

sion (1969) and the coordinates of Padmanabhan & Balasubramanian (1967). From these a set of reflexions was chosen which showed significant Friedel inequalities. The crystal was poled and the intensity of the Bragg reflexion  $I$  measured. The crystal was then poled in the opposite sense and the new intensity  $I'$  measured. This was repeated on a set of 10 reflexions. From these intensities the ratios  $R_o$  [ $=F_o/F'_o=(I/I')^{1/2}$ ] were calculated.

### Discussion

The ratio  $R_o$  of the observed structure factors and the error  $\sigma$  in  $R_o$  arising from counting statistics are shown in Table 1. Also shown are calculated values of the ratio  $R_c$  for several cases: (a) no structural change, (b) inversion of the cell,  $hkl$  to  $h\bar{k}\bar{l}$ , (c) inversion of the cell,  $h\bar{k}\bar{l}$  to  $hkl$ , (d) reorientation of the hydrogen bonds from along  $-c$  to  $+c$  (e) reorientation of the hydrogen bond from along  $+c$  to  $-c$ .

The correctness of each model was tested using a  $\chi^2$  test:

$$\chi^2 = \sum_{i=1}^n \frac{(R_{oi} - R_{ci})^2}{\sigma^2}$$

where the sum is performed over the 13 independent measurements.

Table 2 shows the values of  $\chi^2$  and the probability that a second experiment would have a larger value of  $\chi^2$  if the model is correct. It is evident that model *a* is overwhelmingly more probable and that no structural change occurs on reversal of the poling field. After we had finished our experiment Schmidt, Drumheller & Howell (1971) published the results of their extensive investigation of the dielectric properties of  $\text{Li}(\text{N}_2\text{H}_5)\text{SO}_4$  which they conclude is not ferroelectric. They are able to account for the hysteresis loops by a mechanism of partially blocked conduction along the hydrogen bond chains. Our failure to observe any permanent alteration in the molecular structure of the crys-

tal as a result of poling is in agreement with their results and confirms the fact that it is not possible to reverse the permanent dipole moment of  $\text{Li}(\text{N}_2\text{H}_5)\text{SO}_4$ .

Table 2. The values of  $\chi^2$  and probability for each model

Model	$\chi^2$	Probability
(a)	11.19	59%
(b)	36.53	<1%
(c)	37.67	<1%
(d)	376.73	$\ll$ 1%
(e)	414.72	$\ll$ 1%

We wish to thank the National Research Council of Canada for financial support of this project.

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## International Union of Crystallography

### Report of Executive Committee for 1971

#### Personal Notes

The crystallographic world lost three of its most distinguished members in 1971. Professor Dame Kathleen Lonsdale died on 1 April. She was Professor of Chemistry and Head of the Crystallography Laboratory, University College, London from 1949 to 1968. Her many contributions to crystallography included her work as General Editor of the three volumes of *International Tables for X-ray Crystallography*. She was one of the first women to be elected Fellow of the Royal Society and the first woman President of the British Association for the Advancement of Science. As President of the International Union of Crystallography she chaired the sessions of the Seventh General Assembly in Moscow, in 1966.

On 1 July Sir Lawrence Bragg died at the age of 81. In conjunction with his father, Sir William Bragg, he carried

out the earliest crystal structure determinations by X-ray spectrometry, receiving for this work the Nobel Prize for Physics in 1915. It was as a result of these investigations that it first became possible to obtain absolute values of lattice parameters. Sir Lawrence and his school thereafter developed the quantitative aspects of X-ray diffraction techniques and worked out large numbers of more complicated crystal structures, especially those of silicate minerals. Sir Lawrence took a leading part in the formation of the International Union of Crystallography in 1947, and was its first President.

Professor J. D. Bernal died in September at the age of 70. He was a pioneer in the application of crystallographic methods to biological materials and carried out some of the early work on hormones and vitamins. His X-ray photographs of pepsin in 1933 were the first ever taken of single crystals of a protein. Professor Bernal was for many years

closely associated with the work of the International Union of Crystallography. In 1963 he was elected President of the Union but, owing to ill health, he was subsequently unable to take a very active part in Union affairs and resigned in 1966, a short time before the opening of the Seventh General Assembly in Moscow.

Obituaries for Professor Bragg and Professor Bernal will be published in *Acta Crystallographica* [*Acta Cryst.* (1972), A28, 255 and 359]. An obituary for Professor Lonsdale will also be published in this journal.

### Meetings

The Union sponsored or co-sponsored the following meetings and Summer Schools held during 1971: Current Research in Crystallography, Manchester, U.K., 14–16 April; an International Summer School on Crystal Growth, Noordwijkerhout, The Netherlands, 21 June–2 July; the Third International Conference on Crystal Growth, Marseille, France, 5–9 July; Crystal Structure and Chemical Bonding, Twente, The Netherlands, 3–6 August; an International Summer School on the Investigation of the Surface Structure of Solids by LEED and Supplementary Methods, Smolenice, Czechoslovakia, 6–15 September; the Second European Meeting on Ferroelectricity, Dijon, France, 20–24 September.

The Executive Committee met in Marseille, 5–7 July, on the occasion of the Third International Conference on Crystal Growth. The Programme Committee for the Ninth Congress and the Union's Commission on Crystallographic Apparatus also met in Marseille at this time. The Executive Committee reviewed the plans for the Congress with Professor R. Sadanaga, Chairman of the Programme Committee. The other main items dealt with were: (1) the withdrawal from the Union of the Adhering Body in Pakistan; (2) the Pilot Issue for the future publications on *International Crystallographic Tables* and the associated Computer Trial Project; (3) the publication delays and other questions concerning the Union's journals, including the size of the Technical Editing Staff; (4) the Fourth Edition (and future editions) of the *World Directory of Crystallographers*; (5) the Third Edition of the *Index of Crystallographic Supplies*; (6) Volume 2 of *Early Papers on Diffraction of X-rays by Crystals*; (7) ICSU and UNESCO; (8) the European Crystallographic Committee; (9) the work of the Union's Commissions; (10) sponsorship of meetings and (11) the finances of the General Fund and the unit contribution.

### Substitutions and Appointments

R. E. Marsh and S. Miyake resigned as Co-editors of *Acta Crystallographica*. The Executive Committee thanked them for their services and approved the appointment of three new Co-editors, J. M. Cowley, L. H. Jensen and S. Takagi.

The Executive Committee approved the appointment of E. Ascher, J. D. H. Donnay, W. T. Holser and A. G. M. Janner as Co-editors of *International Tables*.

The Executive Committee considered it necessary to increase the technical editing staff in Chester. Hence the Sub-committee on Staff, Establishment and Salaries appointed Dr D. W. Penfold as Assistant Technical Editor, to start on 12 July, Mr R. S. Daykin as an Editorial Assistant, to start on 4 October, and Mr J. E. Derry as an Editorial Assistant, to start on 24 January 1972, to replace Mrs J. M. Hunter, who was resigning.

### Publications

In 1971, Volume 27 of *Acta Crystallographica* was published; Section A totalled 700 pages and Section B 2494 pages, excluding indexes. Volume 4 of the *Journal of Applied Crystallography* was also published and contained 534 pages, excluding indexes.

Volume 27 (for 1962) of *Structure Reports* was published in December but no further reprints of volumes of *International Tables* were published.

The fourth edition of the *World Directory of Crystallographers* was published in November and contains short biographical data of 6982 scientists from 57 countries.

### Adhering Bodies

The replacement of the Israel Society of Crystallography by the Israel Academy of Sciences and Humanities as the Adhering Body for Israel was accepted by the Executive Committee, subject to confirmation by the Ninth General Assembly. [The replacement of the Société Suisse de Minéralogie et de Pétrographie by the Schweizerische Gesellschaft für Kristallographie as the Adhering Body in Switzerland and the change in name of the Adhering Body for India from the National Institute of Sciences of India to the Indian National Science Academy had already been accepted by the Executive Committee, subject to confirmation by the Ninth General Assembly.]

A request had been received from the Pakistan Council of Scientific and Industrial Research to withdraw from the Union, as from 1 January 1969. The Executive Committee agreed to suspend the membership of the P.C.S.I.R. and to recommend to the Ninth General Assembly that the withdrawal be accepted from 1 January 1969.

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

The full list of memberships of National Committees is given in the *Report of Eighth General Assembly*. The following changes to these memberships should be mentioned:

Argentina: New membership: A. G. Alvarez (Chairman), M. E. J. de Abeledo, L. N. Becka, D. Bedlivi, A. Bonfiglioli, M. Butschkowski, A. Craievich, E. E. Galloni, A. Iñiguez Rodríguez.

Australia: T. M. Sabine replaces A. W. Pryor.

Czechoslovakia: New membership: A. Kochanovská (Chairman), Č. Barta, F. Čech, M. Černohorský, M. Dunaj-Jurčo, S. Ďurovič, J. Garaj, M. Handlovič, K. Huml, J. Komrska, A. Líněk, J. Madar, K. Melka, L. Ulický.

U.S.A.: omit J. A. Ibers, L. H. Jensen, B. Post, D. P. Shoemaker and add C. N. Caughlan, H. Cole, P. Coppens, W. C. Hamilton, C. K. Johnson, V. Schoemaker. R. E. Marsh has succeeded B. Post as Vice-Chairman.

### Work of the Commissions

#### *Commission on Journals*

During 1971 the Commission on Journals produced Volume 27 of *Acta Crystallographica* and Volume 4 of the *Journal of Applied Crystallography*. *Acta Crystallographica* contained about 3200 pages (Section A 700 pages, Section B 2494 pages) excluding indexes, and the *Journal of Applied*

*Crystallography* 534 pages excluding indexes. Section B of *Acta Crystallographica* thus shows an appreciable increase over 1970, but Section A and the *Journal of Applied Crystallography* are very nearly the same size. During the early months of 1971 there was considerable disruption of publication of the journals, partly caused by a postal strike in the United Kingdom, and partly by a move of the printers to larger premises. The Commission and the Executive Committee have devoted a great deal of attention to delays in publication during the year, as a result of which the staff of the Technical Editor has been doubled, and the backlog of unedited typescripts at the Chester office has been reduced practically to zero. There are, however, many papers either in first proof or awaiting typesetting at the printers, and it is proposed to deal with these by producing larger-than-average issues of *Acta Crystallographica* Section B during the early months of 1972. An analysis of the contents of *Acta Crystallographica* for the last six years and of the *Journal of Applied Crystallography* for the last four years is given in Table 2.

The Commission has devoted a good deal of attention during the year to the revision of 'Notes for Authors' and to the question of short structural papers. It is hoped to make an announcement about the latter and to publish a revised set of the former in 1972.

#### Commission on Structure Reports

Volume 27 (1962) was published in December 1971. The length of this volume (1128 pages) was such that the whole voluntary organization, under which *Structure Reports* is published, collapsed somewhat, since the demands on the editors were more than could be met in a sustained burst of activity while they allowed their other commitments to wait. Thus it is fortunate that some measures to shorten the material to be reported had already been taken for subsequent volumes. Volume 29 is all in proof and will be published during 1972. Volumes 28, 30 and 31 could also probably be published during 1972, but Volumes 28 and 30 are still held up, awaiting the Metals manuscripts.

From Volume 31 onwards *Structure Reports* will only

Table 1. *Adhering Bodies*

Country	Category*	Adhering Body	Secretary of National Committee
Argentina	I	Consejo Nacional de Investigaciones Científicas y Técnicas	L. BECKA, Departamento de Física, Facultad de Ciencias Exactas, Universidad Nacional de La Plata, Calle 115 y 49 CC 67 La Plata
Australia	III	Australian Academy of Science	J. DEEBLE, Australian Academy of Science, P.O. Box 216, Civic Square, Canberra, A.C.T. 2068
Austria	I	Österreichische Akademie der Wissenschaften	J. ZEMANN, Mineralogisches Institut der Universität, Dr. Karl Lueger-Ring 1, 1010 Vienna
Belgium	II	Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique	G. JACOBS, Rijksuniversiteit te Gent, Faculteit der Wetenschappen, Laboratorium voor Kristalkunde, Krijgslaan 105, 9000 Gent
Brazil	I	Conselho Nacional de Pesquisas	R. R. FRANCO, Conselho Nacional de Pesquisas, Avenida Marechal Camara 350, Rio de Janeiro, G.B.
B.R.D. (Federal Republic of Germany)	IV	Sektion für Kristallkunde der Deutschen Mineralogischen Gesellschaft	TH. HAHN, Institut für Kristallographie der Technische Hochschule, Templergraben 55, Aachen
Canada	III	National Research Council	F. R. AHMED, Division of Biological Sciences, National Research Council, Ottawa 7, Ontario, K1A OR6
Chile	I	National Committee for Crystallography	I. GARAYCOCHEA-WITTKÉ, Departamento de Física, Universidad de Chile, Casilla 5487, Santiago
Czechoslovakia	I	Československá Akademie Věd	A. LINEK, Institute of Solid State Physics, Československá Akademie Věd, Cukrovarnická 10, Prague 6
D.D.R. (German Democratic Republic)	II	Deutsche Vereinigung für Kristallographie der Deutschen Gesellschaft für Geologische Wissenschaften	H. NEELS, Institut für Mineralogie und Petrographie der Karl-Marx-Universität, Scharnhorststrasse 20, 703 Leipzig
Denmark	I	Akademiet for de Tekniske Videnskaber	INGRID K. LARSEN, The Royal Danish School of Pharmacy, Chemical Laboratory C, DK-2100 Copenhagen
Finland	I	Suomalainen Tiedekatemia	M. AALTONEN, Wihuri Physical Laboratory, University of Turku, Turku
France	IV	Académie des Sciences (Institut de France)	A. AUTHIER, Association Française de Cristallographie, 9 Quai Saint Bernard, Tour 26, Paris 5e
Hungary	I	Magyar Tudományos Akadémia	L. ZSOLDOS, Institute for Experimental Physics, Eötvös University, Múzeum krt 6-8, Budapest VIII
India	I	Indian National Science Academy	R. SRINIVASAN, Centre of Advanced Study in Physics, University of Madras, Guindy Campus, Madras 25
Israel	I	Israel Academy of Sciences and Humanities	V. BENGHIAT, Department of Chemistry, The Weizmann Institute of Science, Rehovoth
Italy	III	Consiglio Nazionale delle Ricerche	S. QUARENI, Istituto di Mineralogia e Petrografia, Università di Padova, Corso Garibaldi 9, 35100 Padova
Japan	IV	Science Council of Japan	Y. SAITO, The Institute for Solid State Physics, University of Tokyo, Roppongi 7, Minato-ku, Tokyo 106
Netherlands	III	Stichting voor Fundamenteel Onderzoek der Materie met Röntgen- en Elektronenstralen	D. FEIL, Chemical Physics Laboratory, Technische Hogeschool Twente, P.O. Box 217, Enschede

\* See footnote(\*) at bottom of Table 1. (cont).

Table 1 (cont.)

Country	Category*	Adhering Body	Secretary of National Committee
New Zealand	I	The Royal Society of New Zealand	P. P. WILLIAMS, Chemistry Division, D.S.I.R., Private Bag, Petone
Norway	I	Det Norske Videnskaps-Akademi	CHR. RØMMING, Department of Chemistry, University of Oslo, Blindern, Oslo 3
Pakistan†	I	Pakistan Council of Scientific and Industrial Research	M. M. QURASHI, P.C.S.I.R. Laboratories, Jamrud Road, Peshawar
Poland	I	Polska Akademia Nauk	L. ŁUKASZEWICZ, Instytut Niskich Temperatur i Badań Strukturalnych, Polska Akademia Nauk, Plac Katedralny 1, Warsaw
South Africa	I	South African Council for Scientific and Industrial Research	G. GAFNER, National Physical Research Laboratory, P.O. Box 395, Pretoria
Spain	III	Consejo Superior de Investigaciones Científicas	S. GARCÍA-BLANCO, Instituto de Química Física 'Rocasolano', Consejo Superior de Investigaciones Científicas, Serrano 119, Madrid 6
Sweden	II	Kungliga Vetenskapsakademien	S. ABRAHAMSSON, Crystallography Group, University of Göteborg, Medicinarg. 9, S-400 33 Göteborg 33
Switzerland	II	Schweizerische Gesellschaft für Kristallographie	J. D. DUNITZ, Laboratorium für Organische Chemie der ETH, Universitätsstrasse 6/8, CH-8006 Zürich
U.K.	V	The Royal Society	D. C. MARTIN, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG
U.S.A.	V	National Academy of Sciences - National Research Council	W. L. KEHL, Gulf Research and Development Co., P.O. Box 2038, Pittsburgh, Pa. 15230
U.S.S.R.	V	Akademija Nauk S.S.S.R.	V. I. SIMONOV, Institute of Crystallography, Leninsky Prospekt 59, Moscow B-333
Yugoslavia	I	Jugoslavenska Akademija Znanosti i Umjetnosti	B. KAMENAR, Laboratory of General and Inorganic Chemistry, Faculty of Science, Ulica Soc. Revolucije 8, 41000 Zagreb

\* 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.

† Membership of the P. C. S. I. R. suspended pending the acceptance of this Body's withdrawal from the Union by the Ninth General Assembly.

contain reports on complete structure determinations, and will be printed by photo-offset from typed manuscripts. This will not increase the length of the volumes, and it will reduce the costs of typesetting and printing considerably. Volumes 32 and 35 are now being put in print. Some indication of the enormous amount of data to be reported in the Organic Section can be conveyed by the fact that the manuscript for the Organic Section of Volume 35 runs to 1500 pages, in addition to several hundred figures. Far reaching discussions on the future of *Structure Reports* activity are to be held early in 1972.

#### Commission on International Tables

##### 1. Present Edition

The manuscript for Volume IV of the present edition, *Revised and Supplementary Tables* (Editors: W. C. Hamilton & J. A. Ibers), has been prepared by the editors and will be sent to the printers soon. It has been decided that Volumes II and III, thus supplemented and extended, should be retained for several years; during this period, plans for their future will be made and submitted to the Executive Committee.

A second reprint of Volume II is required, and this is in hand for publication in 1972: all known corrections are being incorporated into the text and one section of two pages (plus references) 'The Practical Evaluation of Fourier Series and Structure Factors' is being revised.

The position of the present edition is as follows:

	Published	Reprinted
Volume I Symmetry Tables	1952	1965 and 1969
Volume II Mathematical Tables	1959	1967 [and 1972]
Volume III Physical and Chemical Tables	1962	1968
Volume IV Revised & Supplementary Tables (to be published)		

The field covered by the *Tables* will in future be divided into two series:

Series A: Symmetry Tables (including and extending the contents of Volume I of the present edition).

Series B: Diffraction Tables (comprising the contents of Volumes II, III and IV of the present edition).

##### 2. Pilot Issue for Series A

For Series A, but not for Series B, a Pilot Issue is in preparation. This has suffered some more delay, but finally all material is in hand to complete the first four Parts, and the position is:

Part 1 Direct Space (Editor: N. F. M. Henry)	To be published in 1972
Part 2 Reciprocal Space (Editors: Th. Hahn & H. Arnold)	To be published in 1972
Part 3 Patterson Data (Editor: M. J. Buerger)	Published in 1969

## Part 4 Synoptic Tables

(Editors: J. D. H. Donnay, To be published in 1972  
E. Hellner & N. F. M. Henry)

## Part 5 Generalised Symmetry

(Editor: V. A. Koptsik) Issued in 1969 but to be  
replaced by a revised  
and enlarged edition in  
1973

## Part 6 Physical Properties in Symmetric Media

(Editors: E. Ascher & To be published in 1973  
A. G. M. Janner)

A meeting of members of the Editorial Committee involved in Parts 5 and 6 was held in Geneva at the Battelle Institute, 28 June–2 July 1971. To accompany Part 1 there is a new development in that stereoscopic views of the two sample space groups will be provided. Dr G. Langlet (Centre d'Etudes Nucléaires de Saclay, France) has joined the Editorial Committee and is producing these views by computer.

## 3. Computer Trial Project

In July 1971 the Executive Committee gave approval to the proposal for a Computer Trial Project to investigate the feasibility of using a computer to produce the tabular matter for the future edition which might result from the Pilot Issue. The Commission was very fortunate in receiving an invitation from Dr D. W. Smits, Director of the Computing Centre of the University of Groningen, The Netherlands, to set up this project there. Mr D. S. Fokkema, a young mathematician, was appointed – on a part-time basis for the present – to work with the Editorial Committee in preparing for any future edition to be produced by computer. In addition to Dr Smits, Professor

A. Vos, of the Department of Structural Chemistry of the University of Groningen, is acting as a supervisor of the project, which is under the general direction of Professor Th. Hahn for the Commission. Close contact is being maintained by visits. This work started in September 1971, and an interim report will be submitted to the Executive Committee on the first nine months of working on the project (in addition to the one scheduled for the end of 1972).

*Commission on Crystal Growth*

The Commission met once at the Third International Conference on Crystal Growth at Marseille, on 6 July 1971. This meeting was attended by R. Kern, (Chairman), P. Hartman (Secretary), B. Honigmann, R. A. Laudise, R. F. Strickland-Constable and G. A. Wolff (members), and the President and the General Secretary of the Union (*ex officio* members). The present position on the various activities of the Commission is as follows:

1. The idea to compile a list of laboratories and scientists who deal with crystal growth was abandoned, since it appeared that various national lists of this kind exist. Moreover, an international compilation is being realised at the Oak Ridge Materials Science Information Center.
2. The Commission is assisting in the preparation of a dictionary to be edited by the Verein Deutscher Ingenieure. Terms are defined in German, and translations into English, French and Russian are given.
3. The Commission hopes to propose a convention for the description of inorganic crystal structures lacking a centre of symmetry. The etching behaviour of prominent faces and the sign of the piezo-electricity will be related to the absolute structure. The project is progressing gradually.

Table 2. Survey of the contents of the Union journals

## Acta Crystallographica

Vol.	Year	Number of pages	Articles			Short Communications		
			Number	Number of pages	Average length	Number	Number of pages	Average length
20 & 21*	1966	2273*	287	1751	6.10	118	159	1.35
22 & 23	1967	2094	315	1843	5.85	97	126	1.30
A24}	1968	714}2420†	108}	688}	6.37}	27}	34}	1.25}
B24}			359}	1687}	6.72}	89}	123‡	1.44}
A25}§	1969	1027}3699	120}	733}	6.11}	25}	31}	1.24}
B25}			475}	2547}	7.17}	99}	149}	2.01}
A26}	1970	702}2840	112}	676}	6.04}	32}	53}	1.66}
B26}			413}	2046}	6.80}	86}	95}	1.76}
A27}	1971	700}3194	103}	647}	6.28}	24}	34}	1.42}
B27}			480}	2422}	6.60}	91}	87}	1.30}

## Journal of Applied Crystallography

Vol.	Year	Number of pages	Articles			Short Communications		
			Number	Number of pages	Average length	Number	Number of pages	Average length
1	1968	330	54	303	5.60	7	10	1.39
2	1969	312	50	272	5.44	11	16	1.45
3	1970	552	79	479	6.06	26	46	1.77
4	1971	534	74	415	5.61	23	40	1.74

\* Volume 21 includes 304 pages of abstracts of papers presented at the Moscow Congress.

† Plus 24 pages of joint (A+B) index.

‡ For the first time the number of plate-pages was included in the number of pages per paper.

§ Volume A25 includes 295 pages of abstracts communicated to the Stony Brook Congress and 276 pages of papers and discussion at the Cambridge Intensity Meeting, 1968.

4. The Chernov-Lobachev Report on Topics in Crystal Growth, which is an analysis based on questionnaires of the main problems in crystal growth, has been finished.
5. The International Summer School on Crystal Growth was held at Noordwijkerhout, The Netherlands, 21 June–2 July 1971. The 128 participants from 23 countries followed 44 lectures on various aspects of crystal growth including heterogeneous nucleation, homogeneous nucleation, transport reactions, interface stability, epitaxy, hydrothermal growth, melt growth, industrial mass crystallization, habit and structure, and imperfections. The lectures will be published as Volume I of the Elsevier North-Holland Series on Crystal Growth (Editors: W. Bardsley, D. T. J. Hurle and J. B. Mullin) under the title *Crystal Growth. An Introduction*. This Summer School was made possible by financial and organizational assistance from several industries and institutions and it was sponsored by the IUCr and by the ICCG-3. The large number of participants, the quality of the lectures and the close contact between lectures and participants in the Leeuwenhorst Congress Center made this first International Summer School on Crystal Growth quite a success. About one quarter of the participants subsequently attended the ICCG-3 at Marseille. The Commission on Crystal Growth expressed as their view that the organization of a second Summer School after a few years would be very desirable.

#### *Commission on Crystallographic Apparatus*

While most matters were dealt with by correspondence, a meeting-in-person of some members of the Commission (S. C. Abrahams, U. W. Arndt, N. Kato, D. M. Kheiker and A. McL. Mathieson) took place in Marseille, 5–7 July 1971. This meeting was of considerable assistance in clarifying aspects of current and future Commission affairs. The main items of business during 1971 were as follows:

1. *Index of Crystallographic Supplies* (R. Rudman). Following earlier drafts, the *Index* has reached its essentially final form and is ready to be printed.
2. *Radiation Damage Survey* (S. C. Abrahams). Data provided by 8 active participants has been analysed and a draft report has been prepared for comment by members and participants.
3. *Single Crystal Intensity Measurement Project. Phase II* (A. McL. Mathieson). Information on the project has been sought by a number of prospective participants.
4. *Small-Angle Scattering Absolute Intensity Project* (R. W. Hendricks). This is a new project which the Commission has incorporated in its activities. Information on the project has been circulated and its organization is now well-developed with 16 participants. To look after this project, R. W. Hendricks was appointed a consultant to the Commission.
5. *Open Commission Meetings at the Ninth Congress*. Apart from the Open Meetings at which reports on the projects will be given, the Commission will arrange or be associated with two other Open Meetings. One will be on 'Techniques for the Simultaneous Measurement of many reflections and related topics' and the other on 'Interactive Displays for Generating Atomic Models'. U. W. Arndt is the member responsible for these latter activities.

To assist with the organization of the exhibitions of (a) non-commercial apparatus and (b) photographs of crystallographic interest, R. Kiriya was appointed a consultant to the Commission.

#### *Commission on Crystallographic Computing*

During 1971 the Commission conducted, through correspondence, the following items of business:

1. *Standard Tests for Crystallographic Computer Programs. Part I.* (F. R. Ahmed, D. W. J. Cruickshank, A. C. Larson and J. M. Stewart). Work on the first part of the standard tests was completed, and the results were submitted in November 1971 for publication in *Acta Crystallographica* [*Acta Cryst.* (1972). **A28**, 365]. This part covers the calculations commonly used in crystal structure analysis, such as structure factors, least-squares refinement, electron density, and interatomic distances and angles. The tests are for space groups  $P1$ ,  $P\bar{1}$ ,  $P2_1/c$ ,  $Pmn2_1$ ,  $P6_122$ , and  $I\bar{4}3d$ .
2. *World List of Crystallographic Computer Programs* (G. Bassi). The 'Call for Material' for the third edition of the *List* was published in *Acta Crystallographica* (1971), **A27**, 393 and the *Journal of Applied Crystallography* (1971), **4**, 264. The number of replies at the closing date in November 1971 was lower than anticipated. Attempts are being made to solicit more contributions from program authors who may have neglected to inform the editor before the first closing date.
3. *Recommendations for Publication of Crystallographic Data* (J. S. Rollett, C. K. Johnson, A. J. C. Wilson, and F. Hirshfeld). Although this committee did not manage to form a definite policy on the publication of structure factor tables, the decisions of the IUCr Executive Committee in July 1971 were in line with most of this committee's recommendations. These favoured the use of public depositories instead of publication.
4. *Open Commission Meetings at the Ninth Congress*. The Commission will participate in a meeting on 'Data Storage, Search, Retrieval and Publication', organized conjointly with the Commissions on Crystallographic Data, Journals, and *Structure Reports*, and a meeting on 'Interactive Displays for Generating Atomic Models' and an *ad hoc* meeting on 'Discussion and Exchange of Programs for Automatic Diffractometers and Film Scanners', organized conjointly with the Commission on Crystallographic Apparatus.

#### *Commission on Crystallographic Data*

The most important activity of the Commission is the coordination of data collection and publication, to identify gaps in the efforts of the various active groups and to recommend to the Union areas where action should be taken by the Union, either directly or by encouragement of others. Standards for publication to facilitate the recording, checking and compilation of data are important. A recommended standard for the publication of powder data has been published [*J. Appl. Cryst.* (1971), **4**, 81].

The publication of structure factor tables has been studied particularly by those concerned with the costs of publication. The Commission supports the decision of the Executive Committee to establish a depository where copies of these and similar supporting data are available to those requesting them.

The International Council of Scientific Unions was a co-sponsor with UNESCO of an inter-governmental conference in Paris, 4–9 October 1971, to discuss the establishment of UNISIST – a World Science Information System. The Commission was represented at the Meeting, at which the establishment of this new organization was recommended to the Director-General of UNESCO. The first concerns of this organization will be to facilitate cooperation between existing secondary publications by standardization of bibliographic descriptions, the development of indexing tools and language controls and a World Register of Scientific Periodicals.

At the Ninth Congress the Commission is organizing an Open Meeting on 'Powder Data' and, jointly with the Commissions on Crystallographic Computing, Journals and *Structure Reports*, an Open Meeting on 'Data Storage, Search, Retrieval and Publication'.

Several developments during 1971 have come to the attention of the Commission by correspondence or discussion. Volume 27 of *Structure Reports*, covering the literature for 1962, and Volume 5 of the Landolt-Börnstein New Series, *Numerical Data and Functional Relationships in Science and Technology*, were published.

The X-ray Crystallography Group at the University of Parma, Italy, have announced a new journal, *Crystal Structure Communications*, for the rapid publication of the results of solved and refined crystal structure analyses. The data contained will be routinely checked using computer programs before publication to detect errors or major inconsistencies. The American Crystallographic Association, at its meeting in August, organised a Symposium on Crystal Data at which two new projects were discussed: (i) an Atlas of Steroid Structure by D. A. Norton, A. Cooper and W. L. Duax and (ii) a Bond Index to Inorganic and Organometallic Crystal Structures by I. D. Brown. The latter is a compilation of the shortest bond lengths reported for all bond pairs occurring in crystal structure determinations published during 1969 and 1970. The data are taken directly from the papers without checking but the alphabetic listing provides for a useful comparison of recent work in structure determination.

The Third Edition of *Crystal Data* will be published by The Joint Committee on Powder Diffraction Standards, Swathmore, Pennsylvania, early in 1972. Revised and checked data for structures to the end of 1966 are included. Volume 3 of *Molecular Structures and Dimensions*, published by Oosthoek, Utrecht, for the IUCr and the Crystallographic Data Centre, Cambridge, U.K., will be published in February 1972 and will cover the period 1969–1971. In addition, the Centre is extending its coverage of structures to include information derived from electron diffraction and microwave studies. A continuation of *Tables of Interatomic Distances and Configuration in Molecules and Ions* (London: The Chemical Society, 1958 and 1965) is being undertaken by the Centre.

The Centre has announced a depository system for protein crystallographic data, in cooperation with the Brookhaven National Laboratory. Atomic coordinates, structure factors and electron density maps will be accepted and made available in machine-readable form or on microfiche.

#### *Commission on Crystallographic Nomenclature*

The Commission has held no meeting during the year. However, see the report of the IUCr – IMA Joint Committee on Nomenclature.

#### *Commission on Crystallographic Studies at Controlled Pressures and Temperatures*

No information has been received on the work of this Commission.

#### *Commission on Crystallographic Teaching*

In addition to the normal routine enquiries about availability of teaching materials, addresses, etc. which have been dealt with by the secretary and the chairman, the key point in the activities this year was that part of the Commission was actually able to meet. The chairman, secretary and three Commission members met during the meeting on 'Current Research in Crystallography' at Manchester, England, on 16 April 1971. This was a most useful occasion in spite of the relatively small fraction of the Commission present and demonstrated the value of personal meetings as against correspondence in the work of a Commission in the inter-Congress periods. The following extract from the report of this meeting also provides a fairly accurate indication of the activities during 1971.

1. *Open Commission Meeting at the Ninth Congress.* A few suggestions have been received, e.g. order-disorder; training of crystallographers for industry; is crystallography a discipline in its own right?; graduate training; programmed instruction. As a heading under which many of the above aspects will be combined the title of the meeting will be 'Crystallographic training: how and for what?'
2. *The UNESCO pilot project on the Teaching of Crystallography in relation to the Physics and Chemistry of Solids.* This project has been described in the Reports of the (IUCr) Executive Committee for 1968 and 1969. The member of the Commission living close to the UNESCO headquarters in Paris, A. Authier, has undertaken the distribution of copies of those projects which have been completed and an appropriate announcement will be published in the Union's journals [*Acta Cryst.* (1972), A28, 361; *J. Appl. Cryst.* (1972), 5, 251].
3. A discussion of the draft of Dr Elizabeth Wood's book, *Crystals – a Handbook for Teachers*, took place and it was warmly commended. When the final version is available members of the Commission hope to arrange translation and distribution in their own countries.

It was agreed to request that a specific category of abstracts on crystallographic teaching methods be included for the Ninth Congress and that papers submitted under this heading might be presented at the Open Meeting of the Commission or in close association with it.

#### *Commission on Electron Diffraction*

Two members of the Commission, S. Goldsztaub and K. Molière, were involved as members of the programme committee in the planning of the International Summer School on the Investigation of the Surface Structure of Solids by LEED and Supplementary Methods, Smolenice, Czechoslovakia, 6–15 September 1971. The Commission supported this Summer School, which was sponsored by the Union. Lectures were given on 15 subjects by 19 lecturers from Europe and the U.S.A. to nearly 60 students from 15 countries in Europe.

Summarizing suggestions from members of the Commission, the Chairman proposed that three Open Commission Meetings be held at the Ninth Congress. As a result the

Commission is organizing Meetings, admitting contributed abstracts, on (i) Theoretical attack on LEED, (ii) Studies of crystal surfaces by LEED and other methods, and (iii) Gas electron diffraction. The Chairman also suggested appropriate Frontier Topics relating to electron diffraction and sessions are planned on (i) New approaches to crystal structure studies by electron diffraction, (ii) Effects of electron diffraction on back scattering and emission of electrons with particular reference to scanning electron microscopy, (iii) Diffraction contrast in high voltage electron microscopy including inelastic scattering, (iv) Dynamical diffraction by perfect and slightly distorted crystals, and (v) Precise determination of structure amplitudes by kinematical and dynamical diffraction of X-rays, electrons and neutrons.

Continued efforts on the standardization of experimental and analytical procedures and data collection and evaluation for gas electron diffraction have been made by L. S. Bartell and K. Kuchitsu, in close collaboration with other scientists working in this field, and with appropriate organizations.

#### *Commission on Neutron Diffraction*

Work has continued in the areas of interest noted in the report for 1970. In particular, the spectrometer evaluation project has been put into operation and some results of individual measurements have been received. A survey has been conducted to determine the extent of interest in the magnetic structure information project. Replies from the general scientific community, as well as from neutron diffractionists, strongly favour establishing such a project.

#### **IUCr-IMA Joint Committee on Nomenclature**

During 1971 the eight regular and two *ex officio* members considered by correspondence certain problems of nomenclature that are common to the two disciplines, especially those dealing with polytypism. A preliminary ballot indicated substantial agreement among the Committee on nearly three-quarters of the 16 propositions under consideration. The items of agreement include a modification of the definition of polytypism, restriction of the use of new mineral names for individual polytypes, but retention of well established names, restriction of the use of new mineral names for compounds that differ only by isomorphous substitution or by minor deviations in symmetry or physical properties, and definitions for epitaxy, syntaxy, and topotaxy. During 1972 these items will be considered again in a final ballot, and correspondence will be continued on a standard system of structural symbols to designate polytypes.

#### **Representation on other Bodies**

##### *Abstracting Board of the International Council of Scientific Unions*

Various meetings associated with the ICSU Abstracting Board were held in Orléans, France, 7–12 July 1971. The most important of the formal business was conducted at a General Assembly on 8 July. New statutes and by-laws were adopted, providing for incorporation in Switzerland instead of in Belgium, and for the formation of a class of national members. After adoption of the new statutes, three countries (Belgium, Canada, and the United States of America) were admitted as member countries, and two new member services (American Water Resources Association and

Engineering Index) were elected. At the second session of the General Assembly the accounts for 1970 and the budgets for 1971 and 1972 were adopted, and elections for membership of the Executive Committee were held. Other matters discussed were UNISIST and ISDS (International Serials Data System) and 'Marketing' by the member services. 'Marketing' includes not only selling, but research to discover users' needs.

A special open meeting on 'Cooperation among Editors' took place on 11 July. Several speakers outlined the problems of primary publications and the objects of associations of editors in six fields of science, and C. Weiske presented a report on past and present experiences of the Member Services of the ICSU Abstracting Board in cooperation between primary and secondary publications. After considerable discussion it was decided to set up a Joint Working Group consisting of three members from associations of editors of primary publications and three members representing the ICSU Abstracting Board. This Working Group has since held one meeting, in Paris in November, and plans to meet again in June 1972.

The next meeting of the Board will be held in Ustaoset, Norway, 23–29 June 1972.

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

The Union was not represented at the Sixth Annual Meeting of CODATA, at Washington, 19–21 July 1971.

##### *Committee on the Teaching of Science of the International Council of Scientific Unions*

One full meeting of the Committee and one meeting of officers and chairmen of sub-committees have been held during 1971 and both were attended by the Union's representative, C. A. Taylor.

A conference on 'The Education of Teachers for Integrated Science' will be held in April 1973 at the University of Maryland, U.S.A. First circulars for this are now available. It was agreed that better methods of communication between the multiplicity of organizations interested in Science Education were desirable and the 1973 Maryland Conference might provide some opportunities for wide discussion of this problem.

Volume 1 of *New Trends in Integrated Science* published by UNESCO was warmly received and consultations on the future publication policy for *New Trends* with members of the Science Teaching Division of UNESCO were held. It was reported that a contract had been signed with UNESCO to cover work to the end of 1972 in advising on the publication of *New Trends in Integrated Science*, preparatory work on the Maryland Conference and an annotated bibliography on *Integrated Science Teaching* being prepared by Dr Lockard.

A possible joint meeting to consider Material Science as a basis for cross-disciplinary approaches in Science Teaching was discussed. Individual teaching commissions of Unions were asked to consider at what points in the educational system it is desirable or essential to separate science into its separate subjects and at what points they can be coordinated or integrated in some cross-disciplinary or inter-disciplinary way.

##### *Commission on the Solid State of the International Union of Pure and Applied Physics*

The following conferences in 1971 having crystallo-

graphic interest were sponsored by the International Union of Pure and Applied Physics.

1. Third International Conference on Crystal Growth (Marseille, France, July 1971). Co-sponsored with IUCr.
2. Colour Centres in Ionic Crystals (Reading, England, September 1971).
3. Second International Conference on Light Scattering in Solids (Paris, July 1971).
4. International Conference for Solid Surfaces (Boston, U.S.A., October 1971).

For financial reasons no Commission meeting took place in 1971 and agreement on sponsorship (financial and/or moral) of conferences in 1972 was reached by correspondence. As a result, the following conferences in 1972 will be sponsored by IUPAP.

1. International Conference on Thin Films (Venice, Italy, 15–19 May 1972).
2. Second International Conference on Vapour Growth and Epitaxy (Jerusalem, Israel, 22–25 May 1972).
3. Second International Symposium on Surface Physics (Enschede, The Netherlands, 22–23 June 1972).
4. International Conference on Band Structure in Solids (Exeter, England, 3–5 July 1972).
5. Seventh International Symposium on the Reactivity of Solids (Bristol, England, 17–21 July 1972).
6. The Second International Conference on the Properties of Liquid Metals, (Tokyo, Japan, 3–8 September 1972).
7. Third International Conference on Luminescence (Leningrad, USSR, 17–22 August 1972).

Problems arising from the overlap of the dates of the Conference on Liquid Metals (Tokyo, 3–8 September 1972) and the Ninth Congress of the Union (Kyoto, 26 August–7 September 1972) were settled through correspondence with the respective Programme Committees so that crystallographers may attend the pertinent sessions of both meetings.

The IUCr representatives on the board of the Solid State Commission, E. F. Bertaut and J. M. Cowley, remind organizers of crystallographic meetings desiring IUCr and IUPAP co-sponsorship that applications should be received at least 18 months in advance by the Secretary of the Commission (E. F. Bertaut, C.N.R.S., Cedex 166, 38–Grenoble-Gare, France), and the Chairman of the (IUCr) Sub-committee on the Union Calendar, A. Linek.

*International Organisation for Crystal Growth (previously entitled: Comité International de Croissance Cristalline)*

The committee met in July at the Third International Conference on Crystal Growth (ICCG-3) at Marseille. At the previous meeting at Zürich in 1970 two constitutions were put forward, and discussed. A postal vote was then organized amongst those who attended the ICCG meetings in Boston and Birmingham. The small number of replies did not appear to justify a choice between the two proposals and a compromise constitution appeared to be called for. After prolonged discussion by the committee at Marseille such a draft compromise was finally produced, and was voted on and agreed to at a general meeting of those attending ICCG-3.

The Comité International de Croissance Cristalline is to be known in future as the International Organization for

Crystal Growth (IOCG). Its principal function will still be the sponsoring of the ICCG meetings, usually at 3 yearly intervals: the next to be in Japan in 1974. The management of the Organization is to be in the hands of a Council of 20–30 members, together with a small Executive Committee. Groups for the study of crystal growth have been set up in various countries, and are recognised as National Organizations of the IOCG. Members of these groups are automatically members of the IOCG and can attend the General Assemblies which take place at the ICCG meetings.

#### International Council of Scientific Unions

The Union was represented at the 13th ICSU Executive Committee meeting in Ottawa, Canada, 29–30 September 1971 by the President, Professor A. Guinier. The most important discussion was on the role and structure of ICSU. The report of the *ad hoc* committee, set up by the 13th General Assembly in 1970 to consider this problem, was presented. Proposals for revised Statutes and Rules of Procedure will be sent to the members of ICSU for comment, and will then be submitted to an Extra-ordinary Session of the ICSU General Assembly in Helsinki on 15 September 1972. The principle modifications proposed are in the objectives of ICSU and in its administration. Two additional objectives are proposed: to encourage international scientific activity for the benefit of mankind and to stimulate, design and co-ordinate international inter-disciplinary scientific research projects. In the administration of ICSU the General Assembly will remain unchanged; the Executive Committee will be replaced by a General Committee having the same composition and the new Executive Committee will consist of four Officers (the President, the Secretary General, the Treasurer and the President Elect) and four ordinary members, two from the Unions and two from the National Members, elected by the General Assembly from its own membership.

As a result of the work of the ICSU–UNESCO Joint Project to Study the Feasibility of a World Information System (UNISIST) an international conference was held in Paris in October 1971 and was attended by delegates representing 83 member and affiliated states of UNESCO. These delegates adopted a resolution setting in motion a programme which lead to the creation of a world scientific and technological information system.

#### Finances

The audited accounts of the Union for the year 1971 are given at the end of this Report. For comparison, the 1970 figures are provided in italics. Negative quantities are indicated by parentheses.

As a consequence of the revaluation on 20 December 1971 of currencies in relation to the U.S. dollar, a profit arose, in terms of U.S. dollars, on the total net assets of the Union held at that date. After the allocation of those amounts directly related to specific fund accounts, the balance of this profit was divided amongst the nine fund accounts with credit balances, in direct proportion to the balances on these accounts at 31 December 1971.

To ensure that all profits or losses arising as a direct result of the revaluation are reflected in the Balance Sheet at 31 December 1971, the ICSU rates adopted for the valuation of net assets at 31 December 1971 are those issued on 16 February 1972 which approximate most closely to

official rates of exchange operative after the date of revaluation. All transactions concerning the post revaluation period in the accounts (20–31 December 1971), including the end-of-year settlements with Messrs Munksgaard (*Acta Crystallographica* and the *Journal of Applied Crystallography*), Messrs Oosthoek (*Structure Reports* and other publications) and Imperial Metal Industries Ltd., Kynoch Press (*International Tables*), have been converted to dollars at the revised rates of exchange. All earlier transactions have been converted to dollars at the ICSU rates operative at 1 January 1971. These procedures are similar to those used on previous changes in exchange rates in 1961 and 1967.

The *Acta Crystallographica* account for 1971 shows a profit of \$46,967 as compared with a profit of \$71,202 in 1970. The reduction in profit is primarily due to the increase in publication and editing expenses. The publication expenses increased as a result of rising costs, and the technical editing expenses increased mainly as a result of the increase in staff. The apparent increase in the subscription income is a result of the revaluation of the Danish kroner with respect to the U.S. dollar. The actual receipts by Munksgaard were slightly lower than in 1970, with 1,965 subscribers taking both Sections of the journal, as compared with 2,027 in 1970. A large deficit is anticipated in 1971 because of the steady increase in costs, due to inflation, and the considerable increase in the number of pages being published in Section B, which is resulting from the steps taken to reduce the publication time for articles. As in previous years, the total cost of the Technical Editor's office is 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; 86% and 14% respectively for 1971. The journals' accounts have also been charged with administrative expenses as shown in the General Fund.

The *Journal of Applied Crystallography* account for 1971 shows a profit of \$2,726 as compared with \$3,155 in 1970. This reduction in profit was caused by increases in expenditure for the same reasons as for *Acta Crystallographica*. However, the number of subscriptions increased from 1177 in 1970 to 1230 in 1971. The reduced profit necessitated an increase in the subscription rates for 1972.

The *Structure Reports* account shows a deficit of \$4,265 as compared with a profit of \$8,187 in 1970. Volume 27 was published in December 1971, too late in the year for any publication expenses or sales income to appear in the 1971 accounts. Sales income was considerably lower than in 1970 because no other volume has been published since 1969. Considerable editorial work continued on several volumes which are expected to be published in the next few years, with the result that the editorial expenses for 1971 were higher than in 1970 and as high as in 1968 and 1969.

The *International Tables* account shows a profit of \$6,640 as compared with a deficit of \$3,290 in 1970. No reprinting of any volume was necessary in 1971 and sales continued steadily. A meeting of people working on the Pilot Issue

was held in Geneva, at a cost of \$2,282, and the Computer Trial Project was instigated. Salary costs and travelling expenses associated with this project totalled \$1,037.

In 1971, \$299 was received from the sale of 32 copies of *Fifty Years of X-ray Diffraction* and \$1,010, after payment of royalties, from the sale of 213 copies of *Symmetry Aspects of M. C. Escher's Periodic Drawings*. The sale of 106 copies of *Early Papers on Diffraction of X-rays by Crystals* yielded an income of \$1,071. Expenses associated with the preparation of the manuscript for Volume 2 of this publication totalled \$432 and the deficit on the fund account was reduced to \$491.

The *Molecular Structures and Dimensions* account shows a profit of \$538. The income from the sale of 555 copies of Volume 1 and 540 copies of Volume 2 was sufficient to cover all publication expenses and the resultant excess of income over expenditure was shared between the University of Cambridge and the Union in the ratio 3:1.

The General Fund account shows a deficit of \$4,656 as compared with a profit of \$9,067 in 1970. Administrative expenses were slightly higher than in 1970, and there were the additional expenses of a full meeting of the Programme Committee for the Ninth Congress and a meeting of some members of the Commission on Crystallographic Apparatus. The fourth edition of the *World Directory of Crystallographers* was published in November at a cost of \$14,499, and \$8,502 was received from the sale of 2738 copies by the end of the year. Bibliography 4, *Diffusion des Rayons X aux Petits Angles*, was printed and distributed to subscribers to the journals at a cost of \$3,656. Interest from investments and bank accounts was \$13,703 as compared with \$10,838 in 1970.

In 1971, a profit of \$649 was made on the redemption of *f*1,000 3% Nederland 1937, \$2,000 3% Nederland 1947, *f*1,000 3½% Nederland 1956, *f*3,000 4½% Nederland 1958, *f*3,000 4½% Nederland 1959, *f*2,000 4½% Nederland 1960 (II), *f*1,000 4½% Nederland 1963, *f*6,000 4½% Nederland 1964 and *f*3,000 4% Unie Van Zuid Afrika 1955. As on previous Balance Sheets the investments have been valued according to their quotations at the end of the year. Their depreciation in value, together amounting to \$3,132, has not been charged against the General Fund but has again been included as an asset on the Balance Sheet to avoid annual fluctuations in value influencing the General Fund account.

The larger part of the money with the Banks is still placed in deposit accounts, namely at the end of 1971 *f*203,988 with the Amsterdam–Rotterdam Bank N.V., \$7,019 with the First National City Bank of New York and £7,714 with the National Westminster Bank Limited. The amounts shown on the Balance Sheet for Debtors and Creditors relate to sums, principally on the publishing accounts, due at 31 December 1971. Where appropriate these amounts have now been settled.

The Balance Sheet shows that the assets of the Union have increased during the year from \$327,189 to \$397,079, excluding stocks of unsold publications.



## INTERNATIONAL UNION OF CRYSTALLOGRAPHY

## General Fund Account for the year ended 31 December 1971

	U. S. Dollars			U. S. Dollars	
	1971	1970		1971	1970
Subscription to ICSU (2% of subscriptions received from Adhering Bodies in 1970)		264	Subvention received from UNESCO through ICSU	5,250	5,250
Subscription to ICSU Abstracting Board	242	100	Grant from ICSU	—	2,000
Subscription to ICSU Committee on the Teaching of Science	100	100	Refund from ICSU of 1970 Subscription Subscriptions from Adhering Bodies	264	296
Administration Expenses:	200	200	Interest on Investments	13,000	13,300
Honoraria: General Secretary, Treasurer and Secretarial Assistance			Profit on Banking Accounts	10,108	7,570
Audit and Accountancy Charges	1,368	2,166	Net Sale of copies of <i>World Directory of Crystallographers</i>	3,595	3,268
Postages, Stationery, Printing and Sundries	960	660	3rd Edition	649	658
Travelling Expenses	687	772	4th Edition	18	11
Bank Charges and Differences on Exchange	97	205	Net Sale of Sundry Publications (Bibliographies, Book List and List of Computer Programs)	8,502	8,520
Legal Fees	832	171	Amount charged to Journals and Publications:	274	159
Executive Secretary's Office: Salary and Expenses	1,298	1,509	<i>Acta Crystallographica</i>	4,800	4,455
Depreciation of Office Equipment	15,045	13,980	<i>Journal of Applied Crystallography</i>	1,600	1,485
Meeting of Executive Committee	595	553	<i>Molecular Structures and Dimensions</i>	240	6,180
Eighth General Assembly: Printing of Report			Subvention from UNESCO for manuscript for <i>Crystallographic Computing</i>	—	4,000
Ninth General Assembly and International Congress:	1,439	—	Net Surplus from Summer School on Crystallographic Computing	—	1,268
Programme Committee Meeting	3,202	543	Excess of Expenditure over Income carried to Balance Sheet	4,656	(9,067)
Travel Expenses of IUCr Representatives on Other Bodies	234	811			
Expenses of Commissions:					
Meetings	1,194	—			
Other Expenses	—	42			
Sponsorship of Meetings	1,194	42			
<i>World Directory of Crystallographers</i> 4th Edition:	3,093	3,000			
Cost of Printing					
Editorial Honorarium and Other Expenses	11,941	—			
Cost of Printing Bibliography No. 4.	2,558	561			
Contribution towards cost of manuscript for <i>Crystallographic Computing</i>	3,656	—			
	<u>\$ 52,956</u>	<u>\$ 34,893</u>		<u>\$ 52,956</u>	<u>\$ 34,893</u>





**Fifty Years of X-ray Diffraction Account for the year ended 31 December 1971**

	U. S. Dollars	
	1971	1970
<i>Excess of Income over Expenditure carried to Balance Sheet</i>		
	299	417
	<u>\$ 299</u>	<u>417</u>
	344	73
	<u>\$ 344</u>	<u>\$ 344</u>

**Escher Drawings Account for the year ended 31 December 1971**

Binding additional copies		1,314	1,921
<i>Excess of Income over Expenditure carried to Balance Sheet</i>			
	796		
	(27)		
	<u>\$ 769</u>	<u>304</u>	<u>1,152</u>
		<u>\$ 1,010</u>	<u>\$ 769</u>

**Early Papers Account for the year ended 31 December 1971**

Preparation of manuscript and Sundry Expenses	432	1,298	1,998
<i>Excess of Income over Expenditure carried to Balance Sheet</i>			
	639	227	350
	<u>\$ 1,071</u>	<u>1,071</u>	<u>1,648</u>
		<u>\$ 1,071</u>	<u>\$ 1,648</u>

**Molecular Structures and Dimensions Account for the year ended 31 December 1971**

Publication Expenses:			
University of Cambridge	6,828	6,311	1,146
Carriage Charges	—	4,866	928
Administration Expenses	240	11,177	2,074
<i>Excess of Income over Expenditure for the Year</i>			
University of Cambridge	1,615	1,956	1,711
IUCr carried to Balance Sheet	538	—	363
	<u>\$ 9,221</u>	<u>9,221</u>	<u>\$ 1,711</u>
		<u>\$ 9,221</u>	<u>\$ 1,711</u>

We have examined the annexed Balance Sheet, and Income and Expenditure Accounts, and have obtained all the information and explanations which we considered necessary. In our opinion these accounts, together with the notes thereon, give a true and fair of the state of affairs of The Union at 31st December 1971 and of the results for the year ended on that date.

Manchester, England

31 May 1972

Signed: MANN JUDD &amp; Co.

Chartered Accountants