

insemination of cattle was little used in commercial dairy farming, whereas at present half the cows in England and Wales are bred by this method. The third edition of Yapp and Nevens's book issued in 1941 was therefore due for revision, and in the fourth edition the authors have greatly improved the book by completely re-writing the whole to include more recent experimental findings and modern trends in dairy farm practice.

The book remains primarily a student's text-book; but is written in a simple style and can be followed by a reader with little technical knowledge of the subject. Nevertheless, the book covers a very wide field including genetics, nutrition and physiology, and for teaching at university-level an expansion of those sections dealing with the technical background of the subject would seem to be desirable. It must be admitted that this would make the book more voluminous and less attractive to the practical man.

To the farmer and student in Britain, Yapp and Nevens's book will be very useful so long as the reader is familiar with the differences in milk production between the United States and Britain. Apart from Brown Swiss cattle in America, the breeds of dairy cattle are the same in the two countries. In other respects, however, there are differences. The social and economic background of milk production in the United States is the family farm. In that country the summers are warmer and the production of good-quality bulky foods is, on average, easier. Maize and lucerne can be produced in many areas with little risk of a light crop or of a poor-quality product. Since land is plentiful compared with Britain, milk production is often carried on with little purchased feeding-stuffs.

There are certain aspects of the subject that are important in Britain, but which apparently barely merit mention by Yapp and Nevens. One of these is the use of the electric fence for strip-folding grass and fodder crops. Another is the tactical use of nitrogenous fertilizers for flushing swards. However, these are exceptions; and if the differences in environment and differences in terminology and values are borne in mind, this new book on dairy cattle would still merit a place among the most useful half-dozen books on dairy husbandry for the British reader.

It is unfortunate that any book on dairy husbandry begins to be out of date as soon as it is published. Thus, the chapter on artificial breeding was written before the development of techniques using deep-frozen semen. The implications of these changes may be profound, but they must await the next edition; and it is hoped that the fifth edition may follow the fourth before the back-log of new developments becomes too great.

ARTHUR S. FOOT

## NORTH AMERICAN MOSQUITOES

Mosquitoes of North America (North of Mexico)  
By Stanley J. Carpenter and Walter J. La Crosse.  
Pp. vii + 360 + 127 plates. (Berkeley and Los Angeles :  
University of California Press ; London : Cambridge  
University Press, 1955.) 75s. net.

SINCE the publication of the comprehensive works of Howard, Dyar and Knab (1912-17), Dyar (1928) and Matheson (1944), our knowledge of North American mosquitoes has greatly increased, and recent literature on the subject has become vast and scattered; nevertheless, a great deal remains to

be done. But before taking further steps, it is wise to pause and survey what has already been accomplished, and from such a survey to compile a summary which will enable us to see more clearly what still remains unknown. In this book the authors have presented such a summary. They have attempted to bring together in one volume much of the published knowledge on the mosquitoes of this region, and they have endeavoured at the same time to present the information in as concise and up-to-date a form as possible. They have also kept in mind the needs of the "systematic entomologist, the technician and the field worker engaged in mosquito control".

The first point is well covered, for all statements are fully documented, and throughout the text numerous references occur to the bibliography, which contains nearly eight hundred titles. Regarding other aims, it is well realized that scientific investigation of any organism demands, before anything else is started, that the identification of the organism be established beyond doubt. The authors have therefore first given a general account of the life-history of the mosquito and some instructions on collecting and preparing material for study. They then pass to descriptions of the external anatomy of all stages and the internal anatomy of the female. In classification they have closely followed the system of Edwards and have divided the family Culicidae into three sub-families—Dixinae, Chaoborinae and Culicinae. A rather full account is then given of the North American genera and species of the sub-family Culicinae, which includes all the true mosquitoes.

The descriptions of some hundred and forty species occupy three hundred pages or so, the names being arranged alphabetically under genera or sub-genera. Each description is illustrated with figures of distinguishing morphological features of the adult and larva of that species and is accompanied by brief notes on biology, geographical distribution (first in the world and then by States and provinces of North America) and on medical importance wherever this applies. In addition, keys have been constructed to assist in the identification of females, male terminalia and fourth-stage larvae, and 127 females are figured on as many full-page plates. All this is rounded off with a systematic index of six pages.

The work is thus an entomological tool to be used rather than a book to be read, and the real value of a tool is only assessed in use. The systematic entomologist or the mosquito specialist may at first regret that the taxonomic niceties of variations among species and the relationships in species 'complexes' are not more fully treated. The technician may think that his side has received insufficient attention, and the field-worker engaged in mosquito control will not find a section devoted to his special activities. But, to include discussions on these matters would have made an already large book even larger, and might even have necessitated a two-volume work. The interested reader will find the titles of relevant publications in the bibliography.

It is clear that it was not the authors' intention to develop these aspects of their subject, but to concentrate first on the essential identifications, and then to provide a starting-point from which workers could proceed further. It is certain that not only those mentioned but also many other people will have frequent need to consult this book, and because of the convenient lay-out they will find it easy to use as a work of reference for some years to come.