

**INJURIOUS AND USEFUL
INSECTS: AN INTRODUCTION
TO THE STUDY OF
ECONOMIC ENTOMOLOGY**

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Injurious and Useful Insects: An Introduction to the Study of Economic Entomology by L. C. Miall

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L. C. MIALL

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INSECTS

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BY

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*Professor of Biology in the
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1902

PREFACE

THIS little book has been written for beginners who are willing to take some pains to acquire a practical knowledge of insects, and are specially interested in the application of entomology to agriculture, horticulture, and forestry. A practical purpose is, in my opinion, not a hindrance but a powerful motive to the acquisition of scientific knowledge. If not too narrowly prosecuted, the practical purpose may be a means of distinguishing knowledge which is really useful from knowledge which is merely curious. I feel sure that it is much more likely to exercise a wholesome influence on natural history than collecting and naming, which have been far too exclusively attended to for many years past.

I have tried to meet the wants, not only of those who are concerned with insect-ravages, but also of those who seek to inquire into the works of nature. Injurious and useful insects are as full of contrivance, and as beautifully equipped for the struggle of life, as any others. Since they are among the commonest species, they can be easily and profitably studied by those who have no purpose in view except to enlarge their knowledge of living things. The title of the book has not been so strictly interpreted as to exclude a few insects which are neither injurious nor useful, but either very plentiful or particularly instructive.

In my own teaching of economic entomology and other branches of biology, the laboratory work always comes first, and the class-work is only a means of correcting and driving home the instruction of the laboratory. Common insects are provided in large quantities, so that every student is supplied. The rarer ones are exhibited in glazed cases, each of which illustrates a single life-history. The teacher should make his own selection of types, and draw up his own syllabus of work, referring to the text-book wherever a detailed account is required. It is good to draw much from nature, and to

study a few things carefully rather than many in haste. To observe live insects under natural conditions is infinitely more profitable to the economic entomologist than to make a collection. Such advice as this conflicts, I am afraid, with some almost universal propensities of human nature, and it would be too much to expect that it will be followed except by the few. After long experience, I think I can promise those few a reward for their trouble.

I am persuaded that in all branches of natural history too much is made of learned language, and I have used plain English as far as possible: I am not at all convinced that it is less precise than Latin or Greek.

The order of the lessons indicates the general course of study which is recommended. First, the student is put through a short course of work calculated to give him a useful acquaintance with insect structure, and some knowledge of technical processes. In Part II. a number of insects are brought before him for detailed examination. A selection from these types, most of which are of considerable practical importance, will serve as a convenient introduction to the study of life-histories. The order in which they are here presented roughly corresponds to the order of difficulty, the easier types coming first. Part III. pre-supposes a knowledge of the earlier parts, and is intended to prepare the way for systematic study, as well as to give short notices of a number of insects which are likely to attract the student's attention, but which time and space do not allow him to consider in detail. This part of the book is rather to be referred to on occasion than to be read continuously.

The publishers acknowledge with thanks the loan of figs. 23, 24, 66, 67, 68, 90, 91, and 92 from Miall's "Natural History of Aquatic Insects" (Macmillan & Co.); and of figs. 44-47 from Miall's "Round the Year" (Macmillan & Co.).

L. C. M.

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