

Book Reviews

Works intended for notice in this column should be sent direct to the Editor (A. J. C. Wilson, Department of Physics, University College, Cathays Park, Cardiff, Great Britain). As far as practicable books will be reviewed in a country different from that of publication.

Texturen metallischer Werkstoffe. By G. WAS-SERMANN and J. GREWEN. Pp. xii + 808 + 567 figs. Berlin: Springer-Verlag. 2nd edition. 1962. Price DM 148.00.

Since the appearance of the first edition in 1939 an enormous amount of research effort has been expended throughout the world on the study of textures in metallic material. This reflects both the technical importance of and scientific interest in the subject. Most crystals are essentially anisotropic with respect to some of if not all their properties, and since by far the greater proportion of metallic materials is used in the polycrystalline form, it follows that texture, or preferred crystalline orientation, results in anisotropy which will affect the behaviour of the material. Thus, silicon-iron sheet used for transformer laminations can be produced with crystal directions of easy magnetization in favourable orientations. On the other hand preferred orientation in metal sheet used for the production of various articles by deep-drawing and pressing can add substantially to the cost. All this was appreciated by metallurgists in 1939, but since then many more countries have developed their own industries and there has been a tendency towards continuous and fully automated production. Also many new metals and alloys, little more than laboratory curiosities before the war, are now of considerable technical importance.

It is therefore not surprising that so much energy has been devoted to texture research and that new and rapid methods of texture determination involving use of modern diffractometer equipment have been developed. Pioneer work was carried out in Germany notably by the senior author and the new and enlarged monumental edition is a credit to him and to German thoroughness.

Following a brief but adequate outline of the various forms of textures in the first section, a complete survey is made in section 2 of methods of texture determination. The latter are mainly X-ray diffraction methods involving photographic or counter techniques, although optical, acoustic, mechanical and magnetic methods are also dealt with. In section 3 (the longest) a detailed description of

textures is given. These include growth textures in castings and electroplatings, deformation textures in wire, tube and sheet produced by hot and cold working with standard industrial processes, classified according to the crystal symmetry of the metals or alloys concerned. Metals work-harden during cold deformation and generally have to be annealed to soften to a manageable state. Accordingly a large section of this chapter is concerned with textures after annealing.

Theories put forward to account for the development of growth and deformation textures are surveyed in the fourth section, together with those for textures resulting from annealing deformed material. The latter receive the greater attention, justifiably since they are technically the most important in determining the properties of the final product and also because they throw light on one of the most interesting phenomena in metallurgy: recrystallization.

The fifth section, in which the influence of texture on a wide range of properties of fabricated materials is discussed, is the most valuable. The range embraces mechanical, thermal, chemical, electric and magnetic properties, which emphasizes the technical importance of what has been to the reviewer and, from the reference list, to more than a thousand others a fascinating field of study.

The sixth and final section is a collection of appendices setting out the essential data and equations required in texture work as well as presenting a comprehensive index of textures in a convenient tabular form.

The reviewer commends this book to the libraries of all metallurgical departments and of corresponding industrial research establishments, as well as to all workers in the field who can read the language. For the sake of the less talented it is hoped that some benevolent organization will sponsor a translation.

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International Union of Crystallography

Report of Executive Committee for 1962

Personal notes

In 1962 the scientific world again lost a number of distinguished scientists who made great contributions to science. On 28 August the (Canadian) National Research Council, Adhering Body to the Union for Canada, lost its President, Dr E. W. R. Steacie, who was also President of ICSU since his election in 1961. All who participated in the Fourth General Assembly and International Congress of the Union in Montreal in 1957 will remember Dr Steacie as one of the principal hosts for these meetings.

The death of Prof. Niels Bohr on 18 November was a great shock to all scientists. Prof. Bohr, who laid the foundations of the quantum theory of atomic structure, has been one of the most distinguished physicists of our time, and his work has been of great importance to the development of modern crystallography as well.

At the end of the year the community of crystallographers lost one of its senior members by the death, on 31 December, of Sir Charles Darwin. His name will always remain connected with the distinction of perfect and mosaic crystals, and of primary and secondary

extinction, effects which he investigated and studied in the early days of X-ray crystallography.

The Executive Committee is glad to report that in 1962 the role X-ray crystallography has played in protein research was acknowledged by the Nobel prizes which were awarded to Drs F. H. C. Crick, J. D. Watson and M. H. F. Wilkins, and to Drs J. Kendrew and M. Perutz for their researches and discoveries concerning the structure of nucleic acids and of globular proteins respectively. The Executive Committee wishes to take this opportunity to congratulate these Nobel prize winners.

Meetings

The main events in 1962 were the Commemoration Meeting 'Fifty Years of X-ray Diffraction', and the subsequent Symposium on 'Recent Advances in the Experimental and Theoretical Methods of Crystal-Structure Research', which took place in Munich, Germany, from 25 to 31 July. The meetings were held in commemoration of Max von Laue's fundamental discovery in 1912 of the diffraction of X-rays by crystals, and of the first crystal-structure determinations by X-ray diffraction by W. H. and W. L. Bragg immediately after von Laue's discovery. The Ludwigs-Maximilians-Universität München, the Bayerische Akademie der Wissenschaften and the International Union of Crystallography jointly organized the actual Commemoration Meeting; the Symposium was organized by the Union and the Sektion für Kristallkunde der Deutschen Mineralogischen Gesellschaft. About 530 scientists and 120 accompanying members from 27 countries participated in the meetings. At the Commemoration Meeting 15 invited lectures were given; the programme of the Symposium consisted of 6 invited and 57 contributed papers. Further details about the meetings, including lists of the papers presented, can be found in a summary report published earlier (*Acta Cryst.* (1962), **16**, 72).

Immediately before and during the period of the commemoration meetings the Executive Committee and five Commissions of the Union held business meetings in Munich. The more important items of business transacted at the Executive Committee meeting have already been summarized in the above-mentioned report.

During the year further arrangements were made for the Sixth General Assembly and International Congress, to be held in Rome in September 1963. The Programme Committee for the Congress and the subsequent Symposia met twice, in Cambridge in May and in Munich in July.

Resignations and appointments

To the great regret of the Commission on *Acta Crystallographica* and of the Executive Committee, the Technical Editor of the journal, Prof. R. W. Asmussen, asked in 1962 to be released from his duties with the completion of the 1962 volume. During the four years of his handling of the technical side of editing *Acta Crystallographica*, its size had increased from about 900 pages in 1958 to more than 1300 pages, so that the technical editorship required an increasing part of his time. The Executive Committee wishes to express here how grateful the community of crystallographers should be to Prof. Asmussen for his painstaking work for the Union.

Since the increasing size of the journal made it unlikely that a scientist willing to succeed Prof. Asmussen could be found, the Executive Committee decided to appoint a full-time technical editor for the publications of the

Union, with responsibility in the first instance for *Acta Crystallographica*. In the fall of the year Mr S. A. Bryant was appointed to this post; he started his work for the Union on 15 November.

At its meeting in Munich the Executive Committee confirmed the appointment of Drs L. D. Calvert and J. Trotter as additional Co-editors for *Structure Reports*. The Executive Committee further agreed to the recommendation of the Commission on Crystallographic Teaching that the Union should publish a selected set of two-dimensionally periodic drawings by Mr M. C. Escher, and invited Prof. C. H. MacGillavry, who accepted this invitation, to edit this publication jointly with Mr Escher.

In 1962 Prof. E. Alexander resigned as member of the Commission on Crystallographic Teaching because he had been unable to participate in the work of this Commission and did not expect that the situation would soon change.

Publications

In addition to the twelve monthly issues of *Acta Crystallographica*, two important Union publications appeared in 1962: a commemoration volume entitled *Fifty Years of X-ray Diffraction* and Volume III of *International Tables for X-ray Crystallography*.

The commemoration volume has been prepared by Prof. P. P. Ewald, with the help of about 40 authors who themselves took an active part in the development of modern crystallography. This volume, which contains x+720 pages, gives the history of the early discoveries and describes the progress made in the various fields of application of diffraction methods, and there is a chapter on the various schools and the regional developments. The personalities of the founders and the leaders of these schools are sketched in In Memoriams and autobiographies. A final chapter deals with the international organization of modern crystallography.

Details about the new volume of *International Tables* are given below in the section dealing with the activities of the Commission responsible for this publication.

Under the sponsorship of the Commission on Crystallographic Computing a *World List of Crystallographic Computer Programs* was published, and copies were distributed free of charge. The Commission on Crystallographic Teaching prepared a crystallographic book list, copies of which are also available free of charge. Further details about these two lists are given below in the respective Commission reports.

Adhering Bodies; National Committees

An application for membership in Group I was received from the Hungarian Academy of Sciences, and this application will be presented to the Sixth General Assembly in Rome. The present number of adherences amounts to twenty-six. The Adhering Bodies are listed in Table 1 along with the names and addresses of the secretaries of the National Committees. The membership of the National Committees is given at the end of this Report.

Work of the Commissions

Commission on Acta Crystallographica

The main event in the history of the Commission during 1962 was the appointment of Mr S. A. Bryant as a full-time Technical Editor for the publications of

Table 1. *Adhering Bodies*

Country	Group*	Adhering Body	Secretary of National Committee
Argentina	I	Consejo Nacional de Investigaciones Científicas y Técnicas	María Jiménez de Abeledo, Departamento de Física, Comisión Nacional de Energía Atómica, Av. del Libertador Gen. San Martín 8250, Buenos Aires
Australia	II†	Australian Academy of Science	R. I. GARROD, Aeronautical Research Laboratories, Box 4331, G. P. O., Melbourne, Vic.
Austria	I	Österreichische Akademie der Wissenschaften	F. MACHATSCHKI, Mineralogisches Institut der Universität, Dr Karl Luegerring 1, Vienna 1
Belgium	II	Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique	R. VAN TASSEL, Institut Royal des Sciences Naturelles de Belgique, Rue Vautier 31, Brussels
Brazil	I	Conselho Nacional de Pesquisas	E. TAVORA, Faculdade Nacional de Filosofia, Av. Pres. Antonio Carlos 40, Rio de Janeiro, G. B.
Canada	III	National Research Council	W. H. BARNES, Division of Pure Physics, National Research Council, Ottawa 2, Ont.
Chile	I	National Committee for Crystallography	ISABEL GARAYCOCHEA, Centro de Investigaciones de Cristalografía, Universidad de Chile, Casilla 2777, Santiago
Czechoslovakia	I	Československá Akademie Věd	A. LÍNEK, Ústav Technické Fysiky, Československá Akademie Věd, Cukrovarnická 10, Prague 5
Denmark	I	Akademiet for de tekniske Videnskaber	E. KROGH ANDERSEN, Den Kgl. Veterinær- og Landbohøjskoles Kemiske Laboratorium, Bülowsvej 13, Copenhagen V
Finland	I	Suomalainen Tiedeakatemia	K. A. MANSIKKA, Wihuri Physical Laboratory, University of Turku, Vesilinnantie 5, Turku
France	IV	Académie des Sciences (Institut de France)	H. CURIEN, Laboratoire de Minéralogie-Cristallographie à la Sorbonne, 1 Rue Victor-Cousin, Paris 5
Germany	V	Deutsche Mineralogische Gesellschaft	K. BOLL-DORNBERGER, Deutsche Akademie der Wissenschaften, Institut für Strukturforchung, Rudower Chaussee, Berlin-Adlershof
Hungary‡	I	Magyar Tudományos Akadémia	IMRE TARJÁN, Hungarian Academy of Sciences, Puskin-u 9, Budapest VIII
India	I	Ministry of Scientific Research and Cultural Affairs	D. S. KOTHARI, University Grants Commission, Rafi Marg, New Delhi
Israel	I	Israel Crystallographic Society	P. COPPENS, Weizmann Institute of Science, Rehovoth
Italy	II	Consiglio Nazionale delle Ricerche	M. FORNASERI, Istituto di Geochimica, Università di Roma, Rome
Japan	IV	Science Council of Japan	T. WATANABÉ, Physics Department, Faculty of Science, Osaka University, Nakanoshima, Osaka
Netherlands	III	Stichting voor Fundamenteel Onderzoek der Materie met Röntgen- en Elektronenstralen	G. D. RIECK, Technical University, Insulindelaan 2, Eindhoven
New Zealand	I	The Royal Society of New Zealand	D. HALL, Department of Chemistry, University of Auckland, Auckland
Norway	I	Det Norske Videnskaps-Akademi	I. OFTEDAL, Institutt for Geologi, Universitetet i Oslo, Blindern, Oslo
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	J. L. AMORÓS, Departamento de Cristalografía, Consejo Superior de Investigaciones Científicas, P. Castellana 84, Madrid 6
Sweden	II†	Kungliga Vetenskapsakademien	I. LINDQVIST, Department of Agricultural Chemistry I, Royal Agricultural College of Sweden, Uppsala 7
Switzerland	I	Société Suisse de Minéralogie et de Pétrographie	A. NIGGLI, Institut für Kristallographie und Petrographie der Eidg. Technischen Hochschule, Sonneggstrasse 5, Zürich.
U.K.	V	The Royal Society	The Secretary of the British National Committee for Crystallography, The Royal Society, Burlington House, London W. 1
U.S.A.	V	National Academy of Sciences—National Research Council	D. P. SHOEMAKER, Chemistry Department, M. I. T., Cambridge 39, Mass.
U.S.S.R.	V	Akademija Nauk S.S.S.R.	V. I. SIMONOV, Institute of Crystallography, Leninskii prospekt 59, Moscow B-333

* See Statute 2.6 (*Acta Cryst.* (1960), 13, 971).

† The Australian Academy of Science and the Kungliga Vetenskapsakademien have requested that their membership be changed from one in Group I into one in Group II. According to Statute 2.6 these changes are subject to confirmation by the Sixth General Assembly.

‡ Membership not yet fully effective; the application will be presented to the Sixth General Assembly in September 1963 in accordance with Statute 2.5.

the Union. The first fifteen volumes of *Acta Crystallographica* were published with the aid of a Technical Editor who had a full-time academic appointment, and was able to devote only a limited time to *Acta Crystallo-*

graphica. In accepting the resignation of Prof. R. W. Asmussen as Technical Editor, the Commission wishes to express its deep indebtedness to him for his devoted service over many years.

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

Vol.	Year	Number of pages	Articles			Short Communications		
			Number	Number of pages	Average length	Number	Number of pages	Average length
10	1957	874	133	600	4.51	86	91	1.06
11	1958	909	152	790	5.20	73	82	1.12
12	1959	1067	181	926	5.12	93	103	1.11
13*	1960	1164	144	835	5.79	69	105	1.52
14	1961	1318	206	1111	5.40	166	181	1.09
15	1962	1324	199	1170	5.88	105	106	1.01

* Volume 13 includes the report of the Cambridge Congress, involving 169 pages of abstracts

A survey of the growth and contents of the last six volumes of *Acta Crystallographica* is given in Table 2. Volume 15 for 1962 shows a small increase both in the number of pages published and in the number of subscribers. The increase in the size of the successive volumes is an indication of the continuing expansion of the science of crystallography, but unfortunately the increase in income from subscriptions is not keeping pace with the increasing cost of production. The question of changing the subscription prices will be discussed during the forthcoming General Assembly of the Union in Rome.

Commission on Structure Reports

The Commission met in Munich in July and discussed aspects of the production of *Structure Reports*. The much-delayed Volume 17 appeared early in 1963, and it is hoped that Volumes 19 and 20 will also appear in the same year.

Work is progressing simultaneously on all volumes up to 24, and it is expected that by the end of 1963 work on volumes up to 27 (for 1962) will be well under way.

Despite strenuous efforts it seems impossible to produce a volume of *Structure Reports* in less than three years from the start of work, and if the manuscript of one section is delayed, or if there are delays with printing, this period may even be doubled. The number of Co-editors has therefore been increased to twelve so that several volumes can be prepared simultaneously. In the course of 1962 Drs L. D. Calvert and J. Trotter have accepted responsibilities as Co-editors.

Commission on International Tables

The suggestion that *International Tables* be published for bringing up to date and supplementing the former *Internationale Tabellen zur Bestimmung von Kristallstrukturen* was made at the international gathering held in London in 1946 and was confirmed by the appointment of an *International Tables* Commission at the First Assembly of IUCr held at Harvard University in 1948. A trilogy of volumes was then planned, the third of which was published in June 1962, after 15 years strenuous work by the editors and authors involved. The price of the volumes was deliberately kept low, and this was possible because of generous initial financial help from UNESCO and from the U.S. National Research Council. The result is that the sales of Vol. I are now climbing steadily towards the limit of the first edition printed (4000) and a decision concerning the form of their further reproduction may have to be made soon.

Vol. III was a difficult volume to produce, first because there were no comprehensive lists of many of the physical constants required, and secondly because the published values were constantly being improved

upon. The first difficulty meant that some of the compilers were faced with major pieces of research; the second, that inevitably a time guillotine had to be applied after which no changes could be accepted. Few reviews have as yet appeared to allow the editorial commission to judge whether their labours have found approval; some 20 review copies were sent out.

Dr Norman Henry, of the Department of Mineralogy of the University of Cambridge, is actively preparing Vol. IV, which is to supply the cubic space-group diagrams omitted from Vol. I and, in addition, other tables relating to symmetry.

Commission on Crystallographic Apparatus

The Commission held four sessions in Munich in July. In addition, business was conducted by mail and by personal meetings of members with the Chairman. Four consultants were elected during the year: Drs K. Drenck (Denmark), H. A. Levy (U.S.A.), B. M. Rovinsky (U.S.S.R.) and V. Scatturin (Italy). The most active projects are summarized below.

1. *Comparison of X-ray films*. The experimental work on this project, which was directed by Prof. R. Uyeda and Dr H. Morimoto at Nagoya University, Japan, was completed. The final draft of the report was accepted by the Commission and will soon be published in *Acta Crystallographica*.

2. *Radiation protection*. Several drafts of a report prepared by Dr E. G. Steward on radiation hazards associated with X-ray diffraction instrumentation were studied. A final draft was accepted by the Commission and has been published in *Acta Crystallographica* ((1963), **16**, 324).

3. *Precision determination of lattice parameters*. It was decided to wait a few years before reactivating this project. Requests for powder samples used in the previous tests are still accepted and samples are supplied free by the Chairman. A few reports giving the results of measurements on these samples have been received, but generally the powders are used as calibration standards.

4. *Index of Crystallographic Supplies*. After a considerable amount of study and preparation it was reluctantly decided that it would not be possible to prepare a third edition in time for the Rome Congress. The new edition may be prepared at a later date. The project has been under the direction of Dr A. J. Rose.

5. *Exhibit of non-commercial crystallographic apparatus*. Detailed planning for an exhibit of apparatus, devices, teaching aids, etc., at the Rome Congress was nearly completed. Dr Scatturin is consultant to the Commission in charge of this project.

6. *Automatic single-crystal diffractometers*. It was decided to hold an open session of the Commission in Rome

devoted to invited papers on X-ray and neutron automatic instruments. The convener will be Dr A. McL. Mathieson, and six speakers have been invited.

7. *Bibliographies.* The need for comprehensive up-to-date bibliographies in certain areas of crystallographic apparatus and techniques has been realized for some time. The Commission has arranged the preparation of three bibliographies on the following topics: High-temperature X-ray diffraction techniques, low-temperature single-crystal methods, and automatic single-crystal diffractometry. It is planned that they shall be completed before the Rome Congress; the method of publication has not yet been decided. Other topics are being considered.

8. *Neutron instrumentation.* The Commission has elected a consultant (Dr Levy) to decide whether the Commission should consider problems in this field.

9. *Intensity measurements.* Problems relating to the measurement and interpretation of intensities from single crystals and powders have been considered by the Commission for several years. It was agreed to defer a decision whether or not a project be undertaken similar to the lattice-parameter project until the results of the American Crystallographic Association tests become available for study. Invited papers on the subject will be presented in Rome (see 6 above).

10. *Other topics.* Dr Y. Saito presented an interesting summary of crystallographic instrumentation in Japan at the Munich meetings. Little progress has been made in soliciting review articles for *Acta Crystallographica*.

Commission on Crystallographic Computing

The project for the publication of a *World List of Crystallographic Computer Programs* was successfully completed under the editorship of Prof. D. P. Shoemaker with the assistance of the regional and machine correspondents as listed in *Acta Cryst.* (1961), **14**, 898. Copies were distributed with the November issue of *Acta Crystallographica*. Further copies, subject to limited supply, may be obtained on request from Prof. D. P. Shoemaker, Prof. G. A. Jeffrey, or Dr D. W. Smits, or through the Secretaries of the National Committees. The list is complete up to 1 January 1962. It provides information pertaining to the author, machine type, function in abstract format, and the status of availability of the program. 577 programs are listed, for 42 different machines, and 5 general programming languages. There are 248 authors, the majority of whom are crystallographers. It is hoped that this list will provide not only a convenient summary of the status of crystallographic computing up to the end of 1961, but will also be used as a precise form of reference to the particular program actually used in a crystal-structure analysis. The Commission plans to maintain the *World List* as a continuing project, with a second edition during the period 1963-66.

The recommendation to the Programme Chairman of the Rome Congress that a Symposium on computing problems and methods be arranged with Prof. D. W. J. Cruickshank as organizer was favourably accepted. There was little response to the suggestion of a need for standard crystal data to be used for checking program accuracy and this question has been deferred for further discussion at the next Commission meeting. A handbook on *Computing Methods in Crystallography* (Ed. J. S. Rollett) is in preparation, based on the lectures of a summer school held in Oxford in August 1962. It is believed that this

publication will meet the need for an introductory text to the subject.

Commission on Crystallographic Data

In collaboration with the Single Crystal File Office at Birkbeck College, London, the Commission continued its work of collecting and distributing references relating to different aspects of crystallographic data to various organizations, in particular to the Powder Data File, *Structure Reports* and the *Tables of Interatomic Distances*. The largest practical contributions to this work came from a group working at Moscow with Dr Smirnova, who sent over 150 abstracts of Russian papers.

The British National Data Committee held their first meeting in February, when they discussed ways of stimulating interest in the Powder Data File, obtaining useful material for inclusion in the file and collecting unpublished data. Liaison with other committees concerned with scientific information was also discussed.

The Commission held two interim business meetings in Munich in July. At these meetings reports were presented on the work of the various National Data Committees and on the work of the Single Crystal and Powder Data File. Proposals for the standardization of data and methods employed at the Groth Institute were also discussed. Plans were made for meetings to be held during the Sixth International Congress in Rome in September 1963.

Commission on Crystallographic Nomenclature

Correspondence has continued on the numbering of atoms, the nomenclature of structure types, and the use of the words isomorphous, isostructural, and isotypic. During the meetings in Munich a recommendation was made that atoms should be distinguished by an appended arabic number in parentheses, thus: C(1), C(2), . . . , C(19), N(1), N(2), . . . , etc. A permissible alternative would be to number all atoms sequentially, as . . . C(19), N(20), N(21), . . . whenever this would be more convenient, for example, in computing. The recommendation was accepted by the Commissions on *Acta Crystallographica* and on *Structure Reports*.

Commission on Crystallographic Teaching

The activities for the continuing projects of the Commission were as follows:

1. *Syllabus file.* The number of syllabuses on file with the Commission remained at sixteen. No new ones were received during 1962.

2. *Films and teaching aids.* A new list of visual aids and films has been prepared and will be ready for photocopy in February 1963.

3. *Book lists.* A revision of the book list was completed in August 1962. It was originally intended that this should be preliminary to a list in the third edition of the *Index of Crystallographic Supplies*, but the publication of this Index was postponed. Therefore 250 copies of the book list were prepared for circulation.

4. *Book exhibit.* Plans for a book exhibit at the Sixth International Congress in Rome were discussed with the Italian Organizing Committee in cooperation with the Data Commission.

5. *Summer School.* Much time was expended by members of the Commission in making plans to sponsor a short school at Pavia on the teaching and application of crystallography to related sciences. In the course of

the summer it was learned that funds that were originally thought available would not be forthcoming. Because of the limited time available for the preparations, it was thought best to abandon the plans.

6. *Escher drawings.* During the early part of 1962 the Commission prepared a second report on a monograph of symmetry drawings by Mr M. C. Escher.

Commission on Electron Diffraction

As in the previous year, no report has been received from this Commission.

Representation on other bodies

Abstracting Board of the International Council of Scientific Unions

The Executive Committee of the Abstracting Board of ICSU met in Paris on 12 and 13 July 1962. The triennial meeting of the General Assembly was also held on 13 July. The Secretary of the Board circulated copies of 'A tentative study of the publication of original scientific literature', a project that has been mentioned in previous reports. A further study, 'Scientific information for the scientist' has been begun, and a 'Code of good practice for scientific publications', prepared in conjunction with the International Federation for Documentation, the International Organization for Standardization, and the International Federation of Library Associations, has been published. Copies of this 'Code of good practice' have been distributed to members of the Commission on *Acta Crystallographica* and other interested Officers of the Union. Prof. G. A. Boutry, formerly Secretary of the Board, has been elected President, and it is intended to appoint a full-time administrative secretary.

Commission on Macromolecules of the International Union of Pure and Applied Chemistry

During 1962 there was no meeting of this Commission. There will be a meeting during the IUPAC Conference in London, 3-10 July 1963.

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

The Commission was asked, and agreed by correspondence, to recommend to IUPAP to sponsor and support the following conferences in 1963: (1) an International Conference on Lattice Dynamics, to be held in Copenhagen, Denmark, 19-23 August; and (2) an International Conference on Superconductivity, to be held at Hamilton, N.Y., U.S.A., 26-28 August. IUPAP has granted sponsorship and support meanwhile.

The Commission met in Amsterdam on 15 October; and F. C. Frank, P. Laves, P.-O. Löwdin and G. W. Rathenau were present. The question what the task of the Commission should be was discussed. It was agreed that the Commission should do more than judge applications for support by IUPAP to conferences in the field of solid-state physics on their scientific merits, which had been the main activity in the past. It was felt desirable that the Commission should also be active in stimulating the organization of meetings in this field, and on topics of mutual interest for solid-state physicists and crystallographers. Procedures were discussed for planning such conferences and arranging them in the most efficient way.

Several topics for conferences were considered, among them the topic 'Application of physical non-diffraction methods to the investigation of atomic arrangements'. It was hoped that a meeting on this topic could be organized in Zürich (Switzerland). The Commission would welcome suggestions for other suitable topics.

It was further felt desirable that the Commission should try to coordinate meetings supported by IUPAP and IUCr, so that, if possible, an overlap of related conferences be avoided. The work of the Commission in this respect would be greatly facilitated if its Secretary, Prof. G. W. Rathenau (Natuurkundig Laboratorium, Plantage Muidergracht 6, Amsterdam, Netherlands) could be informed as early as possible of the dates of meetings planned on topics in the field of interest of the Commission.

International Council of Scientific Unions

The Union was represented by its Vice-President, Prof. N. V. Belov, at the 14th meeting of the ICSU Executive Board, which was held in Prague from 17 to 21 October.

In addition to the discussion of the financial affairs and to the further routine business, the structure of ICSU and the status of the ICSU Special and Scientific Committees were again among the most important items of discussion. It was agreed to hold an extraordinary General Assembly at the end of 1963 to deal with and decide upon these topics. Other items of discussion were the International Biological Programme, a project to be undertaken under the sponsorship of ICSU; the International Year of the Quiet Sun; the participation in the International Hydrological Programme; and the relations of ICSU with UNESCO, and with other international organizations.

Finances

The audited accounts of the Union for the year 1962 are published at the end of this Report. The amounts are expressed in Netherlands Guilders, and the following rates of exchange were used: £1=\$2.80; \$1=f.3.62=N.F.4.90=Sw.Kr.5.17=D.Kr.6.90. According to a statement received from ICSU, these rates are the standard rates of exchange used by the U.N. organizations at 1 January 1963.

As foreseen in the Report for 1961, the *Acta Crystallographica* account for 1962 shows a larger deficit than the one for 1961, the two deficits being f.16,058 and f.2936 respectively. A comparison of the accounts shows that the cost of printing and binding increased by more than 10 per cent from f.132,832 in 1961 to f.147,159 in 1962. This increase was more than the increase in the income from subscriptions and sales of back numbers which was f.170,979 in 1961 and f.178,296 in 1962. In addition to this increased cost of production, which was caused mainly by three increases in the printing rates in 1962, there was also a higher editorial expenditure in that year. The appointment of a full-time Technical Editor in the fall of 1962, and the expenses in connection with a meeting of the editorial board in Munich, are the main causes for the increased editorial expenditure. The net income from advertisements is still relatively low, but increased from f.3801 in 1961 to f.6544 in 1962.

Fortunately the accumulated balance of the *Acta Crystallographica* account, which decreased to f.161,964, made it unnecessary to take immediate measures. Since, however, the cost of production is likely to increase more

rapidly than the income from subscriptions, an increase in the subscription prices will soon become unavoidable.

The *Structure Reports* account for 1962 shows a balance of f.55,793, and the accumulated balance of this account increased to f.119,777. It should be kept in mind, however, that in 1962 the only publication expenses were the cost of binding additional copies of Volumes 9, 11 and 15. About two-thirds of the income from sales was received with respect to Volume 18, which appeared at the end of 1961 and was also paid for in that and previous years. The sales of all volumes are continuing at quite a satisfactory level which, except for Volume 14, was even higher in 1962 than in 1961.

The cost of production of Volume III of the *International Tables* was a heavy charge against the account concerned. The major part of the printing and binding expenses were, however, already recovered in 1962 from the sales of copies of this volume. Apparently its appearance stimulated the sales of copies of Volumes I and II which were higher in 1962 than in 1961. Although the *International Tables* account for 1962 shows a deficit of f.9524, this is not a real deficit because the money invested in the production of the three volumes, and of Volume III in particular, will be recovered from the sales.

In the accumulated balance of the *International Tables* account, amounting to f.101,879 at the end of 1962, the unsold copies of the three volumes are not included. As for the other publications of the Union, these stocks represent a considerable hidden asset which will gradually be converted into cash over a period of years.

For the Commemoration Volume *Fifty Years of X-ray Diffraction* a special account was opened. Only part of the stock of copies of the book, which appeared in the middle of the year, was sold by the end of 1962. It is hoped that the remaining copies will be sold within one or two years, and that the account will then be about balanced. At the end of 1962 the deficit amounted to f.14,514.

The accumulated balance of the General Publications Fund did not change in 1962, and remained at f.84,562.

The major expenditure charged to the General Fund account in 1962 concerned the Commemoration Meetings in Munich in July. After deduction of the subvention of f.21,720, received from UNESCO through ICSU, an amount of f.15,314 was spent from Union funds for these meetings.

For the activities of the various non-publishing Commissions of the Union a total amount of f.11,666 was needed in 1962, to be compared with f.2456 in 1961. The Commission on Crystallographic Apparatus spent f.4530, mainly for the film-comparison project. In connection with two meetings of the Programme Committee for the Rome meetings an amount of f.4512 was paid for travel expenses. The cost of printing and distribution of the *World List of Crystallographic Computer Programs* amounted to f.1730, which has been entered as an expense of the Commission on Crystallographic Computing.

The administrative expenditure amounted to f.8095 in 1962, and for incidental travelling expenses a total amount of f.1684 was spent (f.10,200 and f.1607 respectively in 1961).

It may be noted that the income from investments and interest on banking and deposit accounts has continuously increased from year to year, and yielded

f.18,114 in 1962, compared with f.14,653 in 1961. The income from the annual subscriptions from the Adhering Bodies has remained about the same, and amounted to f.25,506 in 1962 (f.26,004 in 1961). The sales of copies of the *World Directory of Crystallographers*, of the Teaching Pamphlet, and of Collected Abstracts of previous Congresses, yielded f.239 in total.

The total income of the General Fund in 1962 exceeded expenditure by f.6534, and the accumulated balance of the Fund increased to f.108,700.

A comparison of the Balance Sheet with the previous one shows that the alterations in 1962 in the holding of investments were a conversion of £3000 4½% Conversion Stock 1962 into £3000 6% Conversion Stock 1972, and a redemption of f.1000 3% Nederland 1937, \$2000 3% Nederland 1947 and f.10,000 3% Nederlandsch Indië 1937. No new investments were purchased in 1962. The investments have been valued according to their quotations as at 31 December 1962, and an amount of f.1852 has been added which represents their depreciation in value compared with their valuation on earlier Balance Sheets or with the prices for which they were purchased respectively. It should be noted that this depreciation amounted to f.5990 on the previous Balance Sheet, and that by the inclusion of this item in the Balance Sheet the General Fund account is not influenced by fluctuations in the value of the investments.

The larger part of the balances with the various banks are still placed on deposit accounts, namely, at the end of 1962, f.42,000 with the Amsterdamsche Bank N.V., \$19,519 with the First National City Bank of New York, Sw.Kr.107,616 with the A.B. Svenska Handelsbanken and £861 with the Westminster Bank Ltd. The amounts due from the publishers represent the balances of the accounts with the firms concerned as at the end of 1962; the sums have been received meanwhile.

Membership of Committees, Commissions and other bodies

The membership of the bodies belonging to the Union, and the names of the representatives on bodies not belonging to the Union, were published earlier in this journal (*Acta Cryst.* (1960), **13**, 968; (1961), **14**, 803; (1962), **15**, 733), except for the following changes:

Commission on Structure Reports

Add as Co-Editors: L. D. Calvert (Canada)
J. Trotter (Canada)

Commission on Crystallographic Teaching

Delete: E. Alexander (Israel)

Membership of National Committees

The following membership lists have been received from the Secretaries of the National Committees for Crystallography:

Argentina

No up-to-date membership list has been received.

Australia

R. I. GARROD (Convener), W. BOAS, J. S. BOWLES, C. J. BIRKETT CLEWS, J. M. COWLEY, A. MCL. MATHIESON, N. K. NORRISH, M. S. PATERSON.

Austria

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

Belgium

G. A. HOMÈS (Chairman), W. DEKEYSER (Vice-Chairman), S. AMELINCKX, H. A. L. BRASSEUR, H. BUTTGENBACH, M.-E. DENAEYER, R. E. DE STRYCKER, O. E. GOCHE, A. HACQUAERT, H. J. LAMBOT, S. G. LEFEBVRE, J. MÉLON, P. C. E. MICHOT, J. THOREAU, J. TIMMERMANS, J. TOUS-SAINT, M. VAN MEERSSCHE, R. VAN TASSEL.

Brazil

No up-to-date membership list has been received.

Canada

W. H. BARNES (Chairman), L. G. BERRY, R. L. CUNNINGHAM, F. W. MATTHEWS, W. B. PEARSON.

Chile

N. JOEL (Chairman), R. VERA-MEJE (Vice-Chairman), F. G. CANEPA, H. FLORES-WILLIAMS, I. GARAYCOCHEA, E. GRÜNBAUM, A. KELLER, G. MUELLER, J. MUÑOZ-CRISTI.

Czechoslovakia

A. KOCHANOVSKÁ (Chairman), M. ČERNOHORSKÝ, S. ĎUROVIČ, J. ECKSTEIN, F. HANIC, J. KAŠPAR, A. LÍNEK, J. NOVÁK, B. RADA, M. ROZSÍVAL, J. SEKANINA.

Denmark

A. TOVBORG JENSEN (Chairman), E. KROGH ANDERSEN, R. W. ASMUSSEN, H. CLAUSEN, H. HØJGAARD JENSEN, B. JERSLEV-LUND, A. NOE-NYGAARD, SV. E. RASMUSSEN.

Finland

V. HOVI (Chairman), M. KANTOLA, U. KORHONEN, K. MANSIKKA, H. MIEKK-OJA, TH. SAHAMA, P. TAHVONEN.

France

J. MÉRING (Chairman), J. FRIEDEL and V. LUZZATI (Vice-Chairmen), E. BERTAUT, Y. CAUCHOIS, P. CHATELAIN, Y. LE CORRE, CH. CRUSSARD, H. CURIEN, J. DESPUJOLS, J. D. H. DONNAY, R. GAY, S. GOLDSZTAUB, E. GRISON, A. GUINIER, A. HERPIN, R. HOCART, M. HUBER, R. KERN, J. LAVAL, M. MATHIEU, P. PERIO, TH. PETITPAS, A. J. ROSE, C. STORA, J. J. TRILLAT, J. WYART.

Germany (both States)

R. BRILL (Chairman), BETHGE, K. BOLL-DORNBERGER, G. BORRMANN, E. E. HELLNER, R. HOSEMANN, H. JAGODZINSKI, W. KLEBER, F. LAVES, H. PEIBST, E. R. J. THILO.

Hungary

G. SZIGETI (Chairman), L. GOMBAL, Z. GYULAI, E. NAGY, K. SASVÁRI, P. SZABÓ, K. SZTRÓKAY, I. TARJÁN, L. TOKODY.

India

The Indian National Committee for Physics serves as National Committee for Crystallography as well; its membership is as follows:

D. S. KOTHARI (Chairman), S. BHAGAVANTAM, M. G. K. MENON, K. R. RAMANATHAN, R. RAMANNA, A. K. SAHA.

Israel

F. L. HIRSHFELD (Chairman), P. COPPENS, L. HELLER.

Italy

E. ONORATO (Chairman), S. BEZZI, G. CAROBBI, M. FENOGLIO, M. FORNASERI, F. FUMI, G. GIACOMELLO, A. GHIZZETTI.

Japan

T. FUJIWARA (Chairman), G. HONJO, S. HOSHINO, T. ITO, J. KAKINOKI, N. KATO, R. KIRIYAMA, K. KOHRA, S. MIYAKE, Y. MORINO, I. NITTA, S. OGAWA, R. SADANAGA, Y. SAITO, E. SUI TO, Y. TAKÉUCHI, R. UYEDA, T. WATANABÉ.

Netherlands

E. H. WIEBENGA (Chairman), J. M. BIJVOET, P. B. BRAUN, W. G. BURGERS, J. GOEDKOOP, J. J. DE LANGE, C. H. MACGILLAVRY, A. F. PEERDEMAN, W. G. PERDOK, J. A. PRINS, G. D. RIECK, C. ROMERS, D. W. SMITS, P. M. DE WOLFF.

New Zealand

D. S. COOMBS (Chairman), G. G. C. CLARIDGE, R. H. CLARK, D. HALL, R. R. NIMMO, B. R. PENFOLD, W. A. WATTERS, P. P. WILLIAMS.

Norway

O. HASSEL (Chairman), TOM. F. W. BARTH, O. C. A. BASTIANSEN, H. K. HARALDSEN, I. W. OFTEDAL.

South Africa

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

Spain

J. CABRERA (Chairman), J. L. AMORÓS, L. BRÚ, M. FONT ALTABA, A. HOYOS DE CASTRO, L. MIRAVILLES, L. RIVOIR.

Sweden

G. HÄGG (Chairman), A. MAGNÉLI (Vice-Chairman), G. BORELIUS, C. BROSSET, H. VON ECKERMANN, S. VON FRIESEN, S. GAVELIN, S. HJELMQVIST, J. O. LINDE, I. LINDQVIST, E. NORIN, A. ÖLANDER, P. QUENSEL, L. G. SILLÉN, I. WALLER, A. WESTGREN, F. E. WICKMAN.

Switzerland

M. VUAGNAT (Chairman), E. NIGGLI (Vice-Chairman), R. CHESSEX, E. DAL VESCO, F. LAVES, E. NICKEL, A. NIGGLI, A. SPICHER, M. WEIBEL.

U.K.

J. M. ROBERTSON (Chairman), N. P. ALLEN, K. W. ANDREWS, J. D. BERNAL, M. BLACKMAN, SIR LAWRENCE BRAGG, C. W. BUNN, P. J. GRAY, SIR WILLIAM HODGE, D. M. C. HODGKIN, J. C. KENDREW, SIR PATRICK LINSTED, H. LIPSON, Dame KATHLEEN LONSDALE, D. C. MARTIN, W. H. TAYLOR.

U.S.A.

W. H. ZACHARIASEN (Chairman), K. N. TRUEBLOOD (Vice-Chairman), LEROY E. ALEXANDER, W. W. ATWOOD, G. M. CLEMENCE, P. P. EWALD, I. FANKUCHEN, D. HARKER, E. W. HUGHES, J. A. IBERS, G. A. JEFFREY, J. S. KASPER, H. A. LEVY, W. N. LIPSCOMB, R. E. MARSH, ROSE C. L. MOONEY-SLATER, R. A. RUNDLE, V. SCHOMAKER, D. P. SHOEMAKER, D. H. TEMPLETON, B. E. WARREN, J. WASER, E. A. WOOD.

U.S.S.R.

N. V. BELOV (Chairman), C. B. BOKY, A. I. KITAYGORODSKY, Z. G. PINSKER, I. I. SHAFRANOVSKY, N. N. SHEFTAL, A. V. SHUBNIKOV, V. I. SIMONOV, M. M. UMANSKY, B. K. VAINSHTEIN, G. S. ZHDANOV.

International Tables Account for the year ended 31 December 1962

	<i>Netherlands Guilders</i>	<i>Netherlands Guilders</i>
Publication Expenses:		
Printing and Binding Volume III	80,794.06	Sale of Copies of Volume I
Binding Additional Copies of Volume I	4,400.21	Sale of Copies of Volume II
Volume II	3,496.92	Sale of Copies of Volume III
Printing of Errata Sheets	516.94	Less Publishers' Commission on Sales
	89,208.13	Bank Charges and Differences
Editorial Expenses:		15,538.07
Clerical Assistance and Sundries	280.16	453.92
Travelling Expenses	126.19	
	406.35	
	<u>f. 89,614.48</u>	<u>f. 89,614.48</u>

General Fund Account for the year ended 31 December 1962

Subscription to ICSU (2% of subscriptions received from Adhering Bodies in 1961)	565.23	Subvention from UNESCO through ICSU	(\$ 6,000)	21,720.00
Administrative Expenses:		Subscriptions from Adhering Bodies		25,506.38
Honorarium General Secretary and Secretarial Assistance	5,676.00	Interest on Investments:		
Auditors' Fees	994.79	3½% Australia 1965/69	1,196.17	
Postages, Stationery, Printing and Sundries	1,006.70	4½% Conversion Stock 1962	104.77	
Bank Charges and Differences on Exchange	357.66	6% Conversion Stock 1972	1,737.99	
Depreciation of Office Equipment	60.00	3% Nederland 1937	1,065.00	
	8,095.15	3% Nederland 1947	2,883.28	
Commemoration Meetings in Munich, Germany:		3% Nederlandsch Indië 1937I	1,495.00	
Travel Expenses and Travel Grants	36,705.53	4½% Noorwegen 1955	255.00	
Other Expenses	328.62	4% Unie van Zuid Afrika 1955	240.00	
	37,034.15	Profit through Redemption of Investments		8,977.21
Incidental Travelling Expenses	1,683.50	Interest on Banking and Deposit Accounts		641.12
Expenses of Commissions and Committees:		Sale of Copies of <i>World Directory of Crystallographers</i>	277.97	
Commission on Crystallographic Apparatus	4,530.35	Less Publishers' Commission	69.49	
Commission on Crystallographic Computing	1,729.80	Sale of Copies of Teaching Pamphlet		208.48
Commission on Crystallographic Data	250.53	Sale of Copies of Abstracts	21.25	
Commission on Crystallographic Teaching	643.51	Less Publishers' Commission	2.65	
Programme Committee for Rome Congress	4,512.25			18.60
	11,666.44			
<i>Excess of Income over Expenditure carried to Balance Sheet</i>	<u>f. 65,578.88</u>			<u>f. 65,578.88</u>

Balance Sheet as at 31 December 1962

<i>Liabilities</i>		<i>Assets</i>	
Sundry Creditors:		Cash at Bank:	
The Kynoch Press Ltd, Birmingham	(£ 899.11.1)	Amsterdamsche Bank N.V., Groningen, Guider account	61,908.29
Administrative Expenses	9,117.88	Amsterdamsche Bank N.V., Groningen, Dollar account	5,617.59
<i>Acta Crystallographica</i> Editorial Expenses	2,324.23	Comptoir National d'Escompte de Paris (N.F. 1,773.07)	1,309.90
<i>International Tables</i> Editorial Expenses	48.61	First National City Bank of New York (\$ 21,007.71)	76,047.91
Travelling Expenses	384.08	A.B. Svenska Handelsbanken, Stockholm	
Subscriptions from Adhering Bodies, paid in advance	12,778.78	Westminster Bank Ltd, Cambridge (Sw. Kr. 107,616.14)	75,352.11
	217.20	Deutsche Bank A.G., Munich (£ 950. 1. 6)	9,629.96
		(D.M. 125)	112.89
<i>Acta Crystallographica</i> Account:			229,978.65
Balance as at 1 January 1962	178,022.20	Cash with Editors and Commissions:	
Less Excess of Expenditure over Income for the year to date	16,058.40	Editor and Co-editors of <i>Acta Crystallographica</i>	6,898.17
	161,963.80	Technical Editor of Union Publications (£ 92. 2. 3)	933.65
<i>Structure Reports</i> Account:		Commission on Crystallographic Data (£ 8.18. 5)	90.42
Balance as at 1 January 1962	63,984.10	Commission on Crystallographic Teaching (£ 6. 6. 2)	63.94
Add Excess of Income over Expenditure for the year to date	55,793.32	Programme Committee for Rome Congress (£ 291. 8. 9)	2,954.01
	119,777.42	Due from:	10,940.19
<i>International Tables</i> Account:		Messrs Munksgaard, Copenhagen (D. Kr. 21,597.61)	11,330.91
Balance as at 1 January 1962	111,403.07	N. V. A. Oosthoek's Uitgevers Mij, Utrecht	74,896.33
Less Excess of Expenditure over Income for the year to date	9,524.24	Advertisements in <i>Acta Crystallographica</i> , due for 1962, after deduction of Advertising Agent's Commission (\$ 837.26)	86,227.24
	101,878.83	Investments (Market values as at 31 December 1962):	3,030.88
General Publications Fund:		£ 3,702.19.3 3¼% Australia 1965/69	85½
Balance as at 1 January 1962	84,561.63	£ 3,000.00 6% Conversion Stock 1972	108
General Fund:		f. 35,000.00 3% Nederland 1937	91
Balance as at 1 January 1962	102,165.49	\$ 26,000.00 3% Nederland 1947	88
Add Excess of Income over Expenditure for the year to date	6,534.41	f. 49,000.00 3% Nederland Indis 19371	98
	108,699.90	f. 6,000.00 4¼% Noorwegen 1955	96
		f. 6,000.00 4% Unie van Zuid Afrika 1955	89
		Add Interest accrued thereon	238,888.99*
			2,675.19
		Add Depreciation in value of Investments, entered as an asset	241,564.18
		Office Equipment	1,852.38*
		<i>Fifty Years of X-ray Diffraction</i> Account:	243,416.56
		Excess of Expenditure over Income for the year to date	1,770.00
		Stocks of Unsold Copies of Union Publications	14,514.04
			<i>pro memoria</i>
			f. 589,877.56

Rates of Exchange: £1 = \$2.80; \$1 = f. 3.62 = N. F. 4.90 = D. Kr. 6.90 = Sw. Kr. 5.17 (ICSU rates)

* As in the 1961 accounts, the depreciation in value of the investments has been included in the Balance Sheet only to prevent fluctuations in their values from influencing the General Fund account.

We declare that the above Balance Sheet as at 31 December 1962, and the attached *Acta Crystallographica* Account, *Fifty Years of X-ray Diffraction* Account, *Structure Reports* Account, *International Tables* Account and General Fund Account, exhibit a true and correct view of the affairs of the International Union of Crystallography.

Groningen, Netherlands, Ubbo Emmiusingel 75. 20 June 1963

Signed: VAN DIEN, VAN UDEN & Co. Accountants