ray diffraction, by sophisticated computer methods, are collected.

The third section reports the results obtained by the application of X-ray diffraction to a variety of materials – from historical monuments to the identification of pigments and the study of tension states in metallic alloys. New alternative X-ray sources, particularly suitable for microradiography, are examined in the fourth section.

In the fifth, sixth and seventh sections, the problems of X-ray fluorescence (XRF) are considered. First the evaluation and interpretation of the results of XRF techniques are considered; then their application to particular materials, such as normal and stainless steels, is discussed; and finally, some new X-ray analysis systems are proposed, some using a single technique and others several different ones.

This text is therefore particularly interesting for users of X-ray diffraction and X-ray fluorescence because it offers a series of monographs of both theoretical and practical character. The book will be of value to the experts for the identification of new research fields in the applications of X-ray analysis.

M. GIORDANI
Istituto di Scienze e Tecnologie dell'Ingegneria Chimica
Universita di Genova
Via all'Opera Pia 11
16145 *Genova*
Italy

J. Appl. Cryst. (1980). **13**, 463

Industrial crystallization 78 (Proceedings of the 7th Symposium on Industrial Crystallization,

held in Warsaw, Poland, September 1978). Edited by *E. J. De Jong* and *S. J. Jancic*. Pp. xiv + 588. Amsterdam: North Holland Publishing Company, 1979. Price US $ 73.25, Dfl 150.00.

The book consists of the following chapters: *Nucleation* (86 pp.), *Impurities and crystal growth* (119 pp.), *Hydrodynamics of crystallizers* (77 pp.), *Data measurement and crystallizer design* (106 pp.), *Industrial experience in crystalization* (99 pp.) and '*Poster session*' (79 pp.).

The chapter on nucleation contains nine papers: on precipitations (3), secondary nucleation (3), homogeneous/heterogeneous nucleation, Ostwald ripening, and a review. The chapter on impurities and crystal growth contains 11 papers; there are reports on the precipitation of a binary electrolyte, on potassium alum and sucrose, as well as on growth and growth dispersion, the growth of small crystals, the influence of collisions on the growth of crystals, the control of crystal habit, the effect of hydrodynamic conditions on crystal growth and generally on the role of impurities.

In the chapter on hydrodynamics of crystallizers (seven papers), the topics are: hydrodynamics and classification, the role of geometry, impeller power consumption, mixing intensity and contoured-base crystallizers. The chapter on data measurement and crystallizer design (ten papers) has contributions on kinetics, simulations and design theories, population models, batch fluidized beds, classification of crystallizers and crystallizers with quickly rotating horizontal cooling surfaces. The chapter on industrial experience in crystallization (11 papers) consists of contributions on carnellite, diammonium phosphate, sodium hydrogen carbonate, as well as on recrystallization through fluctuation, a direct-contact-type crystallizer with secondary refrigerant, a pelletizing process, classification, crystallizer selection and continuous centrifuges. The chapter reporting the poster session of the symposium (36 papers) is full of material. Here details are given for the following substances: potassium bromate surfactant solutions, colloid systems, gypsum, sucrose, ice, potash alum, sodium bicarbonate, calcium sulphate and ADP. Also discussed are: particle aggregation, precipitation, multistage countercurrent crystallization, fractional crystallization, periodic and stochastic temperature changes, temperature stabilization in liquid-jacket crystallizers, a scraped-surface heat exchanger, vacuum pans, vacuum crystallizers, incrustation in crystallizers, the system crystallizer/filter, and crystallization due to chemical reaction and salting out.

The book is well produced and contains numerous (281) very good diagrams, flow sheets and drawings of crystallizers. Any specialist will handle it with pleasure because it will give him much stimulation and it relates new results from the frontiers of the science. The individual papers are interesting and informative, with few exceptions. But, more and more, the abundance of material (over 80 papers and 617 references) squeezes even the specialist to death. Whilst formerly the chemical engineer could not obtain a tailor-made crystallizer design because only a little basic knowledge was available, today he is confronted with a lot of methods, which make his choices difficult or even risky. Therefore, these reviews and surveys have an increased importance. Each chapter contains at least one review. This is especially commendable; but a stronger summary of the individual papers, with a compilation of their comparisons and differences would have been a great help for the layman – and even for the specialist.

G. MATZ
Ingenieurabteilung AP
Verfahrenstechnik
Bayer AG
Friedrich Ebert Strasse 217/319
D 5600 *Wuppertal-Elberfeld*
Federal Republic of Germany

J. Appl. Cryst. (1980). **13**, 463 464

Scanning electron microscopy/1979. Parts I and II.

Edited by *O. Johari*. Pp. part I: x + 598; part II: xviii + 910. Scanning Electron Microscopy, Inc., PO Box 66507, AMF O'Hare (Chicago), IL 60666, USA. Price, parts I and II together, US $ 131.00.

These volumes contain most of the papers presented at the Scanning Electron Microscopy 1979 conference which took place in Washington, USA, in April, 1979.

The conference was organized by SEM Inc., Dr Om Johari being the director of the meeting; the various parts were prepared by several University and Industry advisors.

The increasing interest of scanning electron microscopy (SEM) techniques in physical and biomedical sciences is revealed by the number of persons who attended the conference, and by the number of papers; this resulted in the publication of three volumes this year (of which only the first two are reviewed in the present article, as the third is devoted wholly to biomedical applications); from 1967 to 1977 only one volume was needed and in 1978 two volumes were required.

As for the past proceedings, the strongest point appears to be, after each paper, the publication of a reviewer's questions and the author's replies; these dialogues contain information essential to every SEM user.

Owing to the large range of subjects, the division of the papers is quite arbitary

and has led to the inclusion in part I of papers related to physical sciences and in part II of papers of interest for both physical and biomedical sciences, including, for this latter field, a large contribution from X-ray microanalysis. There is certainly something critical about the order of the papers and their classification into major subjects, which appears only at the beginning of Vol. II.

Part I contains 71 papers, including eight reviews on particular subjects and seven tutorials (teaching lectures). Analytical electron microscopy is, as before, widely developed by papers on Raman-microprobe, molecular optical-laser, and Auger electron-spectroscopy techniques.

Semiconductor applications, including surface analysis and material characterization, constitute about half the volume, with a frequent interaction with papers of general interest. VLSI fabrication by Hatzakis and VLSI testing by Feuerbaum appear to be essential to the future developments of integrated circuits. Electron sources and optics, particulates, sediments, archeology and art history, SEM and the law are the other major subjects of this volume.

Part II contains 98 papers with 25 reviews and 11 tutorials. As was mentioned above, this volume includes various papers with supplementary major subjects such as teaching SEM, and analytical electron microscopy applied to biomedical sciences. Some biological papers are included here but the major feature of this volume is a large collection of review papers on X-ray microanalysis of biological samples.

These proceedings bring out fundamental and useful information in the scanning electron microscopy field: they illustrate the importance of complementary detection modes, as, for example, X-ray microanalysis and electron emission.

C. SCHILLER

Laboratoire d'Electronique et de Physique Appliquée
3 *Avenue Descartes*
BP 15 94450 *Limeil-Brévannes*
France