sive but not too easy to use. The method of putting it at the end of each chapter has both advantages and disadvantages. Unfortunately, one of the major advantages seems not to have been recognized. With the references at the end of the chapters, it is not necessary to enter them chronologically as the references appear in the text. It would therefore have been much better if the author had entered his references alphabetically with respect to the authors involved.

In spite of the serious drawbacks associated with the production of this extensive treatment on gaseous electronics, it brings together a review and an analysis of much information derived from many years of study, instruction, and research in this difficult branch of the general subject of physical electronics. Anyone who acquires the book and who has some knowledge of the subject will not deny that it represents a great effort to put in order the basic facts relating to a complex subject.

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Radio Astronomy. International monograph on radio. J. L. Pawsey and R. N. Bracewell. Oxford Univ. Press, New York–London, 1955. x + 361 pp. Illus. + plates. $8.80.

Radio astronomy is by now more than 20 years old, but until the appearance of the present volume there existed only a single semitechnical work on the subject, the book by Lovell and Clegg (1952). Some of us who have been teaching courses in the field have had our course notes mimeographed, but no printed textbook was available. The Pawsey-Bracewell volume is our first textbook and a good one it is. It has been written by the assistant chief and a member of the staff of the famous Radio Physics Laboratory in Sydney, Australia. Above all, it bears witness to the fruitfulness of the research in radio astronomy in Australia, which has provided a strong impetus to the postwar development of this new science.

After a brief, mostly historical, chapter, the book starts off in earnest with a very readable general survey of techniques of observation, a survey that will be especially appreciated by astronomical readers who need and desire such guidance. The sections on aerials, on calibration, and on interferometers (which includes the Mills pencil-beam radiometer) will be read and studied with care by many who are new in the field.

The book apparently has been directed primarily at the physicists and radio engineers, who are newcomers to the mysteries of astronomy. After a brief chapter on radio waves in ionized gases, there follows a lengthy one on aspects of optical solar physics relevant to radio astronomy, and a little later in the book we find a similar chapter on optical astrophysics and our own and other galaxies. At the present stage of development of radio astronomy this is probably all to the good.

The two chapters of greatest length are on solar radio waves and on cosmic radio waves. The first of these bears considerable similarity to the fine chapter on solar radio emission (by Pawsey and Smerd) in Kuiper's recent comprehensive volume on *The Sun,* but this in no way detracts from its value. The other chapter—on cosmic radio waves—is, alas, a little on the brief side, and here the book suffers markedly from a delay in prompt publication: whole sections are more or less out of date, in part because of more recent work by the authors and their associates. It is difficult to avoid this in a field that is still developing as rapidly as radio astronomy is. To take one glaring example of rapid "ageing": there is no reference in the sections dealing with 21-centimeter research to the recent spectacular results on the spiral structure of the galaxy, to the absorption features observed in the profiles of some discrete sources, or to studies relating optical and 21-centimeter features of details of the interstellar medium. In other words, the eager student of the subject will perforce have to depend on recent summarizing articles or volumes like the forthcoming one resulting from the August 1955 symposium held at Jodrell Bank, if he wishes to be up to date in the field. The same criticism applies to problems related to the radio continuum or the identification of discrete radio sources.

The concluding chapters of the book deal with thermal radiation from the moon, radio echo techniques and their application, and a brief survey of the field of radio studies of meteors. A brief chapter on effects of the earth's atmosphere completes the technical presentations.

The Pawsey-Bracewell volume is the first real textbook in radio astronomy, and the authors deserve the thanks of colleagues and students for their courage in attempting to write a textbook at a time when the field is still changing from month to month. Let us hope that the first edition may soon be sold out, that the authors may be persuaded to prepare an up-to-date second edition, and that the publishers will bring the next edition out with minimum delay.

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Nuclear and Radiochemistry. (Revised version of *Introduction to Radiochemistry.*) Gerhart Friedlander and Joseph W. Kennedy. Wiley, New York, 1955. ix + 468 pp. Illus. $7.50.

When this book appeared in 1949, it became deservedly one of the textbooks most widely used by teachers and students seeking a thorough but not overelaborate and expensive introduction to "radiochemistry." The authors stated that they included in this term the "reactions of nuclei and the properties of resulting nuclear species . . . the field of chemical studies with the use of isotopic (radioactive) tracers, including studies of essentially pure tracers at extremely low concentrations." The passage of 6 years has only served to emphasize the wisdom and skill of Friedlander and Kennedy in their choice and integration of subject matter. We are fortunate to have at hand a new edition, written to bring up to date the older material and to take cognizance of some changes in emphasis brought about by the rapid development of the fields just cited. These changes are evident in the new title distinguishing nuclear chemistry from radiochemistry.

The organization of the new volume follows rather closely that found so effective in the first edition. New material is skillfully woven into the fabric of the old. Essentially chemical material appears earlier in the new version. The problem sets have been supplemented effectively by others designed to give the student the increased understanding resulting from the incorporation of new material. An added feature is the inclusion at the end of the book of two new chapters dealing with nuclear energy, both in its civil and military applications, and cosmic aspects of nuclear chemistry.

The expansion of the text has been counteracted by using smaller type and employing a larger format, with no appreciable loss in legibility.

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The Negro in Science. Julius H. Taylor, Ed. Morgan State College Press, Baltimore, 1955. viii + 192 pp. $3.50.

In a more rational society there would be no need for a book on the Negro in science. But discrimination, poorer opportunity for education, and the absence of tradition and environment conducive to the development of research interests have combined to make the Negro in science a rarity—a rarity among Negroes and a rarity among scientists. Yet the

Negro who overcomes the barriers is capable of good scientific work. Most of this volume consists of reprints of published papers by Negro biologists, chemists, mathematicians, and physicists. By examining the papers one could tell nothing about the color of their authors.

The volume was published to mark the dedication of the science quadrangle at Morgan State College. The event symbolizes a trend. Negro colleges have trained remarkably few scientists, partly because scientific facilities have been poor and scientific interests low. Now, however, facilities are improving and interest is growing. But even if opportunities at the college level were exactly the same for Negro and white students, the lasting effects of poorer environments and earlier education would lead to under-representation of Negroes among the ranks of scientists. In the one paper written expressly for this volume, Herman Branson, chairman of the department of physics at Howard University, gives an excellent brief account of the sociological factors responsible for the rarity of Negro scientists.

Some of the material in the book gives encouraging evidence that the number of Negro scientists is increasing. There is a very brief account of the trend toward greater scientific interest in Negro colleges. There is also a biographical directory of Negro scientists. They average a few years younger than a sample of the men and women listed in the most recent volume of *American Men of Science.* More striking is the high concentration in the younger age brackets. A fifth or more of the men and women in *American Men of Science* were born before 1900; only 8 percent of the Negro scientists are as old.

The trends are encouraging, but there is not yet equality of opportunity. Until there is, America will be wasting a good portion of its needed intellectual resources.—D.W.

Metals Reference Book. vols. I and II. Colin J. Smithells. Interscience, New York; Butterworths, London, 1955. xvi + 531 pp. and xv + 434 pp. Illus. $25.

This book attempts to provide a convenient summary of data related to subjects ranging from metal physics through inorganic chemistry and various branches of physical and applied metallurgy. The first edition, which appeared in 1948, has now been followed by a second edition that is thoroughly revised and enlarged. The two new volumes cover data collected by more than 60 contributors.

The first 45 pages of volume I contain tables of weights and measures, temperature, various conversion factors, and mathematical formulas as well as general physical and chemical constants. These are followed by two chapters on properties of atomic nuclei and line spectra of elements. A chapter on x-ray crystallography deals with various methods and data useful for determination of the crystal structure and is followed by a chapter on structure and structural details of metals and innumerable intermediate phases. The remaining part of volume I contains some information on geochemistry, a comprehensive chapter on metallographic identification of various phases in metals and alloys, and about 230 pages on binary and ternary equilibrium diagrams.

Volume II begins with a chapter on gas-metal systems, including solubility data, and is followed by a completely rewritten chapter on diffusion in metals. New chapters included in this volume contain data on elastic properties and damping capacity, physical properties of molten salts, and friction. About 50 pages are devoted to a completely rewritten chapter on thermochemical data and almost the same amount to chapters on various physical properties of metals and alloys. A short chapter on magnetic materials precedes a comprehensive collection of data on mechanical properties of industrial metals and alloys. The remaining 160 pages of volume II contain data and information pertaining to fields of applied metallurgy, such as deep drawing, lubrication, various foundry data, heat treatment, corrosion, and welding.

The two volumes contain an enormous amount of information, and I have noticed only one or two small errors or typographic mistakes in chapters in which the data is more familiar to me. Considering the unusual difficulties in producing a book of this kind, a very high standard in both preparatory and publishing stages is shown. I am sorry to see the examples of typical compounds removed from the table that deals with structural details of various metallic compounds, and if mathematical tables are to be included I would prefer a few pages devoted to logarithms of numbers rather than to solution of integrals and differential equations, for which I would look in mathematical reference books.

Many equilibrium diagrams are drawn to a larger scale than in the first edition and are now preceded by useful interconversion tables of atomic and weight percentages in binary systems. The details of many diagrams based on the book by M. Hansen published in 1936 are now out of date, and where diagrams are modified by later references their choice is somewhat arbitrary. Perhaps it would be helpful in subsequent editions to state when the survey of references was completed before publication.

The extended bibliography at the end of each chapter is a welcome improvement in this new edition, although in chapters that deal with crystal structure and equilibrium diagrams the bibliography is still far from complete.

On the whole the two volumes are comprehensive, extremely valuable, and almost indispensable to workers in the practical fields dealing with metals and alloys.

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Theory of Functions of a Real Variable. I. P. Natanson. Trans. by Leo F. Boron and Edwin Hewitt. Ungar, New York, 1955. 277 pp. Illus. $6.50.

The original Russian text (issued in 1941) contains 17 chapters. In the present book the first nine of these chapters were translated. (A German translation of the entire work was published in 1954.) This English edition is a useful and valuable, clearly written, and easily readable textbook. After an introduction to general sets and to linear point sets (Chapters I and II), the measure of linear sets, the measurable functions, and the Lebesgue integral are treated (Chapters III–VI). Then (in Chapter VII) Hilbert space, mean convergence, and orthogonal systems of functions are discussed. A chapter (VIII) on functions of finite variation and Stieltjes integrals and a chapter (IX) on absolutely continuous functions and the indefinite Lebesgue integral conclude the book.

It is rather strange that in the Russian text all unbounded sets are considered nonmeasurable. There, measurability is defined only for bounded sets without even indicating the simple generalization to the case of unbounded sets. For this reason appendixes to Chapters III, IV, VI, and VII were supplied by E. Hewitt. (Moreover, his appendix to Chapter IX considers functions of finite variation on the infinite line.)

Chapters X–XVII of the original Russian text, whose translation is not included in the present English edition, discuss singular integrals and trigonometric series, point sets in the plane (rather late!), measurable functions of several variables and their integration, set functions and their application in the theory of integration, transfinite ordinal numbers and Baire's classes of functions, as well as normed linear spaces. A final chapter states the role of Russian mathematicians in the development of the the-