

## Conditions of Entomological Work in India.

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The development of Economic Entomology as a branch of Scientific Agriculture is so largely due to the United States, that in countries where its importance was recognized only later there has been a pronounced tendency to adopt methods and results obtained in the States without reference to their suitability to local conditions. India is no exception to the rule. The importance of the investigation of crop pests was recognized only late in the eighties of the last century, but the duty was left in the hands of men who were engaged in Museum work and who were, therefore, not able to investigate the pests reported to them. It was inevitable, therefore, that recommendations were made based on results obtained in the States, and that several of them proved useless. It was not till 1901 when the Department of Agriculture was reorganized and an Agricultural Research Institute established in Pusa, that a full-time officer for the study of pests was appointed. Since then the work has rapidly developed. Two of the Provinces have entomologists of their own, and there is in all the Provinces a staff of subordinate officers. In Mysore, one of the native States, an entomologist was appointed as early as 1908. The Entomological staff in India is still unequal to the immense task before it, but in the next few years a more rapid increase in the staff is likely to take place.

Entomological work in India is largely determined by the local conditions, and these are different from those of most other countries. India is a land of peasant proprietors. The average size of holdings is only four acres against sixty or eighty in the United States, and the yield from an acre represents on an average only what an American farmer would willingly spend in spraying alone. Any costly remedies such as those employed in the States are, therefore, entirely out of question except in regard to crops like coffee and tea, in which the yield per acre is sufficiently high. The consequence is that

the entomologist has to devise methods which are within the very small means of the Indian farmer, and spraying, as a general proposition, cannot be considered at all. Such remedies are being devised, with the increasing recognition on the part of Indian entomologists of the profound difference in Indian conditions from those of most Western Countries. Provided the remedy satisfies the requirements indicated above, the Indian farmer can, as a rule, be easily persuaded to adopt them. Indeed, he himself has not been slow to devise certain ingenious remedies. The insecticidal property of mercury was long known to him, and it was not before it was proved by me \* that any entomologist thought of the value of the metal in that connection. So, too, in regard to the storage of pulses he has hit upon devices which stood the test of scientific investigation. The simple method of putting a layer of sand on top of stored pulses, which I have suggested as an effective means of safeguarding them from the Bruchids, was derived from a study of the local methods of storing them.

Fumigation, as a method, is inapplicable to conditions in India, where each farmer stores his own pulses for the year, and where villages are so far apart and have such crude facilities of transport that distribution of the chemical could not be done on any large scale. Nor could the farmer be entrusted with so dangerous a chemical. The different method required of storing pulses in India is an illustration of the lines the entomologist has to proceed in India. The remedies that are now being devised take into account this fundamental fact. In my own State several remedies have been devised which are of a very simple character. The treatment of *Nymphula defunctalis*, an amphibious caterpillar pest of rice, with kerosening the water in the fields, was proved simple and popular. Another serious caterpillar pest which devastates many dry crops of the state is being controlled by the handpicking of the moths, which are conspicuous objects in the bare field, and easily caught and killed by the children of the village. More examples need not be given to show how very different are the lines in which entomological work has to be carried on in

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\* It has recently come to our notice that in a "Treatise on the Culture of the Pineapple," by William Speechly, published in London in 1821, on pages 321-329, is an account of a method of using quicksilver for the destruction of scale insects on pineapple. [Ed.]

India. If in all work relating to the control of pests in India, regard be had to the attenuated and fragmentary character of the holdings of the farmer and his very small means, often hardly adequate to bare livelihood, there can be no doubt that the diffusion of knowledge of Economic Entomology will be as quick and widespread as in the States.