

International Union of Crystallography
Ninth General Assembly and International Congress of Crystallography
Kyoto, Japan, 26 August–7 September 1972

Table of Contents

Introduction and Opening Ceremony	730		
Ninth International Congress	731		
Minutes of the Ninth General Assembly			
Introduction and list of delegates	731		
<i>First Session, 27 August 1972, 3-50 p. m.</i>			
(1) Introductory remarks by the President	732		
(2) Procedural matters	732		
(3) Approval of Minutes of the Eighth General Assembly	732		
(4) Approval of Agenda	732		
(5) Replacement of Adhering Bodies	732		
(6) Change in name of Adhering Bodies	732		
(7) Withdrawal of the Adhering Body in Pakistan	732		
(8) Amendments to Statutes and By-Laws (see also Minute 33)	732		
(9) Report on the Incorporation of the Union and taxation problems	733		
(10) Report of the Executive Committee	733		
(11) Financial report	733		
(12) Reports of the Commissions	734		
(13) Commission on Journals	734		
<i>Second Session, 29 August 1972, 6-00 p. m.</i>			
(14) Commission on Journals	734		
(15) Commission on <i>Structure Reports</i>	735		
(16) Commission on <i>International Tables</i>	735		
(17) Commission on Crystal Growth	735		
(18) Commission on Crystallographic Apparatus	735		
(19) Commission on Crystallographic Computing	735		
(20) Commission on Crystallographic Data	735		
(21) Commission on Crystallographic Nomenclature	735		
(22) Commission on Crystallographic Studies at Controlled Pressures and Temperatures	736		
(23) Commission on Crystallographic Teaching	736		
(24) Commission on Electron Diffraction	736		
(25) Commission on Neutron Diffraction	736		
(26) Proposal to establish a Commission on Electron Distributions (see also Minute 34)	736		
(27) Size of Commissions	736		
(28) Reports from Representatives on bodies not belonging to the Union	737		
(29) IUPAP Commission on the Solid State	737		
(30) ICSU Abstracting Board	737		
(31) ICSU Committee on the Teaching of Science	737		
(32) Proposed changes to the Statutes and Rules of Procedure of ICSU	737		
		<i>Third Session, 6 September 1972, 9-00 a. m.</i>	
		(33) Further amendment to By-Law 2-7	737
		(34) Establishment of an <i>ad interim</i> Commission on Charge, Spin and Momentum Densities	737
		(35) Consideration of the need for and purpose of Commissions	738
		(36) Establishment of a Working Party on Information Services	738
		(37) IUCr – IMA Joint Committee on Nomenclature	738
		(38) Sub-committee on the Union Calendar	738
		(39) Discussion of the future policy of the Union	738
		(40) Budget estimates for the period until the Tenth General Assembly	738
		(41) Unit contribution for the period until the Tenth General Assembly	739
		(42) Date and place of the Tenth General Assembly	739
		(43) Confirmation of the appointment of the Editors of the publications of the Union	739
		(44) Election of Chairmen and members of Commissions	739
		(45) Election of Representatives on bodies not belonging to the Union	739
		(46) Election of Officers of the Union	739
		(47) Any other business	740
		<i>Closing Ceremony, 6 September 1972, 11-55 a. m.</i>	
		Exhibition of photographs	740
		Votes of thanks	740
		Annex I: Appendices to the Agenda of the Ninth General Assembly	741
		(A) Report of the Executive Committee	741
		(B) Financial report	743
		(C) Reports of the Commissions of the Union	748
		(D) Reports of the Representatives on bodies not belonging to the Union	753
		(E) Report of the IUCr – IMA Joint Committee on Nomenclature	755
		(F) Summary of the activities of the Sub-committee on the Union Calendar	756
		(G) Budget estimates for the period until the Tenth General Assembly; determination of the unit contribution	756
		Annex II: Statutes and By-Laws of the Union	758
		Annex III: Memberships of Committees and Commissions, and Representatives on other bodies	767
		Annex IV: Adhering Bodies and National Committees for Crystallography	770

Introduction and Opening Ceremony

By invitation of the Science Council of Japan, the Ninth General Assembly and International Congress of Crystallography were held at the Kyoto International Conference Hall, Kyoto, Japan, 26 August–7 September 1972.

The meetings were attended by 1263 scientists of whom 761 were from Japan and the remainder from the following 30 countries: Australia, Belgium, Brazil, B.R.D., Canada, Chile, Czechoslovakia, D.D.R., Finland, France, Hong

Kong, Hungary, India, Iran, Israel, Italy, Netherlands, New Zealand, Norway, Poland, Portugal, South Africa, Spain, Sweden, Switzerland, U.K., U.S.A., USSR, Venezuela and Yugoslavia.

The General Assembly and Congress were opened formally on the afternoon of 27 August. The opening ceremony commenced with music by five Koto players, after which the General Secretary of the Organizing Committee, Professor Y. SAITO, introduced the speakers. Speeches of welcome were made by Professor Y. OCHI, President of the

Science Council of Japan, and by Professor S. MIYAKE, Chairman of the Organizing Committee. Professor A. GUINIER, President of the IUCr, replied on behalf of the Union. Professor I. NITTA then presented the Congress Discourse entitled *Japan's Participation in Research on Crystals*. This Congress Discourse has since been published in *Acta Crystallographica* [(1973). A29, 315–322].

Ninth International Congress

Scientific programme

The scientific programme included (i) the Congress Discourse by I. NITTA mentioned above, (ii) three General Lectures, *Crystallography and Biology* by D. C. PHILLIPS, *Electron Diffraction and Microscopy in Japan, Past and Present* by R. UYEDA and *Perfect Crystals and Imperfect Neutrons* by C. G. SHULL, (iii) approximately 510 papers relevant to the Frontier Topics selected for consideration at the Congress and (iv) the book of Collected Abstracts. In addition, the Commissions of the Union organized 13 Open Commission Meetings, contributed papers being accepted for 10 of these meetings, and several *ad hoc* sessions were held. The General Lecture by Professor Shull has since been published in the *Journal of Applied Crystallography* [(1973). 6, 257–263] and Professor Uyeda's lecture will be published in the same journal.

According to the arrangements made by the Programme Committee, and approved by the Executive Committee, each participant was allowed to submit only one abstract. The organizing chairmen for each topic were responsible for the selection of papers to be presented and for the time allocated to speakers. All the abstracts submitted were printed, by direct reproduction of the typescript copy supplied by the authors, in the book of Collected Abstracts and in a Supplement to *Acta Crystallographica*, Section A. A copy of the Supplement was sent to all subscribers to *Acta Crystallographica* and the *Journal of Applied Crystallography*.

Exhibitions

Four exhibitions were held in the Kyoto International Conference Hall, namely an exhibition of commercially available equipment for use in crystallography and allied fields, an exhibition of books and other publications of crystallographic interest, and exhibitions of non-commercial equipment and of photographs.

Social arrangements

A reception by the Science Council of Japan and a concert by the Kyoto Symphony Orchestra were given to all Congress participants. A Congress Banquet and an all-day excursion, either to Nara or to Lake Biwa and Mount Hiei, were also arranged. An extensive programme of visits and activities was provided, mainly for wives accompanying Congress participants.

Minutes of the Ninth General Assembly *

Introduction and list of delegates

Sessions of the General Assembly were held on the afternoon of Sunday 27 August, the evening of Tuesday 29

* These Minutes have been prepared by J. N. King, Executive Secretary, under the authority of D. W. J. Cruickshank, former General Secretary of the Union and Secretary of the General Assembly.

August and the morning of Wednesday 6 September. The following list shows the names of the official delegates appointed by the Adhering Bodies and of the alternates who substituted at one or more sessions. The names are listed by the countries to which the respective Adhering Bodies belong and the number of votes of the Adhering Body is given in parenthesis after the name of each country. The names of the chairmen of the delegations are printed in bold type, those of alternates are marked by an asterisk. The names of officially appointed delegates who were not present at any session of the Assembly are not included.

- Australia* (3): **B. Dawson**, H. C. Freeman, E. N. Maslen.
B.R.D. (4): **Th. Hahn**, E. Hellner* (present only on 6 September), H. Jagodzinski (absent on 6 September), F. Liebau, K. Molière.
Canada (3): F. R. Ahmed, L. D. Calvert* (present only on 29 August), **S. C. Nyburg** (absent on 29 August), J. Trotter.
Chile (1): M. Suwalsky (absent on 6 September).
Czechoslovakia (1): J. Garaj.
D.D.R. (2): **O. Brümmer**, H. Peibst.
Finland (1): M. Kantola.
France (4): A. Authier, E. F. Bertaut, G. Champier*, **S. Goldsztaub**.
Hungary (1): P. Gadó (absent on 27 August).
India (1): A. R. Verma.
Israel (1): F. H. Herstein.
Italy (3): **G. Allegra**, G. Cocco, M. Mammi.
Japan (4): S. Hosoya, M. Kakudo, **S. Takagi**, Y. Saito.
Netherlands (3): **D. Feil**, G. D. Rieck (absent on 6 September), C. Romers, P. M. de Wolff* (present only on 6 September).
New Zealand (1): B. R. Penfold.
Norway (1): C. Rømning.
Poland (1): K. Łukasiewicz.
South Africa (1): J. N. van Niekerk (absent on 6 September), M. J. Laing* (present only on 6 September).
Spain (3): **M. Font-Altaba**, S. Martínez-Carrera, C. Miravittles.
Sweden (2): **S. Abrahamsson**, I. Olofsson.
Switzerland (2): **J. D. Dunitz**, W. M. Meier.
U.K. (5): U. W. Arndt, O. S. Mills, D. C. Phillips, **H. M. Powell**, A. J. C. Wilson.
U.S.A. (5): **S. C. Abrahams**, W. R. Busing, W. C. Hamilton, G. A. Jeffrey, J. Karle.
USSR (5): G. B. Bokoy (absent on 27 August), V. A. Frank-Kamenetsky, E. I. Gladyshevsky* (present only on 27 August), **M. A. Poray-Koshits**, S. P. Solovyev* (present only on 27 August), V. I. Startsev (absent on 27 August), V. I. Iveronova.

No delegates had been appointed by the Adhering Bodies in Argentina, Austria, Belgium, Brazil, Denmark and Yugoslavia.

Present as members of the Executive Committee: A. Guinier (President; Chairman of the General Assembly), F. Laves, **B. E. Warren** (Vice-Presidents), D. W. J. Cruickshank (General Secretary and Treasurer), N. V. Belov (Immediate Past President), D. C. Hodgkin, N. Kato, A. Linek, A. McL. Mathieson, **B. K. Vainshtein** (Ordinary Members), together with D. P. Shoemaker as deputy for W. H. Zachariasen. J. N. King (Executive Secretary) was also in attendance.

First session, Sunday 27 August 1972, 3:50 p.m.**(1) *Introductory remarks by the President***

A. GUINIER welcomed the delegates and the observers to whom he introduced the members of the Executive Committee. He explained that one member, W. H. Zachariassen, was unable to attend the meeting of the Executive Committee in Kyoto for medical reasons. In conformity with By-Law 2.4, Professor Zachariassen had designated D. P. Shoemaker as his deputy at the meetings of the Executive Committee and hence Professor Shoemaker sat with the Executive Committee on the platform during the sessions of the Ninth General Assembly.

(2) *Procedural matters*

In order to verify the list of voting delegates, the President requested the General Secretary to read this list and the delegates to raise their hands when their names were called. [This procedure was repeated at the beginning of the second and third sessions on Tuesday 29 August and Wednesday 6 September respectively.]

Two delegates, B. R. Penfold (New Zealand) and C. Rømming (Norway), were appointed to act as tellers when votes had to be counted during the Assembly.

(3) *Approval of Minutes of the Eighth General Assembly*

These minutes were approved and two copies were signed by the President and the General Secretary, in accordance with By-Law 1.13.

(4) *Approval of Agenda*

The Agenda and Appendices to the Agenda had been distributed to Secretaries of National Committees and to all members of Commissions on 16 June 1972. This Agenda was now approved by the delegates. The President remarked that there were many items on the Agenda and that it was important to give sufficient time to the most important items.

(5) *Replacement of Adhering Bodies*

(a) The replacement of the Israel Crystallographic Society by the Israel Academy of Sciences and Humanities as the Adhering Body in Israel, which had been approved and accepted *ad interim* by the Executive Committee in December 1970, was reported to and accepted by the General Assembly. The following membership of the National Committee for Crystallography was reported: F. H. Herbstein (Chairman), D. Rabinovich (Secretary) and U. Shmueli (Treasurer).

(b) The replacement of the Société Suisse de Minéralogie et de Pétrographie by the Schweizerische Gesellschaft für Kristallographie as the Adhering Body in Switzerland, which had been approved and accepted *ad interim* by the Executive Committee in December 1969, was reported to and accepted by the General Assembly. The following membership of the National Committee for Crystallography was reported: W. Nowacki (Chairman), J. D. Dunitz (Secretary), E. Ascher, P. Engel, E. Kaldis and F. Laves.

(6) *Change in name of Adhering Bodies*

(a) The change in name of the Adhering Body in India from the National Institute of Sciences of India to the Indian National Science Academy had been reported to the Executive Committee in September 1970. This change was now reported to the General Assembly.

(b) In April 1972 the General Secretary had been informed of the intended change in the name of the Adhering Body in the Federal Republic of Germany from the Sektion für Kristallkunde of the Deutsche Mineralogische Gesellschaft to the Arbeitsgemeinschaft Kristallographie. This change had been approved by the Sektion für Kristallkunde and was subject to ratification by the three sponsoring societies of the Arbeitsgemeinschaft Kristallographie, namely the Deutsche Mineralogische Gesellschaft, the Gesellschaft Deutscher Chemiker and the Deutsche Physikalische Gesellschaft. The President reported that the latter two societies had now ratified the change and the Deutsche Mineralogische Gesellschaft was expected to do so in September 1972.

Professor Th. Hahn, Chairman of the National Committee for Crystallography, had informed the General Secretary that the change had been proposed in order to broaden the basis of the Adhering Body to include the physical and chemical societies. The membership of the Sektion für Kristallkunde would be retained within the new Adhering Body, which would have the same objectives. The membership of the National Committee and the Category of Adherence would remain unchanged.

In accordance with the recommendation of the Executive Committee, the General Assembly recognised this change subject to final ratification by the Deutsche Mineralogische Gesellschaft. [The Deutsche Mineralogische Gesellschaft ratified the change on 29 September 1972.]

(7) *Withdrawal of the Adhering Body in Pakistan*

The subscriptions to the Union from the Adhering Body in Pakistan, the Pakistan Council for Scientific and Industrial Research (P.C.S.I.R.), for the years 1969 onwards had not been paid. Before taking action in accordance with Statute 9.6, correspondence was exchanged with Dr M. M. Qurashi, Secretary of the National Committee for Crystallography in Pakistan, in an attempt to seek a solution to the difficulties. However, in April and June 1971, Dr Qurashi reported that the Pakistan Government had declared adherence to and participation in such scientific organizations as unnecessary, and that it was impossible to pay the current and overdue subscriptions to the Union, in any form whatever. Under these circumstances Dr Qurashi, on behalf of the P.C.S.I.R., requested with regret that it withdraw from the Union, as from 1969.

At its meeting in Marseille in July 1971, the Executive Committee agreed to suspend the membership of the P.C.S.I.R. and to recommend to the General Assembly that its withdrawal from the Union be accepted as from 1 January 1969.

The General Assembly accepted with great regret the withdrawal of the P.C.S.I.R. from the Union as from 1 January 1969 and emphasized that individual Pakistani crystallographers would be welcome at meetings of the Union.

(8) *Amendments to Statutes and By-Laws (see also Minute 33)*

For the period between the Eighth and Ninth General Assemblies, when the Union had two Vice-Presidents, Section 14 of the Statutes (headed Interim Statutes) stipulated which Vice-President should substitute for the President if the need arose. As from the end of the Ninth General Assembly the Union would have only one Vice-President and hence this provision was not required. The General

Assembly noted that, as stated in Statute 14.2, Section 14 would be deleted at the end of the Ninth General Assembly.

A list of amendments to the By-Laws proposed by the Executive Committee was sent to the National Committees and Commissions on 16 June 1972, as Appendix 6.2 to the Agenda. By correspondence, the U.S.A. National Committee for Crystallography had suggested to the Executive Committee that the proposed amendments to By-Laws 2.6 and 2.7 be modified and the Executive Committee now proposed the deletion of the suggested additional words 'or are disabled in the sense of By-Law 2.3' from each of these By-Laws. These deletions were proposed because the meaning of 'disability' in By-Law 2.3 was not explicit, although it might be determined implicitly from the context of By-Law 2.3.

The General Secretary explained that the proposed amendment to By-Law 2.8 was intended to improve liaison between the Executive Committee and the National Committees. In reply to a request from S. C. NYBURG (Canada) for distribution of the Programme Committee meeting minutes to National Committees, the General Secretary observed that the main work of the Programme Committee would be reported to the National Committees through the summaries of the draft minutes of the Executive Committee meetings and through the IUCr Newsletters, if the proposed amendment to By-Law 2.8 was adopted.

The General Secretary explained that the proposed amendment to By-Law 6.2 resulted from the instruction of the Eighth General Assembly to the Executive Committee to consider the provision of financial support from the Union funds to encourage inter-Congress meetings of the Commissions (see Eighth General Assembly, Minute 46). F. R. AHMED (Canada) asked whether the new provisions of By-Law 6.2 should be defined to apply to inter-Congress or Congress meetings. The General Secretary replied that funds could not possibly be provided for the travelling expenses of all members of Commissions to attend Congresses and he suggested that this question should be left undetermined and at the discretion of the Executive Committee.

The revised amendments to By-Laws 2.6 and 2.7 and the amendments to By-Laws 2.8 and 6.2 were adopted. [By-Law 2.7 was amended further by the General Assembly on Wednesday 6 September (see Minute 33)]. The amended Statutes and By-Laws are printed as Annex II to these Minutes.

(9) *Report on the Incorporation of the Union and taxation problems*

The Treasurer reported that the Union became incorporated in Geneva, Switzerland on 16 August 1969, by virtue of the resolution of incorporation adopted by the General Assembly on that data, and that the legal processes had now been completed with the registration of the Union at the Commercial Registry in Geneva on 24 February 1972. The seven employees of the Union in Chester were employed by this Swiss association. The Union had received exemption from Swiss federal and cantonal taxation, and could make use of the Double Taxation Agreements between Switzerland and other countries.

The Union had received exemption from U.K. taxation on interest from investments and bank deposits. The Union's auditor had not considered it necessary to make provision for any taxation liability in the accounts for 1970 or 1971.

(10) *Report of the Executive Committee*

The report of the Executive Committee on the activities of the Union since the Eighth General Assembly had been submitted to the National Committees and the Commissions in June 1972, in accordance with Statute 6.8, and follows these Minutes as Annex I, Appendix A.

The General Secretary reported on the present staff employed by the Union. He explained that he had been able to undertake the combined office of General Secretary and Treasurer, when Dr Boom resigned as General Secretary in April 1970, only because of the help given by the Executive Secretary. The papers for the General Assembly and the Executive Committee meetings had been prepared by the Executive Secretary, and Professor CRUICKSHANK observed that his work had been eased immensely and the administration of the Union's affairs had been improved by Dr King's appointment.

The report of the Executive Committee was accepted without further discussion.

(11) *Financial report*

A financial report, covering the calendar years 1969, 1970 and 1971, had been prepared by the Treasurer and had been submitted to the National Committees and the Commissions in June 1972. This report follows these Minutes as Annex I, Appendix B.

The Treasurer drew attention to the facts that there had been annual rises in costs of 8–10% during the period covered by the report, and that devaluation effects had been shared between the various fund accounts. The total assets of the Union had risen from \$234 000 to \$397 000, of which \$203 000 was represented by investments. With reference to the *Acta Crystallographica* account he pointed out that the increase of the accumulated balance to \$146 000 at the end of 1971 resulted mainly from the increase in subscription rates for 1970 and 1971 but also from the low publication rate in 1971. The backlog of unpublished articles was being eliminated in 1972 and a deficit should be expected on the account for 1972. Even so, a balance of \$146 000 was only equivalent to the publication costs for a period of about 6 months and could not be considered excessive.

The *Journal of Applied Crystallography* Account had been opened in 1968 by the transfer of \$15 000 from the General Publications Fund. The journal had been sufficiently profitable for this money to be transferred back to the General Publications Fund in 1969.

For the General Fund of the Union, which covers the expenses of the Executive Committee and Conferences, the accumulated balance had increased from \$39 000 at the end of 1968 to \$52 000 at the end of 1971. The Treasurer compared the accounts for the triennium 1969–1971 with the budget for the period which had been approved by the Eighth General Assembly in 1969. These accounts showed a favourable variant of \$17 872 from the budget, including \$2259 profit on revaluation in December 1971. However, since a deficit of \$5400 had been allowed for in the budget, the actual excess of income over expenditure for the General Fund was \$12 472. The major sources of additional income were the excess yield of \$8029 on interest from investments and banking accounts, and a special grant of \$2000 from ICSU in 1970 to help offset the expenses of the salaried Executive Secretary. The administrative expenses of the Union remained approximately constant during the triennium, but the net cost was \$5307 more than estimated. This increase was not due to expenses attribut-

able to the Executive Secretary, which had been slightly lower than anticipated, but to increases in other expenses. Appreciably less was spent on meetings than was anticipated, particularly on scientific meetings because of the lack of requests for financial support of suitable meetings. In addition, the Summer School on Crystallographic Computing, organized by the Commission on Crystallographic Computing and held just prior to the Eighth Congress, had showed a net surplus of \$1268. The major cause of the increase in the cost of incidental publications was the publication of the Fourth Edition of the *World Directory of Crystallographers* in November 1971. By the end of 1971 sales income had reduced the net cost of this publication to about \$3500, a sum comparable with the cost of printing and distributing Bibliography 4, which was issued to subscribers to the Union's journals in 1971. The General Assembly expressed its thanks with applause to Dr Boom for editing the Fourth Edition of the *World Directory of Crystallographers*.

G. A. JEFFREY (U.S.A.) observed that there would have been no apparent profit on revaluation of currencies if the Union's accounts had been expressed in Swiss francs instead of U.S. dollars. M. A. PORAY-KOSHITS (USSR) considered the administrative expenses to be too high and requested that they be reduced. In reply to a question from E. F. BERTAUT (France), the Treasurer explained that the money in the General Publications Fund represented subventions received to launch *International Tables*. S. C. ABRAHAMS (U.S.A.) commented on the large sums paid out as publishers' commissions. The Treasurer explained that, for each publication, the Union paid a publisher to handle sales and distribution but that the Union owned the publications. In the case of Oosthoek Publishing Company, the Union paid a commission on printing costs and a further commission on sales (15–20%). All postage and distribution costs were met by Oosthoek out of their commission. For *Acta Crystallographica* and the *Journal of Applied Crystallography* the Union had contracts with Munksgaard who received a commission of 12½% on all subscription income, for which they were required to invoice and collect subscriptions, distribute the journals and deal with enquiries as well as maintain a satisfactory standard of printing. The Treasurer agreed that a commission of 12½% on the increased subscriptions for *Acta Crystallographica* Section B represented a large amount of money and the Union might endeavour to reduce this commission.

The financial report was accepted unanimously and, in accordance with Statute 5·10 (i), the Treasurer and any other Officer or Chairman of a Commission were released from financial or other liability to the Union. On the motion of B. DAWSON (Australia), the Assembly expressed its thanks to the Treasurer for his work and his masterly exposition of the accounts.

(12) Reports of the Commissions

According to Statute 8·4 the reports of the Commissions and their activities since the Eighth General Assembly were distributed to the National Committees and the Commissions in June 1972. They are reprinted as Annex I, Appendix C, to these Minutes. The reports were taken as read, but the Chairman of each Commission, or his substitute, was invited to say a few words about any further developments. These verbal reports are summarized in Minutes 13 and 15–25.

The President thanked all Chairmen and members of Commissions for their work which was of benefit to the crystallographic community. He believed that better communication was required between the Commissions and the National Committees, and he suggested that the IUCr Newsletters might be used to make known rapidly the main results of the Commissions.

(13) Commission on Journals

The President referred to the report by the Executive Committee on developments affecting the journals in the last three years. The appointment of additional technical editing staff by the Executive Committee and the move of the printers into new, larger premises had enabled the backlog of manuscripts to be eliminated and the average publication times to be reduced greatly. The scheme for the voluntary deposition of material had been introduced and the first Short Structural Papers were about to be published. He urged all delegates to influence their colleagues to use this short form for articles when appropriate.

The Chairman of the Commission and Editor of *Acta Crystallographica*, A. J. C. WILSON, drew delegates' attention to the written report of the Commission. He observed that the average publication time for articles in the September 1973 issue of *Acta Crystallographica* Section B would be 6·2 months, which was the lowest publication time for this journal since 1952. He hoped that this speed of publication could be maintained as it was almost the shortest time attainable with the present method of printing. The Commission would consider whether appreciably shorter times could be obtained by other publication techniques and whether these means would be desirable. He reported that *Notes for Authors* was in proof and would be published before long.

The Co-Chairman of the Commission and Editor of the *Journal of Applied Crystallography*, R. A. YOUNG, regretted that the number of good papers being submitted for the journal had not increased in 1972 and that the number of personal subscribers remained small. He was concerned also at the overlap in content between the journal and Section A of *Acta Crystallographica*. However, he was pleased that some people considered the journal to be very good and that the publication time was now reasonably short. He hoped to reduce this time further, especially by reducing the time taken to accept a paper, and to increase the number of lead articles and meeting reports.

In reply to questions A. J. C. WILSON reported that the *Acta Crystallographica* Indexes for 1970 and 1971 had been prepared and would be published shortly. He hoped that the 1972 Indexes would be published early in 1973. The ten-year Index for 1958–1967 had been sent to the printers but its typesetting had been delayed.

The President suggested that any discussion of the future policy regarding the journals should be postponed until the next session of the Assembly. He then adjourned the meeting at 6·10 p.m.

Second Session, Tuesday 29 August 1972, 6·00 p.m.

(14) Commission on Journals

In view of the continuing increases in publishing costs, the necessity to increase the subscription rates for *Acta Crystallographica* from 1 January 1973 and the recent changes introduced as economy measures, the President invited the General Assembly to discuss desirable trends in the future policy for the journals.

The Treasurer announced the new subscription rates for *Acta Crystallographica*. He explained that the *Acta Crystallographica* account was expected to show a loss of about \$25 000 for 1972, mainly because of the publication of the large backlog of material, and that a loss of the order of \$12 000 was expected for 1973 if the prices were not increased. He emphasized that these rates had been set at the lowest levels needed to balance the account for 1973. The prices for the *Journal of Applied Crystallography*, which were increased for 1972, had not been altered for 1973. He also announced the additional charges for North American subscribers for the compulsory air-freight service which was being introduced in 1973 at the request of the U.S.A. National Committee. The U.S.A. delegation confirmed that it accepted the arrangement and the charges, whilst the Canadian delegation undertook to make its views known later to the Treasurer. [The Canadian delegation subsequently informed the Treasurer that it was in favour of the above arrangements.]

B. R. PENFOLD (New Zealand) enquired about the possibility of air-freight services to other countries. The Treasurer replied that there was a minimum weight for such services, which would make smaller deliveries very expensive. He observed that individual subscribers could receive their journals by air mail on payment of the extra postal charges.

(15) Commission on Structure Reports

W. B. Pearson, who had been Chairman of the Commission and Editor of *Structure Reports* since 1960, resigned from these posts on 1 July 1972. His successor, J. TROTTER, explained that he would be concerned with the volumes of *Structure Reports* for 1971 onwards, whilst Dr Pearson would retain responsibility for the volumes covering the period 1963–1970. The President's expression of gratitude to Dr Pearson for his enormous efforts over so many years was greeted with applause.

Whilst the Executive Committee agreed that the Commission and its new Chairman must continue their present work, the President invited comments on possible future major improvements or changes to *Structure Reports*. In view of the rapid increase in the number of structure determinations being undertaken, W. B. PEARSON requested that the Union also concern itself with data banks for structure work. He believed that the next three years might be crucial in initiating such an involvement. J. D. DUNITZ (Switzerland) wondered whether the publication of critical structure reports should be continued. He considered that such a system was only workable as long as the time required for critical evaluation remained reasonable.

The General Secretary referred to the possibility of setting up a major working party to look into the questions of storage, retrieval and dissemination of crystallographic information. During the subsequent discussion it became clear that there was a need for a separate working party, not just a meeting between those Commissions of the Union concerned with publications, with wide terms of reference. The General Assembly asked the Executive Committee to set up a Working Party on Information Services to look at the questions of publication, storage, retrieval and dissemination of crystallographic information (see also Minute 36).

(16) Commission on International Tables

TH. HAHN, deputizing for the retiring Chairman of the Commission and Editor of *International Tables* (N. F. M. Henry), reported that the manuscript for Volume IV was

with the printers and that Part 1 and Part 2 of the Pilot Issue had just been distributed to the laboratories participating in the trial. Part 3 had been distributed in 1969 and Part 4 would be distributed later in 1972. [Part 4 was actually distributed in April 1973.] The President's proposal that a telegram of congratulations be sent to Dr Henry was carried with applause.

(17) Commission on Crystal Growth

Neither the Chairman nor any elected members of the Commission were present in Kyoto, but S. C. ABRAHAMS had been asked to report to the General Assembly. He observed that work was continuing on the projects for (i) a convention for the description of polar inorganic structures, (ii) a compilation of etch-figure and piezoelectric data and (iii) the production of a list of scientific or educational films on crystal-growth phenomena. The Commission maintained close contact with the International Organization for Crystal Growth and regional organizations, and with the organization of the Second International Spring School on Crystal Growth. He drew the delegates' attention to the *Compilation of Crystal Growers and Crystal Growth Projects*, which had been prepared by the Research Materials Information Center at the Oak Ridge National Laboratory, U.S.A.

(18) Commission on Crystallographic Apparatus

In his supplementary report, the Chairman of the Commission, A. MCL. MATHIESON, reported that the Small-Angle Scattering Absolute Intensity Project was just getting under way, and he expected that Phase II of the Single-Crystal Intensity Measurement Project would be completed by the end of 1972. He observed that another survey of films might be usefully undertaken, because of the increase in automatic film scanning.

The President congratulated Dr Mathieson on the activity of the Commission.

(19) Commission on Crystallographic Computing

F. R. AHMED, the Chairman of the Commission, reported that Part I of the *Standard Tests for Crystallographic Computer Programs* was about to be published [*Acta Cryst.* (1972), A 28, 365–393], and that the Third Edition of the *World List of Crystallographic Computer Programs* had been submitted for publication in the *Journal of Applied Crystallography* [(1973), 6, 309–346]. It was hoped that continued updating of this List could be maintained through personal contacts, and Dr Ahmed sought the cooperation of National Committees in this task. The Commission hoped to hold a Summer School in Czechoslovakia prior to the Tenth Congress.

(20) Commission on Crystallographic Data

The Secretary of the Commission, D. G. WATSON, deputizing for the Chairman, observed that one of the tasks of the Commission was to act as a clearing house for activities being undertaken in the field of crystallographic data, and that several such activities were listed in the Commission's report.

(21) Commission on Crystallographic Nomenclature

J. D. DUNITZ (Switzerland) suggested that the Union should accept the nomenclature rules adopted by other international Unions in so far as they applied to crystallography and that referees should be instructed accordingly. The Chairman of the Commission, A. J. C. WILSON, undertook to look into the matter.

(22) *Commission on Crystallographic Studies at Controlled Pressures and Temperatures*

The Chairman of the Commission, H. J. MILLEDGE, apologized for the absence of any report on the work of the Commission. She observed that a meeting on Crystalline Transitions at High Temperatures had been held in Odeillo, France and that the Commission would now concern itself with the preparation of standards for use at high temperatures and high pressures, possibly in collaboration with IUPAC and IUPAP. E. N. MASLEN (Australia) requested that the Commission be concerned also with the establishment of transitions suitable for checking methods of measuring low temperatures.

(23) *Commission on Crystallographic Teaching*

The Chairman of the Commission, C. A. TAYLOR, observed that there were trends towards introducing aspects of crystallography in the teaching of young children, and using crystallography as a bridge topic in teaching integrated science. The Commission was considering the possibility of translating Dr E. A. Wood's book, *Crystals - A Handbook for School Teachers*, into other languages.

Details of the new learning materials in the field of crystallography prepared with the assistance of the Commission, under the UNESCO Pilot Project on the Teaching of Crystallography in relation to the Physics and Chemistry of Solids, had been published [*Acta Cryst.* (1972). A28, 361-362; *J. Appl. Cryst.* (1972). 5, 251-252] and the materials could be obtained from A. Authier, a Commission member.

(24) *Commission on Electron Diffraction*

The report of the Commission was received.

(25) *Commission on Neutron Diffraction*

The Chairman of the Commission, L. M. CORLISS, reported that the latest revision of neutron scattering amplitudes had been published [*Acta Cryst.* (1972). A28, 357-358] and that subscriptions were being received for the magnetic structure data-sheet service which had been introduced [*Acta Cryst.* (1972). A28, 474].

(26) *Proposal to establish a Commission on Electron Distributions (see also Minute 34)*

The General Secretary summarized the proposal made by the French National Committee for the establishment of a Commission on Electron Distributions, with the main objective of continuing the organization of the Sagamore Conferences on electron charge, spin and momentum densities. He reported that the Executive Committee recommended to the General Assembly that this Commission should be established, although it appreciated that this could lead to the establishment of many other Commissions whose primary object was to organize meetings. This point of view had been discussed carefully by the Executive Committee in the light of the fact that the Sagamore meetings were supported by the Union already. The Executive Committee favoured calling this body a Commission although, if in a few years the Union had many such meeting-orientated Commissions, it might become advisable to change the name.

E. N. MASLEN (Australia) expressed support of the Commission's aims but suggested that its title might be more appropriately 'Commission on Charge, Spin and Momentum Densities'.

In reply to a question from W. C. HAMILTON (U.S.A.) the President confirmed that the Union would not be liable to give financial support to this Commission to the exclusion of other meetings. F. LIEBAU (B.R.D.) suggested that the Union should not sponsor meetings which were not publicly announced and the General Secretary undertook to bear this point in mind in determining the terms of reference. E. F. BERTAUT (France), one of the organizers of past Sagamore meetings, explained that they did not wish to continue the organization of these meetings on a private basis. Several speakers suggested that the Commission should be set up for a limited period, possibly for three years, and concern was expressed that the establishment of this Commission would lead to the creation of many more similar Commissions on topics of very specific and limited interest. The delegates from Switzerland opposed the proposal to create this Commission because they believed that the Commissions of the Union should be concerned with such matters as publication, education and standards, and not with the organization of meetings. Some delegates had attended previous Sagamore meetings and spoke highly of these meetings, but other delegates did not see the need to establish a Commission just to maintain the organization of these meetings. M. M. WOOLFSON (U.K.) considered that the proper function of Commissions was to serve a general need of a substantial number of crystallographers, not a small need as for the case under consideration.

Some support was expressed for Union involvement in the field of accurate determination of charge, spin and momentum densities. E. F. BERTAUT (France) spoke in favour of such work. Some confusion then became apparent as to whether it was intended that the Commission would be involved mainly in such accurate determinations or mainly in the organization of meetings. At the suggestion of G. A. JEFFREY (U.S.A.) it was agreed to refer this question back to the French delegation, with the request that they submit a new proposal for consideration at the final session of the General Assembly (see Minute 34).

(27) *Size of Commissions*

In accordance with Statute 5.10 (d), the Assembly had to determine the numbers of persons to be elected on the Commissions until the Tenth General Assembly. The General Secretary read out the amended version of Appendix 19 to the Agenda, which listed the number of elected members as recommended by the Commission concerned and by the Executive Committee. The General Assembly approved these numbers which were as follows (the Chairmen of the Commissions not included):

Commission on Journals	0
Commission on <i>Structure Reports</i>	0
Commission on <i>International Tables</i>	0
Commission on Crystal Growth	7
Commission on Crystallographic Apparatus	7
Commission on Crystallographic Computing	7
Commission on Crystallographic Data	8
Commission on Crystallographic Nomenclature	0
Commission on Crystallographic Studies at Controlled Pressures and Temperatures	6
Commission on Crystallographic Teaching	9
Commission on Electron Diffraction	9
Commission on Neutron Diffraction	7

(28) *Reports from Representatives on bodies not belonging to the Union*

In accordance with Statute 8-5, the reports of the Representatives on bodies not belonging to the Union had been submitted to the National Committees and to the Commissions in June; they are reprinted as Annex I, Appendix D, to these Minutes. The reports were taken as read but the Representatives were invited to inform the Assembly of any further developments.

The Representative on the Conference Committee of the European Physical Society had nothing further to add. The Representatives on the International Organization for Crystal Growth and the ICSU Committee on Data for Science and Technology were not present. The supplementary remarks of the other Representatives are summarized below in Minutes 29-31.

(29) *IUPAP Commission on the Solid State*

E. F. BERTAUT, one of the Representatives of the Union, emphasized the need for early applications for sponsorship of meetings, particularly if joint IUPAP and IUCr sponsorship was being sought.

(30) *ICSU Abstracting Board*

A. J. C. WILSON, the Union Representative, reported that France had been admitted as a member country, and the American Institute of Physics, *Excerpta Medica* and the U.S. National Library of Medicine as member services at the recent meeting in Norway.

(31) *ICSU Committee on the Teaching of Science*

C. A. TAYLOR, the Union Representative, reported that Volume 2 of *New Trends in Integrated Science* should be completed by the end of 1972, and that crystallography would play a significant part in the proposed meeting on materials science which would probably be held in 1974 or 1975.

(32) *Proposed changes to the Statutes and Rules of Procedure of ICSU*

The President explained that he would be representing the Union at the General Assembly and Extra-ordinary General Assembly of ICSU being held in Helsinki in September 1972, when changes to the Statutes and Rules of Procedure would be considered. The changes proposed were intended to emphasize the international scientific role of ICSU and to improve the efficiency and reduce the administration expenses by the establishment of a new eight-member Executive Committee, which would direct the affairs of ICSU between General Assemblies and would take over the main duty of the present 35-member Executive Committee. The latter committee would be renamed the General Committee. An Appendix outlining these changes had been sent to National Committees in June. Since then a revised version of the proposed changes had been received from ICSU and a paper on these new changes was distributed to delegates attending the IUCr Assembly. These changes included the alteration of the term 'National Member' to 'Institutional Member', in an attempt to take political difficulties out of the affairs of ICSU. S. C. ABRAHAM (U.S.A.) suggested that the Union should consider modifying its Statutes in a similar way, if the term 'Institutional Member' was accepted by ICSU.

The President proposed that, unless the IUCr Assembly had any objections, he should vote in favour of these changes if this appeared to be appropriate at the Helsinki meeting.

There was no such objection. [The Statutes and Rules of Procedure were revised further before being adopted by the ICSU General Assembly and the terms 'National Member' and 'Scientific Unions' were retained.] The President then adjourned the meeting at about 9-00 p.m.

Third Session, Wednesday 6 September, 9-00 a.m.(33) *Further amendment to By-Law 2-7*

The General Secretary reported that, in view of the discussion at the first session of the General Assembly on the old and new forms of By-Law 2-7 concerning postal ballots, and of the possibility that 'a simple majority of the Officers specified by Statutes 6-1 and 6-3' could actually require a greater number of affirmative votes than 'two-thirds (fractional parts neglected) of these Officers, excluding any who have resigned or died', the Executive Committee believed it would be simpler to abolish the difference in voting procedures between 'routine or procedural matters' and other matters, and to adopt a single procedure for postal ballots. Accordingly the Executive Committee proposed by notice given on 29 August that By-Law 2-7 adopted on 27 August 1972 be replaced by the following simpler version (new wording in italics):

'During the period between meetings of the Executive Committee, voting may take place by post. *Adoption of a proposal shall require affirmative votes from two-thirds (fractional parts neglected) of the Officers specified by Statutes 6-1 and 6-3, excluding any who have resigned or died.* No decision on any proposal other than calling or cancelling a meeting of the Executive Committee shall be made by postal vote in the event that at least two Officers express the wish that the matter concerned should first be given more or further consideration, either by correspondence or at a meeting of the Executive Committee.'

This amendment was adopted by the General Assembly. The Statutes and By-Laws of the Union, as amended at the Ninth General Assembly, are reprinted as Annex II to this Report.

(34) *Establishment of an ad interim of Commission on Charge, Spin and Momentum Densities*

The French delegation had submitted a revised proposal to the General Assembly, in which the terms of reference of the Commission were to promote the study and resolution of the factors which limit accuracy in crystallographic studies relating to charge, spin and momentum densities. The President explained that, if the Assembly wished the Commission to be set up then this could not be done by the present General Assembly, because of the requirements of By-Laws 7-3 and 7-4. However, the Assembly could instruct the Executive Committee to create an *ad interim* Commission for the period to the next General Assembly in 1975, when the whole matter could be reconsidered fully by that Assembly.

D. C. PHILLIPS (U.K.) considered that the new proposal still carried the idea of supporting Sagamore meetings and he could see no reason for the Union to take a lead in the organization of such conferences. Furthermore, he considered the topics to be interdisciplinary and of interest to other Unions. He would like the Executive Committee to investigate how subjects of mutual interest to the IUCr and other Unions could best be developed. Where important contributions could be made by crystallographers, such

contributions should not be overlooked or underestimated. The President observed that some other IUCr Commissions were concerned with the organization of conferences.

The General Assembly then resolved to ask the Executive Committee to create an *ad interim* Commission with the above terms of reference by 37 votes in favour to 13 against, with 6 abstentions.

(35) *Consideration of the need for and purpose of Commissions*

Some observations had been made on this question during the discussion on the establishment of the *ad interim* Commission on Charge, Spin and Momentum Densities (Minutes 26 and 34). The President reported that the Executive Committee had received two papers on the purpose of Commissions, one from two U.K. delegates (O. S. Mills and D. C. Phillips) and the other from R. A. Young. Copies of the first paper had been distributed to delegates. The President agreed that inter-Union Commissions were very important but could be unwieldy because of the different methods of working of the participating Unions. It might be better for the responsibility to lie with one Union, although other Unions might be invited to participate. It was agreed in general discussion that the Executive Committee should examine the activities and problems of all the Commissions of the Union. It might also examine the need for contacts between the IUCr and other Unions. G. ALLEGRA (Italy) asked that the Executive Committee encourage consideration of the present state of and future trends in crystallography. He felt that better liaison between the Executive Committee and the National Committees would also be useful.

(36) *Establishment of a Working Party on Information Services*

During the discussion of the future policy for *Structure Reports* (Minute 15) the Executive Committee had been asked to set up a Working Party on Information Services. The terms of reference and the proposed membership of this working party had since been notified to delegates. The President explained that the proposed membership had been made large because the working party would operate mainly by correspondence. The terms of reference of the working party accepted by the General Assembly were:

(1) To evaluate the present situation in relation to needs in IUCr information services (*e.g.* publication, collection, storage, retrieval, critical appraisal and dissemination of data and other information pertinent to crystallography).

(2) To project these needs into the future and to determine how the IUCr, primarily through its Commissions, should best meet them.

(3) To make specific proposals for needed innovations to and extensions of services in this field. In these proposals, feasibility on economic, manpower and cost bases are to be specifically considered.

(4) To report to the Executive Committee at its meetings in 1973 and 1974 and prepare a full report for circulation before and submission at the Tenth General Assembly in 1975.

M. FONT-ALTABA (Spain) suggested that a French or Italian crystallographer should be included in the membership of the working party, and the General Secretary replied that the Executive Committee would discuss this point, which was important because of the many publications not

in the English language. [The Executive Committee subsequently approved this suggestion and appointed the following to the working party: S. E. Rasmussen (Chairman, as General Secretary of the IUCr), F. R. Ahmed (representing the Commission on Crystallographic Computing), J. D. Dunitz, Th. Hahn (representing the Commission on *International Tables*), G. A. Jeffrey, A. I. Kitaigorodsky, K. Łukaszewicz, A. McL. Mathieson, M. Nardelli, T. Sakurai, J. Trotter (representing the Commission on *Structure Reports*), R. A. Young (representing the Commission on Journals) and D. G. Watson (representing the Commission on Crystallographic Data).]

(37) *IUCr - IMA Joint Committee on Nomenclature*

The Chairman of this Committee, S. W. Bailey, was not present at Kyoto and his written report was taken as read. It is reprinted as Annex I, Appendix E, to these Minutes.

(38) *Sub-committee on the Union Calendar*

A summary of the activities of this Sub-committee is given in Annex I, Appendix F. On behalf of the Executive Committee, the General Secretary thanked A. Linek for his work as Chairman. He reported that the Executive Committee had now decided that the Executive Secretary should take over the task of acting as a central repository for information concerned with the organization and planning of scientific meetings. The Sub-committee had attempted to encourage the organization of inter-Congress meetings. The real difficulty was not in selecting appropriate topics but in finding people prepared to organize these meetings.

The General Secretary reported that a total of 5 meetings for 1973 and 5 meetings for 1974 had received or were being considered for Union sponsorship. The Union would also be supporting a Summer School on Crystallographic Computing to be held in 1975.

(39) *Discussion of the future policy of the Union*

Statutes 5·10 (l) and 5·10 (m) require the General Assembly to determine the general policy and the time table for the period to the next General Assembly, and to give preliminary consideration to the activities of the Union for the three-year period following that General Assembly.

The number of meetings already receiving Union sponsorship had been reported earlier (Minute 38). The General Secretary recalled that the Working Party on Information Services was being set up and the Executive Committee had been asked to look into the work of the Commissions in general. The Fourth Edition of the *World Directory of Crystallographers* had been published in 1971. The Executive Committee had decided that further editions should be published and the U.S.A. National Committee had offered to assist in preparing the next edition. Finally, the General Secretary observed that the Pilot Issue for the new edition of *International Crystallographic Tables* was entering its final stages. S. C. ABRAHAMS (U.S.A.) reported that the Commission on Crystallographic Apparatus hoped to hold an inter-Congress meeting on anomalous scattering in 1974.

(40) *Budget estimates for the period until the Tenth General Assembly*

The budget estimates for the three-year period 1972-1974 had been sent to the National Committees and the Commissions in June; they are reprinted as Annex I, Appendix G.

The Treasurer explained that the estimates referred to the General Fund only. In accordance with the Statutes,

the accounts for the publications were kept separate. However, there were certain items in the General Fund arising from the publication activities of the Union, which might distort the appearance of this budget. For instance, the investment income, which is credited to the General Fund, is income from capital largely raised by the publication activities of the Union. On the other hand, probably more than 50% of the total administrative activity of the Union related to the management of publications, but only about 30% of these administrative costs were charged on the publication accounts.

He explained that there would be a considerable increase in support for scientific meetings for the period 1972-1974.

(41) *Unit contribution for the period until the Tenth General Assembly*

According to Statute 5-10 (k), the General Assembly had to determine the unit contribution for the period to the next General Assembly. Advance warning of a likely increase had been given to National Committees in April 1970 and the detailed proposal had been communicated in March 1972. In view of the considerable expansion in the Union's activities since the last increase was approved in 1966, the necessity of employing a salaried Executive Secretary, the substantial increases in all costs in the last six years, the recent devaluation of the U.S. dollar, and the need to allow a considerable increase in financial support to scientific meetings and Commissions, the Executive Committee proposed, on the basis of the budget just discussed, that the unit contribution be increased from 1 January 1973 to U.S. \$160 for the years 1973 and 1974 and from 1 January 1975 to U.S. \$200 for the year 1975.

The Treasurer observed that the last time that the unit contribution had been increased was in 1966, when it was raised from \$60 to \$100 as from 1 January 1967. In reply to questions, he explained that this was the only opportunity to fix the contribution for 1975. It would be too late to do this at the next General Assembly. Some delegates preferred that the contribution be maintained constant for the three years, some favoured an increase to an amount less than \$200 in 1975 and others favoured smaller, annual increases.

An amendment to the Executive Committee proposal, retaining the unit contribution constant at \$160 for 1973, 1974 and 1975, was carried by 24 votes to 23, with 9 abstentions. The formal vote establishing the unit contribution at this figure for 1973-75 was then approved by 47 votes in favour to 0 against, with 9 abstentions.

The President observed that this decision might necessitate some reduction in the anticipated activities of the Union.

(42) *Date and place of the Tenth General Assembly*

In 1970, an invitation had been received by the Executive Committee from the Adhering Body in the Netherlands, the Stichting voor Fundamenteel Onderzoek der Materie met Röntgen- en Elektronenstralen (FOMRE), to hold the Tenth General Assembly and International Congress of Crystallography in the Netherlands. It was intended that the Assembly and Congress would be held in Amsterdam, at the R.A.I. Congress Centre, 4-13 August 1975. [These dates were altered subsequently to 7-15 August 1975.]

On behalf of FOMRE, the Chairman of the Netherlands delegation, D. FEIL, presented this invitation to the General Assembly, and it was accepted with acclamation. The President expressed the thanks of the General Assembly to the Dutch crystallographic community.

(43) *Confirmation of the appointment of the Editors of the publications of the Union*

In accordance with Statute 7-1, the initial appointments and the re-appointments of the Editors of the publications of the Union were made by the Executive Committee and were subject to confirmation by the General Assembly. The Assembly unanimously confirmed the following appointments:

Editor of <i>Acta Crystallographica</i> :	A. J. C. Wilson (U.K.)
Editor of the <i>Journal of Applied Crystallography</i> :	R. A. Young (U.S.A.)
Editor of <i>Structure Reports</i> :	J. Trotter (Canada)
Editor of <i>International Tables</i> :	Th. Hahn (B.R.D.)

Professor Wilson and Professor Young were reappointed for a period of three years, and Professor Trotter and Professor Hahn were appointed for a period of six years, in accordance with the procedures stated in Statute 7-1.

(44) *Election of Chairmen and members of Commissions*

In accordance with By-Laws 2-2 and 7-3, the nominations made by the Executive Committee for Chairmen and members of the Commissions had been notified to the delegates (and alternates) on 2 September. According to Statute 7-3, the Editors and Co-editors were automatically members of the Commissions set up for the publications concerned. The Commission on Crystallographic Nomenclature consists of the Editors of *Acta Crystallographica*, *Journal of Applied Crystallography*, *Structure Reports* and *International Tables* with the first-named Editor as Chairman. As no other nominations had been made by delegates for the other Commissions, all persons nominated by the Executive Committee were considered as elected. The full membership of the Commissions including *ex officio* members, together with the addresses of the Chairmen, is given in Annex III.

(45) *Election of Representatives on bodies not belonging to the Union*

As no other nominations had been made by delegates, all persons nominated by the Executive Committee were considered as elected. The names and addresses of the Representatives of the Union, including those appointed *ex officio*, are given in Annex III.

(46) *Election of Officers of the Union*

In accordance with By-Laws 2-2 and 7-1, the nominations made by the Executive Committee for Officers of the Union had been notified to delegates (and alternates) on 31 August and, as no other nominations had been made by delegates, the following Officers were considered elected:

President:	Dorothy Hodgkin (U.K.)
Vice-President:	H. Jagodzinski (B.R.D.)
General Secretary and Treasurer:	S. E. Rasmussen (Denmark)
Ordinary members:	K. Łukaszewicz (Poland)
	A. Magnéli (Sweden)
	A. McL. Mathieson (Australia)
	D. P. Shoemaker (U.S.A.)

(Professor Hodgkin was elected an ordinary member of the Executive Committee at the Eighth General Assembly, to serve until the close of the Tenth General Assembly. In accordance with Statute 2.2, the Executive Committee nominated Dr Mathieson to fill the vacancy created for the period to the Tenth General Assembly, by the election of Professor Hodgkin as President.)

The full membership of the Executive Committee is given in Annex III.

(47) *Any other business*

There was insufficient time for Chairmen of Commissions to report to the General Assembly on activities during the Congress, but the General Secretary invited these Chairmen to submit to him written reports of these activities and, on behalf of the Executive Committee, thanked the Commissions for all the work that they had done during the Congress.

In his concluding speech the President was optimistic about the future of the Union. During the Congress much work had been done by the Commissions and the Executive Committee and everyone had received at very good impression of the high scientific level of the Congress. He noted with pleasure the presence of many young crystallographers and also the broadening of the fields of crystallography to include new topics. He suggested that the progress of the Union in recent years was in large part due to the work of the General Secretary and the Executive Secretary, and the General Assembly expressed its appreciation of their work by acclamation. The President then adjourned the meeting at 11:30 a.m.

**Closing Ceremony, Wednesday 6 September,
11:55 a.m.**

Many members of the Congress attended this ceremony of the Congress, which was chaired by the retiring President.

Exhibition of photographs

F. H. HERBSTEIN thanked Professor R. Kiriya for organizing the exhibition of photographs of crystallographic interest on behalf of the Commission on Crystallographic Apparatus. He reported that the judges had awarded the prize for the most attractive photograph to the entry submitted by H. Hashimoto, A. Kumao, T. Etoh and K. Fujiwara (Japan). Entries by K. Zinserling and O. Volskaya (USSR) and by N. Uyeda, T. Kobayashi and E. Suito (Japan) had been selected for commendation.

Votes of thanks

The following votes of thanks were approved with acclaim:

(a) G. ALLEGRA, Chairman of the Italian delegation, spoke on behalf of all the participants when he thanked not only the Science Council of Japan and its President,

Professor Ochi, for the invitation to hold the Ninth General Assembly and Congress in Japan, but also all those in charge of organizing the Congress. He thanked the members of the Programme Committee (E. F. Bertaut, H. Jagodzinski, G. A. Jeffrey, N. Kato, A. R. Lang, V. I. Simonov, A. Vos) and especially R. Sadanaga, the committee chairman, who had been responsible for the high scientific content of the meeting. He noted particularly the substantial Japanese contribution to the scientific sessions. He suggested that the Congress Discourse by I. Nitta and the General Lectures by D. C. Phillips, C. G. Shull and R. Uyeda would alone have justified the visit to Japan.

(b) F. H. LAVES, a retiring Vice-President of the Union, spoke on behalf of the Executive Committee when he thanked the Japanese Organizing Committee and its associated committees. In particular he thanked Y. Saito, S. Hoshino and G. Honjo (General Secretary, Executive Secretary and Treasurer, respectively, of the Japanese Organizing Committee), K. Kohra (Chairman of the Local Programme Committee), E. Suito and H. Hashimoto (Chairman and Secretary of the Kyoto Local Committee), J. Kakinoki (Chairman of the Reception Committee), R. Uyeda and R. Kiriya (Chairman and Vice-Chairman of the Exhibition Committee) and T. Naiki (Member of the Reception Committee responsible for the Ladies' Programme). He also expressed his appreciation to the staff of the Kyoto International Conference Hall and the Kyoto Symphony Orchestra. Finally, he thanked especially S. Miyake, Chairman of the Japanese Organizing Committee.

(c) S. MIYAKE replied on behalf of his Japanese colleagues and thanked the organizers of the previous Congress for their advice and assistance. He assured the organizers of the Tenth Congress that he and his colleagues would be pleased to give them any assistance they required.

(d) The newly-elected President, DOROTHY HODGKIN, was introduced by the retiring President. In the course of her speech she recalled with sadness that the Union had recently lost three of its former Presidents, Sir Lawrence Bragg, J. D. Bernal and Kathleen Lonsdale. They had been remarkable persons who, in spite of extremely different personalities, had worked together wonderfully well for the good of the Union and would have greatly enjoyed the present Congress. She observed that the subject of X-ray diffraction of crystals was sixty years old this year, although the Union was much younger. She extended congratulations to Professor Belov and Professor Bijvoet, who had celebrated their eightieth birthdays recently. She expressed her gratitude to all the retiring members of the Executive Committee, including Professor Zachariasen who was unable to come to Kyoto, and welcomed the new members.

The retiring President, A. GUINIER, then declared the Ninth General Assembly and Congress officially closed at about 12:30 p.m.

ANNEX I]

Appendices to the Agenda of the Ninth General Assembly

Appendix A: Report of the Executive Committee

Memorial notes

The Executive Committee wishes to begin this report by recalling that, since the Eighth General Assembly, the crystallographic community has lost a number of its leading members. As any list would be incomplete, only four names are mentioned here.

Professor Alexey Vasilyevich Shubnikov died on 27 April 1970. He was best known for his work on antisymmetry, and was a member of the Provisional International Crystallographic Committee 1946–48, which founded the International Union of Crystallography.

Professor Dame Kathleen Lonsdale died on 1 April 1971. 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 1971 Sir (William) 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. His other contributions to crystallography are too numerous to mention here. Sir Lawrence took a leading part in the formation of the International Union of Crystallography and was its first President.

Professor John Desmond Bernal died in September 1971 at the age of 70. He was a pioneer in the application of crystallographic methods to biological materials and his X-ray photographs of pepsin in 1933 were the first ever taken of single crystals of a protein. 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.

Meetings

Since the Eighth General Assembly and International Congress of Crystallography in Stony Brook, many meetings have been held under the sponsorship or co-sponsorship of the Union. These meetings included the Second International Meeting on Ferroelectricity, Kyoto, Japan, 4–9 September 1969; the Bragg Symposium 1970, London, 1–3 April 1970; the Second International Conference on Small-Angle X-ray Scattering, Graz, Austria, 26–29 August 1970; the Third Sagamore Conference on Charge, Spin and Momentum Densities, Aussois, France, 9–12 September 1970; the Second International Symposium on Organic Solid State Chemistry, Rehovoth, Israel, 14–18 September 1970; Current Research in Crystallography, Manchester, U.K., 14–16 April 1971; an International Summer School on Crystal Growth, Noordwijkerhout, The Netherlands,

21 June–2 July 1971; the Third International Conference on Crystal Growth, Marseille, France, 5–9 July 1971; Crystal Structure and Chemical Bonding, Twente, The Netherlands, 3–6 August 1971; an International Summer School on the Investigation of the Surface Structure of Solids by LEED and Supplementary Methods, Smolenice, Czechoslovakia, 6–15 September 1971; the Second European Meeting on Ferroelectricity, Dijon, France, 20–24 September 1971; the Second International Conference on Vapour Growth and Epitaxy, Jerusalem, Israel, 23–25 May 1972. The International Summer School on Crystal Growth mentioned above was organized by the Union's Commission on Crystal Growth.

The Executive Committee met in London, 31 March–3 April 1970 on the occasion of the Bragg Symposium, and in Marseille, France, 5–7 July 1971 on the occasion of the Third International Conference on Crystal Growth.

At the meeting in 1970 the most important items of business were: (1) the resignation of G. Boom as General Secretary of the Union, the combination of the offices of General Secretary and Treasurer and the appointment of D. W. J. Cruickshank, formerly Treasurer, to this combined office; (2) the plans for the Ninth Congress of Crystallography; (3) the invitation for the Tenth Congress of Crystallography; (4) the incorporation of the Union; (5) the finances of the General Fund and the unit contribution; (6) the sponsorship of meetings and the work of the Sub-committee on the Union Calendar; (7) the progress of the Union's journals and, in particular, a review of their financial standing and the implementation of economy measures; (8) the employment of a full-time worker on *Structure Reports*; (9) the Pilot Issue for the new and expanded edition of *International Crystallographic Tables*; (10) the publication of *Molecular Structures and Dimensions*, as a joint venture between the Crystallographic Data Centre, Cambridge, U.K. and the Union; (11) the Fourth Edition of the *World Directory of Crystallographers* and incidental publications of the Union; (12) the Joint Committee on Nomenclature of the IUCr and the International Mineralogical Association.

In 1971, the Programme Committee for the Ninth Congress and the Union's Commission on Crystallographic Apparatus met in Marseille at the same time as the Executive Committee. 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 *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.

Executive Committee

Dr G. Boom has resigned as General Secretary of the Union, his resignation taking effect from the close of the meeting of the Executive Committee, held in London from 31 March to 3 April 1970. On 31 March the Executive Committee accepted his resignation with regret and, after agreeing to recombine the offices of General Secretary and Treasurer, unanimously agreed to appoint Professor D. W. J. Cruickshank (formerly Treasurer) to this joint office as from 3 April 1970.

Incorporation

At the Eighth General Assembly it was resolved that the Union be incorporated in Geneva, Switzerland as an Association governed by Articles 60 and following of the Swiss Civil Code and its own Statutes. Early in 1972 the Union's lawyers completed the necessary legal procedures for the incorporation of the Union, and for the registration of the Union at the Commercial Registry in Geneva.

Publications

The Union's publication programme has continued as a most important function. In particular, the Executive Committee has devoted considerable attention to the implementation of economies and the reduction of publication times for the journals. A voluntary scheme has been introduced for the free deposition of structure factor tables and other voluminous material which would otherwise be published in the Union's journals. The publication times for the journals are being reduced substantially as the result of the doubling of the technical editing staff in Chester and also the move of the printer to larger premises.

In 1969, the total number of pages published in *Acta Crystallographica* (Volume 25) amounted to 3699, including 276 pages of papers and discussion at the Cambridge Intensity Meeting in 1968 and the 295 pages of Communicated Abstracts to the Eighth Congress in Stony Brook. In 1970 and 1971 the totals amounted to 2840 and 3194 respectively. However, in the first six months of 1972 approximately 2280 pages will be published. This substantial increase is mainly the result of publishing monthly issues of Section B of *Acta* 60% larger than the average size for 1971; the average publication time for a full-length article has been reduced to under eight months.

The *Journal of Applied Crystallography*, launched in 1968, is now firmly established as a major international scientific journal. In 1969, the number of pages published (in Volume 2) was 312, and in 1970 and 1971 this figure rose to 552 and 534 respectively.

Volume 25 of *Structure Reports* was published in late 1969, and Volume 27 in December 1971.

A second reprint, with corrections and replacements, of Volume I of *International Tables for X-ray Crystallography* was published in 1969. Details of the progress with the Pilot Issue and with Volume IV of the present series may be found in the Commission Report in Appendix C(c).

A new series of publications, *Molecular Structures and Dimensions*, has been started by the Crystallographic Data Centre, Cambridge, U.K., using the extensive data files established by this Centre. The series is being published as a joint venture between the Centre and the Union. The

first two volumes, published in 1970, provide comprehensive coverage of the literature from 1935 to 1968 and there are about 500 additional references to 1969 publications. Entries are arranged in chemical classes with extensive cross-references and there are formula, metal and author indexes. Volume 1 deals with general organic crystal structures and Volume 2 with complexes and organometallic structures. Volume 3, containing information on organic and organometallic structures published during 1969–1971, was issued in February 1972.

The final bibliography in the series prepared under the auspices of the Commission on Crystallographic Apparatus, *Bibliography 4: Diffusion des Rayons X aux Petits Angles* by A. J. Renouprez, was published in 1970, and the third edition of the *Index of Crystallographic Supplies*, also prepared under the auspices of this Commission, was published in April 1972. Both these publications were distributed free to all subscribers to the Union's journals.

The fourth edition of the *World Directory of Crystallographers*, prepared under the General Editorship of G. Boom, was published in November 1971 and contains short biographical data of 6982 scientists from 57 countries. The Second Supplement to the *Crystallographic Book List* was published in *J. Appl. Cryst.* (1972), **5**, 148–162, with an additional note on page 254 of the same volume.

The Commissions

In April 1971, a questionnaire was sent to the nine non-publishing Commissions of the Union, through their Chairmen, in an attempt to establish if they considered that there were real problems or shortcomings in their duties, mode of operation or mutual cooperation. The replies were discussed at the Executive Committee meeting in July 1971. The Executive Committee appreciated the valuable, voluntary work done by members of Commissions and hoped that ways could be found to encourage members of the general crystallographic community to cooperate with and participate in the work of the Commissions. It was noted that the questionnaire had not produced any dramatic replies, which perhaps suggested that the Commissions were reasonably happy with the present situation, and that the present general terms of reference, defined by the Union, were preferable to more rigid and precise terms. Although some discontent was expressed about the method of selecting new members of Commissions no positive suggestions for its improvement had been made. It was agreed by the Executive Committee that, from time to time, it might approve money towards the expenses of an inter-Congress meeting of a Commission, but it was not considered that meetings of the Chairmen of Commissions would be useful. It was noted that the links between the International Organization for Crystal Growth (and the ICCG meetings) and the Union could be closer. A summary of the replies to the questionnaire was sent to Chairmen of Commissions, Secretaries of National Committees and members of the Executive Committee.

The Commission Reports given in Appendix C to the Agenda provide details about the work of the Commissions.

Sub-committee on the Union Calendar

The report of this Sub-committee is given in Appendix F.

International Council of Scientific Unions

The Union was represented at the ICSU Executive Committee meetings in Erevan in October 1969 and Madrid in

September 1970 by Professor N. Belov, and in Ottawa in September 1971 by Professor A. Guinier. Professor Belov and Dr King also represented the Union at the ICSU General Assembly in September 1970. As a result of considerable work by ICSU and UNESCO and the UNISIST feasibility study, an International Conference for the Establishment of a World Science Information System was held in Paris in October 1971. The delegates attending this Conference, representing 83 member and affiliated states of UNESCO, adopted a resolution intended to lead to the creation of a world scientific and technological information system.

Proposals for revised Statutes and Rules of Procedure for ICSU will be submitted to an Extra-ordinary Session of the ICSU General Assembly on 15 September 1972.

The Union is represented on, and takes part in the work of, the ICSU Abstracting Board, the ICSU Committee on Data for Science and Technology (CODATA) and the ICSU Committee on the Teaching of Science. The triennial Reports of these representatives, and representatives on other bodies not belonging to the Union, are given in Appendix D.

Substitutions and appointments

In 1971 R. E. Marsh and S. Miyake resigned as Co-editors of *Acta Crystallographica* and H. Jagodzinski resigned in 1972. The Executive Committee, on behalf of the Union, thanked them for their services and approved the appointment of four new Co-editors, J. M. Cowley, L. H. Jensen, D. Mootz and S. Takagi.

At his request the Executive Committee accepted the resignation of D. P. Shoemaker at the end of 1970 as Chairman of the Commission on *International Tables*, and appointed N. F. M. Henry (formerly Chairman of the Commission 1963-69) to serve in that capacity until the next meeting of the Executive Committee in 1971. At this meeting, Dr Henry's appointment was extended until the close of the Ninth General Assembly and 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*.

W. B. Pearson, Chairman of the Commission on *Structure Reports*, recently submitted his resignation as Chairman of the Commission and Editor of *Structure Reports* as from 1 July 1972. Dr Pearson recommended J. Trotter as his successor and the Executive Committee appointed Professor Trotter as Editor and Chairman of the Commission from 1 July 1972 until the Ninth General Assembly, when the matter can be discussed in detail by the Executive Committee. The appointment of G. Ferguson, C. H. L. Kennard and Clara B. Shoemaker as Co-editors of *Structure Reports* was approved by the Executive Committee in 1969 and 1970.

Union staff

On the proposal of the Executive Committee, the Eighth General Assembly approved the appointment of a salaried Executive Secretary. This arrangement has been found to work well and has improved the day-to-day administration of the Union's affairs. It has given much-needed relief to the General Secretary and Treasurer. The Union has an office at 13 White Friars, Chester, England. The Executive Secretary, first appointed on a provisional basis in February 1969, is Dr J. N. King and he is assisted by Miss K. M. Williams (Secretary).

With the authorization of the Executive Committee, the Sub-committee on Staff, Establishment and Salaries has increased the technical editing staff in Chester employed to work on the Union's journals. The present staff consists of Mr S. A. Bryant (Technical Editor), Dr D. W. Penfold (Assistant Technical Editor), Mr R. S. Daykin and Mr J. E. Derry (Editorial Assistants) and Mrs J. I. Heywood (Secretary).

Acknowledgements

On behalf of the Union, the Executive Committee wishes to express its deep gratitude to the Science Council of Japan for the invitation to hold the Ninth General Assembly and International Congress of Crystallography in Japan. The devoted work undertaken by the various organizing committees and all other persons who have participated in the preparation and organization of the Congress render the Union greatly indebted to all Japanese crystallographers. The Executive Committee further expresses its thanks to the members of the Programme Committee for their work in preparing the scientific programme for the Congress.

The continuing interest and support shown by UNESCO, through the annual subvention received by the Union *via* ICSU, is gratefully acknowledged. The Union is also greatly appreciative of the special grant given by ICSU in 1970.

Finally, the Executive Committee wishes to extend its thanks to all those crystallographers who devote so much time and energy to the Union. Without their help the Union's activities would be severely curtailed and it is hoped that the international contacts made will continue to bring about a better understanding between crystallographers of different nationalities.

June 1972.

Appendix B: Financial report

The accounts of the Union for the calendar years 1969 and 1970 have already been published [*Acta Cryst.* (1971), A27, 90-94 and 692-696 respectively]. The accounts for 1971 have been audited and will be published in *Acta Crystallographica*, Section A later in 1972 [*Acta Cryst.* (1972), A28, 675-679].

The accounts for the three years are summarized in Tables 1-9, in which all amounts are expressed in U.S. dollars. As a consequence of the revaluation on 20 December 1971 of currencies in relation to the U.S. dollar, a profit of \$19992 arose, in terms of U.S. dollars, on the total assets held at that date. After 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 in these accounts at 31 December 1971. The ICSU rates of exchange used for the 1970 and 1969 accounts and for the 1971 accounts before revaluation were \$1 = Netherlands f3.60 = Swedish Kr. 5.16 = Danish Kr. 7.50 = £0.4167 = Swiss F 4.32. The rates of exchange used for transactions after revaluation were \$1 = Netherlands f3.20 = Danish Kr. 7.00 = £0.386 = Swiss F 3.84.

In examining the *Acta Crystallographica* accounts (Table 1) it should be remembered that the basic annual combined subscription (for both Sections) was raised from D.Kr. 600 for 1969 to D.Kr. 1000 for 1970 and 1971. The numbers of pages published were 3699 in 1969 (including 276 pages

on the Cambridge Intensity Meeting and 295 pages of Congress abstracts), 2840 in 1970 and 3194 in 1971, excluding indexes. The numbers of subscribers to one or both Sections of *Acta* were as follows:

	1969	1970	1971
Sections A and B	2106	2027	1965
Section A only	185	191	191
Section B only	91	103	102

The apparent increase in subscription income in 1971 is a result of the revaluation of the Danish Kroner with respect to the U.S. dollar. The income in Danish Kroner was lower than in 1970. Likewise the figures for the printing expenses in 1971 are affected by the revaluation, but these expenses, in Danish Kroner, were higher than for 1970. The profit for 1971 was considerably lower than for 1970 and a large deficit is anticipated in 1972. This deficit will

arise from the steady increase in costs, due to inflation, and the considerable increase in the number of pages being published, which is resulting from the steps taken to reduce the publication time for articles.

The *Journal of Applied Crystallography* accounts are given in Table 2. The number of subscribers has increased slowly but steadily. It was 1125 in 1969, 1214 in 1970 and 1230 in 1971. The numbers of pages published in these years were 312, 552 and 534 respectively. The sum transferred from the General Publications Fund in 1968 to launch the journal was transferred back to that Fund in 1969. The accumulated balance in the *JAC* account at the end of 1971 was only \$22 072, and it was necessary to raise the full subscription from D.Kr. 240 to D.Kr. 300 for 1972 to counteract the continued rise in costs. The journals' accounts (Tables 1 and 2) have also been charged with administrative expenses shown in the General Fund account (Table 9).

Table 1. *Acta Crystallographica*

Income	1969		1970		1971	
Subscriptions	149,159		236,538		247,089	
Sale of single copies and back numbers	20,135		16,623		13,962	
	<u>169,294</u>		<u>253,161</u>		<u>261,051</u>	
Less Publisher's commission	21,162	148,132	31,645	221,516	32,631	228,420
Yield from advertisements		4,777		3,251		5,591
		<u>152,909</u>		<u>224,767</u>		<u>234,011</u>
Expenditure						
Printing and binding	125,788		108,175		132,991	
Distribution and postage	16,966		14,415		14,438	
Reprinting earlier volumes	3,496		-		-	
Congress Supplement	4,393		-		-	
Editorial expenses	24,154		26,520		34,815	
Administrative expenses	4,573		4,455		4,800	
		<u>179,370</u>		<u>153,565</u>		<u>187,044</u>
Difference between income and expenditure		<u>- \$26,461</u>		<u>+ \$71,202</u>		<u>+ \$46,967</u>
Profit on revaluation of currencies		-		-		7,381
Accumulated balance at the end of the year		<u>\$20,181</u>		<u>\$91,383</u>		<u>\$145,731</u>

Table 2. *Journal of Applied Crystallography*

Income	1969		1970		1971	
Subscriptions	30,712		32,504		36,440	
Sale of single copies and back numbers	2,190		3,413		3,789	
	<u>32,902</u>		<u>35,917</u>		<u>40,226</u>	
Less Publisher's commission	4,387	28,515	4,490	31,427	5,028	35,198
Yield from advertisements		901		1,147		1,021
		<u>29,416</u>		<u>32,574</u>		<u>36,219</u>
Expenditure						
Printing and binding	12,795		20,424		22,987	
Distribution and postage	2,153		2,084		3,054	
Congress Supplement	532		-		-	
Editorial expenses	4,465		5,426		5,852	
Administrative expenses	1,525		1,485		1,600	
		<u>21,470</u>		<u>29,419</u>		<u>33,493</u>
Difference between income and expenditure		<u>+ \$7,946</u>		<u>+ \$3,155</u>		<u>+ \$2,726</u>
Profit on revaluation of currencies		-		-		1,111
Transfer to General Publications Fund*		15,000		-		-
Accumulated balance at the end of the year		<u>\$15,080</u>		<u>\$18,235</u>		<u>\$22,072</u>

* The *Journal of Applied Crystallography* Account was opened in 1968 by the transfer of \$15,000 from the General Publications Fund. This amount was transferred back to the General Publications Fund in 1969 so as to be available for support of other developments.

The *Structure Reports* accounts are shown in Table 3. Two volumes were published in 1969 but none in 1970. The next volume published, Volume 27, was actually published in December 1971, but was too late in the year for any publication expenses or sales income to appear in the 1971 accounts. Hence the income from sales in 1970 and 1971 is very low compared with 1969. Editorial expenses for future volumes continued to occur in 1970 and 1971 with the result that a deficit occurred in 1971. However, the accumulated balance remains at a satisfactory level.

The *International Tables for X-ray Crystallography* accounts are summarized in Table 4. A further reprint of Volume I was necessary, which resulted in a deficit for the year in question, 1970. However, sales continue steadily. Work on the Pilot Issue continues, with consequent expenditure.

Tables 5 and 6 summarize the accounts for *Fifty Years of X-ray Diffraction* and *Symmetry Aspects of M. C.*

Escher's Periodic Drawings. The outstanding honorarium for *Symmetry Aspects* was paid in 1969 and 1970, and the last copies of this publication were bound in 1970. Both books continue to sell steadily and have realized small profits.

The *Early Papers on Diffraction of X-rays by Crystals* accounts are shown in Table 7. The first volume was published in 1969. Although sales dropped off in 1971 the expenses of this volume were nearly recovered by the end of 1971, thanks to the aid of the subvention of \$3500 from UNESCO for the preparation of the manuscript. The remainder of the manuscript will be published, in Volume 2, in late 1972. Some of the editorial costs for Volume 2 appear in the 1971 accounts (\$432).

The first two volumes in the new series *Molecular Structures and Dimensions* were published in 1970, and the accounts for 1970 and 1971 are summarized in Table 8. This series is the result of considerable work at the Crystal-

Table 3. *Structure Reports*

Income	1969		1970		1971	
Sale of copies	53,774		17,643		9,355	
Less Publisher's commission	<u>9,595</u>	44,179	<u>3,224</u>	14,419	<u>1,754</u>	7,601
<i>Expenditure</i>						
Printing and binding						
Volume 25 (Index 1951-1960)	7,503		-		-	
Volume 26 (1961)	14,786		-		-	
Binding additional copies of previous volumes	414		1,275		593	
Editorial expenses	<u>10,196</u>	32,899	<u>4,957</u>	6,232	<u>11,273</u>	11,866
<i>Difference between income and expenditure</i>		<u>+\$11,280</u>		<u>+\$8,187</u>		<u>-\$4,265</u>
<i>Profit on revaluation of currencies</i>		-		-		4,336
<i>Accumulated balance at the end of the year</i>		<u>\$72,957</u>		<u>\$81,144</u>		<u>\$81,215</u>

Table 4. *International Tables for X-ray Crystallography*

Income	1969		1970		1971	
Sale of copies	17,007		12,717		16,879	
Less Publisher's commission	<u>3,550</u>	13,457	<u>2,741</u>	9,976	<u>4,154</u>	12,725
<i>Expenditure</i>						
Printing and binding reprint of Volume I	-		11,665		-	
Binding additional copies	4,314		437		1,550	
Editorial expenses	1,019		212		598	
Pilot Issue	2,163		952		2,900	
Computer Trial Project	-	7,496	-	13,266	1,037	6,085
<i>Difference between income and expenditure</i>		<u>+\$5,961</u>		<u>-\$3,290</u>		<u>+\$6,640</u>
<i>Profit on revaluation of currencies</i>		-		-		1,845
<i>Accumulated balance at the end of the year</i>		<u>\$36,911</u>		<u>\$33,621</u>		<u>\$42,106</u>

Table 5. *Fifty Years of X-ray Diffraction*

Income	1969		1970		1971	
Sale of copies	546		417		362	
Less Publisher's commission	<u>95</u>	451	<u>73</u>	344	<u>63</u>	299
<i>Difference between income and expenditure</i>		<u>+\$451</u>		<u>+\$344</u>		<u>+\$299</u>
<i>Profit on revaluation of currencies</i>		-		-		67
<i>Accumulated balance at the end of the year</i>		<u>\$521</u>		<u>\$865</u>		<u>\$1,231</u>

lographic Data Centre at the University of Cambridge. Sales have been most encouraging and all the publication expenses of these two volumes were recovered by the end of 1971. Profits on this publication are currently shared between the University of Cambridge and the Union in the ratio 3:1.

Table 9 summarizes the accounts for the General Fund of the Union, whilst Table 10 compares the accounts for the triennium, in further condensed form, with the budget which was approved by the Eighth General Assembly in 1969. These accounts showed a favourable variant of \$17 872 from the budget, including \$2259 profit on revaluation in December 1971. However, since a deficit of \$5400 had been allowed for in the budget, the actual excess of income over expenditure for the General Fund was \$12 472. Appreciably less was spent on meetings than had been anticipated. In particular, the Summer School on Crystallographic Computing, organized by the Commission on

Crystallographic Computing and held just prior to the Eighth Congress, showed a net surplus of \$1268. The major sources of additional income were the excess yield of \$8029 on interest from investments and banking accounts, and a special grant of \$2000 from ICSU in 1970 to help offset the expenses of the salaried Executive Secretary. The administrative expenses of the Union remained approximately constant during the triennium, but the net cost was \$5307 more than estimated. The Commission on Crystallographic Apparatus held a meeting-in-person in July 1971, at a cost of \$1194 to the Union. The Fourth Edition of the *World Directory of Crystallographers* was published in November 1971; at the end of 1971 sales income had reduced the net cost of this publication to the Union to about \$3500, a sum comparable with the cost of printing and distributing *Bibliography 4*, which was issued to subscribers to the Union's journals in 1971.

Tables 11 and 12 give a comparison of the Balance Sheet

Table 6. *Symmetry Aspects of M. C. Escher's Periodic Drawings*

Income	1969		1970		1971	
Sale of copies		1,769		1,921		1,314
Less Publisher's commission	310		336		230	
Royalties and honorarium	<u>808</u>	<u>1,118</u>	<u>816</u>	<u>1,152</u>	<u>74</u>	<u>304</u>
		651		769		1,010
<i>Expenditure</i>						
Binding additional copies		—		796		—
<i>Difference between income and expenditure</i>		<u>+ \$651</u>		<u>— \$27</u>		<u>+ \$1,010</u>
<i>Profit on revaluation of currencies</i>		—		—		<u>97</u>
<i>Accumulated balance at the end of the year</i>		<u>\$864</u>		<u>\$837</u>		<u>\$1,944</u>

Table 7. *Early Papers on Diffraction of X-rays by Crystals*

Income	1969		1970		1971	
Subvention from UNESCO		3,500		—		—
Sale of copies	2,919		1,998		1,298	
Less Publisher's commission	<u>511</u>	<u>2,408</u>	<u>350</u>	<u>1,648</u>	<u>227</u>	<u>1,071</u>
		5,908		1,648		1,071
<i>Expenditure</i>						
Printing and binding	7,542		—		—	
Preparation of manuscript, etc.	<u>1,144</u>	<u>8,686</u>	<u>—</u>	<u>—</u>	<u>432</u>	<u>432</u>
<i>Difference between income and expenditure</i>		<u>— \$2,778</u>		<u>+ \$1,648</u>		<u>+ \$639</u>
<i>Profit on revaluation of currencies</i>		—		—		—
<i>Accumulated balance at the end of the year</i>		<u>— \$2,778</u>		<u>— \$1,130</u>		<u>— \$491</u>

Table 8. *Molecular Structures and Dimensions*

Income	1970		1971	
Sale of copies		2,074		11,177
Less Publisher's commission		<u>363</u>	<u>1,711</u>	<u>1,956</u>
				9,221
<i>Expenditure</i>				
Publication expenses		1,471		6,828
Administrative expenses		<u>240</u>	<u>1,711</u>	<u>240</u>
				7,068
<i>Difference between income and expenditure</i>			<u>nil</u>	<u>+ \$2,153</u>
<i>Excess of income over expenditure paid to University of Cambridge</i>			—	<u>1,615</u>
<i>Profit on revaluation of currencies</i>			—	<u>129</u>
<i>Accumulated balance at the end of the year</i>			<u>nil</u>	<u>+ \$667</u>

Table 9. *General Fund*

<i>Income</i>	1969	1970	1971
Subscriptions from Adhering Bodies	13,300	13,300	13,000
Yield from investments and banking accounts	12,181	11,496	14,352
UNESCO subventions:			
Through ICSU	5,250	5,250	5,250
For <i>Crystallographic Computing</i> manuscript	—	4,000	—
Grant from ICSU	—	2,000	—
Refund from ICSU of previous year's subscription	244	296	264
Sale of copies of:			
<i>World Directory of Crystallographers</i>	47	11	8,520
Incidental publications	411	159	274
Amount charged to Journals and Publications:			
<i>Acta Crystallographica</i>	4,573	4,455	4,800
<i>Journal of Applied Crystallography</i>	1,525	1,485	1,600
<i>Molecular Structures and Dimensions</i>	—	240	240
Surplus from Summer School on Crystallographic Computing	—	37,531	1,268
		43,960	—
			48,300
<i>Expenditure</i>			
Administration	20,327	20,016	20,882
Subscriptions to ICSU and bodies of ICSU	495	564	542
Executive Committee meeting	—	5,356	4,215
8th General Assembly & Congress:			
Travel grants and expenses	9,273	—	—
Programme Committee	969	—	—
Printing of Report	—	—	1,439
9th General Assembly and Congress:			
Programme Committee	—	543	3,202
IUCr representatives on other bodies – travel expenses	567	811	234
Commissions:			
Meetings	—	—	1,194
Other expenses	13	42	—
Sponsorship of meetings	—	3,000	3,093
<i>World Directory of Crystallographers</i> , 4th edition:			
Printing	—	—	11,941
Editorial honorarium and other expenses	85	561	2,558
Bibliography 4 – printing	—	—	3,656
Contribution towards cost of <i>Crystallographic Computing</i> manuscript	—	4,000	—
	31,729	34,893	52,956
<i>Difference between income and expenditure</i>	<u>+\$5,802</u>	<u>+\$9,067</u>	<u>-\$4,656</u>
<i>Profit on revaluation of currencies</i>	—	—	2,259
<i>Accumulated balance at the end of the year</i>	<u>\$45,246</u>	<u>\$54,313</u>	<u>\$51,916</u>

Table 10. *Comparison of budget and accounts for the years 1969–1971 inclusive*

<i>Income</i>	Budget	Accounts	Difference
Subscriptions from Adhering Bodies	39,000	39,600	+ 600
Yield from investments and banking accounts	30,000	38,029	+ 8,029
Subventions from UNESCO through ICSU	15,750	15,750	—
Sales of incidental publications	750	844	+ 94
Grant from ICSU	—	2,000	+ 2,000
Profit on revaluation of currencies	85,500	2,259	+ 2,259
		98,482	+ 12,982
<i>Expenditure</i>			
Administration	37,000	42,307	+ 5,307
Subscriptions to ICSU and bodies of ICSU	1,400	797	— 603
Expenses of non-publishing Commissions	1,500	1,249	— 251
Meetings	46,000	31,434	— 14,566
Cost of incidental publications	5,000	10,223	+ 5,223
	90,900	86,010	— 4,890
<i>Favourable variant from budget</i>			<u>\$17,872</u>
<i>Less Budgeted deficit</i>			<u>5,400</u>
<i>Excess of income over expenditure in triennium</i>			<u>\$12,472</u>

of the Union at the beginning and the end of the triennium. Table 11 shows the fund accounts whilst Table 12 shows the distribution of the assets. The total assets have risen from \$234 051 to \$397 079 during the period, including \$19 992 as a result of the revaluation of currencies in December 1971. It should be remembered that the stocks of unsold copies of the publications of the Union have also increased. The value of these stocks is not included in the assets and it represents a substantial asset which is continuously being converted into cash.

The largest balance is in the *Acta Crystallographica* account but, with a turnover of about \$200 000 per annum, the balance at 31 December 1971 was less than the annual expenditure on printing and editing. As stated earlier, a substantial deficit is expected on the 1972 operations of *Acta Crystallographica*. The assets at 31 December 1971 shown in Table 12 include an amount of \$115 312 for debtors. The largest part of this (\$94 646) relates to amounts

due to the Union from Messrs Munksgaard in respect of the publishing operations for *Acta Crystallographica* and the *Journal of Applied Crystallography* during 1971. This amount, due in 1972, and the great majority of the other accounts under debtors and creditors, have since been settled.

The Union's bank accounts are held with the Union Bank of Switzerland in Geneva, the Amsterdam-Rotterdam Bank N.V. in Groningen, the First National City Bank in New York and with the National Westminster Bank in Manchester and Chester. The investments are in government bonds due to mature at various dates until 1993 and with a total maturity value of f339 000, plus \$100 000, plus £3000. The largest single holding at 31 December 1971 was of \$37 000 6¼% Denmark 1982 bonds. During 1972 bank holdings have been reduced by further purchases of government bonds, including £30 000 U.K. Treasury 8¼% Loan 1987/90.

June 1972.

Table 11. *Balance Sheet. Fund Accounts*

Accounts	31 December 1968	31 December 1971
<i>Acta Crystallographica</i>	46,642	145,731
<i>Journal of Applied Crystallography</i>	22,134	22,072
<i>Structure Reports</i>	61,677	81,215
<i>International Tables</i>	30,950	42,106
<i>Fifty Years of X-ray Diffraction</i>	70	1,231
<i>Escher Drawings</i>	213	1,944
<i>Early Papers</i>	—	—491
<i>Molecular Structures and Dimensions</i>	—	667
General Publications	32,921	50,688
Total of publication accounts	\$194,607	\$345,163
General Fund	39,444	51,916
<i>Total accumulated balance</i>	<u>\$234,051</u>	<u>\$397,079</u>

Table 12. *Balance Sheet. Assets*

Current assets	31 December 1968	31 December 1971
Cash at Banks:		
Current Accounts	9,651	15,889
Deposit and Sav- ings Accounts	62,733	72,384
	<u>72,384</u>	<u>90,751</u>
Cash with Union		
Officials	1,133	1,731
Debtors*	64,663	115,312
Subscriptions due	400	750
	<u>138,580</u>	<u>224,433</u>
Deduct Creditors	13,269	34,029
<i>Net Current Assets</i>	<u>125,311</u>	<u>190,404</u>
Fixed assets		
Investments*	107,218	203,211
Office Equipment	1,522	3,464
	<u>108,740</u>	<u>206,675</u>
<i>Total Fixed Assets</i>	<u>\$234,051</u>	<u>\$397,079</u>

* In the Balance Sheet for 1968, the interest accrued on investments at the end of the year was included in the Fixed Assets, under Investments. In the Balance Sheet for 1971, the interest accrued has been included, more appropriately, in the Debtors. Hence the figures for 1968 given above, for comparison purposes, include the accrued interest in the Debtors.

Appendix C: Reports of the Commissions of the Union

(a) Commission on Journals

During the three years since the Eighth General Assembly of the International Union of Crystallography at Stony Brook, the Commission has devoted a great deal of attention to the reduction of publication costs and the reduction of publication times. As a contribution towards the former, a scheme for the voluntary deposit of voluminous material, including structure factor tables, has been introduced. It is still too early to assess the saving resulting from this. The introduction of Short Structural Papers is expected to contribute both to the reduction of publication costs and of publication times; Short Structural Papers will be published as quickly as Short Communications, and their compact form will occupy less than half the space of the traditional form.

During the three years the technical editing staff has been approximately doubled, and the printer has moved to larger premises. As a result, the backlog of papers at the Technical Editor's office has been entirely cleared and the output of the printer has greatly increased. Readers will have noticed the large size of the issues of Section B of *Acta Crystallographica* during the early months of 1972. These reflect the increased rate of technical editing and printing, and will result in clearing the backlog at the printers by August or September 1972. When this has been achieved the time required for publication will be set by the technical possibilities at each stage, and publication times will be approximately the same for the *Journal of Applied Crystallography* and both Sections of *Acta Crystallographica*. There is then likely to be a noticeable fluctuation in the size of successive issues, reflecting fluctuations in the rate at which papers are received by the editors.

During the triennium the Editors have produced revised *Notes for Referees* and *Notes for Authors*. The new *Notes for Referees* were put into use in 1970, and the new *Notes for Authors* are in the press [*Acta Cryst.* (1973). A29, 97-108, B29, 145-156; *J. Appl. Cryst.* (1973). 6, 46-57].

With the reduction of publication times it is becoming more reasonable to consider air freight or air mail as a method of achieving quicker delivery of the journals out-

side Europe. These and other methods of reducing delivery times are under consideration.

Because of inflation and the increase in the volume of material accepted for publication, it has been necessary to increase the subscription rates for the *Journal of Applied Crystallography* with the effect from the first issue of 1972. Substantial increases for *Acta Crystallographica* will be necessary with effect from the first issues of 1973.

3 May 1972.

A. J. C. WILSON, Chairman
R. A. YOUNG, Co-chairman

(b) *Commission on Structure Reports*

Volume 27 (1962) is the only volume of *Structure Reports* that has been published since the Eighth General Assembly, although Volume 29 will also appear this year. Volumes 28, 30, 31 and 35 are each delayed by the manuscript of one section. Volumes 32 and 35 are partly in print, and Volumes 33 and 37 are also being worked on. Volume 35 (1970) is the product of an attempt to bring out *Structure Reports* with no more than 18 months delay. Although this attempt has failed, it is seen, at least as regards the Metals and Organic Sections, that the goal is quite attainable.

Two significant changes are being introduced with Volume 31 (1966). First, in order to prevent volumes from being too long, only papers giving proper structure determinations will be reported; other crystal data will be ignored. Secondly, in order to reduce the costs of producing each volume, they are to be printed by photo-offset from typed manuscripts.

During the period covered by this report, 19 Co-editors have been active in producing *Structure Reports* manuscripts.

27 April 1972.

W. B. PEARSON, Chairman

(c) *Commission on International Tables*

(i) *Present edition of International Tables for X-ray Crystallography*

The present edition continues to flourish. The Commission is producing a new volume not envisaged in the original planning. This new volume (Volume IV, Editors: W. C. Hamilton and J. A. Ibers) consists of revised tables to replace certain tables in Volume III and also additional tables; it is at present with the printers.

The older volumes continue to sell well, and the dates of publication are as shown below.

	Published	Reprinted
Volume I. <i>Symmetry Tables</i>	1952	1965 1969
Volume II. <i>Mathematical Tables</i>	1959	1967 1972
Volume III. <i>Physical and Chemical Tables</i>	1962	1968
Volume IV. <i>Revised and Supplementary Tables</i>	To be published	

The field covered by the Tables is now 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 Volume II, III and IV of the present edition).

(ii) *Pilot Issue for Series A: Symmetry Tables*

For Series A, but not for Series B, a Pilot Issue is in preparation. This has suffered considerable delays owing to the complexity of the material, it having been decided to explore symmetry in considerable depth in order to exploit the Pilot Issue to the full. It is being sent gratis to some 250 laboratories in various countries so that detailed user criticism can be available within a year or so. This, along with the experience of the Editorial Committee for the Pilot Issue, will be valuable in the planning of any future edition that may be decided upon by the Union.

A new development from the Pilot Issue was approved in July 1971 by the Executive Committee; this was the Computer Trial Project of the Commission. It had become clear that future editions of *Symmetry Tables* would have to be produced by computer, and probably printed in this way also; the Pilot Issue will be the last occasion when space-group data are derived by hand. Accordingly, the Commission accepted an invitation from Dr D. W. Smits to set up the Computer Trial Project at the Computing Centre of the University of Groningen. This is under the general direction of Professor Th. Hahn for the Commission, with Professor A. Vos and Dr Smits acting as Supervisors at Groningen where Mr D. S. Fokkema is employed on the project. The results of this project will be available for the planning of any future edition and will not be used in the Pilot Issue, except perhaps as an experimental measure in Part 5 or Part 6.

Another development, but one forming part of the Pilot Issue, is the preparation of stereoscopic diagrams for cubic space groups. This is being done by Dr G. Langlet at the Centre de Saclay, France.

	Editors	Date
Part 1. Direct Space	N. F. M. Henry	To be published in 1972
Part 2. Reciprocal Space	Th. Hahn	To be published in 1972
Part 3. Patterson Data	M. J. Buerger	Published in 1969
Part 4. Synoptic Tables	J. D. H. Donnay, E. Hellner & N. F. M. Henry	To be published in 1972

(The large section on Lattice Complexes is being published separately.)

Part 5. Generalised Symmetry	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	E. Ascher & A. G. M. Janner	To be published in 1973.

(iii) *Chairmanship of the Commission*

D. P. Shoemaker was appointed Editor of *International Tables* and Chairman of the Commission at the Eighth

General Assembly, but he resigned in November 1970. By action of the Executive Committee, N. F. M. Henry was appointed to serve as Editor and Chairman until the Ninth General Assembly.

16 March 1972.

N. F. M. HENRY, Chairman

(d) *Commission on Crystal Growth*

The Commission met twice during this period, namely at the Eighth Congress at Stony Brook in August 1969 and at the ICCG-3 at Marseille in July 1971.

In order to acquire a vision on the development of crystal growth science, a report on Topics in Crystal Growth was made by A. A. Chernov and A. N. Lobachev. This report is an analysis, based on questionnaires, of the main problems in crystal growth.

In the field of normalization two activities should be mentioned. The Commission assisted in the preparation of a dictionary of terms in crystal growth science, to be edited by the Verein Deutscher Ingenieure. Terms are defined in German, and translations into English, French and Russian are given. 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 piezo-electricity will be related to the absolute structures. The project is progressing gradually.

An International Summer School on Crystal Growth has been held at Noordwijkerhout (Netherlands) from 21 June to 2 July 1971. The 128 participants from 23 countries followed 44 lectures on various aspects of crystal growth given by 13 lecturers. The lectures were intended to present a broad review of current crystal growth topics. The material will be published by Elsevier/North-Holland. As both lecturers and participants agreed that this first international summer school was a success, the Commission will consider the organization of a second summer school after a few years.

5 May 1972.

R. KERN, Chairman

(e) *Commission on Crystallographic Apparatus*

After the close of the Eighth Assembly and Congress at Stony Brook, the Commission met to discuss its work for the subsequent three years. A meeting-in-person of a majority of the Commission also took place at Marseille, France, 4-6 July 1971, to handle in detail Commission matters. Otherwise business has been conducted by correspondence. R. W. Hendricks and R. Kiriya were appointed Consultants to the Commission.

Major activities of the Commission have related to publications, projects and arrangement of meetings, as detailed below:

Publications. The following items were issued free to subscribers to Union journals:

(i) *Bibliographies.* The fourth and, for the present, final bibliography, on *Diffusion des Rayons X aux Petits Angles* by A. J. Renouprez, was published in 1970.

(ii) *Index of Crystallographic Supplies* (R. Rudman). This project was reactivated during this term of the Commission. Through published notices and direct enquiries to manufacturers and agents, the necessary information was

gathered and collated. The publication, which constituted the Third Edition of the *Index*, appeared early in 1972.

Projects

(i) *Intensity measurement projects*

(a) *Single crystal intensities - phase I* (S. C. Abrahams). The final report on this component of the project appeared in two parts, Part I by S. C. Abrahams, W. C. Hamilton and A. McL. Mathieson [*Acta Cryst.* (1970). A26, 1-18] and Part II by W. C. Hamilton and S. C. Abrahams [*Acta Cryst.* (1970). A26, 18-24].

(b) *Single crystal intensities - phase II* (A. McL. Mathieson). Following discussion at an Open Session of the Commission during the Eighth Congress, it was deemed advisable to tackle an elaboration of phase I in which absorption corrections would be mandatory and experimental procedures to correct or estimate extinction effects would be used. Notices appeared in Union journals and a number of individuals have expressed interest in participation. It is hoped to present a preliminary account at the Ninth Congress.

(c) *Powder specimen intensities* (F. H. Herbststein). While it was agreed that this project should be formally terminated so far as the Commission was concerned, participants have continued to explore the factors involved in determining accuracy in this technique [cf. P. Suortti & L. D. Jennings (1971) *J. Appl. Cryst.* 4, 37-43, and members of the Finnish group, T. Paakari, P. Suortti & O. Inkinen (1970) *Ann. Acad. Sci. Fenn. A VI, Physica*, p. 345].

(d) *Small-angle scattering absolute intensity* (R. W. Hendricks). At the Second International Conference on Small Angle Scattering of X-rays, Graz, 1970, discussion led to formulation of an international project on absolute measurement in this technique. Following a request for sponsorship, the Commission assumed responsibility for the project. Notices were placed in Union journals and approximately 17 participants have agreed to take part. Selected and standardized specimens have begun to be circulated among participants.

(e) *Intercomparison of F values from dynamical procedures* (N. Kato). To stimulate measurement of *F* values by procedures not based on intensity, informal encouragement to appropriate individuals and groups was planned with the aim of generating a session on this subject at the Ninth Congress.

(ii) *Radiation damage project* (S. C. Abrahams)

Concern with the condition of the specimen crystal in the measurement of accurate structure factor values was extended to recognize that radiation damage by X-rays can significantly change intensities in some cases and thus potentially introduce serious error in the derivation of *F* values. Since there is little information on the different responses to radiation shown by different structures, a preliminary survey was initiated. Its objectives were to determine the range of magnitude of radiation damage in crystals undergoing standard structure analysis and, if sufficiently representative, to detect trends in relation to structure type. Eight participants have responded to notices in Union journals and supplied data which have been analysed. A report has been prepared and will be published subsequently [*Acta Cryst.* (1973). A29, 111-116]. The material will be presented in an Open Meeting at the Ninth Congress.

(iii) *Other items*

(a) *Photographic film*. As the result of the disruption of supply of a particular film to a section of the crystallographic community, the Commission was made aware of the possibilities inherent in changes in production and types of film manufactured commercially and of the need to assess the situation, particularly in the light of the new generation of microdensitometers. The time may be appropriate for a new study of characteristics of film currently in use. The possibility of an *ad hoc* meeting at Kyoto on this subject has been mooted.

(b) *Goniometer heads*. Some discussion took place on the need for modifications of the standard model. However no action was initiated.

Activities of the Commission more directly related to the Ninth Congress at Kyoto are: (i) *Exhibition of non-commercial apparatus* (R. Kiriya). Notices concerning this exhibition have appeared in the Congress First Circular. (ii) *Exhibition of photographs of crystallographic interest* (R. Kiriya). Notices requesting submission of entries have also appeared for this component. (iii) *Open meetings of the Commission*. (a) 'Techniques for Simultaneous Measurement of Reflections and Related Topics' (U. W. Arndt). (b) 'Displays for Generating and Manipulating Atomic Models' (U. W. Arndt), in association with the Commission on Crystallographic Computing. (c) *Commission projects*. (i) Radiation Damage (S. C. Abrahams). (ii) SCIMP-phase II (A. McL. Mathieson).

1 May 1972.

A. McL. MATHIESON, Chairman

(f) *Commission on Crystallographic Computing*

The book *Crystallographic Computing*, covering the proceedings of the 1969 summer school, was published by Munksgaard in August 1970. One hundred copies were made available to UNESCO, and one copy was distributed free of charge to each of the school participants. The remainder of the first printing was completely sold out within a few months of publication.

Through concentrated effort on the preparation of Part I of the *Standard Tests for Crystallographic Computer Programs*, the tests were completed and the results were submitted in November 1971 for publication in *Acta Crystallographica*, Section A [*Acta Cryst.* (1972). A28, 365-393].

Work on the preparation of the third edition of the *World List of Crystallographic Computer Programs* was started by the editor in charge, G. Bassi. The 'Call for Material' was published in *Acta Cryst.* (1971). A27, 393-396. Since the number of replies at the closing date of November 1971 was lower than anticipated, a reminder was sent out to all persons listed in the second edition of the *List*. Work on this project is continuing.

The Commission has arranged to hold two joint open meetings and an *ad hoc* meeting with other Commissions at the Ninth Congress. The topics of discussion are: (a) Data storage, search, retrieval and publication; (b) Displays for generating and manipulating atomic models; and (c) Discussion and exchange of programs for automatic diffractometers and film scanners.

24 March 1972.

F. R. AHMED, Chairman

(g) *Commission on Crystallographic Data*

During the period between the Eighth and Ninth Congresses the Commission has not met but carried out its ac-

tivities by correspondence, much of which has been handled by the Secretary of the Commission, D. G. Watson. Regular meetings of the Chairman and Secretary aided in the planning and coordination of communications with data compilation activities in a number of countries.

The first two volumes of a new publication, *Molecular Structures and Dimensions*, were issued in 1970 as a joint venture between the Union and the Crystallographic Data Centre, Cambridge, U.K. These volumes provide comprehensive coverage of the literature from 1935 to 1968. Volume 1 deals with general organic crystal structures and Volume 2 with complexes and organometallic structures. A first supplement, covering the period 1969-1971, was published in 1972. The use of computers to check data and as an aid to compilation and publishing was an outstanding feature of this work. The methods used have been of assistance to others working in similar fields and were described and demonstrated at a meeting of CODATA. A project on inorganic crystal data has been started on similar lines at Imperial College, London, under the direction of D. Rogers.

Other data developments include the publication of Volume 27 of *Structure Reports*, covering literature on structural determinations of metals, organic compounds and inorganic compounds for 1962, and Volume 5 in the Landolt-Börnstein New Series, *Numerical Data and Functional Relationships in Science and Technology*, which tabulates data for organic and organometallic compounds, excluding proteins, covering the literature from 1922 to 1968. The Third Edition of *Crystal Data* will be published by the Joint Committee on Powder Diffraction Standards in 1972. The X-ray Crystallography Group at the University of Parma, Italy, have published a new journal, *Crystal Structure Communications*, for rapid publication of refined structure analyses which have been checked by computer programs for errors and inconsistencies.

An *Atlas of Steroid Structures* has been prepared by D. A. Norton (University of Buffalo, U.S.A.). A bond index to the shortest bond length for atom-to-atom bond pairs reported in crystal structure determinations has been compiled by I. D. Brown (McMaster University, Canada). A repository system for protein crystallographic data has been organised at the Brookhaven National Laboratory, New York, U.S.A. in cooperation with the Crystallographic Data Centre, Cambridge University, England. Sponsored by the Commission on Neutron Diffraction of the Union, a Magnetic Structure Data Sheet project has been initiated. With the cooperation of neutron diffractionists, data will be published prior to formal publication.

These projects show the international nature and specialized character of data compilation activities in the crystallographic field.

A recommended practice for the publication of powder data was accepted by the Commission at the Eighth Congress and has been published [*J. Appl. Cryst.* (1971). 4, 81-86]. 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.

11 May 1972.

F. W. MATTHEWS, Chairman

(h) *Commission on Crystallographic Nomenclature*

Since the joint Open Commission Meeting organized during the Eighth Congress at Stony Brook in 1969, the Com-

mission has functioned entirely by correspondence. Through its Chairman, it has participated in the work of the Joint Committee on Nomenclature established by the International Union of Crystallography and the International Mineralogical Association. Other interests within the Union are also represented on this Committee.

3 May 1972.

A. J. C. WILSON, Chairman

(i) *Commission on Crystallographic Studies at Controlled Pressures and Temperatures*

No Triennial Report on the work of this Commission has been received from the Chairman (Dr H. J. MILLEDGE).

(j) *Commission on Crystallographic Teaching*

1. *General*

Throughout the inter-Congress period the Secretary and the Chairman of the Commission have dealt with various routine enquiries regarding teaching materials and programmes, and various attempts at discussions of topics amongst the Commission by correspondence have been made. The key point in the three-year period, however, was that one part of the Commission was actually able to meet. The Chairman, Secretary, and three members met during the meeting on 'Current Research in Crystallography' at Manchester, U.K., on 16 April 1971. In spite of the small number of members present the occasion was a most fruitful one and demonstrated the value of personal meetings as against correspondence in the work of a Commission during the inter-Congress period.

2. *UNESCO Pilot Project*

A list of all projects, many of which are complete, has been prepared by A. Authier and, since he is the member of the Commission living nearest to the UNESCO Headquarters in Paris, it has been agreed that he should be the link with UNESCO. He has arranged the distribution of the material including the supply of one copy of each item to each member of the Commission.

3. *Questionnaire on the activities of Commissions*

The meeting in Manchester enabled the Commission to deal effectively with this questionnaire and the two major points emerging were that the most important activity is the sharing and dissemination of information about ideas and materials for teaching at all levels, and that, though finance is a problem, inter-Congress meetings would be a very fruitful means of achieving this end.

4. *Crystallography at school level*

Dr Elizabeth Wood's draft book, *Crystals - a Handbook for School Teachers*, was warmly commended by members of the Commission and, when the final version is available, members hope to arrange translation and distribution in their own countries.

5. *Film list*

Attempts are being made to compile a list of teaching films but, so far, no up-to-date list is available.

6. *Summer schools*

The Secretary has compiled a list of summer schools in crystallography each year and these have proved helpful

in keeping crystallographers informed of the many varied activities of this type which occur.

7. *Ninth General Assembly and Congress*

It was decided that at Open Commission Meeting should be held at Kyoto under the general heading 'Crystallographic Teaching - How and for What?'. A request was made that a special Congress topic on 'Teaching Methods' should be included in the programme and that any papers submitted would be presented during the open session. Some difficulties have been experienced in planning specific speakers for the programme because of the uncertainty that many people have about their attendance at the Congress, but it will undoubtedly be possible to arrange a lively discussion once the participants likely to be available are identified.

8. *ICSU Committee on Science Teaching*

The Chairman has represented the Union at three full meetings of the Committee and, as Chairman of the UNESCO Advisory Sub-committee, at three meetings of officers and chairmen. Details are given in a separate report. Advice is being sought from the various Scientific Unions on the points in the educational system at which it is desirable or essential to separate science into specific disciplines and at what points they can be combined or integrated in some cross-disciplinary or inter-disciplinary way, and it is hoped to include discussions on this topic during the Open Commission Meeting at Kyoto.

1 May 1972.

C. A. TAYLOR, Chairman

(k) *Commission on Electron Diffraction*

The field with which the Commission is concerned is divided into three sub-fields: (i) High energy electron diffraction (HEED), (ii) Gas electron diffraction and (iii) Low energy electron diffraction (LEED). Stemming from the same root, they now are at different phases of development and have different aspects of activity. The fundamental studies of dynamical diffraction effects, which have been the most attractive problems in the first sub-field, have brought about successful results and are now finding many fruitful applications in diverse problems of crystallography, especially in connexion with electron microscopy. In marked contrast to the diversity of problems in the first sub-field, the problems in the second sub-field (gas electron diffraction) are concentrated in how to obtain and accumulate accurate data on bond lengths and angles in molecules. Although the technique of LEED has become popular recently, the full accomplishment of its possibilities in revealing the atomic structure of crystal surfaces requires further developments in the theory and in supplementary methods. It may be helpful to report the work done by the Commission in these three sub-fields.

(i) The diverse frontiers of the first sub-field can hardly be covered in a simple way and several basic problems in high energy electron diffraction were proposed by the Commission to the Programme Committee for consideration as Frontier Topics at the Ninth Congress. As a result, three Frontier Topics (Numbers 26-28) were finally selected concerning this sub-field, namely 'New approaches to structural studies by electron diffraction and microscopy', 'Effects of electron diffraction on back scattering and emission of electrons with particular reference to scanning electron microscopy', and 'Diffraction effect and inelastic

scattering in electron diffraction and microscopy'. Aspects of this sub-field are also relevant to some of the other Frontier Topics at the Congress.

(ii) In the second sub-field, gas electron diffraction, the following work has been done:

(a) Efforts have been made to establish procedures for minimizing and evaluating errors and for standardizing experimental and analytical processes in gas electron diffraction. Reports have been published or will be published shortly by four research groups working with close contact to each other; (i) L. S. Bartell, *Physical Methods in Chemistry*, 4th edition (Interscience, 1972), (ii) R. L. Hilderbrandt & R. A. Bonham, *Annual Review of Physical Chemistry*, Vol. 22 (1971) 279, (iii) H. M. Seip & R. Stølevik, *Molecular Vibrations and Structure Studies* (Elsevier, 1972) and (iv) K. Kuchitsu, *Molecular Vibrations and Structure Studies* (Elsevier, 1972), K. Kuchitsu, *MTP International Review of Science, A Biennial Review Series, Physical Chemistry*, Vol. 2, Chap. 6 (Butterworth, 1972), K. Kuchitsu & S. J. Cyvin, *Molecular Vibrations and Structure Studies*, Chap. 12 (Elsevier, 1972).

(b) The past activities on data collection and evaluation of gas electron diffraction have been summarized in the report by K. Kuchitsu, entitled 'Collection and Evaluation of Electron Diffraction Data' and presented to the U.S.-Japan Seminar on Evaluation, Compilation and Presentation of Physical Property Data and Data Center Activities, held in Tokyo, 15-17 November 1971, and were discussed by L. S. Bartell, K. Kuchitsu, O. Bastiansen, *et al.*, at the Austin Symposium on Gas Phase Molecular Structure, held at the University of Texas, Austin, U.S.A., 28 February-1 March 1972. The collection of references and data on gas electron diffraction is being undertaken at the Crystallographic Data Centre, Cambridge, U.K., and at the Sektion Strukturdokumentation, Universität Ulm, B.R.D.

(c) The Open Commission Meeting on Gas Diffraction at the Ninth Congress is being organized by K. Kuchitsu and L. S. Bartell and will consist of 15 papers, including one invited paper. Additionally, one *ad hoc* meeting is being planned on standardization of experimental and analysis procedures for gas electron diffraction.

(iii) The 1971 International Summer School on the Investigation of the Surface Structures of Solids by LEED and Supplementary Methods gave a great stimulus to the development of the field in Europe. Two Open Commission Meetings, on 'Theoretical attack on LEED' and 'Studies of crystal surfaces by LEED and other methods', will be held at the Ninth Congress to make the stimulation world-wide and the foundation of these surface studies more sound. They are being organized by G. Honjo and K. Molière, with one invited paper and seven contributed papers in each Meeting.

Finally it should be added that, in spite of the aforementioned differences between the three sub-fields, they have close correlations with each other: LEED and HEED have common problems in their basic theories, as is evidently recognized in the papers which will be presented at the Open Commission Meeting Number 57, and anomalous structures in very fine solid particles attract the interests both of gas electron diffraction and HEED scientists.

22 May 1972.

G. HONJO, Chairman

(I) Commission on Neutron Diffraction

The activities of the Commission have been grouped

around three projects: (i) maintaining an up-to-date compilation of nuclear scattering amplitudes, (ii) evaluation of neutron spectrometer performance, and (iii) establishing a magnetic structure information service.

The Commission collects current information on nuclear scattering amplitudes on a continuing basis by means of careful searching of the literature and by direct communication with workers in the field. From information thus obtained, a revised list of the scattering amplitudes of elements and isotopes has been prepared and has been submitted for publication in *Acta Crystallographica* [*Acta Cryst.* (1972). A28, 357-358]. This tabulation will replace the Commission's 1969 compilation [*Acta Cryst.* (1969). A25, 391-392].

A programme has been initiated to compare the performance of neutron spectrometers at different reactor installations. The need for such an evaluation programme stems from the fact that most spectrometers have been individually constructed and are operated at reactors of varying design. It is hoped that the programme will lead to an evaluation of the different factors affecting performance and to suggestions for obtaining optimum conditions. Each laboratory interested in participating in the survey receives a standard Al_2O_3 powder sample and three gold foils for intensity measurements at each spectrometer to be tested. The irradiated gold foils are being counted in three different laboratories, chosen so that the time consumed in shipment from different parts of the world is kept within tolerable limits. The laboratories are: Australian Atomic Energy Commission, Sutherland, Australia; National Bureau of Standards, Washington, D.C., U.S.A.; and Institutt for Atomenergi, Kjeller, Norway. The counting facilities at these laboratories have been intercalibrated. As of the time of writing, 38 reactor laboratories have been asked to participate, and favourable answers have been received from 27. Results from 14 instruments have been collected thus far and these are now being studied.

The Commission has decided to establish an information service designed to provide rapid dissemination of magnetic structure information among neutron diffractionists and other scientists in related fields. The service will take the form of magnetic structure data sheets distributed periodically to subscribers. It will be directed by Dr D. Cox of Brookhaven National Laboratory. The data will be supplied by neutron diffractionists working in the field, at the time the research is submitted for publication or presentation at a conference. The material will then be edited to provide uniformity of style and will be given a classification so that the data sheets can be inserted into a loose-leaf binder according to a scheme such as that used in Wyckoff's *Crystal Structures*. At the present time, all the necessary editorial, financial and operational arrangements have been completed and preparations are under way for printing and distributing blank data sheets to neutron diffractionists and for soliciting subscriptions to the information service.

4 May 1972.

L. M. CORLISS, Chairman

Appendix D: Reports of the Representatives on bodies not belonging to the Union

(a) IUPAP Commission on the Solid State

The Commission has considered the question of the type of conference which might most fruitfully be supported. While the idea of a big solid-state conference is not com-

pletely rejected, the Commission members favour the middle-sized conferences of 200–300 participants as particularly suitable. Some of these conferences have a repetitive character and are organized on a nearly self-supporting basis. The following conferences have been sponsored morally and sometimes financially. Financial support from IUPAP is indicated by an asterisk.

Third Sagamore Conference on Charge, Spin and Momentum Densities, Aussois, France, 9–12 September 1970; co-sponsored by IUCr.

*Metastable Alloys, Brela, Yugoslavia, 28–30 September 1970.

*Third International Conference on Crystal Growth, Marseille, France, 5–9 July 1971; co-sponsored by IUCr and IOCG (International Organization for Crystal Growth, formerly called Comité International de Croissance Cristalline – CICC).

*Second International Conference on Light Scattering in Solids, Paris, France, 19–23 July 1971.

Fourth International Symposium on Magnetic Resonance, Jerusalem, Israel, 24–31 August 1971.

*Colour Centres in Ionic Crystals, Reading, U.K., 13–17 September 1971.

International Conference for Solid Surfaces, Boston, U.S.A., 11–15 October 1971.

International Conference on Thin Films, Venice, Italy, 15–19 May 1972.

*Second International Conference on Vapour Growth and Epitaxy, Jerusalem, Israel, 22–25 May 1972; co-sponsored by IUCr and IOCG.

*Second Symposium on Surface Physics, Enschede, The Netherlands, 22–23 June 1972.

*International Conference on Band Structure in Solids, Exeter, U.K., 3–5 July 1972.

Seventh International Symposium on the Reactivity of Solids, Bristol, U.K., 17–21 July 1972; co-sponsored by IUPAC.

*Second International Conference on Luminescence, Leningrad, USSR, 17–22 August 1972.

International Conference on the Applications of the Mössbauer Effect, Ayeleth Hashahar, Israel, 28–31 August 1972.

*Second International Conference on the Properties of Liquid Metals, Tokyo, Japan, 3–8 September 1972.

First International Conference on Modulation Spectroscopy, U.S.A., 23–26 November 1972; recommended by the IUPAP Solid State Commission and Spectroscopy Commission.

The undersigned have done their best to establish links between IUCr, IUPAP and also IUPAC. This is specially true for co-sponsored conferences which must comply with both sponsors' rules. Applications for co-sponsorship should be received well in advance (before the month of July preceding the conference year) by the Chairman of the IUCr Sub-committee on the IUCr calendar and by the Secretary of the IUPAP Solid State Commission.

4 May 1972. E. F. BERTAUT & J. M. COWLEY
Representatives

(b) *Conference Committee of the European Physical Society*
At its meeting in London, 31 March–3 April 1970, the

IUCr Executive Committee appointed the Chairman of the Sub-committee on the Union Calendar, A. Línek, as the representative of the Union on the Conference Committee of the European Physical Society.

The representative attended two meetings of the Committee and further business was dealt with by correspondence. The Committee is attempting to introduce some order and coordination into the organization of meetings of European physicists and the Union representative has been concerned particularly in preventing an overlap in content or dates for conferences on topics of interest both to crystallographers and physicists.

2 May 1972. A. LÍNEK, Representative

(c) *International Organization for Crystal Growth (formerly the Comité International de Croissance Cristalline)*

The full committee met in Zürich in September 1970, and again in Marseille in July 1971. Much of these meetings was devoted to the establishment of a constitution: it was finally agreed that the management of the International Organization for Crystal Growth (IOCG) be vested in the hands of a Council of 20–30 members, together with a small Executive Committee: the Council to be appointed principally by the various national groups which have now been established. The formation of these groups has been strongly encouraged by the IOCG and they are now established in Belgium, France, The Netherlands, Switzerland, the U.K., the U.S.A. and some other countries. The chief function of IOCG still remains the handling of funds derived from the triennial scientific meetings known as International Conferences on Crystal Growth (ICCG).

During the period in question, the 3rd ICCG meeting was held in Marseille. The organization was in the hands of the Groupe Française de la Croissance Cristalline. About 700 persons attended. As at the 2nd ICCG meeting in 1968, much of the material dealt with the practical preparation of industrial single crystals, but much more attention was also paid to the characterization of materials, and to the theories of nucleation and growth: a section on bulk industrial crystallization was also included. The Fourth International Conference on Crystal Growth will be in Japan in 1974.

Undoubtedly the IOCG has created an immense momentum in its special field of interest, which still remains the practical methods of growing crystals for general industrial purposes.

The IOCG was previously known as the Comité International de Croissance Cristalline (CICC).

18 April 1972. R. KERN & R. F. STRICKLAND-CONSTABLE
Representatives

(d) *ICSU Abstracting Board*

There have been several developments in the structure and work of the Abstracting Board of the International Council of Scientific Unions during the triennium. The Board is now active in various fields of engineering, though the World Federation of Engineering Organisations has not yet found it possible to participate on the same basis as the International Council of Scientific Unions. The proceedings of the annual full Board meetings are now published, and include accounts of the activities of its mem-

bers; the work of the IUCr in various fields of information has been fully covered. The country of incorporation has been changed from Belgium to Switzerland, for much the same reasons as the IUCr chose the latter country for its own incorporation. The Board has made provision for national membership, and up to the end of 1971 three countries (Belgium, Canada, and the United States of America) had been admitted.

The ICSU Abstracting Board has participated in many of the working groups set up in preparation for UNISIST, and much of the material available before the intergovernmental conference on UNISIST in October 1971 bears the name of the Board as well as that of UNESCO. Among this material is an impressively voluminous *Reference Manual for the Preparation of Machine-Readable Bibliographic Descriptions*, at present under test. This, and the *International List of Periodical Title Word Abbreviations* [reviewed in *Acta Cryst.* (1971). A27, 398], are likely to be of great importance for information services.

As a result of discussions that took place at the 1971 General Assembly, the ICSU Abstracting Board has set up a Joint Working Group consisting of representatives of the Board and of various existing associations of editors of primary publications. This Group has prepared a leaflet *Cooperation among Editors: Guidelines for Primary Publications and Abstracting and Indexing Services*, and will hold an open meeting at Ustaaset, Norway, on 25 June 1972.

8 May 1972.

A. J. C. WILSON, Representative

(e) *ICSU Committee on Data for Science and Technology (CODATA)*

The Union was represented at the Fifth Annual Meeting of CODATA held at St. Andrews, Scotland, on 11 September 1970. A paper was presented outlining data checking and publication methods using computers, as applied in the field of crystallography. This work was of considerable interest to the conference as it represented a major improvement in the efficiency of publication of edited and checked data.

CODATA have been informed of new developments in crystallographic data compilation to be included in a revised edition of their publication, *International Compendium of Numerical Data Projects*.

The Union will be represented at the Third International Conference to be held in France in June 1972.

11 May 1972.

F. W. MATTHEWS, Representative

(f) *ICSU Committee on the Teaching of Science*

Three full meetings of the Committee have been held in the inter-Congress period, two in Paris and one in London, and all three were attended by the Chairman of the Commission on Crystallographic Teaching as the representative of the IUCr. He was appointed Chairman of the UNESCO Advisory-Sub-committee and also has attended three meetings of Officers and Chairmen in Paris, Rome and Geneva.

The terms of reference of the Committee are: 1. To further the teaching of science at all levels; 2. To cooperate with other organizations concerned with science teaching; 3. To facilitate cooperation among the teaching commissions of the individual scientific unions.

The principle activities of the Committee have been:

(a) The planning of a symposium on educational technology which will be held in Paris, 13–16 September 1972, and will be a small meeting of invited participants; it is hoped that UNESCO will commission background papers and publish the proceedings.

(b) The planning of a conference on 'The Education of Teachers for Integrated Science' which will be held at the University of Maryland, U.S.A., 3–13 April 1973.

(c) The preparation of an annotated bibliography on integrated science teaching under contract to UNESCO.

(d) Discussions with UNESCO on Vol. 1 of *New Trends in Integrated Science*, which was warmly received, and on future volumes in the series.

(e) Discussions of ways in which better communication between the multiplicity of organizations interested in science teaching may be improved. The Maryland conference may provide opportunities for further discussion of this difficult problem.

(f) Discussion of future conferences and activities including tentative plans for a joint meeting on Materials Science as a basis for cross-disciplinary teaching.

(g) Discussion of the problem of timing the presentation of individual sciences at various levels of teaching, including requests to individual teaching commissions of the scientific unions 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.

1 May 1972.

C. A. TAYLOR, Representative

Appendix E: Report of the IUCr – IMA Joint Committee on Nomenclature

The International Union of Crystallography and the International Mineralogical Association set up a Joint Committee on Nomenclature in 1970 to consider nomenclature problems that are common to the two disciplines, especially those problems dealing with polytypism. Each organization is represented on the Joint Committee by four regular members and an *ex officio* member.

Solicitation for suitable problems for consideration was made through both organizations and by the Committee members. Committee discussion by correspondence had progressed by the end of 1971 to a preliminary ballot on 16 individual propositions. There was substantial agreement among the Committee on 11 of the propositions. The items of agreement include a modification of the definition of polytypism (to permit minor deviations in composition and symmetry), 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 small amounts of isomorphous substitution or by minor deviations in symmetry or physical properties, and standardization of the definitions of epitaxy, syntaxy, topotaxy, and polycrystal.

During 1972 these items will be considered again in a final ballot. Correspondence will be continued on a standard system of structural symbols to designate polytypes.

21 March 1972.

S. W. BAILEY, Chairman

Appendix F: Summary of the activities of the Sub-committee on the Union Calendar

This Sub-committee is a sub-committee of the Executive Committee and therefore, according to Statute 8-1, has no obligation to report to the General Assembly. However, the Chairman, A. Línek, has kindly summarized the activities of his Sub-committee and this summary is given at the end of this Appendix. The Sub-committee has worked satisfactorily and has received and examined many requests for Union sponsorship.

The Sub-committee was established in 1968 as a result of recommendations by the Advisory Panel on Future Meetings and Congresses, which was set up by the Executive Committee at the request of the Seventh General Assembly. The Sub-committee has the following duties:

- (i) To encourage and coordinate all international meetings sponsored or co-sponsored by the Union. It should aim at obtaining commitments for a calendar of meetings of appropriate size and good scientific continuity extending at least three years ahead.
- (ii) To ensure that this calendar of meetings is well-publicized in the Union's journals and to aid and encourage crystallographers to attend the meetings.
- (iii) To act as a central office of the Union for information concerned with the organization and planning of scientific meetings.

The recommendations of the Advisory Panel were conveyed to the Eighth General Assembly in Appendix 18-2 to the 1969 Agenda. The Panel recommended that the Union continued its policy of holding a General Assembly and Congress every three years and that these Congresses continued to have a high scientific content. However, the Panel also recommended that the Union placed an increasing emphasis on the organization of meetings and symposia to be held during the two years between consecutive Congresses. More recently, there has been a suggestion that annual symposia with limited topics are preferable to large Congresses held every three years.

The Sub-committee has attempted to encourage the organization of such inter-Congress meetings, with little success. Greater success might be obtained by some fusion of this Sub-committee and the triennial Programme Committees established, by the Executive Committee, to determine the scientific programme for the Congresses. The Executive Committee will consider these suggestions at its meeting in Kyoto.

The report by Dr Línek on the work of the Sub-committee is given below:

Aided by its new members, this Sub-committee commenced its work by considering the criteria for sponsorship and financial support by the Union for international or regional crystallographic meetings. A questionnaire was introduced for organizers of individual meetings who approach the Sub-committee with requests for sponsorship and financial support by the Union.

The following meetings on topics of crystallographic significance were recommended to the Executive Committee for sponsorship, and subsequently were awarded Union sponsorship. These meetings also receiving financial support from the Union are indicated by an asterisk.

*Current Research in Crystallography, Manchester, U.K., 14-16 April 1971.

Crystal Structure and Chemical Bonding, Twente, The Netherlands, 3-6 August 1971.

*International Summer School on the Investigation of the Surface Structures of Solids by LEED and Supplementary Methods, Smolenice Castle, Czechoslovakia, 6-15 September 1971.

*Second European Meeting on Ferroelectricity, Dijon, France, 20-24 September 1971.

Second International Conference on Vapour Growth and Epitaxy, Jerusalem, Israel, 23-25 May 1972.

*Third International Symposium on the Chemistry of the Organic Solid State, Glasgow, U.K., 18-22 September 1972.

*Structure of Biological Molecules, Stockholm, Sweden, 9-11 July 1973.

*Third International Meeting on Ferroelectricity, Edinburgh, U.K., 10-14 September 1973.

*The Structure of Real Crystals, Melbourne, Australia, 19-23 August 1974.

In addition, the following meetings held after the Eighth General Assembly were awarded Union sponsorship by the Executive Committee before the Sub-committee commenced its work.

Second International Meeting on Ferroelectricity, Kyoto, Japan, 4-9 September 1969.

*Bragg Symposium 1970, London, 1-3 April 1970.

Second International Conference on Small-Angle X-ray Scattering, Graz, Austria, 26-29 August 1970.

*Third Sagamore Conference on Charge, Spin and Momentum Densities, Aussois, France, 9-12 September 1970.

*Second International Symposium on Organic Solid State Chemistry, Rehovoth, Israel, 14-18 September 1970.

*International Summer School on Crystal Growth, Noordwijkerhout, The Netherlands, 21 June-2 July 1971.

Before the establishment of regular notices on Forthcoming Meetings and a Calendar of Events in the *Journal of Applied Crystallography*, a circular was issued irregularly to National Committees, Chairmen of Commissions, etc., containing data on meetings which were of interest to crystallographers.

June 1972.

Appendix G: Budget estimates for the period until the Tenth General Assembly; determination of the unit contribution

(a) Budget estimates

As previously, an estimated budget for the period until the next General Assembly has been prepared for the General Fund only. Since the budget estimates had to be prepared at a time when the decisions on many activities had still to be made, these estimates should be considered with due reserve. With this proviso, and in accordance with Statute 9-3, the Executive Committee presents to the Ninth General Assembly the following estimates for the three-year period 1 January 1972-31 December 1974.

<i>Income</i>	\$	
Subscriptions from Adhering Bodies	55,440	
Yield from investments and banking accounts	55,000	
Subventions from UNESCO through ICSU	16,750	
Sale of incidental publications	2,310	\$129,500

<i>Expenditure</i>			
Administration	54,000		
Subscriptions to ICSU and bodies of ICSU	2,000		
Administrative Meetings	29,000		
Scientific Meetings	44,000		
Cost of incidental publications	4,000	\$133,000	
<i>Estimated deficit</i>			-\$3,500

The former item 'Meetings' has been divided into two items 'Administrative Meetings' and 'Scientific Meetings', and the former item 'Expenses of non-publishing Commissions' has been absorbed under 'Scientific Meetings'. The latter item also includes the financial assistance given to scientific meetings organized or sponsored by the Union, any expenses of Commission Chairmen and of the Programme Committee for the triennial Congresses of Crystallography. Expenses included under 'Administrative Meetings' are those of the Executive Committee meetings, Union representation on other bodies and the printing of the Report of the General Assembly. As in the previous triennium, the above budget assumes that part of the expenses of administration will be charged on the publication accounts. The total expenses of administration are estimated as \$77 200, of which \$23 200 is expected to be charged on the publication accounts.

The estimated income from subscriptions from Adhering Bodies is based on the increased unit contribution for the years 1973 and 1974 proposed by the Executive Committee below.

It should be noted that the considerable increase in the cost of meetings, as compared with the three-year period 1969-71, is due mainly to a combination of the high expenses of the meetings in Japan in 1972 and to an increased level of support for scientific meetings and Commissions in 1973 and 1974. In the estimates of expenditure it has been necessary to allow for continuing inflation of costs. The

increased expenses are being offset to a substantial extent by the increased yield from investments, which will result from the investment policy followed in recent years.

(b) Unit contribution

According to Statute 5·10(k) the General Assembly has to determine the unit contribution from the Adhering Bodies for the period to the next General Assembly.

The Executive Committee considers it necessary to recommend an increase in the unit contribution from 1 January 1973. National Committees were advised of the Executive Committee's intention in April 1970 and were informed of the details of the proposal in March 1972.

The last time that the unit contribution was increased was at the General Assembly in 1966, when it was raised from \$60 to \$100 as from 1 January 1967. In view of the considerable increase in the Union's activities since then, the necessity of employing a salaried Executive Secretary, the substantial increases in all costs in the last 6 years, the recent devaluation of the U.S. dollar, and the need to allow a considerable increase in financial support to scientific meetings and Commissions, the Executive Committee proposes, on the basis of the budget shown in section (a) above, that the unit contribution be increased from 1 January 1973 to U.S. \$160 for the years 1973 and 1974 and from 1 January 1975 to U.S. \$200 for the year 1975.

The above proposal is made on the basis of the currency rates which prevailed in January-February 1972. (At 16 February 1972 the rates in use by U.N. organizations were U.S. \$1·00 = £0·386 = Netherlands f3·20 = Swiss F 3·84). Should further alterations to exchange rates occur before the General Assembly, the Executive Committee may consider it necessary to make supplementary proposals or to designate the unit contribution in terms of another currency (Statute 9·5).

June 1972.

ANNEX II

Statutes and By-Laws of the International Union of Crystallography

as Adopted by the Fourth General Assembly in 1957 and Amended by the Fifth General Assembly in 1960, the Sixth General Assembly in 1963, the Seventh General Assembly in 1966, the Eighth General Assembly in 1969, and the Ninth General Assembly in 1972

Statutes**1. Objects of the Union**

1.1. The objects of the Union are

- (a) to promote international cooperation in crystallography;
- (b) to contribute to the advancement of crystallography in all its aspects, including related topics concerning the non-crystalline states;
- (c) to facilitate international standardization of methods, of units, of nomenclature and of symbols used in crystallography;
- (d) to form a focus for the relations of crystallography to other sciences.

1.2. For these purposes the Union shall have the power

- (a) to adhere to the International Council of Scientific Unions;
- (b) to organize international meetings and conferences on subjects falling within the purview of the Union;
- (c) to promote international publication of crystallographic research and of crystallographic works;
- (d) to set up Commissions or other bodies for special objects;
- (e) to initiate, promote and coordinate crystallographic research requiring international cooperation;
- (f) to organize Special Projects which shall be financed independently of the regular operations of the Union;
- (g) to participate in Joint Commissions with other Unions or other scientific bodies in matters of interest to the Union;
- (h) to perform all such other legal acts as are essential for or conducive to the objects of the Union including the constitution or organization of separate or independent bodies having an appropriate legal status.

2. Organization and Legal Domicile

2.1. Under the name of International Union of Crystallography an Association has been organized and incorporated; it is governed by Articles 60 and following of the Swiss Civil Code and by the present Statutes of Incorporation.

2.2. The duration of the Union is not limited.

2.3. The legal domicile of the Union is in Geneva, Switzerland.

3. Membership

3.1. The members of the Union are its Adhering Bodies.

3.2. There shall be only one member for each Country.

3.3. In a Country the Adhering Body can be a National Academy, National Research Council or similar body, or a scientific society or group of such societies. Each Adher-

ing Body shall form a National Committee for Crystallography to represent it in the Union.

3.4. Any number of Countries may agree to form a group in order to name or establish a single Adhering Body. This Body shall form a joint National or Regional Committee for Crystallography. Wherever the terms Country and National Committee for Crystallography are used in these Statutes or in the By-Laws, they shall be taken to include such groups of Countries and joint National or Regional Committees for Crystallography.

3.5. Membership in the Union shall be fully effective when the nature of the Adhering Body and the membership of the National Committee have been reported to and accepted by the General Assembly. Any replacement of an Adhering Body is subject to the approval of the Executive Committee and acceptance by the General Assembly. Any major change in the nature of an Adhering Body shall be considered valid only after it has been reported to and accepted by the General Assembly.

3.6. Adherence to the Union shall be in one of five Categories I-V with corresponding voting powers and contributions as set out in Statutes 5.5 and 9.4. A Body applying for adherence to the Union shall specify in which Category it wishes to adhere; this choice of Category, or any desired change in the Category, is subject to the approval of the Executive Committee and confirmation by the General Assembly.

3.7. Any extension of a joint adherence formed in accordance with Statute 3.4 is subject to the approval of the Executive Committee and acceptance by the General Assembly.

3.8. Participation in Special Projects [Statute 1.2(f)] shall not be obligatory. The extent of financial participation shall be a matter for special negotiation for each such project, except that the relationship between contribution and voting power within the project shall be that of the Category scheme defined in Statutes 5.5 and 9.4 to determine this relationship in the General Assembly.

3.9. Each National Committee has the right to submit to the Union through the General Secretary questions within the competence of the Union.

3.10. Any Adhering Body may withdraw from the Union if it has given notice of withdrawal at least six months before the end of the current financial year; it is required to fulfil its obligations relating to the time period when it was a member of the Union. Its membership and any further obligations shall then be suspended by the Executive Committee at the expiry of the notice of withdrawal. The withdrawal shall take effect when it has been reported to the General Assembly.

3-11. An Adhering Body which withdraws from the Union in accordance with Statute 3-10, or any Adhering Body whose membership is cancelled in accordance with Statutes 5-12 or 9-6, loses all rights in connexion with the Union.

3-12. If the Countries of a group formed in accordance with Statute 3-4 agree that the group should be dissolved, or if a Country wishes to withdraw from such a group, with or without the agreement of the other Country or Countries of the group, the adherence of the original group shall be suspended by the Executive Committee at the expiry of an appropriate notice, provided that the original group has fulfilled its obligations. The termination of the original adherence shall take effect when the matter has been reported to the General Assembly. Pending this report, the Countries of the group, or any of them, may submit proposals for the continuation of their representation in the Union. In each of such proposals the nature of the Adhering Body, the membership of the National Committee and the desired Category of adherence shall be specified. These proposals are subject to the approval of the Executive Committee, which shall then make *ad interim* arrangements concerning these adherences. These arrangements are subject to acceptance by the General Assembly.

4. Administration

4-1. The work of the Union shall be conducted by

- (a) the General Assembly;
- (b) the Officers of the Union, constituting the Executive Committee;
- (c) the Commissions as defined in Statute 8-1.

The composition and function of these bodies are defined in the following paragraphs, whose application is governed by the By-Laws.

5. General Assembly

5-1. The work of the Union shall be directed by the General Assembly which is composed of delegates appointed by the Adhering Bodies.

5-2. The Executive Committee is responsible to the General Assembly and shall participate in its deliberations. Members of the Executive Committee have no voting power in the General Assembly, except for the casting vote of the Chairman [Statute 5-8].

5-3. The General Assembly shall, as a rule, hold an ordinary meeting once every three years. The date and the place of the meeting, unless determined by the previous General Assembly, shall be determined by the Executive Committee. The General Secretary shall communicate the date and the place of the meeting to the National Committees and to the Commissions at least twelve months in advance.

5-4. In special cases, the President of the Union, with the consent of the Executive Committee, may call an extraordinary meeting of the General Assembly. He shall do so at the request of one-fifth of the Adhering Bodies. The routine business of a General Assembly prescribed in Statute 5-10 shall normally be omitted, unless specifically included in the agenda; but an extraordinary General Assembly shall have the same powers, and be subject to the same rules, as an ordinary General Assembly, except where otherwise is stated in the Statutes and By-Laws. The General Secretary shall communicate the date and the place of the extraordinary General Assembly to the National Committees and to the Commissions at least eight months

in advance if amendment of the Statutes is contemplated, or at least four months otherwise.

5-5. The voting power of an Adhering Body at General Assemblies shall be in accordance with its Category of adherence, as follows

Category	I	II	III	IV	V
Number of votes	1	2	3	4	5

5-6. Each Adhering Body, through its National Committee, shall make known to the General Secretary before the opening of each General Assembly the names of its delegates (and of their alternates, if any), and also the name of the chairman of the national or regional delegation. No Officer of the Union may be a member of any delegation, nor shall any person serve as a member of more than one delegation.

5-7. Normally each of the delegates present at a General Assembly shall have one vote only, but when for special reasons an Adhering Body cannot be fully represented at a General Assembly it may distribute its votes among a number of delegates smaller than the number of votes which that Adhering Body has in accordance with the Category in which it adheres; such a decision has to be made known to the General Secretary before the opening of the General Assembly concerned. Any Adhering Body not represented at a General Assembly may forward its views to the General Secretary by letter, and such views shall be made known to the General Assembly if received before voting takes place.

5-8. Except where otherwise provided in the Statutes and By-Laws, decisions of the General Assembly are taken by a majority of the votes cast. In the event of an equal division of votes the Chairman shall take the final decision.

5-9. No question which has not been placed on the agenda of business to be transacted at the General Assembly shall be discussed or put to the vote unless a proposal to that effect be approved by at least two-thirds of the votes there represented.

5-10. The General Assembly shall

- (a) take appropriate action on any matters concerning membership in the Union [Statutes 3-5, 3-6, 3-7, 3-10, 3-12 and 5-12];
- (b) elect the President, the Vice-President, the General Secretary, the Treasurer and the other Officers of the Union [Statutes 6-1 and 6-3];
- (c) consider, and make decisions regarding, the confirmation of the appointments of Editors of publications of the Union [Statute 7-1];
- (d) determine the number of elected members of each Commission set up by the General Assembly [Statutes 5-11(c) and 8-2];
- (e) elect the Chairmen and members of the Commissions [Statute 8-2];
- (f) elect representatives of the Union on Joint Commissions with other Unions, and on other scientific bodies [Statutes 1-2(g) and 8-5];
- (g) receive the reports on the activities of the Union and of its Commissions [Statutes 6-8 and 8-4];
- (h) receive the audited accounts for the years elapsed since the previous General Assembly [Statute 9-1];
- (i) on receipt of satisfactory reports or accounts, release the Treasurer, or any other Officer, or the Chairman or any member of any Commission or other body, from financial or other liability to the Union;
- (j) determine the budget for general expenditure for the period to the next General Assembly, on the basis of

the estimate prepared by the Executive Committee [Statutes 9·2 and 9·3];

- (k) determine the unit contribution for the period to the next General Assembly [Statute 9·5];
- (l) determine the general policy and the time table for the period to the next General Assembly;
- (m) give preliminary consideration to the activities of the Union for the three-year period following the next General Assembly.

5·11. The General Assembly shall have the power

- (a) to amend these Statutes in accordance with Statute 13·1;
- (b) to formulate and amend By-Laws on any matters not covered by these Statutes;
- (c) to set up any Commission or other body it may deem necessary for the administrative and scientific work of the Union, and to determine the terms of reference of such body [Statute 1·2(d)];
- (d) to dissolve any Commission or other body set up in accordance with Statute 5·11(c) when its existence is deemed no longer necessary;
- (e) to determine the nature of Special Projects which shall be financed independently of the regular operations of the Union [Statute 1·2(f)];
- (f) to decide on all other questions falling within the competence of the Union.

5·12. The General Assembly may cancel the membership of any Adhering Body of the Union for any serious cause; such a decision may only be taken after the member in question has been previously given an opportunity to furnish an explanation to the Executive Committee for forwarding to the General Assembly. At least three-fourths of the total number of the votes of all Adhering Bodies are required for cancellation.

6. Executive Committee

6·1. The officers of the Union constituting the Executive Committee are

- (a) the President;
- (b) the Vice-President;
- (c) the General Secretary;
- (d) the Treasurer;
- (e) the immediate Past President;
- (f) six ordinary members.

6·2. The election of Officers of the Union shall be arranged in such a way that there will not be more than two Officers from any one Country. A person is regarded as belonging to the Country in which he is normally resident and where he conducts the main part of his work. In cases of doubt the General Assembly shall decide to which Country a person is considered to belong.

If during the period between General Assemblies the number of Officers from a Country is increased above two because of any change of Country of residence, the Officer or Officers who changed his or their Country of residence may continue his or their service until the close of the next General Assembly. If at that time the number of Officers from the Country concerned would remain above two, one or more of the Officers who changed his or their Country of residence shall be considered to have resigned.

6·3. The offices of General Secretary and Treasurer may be combined and shall then be considered as a single office. Otherwise no person shall hold more than one office simultaneously. The voting power of the Officer holding the combined office of General Secretary and Treasurer shall

not be more than that of either the General Secretary or the Treasurer.

6·4. The President holds office as President until the close of the ordinary General Assembly following his election, and continues as a member of the Executive Committee until the close of the ordinary General Assembly next but one following that of his election. He is not then eligible for immediate re-election to the office of President, nor to any other office in the Executive Committee.

The Vice-President holds office until the close of the ordinary General Assembly following his election. He is not eligible for immediate re-election to the same office.

The General Secretary and the Treasurer hold office until the close of the ordinary General Assembly following that of their election. They are eligible for immediate re-election to the same office, but shall not serve in that office for more than three full consecutive terms.

Three ordinary members are elected at each ordinary General Assembly and hold office until the close of the ordinary General Assembly next but one following that of their election. They are not eligible for immediate re-election to the same office.

In the event of a vacancy, through resignation, death or other cause, any Officer elected by the General Assembly to fill the unexpired term of office shall serve only to the end of the normal term of the Officer he replaces; at the end of this service he may be nominated for re-election for a full term to the same office.

6·5. The Executive Committee shall carry out the decisions of the General Assembly and give effect to the general policy of the Union as determined by the General Assembly.

6·6. During the periods between General Assemblies the Executive Committee shall have full power to carry on the business of the Union in all matters not specifically assigned by the Statutes, the By-Laws or the General Assembly to individuals or to Commissions or other bodies. If necessary, it may make *ad interim* arrangements in all matters assigned by the Statutes and By-Laws to the General Assembly.

6·7. In the event of an individual, a Commission or another body of the Union failing to act in any matter assigned to him or it by the Statutes, By-Laws or the General Assembly, the Executive Committee may, after reasonable notice to the individual or body in question, take action on behalf of the Union.

6·8. The Executive Committee shall report on its activities to the General Assembly. The action taken by the Executive Committee in accordance with Statutes 3·5, 3·6, 3·7, 3·10, 3·12, 6·6, 6·7, 7·1, 7·2, 8·2, 9·6 and 9·9 shall be included in this report. The report to the General Assembly shall be dispatched by the General Secretary to the National Committees and to the Commissions at least ten weeks before the meeting.

7. Publications of the Union

7·1. The Editors of the publications of the Union are appointed by the Executive Committee for initial terms extending through not more than six years beyond the ordinary General Assembly following the appointment. Each initial appointment is subject to confirmation by that General Assembly. Reappointments may be made by the Executive Committee for terms of not more than three years, and are subject to confirmation by the ordinary General Assembly following the reappointment. The number of reappointments is not limited.

7-2. Co-editors and Assistant Editors are appointed by the Editors for terms of not more than three years, but they may be reappointed immediately for terms of the same length. The appointments and reappointments are subject to the approval of the Executive Committee. The number of reappointments is not limited.

7-3. Editors and Co-editors are members of the Commissions set up for their respective publications.

8. Commissions and Joint Commissions

8-1. The term 'Commission' shall be understood to include all Commissions, Committees, and other bodies of the Union with the exception of National Committees for Crystallography, and the Executive Committee and its subcommittees.

8-2. The Chairmen and members of the Commissions are elected at each General Assembly. Subject to the approval of the Executive Committee, Commissions may co-opt further members during the periods between General Assemblies, and may fill vacancies arising from resignation, death or other cause. Members (but not Chairmen) may be nationals of or residents in a Country not adhering to the Union.

8-3. The Commissions shall be responsible to the General Assembly. They shall generally have full freedom in arranging their internal structure and work. They may formulate their own Rules of Procedure within the framework of the Statutes and By-Laws of the Union, and within their terms of reference.

8-4. The Chairmen shall report on the activities of the Commissions to the General Assembly. These reports shall reach the General Secretary at least fourteen weeks before the General Assembly and shall be dispatched by him to the National Committees and the Commissions at least ten weeks before the meeting.

8-5. The representatives of the Union on Joint Commissions and on other scientific bodies [Statute 1-2(g)] are elected at each General Assembly. For each such body one representative shall be designated as the chief representative of the Union. His obligations to report are the same as those of the Chairmen of the Commissions.

9. Finance

9-1. The Executive Committee shall be responsible to the General Assembly for all the financial affairs of the Union.

9-2. The Chairman of each Commission (or other member approved by the Executive Committee) shall be responsible to the Executive Committee for any expenditure of funds by his Commission. Five months before each General Assembly he shall submit to the Executive Committee an estimate of the budget of his Commission for the period between that General Assembly and the one following it. He shall submit annually to the Executive Committee a revised budget for the ensuing year and a statement of accounts for the preceding year. His accounts shall be available for audit by the Executive Committee or its appointees.

9-3. The Executive Committee shall prepare an estimate of the budget for the period between the next General Assembly and that following it. This estimate shall be dispatched by the General Secretary to the National Committees and to the Commissions at least ten weeks before the meeting.

9-4. Each Adhering Body shall pay an annual subscription in accordance with its Category of adherence, as follows

Category	I	II	III	IV	V
Number of unit contributions	1	3	6	10	15

The annual subscriptions are payable during the calendar year to which they apply.

9-5. The unit contribution, stated in terms of a currency to be designated by the Executive Committee, shall be determined by the General Assembly for the period to the next General Assembly.

9-6. Any Adhering Body which is in arrears with its subscription for two years shall be warned and shall be deprived of its voting power. The membership of any Adhering Body which is in arrears for four years shall be automatically suspended and may be cancelled by the General Assembly under Statute 5-12. An Adhering Body whose membership has been suspended shall receive no privileges of the Union and incur no further responsibility for dues; it may be reinstated by action of the Executive Committee.

9-7. The financing and management of publications of the Union shall be kept distinct from general expenditure. Editors and Co-editors shall be responsible to the Executive Committee for any receipts or expenditure of funds by them with respect to their publications.

9-8. The financing and management of Special Projects of the Union shall be kept distinct from the regular operations of the Union.

9-9. No funds may be solicited or accepted on behalf of the Union or any of its Commissions from any international, governmental or other agency or person without the prior approval of the Executive Committee. Any National Committee for Crystallography may however solicit funds within its own Country for the support of its own activities or in its capacity as host for a General Assembly, Congress or other meeting sponsored by the Union. Any funds in the form of donations, legacies, or grants, accepted by the Executive Committee shall be used so far as is possible in accordance with the wishes of the donors.

10. Liability

10-1. The Union is liable only to the extent of its assets, and the Adhering Bodies are not individually liable for its corporate debts and liabilities.

10-2. The liabilities of the Adhering Bodies are limited to the payment of their annual subscriptions and to such contributions to the Special Projects of the Union as they may have pledged.

10-3. No Officer of the Union shall be individually liable for the corporate debts and liabilities of the Union. The Union shall indemnify any Officer or former Officer in respect of any claims laid against him in respect to his authorized actions on behalf of the Union. At its discretion the Executive Committee may extend this indemnity to other persons in respect of their authorized actions on behalf of the Union.

10-4. The Union shall not accept any liability for any personal loss, damage or accident sustained by any individual, not being an employee of the Union, engaged in any activity, including travel, on behalf of the Union.

11. Auditor and Representation of the Union

11-1. The Auditor of the Union shall be a person or corporation authorized to act as a public accountant. The Auditor shall be appointed by the Executive Committee on the recommendation of the Treasurer and maintained

thereafter subject to the approval of the General Assembly.

11.2. With the exception of cheques, all contracts and formal agreements involving the Union shall be signed by two Officers of the Union. The Executive Committee may restrict the power to sign a particular document or type of document to specific persons among the Officers; and it shall determine rules for the signing of cheques.

11.3. The President shall be the official representative of the Union on all other civil and legal occasions and in dealing with other organizations. He may in this respect delegate his powers to another Officer of the Union, or, with approval of the Executive Committee, to any other person.

12. Dissolution of the Union

12.1. The Union shall not be dissolved except on a motion presented at a General Assembly. If a motion to dissolve is to be presented, the notice for that General Assembly as given under Statute 5.3 or 5.4 shall include a statement of the motion to dissolve and shall refer specifically to this Statute. Such a motion shall be presented to the General Assembly without amendment and at least three-fourths of the votes there represented shall be required for dissolution.

In the event that less than three-fourths of the total number of the votes of all Adhering Bodies are represented at the General Assembly, a postal ballot may be arranged, and in such a postal ballot at least three-fourths of the total number of the votes of all Adhering Bodies shall be required for dissolution.

12.2. In the event of dissolution of the Union in accordance with Statute 12.1, the General Assembly shall appoint a special Committee, reporting to the International Council of Scientific Unions, for the liquidation of the as-

sets of the Union. The nett assets shall be given to one or more, preferably international, organizations or institutions which shall spend the assets for purposes so far as is possible in accordance with the objects of the Union.

13. Statutes

13.1. Amendments to the Statutes require action at a General Assembly. An amendment is adopted at such an Assembly only if (i) at least two-thirds of the votes represented at the General Assembly are affirmative and (ii) if these affirmative votes amount to more than half the total number of the votes of all Adhering Bodies. In the event that the vote on a proposed amendment satisfies condition (i) but not condition (ii), the Executive Committee may refer the proposed amendment to a postal ballot of the Adhering Bodies. If the proposed amendment then obtains affirmative votes amounting to more than half the total number of the votes of all Adhering Bodies, the amendment is adopted.

Proposals for amendments may be made by the Executive Committee or by any National Committee. Such proposals made by National Committees shall reach the General Secretary at least six months in advance of the General Assembly. The General Secretary shall dispatch these proposals, and those made by the Executive Committee, to the National Committees and to the Commissions at least four months before the meeting.

13.2. The present English text shall be considered the authoritative text in the interpretation of these Statutes. Where disputes arise concerning this interpretation, the matter shall be decided by the General Assembly, or, during the periods between General Assemblies, by a ruling of the President of the Union.

By-Laws

1. General Assembly

1.1. The agenda of business to be transacted at a General Assembly shall be determined by the Executive Committee and shall be dispatched by the General Secretary to the National Committees and to the Commissions at least ten weeks before the meeting.

1.2. Any National Committee and any Commission of the Union may propose business to be transacted at a General Assembly. Such proposals shall reach the General Secretary at least four months before the meeting, and shall be included in the agenda of the General Assembly.

1.3. Chairmen of the National Committees and of the Commissions may attend the General Assembly and take part in the discussions but shall have no voting power. The President may invite representatives of scientific bodies, or individuals, to attend the General Assembly; such invited guests may take part in the discussions but shall have no voting power. Other interested persons may also attend the General Assembly but they shall not take part in the discussions, unless specifically invited or permitted to do so by the Chairman, and they shall have no voting power.

At the discretion of the Chairman any or all of the persons attending the General Assembly under this By-Law may be required to withdraw; they shall withdraw where it is so prescribed elsewhere in these By-Laws.

1.4. If a delegate to a General Assembly is absent from a session of the Assembly, his place may be taken by any of the alternates nominated to the Assembly under Statute 5.6 provided that the Secretary of the Assembly is notified before the beginning of the session of the name of the delegate and of the name of the alternate, either by the delegate or by the chairman of his delegation. In general no such substitution may take place during a session of the Assembly, but the Chairman of the Assembly may permit substitution to be made under special circumstances.

1.5. The names of the representatives of a Body whose application for adherence to the Union has been received and declared in good order by the Executive Committee under By-Law 2.9(a), shall be made known to the General Secretary as prescribed in Statute 5.6. These representatives shall be seated with the delegates of the Adhering Bodies during the preliminary ceremonies.

1.6. Unless decided otherwise by the General Assembly, matters concerning adherence to the Union shall take precedence over all other business at the first business session of the General Assembly, and shall normally precede the reading of the minutes and the discussions of matters arising therefrom.

1.7. Delegates of an Adhering Body may not vote on any matter concerning its membership in the Union.

1.8. In the event of the General Assembly considering

a change in a group of Countries according to Statute 3-12, the delegates from the Countries belonging or previously belonging to the group may not vote on any matters concerning the representation in the Union of any of these Countries. After acceptance of the *ad interim* arrangements made by the Executive Committee under Statute 3-12, these delegates have full voting power.

1-9. The delegates of new members may not vote on any matters concerning adherence to the Union, nor on any matters concerning the adoption of the minutes of the previous General Assembly, during the General Assembly at which they themselves are admitted.

1-10. During the discussion of and the voting on matters concerning adherence to the Union, the representatives of Bodies applying for adherence, and all persons attending the General Assembly under By-Law 1-3, shall withdraw; but this shall not exclude the possibility of an invitation by the Chairman to specified persons to present information to the General Assembly during the discussion.

1-11. The General Secretary shall post on the official bulletin board of the General Assembly the names of the Chairmen and members (and alternates, if any) of the delegations and the numbers of votes represented by them.

1-12. During the General Assembly any delegate (or alternate) and any Officer of the Union is considered to have been notified of any action of the General Assembly, or of the Executive Committee, or of any Commission, if one of the two following procedures is adopted

- (a) a notice is placed in the mail box or other location at which the delegate (or alternate) or the Officer is accustomed to receive his mail during the course of the General Assembly, or
- (b) a notice is handed to the designated Chairman of each delegation with the specific request that he communicate its contents to his delegation, and to the General Secretary with the specific request that he communicate its contents to the Executive Committee,

provided that in either case a similar notice is posted on the official bulletin board.

1-13. Minutes of the meetings of the General Assembly shall be made. Copies of the draft minutes shall be communicated by the General Secretary to the National Committees, to the Officers of the Union and to the Chairmen of its Commissions. After approval at a subsequent General Assembly, two copies of the definitive minutes shall be signed by the Chairman and the Secretary of the session at which they are approved, and shall be kept by the President and the General Secretary.

2. Executive Committee

2-1. The Executive Committee shall meet at each General Assembly. There shall be at least two additional meetings during the period between General Assemblies, unless the Executive Committee by a postal vote decides otherwise.

2-2. The Executive Committee shall make nominations to the General Assembly for the Officers of the Union, for the Chairmen and members of the Commissions, and for representatives on Joint Commissions and on other scientific bodies. In each case in which an Officer of the Union is nominated for another office, either by the Executive Committee or by delegates to the General Assembly [By-

Law 7-2], the Executive Committee shall also include a nomination for the office which would be vacated if the election to the other office occurs. If the election to the other office does not occur and if the Officer's term has not expired, the nomination to the office which would have been vacated shall not be considered.

2-3. In the event of the resignation, death or disability of the President, the Vice-President shall assume the office of President until the close of the next ordinary General Assembly.

In the event of the resignation, death or disability of the Vice-President, the Executive Committee may appoint one of its members to serve as Vice-President until the close of the next ordinary General Assembly.

In the event of such circumstances that the General Secretary or the Treasurer cannot carry out his duties, the other shall assume those duties until the Executive Committee has considered the situation. In that event the Executive Committee may, but need not, appoint a new General Secretary or Treasurer to serve until the close of the next ordinary General Assembly.

In the event of the resignation, death or disability of an ordinary member of the Executive Committee, the Executive Committee may co-opt a new member to serve until the close of the next ordinary General Assembly.

The accession of an Officer of the Union to a new office under the conditions of this By-Law shall be accompanied by his resignation from the office to which he was previously elected, but service under this By-Law shall not affect his eligibility for immediate re-election to the new office.

2-4. Any Officer unable to attend a meeting of the Executive Committee may designate a deputy to attend that meeting. Such a deputy shall be named in writing to the President or the General Secretary. He shall have no voting power and shall not be counted as part of a quorum.

2-5. The President, on his own initiative or at the request of the Executive Committee, may invite any individual to be present at a meeting of the Executive Committee; such an invited guest may take part in the discussions but shall have no voting power.

2-6. At a meeting of the Executive Committee two-thirds (fractional parts neglected) of the Officers specified by Statutes 6-1 and 6-3, excluding any who have resigned or died, shall constitute a quorum; and decisions shall be taken by a simple majority of the Officers present and voting. The Chairman of the meeting shall not vote in open ballots; but in the event of an equal division of votes the Chairman may take the final decision. In secret ballots required by the Statutes or By-Laws or ordered by the Chairman he may vote at his discretion. If he does not vote and there is an equal division of votes he may take the final decision. If he has voted in a secret ballot he may not take the final decision, and must leave it to further discussion and ballot.

2-7. During the period between meetings of the Executive Committee, voting may take place by post. Adoption of a proposal shall require affirmative votes from two-thirds (fractional parts neglected) of the Officers specified by Statutes 6-1 and 6-3, excluding any who have resigned or died. No decision on any proposal other than calling or cancelling a meeting of the Executive Committee shall be made by postal vote in the event that at least two Officers express the wish that the matter concerned should first be given more or further consideration, either by correspondence or at a meeting of the Executive Committee.

2-8. Minutes of the meetings of the Executive Committee shall be made. Two copies of the minutes shall be signed by the Chairman and the Secretary of the meeting at which they are approved, and shall be kept by the President and the General Secretary. A summary of the draft minutes of meetings of the Executive Committee shall be despatched by the General Secretary to the National Committees within ten weeks of the conclusion of each meeting.

2-9. In addition to the obligations described in the Statutes and elsewhere in these By-Laws, the Executive Committee shall

- (a) receive and report on applications for adherence to the Union if the nature of the applying Body and the membership of the National Committee have been duly reported to and considered to be in good order by the Executive Committee; pending the next General Assembly the Executive Committee may in the case of case of such applications provide such services of the Union as it deems proper;
- (b) consider and report on any other questions concerning adherence to the Union;
- (c) present an annual report, including an audited statement of receipts and expenditure, to the National Committees;
- (d) report to the Commercial Registry of Geneva any changes in the registered information concerning the Union.
- (e) have the power to appoint representatives on scientific bodies not belonging to the Union.

3. President

3-1. The President of the Union is Chairman of the General Assembly and of the Executive Committee. In the absence of the President from a session or meeting, the Vice-President, or if he is not present another Officer of the Union designated by the Executive Committee, shall act as Chairman.

3-2. The President of the Union is an *ex officio* member, with voting power, of all Commissions of the Union.

4. General Secretary

4-1. The General Secretary of the Union is Secretary of the General Assembly and of the Executive Committee. In his absence from a session or meeting, another Officer of the Union designated by the Executive Committee shall act as Secretary.

4-2. The General Secretary of the Union is an *ex officio* member, with voting power, of all Commissions of the Union.

4-3. The General Secretary is responsible for conducting the ordinary business of the Union, with the exception of the financial administration, and for keeping its records.

5. Treasurer

5-1. The Treasurer of the Union is responsible for the financial administration of the Union and for keeping its accounts.

5-2. The Treasurer is an *ex officio* member of all Commissions of the Union, with voting power only for those questions which may involve the Union in financial commitments.

6. Commissions of the Union

6-1. The Chairmen of the Commissions and the chief representatives on Joint Commissions or other bodies shall forward records of all meetings of the Commissions to the President and the General Secretary. They shall report annually on the activities of these bodies to the Executive Committee.

6-2. If funds are provided for the use of a Commission, it may make its own financial arrangements, with the prior approval of the Executive Committee and subject to the provisions of the Statutes and By-Laws. In cases where the Executive Committee has given prior approval, payments toward travelling expenses of Chairmen and members of Commissions may be made from the general funds of the Union.

6-3. No person who has served for three consecutive full terms of office on a Commission is eligible for nomination for a fourth consecutive term of service on the same Commission except as Chairman. In no case is any person eligible for more than four consecutive full terms of service on the same Commission. These limitations do not apply to Editors [Statute 7-1], Co-editors [Statute 7-2] and *ex officio* members. Any Commission, in its Rules of Procedure, may reduce the length of service specified here.

6-4. In the event of the resignation, death or disability of the Chairman of any Commission, the Executive Committee shall appoint a member of that Commission to serve as Chairman until the close of the General Assembly following this appointment.

7. Nominations and Elections

7-1. All delegates (and alternates) shall be notified of the nominations presented by the Executive Committee under By-Law 2-2 for the Officers of the Union at least ninety-six hours before the scheduled commencement of the session of the General Assembly at which the vote is to be taken.

7-2. After the delegates have been notified of the nominations by the Executive Committee as prescribed in By-Law 7-1, other nominations for Officers of the Union may be made by any six or more delegates. Such nominations shall be made in writing to the General Secretary not less than forty-eight hours before the voting session and shall be accompanied by a written statement that the consent of the nominees has been obtained. These nominations shall be posted by the General Secretary on the official bulletin board not less than thirty-six hours before that session.

7-3. Recommendations from each Commission for the Chairman and members of the Commission shall be made in writing to the General Secretary not less than seventy-two hours before the voting session of the General Assembly. These recommendations shall be approved by a majority of the members of the Commission and shall be accompanied by a written statement that the consent of the persons recommended has been obtained. All delegates (and alternates) shall be notified of the nominations presented by the Executive Committee under By-Law 2-2 for the Chairman and members of each Commission at least forty-eight hours before the voting session.

7-4. After the delegates have been notified of the nominations by the Executive Committee as prescribed in By-Law 7-3, other nominations for the Chairman and members of each Commission may be made by any six or more delegates. Such nominations shall be made in writing to the General

Secretary not less than twenty-four hours before the voting session and shall be accompanied by a written statement that the consent of the nominees has been obtained. These nominations shall be posted by the General Secretary on the official bulletin board not less than twelve hours before that session.

7.5. In voting for the President, Vice-President, General Secretary and Treasurer of the Union, each of these offices shall be taken separately and voting shall be by secret ballot. A simple majority of the votes represented by the delegates present at the voting session shall be required for election. If there is only one candidate for one of these offices, his nomination shall be presented to the General Assembly and the candidate concerned shall be considered as elected. If there are two candidates or more, and an election is not achieved after two ballots, the candidate receiving the smallest number of votes in the second ballot shall be removed from the list. If an election is not achieved after a third ballot, this procedure shall be repeated until an election is achieved. Any ballot form showing more than one mark shall be invalid. Any contingency arising during the balloting shall be resolved by a ruling of the Chairman of the General Assembly.

7.6. The election of the ordinary members of the Executive Committee shall be by secret ballot, the ballot form showing the nominations presented by the Executive Committee and the nominations made by delegates. A simple majority of the votes represented by delegates present at the voting session shall be required for election. If there are not more candidates than vacancies, the nominations shall be presented to the General Assembly and the candidates shall be considered as elected. If there are more candidates than vacancies and all vacancies are not filled by election at the first ballot, a second ballot shall be arranged containing the names of the candidates not elected. If there are vacancies after the second ballot, the balloting procedure shall be repeated until all vacancies are filled; for each of these subsequent ballots the name of the candidate receiving the smallest number of votes on the preceding ballot shall be removed from the list. Any ballot form showing more marks than the appropriate number of va-

cancies shall be invalid. Any contingency arising during the balloting shall be resolved by a ruling of the Chairman of the General Assembly.

7.7. In voting for the Chairmen and members of the Commissions each Commission shall be considered separately. For the election of the Chairmen the procedure described in By-Law 7.5 shall be followed. For the election of the members of the Commissions the procedure described in By-Law 7.6 shall be followed except that no more than two ballots shall be held. Any vacancies still remaining may be filled as provided in Statute 8.2.

7.8. The procedure for the nomination and election of representatives of the Union on Joint Commissions and on other scientific bodies is so far as is possible the same as that for the nomination and election of the Chairmen and members of the Commissions.

8. By-Laws

8.1. These By-Laws may be amended or suspended at any General Assembly and at least two-thirds of the votes there represented are required for an amendment or suspension. A motion to amend or suspend, if not already included in the agenda of business of the General Assembly, may be placed there by the procedure of Statute 5.9. No notice is required for a proposal to suspend the time limits prescribed by By-Laws 7.2 and 7.4. Notification of any other motion to amend or suspend the By-Laws must be given by its originators to all delegates (and alternates) and to all Officers of the Union in accordance with the procedure prescribed in By-Law 1.12, at least forty-eight hours before the session of the General Assembly at which the motion is to be considered.

8.2. Words importing the male sex in the Statutes and By-Laws shall include the female sex.

8.3. The present English text shall be considered the authoritative text in the interpretation of these By-Laws. Where disputes arise concerning this interpretation, the matter shall be decided by the General Assembly, or during the periods between General Assemblies, by a ruling of the President of the Union.

APPENDIX

Time Table in Preparation for General Assembly

		Statute	By-Law
12 months	Notice of date and place of ordinary General Assembly to National Committees and Commissions	5·3	–
8 months	Notice of date and place of extraordinary General Assembly to National Committees and Commissions, if amendment of Statutes is contemplated	5·4	–
6 months	Proposals for amendments to Statutes to General Secretary	13·1	–
5 months	Estimated budgets from Commissions to Executive Committee	9·2	–
4 months	Proposals for agenda of General Assembly to General Secretary	–	1·2
4 months	Notice of date and place of extraordinary General Assembly to National Committees and Commissions, if amendment of Statutes is not contemplated	5·4	–
4 months	Proposals for amendments to Statutes to National Committees and Commissions	13·1	–
14 weeks	Reports of Commissions to General Secretary	8·4	–
10 weeks	Report of Executive Committee to National Committees and Commissions	6·8	–
10 weeks	Reports of Commissions to National Committees and Commissions	8·4	–
10 weeks	Budget to National Committees and Commissions	9·3	–
10 weeks	Agenda to National Committees and Commissions	–	1·1

Time Table during General Assembly

'Before'	Notice by National Committees to General Secretary of names of delegates, alternates and chairmen of delegations, and of distribution of votes if not one per delegate	5·6, 5·7	–
96 hours	Nominations by Executive Committee for Officers of Union	–	7·1
72 hours	Recommendations by Commissions to General Secretary for Chairmen and members of Commissions	–	7·3
48 hours	Notice to General Secretary of nominations by delegates for Officers of Union	–	7·2
48 hours	Nominations by Executive Committee for Chairmen and members of Commissions	–	7·3
48 hours	Notification of motion to amend or suspend By-Laws	–	8·1
36 hours	Posting of nominations by delegates for Officers of Union	–	7·2
24 hours	Notice to General Secretary of nominations by delegates for Chairmen and members of Commissions	–	7·4
12 hours	Posting of nominations by delegates for Chairmen and members of Commissions	–	7·4

ANNEX III

**Membership of Committees, Commissions, etc.,
as at 1 August 1973**

Membership of Bodies belonging to the Union

EXECUTIVE COMMITTEE

President

Dorothy Hodgkin*
Laboratory of Molecular Biophysics, Department of Zoology,
South Parks Road,
Oxford OX1 3PS, England

Vice-President

H. Jagodzinski* (B.R.D.)

General Secretary and Treasurer

S. E. Rasmussen*
Department of Chemistry,
Aarhus University,
DK-8000 Aarhus C, Denmark

Immediate Past President

A. Guinier* (France)

Ordinary members

N. Kato* (Japan)
K. Łukaszewicz† (Poland)
A. Magnéli† (Sweden)
A. McL. Mathieson‡ (Australia)
D. P. Shoemaker† (U.S.A.)
B. K. Vainshtein* (USSR)

Executive Secretary

J. N. King
International Union of Crystallography, 13 White Friars, Chester
CH1 1NZ, England

COMMISSION ON JOURNALS

Chairman and Editor of Acta Crystallographica

A. J. C. Wilson
Department of Physics,
University of Birmingham,
P.O. Box 363, Birmingham B15
2TT, England

Co-chairman and Editor of Journal of Applied Crystallography

R. A. Young, School of Physics and
Engineering Experiment Station,
Georgia Institute of Technology,
Atlanta, Georgia 30332, U.S.A.

* Until the close of the Tenth General Assembly (1975).

† Until the close of the Eleventh General Assembly (1978).

‡ Nominated by the Executive Committee to fill the vacancy created by the election of Dorothy Hodgkin as President.

Co-editors

J. M. Cowley (U.S.A.; *Acta*)
A. Guinier (France; *JAC*)
M. Hart (U.K.; *JAC*) (as from
1 January 1973)
R. D. Heidenreich (U.S.A.; *JAC*)
G. A. Jeffrey (U.S.A.; *Acta*) (as from
1 August 1973)
L. H. Jensen (U.S.A.; *Acta*)
H. Lipson (U.K.; *Acta*)
D. Mootz (B.R.D.; *Acta*)
Z. G. Pinsker (USSR; *Acta*)
S. Takagi (Japan; *Acta*)
R. Uyeda (Japan; *JAC*)
P. J. Wheatley (U.K.; *Acta*)
E. R. Wölfel (B.R.D.; *JAC*)
P. M. de Wolf (Netherlands; *JAC*)
J. Wyart (France; *Acta*)

Book-review Editor

M. M. Woolfson (U.K.; *Acta* and
JAC)

COMMISSION ON STRUCTURE REPORTS

Chairman and Editor

J. Trotter
Department of Chemistry
University of British Columbia,
Vancouver 8, British Columbia,
Canada

Co-editors

B. Beagley (U.K.)
I. D. Brown (Canada)
L. D. Calvert (Canada)
C. Calvo (Canada)
G. Ferguson (Canada)
A. J. Frueh Jr (U.S.A.)
E. J. Gabe (Canada)
A. W. Hanson (Canada)
J. Iball (U.K.)
H. W. King (Canada)
A. C. Larson (U.S.A.)
C. E. Nordman (U.S.A.)
W. B. Pearson (Canada)
J. M. Robertson (U.K.)
Clara B. Shoemaker (U.S.A.)
N. G. Vannenberg (Sweden)
(as from 1 July 1973)

Ex officio member

D. G. Watson (U.K.) (as Chairman
of the Commission on Crystallographic Data)

COMMISSION ON INTERNATIONAL TABLES

Chairman and Editor

Th. Hahn
Institut für Kristallographie
der Technische Hochschule,
Templergraben 55, Aachen, B.R.D.

Co-editors

H. Arnold (B.R.D.)
E. Ascher (Switzerland)
E. F. Bertaut (France)
M. J. Buerger (U.S.A.)
D. W. J. Cruickshank (U.K.)
J. D. H. Donnay (Canada)
E. Hellner (B.R.D.)
W. T. Holser (U.S.A.)
J. A. Ibers (U.S.A.)
A. G. M. Janner (Netherlands)
V. A. Koptsik (USSR)
D. P. Shoemaker (U.S.A.)
H. Wondratschek (B.R.D.)

COMMISSION ON CRYSTAL GROWTH

Chairman

P. Hartman
Geologisch- en Mineralogisch
Instituut der Rijksuniversiteit,
Garenmarkt, Leiden,
The Netherlands

Elected members

K. S. Bagdasarov (USSR)
E. Kaldis (Switzerland)
N. Kato (Japan)
R. A. Laudise (U.S.A.)
R. F. Strickland-Constable (U.K.)
I. Sunagawa (Japan)
K. Wilke (D.D.R.)

Ex-officio member

R. A. Young (U.S.A.) (as Editor of
Journal of Applied Crystallography)

COMMISSION ON CRYSTALLOGRAPHIC APPARATUS

Chairman

S. C. Abrahams
Bell Laboratories,
600 Mountain Avenue,
Murray Hill, New Jersey 07974,
U.S.A.

Elected members

U. W. Arndt (U.K.)
M. Colapietro (Italy)
S. Hosoya (Japan)
D. M. Kheiker (USSR)
S. Ramaseshan (India)
R. Rudman (U.S.A.)
P. Suortti (Finland)

COMMISSION ON CRYSTALLOGRAPHIC
COMPUTING*Chairman*

F. R. Ahmed
Division of Biological Sciences,
National Research Council of
Canada, Ottawa, Ontario K1A
0R6, Canada

Elected members

S. A. Abrahamsson (Sweden)
G. Bassi (France)
A. C. Larson (U.S.A.)
T. Sakurai (Japan)
K. Sasvári (Hungary)
V. I. Simonov (USSR)
M. M. Woolfson (U.K.)

Ex officio member

D. G. Watson (U.K.) (as Chairman
of the Commission on Crystallo-
graphic Data)

COMMISSION ON CRYSTALLOGRAPHIC
DATA*Chairman*

D. G. Watson
University Chemical Laboratory,
Lensfield Road, Cambridge CB2
1EW, England

Elected members

R. Allmann (B.R.D.)
I. D. Brown (Canada)
F. L. Hirshfeld (Israel)
G. G. Johnson Jr (U.S.A.)
M. Nardelli (Italy)
H. M. Ondik (U.S.A.)
D. Rogers (U.K.)
N. L. Smirnova (USSR)

Ex officio members

F. R. Ahmed (Canada) (as Chairman
of the Commission on Crystallo-
graphic Computing)
J. Trotter (Canada) (as Chairman of
the Commission on *Structure
Reports*)
A. J. C. Wilson (U.K.) (as Chairman
of the Commission on Journals)

COMMISSION ON CRYSTALLOGRAPHIC
NOMENCLATURE*Chairman*

A. J. C. Wilson
Department of Physics,
University of Birmingham,
P.O. Box 363, Birmingham B15
2TT, England

Members

Th. Hahn (B.R.D.)
J. Trotter (Canada)
R. A. Young (U.S.A.)

COMMISSION ON CRYSTALLOGRAPHIC
STUDIES AT CONTROLLED PRESSURES
AND TEMPERATURES*Chairman*

M. Foex
Laboratoire des Ultra-Réfrac-
taires, Centre National de la
Recherche Scientifique, 66 Odeillo
(Pyrénées-Orientales), France

Elected members

V. P. Butuzov (USSR)
S. F. Block (U.S.A.)
J. C. Joubert (France)
S. Ogawa (Japan)
C. J. M. Rooymans (Netherlands)
K. F. Seifert (B.R.D.)

Ex officio members

S. C. Abrahams (U.S.A.) (as Chair-
man of the Commission on Crys-
tallographic Apparatus)
L. M. Corliss (U.S.A.) (as Chairman
of the Commission on Neutron
Diffraction)
G. Honjo (Japan) (as Chairman of
the Commission on Electron
Diffraction)

COMMISSION ON CRYSTALLOGRAPHIC
TEACHING*Chairman*

C. A. Taylor
Department of Physics, University
College, P.O. Box 78, Cardiff
CF1 1XL, Wales

Elected members

A. Authier (France)
K. F. Fischer (B.R.D.)
M. Font-Altaba (Spain)
K. Kohra (Japan)
P. Krishna (India)
G. Lundgren (Sweden)
T. I. Malinovsky (USSR)
G. D. Rieck (Netherlands)
(Secretary)
A. F. Wells (U.S.A.)

COMMISSION ON ELECTRON DIFFRACTION

Chairman

G. Honjo
Department of Physics, Faculty of
Science, Tokyo Institute of
Technology, Oh-okayama,
Meguro-ku, Tokyo, Japan

Elected members

L. S. Bartell (U.S.A.)
P. Ducros (France)
P. B. Hirsch (U.K.)
K. Kuchitsu (Japan) (Secretary)
K. Molière (B.R.D.)
A. F. Moodie (Australia)
H. M. Seip (Norway)
S. A. Semiletov (USSR)
G. A. Somorjai (U.S.A.)

COMMISSION ON NEUTRON DIFFRACTION

Chairman

L. M. Corliss
Department of Chemistry, Brook-
haven National Laboratory,
Upton, N.Y. 11973, U.S.A.

Elected members

A. F. Andresen (Norway)
G. E. Bacon (U.K.)
D. Cox (U.S.A.)
S. Hoshino (Japan)*
B. Klar (France)
W. C. Koehler (U.S.A.)
R. P. Ozerov (USSR)
T. M. Sabine (Australia)
B. T. M. Willis (U.K.)*

Ad interim COMMISSION ON CHARGE,
SPIN AND MOMENTUM DENSITIES*Chairman*

R. J. Weiss
Materials Science Division,
Army Materials and Mechanics
Research Centre, Watertown,
Massachusetts 02172, U.S.A.

Members

E. F. Bertaut (France)
P. Cade (U.S.A.)
P. Coppens (U.S.A.)
Malcolm J. Cooper (U.K.)
B. Dawson (Australia)
N. Kato (Japan)
K. V. J. Kurki-Suonio (Finland)
R. M. Moon (U.S.A.)
N. N. Sirota (USSR)
E. R. Wölfel (B.R.D.)

Ex officio member

L. M. Corliss (U.S.A.) (as Chairman
of the Commission on Neutron
Diffraction)

The President and the General
Secretary and Treasurer of the
Union are *ex officio* members of
all Commissions.

* Co-opted in 1973

Representatives on Bodies not belonging to the UnionCOMMISSION ON THE SOLID STATE OF
THE INTERNATIONAL UNION OF PURE
AND APPLIED PHYSICS

J. M. Cowley
Department of Physics, Arizona
State University, Tempe, Arizona
85281, U.S.A.

INTERNATIONAL ORGANIZATION FOR
CRYSTAL GROWTH*Representatives*

P. Hartman
Geologisch- en Mineralogische
Instituut der Rijksuniversiteit,
Garenmarkt, Leiden,
The Netherlands

N. Kato
Department of Applied Physics,
Nagoya University, Faculty of
Engineering, Furo-cho, Chikusa-ku,
Nagoya, Japan.

Alternate

R. A. Laudise
Bell Telephone Company, Murray
Hill, New Jersey 07974, U.S.A.

ICSU ABSTRACTING BOARD

Representative

J. Trotter (Canada) (*ex officio* as
Chairman of the Commission on
Structure Reports)

Alternates

A. J. C. Wilson (U.K.) (*ex officio* as
Chairman of the Commission on
Journals)

R. A. Young (U.S.A.) (*ex officio* as
Co-Chairman of the Commission
on Journals)

ICSU COMMITTEE ON DATA FOR SCIENCE
AND TECHNOLOGY*Representative*

D. G. Watson (U.K.) (*ex officio* as
Chairman of the Commission on
Crystallographic Data)

ICSU COMMITTEE ON THE TEACHING
OF SCIENCE*Representative*

C. A. Taylor (U.K.) (*ex officio* as
Chairman of the Commission on
Crystallographic Teaching)

Alternate

G. D. Rieck (*ex officio* as Secretary
of the Commission on Crystallo-
graphic Teaching)
Laboratorium voor Fysische
Chemie,
Technische Hogeschool Eind-
hoven, Postbus 513, Eindhoven,
The Netherlands

CONFERENCE COMMITTEE OF THE EUROPEAN
PHYSICAL SOCIETY*Representative*

A. Linek, Institute of Solid State
Physics, Československá Akademie
Věd, Cukrovarnická 10, Praha,
Czechoslovakia

ANNEX IV

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	L. BECKA, Departamento de Física, Facultad de Ciencias Exactas, Universidad Nacional de La Plata, Calle 115 y 49 CC 37, 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 271, B-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	Arbeitsgemeinschaft Kristallographie	H. WONDRA TSCHKE, Institut für Kristallographie der Universität, Kaiserstrasse, 7500 Karlsruhe
Canada	III	National Research Council	L. D. CALVERT, Division of Chemistry, National Research Council of Canada, Ottawa, Ontario K1A 0R6
Chile	I	National Committee for Crystallography	I. GARAYCOCHEA-WITTKE, Departamento de Física, Universidad de Chile, Casilla 5487, Santiago
Czechoslovakia	I	Československá Akademie Věd	A. LÍNEK, 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 Geologisch Wissenschaften	H. PEIBST, Deutsche Akademie der Wissenschaften zu Berlin, Mohrenstrasse 40/41, DDR-108 Berlin.
Denmark	I	Akademiet for de Tekniske Videnskaber	I. KJØLLER LARSEN, The Royal Danish School of Pharmacy, Chemical Laboratory C, Universitetsparken 2, 2100 Copenhagen Ø
Finland	I	Suomalainen Tiedeakatemia	P. PAALASSALO, Wihuri Physical Laboratory, University of Turku, 20500 Turku 50
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 of Solid State Physics, Eötvös University, Múzeum krt. 6-8, 1088 Budapest
India	I	Indian National Science Academy	R. CHIDAMBARAM, Scientific Officer, (E) Nuclear Physics Division, Bhabha Atomic Research Centre, Trombay, Bombay-85
Israel	I	Israel Academy of Sciences and Humanities	MICHAL HAREL, The Weizmann Institute of Science, Rehovot
Italy	III	Consiglio Nazionale delle Ricerche	M. MAMMI, Istituto di Chimica Organica, Università di Padova, Via Marzolo 1, 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	P. T. BEURSKENS, Laboratorium voor Kristallografie, Toernooiveld, Nijmegen
New Zealand	I	The Royal Society of New Zealand	W. T. ROBINSON, Chemistry Department, University of Canterbury, Private Bag, Christchurch
Norway	I	Det Norske Videnskaps-Akademi	CHR. RØMMING, Department of Chemistry, University of Oslo, P.O. Box 1033, Blindern, Oslo 3
Poland	I	Polska Akademia Nauk	A. PIETRASZKO, Instytut Niskich Temperatur i Badań Strukturalnych, Polska Akademia Nauk, Plac Katedralny 1, Wrocław
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, Medicinareg. 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	Sir DAVID MARTIN, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG

<i>Country</i>	<i>Category*</i>	<i>Adhering Body</i>	<i>Secretary of National Committee</i>
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
USSR	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.

National Committees for Crystallography

Argentina

A. G. ALVAREZ (Chairman), L. N. BECKA, MARÍA E. J. DE ABELEDO, DORA BEDLIVY, A. BONFIGLIOLI, M. BUTSCHKOWSKI, A. CRAIEVICH, E. E. GALLONI, A. IÑIGUEZ RODRÍGUEZ.

Australia

A. McL. MATHIESON (Chairman), B. DAWSON, H. C. FREEMAN, E. O. HALL, C. H. L. KENNARD, E. N. MASLEN, A. F. MOODIE, A. W. PRYOR, E. W. RADOSLOVICH, T. M. SABINE.

Austria

J. ZEMANN (Chairman), H. HERITSCH, O. KRATKY, F. MACHATSCHKI, H. NOWOTNY, A. PREISINGER, E. H. K. SCHMID.

Belgium

W. DEKEYSER (Chairman), H. BRASSEUR (Vice-Chairman), S. AMELINCKX, L. DANGUY, O. GOICHE, L. HABRAKEN, G. HOMES, G. JACOBS, J. MOREAU, P. PIRET, J. TOUSSAINT, M. VAN MEERSSCHE, R. VAN TASSEL.

Brazil

R. SALDANHA DA GAMA (Chairman), R. RODRIGUES DA SILVA, Y. P. MASCARENHAS, R. R. FRANCO.

B.R.D. (German Federal Republic)

H. WONDRAUSCHEK (Chairman), K. BONSE, W. HOFFMAN, F. LIEBAU, K. MOLIÈRE, H. G. VON SCHNERING, H. SCHULZ.

Canada

J. TROTTER (Chairman), I. D. BROWN, L. D. CALVERT, G. DONNAY, E. J. GABE, A. W. HANSON.

Chile

O. WITTKE (Chairman), H. CID-DRESDNER (Vice-Chairman), ISABEL GARAYCOCHEA-WITTKE.

Czechoslovakia

A. KOCHANOVSKÁ (Chairman), J. GARAJ (Vice-Chairman), Č. BARTA, F. ČECH, M. ČERNOHORSKÝ, M. DUNAJ-JURČO, S. ĎUROVIČ, M. HANDLOVIČ, K. HUML, J. KOMRSKA, A. LÍNEK, J. MAĎAR, K. MELKA, L. ULICKÝ.

D.D.R. (German Democratic Republic)

H. NEELS (Chairman), H. BETHGE, K. BOLL-DORNBERGER, H. PEIBST, M. SCHENK, G. E. R. SCHULZE, K. T. WILKE.

Denmark

K. DRENCK (Chairman), E. K. ANDERSEN, P. F. ANDERSEN, J. DANIELSEN, O. DIETRICH, H. HØJGAARD JENSEN, B.

JERSLEV, I. KJØLLER LARSEN, H. MICHELSEN, H. PAULY, S. E. RASMUSSEN, J. VILLADSEN, K. J. WATSON.

Finland

V. HOVI (Chairman), O. INKINEN, P. KETTUNEN, K. KURKISUONIO, P. PAALASSALO, A. PAJUNEN, E. SUONINEN.

France

S. GOLDSZTAUB (Chairman), P. LARUELLE and R. GRAF (Vice-Chairmen), A. AUTHIER, A. DURIF, Mme P. HERPIN, B. JACROT, J. MEINNEL, M. RENAUD, R. WEISS.

Hungary

I. TARJÁN (Chairman), I. HARGITTAI, E. KRÉN, L. MALICSKÓ, J. PÓCZA, K. SASVÁRI, GY. SZIGETI, K. SZTRÓKAI, L. ZSOLDOS.

India

A. R. VERMA (Chairman), S. CHANDRASEKHAR, R. CHIDAMBARAM, G. B. MITRA, L. M. PANT, A. R. PATEL, G. N. RAMACHANDRAN, S. RAMASESHAN.

Israel

L. LEISEROWITZ (Chairman), J. BERNSTEIN, Z. DORI, MICHAL HAREL, J. PERL.

Italy

A. VACIAGO (Chairman), G. ALLEGRA, G. CAGLIOTI, E. CANNILLO, A. CODA, M. MAMMI, M. NARDELLI, S. QUARENI, G. RIGAULT.

Japan

S. TAKAGI (Chairman), I. GOKYU, S. HOSHINO, S. HOSOYA, Y. IITAKA, M. KAKUDO, N. KATO, K. KOHRA, N. MORIMOTO, S. NAGAKURA, K. OSAKI, R. SADANAGA, Y. SAITO, T. SAKURAI, Y. SASADA, Y. TAKÉUCHI, D. WATANABE, Y. YAMADA.

Netherlands

D. FEIL (Chairman), P. T. BEURSKENS, P. B. BRAUN, J. DRENTH, G. DALLINGA, B. VAN GEELLEN, TH. J. H. GEURTZ, W. A. GOEDKOOP, P. HARTMAN, F. JELLINEK, B. O. LOOPSTRA, B. OKKERSE, A. F. PEERDEMAN, G. D. RIECK, H. M. RIETVELD, C. ROMERS, J. W. VISSER, C. G. VONK, A. VOS, P. M. DE WOLFF.

New Zealand

P. P. WILLIAMS (Chairman), E. N. BAKER, D. S. COOMBS, A. G. FREEMAN, B. R. PENFOLD, W. T. ROBINSON, S. V. RUMBALL, J. M. WATERS, T. N. WATERS.

Norway

S. FURBERG (Chairman), O. FOSS, J. GJØNNES, F. GRØNVOLD, CHR. RØMMING, H. M. SEIP, H. SØRUM.

Poland

K. ŁUKASZEWICZ (Chairman), J. AULEYTNER, Z. BOJARSKI, J. LECIEJEWICZ, A. PIETRASZKO, W. TRZEBIATOWSKI, J. ŻMIJA.

South Africa

J. N. VAN NIEKERK (Chairman), G. GAFNER, F. R. L. SCHOENING.

Spain

L. BRÚ (Chairman), J. DOETSCH, M. FONT-ALTABA, S. GARCÍA-BLANCO, A. HOYOS, J. RODRIGUEZ, J. M. VIVALDI.

Sweden

S. ABRAHAMSSON (Chairman), B. AURIVILLIUS, O. BECKMAN, D. CARLSTRÖM, G. HÄGG, N. INGRI, G. JOHANSSON, P. KIERKEGAARD, B. LINDQVIST, I. LINDQVIST, G. LUNDGREN, S. LUNDQVIST, A. MAGNÉLI, I. OLOVSSON, A. WESTGREN.

Switzerland

E. ASCHER (Chairman), E. KALDIS (Vice-Chairman), J. D. DUNITZ, P. ENGEL, F. LAVES, W. NOWACKI.

U.K.

A. J. C. WILSON (Chairman), D. M. BLOW, W. COCHRAN, A. COTTRELL, D. W. J. CRUICKSHANK, K. DUNHAM, M. HART, P. B. HIRSCH, D. C. HODGKIN, H. LIPSON, H. MASSEY, J. NUTTING, D. C. PHILLIPS, H. F. W. TAYLOR, P. J. WHEATLEY.

U.S.A.

J. KARLE (Chairman), R. E. MARSH (Vice-Chairman), R. D. BURBANK, W. R. BUSING, H. BROWN, C. N. CAUGHLIN, J. M. COWLEY, H. COLE, P. COPPENS, G. A. JEFFREY, C. K. JOHNSON, J. S. KASPER, W. L. KEHL, E. C. LINGAFELTER, M. H. MUELLER, V. SCHOMAKER, D. P. SHOEMAKER, R. SMOLUCHOWSKI, H. STEINFINK, D. H. TEMPLETON, R. A. YOUNG.

USSR

N. V. BELOV (Chairman), G. B. BOKY, A. I. KITAIGORODSKY, Z. G. PINSKER, M. M. UMANSKY, I. I. SHAFRANOVSKY, N. N. SHEFTAL, V. I. SIMONOV, B. K. VAINSHEIN, G. S. ZHDANOV.

Yugoslavia

D. GRENIĆ (Chairman), LJ. BARIĆ, A. BEZJAK, S. GRAFENAUER, LJ. GOLIĆ, R. HERAK, B. KAMENAR, K. KRANJC, I. KRSTANOVIĆ, B. MATKOVIĆ, S. ŠČAVNIČAR.