Finally, one is tempted to philosophize concerning the effect of leadership and organization on scientific productivity. Freedom to carry on activities, uninhibited by administrative formalities and restrictions, with provision of excellent assistance and facilities like those at Berlin and Heidelberg, and a supreme interest in the work being done were significant factors in developing the environment in which creative ability could so flourish.

CHARLES N. FREY

Standard Brands Incorporated

Vitamin Methods, Vol. 1. Paul György, Ed. New York: Academic Press, 1950. 571 pp. $10.00.

The first volume of the treatise on vitamin methods deals with the physical, chemical, and microbiological methods of vitamin assay. The presentation of material has been built around the methods employed for assay, rather than around the assays for a specific vitamin. This permits a discussion of principles involved for each type of assay, which is followed by a discussion of variations in technique for the individual vitamins. Most techniques are given in sufficient detail to be used without consulting additional reference sources. Animal assay methods are to be given in a second volume.

The book is divided into five sections dealing with physical, chemical, microchemical, and microbiological methods of assay, and the use of optical instruments in vitamin assays. In the section on physical methods, assays are described for vitamin A and provitamins A by the ultraviolet absorption spectra technique. The difficulties encountered in the application of this method to the assay of vitamins D, E, K, and B_6 are discussed. Fluorometric assay methods for vitamin A, thiamine, riboflavin, and ß-pyracin are given. Chemical methods are described for vitamin A and carotene, vitamins D, E, and K, thiamine, niacin and niacinamide, pyridoxine, choline, inositol, *p*-aminobenzoic acid, ascorbic acid, and pteroylglutamic acid and related folic acid compounds. Microchemical methods are given for vitamin A and carotene, ascorbic acid, riboflavin, phosphatase, iron, and protein.

The microbiological assay section discusses methods utilizing lactic acid bacteria, yeasts, *Neurospora* mutants, and miscellaneous microorganisms. A particularly useful section gives, in two tables with reference keys, a cross index of vitamin assays, the test organisms, and a key to the details of assay procedure. Another table summarizes the preferred method of assay for each vitamin. Assay methods for *p*-aminobenzoic acid, biotin, choline, folic acid, inositol, nicotinic acid, pantothenic acid, riboflavin, thiamine, and vitamin B_6 are described.

The section on the use of optical instruments should be of value to those selecting apparatus for vitamin assays.

MARY S. SHORB

University of Maryland

Antibiotics. George W. Irving, Jr. and Horace T. Herrick, Eds. Brooklyn, N. Y.: Chemical Publishing, 1949. 273 pp. $6.75.

In the period September 1946–January 1947 the U. S. Department of Agriculture Graduate School sponsored a series of lectures entitled "Progress in the Field of Antibiotics." These lectures (with the exception of three dealing with restricted material on penicillin) have been collected as chapters in *Antibiotics.*

Four chapters are devoted to penicillin. These cover the early history, the wartime developments in England and in this country, the government certification program, the development of high-yielding strains of *Penicillin,* and the advances in commercial production of penicillin. It is regrettable that the lectures dealing with the chemistry and synthesis of penicillin and the production of new penicillins biosynthetically could not be included to round out this section. The clinical uses of penicillin and streptomycin are covered in one chapter, and in another the chemistry of streptomycin is presented in the form of charts and equations. Other chapters deal with gramicidin and tyrothricin, the chemical aspects of antibiotics other than those already mentioned, and the use of antibiotics in veterinary medicine. Four chapters deal with the production of antibiotics by microorganisms, basidiomycetes, actinomycetes, and higher plants.

Each chapter is written by a man who has made major contributions in the antibiotic field. The subjects are necessarily covered in a general way, and results rather than methods are emphasized. Thus, little or no mention is made of the techniques of screening microorganisms for antibiotic-producers, of isolation methods such as adsorption, and partition chromatography, of means of characterizing new antibiotics such as paper chromatography and the Craig countercurrent distribution technique. The various chapters do present in an interesting way the general picture of the development and status of antibiotic research up to January 1947. Selected bibliographical references afford a convenient entry to the literature for those who want more detail.

This book should provide an interesting introduction for those who are not familiar with the antibiotic field and a convenient reference source for those who are.

H. E. CARTER

University of Illinois

Genetics, Paleontology, and Evolution. Glenn L. Jepsen, Ernst Mayr, and George Gaylord Simpson, Eds. Princeton, N. J.: Princeton Univ. Press, 1949. 474 pp. $6.00.

This is a collection of papers presented at the Princeton Bicentennial Conference on Genetics, Paleontology, and Evolution. The conference was arranged by the Committee on Common Problems of Genetics, Paleontology, and Systematics, of the National Research Council, and was held on January 2–4, 1947, under the directorship of Prof. Glenn L. Jepsen.

The Committee on Common Problems was formed in 1942 for the purpose of bringing together paleontologists, systematists, and geneticists in the study of problems of evolution. Another outgrowth of the work of this committee was the founding of the Society for the Study of Evolution, in 1946, and the establishment of the journal *Evolution*, which is published by the society.

The Princeton symposium was a conference of about sixty workers in diverse fields of evolutionary study, chiefly paleontologists, systematists, and geneticists. Several European scholars attended, as guests of Princeton University, and contributed to the program and to the present volume. The scope of the conference is indicated by the following list of topics for discussion, the principal speaker being indicated in each case:

Time in Earth History (Adolf Knopf), Gene and Character (Curt Stern), Gene and Mutation (A. H. Sturtevant), Time Series, Trends, in Animals (A. S. Romer), Time Series, Trends, in Plants (R. W. Chaney), Rates of Evolution in Animals (G. G. Simpson), Rates of Evolution in Plants (G. L. Stebbins, Jr.), Speciation and Systematics (Ernst Mayr), and Adaptation and Selection (Sewall Wright). There was, in addition, a public address on Man's Evolution: Past and Future, by J. B. S. Haldane (*The Atlantic*, 1947, 179: 45.). A summation of the conference, by H. J. Muller, concluded the program. A brochure summarizing the discussion was published by the university in 1948 (Princeton University Bicentennial Conference, Series 2, Conf. 3, pp. 1–36, 1948).

The present volume includes the full text of 23 papers presented by members of the conference. All of the papers mentioned above are included, except that of Sturtevant, and there are in addition papers by E. H. Colbert, D. D. Davis, E. B. Ford, William Hovanitz, Theodor Just, David Lack, H. L. Mason, J. A. Moore, Bryan Patterson, W. P. Spencer, D. M. S. Watson, T. S. Westoll, and H. E. Wood II.

This book does not represent the "synthesis of biology and geology through their common denominator, evolution," which, in Prof. Jepsen's phrase, was the original objective of the committee. It is true that "paleontology studies the results of evolution, while genetics studies its mechanism," but it does not follow that the intermingling of paleontologists and geneticists will result automatically in the elucidation of genetic mechanisms over the broad field of known evolution. Genetics, which in its earlier years was called "experimental evolution," has so far developed valid methods for the study of only a small sector of biological variation. It tells us virtually nothing of the manner of origin of new gene loci. Its results on the nature of genic elements outside the choromosomes are still equivocal. In the allelic mutation of chromosomal genes, on which almost all experimental study of gene mutation has been focused, it cannot yet speak clearly as to the extent and characteristics of subliminal mutation. It has made a major contribution to evolutionary theory in the concept of gene frequencies in equilibrium with evolutionary pressures, a subject covered in this volume in an elegant paper by Sewall Wright. But as to the sources and mechanisms of the variations found in evolution on the grand scale, the development of experimental genetics to date has placed little restriction upon free speculation. The investigation of time series, trends, and rates of evolution, which makes up the bulk of this volume, necessarily remains today, as in Darwin's time, a wholly descriptive science.

This book includes a valuable collection of papers, representing, in many cases with excellent examples, the wide diversity of current work on evolutionary problems.

L. J. STADLER

Yale University

The Vertebrate Body. Alfred Sherwood Romer. Philadelphia-London: W. B. Saunders, 1949. 643 pp. $5.50.

This most recent book of Prof. Romer's bids fair to become one of the leading textbooks in college courses in comparative anatomy. The author, trained in the Columbia school of Gregory and McGregor, and now Agassiz Professor of Zoology in Harvard University, has written an admirable account of vertebrate history and structure.

The book is truly comparative. It avoids overemphasis on human structures, one of the most common faults of textbooks on comparative vertebrate anatomy. The early chapters are devoted to the vertebrate pedigree, to a roll call of the vertebrates, and to an adequate treatment of the animal cell and its physiology. Chapter 5 gives a fairly comprehensive account of early vertebrate development, and a series of chordate forms ranging from *Amphioxus* to Mammalia is treated in a comparative manner.

Eleven chapters are devoted to a consideration, seriatim, of the various organs and organ systems of the vertebrate body. Among the several systems, the skeleton is treated in the most detailed fashion; a section of 112 pages being devoted to this topic. This undoubtedly stems from the author's interest and experience in this particular field, as well as from the fact that this system, drawing from the field of paleontology, offers a splendid opportunity for a really adequate evolutionary story. The muscular system, treated rather briefly by most textbooks, is covered in a rather comprehensive manner. The other organ systems are also well covered, the material being presented in a clear and interesting fashion.

One of the unique features of the book is that, in addition to presenting the comparative anatomy of the various organ systems, it gives considerable attention to the development, histological structure, and physiology of the various structures. A knowledge of the embryonic origin of an organ is fundamental to an understanding of its adult structure, and including histological material makes for a clearer and more interesting study. The relationship of form to function, ignored by many writers in this field, is adequately treated by Prof. Romer. To illustrate this point, the chapter on the muscular system is introduced by an account of the histological structure of the various types of muscle, followed by a consideration of muscle fiber function.

The appendix includes, besides a rather full bibliography and synoptic classification of the vertebrates, a section on scientific terminology. A list of some 600