The opening chapter on the theory of oxidation-reduction by the late L. Michaelis contains interesting comments on the mechanism of enzymatic oxidations. The critical importance of phosphate in the processes allied to biological oxidations is covered in three chapters. N. O. Kaplan classifies the various types of phosphate bonds, their biological generation and utilization, and calculation of their energy content. S. P. Colowick presents a much-needed lucid discussion of transphosphorylating enzymes and H. M. Kalckar summarizes information on the dephosphorylation of adenosine polyphosphates. A comprehensive review of the pyridine nucleotides and their apodehydrogenases is written by F. Schlenk. The general properties of flavoproteins and a treatment of the known flavin enzymes are covered by H. Theorell. Discussion of the iron-containing enzymes is divided among sections on the cytochromes by K.-G. Paul, the catalases and peroxidases by H. Theorell, and the nature of enzyme-substrate interaction by B. Chance. Copper oxidases are reviewed by C. R. Dawson and W. B. Tarpley.

There are chapters on amino acid oxidases by H. A. Krebs, amine oxidase by E. A. Zeller, lipoxidases by R. T. Holman and S. Bergström, and organic sulfur oxidases by C. Fromageot. Anaerobic glycolysis, which still holds many secrets, is reviewed by F. Dickens, and the subject of yeast and mold ferments is thoroughly reviewed by F. F. Nord and S. Weiss. Chapters are also included on aldolase and isomerase by Meyerhof, on keto acid decarboxylases by B. Vennesland, amino acid decarboxylases by O. Schales, desulfinase by Fromageot, succinic dehydrogenase by F. Schlenk, hydrogenase and hydrogenlyase by W. W. Umbreit, and the enzymes in luminescence by E. N. Harvey.

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Aspects of the Constitution of Mineral Oils. K. Van Nes and H. A. Van Westen. Houston-Amsterdam: Elsevier Press, 1951. 484 pp. $9.00.

This is a most important book for all who are interested in the chemistry of petroleum oils. The authors are members of the research staff of the Koninklijke/Shell-Laboratory in Amsterdam, and they acknowledge supervision of the work by J. J. Leendertse. As stated in the preface, "The primary object . . . was to introduce a hitherto unpublished method for structural group analysis." The book also includes a fairly comprehensive survey of our present knowledge concerning the constitution of mineral oils, more especially the lubricating oil fractions. "The new method referred to can be considered as a thorough revision of the 'ring analysis' or 'Waterman analysis.' It is based on the same principles but has a sounder experimental background and is of simpler application."

The essential thesis of the present work could have been presented as a monograph of about 200 pages, but the authors have naturally included much well-reviewed material on the physical properties of hydrocarbons, methods of separation, characterization, and identification that serve as background to make the purpose and value of their own contributions clearer.

It is of especial interest to the reviewer that the authors have included an excellent chapter of 51 pages, including a bibliography of 101 references, on the genesis of mineral oils. However, they have been unable to find, in any of the references cited, any clue to the formation of the complex polycyclic hydrocarbons in which they are primarily interested, nor do they speculate as to how such complex hydrocarbons have been formed. They seem to favor the catalytic action of silicates. "For lack of a better explanation of the numerous reactions that must have taken place . . . it seems best for the present to adhere to the hypothesis of low-temperature catalytic cracking."

The "ring analysis" method as developed by Vlugter, Waterman, and Van Westen was first published in 1932. This method involved hydrogenation of the oil fractions and determination of physical properties before and after hydrogenation. Since 1932 a great deal of work has been done. The data required by the method evolved by the authors include only the refractive index (n), density (d), and the molecular weight (M)—hence it is referred to as the *n-d-M* method. It is doubtful if this method could be published in any of our scientific journals with anything approaching the thoroughness of the present volume. It seems likely that more and more original work will be published in the form of monographs.

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The Biological Sciences

Genetics and the Origin of Species. 3rd ed. Theodosius Dobzhansky. New York: Columbia Univ. Press, 1951. 364 pp. $5.00.

That a third edition of this book is required in less than 15 years is convincing evidence of its importance as an argument of the genetic mechanisms of evolutionary change, and even more of its lucidity and readability. The first edition, published in 1937, won immediate recognition as the most competent analysis of the origin of species since Darwin. Like Darwin's work, it contained no new facts but it marshaled the available genetic data and, in terms of the principles of population analysis developed by Sewall Wright, made their evolutionary implications unmistakable. The second edition, which appeared four years later, was considerably larger and gave a much more extensive review of relevant genetic studies in plants as well as in animals. In 1941, recognition of the scientific merit of the second edition received public acknowledgment in the award to the author of the

Daniel Giraurd Elliot Medal of the National Academy of Sciences and a certificate for the most meritorious work in zoology and paleontology of the year.

Like the preceding editions, the new one preserves the original framework in the same chapter headings, but it is completely rewritten and includes some discussion of most of the relevant studies of changing populations that have appeared in the past 10 years. Unlike the second edition, the present work has been deliberately shortened—particularly by eliminating discussion of many of the recent plant studies, expanded accounts of which are given in *Variation and Evolution in Plants* (SCIENCE, **112**, 764 [1950]), by G. L. Stebbins. The literature list has been expanded to include the large number of important titles of the past 10 years.

What this book is about is adequately stated in the preface:

> . . . instead of the varied theories of evolution which arose in different branches of biology, we are now witnessing the emergence of a new science of life unified by the great evolutionary idea. . . . Biology is becoming more than a branch of technology concerned with organic materials and processes. It aspires toward . . . an understanding . . . of the organism as a part of the constantly changing and developing pattern of nature. Evolutionary biology is a study of the dynamics of life.

In the increasing understanding of this unfolding pattern the experimental studies of the author himself have had an important part. These studies in experimental evolution in wild populations of *Drosophila pseudoobscura,* published for the most part since the last edition of his book under the general title "Genetics of Natural Populations," are summarized briefly in the present volume. The basic fact that emerges from the genetical study of evolutionary change is that the population is the essential unit and not the individual.

The chapter headings indicate the general argument of the book: organic diversity, heredity and mutation, selection, adaptive polymorphism, race formation, isolating mechanisms, hybrid sterility, species as natural units, and patterns of evolution. The key chapter, and certainly the longest, is that devoted to isolating mechanisms. "Race and species formation without isolation is impossible." "Species may be maintained distinct by any, or a combination of several, reproductive isolating mechanisms." The most direct evidence in support of the whole thesis is given in the chapter on hybrid sterility. Here it is shown by well-tested examples that there are a great many effective natural mechanisms for reproductively isolating varieties and species. Thus "the species is not a static unit, but a stage in the process of evolutionary divergence." Again, "species are groups of populations, the gene exchange between which is limited or prevented in nature by one, or a combination of several, reproductive isolating mechanisms. In short a species is the most inclusive Mendelian population."

The final chapter, on patterns of evolution, summarizes the whole argument.

> The biological function of sexual reproduction is the formation of an immense variety of genotypes, some of which prove to be adaptively valuable and are established by natural selection. Conversely, reproductive isolation prevents the gene exchange between populations which occupy different adaptive peaks. [There are some human applications that may find less ready acceptance.] Genetically conditioned educability favors diversity of human personalities and cultures. . . . The biological meaning of the diversity among humans, like that of organic diversity on the biological level, is adaptation to the variety of environments which the organism encounters or creates.

This book has become the twentieth-century equivalent of Darwin's *Origin of Species.* As such it can be read with profit by biologist and layman alike.

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Checklist of Palaearctic and Indian Mammals, 1758 to 1946. J. R. Ellerman and T. C. S. Morrison-Scott. London: British Museum (Natural History), 1951. 810 pp. £3 5s.

This is a major work, of great and obvious importance to students of mammals and likely, through them, to have future significance for the whole subject of systematics.

No modern list of the mammals of the largest land mass on earth has been available. In itself, the provision of such a list is a great contribution, but the authors have done much more than that. Designation of this work as a "checklist" is a British understatement. This big, handsome volume is, in fact, a complete systematic revision of all the 809 species and still more numerous subspecies of an enormous fauna. The revision is based not only on the literature but also on firsthand study of the collections of the British Museum, unrivaled in richness for most of the region involved.

For each major and, as needed, many minor groups, there is a brief, adequate discussion of the reasons for the present arrangement. Synonymy is given for all genera, species, and subspecies, and geographic ranges for species and subspecies. References are given not only to original publications of descriptions of all genera and smaller groups, but also to diagnostic reviews for genera and species. Where such reviews are not available, the authors have provided new morphological keys. In spite of the fact that there are no illustrations or formal descriptions, this work thus facilitates identification of any mammal from its region.

This is not the place for discussion of differences of opinion as to the formal classification. It is in general highly satisfactory, and deviations from previous arrangements are explained. Some of these deviations are not likely to be generally accepted, but on the whole they point forward to improvements in the classification of the order.

The broader significance of the work is its bearing on trends in the systematics of living organisms in general. Mammalogy is now reaching a point at which

ornithology arrived some time ago and toward which other branches of systematic zoology are tending—the end of the age of discovery. Certainly very few living mammals remain to be discovered. The discovery of any *really* new genus (one of which no species was known before) is improbable, and few really new species are likely to turn up. As this point approaches, there is a tendency for systematists grossly to exaggerate the differences among known forms. Later there develops a more mature systematics, less concerned with giving new names than with elucidating the biological relationships of populations.

Ornithology is happily well advanced in its mature phase. Mammalogy is not, but this book is one of the signs that the phase has begun. At least, it displays a substitution of rational synthesis for excessive, ill-grounded analysis. As a rather extreme but significant example, the authors recognize (for their area) 14 species of the genus *Felis*. At one time or another these have been placed in 101 species (of which 42 are now considered valid as *subspecies*) and under 35 generic names (9 now used for *subgenera*). To be sure, this is only a beginning, for the authors' approach is morphological and full biological significance does not automatically emerge. It is, however, a great stride toward getting the morphological data into a form that *does* have biological meaning.

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Traité de Zoologie: Anatomie, Systématique, Biologie — Insectes Supérieurs et Hémiptéroïdes, Vol. X, Parts 1 and 2. Pierre-P. Grassé, Ed. Paris: Masson, 1951. Part 1, 975 pp., 6500 fr.; Part 2, 973 pp., 6500 fr.

For generations European zoologists have, at intervals, undertaken many-volume encyclopedic works on their science. These studies are of a character quite different from anything ever produced in America. They serve the important purpose of collecting a vast quantity of information in a single series of volumes, so that biologists can readily obtain at least some information on virtually any animal group. A disadvantage of a compilation such as this is that unless authorship is split to an impossible degree, not every section can be written by a specialist. It seems likely that every entomologist will find the work reviewed here full of interesting information of which he was previously unaware. On the other hand, when he reads the sections on the particular groups of insects in which he specializes—and occasionally elsewhere in the book—he will be disappointed because of basic errors or unfortunate omissions.

Volume X of *Traité de Zoologie* is so large that it is bound in two fascicles, having the consistently fine appearance and, for the most part, excellent illustrations of this series. The following is a list of the insect orders treated in the volume, with the authors and the number of pages in parenthesis: Neuroptera (L. Berland, P. Grassé, 64); Mecoptera (P. Grassé, 54); Trichoptera (R. Despax, 49); Lepidoptera (J. Bourgogne, 275); Diptera (E. Séguy, 295); Siphonaptera (E. Séguy, 25); Hymenoptera (L. Berland, F. Bernard, 506); Strepsiptera (R. Jeannel, 23); Psocoptera (A. Badonnel, 40); Mallophaga (E. Séguy, 24); Anoplura (E. Séguy, 20); Homoptera (P. Pesson, 267); Heteroptera (R. Poisson, 147); Thysanoptera (P. Pesson, 64).

After a brief definition of each order, an extended and well-illustrated treatment of the external and internal morphology of adult, larva, and pupa is presented. These morphological sections present a vast amount of interesting detail on structures and functions. Unfortunately, no serious effort has been made to use a single morphological nomenclature consistently throughout the work, so that homologous structures may go under different names in different orders of insects.

Following the morphological section for each order are usually found sections on bionomics, ecology, distribution, and sometimes physiological or genetic details relating to the order. A section on systematics gives information on each family, usually with a brief characterization (no keys) and a statement of habits and distribution, often also mentioning certain species of biological interest or of medical or agricultural importance. The systematic sections are illustrated by many figures, a list of which would be found to be particularly rich in the unfamiliar or bizarre types (e.g., the thrips—such as Nymphomyiidae, Diptera). The classification followed is not extreme, although in some sections (e.g., ants, sphecoid wasps, leaf hoppers) more families are recognized than seem necessary or desirable. At the end of the treatment of each order is a bibliography containing references to some of the more important works on the group.

It is perhaps worth mentioning that the section on Mecoptera seems particularly full and well done, and that it contains a review of Tillyard's work on the "panorpoid complex."

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The Genetics of Micro-Organisms. D. G. Catcheside. New York–London: Pitman, 1951. 223 pp. $4.50.

The introduction of genetic methods to studies of biochemistry and microbiology has created a need for just this sort of book. It

> . . . is based on a course of lectures devised for biochemists specializing in the microbial aspects of their subject. It attempts to provide an introduction to the general and special aspects of the genetics of micro-organisms.

Students of genetics will also find the book of great value, since it brings together a great deal of material which is strongly influencing current genetic thought and which is not covered in most textbooks of genetics. The book is well written, compact, and "meaty"—but the full appreciation of certain genetic implications

may require some previous knowledge of genetics.

Approximately half the book deals with the genetics of fungi, largely of *Neurospora*. Separate chapters are devoted to the genetics of yeasts, protozoa, bacteria, and viruses. This arrangement means that certain subjects—such as mutation, adaptation, cytoplasmic inheritance, etc.—are split up to a certain extent, but this is perhaps necessary, since reproductive systems are so dissimilar in different groups of organisms that it might be confusing to consider them together. There is a chapter on the sexual reproductive systems of fungi and algae which illustrates the diversity of hereditary mechanisms present in these groups, and which should be very useful as a basis for selecting the material best suited to particular studies.

Although the text was completed in February 1949, it is surprisingly up to date and complete. Pertinent literature to the end of 1949 has been reviewed, apparently by additions to the proof. Important studies are discussed in some detail, and the methods used and inferences drawn are critically reviewed. There is a good bibliography that cites recent reviews, when available, rather than earlier, individual publications. Literature references in the text are by superscripts indicating items in a single bibliography. This simplifies the reading for those not particularly interested in the authors concerned.

This reviewer considers that the book has been well planned and successfully written. There are remarkably few errors either by the printer or by the author. The treatment of the material may not be as elementary as the preface implies.

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Embryology of the Viviparous Insects. Harold R. Hagan. New York: Ronald Press, 1951. 472 pp. $6.50.

When a person engaged in teaching and research for many years undertakes to summarize his work and put it between the covers of a book, an important and worth-while contribution usually results, and fellow-workers in the field derive great benefit. Such a book is *Embryology of the Viviparous Insects.*

As the author says in his preface, this book

> . . . has been designed to fulfill three functions: as a text for the student entomologist, as a source book for the professional entomologist or general zoologist, and as a reference tool for public health and applied research workers who desire a knowledge of the embryogenies of viviparous hexapods.

The book is divided into two parts, entitled "General Considerations" and "Embryogenies." In the first part, terms are defined and concepts explained—preliminaries that are so necessary in a highly specialized work. Then the anatomy of the female reproductive organs is described, followed by an explanation of general embryological sequence, organology in the older embryo, and a general classification of types of viviparity. Hagan gives here his classifications based on his own research and discusses at length his reasons for such classification.

Part Two consists of embryogenies of individual insects, ranging from more simple ovoviviparous types up to the highly specialized pseudoplacental forms, such as various aphids and the Polyctenidae. This section ends with Chapter 15, an appraisal of viviparity. In some respects this is the most interesting chapter of all—although generalizations such as these are of course highly speculative, and at times a tinge of Lamarckianism creeps in. There is probably more of the author revealed here, however, than in any other part of the book.

One must examine this book in light of the functions that the author says it must fulfill. As a text the book is invaluable. It sheds light on a difficult field of study. It makes clear some of the most puzzling problems of development and, through his classification, so ably explained, brings order to these problems. As a reference work for the professional entomologist or the general zoologist, it will fill a long-felt vacancy. And the research worker in public health will be greatly aided by the well-drawn-up embryogenies. One regrets only that more illustrations were not included. The development of *Chrysomela varians,* although described in detail, is illustrated by only four diagrammatic cross sections. The development of *Glossina* in the section on adenotrophic Diptera would benefit with more complete illustration. For those unfamiliar with the intricate development of insect embryos more illustrations to accompany the descriptive material would aid greatly in understanding. Despite this criticism, the volume ably fulfills the three functions stated in the preface and will be a valuable addition to any entomologist's library.

The bibliography is excellent and complete. The book is well worth close study by those interested in fundamental entomology, and one must congratulate Professor Hagan for his achievement in summing up the work of a lifetime in the difficult field he has chosen for his research interest.

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The Origin, Variation, Immunity and Breeding of Cultivated Plants. N. I. Vavilov; trans. from the Russian by K. Starr Chester. Waltham, Mass.: Chronica Botanica; New York: Stechert-Hafner, 1951. 364 pp. $7.50.

N. I. Vavilov, who championed classical genetics in the dramatic and tragic controversy with T. D. Lysenko, exponent of a biology molded to current Russian ideology, lost not only his courageous battle for freedom of inquiry but also his life. But his works, like those of earlier martyrs of science, may well endure long after his adversaries and their strange dogmas are forgotten.

This volume presents English translations of Vavilov's contributions to a symposium on "The Scientific Basis for Plant Breeding," of which he was the editor and principal contributor. It includes, in addition to an introductory essay and an extensive bibliography, four articles of which the first, "Phytogeographic Basis of Plant Breeding," is perhaps the most important. Here we have Vavilov's final conclusions on centers of origin of cultivated plants after a lifetime of exploration and study. Here is the first comprehensive and authoritative work on the origin of cultivated plants since de Candolle.

As a result of his extensive studies on cultivated plants and their relatives in all parts of the world, Vavilov recognized eight principal centers of origin: China, India, Indo-Malaya, Central Asia, the Near East, Abyssinia, the Mediterranean region, Middle and South America. Each of these regions possessed natural floras containing species amenable to domestication and each has made important contributions to the world's useful plants. Contemporary students of cultivated plants may differ with Vavilov on details (this reviewer differs with some of his conclusions on maize), but they can scarcely fail to recognize the monumental contribution he has made by clarifying the picture of the origin of cultivated plants and the geographic distribution of their wild relatives.

The other three articles in this volume, although useful, are by no means as significant or of such general interest as the first. One article is devoted to parallel variations in related species and is an elaboration of Vavilov's earlier work on this subject. Another, on immunity to diseases in plants, is of primary interest to pathologists and plant breeders. The final paper, entitled "Scientific Bases of Wheat Breeding," is a comprehensive monograph on this important cereal and contains much invaluable information for botanists and plant breeders alike. The new species of wheat that Vavilov and his colleagues have discovered are already being used for breeding purposes in America and other countries. His conclusions on the origin of the several cultivated species will be of great interest to archaeologists and anthropologists.

Dr. Chester's translation of the articles is excellent. Dr. Verdoorn, Chronica Botanica editor, has rendered an important public service in making these somewhat inaccessible works available to English-speaking scientists who, still enjoying freedom of inquiry, can use them in the improvement of cultivated plants and in the advancement of knowledge in several fields.

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Mineral Nutrition of Plants. Emil Truog, Ed. Madison: Univ. Wisconsin Press, 1951. 469 pp. $6.00.

This volume is the result of the symposium on the mineral nutrition of plants held at the University of Wisconsin in 1950. In its 18 chapters existing information, both theoretical and practical, on the mineral nutrition of plants is presented by leaders in their particular fields. Nowhere on the cover or title pages, however, is there any indication that the book is a symposium rather than a monograph or textbook. This will be a disappointment to those who, from the title, will expect to find a well-rounded treatise of mineral nutrition. In addition, the great variation in the technical and readability levels of the different papers is an undesirable feature—although one that is characteristic of symposia. On the other hand, for those who wish to obtain the latest views on several of the many phases of mineral nutrition, this volume will be useful. It might better have been titled "Advances in the Mineral Nutrition of Plants."

After an introductory chapter on the fertility of the great soil groups and world fertility problems, the remaining 17 chapters are divided into five sections, with an attempt to provide a logical sequence starting with the soil and ending with environmental influences on the growth and nutrition of plants. Several gaps were left, especially on the correlation of soil types and geographic regions with mineral deficiencies, and the effect of mineral deficiency on plant morphology and nutritive value.

In the first group of chapters, which deals with soils, an excellent review is given on the manner whereby the soil functions in the gradual allotment of its nutrient elements. This is followed by several chapters in which existing views on ionic movement of nutrients are discussed, together with the complexities involved. The section closes with chapters on the effect of the physical properties of the soil and the role of microorganisms as each affects nutrient availability. The second group of papers deals with the mechanism of ion absorption by the plant and the translocation of nutrients within the plant. The latter phase is illustrated by several excellent autoradiographs.

Two specific field problems are considered in the third section. One takes up the control of nitrogen effects on apple trees and the other, nutritional field problems in the production of vegetables for the canning industry. In the fourth section are three pertinent papers on the role of minerals in plant nutrition. The first considers the criteria by which the essential nature of inorganic nutrients are determined; another discusses mineral nutrition in relation to the ontogeny of plants; in the third, the correlation between protein-carbohydrate metabolism and mineral deficiency in plants is outlined. The material in this section succeeds unusually well in presenting difficult subject matter clearly and concisely. In the last section are three papers dealing with modifying influences of various environmental factors, including light and moisture, upon mineral nutrition.

The up-to-date information provided by the contributors to this book, all of whom are actively engaged in research, will be of special interest and value to many teachers and investigators, as well as to others concerned with the practical applications.

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The Principles of General Biology. Mary S. Gardiner. New York: Macmillan, 1952. 657 pp. $5.75.

This book impresses the writer as being one of the better general biology texts to appear in the postwar era. Dr. Gardiner has made a wide and general survey of the field of biology, stressing basic concepts, rather than presenting a collection of facts. Unlike so many of the more recent books, which lay great emphasis on man, this book deals with the more general and fundamental concepts of biology. To this reviewer, this seems to be one of the book's most desirable features. The author definitely states that the book is not designed as a day-by-day text, but is intended as a supplement to classroom and laboratory work.

The book is divided into four sections. The first part, "The Organization of the Natural World," is particularly well done. It deals with the cell, protoplasm, and the physicochemical aspects of biology. It is clearly written and can be followed by students with limited training in the fields of physics and chemistry.

A rather unique feature of the section "The Organization of Biological Systems" is the comparative treatment given the organization of living things. For example, plants (Thallophyta) and animals (Protozoa) at the lower levels of organization have been discussed together. The same comparative treatment is given the Metaphyta and Metazoa. This type of comparative treatment seems to have definite advantages in emphasizing the unity of living organisms. This is followed by a rather detailed serial consideration of the Annelida, Arthropoda, and Chordata. The section on the Chordata is quite extensive, both as to form and function.

Although a good portion of Section 2 is devoted to the physiology of plant and animal forms, the third section, "The Operation of Biological Systems," deals in a more general way with such fundamental processes as nutrition, metabolism, growth, reproduction, and inheritance. Here, again, plant and animal forms are discussed comparatively, and the unity of living organisms is further emphasized. "The Evolution of Biological Systems" is well written, with emphasis on the historical development of the doctrine of organic evolution.

This reviewer has been impressed with the emphasis Dr. Gardiner has placed on the historical development of biological concepts and theories. This is best illustrated in the sections dealing with vitamins, hormones, and the doctrine of organic evolution. This type of treatment makes for a deeper appreciation, as well as for a clearer understanding of these topics.

The author writes with a smooth, easy style. The book is very readable and tells a story, rather than being a serialized collection of biological facts. As Dr. Gardiner has kept abreast of the field, the book is written in the light of the most modern discoveries in biology. The illustrations, many of them photographs, are numerous, clear, and good. Simplicity and ease of interpretation characterize most of the illustrations.

All things considered, the book is an excellent one and well suited to a course in biology where the instructor wishes to stress principles, rather than subjecting his students to an encyclopedia of facts.

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The Medical Sciences

Global Epidemiology: A Geography of Disease and Sanitation: Africa and the Adjacent Islands, Vol. II. James Stevens Simmons *et al.* Philadelphia-London: Lippincott, 1951. 652 pp. $15.00.

The advent of World War II emphasized problems of international health and the transmission of disease. Surveys made by the Medical Department of the U. S. Army formed the basis for Volume I of this series, which provided data on India, the Far East, and the Pacific area. The volume has been well received and has provided the only adequate reference on the geographical distribution of diseases of that portion of the world. Volume II, as indicated in the preface, is designed to provide a concise summary, by political units, of current health conditions on the African continent. The success in achieving its objectives is appropriately attributed to the initiative of the Medical Intelligence Division of the Preventive Medicine Service of the Army, grants from the U. S. Public Health Service to the School of Public Health of the University of Minnesota, and to the cooperation of numerous health officials and research and educational institutions of many countries. A great deal of recent data was acquired by Ruth Alida Thomas on a survey trip in the winter of 1950 to Africa and various colonial headquarters in Europe.

The material is organized according to geography and climate, population and socioeconomic conditions (including vital statistics, social economy, food and nutrition, and housing), environment and sanitation (including flora and fauna), health services, and medical facilities, followed by a separate discussion of the more important diseases. Numerous small maps outline the distribution of various diseases or vectors. Section One includes the countries of the Nile Valley, the Ethiopian highlands, East Africa, the islands of the Indian Ocean, South Africa, Equatorial Africa, West Africa, and, in Section Eight, Northern Africa —a total of 45 countries being considered. A bibliography is appended to each section. A useful appendix includes maps of the principal tropical diseases and reprints "Health Hints for the Tropics," prepared by a committee of the American Society of Tropical Medicine. A complete index is provided.

Africa, as one of the great undeveloped regions of the world, is destined for an increasingly important future role. Colonial domination in the past has tended to minimize world interests in this continent, but international trade, travel, and the possibility of