are definitely desirable. The volume will undoubtedly be helpful to many people working in the laser field, and most scientific libraries and reading rooms will want to have it available.

On the other hand, this first volume also points up some of the difficulties involved in choosing the articles to be covered. About 15 reports on work carried out for the Defense Department are included, and my personal feeling is that these abstracts could have been omitted without limiting the value of the book. Abstracts published in the *Bulletin* of the American Physical Society were abstracted, which is probably desirable. The few favorable comments made in the abstracts should have been omitted, since favorable comments were not made about the most important papers in the field. The problem of achieving uniform quality in the abstracts is obvious in several cases where the abstract is an almost exact paraphrase of the title. A somewhat more comprehensive foreword in which the author stated his criteria for inclusion of abstracts and the period covered by the volume would have been helpful.

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Economic Geography

The Geography of Modern Africa. William A. Hance. Columbia University Press, New York, 1964. xiv + 633 pp. Illus. $12.

Although racial and social problems are still major factors in the pattern of Africa's rapid political change, the most important problems in the newly independent African countries are invariably economic. Are the smaller states economically viable, and what are the chief resource problems? How many of the states have adequate capital, labor, and technical equipment to develop their potential and raise standards of living?

William A. Hance is well qualified for the task of presenting Africa's economic situation, as professor of economic geography at Columbia University, as a frequent visitor to Africa, as a keen student of problems of economic development, and as the author of a notable study, *African Economic Development* (Harper, New York, 1958) and several major articles. *The Geography of Modern Africa* is essentially an up-to-date survey of the main features of the economic geography of Africa, arranged according to seven major regions. In its enormous scope this book is remarkably accurate. Considerable care must have been taken to check the sources of information. The publishers deserve especial congratulation for the speed with which they produced this text, for the extremely attractive format, and for the high quality of print and of reproduction of maps and diagrams. Only five chapters are devoted to generalities. The whole emphasis is on regional aspects, and each region is treated differently. Thus, while in West Africa land use, including the agriculture, receives immediate treatment after the introduction, in South Africa, agriculture follows consideration of racial problems and of mining. Although the regional coverage of the continent is complete, particular attention is paid to tropical Africa (the largest single section is that given to West Africa), and there is a marked emphasis on current and future problems, leading, for example, to unexpectedly large subsections on industrialization. Problems of overpopulation and of population distribution receive considerable treatment, and attention is firmly focused on areal aspects. This is not a study of African economics but of economic geography. As such, it contains the best general appraisal of Africa's resources, and of her regional economic problems, yet produced.

Having acknowledged Hance's skill and authority in economic geography, one must, however, offer some criticism of his generalizations with regard to the biological and physical background. These are, in any case, very limited in scope, although of major importance in the consideration of Africa's economic future. For example, it is claimed that "latosolic soils provide the main reason for the dominance of shifting agriculture in tropical rainy and savanna areas . . ." (p. 16 and similarly on p. 202). Admittedly, latosolic soils can be fragile and pessimism has been expressed by numerous authorities. But some attention must be paid to the views of Vine ("Is the lack of fertility of tropical soils exaggerated?" in *Proceedings*, 2nd Inter-African Soils Conference, Leopoldville, 1954, **1**, pp. 389–412), among others, and to the quite different views on shifting agriculture which regard it as limited not so much by soils, as by problems of capital, tradition, pasture, difficulties of livestock integration, and availability of fertilizers. If rainforest plots are abandoned after 2 to 5 years of use, should we blame the soil or the almost continuous cultivation with long rainy seasons and without use of fertilizers? Longer periods of cultivation in some savanna areas may be related to the annual rest given the soil during the dry season. Minor blemishes include uncritical acceptance of such terminology as "savanna climate type" (p. 15), which misleads the student by begging the question of vegetation-climate relationships; claims that much of the more favorable land from the climatic standpoint "falls in the highland climatic regions" (p. 15), when the criteria for judging "favorability" are not provided and the greatest productivity in commercial agriculture is in the lower, hotter, and more humid areas; and the suggestion that formerly Africans were "of low average stamina" (p. 6), when, despite the possible correctness of the suggestion, the evidence is so controversial and when it is known that African porters performed remarkable feats of load carrying and endurance. Why, incidentally, is sea fishing included in the discussion of land use (p. 194)?

These criticisms are, however, small and are intended in no way to detract from this remarkably well-written and well-presented study which should be accepted as the standard reference work on the subject in English, and in which the attention to detail has set a remarkably high standard for all other similar studies to follow.

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Tools and Techniques

Physical Acoustics. Principles and methods. vol. 1, part A. Warren P. Mason, Ed. Academic Press, New York, 1964. xvi + 515 pp. Illus. $18.

Within the past few years the field of physical acoustics has become fashionable and exciting. The ability to generate, propagate, and detect elastic waves (phonons) in the microwave region, and their use in the study of thermal, electronic, magnetic, and mechanical properties of solids, are only the most striking of the new

developments in acoustics. The many other developments include the development of semiconductor transducers and their use in measuring strains, accelerations, and displacements; phonon amplification, using paramagnetic crystals or piezoelectric semiconductors; improved, high-frequency, ultrasonic delay lines; and the applications of ultrasonics to cleaning, testing, machining, polymerization, and medical diagnosis. Considering the increasing number of workers in this field, and the vastly increased number of applications in the laboratory and in industry, this is an opportune time for the appearance of a series of books which attempts to summarize the present state of knowledge of physical acoustics. This volume is the first of a six-volume series, edited by W. P. Mason, whose professed aim is to provide a comprehensive introduction for those entering the field and for those interested in using its results. The first volume succeeds admirably in these purposes.

The present volume deals primarily with the tools and techniques of physical acoustics necessary for the measurement of stress waves in fluids and solids. The first two chapters, which are introductory in nature, constitute an excellent if succinct review of the classical theory of propagation of small amplitude waves in fluids and solids (Thurston) and of guided wave propagation in cylinders and plates (Meeker and Meitzler). Special attention is appropriately paid to topics that are important in current research—for example, mode coupling and wave propagation in strained elastic crystals. Recognizing that piezoelectric quartz transducers have been exhaustively discussed in many previous books (for example, both Cady and Mason), Berlincourt, Curran, and Jaffe restrict their discussion of transducers primarily to piezoelectric ceramics, together with a brief analysis of piezomagnetic transducers. This chapter presents a wealth of well-organized data (in tables and charts) on ceramic transducers. In a relatively brief chapter, McSkimin summarizes the extraordinarily varied methods used for measuring mechanical properties (primarily velocity and attenuation of stress waves) of liquids and solids. Accompanied as it is by 212 references, this chapter serves as an excellent guide to the literature. The applications of acoustical and mechanical waves in filters and oscillators are summarized in a chapter by Mason. The final two chapters discuss the uses of elastic waves in dispersive and nondispersive delay lines; both piezoelectric and magnetostrictive guided-wave delay lines are discussed in some detail by May, with a briefer treatment by Mason of the more conventional, multiple-reflection, ultrasonic delay lines.

This book may be recommended to physicists and others concerned with developments in the techniques of physical acoustics, with special emphasis on wave propagation in solids. In view of the number of contributors, there is remarkably little duplication, except in references. With respect to the latter, I appreciate the presentation (by Meeker and Meitzer alone) of general references separately from the literature references. But the omission of references to several standard works in the field should be noted: the book and two review articles of Hearmon (misspelled "Hearman") and the review article by Huntington. The author index is complete (and useful), but the subject index is not entirely adequate—for example, the entry under "velocity" is quite sketchy. The handsome format, excellent and plentiful graphs and illustrations, as well as the presence of cross-references among the chapters, are indicative of careful editing.

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Isotopes in Engineering

Radioactive Isotopes in Instrumentation and Control. N. N. Shumilovskii and L. V. Mel'ttser. Translated from the Russian edition (Moscow, 1959) by R. F. Kelleher. P. J. Blaetus, and G. A. Young, Eds. Pergamon, London; Macmillan, New York, 1964. xiv + 198 pp. Illus. $10.

This English translation of a volume originally issued by the Publishing House of the Academy of Sciences of the U.S.S.R. is a good example of cross-fertilization in the world scientific community and a very adequate addition to the International Series of Monographs on Nuclear Energy. The approach, a thorough treatment on a theoretical basis and one of the most rigorous available on the uses of isotopes in engineering practice, may have as many limitations as advantages for most American industrial practitioners. The mathematical treatment may be somewhat confusing because the symbolism is not that commonly used in American texts. The complexity of the mathematical treatment will probably surprise many workers who have considered applications of radioisotopes, such as gauging, an empirical science.

The introduction, which is intended as a summary and review, presents a minimal discussion of nuclear radiations and detectors and measuring circuits, using block diagrams, and includes a fairly detailed treatment of errors in measurements. The nine chapters cover a variety of applications of radioisotopes in instrumentation and control. The first and second chapters deal with the measurement of thickness and density by absorption and back scattering. Chapters 3, 4, and 5, treat relay devices used for control and the measurement of level and flow of liquids. Chapters 6 and 7 cover the measurement of flow of gases and gas pressure. Analysis and composition control are considered in chapter 8, and in the last chapter the determination of the minimum source activity for the particular dynamic properties of instruments is discussed.

Most of the 76 references cite Russian literature. There is a foreword by Paul C. Aebersold and a short index.

In general, the treatment is clear and concise, and the volume is not seriously impaired by a few small errors, such as the substitution of neutron for neutrino (p. 3) in the explanation of the continuous spectrum in beta decay. The book is recommended to any well-trained engineer seriously interested in applications of radioisotopes to instrumentation and control.

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Botany

Poisonous Plants of the United States and Canada. John M. Kingsbury. Prentice-Hall, Englewood Cliffs, N.J., 1964. xiv + 626 pp. Illus. $13.

Primarily, this book is a reference source for the physician and veterinarian and a textbook for the medical and veterinary student. For persons who wish to investigate poisonous