Puerto Rico, the planted Bermuda grass was being eaten by changas, *Scapteriscus vicinus* Scudder, although just outside the post, the native gramma grass, *Stenotaphrum secundatum,* flourished with undiminished vigor.

It should not be thought, however, that gramma grass, or any other native grass for that matter, will survive insect attacks under all conditions. Indeed, when supposedly ideal conditions are being artificially supplied for the grass, these may be even more favorable for some particular insect pest. Thus, a circle of yellow gramma grass surrounding the head of an underground sprinkler system was found to mark the limits of an exceptional abundance of a leafhopper, *Kolla fasciata* Walker, present in only normal numbers elsewhere on a lawn near Aguadilla, Puerto Rico.[7] Naturally, also, native vegetation has specific native pests, and large areas of gramma grass may have all the blades eaten down to the sprawling stalks by the little green Pyralid caterpillars of *Psara phaeopteralis* Guenée. These are only a few of the more obvious examples of the effect produced by specific members of the wild animal life of grasslands, but are ample to illustrate the necessity for including them in all ecological studies of pastures and meadows if these are to be considered at all complete.

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[7] *Jour. Econ. Ent.*, 33 (3): 584, February, 1940.

PROPER CREDIT FOR DISCOVERY OF "A RELATIONSHIP BETWEEN DENTAL CARIES AND SALIVA"

IN the March 31, 1944, issue of SCIENCE, Turner and Crane[1] report that they have discovered "a clear relationship . . . between the rate of starch hydrolysis by saliva and the incidence of caries in the individual." The note gives the impression that the finding is new, as indicated by the part quoted here and the absence of any reference to other work on this subject. Therefore, attention should be called to the fact that in 1941 Florestano, Faber and James,[2] using a much larger number of subjects, discovered and reported essentially the same results and conclusions. Consequently, credit for the finding should go to the latter group of workers.

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[1] N. C. Turner and E. M. Crane, SCIENCE, 99: 262, 1944.
[2] H. J. Florestano, J. E. Faber and L. H. James, *Jour. Am. Dental Assoc.*, 28: 1799–1803, 1941.

SCIENTIFIC BOOKS

PLANT VIRUSES

Plant Viruses and Virus Diseases. By F. C. BAWDEN. Second edition. xi + 294 pp. Waltham, Mass., Chronica Botanica Company. 1943. $4.75.

THE book represents an attempt to describe and correlate advances that have been made in the study of plant viruses during the last decade. It deals largely with less than a dozen viruses whose chemical and physical properties have been studied somewhat intensively. Such emphasis on the chemical and physical phases of virus work is perhaps justified, since it is in this field that plant virus research has made remarkable advances in recent years, but I suspect that most plant pathologists would prefer a book discussing virus diseases more broadly. On the whole the book is unusually well written and well illustrated. Biochemical and biophysical phases of plant virus research, especially, are presented accurately and entertainingly, although some descriptions of chemical methods seem unnecessarily long and detailed.

It is unfortunate that in a book of such excellence there should be some serious errors. Chapter 5, which the author states needed extensive alterations in the preparation of a second edition because of the growth of knowledge regarding the relationships between viruses and their insect vectors, may be cited in this connection. In discussing the latent period of viruses in insect vectors the author states on page 76 that the latent period "seems to start from the time the vectors leave the infected plant rather than from the start of feeding on it." The reviewer knows of no evidence anywhere in plant virus literature to support this statement. In discussing such viruses as aster yellows, whose vectors have prolonged latent periods, he states that "in published work there is no indication that vectors can ever infect healthy plants immediately after leaving infected ones." As a matter of fact such cases are reported in the literature. In discussing Black's evidence that the virus of aster yellows multiplies in the vector *Cicadula sexnotata* on page 80 he states, "it is noticeable that the number of successful inoculations is usually greater if the extracts of macerated insects are diluted 1/1000 than if diluted 1/100 or 1/10." This statement is misleading because Black's data do not indicate that dilutions at 1/1000 give more transmissions than dilutions at 1/100 or 1/10. Perhaps the most unsatisfactory section in the chapter is that dealing with work by Fukushi. The author cites the same two papers, published in 1934 and 1935, that were referred to in the first edition and makes essentially the same arguments against Fukushi's evidence that rice stunt virus multiplies in the vector. In papers published in 1939 and

1940 Fukushi has brought evidence for multiplication in the vector which the reviewer considers overwhelming. The 1939 paper at least must have reached England, for it is abstracted in the *Review of Applied Mycology*. In any case, the discussion relating to multiplication of viruses in insects is unsatisfactory. Carelessness in citing literature is not confined to references regarding the researches of others but extends to some references made to Bawden's own papers. On page 162, for example, he quotes two papers by Bawden and Pirie, published in 1936 and 1937. The 1936 paper cited is not pertinent to the subject under discussion. Another paper by Bawden and Pirie published in 1936, which should have been cited, is not mentioned. The 1937 paper is incorrectly cited.

Chapter 1 gives a brief account of the history of plant virus research. Chapters 2 and 3 describe symptoms associated with representative virus diseases on different hosts and under different conditions. Chapter 4 discusses transmission by various methods. A rather complete list of the viruses known to be spread by insects is given. A statement on page 60 that sugar-cane mosaic is transmitted by aphids and by a leafhopper is in error. Sugar-cane mosaic is not known to be transmitted by any leafhopper.

Chapter 6 on virus strains, mutations and acquired immunity is one of the best. The new conception that most viruses exist in a number of strains has done much to clarify virus disease problems; this the author brings out forcibly. He discusses two types of behavior in virus-infected plants that have been described under the term "acquired immunity." The first type covers cases in which a disease is severe in the acute stage but mild in the chronic stage. The second covers cases in which plants affected by one strain of a virus become immune from infection by other strains of the same virus.

Serological reactions of the plant viruses are dealt with in Chapter 7, where the author shows how precipitin reactions, complement fixation, neutralization of infectivity and anaphylaxis reactions may be used in identifying viruses and in showing relationships between them as well as in quantitative measurements.

Chapters 8, 9, 10, 11 and 12 cover methods of purifying viruses, properties of purified virus preparations, optical properties of purified virus preparations, inactivation of viruses and sizes of virus particles. Chapter 13, on the physiology of virus-diseased plants, enumerates most of the chemical changes known to take place in affected plants. It is the reviewer's opinion that the book would have been improved if in these chapters more emphasis had been placed on the numerous experiments performed by Stanley and his associates in proving that the so-called virus protein isolated from plants affected by tobacco mosaic had the properties of tobacco mosaic virus, since it was this work that initiated a new era in virus research. In chapter 13, also, the movement and multiplication of viruses in different tissues are discussed.

Chapter 14 is on the naming and classification of viruses, and chapter 15 on control of virus diseases. In the last chapter, chapter 16, various views as to whether or not viruses are living and theories of their origin and mode of increase are presented.

The author has undoubtedly succeeded in describing and correlating recent advances in the study of plant viruses in the second edition in a more thoroughgoing way than in the first. It seems safe to predict that this edition will be received with the same enthusiasm that was accorded the first.

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ANOPHELES GAMBIAE

Anopheles gambiae in Brazil, 1930 to 1940. By FRED L. SOPER and D. BRUCE WILSON, 262 pp., 75 figs. New York: The Rockefeller Foundation.

WHEN we fight a common enemy we expect to share with our allies the burden of the cost of the war. If the fighting takes place in foreign lands, it is to our advantage, but by no means does that lessen our obligations. Brazil, with the aid of the Rockefeller Foundation, recently fought, and won, a war for most of the countries in the New World. The enemy was not a political one, but nevertheless is capable of great destruction of life and property, for it is one of the deadliest disease carriers known—*Anopheles gambiae*.

Anopheles gambiae is native to tropical Africa. Late in 1929 or early in 1930 it was carried across the South Atlantic to Natal, Brazil, probably by one of the fast mail-carrying French destroyers which were capable of traveling between Dakar and Natal in only four days. In the following years it spread along the coast northward from Natal to Caponga, a fishing village only forty-five kilometers from Fortaleza, and from the coast it advanced inland along the river valleys until, by 1940, it had invaded the upper reaches of the Jaguaribe and its tributaries as far as Madelena, Barra de Conceição and Quixará. Its range also included the valley of the Assú River as far as São Rafael, and the Apodí valley as far as São Sebastião and Augusto Severo. The migration was accomplished by infiltration, that is, by short flights from one breeding place to another and by transportation of the adult in various kinds of vehicles.

Almost everywhere the *gambiae* invasion was followed by severe malaria epidemics. The first outbreak occurred at Natal in 1930 and subsided when control measures eradicated the mosquito from that city. In