

gesättigtes Schwerbenzin. Es resultierten folgende elastische Konstanten für 22° C.:

$$c_{11} = 1,643 \times 10^{11}, \quad c_{12} = 0,433 \times 10^{11}, \quad c_{44} = 0,515 \times 10^{11} \text{ erg.cm.}^{-3}.$$

(Fehler bei c_{11} bzw. c_{12} und c_{44} unter 0,3% bzw. 2,5% und 1%).

Die von Ramachandran & Wooster erzielten Werte sind:

$$c_{11} = 1,5 \times 10^{11}, \quad c_{12} = 0,3 \times 10^{11}, \quad c_{44} = 0,7 \times 10^{11} \text{ erg.cm.}^{-3}.$$

Die Übereinstimmung ist befriedigend, wenngleich nicht ganz innerhalb der Fehlerschätzung von Ramachandran & Wooster.

References

- HAUSSÜHL, S. (1957). *Fortschr. Min.* **35**, 4.
 RAMACHANDRAN, G. N. & WOOSTER, W. A. (1951). *Acta Cryst.* **4**, 431.

Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. Copy should be sent direct to the British Co-editor (R. C. Evans, Crystallographic Laboratory, Cavendish Laboratory, Cambridge, England).

Kristallografiya

A complete English translation of this journal is now available (see *Acta Cryst.* (1957), **10**, 608). The publication of contents lists in these columns is therefore discontinued.

The structure of the chromium sulphides

An error occurs in the above article by F. Jellinek (*Acta Cryst.* (1957), **10**, 620). On p. 628 the last two lines in the penultimate paragraph in the left-hand column should read 'and Fe_7S_8 , but to ferrimagnetism in Fe_7Se_8 (Okazaki & Hirakawa, 1956).'

Book Reviews

Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 99, Livingston Street, Brooklyn 1, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.

Handbuch der Physik: Encyclopaedia of Physics. Band 32. Structural Research. Edited by S. FLÜGGE. Pp. vii+663 with 373 figs. Berlin; Göttingen; Heidelberg: Springer. 1957. Price DM. 144.00.

This volume of the *Encyclopedia of Physics* covers the principles and practice of structural research by diffraction of X-rays, electrons and neutrons in six articles by specialists in the field.

The first article, about 100 pages in length, is entitled 'Experimental methods for the determination of crystal structure by X-rays'. The authors are A. Guinier and G. von Eller.

Of the four sections, the first describes the different types of cameras used to record the diffraction patterns from single crystals and from powders, and a few pages are given over to the use of counter diffractometers. In the second section methods of intensity measurement are surveyed, and the corrections required to give values of $|F|^2$ from the X-ray intensities are outlined. An account of the theory and practice of crystal-structure analysis follows. It includes some very attractive illustrations of the use of von Eller's photographic method for the evaluation of two-dimensional Fourier series. This section is heavily biased in favour of analogue machines and makes no mention of high-speed electronic digital computers, with which the future of crystallographic com-

puting certainly lies. The last section is concerned with such topics as the determination of crystallinity and of the texture of solids, the identification of materials by X-ray methods, and the measurement of internal stresses in metals.

The authors have done very well in presenting such a readable survey of the more important applications of X-ray diffraction in a relatively small space. This article is in French.

The second article, by J. Bouman, is entitled 'Theoretical principles of structural research by X-rays', and extends over some 140 pages. The treatment is rather heavy in places, and this is not an article for the novice. From the elementary theory of diffraction and the analysis of simple structures the author proceeds to lattice theory and the properties of the reciprocal lattice. The present writers were pleased to find that the properties of Fourier transforms, and their importance for the theory of diffraction, were discussed at an early stage in this article, but felt that even more use could have been made of them. A section is devoted to the discussion of the symmetry of structures; a surprisingly full treatment is achieved in the space of some 20 pages. The topics dealt with next come under the heading of fundamental concepts in X-ray scattering, the most important being a discussion of dispersion. There follows a section devoted to diffraction by small crystals, a discussion of the dynamical theory, of extinction and of absorption, and of

lattice distortions and the temperature factor. The last section, on problems of structure analysis, to some extent overlaps with what has been said by von Eller in part of the first article.

This is not an easy article to read, but one cannot fail to be impressed by its scope. It is in English; there are a few minor awkwardnesses in the construction of sentences.

This article is followed by one by G. Fournet on 'The study of fluids and amorphous substances by X-ray scattering' (in French). The main part of this contribution deals with the theory of scattering from spherical or elongated particles, randomly distributed or in dense assemblies. The case of assemblies of different particles is also discussed. Expressions are derived for the intensities of scattering in terms of radial distribution functions and also in terms of parameters obtained from the thermodynamics of fluids. The theory is developed carefully and in detail, and this part of the article will be useful to all those engaged in studies of gases, liquids, or amorphous substances. The second part of this contribution deals with various experimental applications and includes a critical assessment of the information which can be derived legitimately from the presence of a maximum in the scattering curve.

W. W. Beeman, P. Kaesberg, J. W. Anderegg and M. B. Webb contribute an article entitled 'Size of particles and lattice defects'. The first part of this contribution deals with the subject of low-angle scattering. The presentation of the theory and applications is excellent, and the reader is told exactly what information can be obtained from the scattering curves, and how to obtain it. The frequent summaries throughout the article help to crystallize the information presented. The second part of this article deals with the effect of lattice defects and finite crystal size on the X-ray scattering. This subject is complex and does not yield readily to 'general' treatment. Calculations are now available for particular cases, for example for the effect of faults, point defects and certain types of ordering, but one sympathizes with the authors in not discussing these in much detail. The section on analysis of line shapes leaves the reader with an uneasy feeling about the precise nature of the information which can be derived from such investigations, but it is a pity that some of the more recent experiments from which stacking-fault probabilities have been deduced could not be included. The article ends with a brief account of some special techniques used for investigating sub-structures in crystals; a curious spelling of the word polyganization has been used here.

The subject 'Electron diffraction' is covered in an article of about 100 pages in German by H. Raether. This contribution includes chapters on apparatus, diffraction theory and experiments, and application of electron diffraction to special problems. It is impossible today to give a detailed account of this subject in so short a space, and the author has therefore concentrated on certain topics. The chapter on apparatus is nicely balanced and includes some of the modern developments. Part II contains a particularly useful, clear and physical account of the kinematical and dynamical theories of diffraction, and of their relation. The fine structure of diffraction spots is discussed in detail, but it seems a pity that the

subject of Kikuchi lines had to be discussed in less than two pages. Certain diffraction effects from non-ideal lattices are discussed at some length, but little is said about the use of electron diffraction in the determination of crystal structures. The last part deals with investigations of surface layers, epitaxy, oxidation etc. The style of the article is lucid, and it includes many useful references, particularly to German publications.

The final article is by G. R. Ringo on 'Neutron diffraction and interference', and offers an excellent complete coverage of the subject through 1956, embracing some items like inelastic scattering not covered in the other two full-length reviews on neutron diffraction (Bacon's book and Shull & Wollan's review article). The author has reasonably well digested the contents of all papers on neutron diffraction and has presented the salient features of these papers in an orderly clear cut fashion. This book should be available to the serious research worker in the field but is too expensive for this article alone.

There is a combined index for the English and German contributions, giving each word in both languages, and a separate index in French for the French contributions. The former is very useful for those with language difficulties, and it is a pity that this scheme could not be extended to include French as well.

This book will be useful in every crystallographic laboratory as a work of reference, since it covers so many topics in diffraction analysis. The editor should be congratulated on the generally high standard of the contributions, and the printers on the quality of the production.

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Der Ultraschall, Nachtrag zum Literaturverzeichnis der 1954 erschienenen 6. Auflage.

By L. BERGMANN. Pp. 66. Stuttgart: Hirzel. 1957.
Price DM. 9.

Bergmann's comprehensive volume on ultrasonics has been reviewed in this journal (*Acta Cryst.* (1955), 8, 69). One of its valuable features is a list of 5162 references on all aspects of the subject. The present pamphlet contains references 5163-7182. Of these 616 complete the list of pre-1954 papers and 1421 papers are the output from the fall of 1954 to the end of 1956. A special list gives the section of the book and subject matter appropriate for the reference.

It appears to the reviewer that publication of this list is an excellent scheme for keeping a handbook up to date until some fundamental development makes a full-scale revision necessary.

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