and later books are promised on electricity and magnetism, on heat and on quantum mechanics. The experience of many physics teachers is that the individual volumes of such sets vary greatly in quality, especially when the books are written by several authors. However, Skinner's book can be placed high among the textbooks in this general class.

The book is divided into three main chapters. The first, on the kinematics of special relativity, emphasizes the historical importance of the Michelson–Morley experiment and its relationship to the two postulates of special relativity. For me, this emphasis is not unwelcome, but perhaps it would have been well to point out that, in addition to the historical developments by Lorentz, Poincaré and Einstein, there were other experiments, especially Fizeau's work on the speed of light in moving water and Bradley's and Airy's observations of astronomical aberration, which were of equal importance in the evolution of the final theory. The central importance of the Lorentz transformation is stressed and adequately deduced and discussed. The author also gives a satisfying discussion of this formalism in the four-dimensional form that should be readily intelligible to beginning students. Other uses of the four-vector formalism, for example, in the propagation of waves and in the doppler effect, are especially well done.

Chapter 2 is on the dynamics of special relativity, and here it is fine to see a considerable proportion of examples from important current problems of the atomic nucleus, collision phenomena and particle decay. The illustrations are closely related to rather recent experimental work. This chapter will undoubtedly excite the greatest interest and be the most rewarding for careful study by both students and teachers.

The short Chapter 3 is Skinner's attempt to bring general relativity into focus for the beginning student and represents a distinct departure in textbook writing on this subject. The author has made a worthwhile contribution in producing a chapter that does not follow the usual conventional pattern and will appeal especially to the exceptionally able student. The text has a large number of carefully worked examples and many challenging problems.

Regardless of the success that the other volumes may achieve, Skinner's book will stand on its own and find a useful place in these days of rapidly changing physics curricula.

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Quantum Electronics, Vol. 1, 2: Basic Theory And Maser Amplifiers And Oscillators

By V. M. Fain, Ya. I. Khanin; J. H. Sanders, *ed.*
(Trans. by H. S. H. Massey) 313 pp. and 311 pp. Pergamon, Oxford, 1969. $31.00 (the set)

In recent years many textbooks have appeared in the US on quantum electronics; for example, books by Chang, Pantell and Puthoff, and Yariv use these words explicitly in their titles.

Now a Soviet version on the same subject has become available in an English translation. It should be noted at the outset that the original Russian text was published in 1965, and at that time the book undoubtedly represented a pioneering effort to bring the results of recent research on masers and lasers to the classroom. Inevitably the book is now somewhat dated, as great strides have been made in the meantime, especially in the field of laser applications and nonlinear optics. The book is an interesting comparative source for the parallel development of this field in the USSR and the West.

Both authors were at Gorki State University at the time of writing. V. M. Fain, who is now at the Institute of Solid State Sciences of the Academy of Sciences in Moscow, is a theoretician who wrote essentially all chapters of volume 1. Ya. I. Khanin wrote practically the whole of volume 2, which makes a close connection between theory and experiment of masers and lasers. The authors have written a score of research papers in this field, and these papers clearly provided a starting point for the book.

The first volume contains the usual chapters on quantum theory of the interaction of radiation and matter, on the density-matrix formalism including damping, on the behavior of spin systems, on the susceptibilities of two- and three-level systems and spontaneous and stimulated emission in free space and in resonators. A rather special chapter, which is not commonly 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 postgraduates. 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