

**OUTDOOR STUDIES:  
A READING BOOK  
OF NATURE STUDY**

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Outdoor Studies: A Reading Book of Nature Study by James G. Needham

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**JAMES G. NEEDHAM**

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ECLECTIC SCHOOL READINGS

# OUTDOOR STUDIES

A READING BOOK OF  
NATURE STUDY

BY

JAMES G. NEEDHAM



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1898

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OUTDOOR STUDIES.

W. P. 4

## PREFACE.

THE years that intervene between the primary and the high school, for all of which nature study is now prescribed, cover a very wide period of mental development. For the earlier years of that period there is now no lack of books, offering object lessons, guides to random observations, stories of common things interweaving facts with interesting fancies to the edifying of imaginative childhood. This little book is intended to supply for the later years of that period a few lessons of greater continuity, calling for more persistence of observation, and introducing a few of the simpler of our modern conceptions of nature at large. These lessons presuppose some years of experience of life and some previous training in observation. They are not given as stories, nor for the sake of language lessons primarily, but for the sake of the interest and educative value of the facts and phenomena of nature which they set forth.

In writing them I have had in mind the boys and girls more than the teachers. I have written of things I would have the pupils see and do and think about, and I trust no teacher will undertake to do all the seeing and doing and thinking for them. I hope the suggestions for field study will be found so simple and explicit that pupils may follow them individually and at home whenever desirable. Not the least of my objects has been to pave the way for more intelligent and profitable text-book work in the high school, and I am well assured that that work will be better done for the insight gained from studies such as these.

Wherever a plant or animal is discussed in the following pages a number is inserted in the text, referring to a corresponding number in a list of scientific names, which has been relegated to the end of the book lest the big names frighten any one. These names will at least

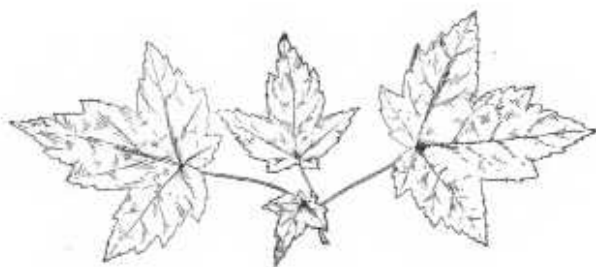
help teachers to use the indexes of whatever scientific literature may be available for reference.

To Mr. A. D. MacGillivray I am indebted for determining the names of a number of insects. Mrs. J. H. Comstock and Miss Anna A. Schryver have helped me with valuable suggestions as to the subject matter. I have, as ever, to acknowledge the assistance of my wife, Anna Taylor Needham, in the preparation of the drawings. A number of insects are figured for the first time and all the cuts are new.

This little book, simple and elementary as it is, represents an amount of labor that is only justified by my faith in the future of nature studies and in the educating and refining influence they are yet to exert both in school and out.

JAMES G. NEEDHAM.

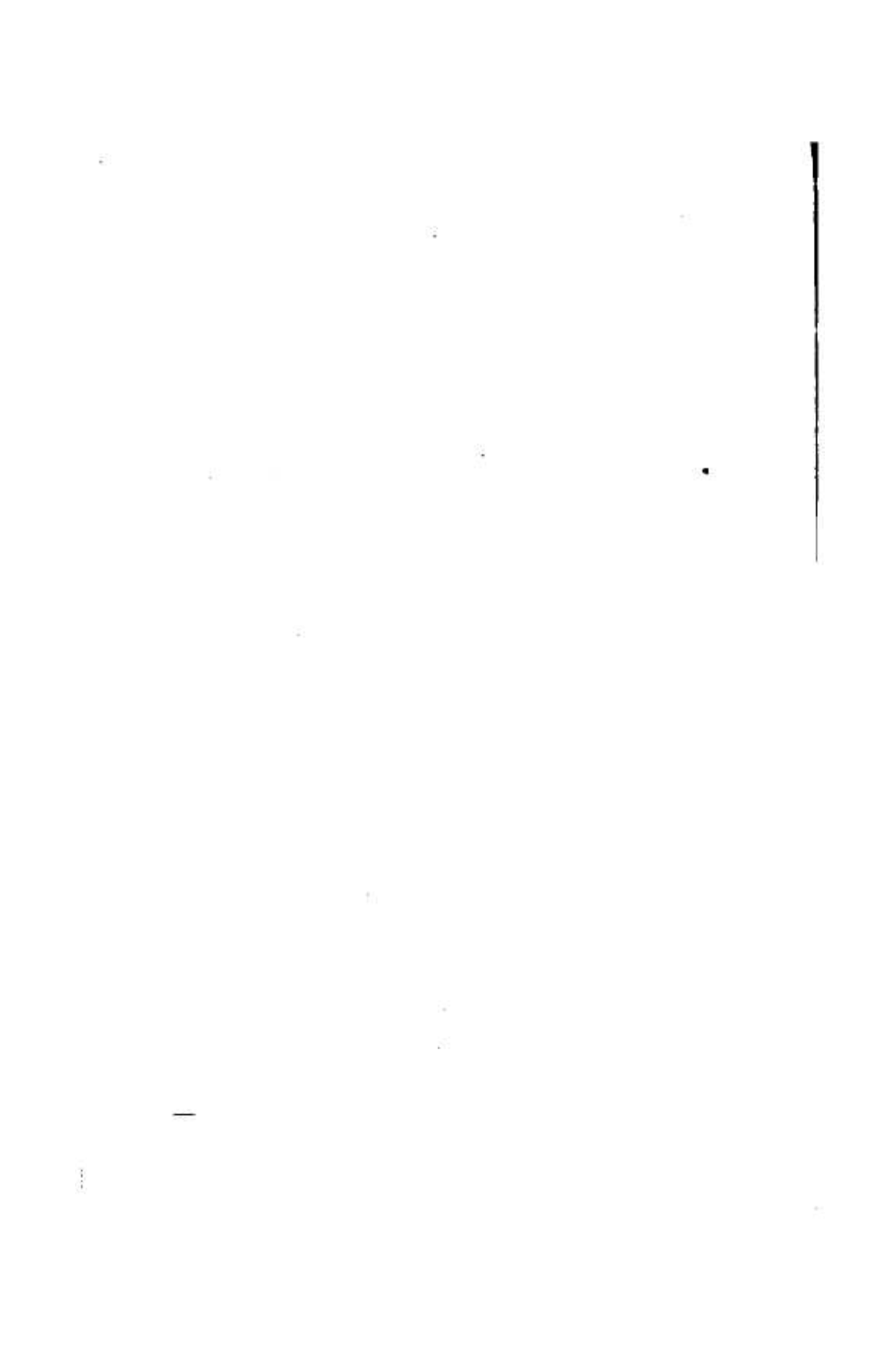
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## BUTTER AND EGGS AND BUMBLEBEES.

### I. ASSOCIATION.



NOT far from my door—probably not very far from yours—grows the familiar roadside weed commonly known as butter and eggs.<sup>1</sup> Little clumps of it appear here and there in dry, exposed places along the street, and in a piece of waste ground farther away a patch of it in full bloom looks like a great yellow blotch on the hillside.

Last spring, when it expanded its delicate leaves,—hardly wider than those of the grass, and of a paler green,—one who did not know would not have thought this slender thing a hardy native of dry and sterile soil, and would not have expected such abundance of blossoms as have been produced all summer long. Flowers first appeared in May, and are abundant still, though frosts are near at hand.

What curious things these flowers (Fig. 1) are, perched close together alongside the top of the stem, each with its pouting yellow mouth turned outward, and its long hollow spur pointing down the stem! Why is its mouth so tightly shut? Why that swollen *palate*, as it is called, atop of the