

## International Union of Crystallography

### Sixth General Assembly, International Congress and Symposia

By invitation of the Consiglio Nazionale delle Ricerche and the Italian National Committee for Crystallography, the Sixth General Assembly and International Congress of the Union, and three subsequent Symposia, were held in Rome from 9 to 18 September 1963. All meetings took place in the Palazzo dei Congressi, E.U.R., with the exception of the evening session of the Assembly on Tuesday 10 September. During the four days preceding the Congress, the Executive Committee and most Commissions of the Union met in the Città Universitaria.

The Congress and Symposia were attended by more than 1300 active and 300 accompanying members from the following thirty-four countries: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, India, Israel, Italy, Jamaica, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, South Africa, Sweden, Switzerland, Turkey, Union of Soviet Socialist Republics, United Kingdom, United States of America, and Yugoslavia.

Generous financial support towards the cost of the organization of the meetings was received from various Italian governmental and industrial organizations. In addition a subvention received from UNESCO through ICSU was used to pay part of the travelling expenses of the invited speakers and of the cost of production of the Abstracts of the Communications presented at the meetings.

The Assembly and Congress were formally opened on Monday morning 9 September. The President of the Consiglio Nazionale delle Ricerche, Professor GIOVANNI POLVANI, welcomed the participants on behalf of the Italian hosts. In his opening speech he stressed the role which in his opinion crystallography had always played in the natural sciences, and as an example he showed that crystallographic considerations had probably even led Avogadro to his famous law. Professor P. P. EWALD, President of the Union, expressed the thanks of all members of the Congress to the Italian organizers. He further reviewed the activities of the Union during the period since the Fifth General Assembly in 1960.

The Assembly and Congress were formally closed on Saturday afternoon 14 September. After the Assembly had passed its votes of thanks (see next chapter, section (28)), the President gave a short address in which he again thanked the Italian hosts for the hospitality received in Rome. After he had also thanked all who had assisted him during his term of office, he expressed his happiness to hand over the Presidency to Professor J. D. Bernal who owing to illness had unfortunately not been able to attend the meetings in Rome. On behalf of all present, the senior Vice-President of the new Executive Committee, DAME KATHLEEN LONSDALE, thanked Professor Ewald for the work he had done for the Union during his Presidency. The Sixth General Assembly and International Congress were then declared closed.

### Sixth General Assembly

Twenty-six Adhering Bodies, including one of the two new members whose adherence was ratified in Rome, were represented by delegates. The Belgian delegates had sent their apologies explaining that circumstances beyond their control had prevented them from attending the General Assembly; no delegate had been appointed by the newly admitted Adhering Body for Pakistan. The Assembly met in the Palazzo dei Congressi on Monday morning 9 September and Saturday afternoon 14 September, and in the Istituto di Mineralogia on Tuesday evening 10 September. A detailed report will be published separately, and sent to the Secretaries of the National Committees. The following is a summary of the business transacted.

#### (1) *Adhering Bodies*

(a) Adherence to the Union in Group I of the Magyar Tudományos Akadémia [Hungarian Academy of Sciences] and the Pakistan Council of Scientific and Industrial Research was approved.

(b) The changes in membership of the Australian Academy of Science and of the Kungliga Vetenskapsakademien [Royal Swedish Academy of Science] from Group I to Group II were approved.

#### (2) *Minutes of the Fifth General Assembly*

The minutes of the meetings of the Fifth General Assembly, held in Cambridge, England, on 15, 18 and 20 August 1960, were approved.

#### (3) *Amendments to Statutes and By-Laws*

(a) Two interim Statutes, to be deleted at the close of the Seventh General Assembly, were adopted, according to which for the calculation of the maximum period of service of the General Secretary only the terms of office since the Fourth General Assembly, at which the present set of Statutes and By-Laws came into force, should be considered.

(b) A new By-Law was adopted according to which at each General Assembly the number of persons to be elected on each individual Commission for the period until the next General Assembly has first to be determined before the nominations are made. In consequence of this adoption, six By-Laws and two references had to be renumbered.

The Statutes and By-Laws in their new form will be printed in the detailed report on the Sixth General Assembly.

#### (4) *Statutory Reports*

The statutory reports of the Executive Committee and of the Commissions concerning the activities since the Fifth General Assembly were taken as read. In addition to these reports, verbal reports were given on

later activities and on matters discussed in Rome by the bodies concerned (see next sections).

#### (5) *Commission on Acta Crystallographica*

The Editor of the journal, A. J. C. WILSON, first took the opportunity of expressing the thanks of the Commission to R. W. Asmussen for his faithful work as Technical Editor of *Acta Crystallographica* until his resignation at the end of 1962. He then introduced to the Assembly Mr S. A. Bryant, who had been appointed full-time technical editor of the publications of the Union.

At its first meeting in Rome, before the opening of the Assembly, the Commission had discussed the financial position of the journal, which was beginning to give some concern. The subscription prices had remained unchanged since 1954 but during this period the size of the annual volumes had increased by about 50%, and the printing rates by more than 85%. The result was that in the last few years the journal had been running at a small, but increasing deficit in spite of the increasing number of subscriptions. After discussing several proposals, including the possibility of introducing page charges, the Commission had decided to recommend a slight increase in the subscription prices to the Executive Committee. [The Executive Committee later reported that it had followed this recommendation, and decided that as from 1964 the regular and the reduced personal subscription prices be increased by one-third and one-fifth respectively.]

The Commission had discussed and approved a new set of 'Notes for Authors'. A matter of great concern to the Commission was the time lag in processing papers. The backlog of Short Communications had already been cleared, and the Editor reported that, unless unforeseen circumstances arose, a considerable acceleration in the publication of papers would be apparent in the course of the next twelve months.

#### (6) *Commission on Structure Reports*

The Editor of *Structure Reports*, W. B. PEARSON, reported that Volumes 19 and 20 (for 1955 and 1956 respectively) were expected to appear before the end of 1963. He emphasized that in order to fulfil the promise of catching up to the minimum delay of three to four years in publication by 1966, it was essential that Co-editors be appointed immediately in Rome to start work on all volumes up to that for 1962. [Except for the Metals Section of the 1962 Volume, these appointments were in fact made in Rome.]

The Editor further reported that the ten-year General Index 1951-60 should contain lists of 'simple' metallic and inorganic compounds arranged according to structure type. If an agreed nomenclature or symbolism of structure types were available at that time, the Index (Vol. 25) would be an appropriate place to introduce it, together with the lists of compounds. (Compare section (15).)

#### (7) *Commission on International Tables*

On her retirement after 16 years of service as Editor of *International Tables*, DAME KATHLEEN LONSDALE first expressed her warmest thanks to her Co-editors and Co-authors for their cooperation. She reported on the most satisfying sales of Vol. III which had appeared in 1962, and stated that Vols. I and II had already made

a handsome profit for the Union in spite of their low price. A Supplement to Vol. I containing the cubic space groups, which for some time had been referred to as Vol. IV, was in active preparation; and further Supplements or Volumes would be prepared as required.

After Dame Kathleen Lonsdale had ended her report, the Assembly expressed its great appreciation to her for the enormous amount of work she had done for the Union as Editor of *International Tables*.

#### (8) *Commission on Crystallographic Apparatus*

The Chairman of the Commission, W. PARRISH, summarized the Commission's activities during the period since the Fifth General Assembly. He particularly mentioned the two bibliographies, on 'Low-temperature X-ray diffraction' and 'High-temperature X-ray diffraction techniques' respectively, which had been prepared under the auspices of the Commission, and copies of which were available for inspection in Rome.

#### (9) *Commission on Crystallographic Computing*

The report of the Commission was presented by its Chairman, G. A. JEFFREY. One of the major activities had been the compilation and publication of the *World List of Crystallographic Computer Programs*. The users of the List were urged to report to the Editor, D. P. Shoemaker, what use they had made of the List, and it was emphasized that their comments would be of great importance to the Commission because the publication of a second edition was being considered.

#### (10) *Commission on Crystallographic Data*

The secretary of the Commission, O. KENNARD, reported that at its meeting in Rome before the opening of the Assembly the Commission had re-examined its aims and activities, and decided on the future lines of work. During the coming three years the Commission hoped (i) to maintain liaison between various groups concerned with crystallographic data; (ii) to contribute to the standardization of the presentation of crystallographic data appearing in primary publications; (iii) to promote the inclusion of crystallographic data in official Pharmacopœias, and the use of such data in the characterization and standardization of pharmacologically important compounds; and (iv) to look into the question of producing a comprehensive bibliography of crystallographic publications. The Commission had agreed that its membership be reduced from 14 to 8, and that each member should assume full responsibility for a specific activity of the Commission.

#### (11) *Commission on Crystallographic Nomenclature*

A. J. C. WILSON, as Chairman of the Commission, reported that it had not held any meetings, but that it had discussed several questions by correspondence.

A query was put from the floor whether the Commission should not be abolished because the need for having the Commission was not evident, particularly in view of the fact that sometimes special *ad hoc* Committees are set up to look into questions of symbolism and related matters (compare section (15).) It was felt, however, that although preferably the Commission itself should not initiate activities, its existence as a body to which questions of nomenclature could be referred was justified so that the Commission should be continued.

(12) *Commission on Crystallographic Teaching*

The Chairman of the Commission, A. J. FRUEH, reported on various matters discussed by the Commission in Rome. It had made plans for publishing a revised version of the book list, which was compiled a few years ago and then distributed in a mimeographed form; and to include in the booklet also a list of films, with a short descriptive commentary for each film. Other topics discussed by the Commission were the survey it was later asked to undertake concerning the role of crystallography in teaching and research in various countries (compare section (21)); and the participation by the Commission in the work of the ICSU Inter-Union Commission on Science Teaching, on which, according to a later decision by the Executive Committee, the Union should be represented through its Commission on Crystallographic Teaching.

(13) *Commission on Electron Diffraction*

L. O. BROCKWAY, Chairman of the Commission, reported that the main item of discussion at the Commission meeting had been the arrangements for the Symposium on Electron Diffraction in Melbourne, Australia, in 1965 (compare section (23)). At the suggestion of the Australian Organizing Committee, the Commission had considered the membership of the Programme Committee for this Symposium, and recommended to the Executive Committee that apart from the Australian members and in addition to the Chairman of the Commission, the following persons be appointed on the Programme Committee: L. O. Brockway (U.S.A.), Z. G. Pinsker (U.S.S.R.) and R. Uyeda (Japan).

(14) *Representation on Other Bodies*

(a) The Representative of the Union on the Commission on Macromolecules of the International Union of Pure and Applied Chemistry, C. W. BUNN, reported that, as this Commission had never dealt with matters of specific crystallographic interest, in his opinion there was no reason why the Union should continue to be represented on it. In accordance with this suggestion it was agreed that the Assembly should not reappoint a representative on the IUPAC Commission on Macromolecules.

(b) F. H. LAVES, Representative on the Commission on the Solid State of the International Union of Pure and Applied Physics, reported that after the Cambridge Assembly in 1960 this Commission had completely renewed its membership, and had become much more active. At a recent meeting of the Commission it had been decided that one of its principal aims should be to sponsor small conferences with an attendance of about 200 participants. Again the point was stressed that the Commission would appreciate suggestions from crystallographers for topics for such conferences, which should be of mutual interest to crystallographers and solid-state physicists. The collaboration of the Commission in the arrangements for the second symposium of the Conference in Australia in 1965 should be sought (compare section (23)).

(c) The Observer on the ICSU Abstracting Board, A. J. C. WILSON, reported that the Board had begun with work in the field of physics, but that by now it was also active in the fields of biology and chemistry. Even more recently the Board seemed to have become con-

cerned with primary scientific publication, not merely with abstracting.

(15) *Sub-committee on Structure-type Designation*

The Executive Committee reported that in connection with the wish of the Commission on *Structure Reports* to include a nomenclature or symbolism of structure types in the General Index volume, it had invited F. H. Laves to set up a Sub-committee to consider the possibilities for a classification of structures.

(16) *Sub-committee on Neutron Diffraction*

The question was asked whether the time had not come for the Union to set up a Commission on Neutron Diffraction. As this suggestion could not be considered in sufficient detail in Rome, it was later agreed that G. E. Bacon be asked to set up a Sub-committee to study the matter, and to report to the Executive Committee in good time before the Seventh General Assembly.

(17) *Fifty Years of X-ray Diffraction*

The Editor of this Commemoration Volume, P. P. EWALD, reported that, contrary to his original intention, he had decided not to prepare a second, revised, edition of the book. Only a limited number of copies had been printed, and the type had been kept for a second printing which would be made soon.

(18) *World Directory of Crystallographers*

The Editor of the second edition of the Directory, D. W. SMITHS, reported that he intended to start the preparations for a third edition at the end of 1963 or early in 1964. The price of the new edition would probably be \$2.50 per copy, with a reduced price of \$1.50 per copy for block orders.

(19) *Publication of drawings by M. C. Escher*

C. H. MACGILLAVRY, who had been appointed by the Executive Committee to act on behalf of the Union as Editor for this publication, reported that she and Mr Escher had selected about forty of his periodic drawings for inclusion in the book, about ten of them to be reproduced in colour. It had appeared that black-white mirror planes were missing from Escher's drawings; and also that ordinary mirror symmetry was less well represented than rotation and glide-plane symmetry. This is inherent in Escher's choice of motifs, and crystals or organic molecules show the same tendency. Mr Escher had already started work on the selected drawings to make them ready for reproduction. The Editor added that she intended to write a short general introduction, and then to comment on each separate figure.

(20) *Journal of Applied Crystallography*

W. PARRISH reported that at the request of the Executive Committee, he had studied, with H. P. Rooksby and A. J. C. Wilson, the advisability of the publication by the Union of a new journal to be devoted to applied and industrial crystallography. This Committee of three was of the opinion that there was indeed a need for such a journal. In a detailed report to the Executive Committee they had made proposals about the scope and contents, the publication policy and further details. Financial estimates were also included in this

report, copies of which were made available to the delegates with the specific request that the contents be kept private.

Since it was felt that not all delegates would have sufficient time to study the report in detail, the Assembly appointed a Committee to read the report critically and to advise the Assembly at a later session. This committee later reported that in their opinion the need for the new journal was somewhat exaggerated, and that the desire of many crystallographers to have their papers appear in journals appropriate to their main interest was underestimated. They felt that many of the topics suggested for inclusion in the new journal were acceptable to *Acta Crystallographica*. During the discussion some fear was expressed that with the proposed programme of the new journal only papers on structure determinations would be left for *Acta Crystallographica*. The committee had further compared the financial estimates with the accounts of *Acta Crystallographica* in its first eight years, and was of the opinion that the estimates were too optimistic. However, it was noted that the existing publications of the Union had all been heavily subsidized when they were started. These subventions had been recovered meanwhile, and the publication funds of the Union being in an extremely healthy state would allow the Union to take the risk of launching the new publication.

After these and further discussions, the Assembly approved the proposal that the Union should publish the new journal, and the Executive Committee was authorized to continue with the preparations and to appoint W. Parrish as Editor.

#### (21) *Place of Crystallography in teaching and research*

In a statement to the Assembly, J. D. BERNAL had explained the need for an investigation regarding the place of crystallography in teaching and research, in order to study the action that could and should be taken to ensure that crystallography be generally recognized as a discipline in its own right, and that it be so considered in the basic teaching of science students. During the discussion it emerged that the situation differed from country to country. In some countries separate chairs of crystallography are being created in a number of universities whereas in other countries crystallography still forms a part of the training in another subject (physics, chemistry, geology, etc.) or is even more neglected. It was felt, therefore, that any one statement was unlikely to suit every national situation, but that the Union should be prepared to give advice to any individual country asking for it.

It was agreed that the Commission on Crystallographic Teaching should assemble factual information on the value and status of crystallography as an academic discipline and as a research tool, and should make this information available to individuals and to adhering bodies as required.

#### (22) *Finances*

(a) The financial report based on the audited accounts for the years 1960, 1961 and 1962 was taken as read, and accepted without discussion. The General Secretary was thereafter discharged from liability to the Union.

(b) The budget estimates for general expenditure for the three years 1963, 1964 and 1965 were approved as

amended by the Executive Committee in Rome; they showed an estimated deficit of *f.*29,000. It was noted that the budget estimates for the previous three-year period had shown an estimated deficit of *f.*14,560, but that the income of the General Fund had actually exceeded the expenditure by *f.*47,084.

(c) As the accumulated balance in the General Fund was considered sufficiently high to allow for the deficit estimated for the period until the Seventh General Assembly, it was decided to leave the unit contribution unchanged at sixty U.S. dollars for each of the years 1964, 1965 and 1966.

#### (23) *Future meetings*

The following invitations had been received, and they were accepted with gratitude.

(a) An invitation from the Australian Academy of Science to join in sponsorship of a Conference in Melbourne in August 1965, consisting of two symposia on the following topics: (1) 'Electron Diffraction', (2) 'The Nature of Defects in Crystals'. The Commission on Electron Diffraction should collaborate in the organization of the first symposium, and for the second the collaboration of the IUPAP Commission on the Solid State should be sought. The two symposia should run in parallel.

(b) An invitation from the Akademia Nauk of the U.S.S.R. to hold the Seventh General Assembly and International Congress in Moscow in August 1966. The Chairman of the U.S.S.R. delegation, N. V. BELOV, explained that the meetings would be held in the buildings of the University of Moscow, and he expressed the hope that the dormitories of the University would be available for the members of the Congress.

#### (24) *International Council of Scientific Unions*

The Executive Secretary of ICSU, A. E. DECAE, had been invited to inform the Assembly about the intended reorganization of the Council. He first explained that the work of ICSU was currently conducted by three bodies: (i) the General Assembly composed of delegates from the 51 National and 14 Scientific Members of ICSU, meeting once every three years; (ii) the Executive Board, consisting of the members of the Bureau and of representatives of the Scientific Members, meeting annually; and (iii) the Bureau, consisting of the President and seven other Officers elected by the General Assembly. A new structure had been proposed, to be discussed and decided upon by an extraordinary General Assembly of ICSU in November 1963. One of the main changes would be the replacement of the Executive Board by an Executive Committee consisting of four Officers, 14 representatives of the Scientific Members, and in addition 10 representatives of the National Members. The Union representatives would each be elected for a period of four years, and if new Unions were admitted to ICSU, the total number of Union representatives would be kept at 14 so that a grouping of the Unions would become necessary. Between the annual meetings of the Executive Committee, the responsibility for transacting urgent business would be with a Board of Officers, and contrary to the current Bureau, this Board could be considered a body of the Executive Committee rather than a separate body concurrently with the Executive Committee.

During the discussion it became clear that the Assembly felt in principle in favour of the proposed reorganization of ICSU. However, the Assembly was strongly opposed to the proposal that the Unions be grouped for the purpose of representation on the Executive Committee of ICSU; this was expressed in a motion which was carried unanimously.

#### (25) Organization of future Congresses

Some time was devoted to a discussion of the merits and demerits of the Rapporteur system, and of other ways of organizing the Congresses. The matter was introduced by the Chairman of the Programme Committee, W. H. TAYLOR, who explained that, unless a limited and more specialized congress were held each year, there would always be the problem of how to deal with the large number of contributed papers. The Rapporteur system had saved a considerable amount of time, and it could certainly be improved after the experience gained at two Congresses. Other possibilities would be to have more review papers of a general character, to restrict the number of topics, or to extend the period of the Congress.

During the discussion which followed different views were expressed about the Rapporteur system. Whereas some speakers supported the system, and made suggestions for improvement, others severely criticized it and strongly objected to its ever being used again. F. C. FRANK advocated that consideration be given to the method used for the meetings of the Faraday Society which he explained in detail. At these meetings there are only discussions of papers after their full text has been sent to the participants in advance. However, he admitted that the topics of these meetings are narrowly defined, which makes the task of the Society easier.

Some suggestions were also made which were a kind of compromise and required the appointment of discussion leaders instead of rapporteurs. The individual authors would each be allowed a short time to introduce their papers, or to contribute from their papers what they might think relevant to topics of interest selected in advance by the discussion leaders from groups of papers.

Members were invited to send further specific proposals or comments to the General Secretary of the Union for the guidance of the organizers of future Congresses.

#### (26) Appointment of Editors

The following appointments by the Executive Committee of Editors of the Union's three main publications, for the period until the Seventh General Assembly, were confirmed:

*Acta Crystallographica*: A. J. C. WILSON  
*Structure Reports*: W. B. PEARSON  
*International Tables*: N. F. M. HENRY

The Executive Committee later reported that it had approved the appointments by the above Editors of the Co-editors whose names are listed in the next section.

#### (27) Elections

Officers of the Union, Chairmen and members of the Commissions, and Representatives of the Union on other bodies, were elected. The new membership of the

Executive Committee, the Commissions, *etc.*, is given below. In considering the list, the following points should be kept in mind: (a) one Vice-President and three ordinary members of the new Executive Committee were elected by the Fifth General Assembly to serve until the close of the Seventh General Assembly in 1966; (b) at the Fourth General Assembly it was agreed that no new members should be appointed on the *Acta Crystallographica* Advisory Board, and that the members of this Board should be considered as having been appointed until their service terminates by resignation or death; (c) according to Statute 6.3 the Editors and Co-editors are automatically members of the Commissions set up for their respective publications; (d) the Fifth General Assembly had resolved that the Commission on Crystallographic Nomenclature should consist of the Editors of *Acta Crystallographica*, *Structure Reports* and *International Tables ex officio*, with the first of the Editors as Chairman; and (e) according to By-Laws 3.1 and 4.1, the President and the General Secretary are *ex-officio* members of all Commissions.

#### *Executive Committee*

##### *President:*

J. D. BERNAL\* (U.K.)

##### *Vice-Presidents:*

DAME KATHLEEN LONSDALE\* (U.K.)

I. NITTA† (Japan)

##### *General Secretary:*

D. W. SMITS,\* Rekencentrum, University of Groningen, Grote Appelstraat 11, Groningen, Netherlands

##### *Retiring President:*

P. P. EWALD\* (U.S.A.)

##### *Ordinary Members:*

W. H. BARNES\* (Canada)

J. M. COWLEY† (Australia)

H. CURIEN† (France)

H. JAGODZINSKI† (Germany)

B. E. WARREN\* (U.S.A.)

G. S. ZHDANOV\* (U.S.S.R.)

#### *Acta Crystallographica Advisory Board*

SIR LAWRENCE BRAGG (U.K.)

L. PAULING (U.S.A.)

R. W. G. WYCKOFF (U.S.A.)

#### *Commission on Acta Crystallographica*

##### *Editor and Chairman:*

A. J. C. WILSON, Department of Physics, University College, Cathays Park, Cardiff, Wales

##### *Co-editors:*

I. FANKUCHEN (U.S.A.)

H. JAGODZINSKI (Germany)

H. LIPSON (U.K.)

\* Until the close of the Seventh General Assembly (1966).

† Until the close of the Eighth General Assembly (1969).

R. E. MARSH\* (U.S.A.)  
 S. MIYAKE\* (Japan)  
 I. NITTA† (Japan)  
 J. WYART (France)

*Commission on Structure Reports*

*Editor and Chairman:*

W. B. PEARSON, Division of Pure Physics, National  
 Research Council, Ottawa 2, Ontario, Canada

*Co-editors:*

J. M. BIJVOET (Netherlands)  
 G. B. BOKY (U.S.S.R.)  
 P. J. BROWN (U.K.)  
 L. D. CALVERT (Canada)  
 J. DONOHUE (U.S.A.)  
 J. D. DUNITZ (Switzerland)  
 J. S. KASPER (U.S.A.)  
 A. McL. MATHIESON (Australia)  
 M. V. NEVITT (U.S.A.)  
 J. M. ROBERTSON (U.K.)  
 A. TAYLOR (U.S.A.)  
 J. TROTTER (Canada)  
 T. WATANABÉ (Japan)

*Ex-officio Member:*

J. D. H. DONNAY (U.S.A.) (as Chairman of the  
 Commission on Crystallographic Data)

*Commission on International Tables*

*Editor and Chairman:*

N. F. M. HENRY, Department of Mineralogy,  
 Downing Place, Cambridge, England

*Co-editors:*

M. J. BUERGER (U.S.A.)  
 C. H. MACGILLAVRY (Netherlands)  
 G. D. RIECK (Netherlands)

*Elected Members:*

T. HAHN (Germany)  
 D. P. SHOEMAKER (U.S.A.)

*Commission on Crystallographic Apparatus*

*Chairman:*

A. McL. MATHIESON, CSIRO Chemical Research  
 Laboratories, Box 4331, G.P.O., Melbourne,  
 Vic., Australia

*Elected Members:*

S. C. ABRAHAMS (U.S.A.)  
 F. H. HERBSTEIN (South Africa)  
 R. PEPINSKY (U.S.A.)  
 V. SCATURIN (Italy)  
 E. G. STEWARD (U.K.)  
 M. M. UMANSKY (U.S.S.R.)

*Commission on Crystallographic Computing*

*Chairman:*

D. P. SHOEMAKER, Chemistry Department, Mas-  
 sachusetts Institute of Technology, Cambridge  
 39, Mass., U.S.A.

*Elected Members:*

W. R. BUSING (U.S.A.)  
 D. W. J. CRUICKSHANK (U.K.)  
 T. HAHN (Germany)  
 A. LÍNEK (Czechoslovakia)  
 M. A. PORAY-KOSHITS (U.S.S.R.)  
 Y. TAKÉUCHI (Japan)

*Commission on Crystallographic Data*

*Chairman:*

J. D. H. DONNAY, Department of Chemistry, The  
 Johns Hopkins University, Baltimore 18, Md.,  
 U.S.A.

*Secretary:*

O. KENNARD,\* University Chemical Laboratory,  
 Lensfield Road, Cambridge, England

*Elected Members:*

V. A. FRANK-KAMENETSKY† (U.S.S.R.)  
 R. SADANAGA (Japan)  
 N. L. SMIRNOVA (U.S.S.R.)  
 J. C. SPEAKMAN (U.K.)  
 E. G. STEWARD (U.K.)  
 A. VACIAGO (Italy)

*Ex-officio Member:*

W. B. PEARSON (Canada) (as Chairman of the  
 Commission on *Structure Reports*)

*Commission on Crystallographic Nomenclature*

*Chairman:*

A. J. C. WILSON, Department of Physics, Univer-  
 sity College, Cathays Park, Cardiff, Wales

*Other Members:*

N. F. M. HENRY (U.K.)  
 W. B. PEARSON (Canada)

*Commission on Crystallographic Teaching*

*Chairman:*

A. J. FRUEH, Department of Geological Sciences,  
 McGill University, Montreal, Quebec, Canada

*Secretary:*

H. CURIEN,\* Laboratoire de Minéralogie-Cristallo-  
 graphie, 1 Rue Victor Cousin, Paris 5, France

*Elected Members:*

L. V. AZAROFF (U.S.A.)  
 S. FURBERG (Norway)

\* Elected by the General Assembly as member of the Com-  
 mission concerned, and appointed Secretary by the Commis-  
 sion.

† Coopted after the close of the Sixth General Assembly.

\* Appointed after the close of the Sixth General Assembly.

† Until the end of 1963.

N. JOEL (Chile)  
 F. MAZZI (Italy)  
 H. D. MEGAW (U.K.)  
 S. RAMASESHAN (India)  
 I. I. SHEFRANOVSKY (U.S.S.R.)  
 J. ZEMANN (Germany)

*Commission on Electron Diffraction*

*Chairman:*

H. A. RAETHER, Institut für Angewandte Physik,  
 Jungiusstrasse 11, Hamburg 36, Germany

*Elected Members:*

O. C. A. BASTIANSEN (Norway)  
 M. BLACKMAN (U.K.)  
 J. M. COWLEY (Australia)  
 S. GOLDSZTAUB (France)  
 R. D. HEIDENREICH (U.S.A.)  
 R. UYEDA (Japan)  
 B. K. VAINSHTEIN (U.S.S.R.)

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

*Representatives:*

F. H. LAVES, Institut für Kristallographie und  
 Petrographie der E.T.H., Sonneggstrasse 5,  
 Zürich, Switzerland  
 P.-O. LÖWDIN, Quantum Chemistry Group, Uni-  
 versity of Uppsala, Sweden

*Abstracting Board of the International Council of  
 Scientific Unions*

*Observers:*

W. B. PEARSON, Division of Pure Physics, National  
 Research Council, Ottawa 2, Ontario, Canada  
 A. J. C. WILSON, Department of Physics, Univer-  
 sity College, Cathays Park, Cardiff, Wales

(28) *Votes of thanks*

At the conclusion of the Assembly, the following votes of thanks were passed by acclamation:

(a) To UNESCO for their financial assistance which had enabled many scientists from abroad to participate in the meetings held in Kyoto, September 1961; in Munich, July 1962; and in Rome, September 1963.

(b) To the Japanese delegates, and through them to the Science Council of Japan, for inviting the Union to participate in the Symposia held in Kyoto in September 1961; to the organizers of these meetings for the excellent arrangements and high standards of the scientific programme; and to all Japanese hosts for the great hospitality which the participants from abroad had received throughout their stay in Japan.

(c) To the German delegates, and through them to the Bayerische Akademie der Wissenschaften and the Ludwig-Maximilians-Universität München, for being hosts together with the Union for the meetings held in Munich in July 1962 in commemoration of the fundamental discovery of the diffraction of X-rays by crystals in 1912, and the subsequent first crystal-structure determinations by X-ray diffraction.

(d) To the Consiglio Nazionale delle Ricerche, and the Italian National Committee for Crystallography, for inviting the Sixth General Assembly and International Congress to Rome; to the Italian Organizing Committee, and in particular to the Executive Board of this Committee consisting of E. Onorato (Chairman), F. de Carli, M. Fornaseri, P. Gallitelli, P. Giacomello, F. Rolla and I. Grimaldi, and to all other persons who assisted in the local arrangements, for all the work done by them which had made the meetings a success and the stay of the participants in Rome as pleasant and interesting as possible.

(e) To the Programme Committee consisting of W. H. Taylor (Chairman), P. Gallitelli, C. H. MacGillavry, A. Magnéli, H. G. Smith and B. K. Vainshtein, and to the organizers of the three Symposia, D. W. J. Cruickshank, G. Donnay and W. Cochran, for their splendid arrangement of the scientific programme of the meetings.

(f) Telegrams were sent to Sir Lawrence Bragg and to the newly elected President of the Union, J. D. Bernal, with the greetings of the Assembly and the best wishes of all participants.

## Sixth International Congress

### (1) *Scientific Programme*

The scientific programme of the Congress consisted of:

(a) A Congress Discourse delivered by E. ONORATO on 'Crystallography; the old and the new', on 9 September.

(b) The following four General Lectures presented by invited speakers, each paper being the first event on one of the days of the Congress:

'Characteristic coordination polyhedra' by L. E. ORGEL;  
 'Crystal chemistry of complex compounds' by G. B. BOKY;

'Physical properties of defects in crystals' by J. FRIEDEL, and

'Structure refinement, 1963' by R. E. MARSH.

(c) About 500 contributed papers arranged in groups according to twenty-one topics, and presented during the week of the Congress at three to five simultaneous morning and afternoon sessions. Some of these sessions had been organized in collaboration with the Commissions on Crystallographic Apparatus, on Crystallographic Data and on Crystallographic Teaching respectively, and with the International Mineralogical Association.

Most of the contributed papers were treated under a Rapporteur system in order that the total number of sessions be reduced. The text of the papers concerned had been sent to the Rapporteurs about two to three months before the Congress, and the authors had been asked to submit also general information about the work, including reprints of related papers already published. At the sessions concerned the authors of the papers included in the Rapporteur's report were present to facilitate discussion.

As at the Fifth International Congress in 1960, at which the Rapporteur system had been tried for the first time, very divergent opinions about the value and usefulness of the system were again expressed. Its merits and demerits were discussed at length at the last session of the General Assembly (see section (25) of the previous part of this Report).

Abstracts of the papers presented at the Congress, including those which were included in the Rapporteurs' reviews or read in title only, had been distributed in advance. These collected abstracts have been reprinted as a Supplement to *Acta Crystallographica*, which has been sent free of charge to all subscribers to the journal.

### (2) Exhibitions

(a) In the main reception hall and an adjoining side wing of the Palazzo dei Congressi an exhibition of commercially available apparatus was held. Twenty-one firms participated in this exhibition, at which the most up-to-date apparatus was shown.

(b) Part of the exhibition area was reserved for an exhibition of non-commercial apparatus and devices. This exhibition had been organized under the auspices of the Commission on Crystallographic Apparatus by V. Scatturin, to enable individual members of the Congress to show their own constructions of equipment.

(c) In collaboration with the Commissions on Crystallographic Data and on Crystallographic Teaching, a book exhibition was also organized. The publications on display had been arranged by subjects, and this contributed greatly to the value of the exhibition.

### (3) Social arrangements

The members of the Congress enjoyed the following programme of social events which was organized for them. On the afternoon of Wednesday 11 September three excursions took place to places of historical interest, namely to Ostia Antica, to Necropoli etrusca di Cerveteri and to Villa Adriana (Tivoli) respectively. On the evening of the same day a concert of chamber music was given by the instrumental ensemble 'I Musici' in the Aula Magna of the Città Universitaria, and the audience will undoubtedly long remember the perfect performance. The Congress Dinner was held on 12 September in the new Hilton Hotel; it was the first banquet held there with such a large attendance, more than 1200 persons. Short after-dinner speeches were given by E. ONORATO and J. WYART, and the President of the Union, P. P. EWALD, closed the event. The Management of Philips S.p.A., on behalf of the Philips Companies throughout the world, were hosts at a cocktail party in the Castel Sant'Angelo on 13 September; they could hardly have chosen a more impressive place for this reception. For the accompanying members there was also a tea reception at the Casina delle Rose on the first day of the Congress.

## Symposia

In conjunction with the Congress three Symposia were held. The Rapporteur system was not applied to any of the papers presented at these Symposia, and the usual procedure was followed that after each paper there was normally opportunity for discussion. Abstracts of the papers had also been distributed in advance, and they have been republished with the abstracts of the Congress papers.

(a) On the initiative of the Commission on Crystallographic Computing, the first Symposium was devoted to 'Problems and methods in crystallographic computing'. On Saturday 14 September DAME KATHLEEN LONSDALE and C. H. MACGILLAVRY presented two introductory lectures to this Symposium, in which they discussed problems arising in the collection and handling of experimental data. A third invited introductory lecture entitled 'Observed to calculate: the crystallographer as computer' was given by D. SAYRE on Monday morning 16 September. During five morning and afternoon sessions on 16, 17 and 18 September, about forty invited and contributed papers were presented.

(b) The topic of the second Symposium was 'Phase transitions in solids'. An introductory lecture entitled 'Phase transformations' was given by M. J. BUERGER on Saturday 14 September, and about thirty-five invited and contributed papers were presented during six morning and afternoon sessions on 16, 17 and 18 September.

(c) The third Symposium, on 'Some aspects of lattice dynamics' was of a different character in so far as its programme consisted of an introductory lecture by W. COCHRAN, and four invited review papers only, which were presented on 16 and 17 September. The titles of these papers and the names of the authors were:

- 'Some aspects of lattice dynamics' by W. COCHRAN;
- 'Temperature diffuse scattering of X-rays' by B. E. WARREN;
- 'Neutron scattering by phonons in crystals' by B. N. BROCKHOUSE;
- 'Optical aspects of lattice vibrations' by J. P. MATHIEU; and
- 'Lattice dynamics and the macroscopic properties of crystals' by W. LUDWIG.