hr/> 630,720
Application of funds		
Increase in debtors and accrued income (including subscriptions)	-950	—
Decrease in creditors, accrued charges and income received in advance	—	-16,356
Purchase of office equipment	-5,555	-15,368
Purchase of investments	-2,814,523	-970,407
	<hr/> -133,722	<hr/> -371,411
Movement in net liquid funds	-133,722	-371,411
Net liquid funds include cash at banks and with Union officials.		

Notes to the Financial Statements

1. Accounting Policies

(a) Accounting convention

The financial statements are prepared under the historical cost convention.

(b) Rates of exchange

Unesco rates of exchange as issued by the ICSU Secretariat are used in the preparation of the financial statements.

Assets and liabilities held in currencies other than Swiss Francs at the balance sheet date are translated into Swiss Francs at the rates operative on that date.

In each of the income and expenditure accounts, transactions in currencies other than Swiss Francs are translated by applying the rates of exchange appropriate to the individual dates of the transactions.

Profits and losses arising from the fluctuations in rates of exchange during the year are divided between the fund accounts with credit balances in direct proportion to those balances at the closing balance sheet date.

(c) Publication costs

Publication, editorial and administrative expenses of publications are charged in the appropriate income and expenditure account as and when incurred.

(d) Stocks of unsold copies of Union publications

Stocks of unsold copies of publications are not valued for accounting purposes.

(e) Expenditure on premises

Expenditure on renovation and refurbishing is charged against the appropriate income and expenditure accounts in the year in which it is incurred.

(f) Depreciation

(i) Office equipment is depreciated on the straight line basis at a rate of 20% per annum.

(ii) Office computer equipment is fully depreciated in the year of purchase.

2. Rates of exchange

The assets of the Union are recorded in the financial statements in Swiss Francs but are held in currencies which are considered to be appropriate to the Union's requirements. It therefore follows that the effect of fluctuations in exchange rates will normally only arise at the year end when the figures are reported in Swiss Francs.

The rates of exchange operative at the balance sheet date compared with the Swiss Franc were as follows:

	1988	1987
Netherland Guilders	1.3541	1.3750
Danish Crowns	4.6111	4.7059
Pounds Sterling	0.3771	0.4080
US Dollars	0.6944	0.7353
European Currency Unit (ECU)	0.5990	0.6891
Australian Dollars	N/A	1.0661

The total assets of the Union at 1 January 1988 (SwFr 4,011,504) would have had the value of US \$2,949,659 or £1,636,694 if expressed in those currencies. At 31 December 1988 these assets (SwFr 4,491,458) would have had the value of US \$3,118,868 or £1,693,729

respectively, being an increase of US \$169,209 or £57,035 from the previous year.

3. Taxation

As an association incorporated in Switzerland, the Union is exempt from Swiss Federal and Geneva Cantonal tax. Under the terms of the United Kingdom/Switzerland

Double Taxation Agreement dated 8 December 1977, investment income arising within the United Kingdom under present circumstances will not be subject to United Kingdom tax.

Other investment income received from countries with which Switzerland has a Double Taxation Agreement is exempt from tax.

4. Investments

	Holding at cost 1 January 1988	Swiss Francs	Disposals/ Redemptions during the year	Fluctuations in rates of exchange	Holding at cost 31 December 1988
Deposited for safe custody with the Union Bank of Switzerland					
SwFr 25,000	24,615	—	—24,615	—	—
(4.5% Swiss Federal 1983-1995)					
SwFr 250,000	258,748	—	—258,748	—	—
(4.75% Swiss Confederation 1984-1994)					
SwFr 190,000	208,442	—	—208,442	—	—
(5.625% International Bank for Reconstruction and Development)					
Deposited for safe custody with Amsterdam-Rotterdam Bank NV					
ECU 100,000	145,902	—	—175,922	30,020	—
(9.5% New Zealand 1985-1992)					
Dfl 300,000	—	221,820	—225,000	3,180	—
(AMRO Obligatie Fund)					
Dfl 300,000	—	221,820	—225,000	3,180	—
(AMRO All-in Fund)					
Held by Rothschild Asset Management Limited					
£300,000	735,294	—	—	60,251	795,545
(Old Court International Reserves Limited)					
Held by Merrill Lynch					
(Corporate Government Securities)					
US \$120,000 TIGR.SER15-89RG	138,104	—	—	8,125	146,229
US \$200,000 TIGR.SER15-98RG	108,651	—	—115,043	6,392	—
US \$55,000 TIGR.SER18-88RG	67,876	—	—76,860	8,984	—
US \$50,000 TIGR.SER18-98RG	27,166	—	—28,764	1,598	—
US \$23,807 GNM P146535-2016	—	32,327	—155	1,170	33,342
US \$72,032 GNM P169332-2016	—	97,801	—3,854	3,586	97,533
(Mutual Funds/Unit Investment Trusts)					
US \$50,000 USA Income portfolio	—	69,156	—	2,488	71,644
US \$45,246 GSIF 1B GNMASRS	60,003	—	—5,958	3,607	57,652
US \$9,606 US Federal Sec. FDS	136,020	—	—139,022	3,002	—
1,108 Units ML Capital Fund/CLB (US\$)	—	39,535	—	—3,503	36,032
2,727 Units ML Basic Fund/CLB (US\$)	—	77,045	—	—5,003	72,042
(Certificates of deposit)					
US \$98,000 CD Valley FS&L V NUYS CA	—	147,980	—154,840	6,860	—
US \$50,000 CD Calif Fedl S&L	—	72,000	—	—	72,000
US \$30,000 CD Lomas Bank	40,800	—	—41,700	900	—
Held by Foreign & Colonial					
32,468 Units Reserve Asset Fund Class D (US\$)	—	849,727	—	—26,789	822,938
5,943 Units Reserve Asset Fund Class L (£)	—	147,367	—	—166	147,201
16,451 Units Reserve Asset Fund Class O (US\$)	—	306,976	—	—12,279	294,697
19,286 Units Reserve Asset Fund Class X (£)	—	530,969	—	—600	530,369
Deposited for safe custody with National Westminster Bank PLC, Manchester					
£100,000 (10.5% Treasury Stock 1989)	241,440	—	—258,322	16,882	—
£20,000 (13.75% Treasury Stock 1993)	61,600	—	—65,907	4,307	—
£20,000 (14.5% Treasury Stock 1994)	62,227	—	—66,578	4,351	—
£20,000 (15.25% Treasury Stock 1996)	68,797	—	—73,608	4,811	—
£20,000 (15.5% Treasury Stock 1998)	68,819	—	—73,631	4,812	—
	2,454,504	2,814,523	—2,221,969	130,166	3,177,224

Investments are noted in the balance sheet at their market value at 31 December 1988. The difference between cost and market value has been shown as an adjustment in order that the investments can be stated at cost. This prevents the fluctuations in value from influencing the General Fund.

5. Bank Interest

	Swiss Francs	
	1988	1987
National Westminster Bank PLC		
USA Money Market Account	—	1,801
Manchester Deposit Account	889	2,141
Manchester SMMO Account	73,635	51,405
Manchester Business Reserve Account	8,790	—
Amsterdam-Rotterdam Bank NV		
Current Guilder Account	69	71
Guilder Savings Account	878	2,961
Guilder 1 month deposits	6,829	18,927
ECU 1 month deposit	3,049	5,323
ECU deposit account	—	2,215
US\$ Accounts	21	1,917
Union Bank of Switzerland		
Current Account	63	86
Merrill Lynch		
CMA Account	8,431	9,314
Interest from Munksgaard	16,527	19,273
Interest on officers' petty cash accounts	54	86
	<u>119,235</u>	<u>115,520</u>
Allocated to Ewald Fund	13,550	14,506
Balance in General Fund	105,685	101,014
	<u>119,235</u>	<u>115,520</u>

6. Investment Interest

	Swiss Francs	
	1988	1987
ML Basic value fund	2,800	—
ML Capital fund	2,090	—
P146535-2016	1,886	—
P169332-2016	5,569	—
CD Lomas	764	—
4.5% Swiss Federal 1983-1995	611	731
4.75% Swiss Confederation 1984-1994	6,409	7,225
5.625% International Bank for Reconstruction and Development	9,552	14,465
9.5% New Zealand 1985-1992	16,689	15,421
CD Goldome	—	6,288
GSIF 1B GNMASRS	5,185	6,429
10.5% Treasury Stock 1989	37,560	13,161
13.75% Treasury Stock 1993	8,869	3,190
14.5% Treasury Stock 1994	6,611	4,938
15.25% Treasury Stock 1996	9,847	3,957
15.5% Treasury Stock 1998	7,043	4,730
Withholding tax recoverable	5,053	8,214
US Federal	7,598	—
USA Income	4,274	—
CD Valley	2,046	—
	<u>140,456</u>	<u>88,749</u>
Less: Rothschild management fees	4,257	—
	<u>136,199</u>	<u>88,749</u>