large common denominator of enzymology and immunology has long been perceived. The basic theoretical considerations have been formulated, but hitherto they have not been extensively explored in the light of modern developments in these fields, and with a view to elucidation of concrete mechanisms.

The subject is considered in five sections: (1) "Antigens as Biocatalysts"; (2) "Antibody as a Specific Enzyme Inhibitor"; (3) "Anti-Enzyme Immunity"; (4) "Immunity against Bacterial Enzymes," and (5) "The Problem of Antibody Formation against Respiratory Enzymes."

The first section deals with the characteristics of catalysis in general and reviews the data showing that an antigen functions as a catalyst: (a) one molecule of an antigen induces the formation of many molecules of antibody; (b) the antigen (catalyst) forms no part of the resulting antibody (reaction product); (c) the reaction catalyzed is thermodynamically possible regardless of the presence of the catalyst. The nature of antibodies and current theories of the mechanism of their formation are summarized. Of especial interest is a discussion of the directive effects of optically active catalysts upon certain simple chemical reactions.

In the second section, the hypothesis is advanced that since antigens are catalysts and "since practically all proteins are antigenic, the conclusion appears to be inescapable that all proteins are endowed with catalytic activity." (The possibility that certain non-protein substances are antigenic is considered briefly and set aside on the grounds that it is not proved that such substances do not combine with proteins *in vivo*, to form the complete antigen.) This hypothesis leads to the following analogy:

Antigen + globulin factors → Antibody globulin
Enzyme + substrate → Reaction products

Hence antigen and enzyme, globulin factors and substrate, and antibodies and reaction products, respectively, are regarded as counterparts, and the "neutralization" of an antigen by its antibody is comparable to the specific inhibition of an enzyme by the reaction products. It is noted that this viewpoint differs from the usual one, wherein the relationship of antibody to antigen has been likened to that of enzyme to substrate.

The remainder of the second section, and of the book, is largely devoted to a summation of experimental data bearing on the above analogy, principally under the headings of the formation of specific inhibitors in enzyme reactions and of antibodies against enzymes. The anomalous failure of the prosthetic groups of respiratory enzymes to function as haptens is considered. Particularly commendable is the author's broad conception of bacterial toxins and the recognition of bacterial enzymes as toxins, points concerning which too restricted a view has been too often taken.

In the formulation of his ideas, Dr. Sevag has consulted more than a thousand publications, of which 482 constitute the bibliography of his book. Immunologists and enzymologists will be indebted to him for the critical collation of so much literature, much of it not readily accessible previously.

The author has successfully avoided the pitfall of unnecessary duplication of basic material adequately treated elsewhere. As a consequence, this is no book for the neophyte. The reader will profit most if he has a solid foundation in immunology and enzymology. Furthermore, he who desires a didactic presentation will be disappointed, for Dr. Sevag does not pretend to provide the ultimate solution of the problems he discusses—quite the contrary, he attempts only to point the way. Each reader will find many opportunities to take issue with the author, who, one feels, was fully aware of the alternatives when he chose particular conclusions. The present reviewer surmises that the usefulness of Dr. Sevag's book will derive as much from the disagreement and consequent experimentation that it will catalyze, as from its factual content.

HENRY W. SCHERP
SCHOOL OF MEDICINE AND DENTISTRY,
UNIVERSITY OF ROCHESTER

MOSQUITOES OF NEW JERSEY

The Mosquitoes of New Jersey and Their Control. By THOMAS J. HEADLEE. 9 × 6 inches. x + 326 p. 16 pl. 87 figs. New Brunswick: Rutgers University Press. 1945. $4.00.

IN early times the travelers who wrote books frequently paid their respects in uncomplimentary terms to the mosquitoes of New Jersey and elsewhere. But in spite of the mosquito problem that persisted for years to the great annoyance of large numbers of our population, the entomologists of this country did not pay much attention to it until around 1900. According to the "Bibliography of American Economic Entomology," the 2,418 separate titles by B. D. Walsh and C. V. Riley from 1860 to 1888 include only two that deal with mosquitoes. During the same period the 3,006 titles by state and other entomologists include only 4 on mosquitoes. From 1888 to 1896, the 3,956 references include 19 on mosquitoes, 10 of which are either by L. O. Howard or by Riley and Howard. From 1896 to 1900, out of 1,882 titles, 55 are on mosquitoes. During this long period economic entomologists were concerned mainly with insects injurious to crops.

Such a condition no longer exists and we now have

an extensive literature on mosquitoes to which Dr. Headlee's book is among the latest contributions. Dr. Headlee is well qualified to write with authority on this subject because of his long association with all aspects of the mosquito problem in New Jersey, including those of leadership and initiative in organizing control work. His book is designed to furnish exactly the type of information that is needed by entomologists, mosquito control workers, sanitary engineers, public health officials and others, for a basic, intelligent understanding of mosquito problems and their solution.

There is a very short chapter on the value of mosquito control, followed by a larger one on the structure and classification of mosquitoes, including keys for the separation of adults and larvae. One set of keys involving the use of microscopic characters is designed for the laboratory, and another, involving characters that can be seen by the use of the eye and a hand lens, is intended for field use. This is a distinction that should appeal to field workers. Chapter 3 is devoted to the mosquito fauna of New Jersey and the numerical abundance of New Jersey species over a ten-year period, 1932 to 1941. Chapter 4, which occupies approximately 60 per cent. of the book, is concerned with mosquito biology. In this chapter will be found complete descriptions of the adults and larvae, together with information on the habits of the adult and early stages, life histories and distribution, including the author's numerous observations, for 37 species. The importance of this chapter is augmented by numerous illustrations including those of external anatomical details.

Chapter 5 deals with the influence of environment on mosquitoes, such as temperature, water, food supply, natural enemies, the attraction of mosquitoes to man and mosquito flight. The remaining 6 chapters describe the history of mosquito control in New Jersey; the principles and detailed methods of control for various types of breeding places; the use of larvicides and equipment, and specific directions for successful work; mosquito repellants; mosquito control laws of New Jersey; and the economic effect of mosquito reduction.

Dr. Headlee has incorporated in this book the results of his observations and research and the sound, practical facts that have been distilled and tested by him over many years. Its wealth of information on all phases of the problem should appeal greatly to all who are engaged in mosquito control work. There is only one section of the book in which, I think, the subject is slightly overemphasized. This is the last chapter of six pages on the economic effects of mosquito reduction, wherein large gains in taxable values are attributed solely to mosquito reduction. I have no doubt about mosquito control playing an important part in bringing about these tax valuation increases, especially along the Atlantic coast of New Jersey where the resorts are located, but I do not believe that the enormous increase in that portion of New Jersey lying within the New York metropolitan area was due entirely to mosquito reduction. I think that economic conditions had a hand in the increase also. According to Monograph One of the "Plan of New York and Its Environs," there was from 1900 to 1922 an increase of 321 per cent. in the number of light chemical industries in the New Jersey part of the metropolitan area and an increase of 253 per cent. in the number of heavy chemical industries. According to Monograph Two, during the same period there were increases in the number of various types of metal industries in metropolitan New Jersey, ranging from 130 to 355 per cent. These movements to Metropolitan New Jersey took place both before and after 1915, the date after which mosquitoes were scarce in that area. The reasons given for moving to New Jersey include more space, better rail and water transportation facilities, more and cheaper labor, isolated locations for chemical industries, cheaper land, etc.

The title of Dr. Headlee's book indicates that it applies mainly to New Jersey, but this is misleading, as many of the conditions under which mosquitoes breed in New Jersey are duplicated in various other adjoining states. As a matter of fact, of the 37 species of mosquitoes found in New Jersey, five occur as well in northeastern America, four are found in the southeastern states and 28 species are found all along the Atlantic Coast, some in many inland states. From this it is apparent that the usefulness of this book extends far beyond the boundaries of New Jersey. The impact of war has demonstrated again the need for knowledge of the biology, taxonomy and control of the Culicidæ as well as of other arthropods, and I am sure that Dr. Headlee's informative work will meet with the favorable reception that it deserves.

HARRY B. WEISS

BOOKS RECEIVED

EINSTEIN, ALBERT. *The Meaning of Relativity.* Pp. 135. Second edition, revised. Princeton University Press. $2.00. 1945.

KING, RONOLD W. P. *Electromagnetic Engineering; Vol. I, Fundamentals.* Illustrated. Pp. xiv + 580. McGraw-Hill Book Company. $6.00. 1945.

PANTH, BHOLA D. *Consider the Calendar.* Illustrated. Pp. 138. Teachers College, Columbia University. 1944.

TAYLOR, NORMAN. *Cinchona in Java.* Illustrated. Pp. 87. Greenberg, Publisher. $2.50. 1945.

WARTENBERG, ROBERT. *The Examination of Reflexes.* Illustrated. Pp. xii + 222. The Year Book Publishers, Inc., Chicago. 1945.

WILLIAMS, ROGER J. *What to Do About Vitamins.* Illustrated. Pp. vi + 56. University of Oklahoma Press. 1945. $1.00.