

Africa where he has not worked and for background information in fields which impinge upon his own. It will also become, no doubt, the standard guide for the nonspecialist who only wants to know about Africa. In many ways it is a very good guide, though it is not the only one in its field. At the time it was planned the only general survey of African conditions was the old edition of Lord Hailey's *African Survey*, then almost 20 years old and sadly out of date. This was completely rewritten and reissued in 1957 and remains the most authoritative source on Africa, though its style is not one to attract the general reader. No doubt the scholar will prefer its succinct pages packed with detailed information to the more lively prose of *Tropical Africa* where the flow of analogies and metaphors obscures the facts and, on occasion, seems to crowd them out all together. Nevertheless, even the reissue of *The African Survey* is now some four years old, and for more recent information *Tropical Africa* is now the most convenient source.

It is also probable that the scholar will prefer volume 1 of *Tropical Africa*, for there the chapters deal very largely with material things which can be counted, measured, and placed on maps, where it is possible to give evaluations which rest on more or less accepted standards. The treatment therefore tends to be factual. The general reader no doubt will prefer volume 2, for it deals with economic, political, and social developments which are more likely to interest him and which he will feel to be more immediately pertinent as background to the events with which he is concerned. Recent political developments have been more fully described in other recent books, but here they find their setting amidst the background of poverty, illiteracy, inadequate medical facilities, difficulties caused by the terrain, and the scarcity of competent technologists with an understanding of tropical conditions. The reader can therefore assess not only constitutional developments and the programs of political leaders, but also the problems with which these leaders must cope if their peoples' demand for a better life is to be met.

It is also a strength of *Tropical Africa* that the viewpoint is not solely that of the towns and of the young educated leaders who dominate so much of the current political scene. These are certainly important, but Africa is still largely rural. Many of its people

are conservatives with no great liking of, or respect for, many of the changes urged upon them. In this world of the countryside, much of the urge for change has come from the outside, often through European administrators and technicians who have striven to introduce new methods and institutions to people uncertain that they are desirable or worth the effort required of them. Something of the problems involved in successfully bringing about technical or institutional changes is made clear in the chapter on community development. With the emergence of the independent nations, the impetus to change given by the old administrators and technical officers will vanish. At the same time the development funds made available during the past 20 years by the various colonial powers can be expected to diminish. It will now be for the new African elite, whose origins and ambitions are sketched in another chapter, to channel the ambitions of their people behind schemes for economic and social change and, at the same time, to find funds to finance the projects. It is too soon to say whether the magic of independence will prove more fruitful than the old compulsions in assisting Africa to overcome its poverty and to provide a basis for rapid advance.

Volume 2 has a fascinating story to tell, and much of it, especially the long quotations from the background papers, is extremely valuable. Unfortunately it cannot be recommended as one would wish. A tendency to editorialize pervades the volume, and implicit and explicit biases distort the presentation. The first two chapters, on indigenous patterns of social life and on social change, are particularly bad in this respect. They will make the anthropologist cringe and wonder if 30 years of research can have been for naught. They will infuriate any Africans who read them, and rightly so. It is utter nonsense to write that Africa was in the Stone Age when the Europeans arrived. Iron-working was a well-established craft throughout Africa at the time and had been for a thousand years and more. African trade in iron, copper, and other metals was carried on for centuries before the Europeans came and stopped it. It is equally absurd to write that Africa had no centralized governments before colonial rule was established. If by this is meant no centralized governments on the present scale or on the present models, well and good; otherwise a most casual

knowledge of African conditions in the 19th century should have prevented such a statement. Both statements seem to be derived from a desire to stress the lag between European and African development. The same bias appears in the remark that "Africans like children" select some things and reject others. This is reminiscent of the old racialist myth that dark people and children are somehow alike and irrational, while Europeans are adult and rational. This is 1960, and such statements have long since disappeared from serious scholarly writing.

These are merely three instances, though flagrant ones, of the bias which distorts the first two chapters of this volume and which appears in somewhat less obvious form in the more factual chapters that follow. In a curious fashion, the volume seems pervaded by the thought and feelings characteristic of the 1940's. The implicit assumptions remain those of the colonial era, rather than those of the new period into which Africa is now moving. The tone is paternalistic and moralistic. There is a strong Christian bias, which colors the account of the role of Islam in Africa. If one can ignore all this, then there is much to appreciate in the chapters which describe administrative and political structures in the various African countries, methods of financing development, educational systems and the work of adult education, methods of community development, the work of the various churches, the organization of African trade unions, the control of disease, and the role of the new elite.

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X-Ray Absorption and Emission in Analytical Chemistry. H. A. Liebhafsky, H. G. Pfeiffer, E. H. Winslow, P. D. Zeman. Wiley, New York, 1960. 367 pp. Illus. \$13.50.

This book is intended for the analytical chemist who is entering the field of x-ray spectrochemical analysis, and thus far it is the most comprehensive book published for this purpose. The authors have covered almost every subject of interest to the intended reader, some more completely than others, but this is to be expected when dealing with a subject which overlaps several scientific fields.

The first chapter deals with the theory of x-ray generation and the properties of x-rays; this is followed by a chapter on x-ray detectors. The succeeding chapters deal with specialized fields of interest, including absorptiometry, film thickness determination, and x-ray emission spectrography. There is a chapter containing excellent descriptions of presently available equipment, and one on the elementary statistics of x-ray measurements. The final chapter deals with special topics which are closely related to the general field—for example, gamma-ray absorption and emission, x-ray point sources, and applications in the biological sciences.

The book is very clearly written and readable, and it will provide the analytical chemist with a considerable amount of the information necessary for entering the field. Especially useful are the discussions of sample preparation and sample handling.

The book's value is further enhanced by the tables of wavelengths and constants given in the appendixes as well as by a bibliography of element determinations.

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Physical Methods of Organic Chemistry. vol. 1, part 1 of *Technique of Organic Chemistry*. Arnold Weissberger, Ed. Interscience, New York, ed. 3, 1960. xii + 918 pp. \$24.50.

The expansion of volume 1 of this excellent series on the technique of organic chemistry reflects both the volume's popularity and the editor's awareness of the need to include additional chapters on physical methods. The general excellence of format and printing has been retained, but I believe that fewer monographs should be included in each volume. The cost is high, but it is commensurate with the value of the monographs.

Part 1 has gained four new chapters and has lost five by transfer to Part 2. The new chapters are "Automatic control" by J. M. Sturtevant; "Automatic recording" by D. R. Simonsen; "Weighing" by A. Corwin; and "Determination of particle size and molecular weight" by G. B. Beyer. The first is a very concise introduction to the general principles of automatic control and includes most of the essential parts of the chap-

ter on temperature control (by J. M. Sturtevant) which was included in the previous edition. The chapter on automatic recording presents a brief introduction to the general characteristics of various types of recorders. These two chapters, although they contain a judicious selection of material, are too brief to be of great practical value to the majority of chemists. The excellent chapter on weighing fills an evident gap in the earlier editions. The author has packed into 57 pages a great amount of valuable information on the design and testing of balances and on the procedures of weighing. Beyer's chapter on particle size and molecular weight fills in admirable fashion the need for a concise and systematic account of the methods used to characterize systems having broad distributions of particle size, as well as the need for a résumé of the type of results most characteristic of these methods.

Chapters retained from part 1 of the second edition are: "Density" by N. Bauer and S. F. Lewin; "Temperature measurement" by J. M. Sturtevant; "Determination of melting and freezing temperatures" by E. L. Skau, J. C. Arthur, Jr., and H. Wakeham; "Determination of boiling and condensation temperatures" by W. Swietoslawski and J. R. Anderson; "Determination of vapor pressure" by G. W. Thomson; "Calorimetry" by J. M. Sturtevant; "Determination of solubility" by W. J. Mader, R. D. Vold, and M. J. Vold; "Determination of viscosity" by J. F. Swindells, R. Ullman, and H. Mark; "Determination of properties of insoluble monolayers at mobile interfaces" by A. E. Alexander; "Determination of surface and interfacial tension" by W. D. Harkins, revised by A. E. Alexander; "Determination of osmotic pressure" by R. H. Wagner and L. D. Moore, Jr. Although these chapters are retained from the previous edition, the following are new contributors to them: Lewin, Arthur, Mader, Swindells, and Ullman. The chapter on viscosity is essentially new and is a much more satisfactory presentation than that of the previous edition. Alexander's chapter on insoluble monolayers at mobile interfaces replaces "Properties of monolayers and duplex films" by W. D. Harkins. It is limited to a presentation of the properties of monolayers at air-water and oil-water interfaces and a discussion of the use of the former to investigate processes taking place at interfaces.

The remaining chapters, although

they incorporate new topics, tables, figures, examples, and some new discussion of theory, are essentially unchanged. The average increase in number of references is 25 percent, and the same increase holds for the length of the chapters. The authors are to be commended for bringing their work up to date.

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Statistical Theory of Communication.

Y. W. Lee. Wiley, New York, 1960. xvii + 509 pp. Illus. \$16.75.

The modern curriculum in electrical engineering is distinguished from its predecessors by an emphasis on fundamental theory rather than on the details of "hardware." This is as it should be; fashions in electronic circuitry change so quickly that a concentration on detail rather than on principle would render any engineering education obsolete within a very few years. One of the major basic subjects to receive attention recently is the theory of communication. While there have been several texts on modulation theory, theory of noise, and information theory, all except Middleton's weighty volume are fairly specialized and are not suitable for a general introduction to the subject. In many ways this book fills the need for such an introductory text.

This book begins with an account of Wiener's theory of generalized harmonic analysis. The account, though heuristic, is well written and shows the author's thorough mastery of the subject. Good motivating arguments are given for the introduction of the autocorrelation function, spectral density, and related functions. The discussions are accompanied by numerous illustrative examples. The chapters on harmonic analysis are followed by several chapters on the theory of probability, but the latter are less well written than the former. With the current emphasis on the formulation of engineering problems in probabilistic terms, little less than a complete course in the subject can adequately cover the basic concepts.

The next several chapters, an excellent feature of Lee's book, are devoted to discussions of a number of the practical problems encountered in adapting "hardware" to make use of theory. The many pictures of experimental correlograms lend interest to the theoretical