ments such as the application of Seemann–Bohlin geometry, multichannel diffractometry and automatic control are briefly described. The third chapter starts with brief remarks on qualitative powder analysis and proceeds with a description of the steps involved in performing a quantitative analysis, with many practical instructions included. In Chapter 4, different types and sources of error are enumerated and discussed. The authors seem, however, to underestimate the difficulties and errors caused by the strains and imperfections in crystalline materials. The last chapter provides the reader with examples of the quantitative X-ray powder analyses of some minerals. The bibliography contains references to 235 papers.

The book may be useful as an introduction to quantitative X-ray powder analysis as well as a reference book on the subject.

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Руководство по рентгеновскому исследованию минералов. Edited by *В. А. Франк-Каменецкий* **(Handbook for the X-ray investigation of minerals.** Edited by *V. A. Frank-Kamenetskij*). Pp. 400. Leningrad: Nedra. Price Rb 1·53.

This is a fairly complete handbook for a course in the X-ray crystallographic examination of minerals and industrial materials, excluding the analysis of crystal structure (which is discussed only in outline). It includes powder and single-crystal measurements; qualitative and quantitative phase analysis; photographic and counter methods; high and low-temperature apparatus; notes on computing, *etc.* The material is much what might be included in an M.Sc. course in industrial crystallography and indeed the text has been produced by a collective at the Department of Crystallography of the Geological Faculty of Leningrad University for their own use. The account is thorough, if conservative. It hands on many still useful tricks, like using a slide-rule with the sliding scales reversed for indexing cubic powder photographs. (It is time that new tricks, based on pocket calculators, were developed for the next generation of crystallographers.) Much of the text is occupied with descriptions of apparatus made in the Soviet Union which is broadly similar to that familiar elsewhere. For identification and indexing powder photographs accuracy in measuring the first few lines is important, so that some account of the Guinier camera would be expected.

Because of its local connexions it is unlikely that this book would circulate far outside the circle of users of Soviet-built apparatus but, today, when the elaborate structure analysis now proceeding in the biological field takes the limelight, it is a useful reminder of where and how many of the bread-and-butter problems are to be tackled.

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Surface physics of materials. Vol. II. Edited by *J. M. Blakely*. Pp. xi + 269. New York: Academic Press, 1975. U.S. $27.00.

This is the second volume of a series containing articles by individuals who have made substantial contributions to various problems of topical interest in surface physics. The objectives are to give a broad coverage but with an emphasis upon fundamentals which will remain sound as the subject develops.

The five chapters in this volume contain reviews of *Transport of Matter at Surfaces* by H. P. Bonzel, *Interaction of Atoms and Molecules with surfaces* by J. W. Gadzuk, *Chemical Analysis of Surfaces* by R. L. Park, *Surface Vibrations* by M. G. Lagally and *Interaction between Surfaces: Adhesion and Friction* by D. Tabor. As is usual with collections of articles of this type the

Rather than reviewing the various theories of chemisorption Gadzuk concentrates upon the approach in which theoretically exact solutions are obtained to (oversimplified) model problems. The virtue of this approach is that it can give physical insight into the atomistic and electronic mechanisms of chemisorption. This theory is applied to three specific adsorption experiments: W(100)–H; alkali metal adsorption on metals and 5*d* transition metals on tungsten. The assumptions made about the reader's prior knowledge vary enormously and so the extent to which the objectives will be met is difficult to judge.

Bonzel points out that, in spite of an extensive literature, knowledge of the microscopic processes of surface diffusion is still quite limited. He gives emphasis to the results rather than the experimental techniques and includes references to useful recent reviews. He concludes with a well justified criticism of the use of simple pairwise interaction models.

theory is still under active development.

Park gives a rather philosophical review of the principles of various techniques of surface chemical analysis. The reader wishing to learn how actually to perform an analysis will have to make extensive use of his references.

The atomic vibrations at clean crystalline surfaces are described by Lagally who compares theory and the results obtained using LEED and atomic scattering. Very little data is available on surface phonons and their dispersion and that which exists is difficult to interpret. Lagally's article is a good aid for interpretation.

In an article unusual for this type of book Tabor gives an excellent review of the friction and adhesion between surfaces of 'real' materials as opposed to flat, single-crystal planes. It makes salutory reading for any surface physicist who may have claimed that his work on some carefully selected simple system will throw light upon the mechanisms of adhesion.

In all this is a useful book for a statement of the current position and a useful source of references to original material.

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Crystal growth from high-temperature solutions. By *D. Elwell* and *H. J. Schell*. Pp. vii + 634, Figs. 179, Tables 54. London: Academic Press, 1975. Price £19.80.

A review of this book by P. Hartman has been published in the November issue of *Acta Crystallographica*, Section A, page 1035.