first three terms in equation (6); the summation of x_{ji}^2 and of y_{ki}^2 can be done simultaneously with the summation of the coefficients $x_{ji}y_{ki}$.

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International Union of Crystallography

Deposition of Tables of Anisotropic Thermal Parameters

In its report to the IUCr Executive Committee and Tenth General Assembly of the Union which was held in Amsterdam, 7–15 August 1975, the Working Party on Information Services proposed that tables of anisotropic thermal parameters should, in general, be deposited together with structure factor tables.

With the agreement of the Executive Committee and the Chairman of the Commission on Journals, this proposal has now been implemented. All tables of anisotropic thermal parameters (except for very short tables) will be deposited, unless the Co-editor accepting the paper specifically requires that they be published. If a table gives both positional and thermal parameters both will be deposited but the positional parameters will also be published.

Two copies of the tables will be required. They should be in typescript, and not reduced photographically. They should be headed descriptively on the first page, with column headings recurring on each page, and pages should be numbered clearly to ensure the correct sequence. The optimum page size is up to 30 cm × 21 cm, whilst the limiting page size is 33 cm high × 24 cm wide. Each set of material to be deposited should be accompanied by the title, the authors' names and addresses and the abstract from the parent paper.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.

The solid state. By H. M. ROSENBERG. Pp. 235. Oxford: Clarendon Press, 1975. Price £2.75 (paper).

In this paperback H. M. Rosenberg approaches the subject in a refreshingly practical and down-to-earth way. The student beginner is introduced to dislocations, vacancies, interstitials, *etc.* in some detail before learning about Bloch waves and electron band structure. The applied, almost do-it-yourself approach is maintained throughout the book, with emphasis on advanced experimental techniques, such as electron and field-ion microscopy, ESCA, metallography (to name just a few), and with little importance attached to abstract ideas. In those few cases where difficult concepts are treated, very illuminating figures (such as the one illustrating *Umklapp*) are provided.

Devices are treated in great detail. While most texts may at most treat the *p–n* junction and the transistor, in this volume a wide variety of devices, such as the bipolar transistor, FET's, LED's and many others are treated.

The treatment of electron band theory and phonons is short and may even be regarded as weak, however, this may be justified for an introductory book of this kind, as is the courageous omission of superconductivity. This attitude is reminiscent of that of Pauli at the ETH, who treated in his courses classical physics in great detail and thoroughness, at the expense of omitting quantum mechanics. His reasoning was, that if students are taught advanced subjects, necessarily in a superficial way (in an undergraduate course), they may end up feeling that they understand everything; while the judicious omission of some of the most exciting subjects leaves them in a state of curiosity when they graduate, a curiosity that may be preserved throughout their lives.

I feel that the exercise problems in the book are somewhat of a routine nature, and that a few more difficult and stimulating ones (perhaps requiring some further reading) for advanced students would be very desirable.

In addition to engineering students (and perhaps chemistry, biology, and even humanity students) I would strongly recommend the book as required reading for advanced graduate courses in the theory of solids. Many students graduate nowadays from such courses with some technical competence in the handling of Green functions, Feynman diagrams, and even renormalization groups, without the faintest understanding how a transistor works and what a dislocation is. A compulsory examination on the material of this book can add perspective and also some genuine understanding to students of this type.

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Introduzione alla fisica dei materiali. By G. CAGLIOTI. Pp. xvi + 381. Bologna: Zanichelli, 1974. Price 11.800 Lire.

Despite its title ('Introduction to the Physics of Engineering Materials' according to the English synopsis provided on p. XIII), this is a very fundamental book on the basic physical principles needed in the development of a scientifically sound interpretation of the properties of materials. Caglioti's concept is to develop a unified picture starting from quantum mechanics and arriving at macroscopic properties of materials. The first three chapters deal with atoms, molecules, and

crystals, and can be understood as an introduction to physical concepts in atomic, molecular, and solid-state science. The guiding principle throughout the text is the increasingly complex behaviour of electrons from stable states in the H atom to 'bistability' in H_2^+, 'hexastability' in C_6H_6, and 'polystability' in crystals. Emphasis is on spectroscopy, and maser and laser techniques are treated in detail. The chapter on crystals also contains an introduction to band theory (metals and semiconductors), lattice dynamics, and neutron scattering, the latter especially sound.

As expected, macroscopic properties can be related to microscopic theory where electronic mechanisms are involved, and where, in the case of crystals, symmetry arguments can be employed. In the remaining 36 pages, the author makes an attempt to arrive at a similar level of interpretation for mechanical properties of crystals based on the concept of planar force constants. Peierls stresses (using the Frenkel–Kontorava model for a dislocation) and fracture strengths (for brittle fracture) are calculated, and a lattice dynamical foundation of acoustic emission is presented. It becomes clear that an atomistic interpretation of the mechanical properties of engineering materials will remain a very difficult task for a long time to come. The last figure of the book shows a photograph of the oil tanker Martha R. Ingram on January 11th, 1972, after complete fracture amidships....

The book is intended for advanced students of physics, chemistry and engineering (nuclear, electronic, chemical, mechanical). It does not provide many empirical facts but lays down, with patience and sometimes in considerable detail, the formal aspects of physical principles used. The first three chapters also contain exercises and excellent references for further reading.

In the best humanistic tradition, the author tries to open perspectives and to remind the reader of the beauty and universality of the human mind, be it primarily directed towards science, engineering or arts. For this reason alone one would hope that Caglioti's book will be translated.

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Manual of optical mineralogy. By D. SHELLEY. Pp. xiii+239. Amsterdam: Elsevier, 1975. Price (cloth) Dfl 65.00, (paper) Dfl 26.95.

The ability to use a polarizing microscope is an essential skill for every student of geology and to help to instill this, several texts have been written on the subject, some devoted entirely to principles whilst others provide in addition the data on individual mineral species so essential to the practising petrographer. This new text falls into the latter category with more than two-thirds of the book given over to mineral data and descriptions.

The book begins with an introduction to general crystallography, dealing briefly with symmetry, Miller indices and some of the physical properties of minerals. Structure, unit cells, and axial ratios receive curt treatment, though the whole of this section is generally dealt with more fully in standard texts on mineralogy.

Chapter 2 is devoted to the polarizing microscope, components, accessories, basic adjustments and care of the instrument – though the advice that benzene be used as a cleaning agent should perhaps be tempered by a health warning! Chapter 3 discusses the optical properties of minerals with the aid of numerous diagrams whilst Chapter 4 covers laboratory techniques, sample preparation, RI determination, orientation, interference figures, optic sign, $2V$, extinction angles, pleochroism and use of the universal stage. A very short Chapter 5 outlines routine laboratory procedure and should perhaps have been appended to Chapter 4.

The greater part of the book appears in Chapters 6 and 7 as mineral data and descriptions. Tables of minerals according to RI, birefringence, colour and optic sign are followed by individual descriptions of 127 minerals giving composition, crystal system, colour, optical properties, orientation diagrams, occurrence, and distinguishing features. Photographs of some minerals illustrate this section and, though good, are relatively infrequent compared with other texts. Typographic errors are few, and most, though not all, diagrams are good.

Comparisons between this text and its older rivals will doubtless be made by both teachers and students. Resemblances are inevitable, though clearly the author has made good use of recent standard texts on mineralogy which postdate most rivals. This comparison will also extend to cost, and students will wonder why this textbook is twice as expensive as some others. This book would provide a useful alternative at half this price, but the cost will doubtless deter many students and professionals may find the mineral data too selective. As the book is so clearly aimed at geologists, the title should perhaps have reflected this.

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Surface Science. Vienna: International Atomic Energy Agency, 1975. Vol. 1: pp. 503; price $31.00. Vol. 2: pp. 302; price $19.00.

I have a strong prejudice against multiauthor volumes such as these; in general, the contributions are very uneven in quality, very rarely sustain a coherent theme and represent a poor substitute for the scholarly monographs of less frenetic times. I can well imagine that previous discussions (*Theory of Condensed Matter*, *Theory of Imperfect Crystalline Solids and Electrons in Crystalline Solids*), at the Trieste International Centre for Theoretical Physics have been homogeneous and successful but to take on *Surface Science*, in the same breath as it were, was altogether too ambitious.

Having said that, there is some good material here for the selective reader. Selectivity is necessary for one has a déjà-vu impression of much, something which conveys the uncharitable thought 'have a theoretical suitcase, will travel!' To continue with my prejudices just a little further, one might ask, rhetorically of course, whether the balance of the material is right if a major intent of the Trieste Schools were to provide stimulus and help to students from the developing countries. Would it not have made more sense to see the articles in *Applied Surface Science* have more prominence? Parson's article on *Electrode reactions and Corrosion*, Tabor's on *Friction*, and Dowden's on *Applied*