

the subject under review, giving credit in all cases to the authorities quoted. I have to express my thanks to Dr. James Fletcher, Dominion Entomologist, and the Rev. Geo. W. Taylor, of Wellington, for assistance rendered in revising my work; also to Dr. S. F. Toimie on "Stick Pests," and Mr. E. F. Robinson on "Bee Pests." Nevertheless, I am quite aware that in a publication of this description mistakes will occur in spite of the most careful revision, and for all such I ask the indulgence of the public.

Kellogg, in his Introduction to "American Insects," says:

"Throughout this book reference is constantly made to the injuries done by insects to our forest-trees, flowers, fruits, vegetables and grains. The millions of dollars lost annually because of the sap-sucking of the San Jose scale, the grape-phylloxera, the chinch-bug, and the Hessian fly, and the biting and chewing of beetles and caterpillars, grubs and borers, are a sort of direct tax paid by farmers and fruit-growers for the privilege of farming and growing fruit. If this tax were levied by Government and collected by agents with two feet, instead of being levied by Nature and collected by six-footed agents, what a swift revolt there would be! But we have, most of us, a curious inertia that leads us to suffer with some protesting complaint but little protesting action the 'ways of Providence,' even when we fairly well recognise that Providence is chiefly ourselves.

"When we reflect on the four hundred millions of dollars a year lost to our pockets* by insect ravages, we may incline to believe that the only kind of insect study which should claim our attention is the study of how to rid our lands of these pests. We may be excused for affirming of bugs, as was said of Indians by some epigrammatist, that the only good ones are the dead ones. When, however, we learn, as we are learning in these present days, that insects are not simply serious enemies of our crops and purses, but are truly dangerous to our very health and life, we must become still more extravagant in our condemnatory expressions concerning them.

"We have long looked on mosquitoes, house-flies and fleas as annoyances and even tormentors, but that each of these pests actually acts as an intermediate host for, and is an active disseminator of, one or more wide-spread and fatal diseases is knowledge that has been got only recently. Mosquitoes help to propagate, and are, almost certainly, the exclusive disseminating agents of malaria, yellow fever, and the various forms of filariasis; house-flies aid in spreading typhoid fever and other diseases; fleas are agents in distributing the germs of bubonic plague. Other insects are known to spread other diseases. Howard says: 'While in malaria and typhoid we have two principal diseases common to the United States which may be conveyed by insects, the agency of these little creatures in the transfer of the disease-germs is by no means confined to human beings. In Egypt and in the Fiji Islands there is a destructive eye-disease of human beings, the germs of which are carried by the common house-fly. In our Southern States an eye-disease known as pink-eye is carried by certain very minute flies of the genus *Hippelates*. The so-called Texas fever of cattle is unquestionably transferred by the common cattle-tick, and this was the earliest of the clearly demonstrated cases of the transfer of disease by insects. In Africa a similar disease of cattle is trans-

*In the United States.—J.R.A.