

encountered in textbooks of this kind, is concerned with quantum effects appearing in the interaction of free electrons in high-frequency cavities. A brief 36-page chapter on nonlinear optics concludes volume 1.

Volume 2 contains only three chapters, one on paramagnetic maser amplifiers, one on microwave maser oscillators and one of eight pages on various types of lasers. There is an excellent appendix on laser resonators (38 pages) and another one of about the same length on the spectra of paramagnetic crystals.

It is clear that these contents can not do justice to the status of lasers in 1969. The book is rather complete in its discussion of microwave masers. Although two-level systems are not of much practical importance in this case, a considerable amount of attention is devoted to them. Both volumes contain rather detailed derivations that should be helpful to the beginning student, but the organization of the material is not optimum for a textbook in a quantum-electronic course at the present time. This is not the fault of the authors, for at the time of writing the subject matter was simply closer to research papers than to the classroom.

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Monographies du Centre D'Actualisation Scientifique et Technique, Vol. 3: La Rheologie

B. Persoz, ed.
190 pp. Masson, Paris, 1969. 50 F

The discipline of rheology deals with the relation between stress and deformation of materials. In particular, rheology is concerned with the classification of material behavior, its representation by mathematical relations and the explanation, based on the internal structure of the material, for the different kinds of material behavior observed. These include viscoelastic, elastic-plastic, viscoelastic-plastic and non-Newtonian fluid flow. The subject is of interest to physicists, mathematicians and engineers who may be concerned with the mechanical properties of metals and alloys, stone, concrete, glass, ceramics, polymers, suspensions and emulsions.

The present work is a collection of eight articles by different authors who are research workers in some aspect of rheology; the articles are apparently based on a series of lectures for post-graduates. The book is therefore more a survey of the field and will be appropriate for those who have a graduate-level grasp of some branch of mechanics of solids or fluids.

Five of the eight sections deal with basic ideas concerning the representation of material behavior by mechanical models, the mathematical formulation of the theory and basic test procedures. The remaining sections survey the flow of metals, polymers, and suspensions.

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Principles of X-Ray Metallurgy

By T. Kovacs
185 pp. Plenum, New York, 1969.
\$9.50

It is noteworthy that almost 60 years after Max von Laue and his colleagues demonstrated the diffraction of x rays, there is still only a small number of standard texts on the subject. Their ranks have grown substantially just in the last decade. One brings to mind, for instance, the texts by E. W. Nuffield, J. B. Cohen, and B. E. Warren, as well as the third edition of C. S. Barrett's classic, now coauthored by T. B. Massalski, and the translations of A. Guinier's books.

Add to these such earlier works as those by M. J. Buerger, B. D. Cullity, and H. P. Klug and L. E. Alexander, for example, and one may justifiably ask, "Why write another?" The author of *Principles of X-Ray Metallurgy* answers that there is a need to "... dispel the common misconception that x-ray diffraction techniques are best taught in postgraduate courses." If such a misconception does exist, then, I believe, it is most likely to be found among faculties in institutions like the Hatfield College of Technology where the author is a Senior Lecturer in Materials Science and Technology. No doubt the majority of his students are headed for industrial positions in applied research. In all probability, they are not temperamentally suited to the rigor of the treatments found in

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Moscow, USSR

Translated from Russian by
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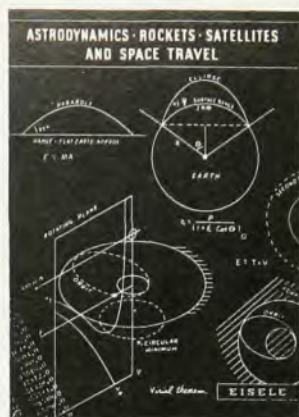
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the standard x-ray texts. On the other hand, a concise monograph like this one, which emphasizes solutions to practical problems using clear illustrative examples, should be most welcome to them. In fact, the book could have been entitled, *Practical X-Ray Metallurgy*.

The author has not omitted the essentials; he merely quotes most of them without proof. Chapter 4, for example, reviews the fundamentals of x-ray diffraction by crystalline matter in about seven pages of text. Conversely, Kovacs' much lengthier treatments of the Laue method and the powder method in Chapters 5 and 6, respectively, are as clearly written as any in the literature. His final two chapters are devoted to practical problems of the sort encountered in industrial research: identification of unknowns, analysis of alloy-phase diagrams, grain-size determination and the texture of wires and sheets. The book concludes with a bibliography of well known reference books.

One might well imagine a number of recalcitrant students being eased into the subject of x-ray diffraction by means of Kovacs' neat little book and the proper faculty guidance. But if you are planning to own just one reference on the subject, you had better look elsewhere.

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Springer Tracts in Modern Physics, Vol. 49:

Electron Scattering, Photoexcitation and Nuclear Models; Baryon Current Solving SU(3), Charge-Current Algebra
G. Höhler, ed.

146 pp. Springer-Verlag, New York, 1969. \$11.00

This volume of the *Springer Tracts in Modern Physics* is in two parts, as reflected in the title of the book. Although the intent of the tracts is to present competent reviews of modern physics, they are not really intended for the pedestrian in the subject matter.

The first part of this book is a review of the basic theory of electron scattering from nuclei and of photonuclear processes. Several experiments in electron scattering are analyzed and discussed along with the theory. The giant-resonance region, which has received considerable attention in the past few years is emphasized, particu-

larly with reference to inelastic electron scattering and excitation of nuclear levels below and in this region.

The second part of the book is devoted to currents and their algebra. Group dynamics has already provided prescriptions for developing conserved currents for baryons of fixed internal quantum numbers. In this article these prescriptions are extended to apply to an entire SU(3) octet of weak and electromagnetic currents. Once again the treatment is not presented in a tutorial form and will be of interest to particle-algebraists rather than the casual reader.

The *Tracts* form in reality a hard-bound journal of reviews of selected topics of interest to specialists in various disciplines in modern physics. Although they may be valuable sources of information to researchers and serve as keys to new information for them on these selected topics, their audience appeal is not broad.

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Superconductivity Vols. 1, 2

R. D. Parks, ed.

664 pp. and 748 pp. Marcel Dekker, New York, 1969. \$75.00 a set

Superconductivity was discovered in 1911 by Kamerlingh Onnes in Leiden, when he found that the electrical resistance of certain metals vanishes below a critical temperature T_c . Although it was immediately apparent that this phenomenon was a scientific mystery of the first order, as well as having the possibility of many practical applications, progress toward unraveling the mystery or in making applications was rather halting for some 40 years.

Probably the most lasting development was the formulation of a pair of phenomenological equations in 1935 by Fritz and Heinz London to describe the perfect conductivity and perfect diamagnetism. Progress accelerated in the postwar period, leading to the theoretical breakthrough of the "BCS Theory" by John Bardeen, Leon Cooper and J. Robert Schrieffer in 1957. This theory opened the modern era of research in superconductivity, marked by the availability of a successful microscopic theory that