

# ECLECTIC EDUCATION SERIES

## Nature Study

By using this book you agree to be bound by the "Terms of Use" found at:

<http://www.dollarhomeschool.com/Terms.html>

Which prohibit, among other things, the duplication for resale or redistribution of this book as well as posting it on any public forum such as the Internet.

[www.dollarhomeschool.com](http://www.dollarhomeschool.com)



COPYRIGHT, 1905, BY  
FRANK OVERTON.

ENTERED AT STATIONERS' HALL, LONDON.

---

OVERTON'S NATURE STUDY.

W. P. 9

# NATURE STUDY

A PUPIL'S TEXT-BOOK

BY

FRANK OVERTON, A.M., M.D.

ASSISTED BY

MARY E. HILL

INSTRUCTOR IN SCIENCE AND NATURE STUDY IN THE GOODYEAR-  
BURLINGAME SCHOOL, SYRACUSE, N.Y.



NEW YORK .: CINCINNATI .: CHICAGO  
AMERICAN BOOK COMPANY

## INTRODUCTION

TIME was in the history of our schools when a pupil was given a certain subject concerning which he knew nothing and cared less, and was expected to evolve from it a composition that should contain both good ideas and good English. No one seemed to realize that this was a double task that, like Janus, faced in opposite directions. Either way by itself was sufficiently difficult; but for a pupil to follow both simultaneously was quite impossible. Even to-day an inexperienced teacher too often regards English as the material for the manufacture of ideas rather than as a medium for expressing them. Thus it often happens that, in our elementary schools, the language lessons are a weary work and a strain on both teacher and pupil.

The seemingly natural plan of letting the child express his own thoughts in language either spoken or written marks a new era in the teaching of English. When we go a step farther and confine the language work to those subjects which must interest the child, we shall have ideal conditions.

The correlation of nature study with language lessons is almost inevitable. The child sees certain living creatures and is interested in their life and habits and almost involuntarily he tells what he sees; if the teacher is in sympathy with him, he likes quite as well to write about his observations as to tell about them. And since he is trying to express only what he knows and has experienced, his English is simple and straightforward; and, even when it is faulty, it may be corrected better by good example than by that ogre of school work in English, the blue pencil.

Dr. Overton's experiments in interesting the children of his native town in nature have proved to be of wide interest. No phase of his work has been more important pedagogically than his success in getting his pupils to make notes in the field. Each one of these notebooks which I have examined is a mine of wealth to the teacher of English, if she knows how to work it. In them are recorded observations about bird and beast, flower and insect, showing where the child's interest in the outdoor world was aroused. Such records, taken as starting points for further personal observations and for reading, will be a source of most interesting information about familiar objects, and must surely result in language lessons which will delight both pupil and teacher. The whole plan of Dr. Overton's book seems to me simple and excellent, and it can not fail to be of great use to the grade teacher.

ANNA BOTSFORD COMSTOCK.

BUREAU OF NATURE STUDY,  
CORNELL UNIVERSITY.

## HOW TO USE THIS BOOK

**Design of This Book.** — These lessons are designed to furnish a year's work in nature study for pupils from eight to eleven years of age. They are upon subjects that are connected with everyday life, and the material for their study can easily be secured even in the larger cities. The subjects are arranged in the order of the seasons, beginning with early fall; but suggestions are given for continuing the study of many of the specimens throughout the whole period of their life histories. The lessons throw light on unfamiliar sides of familiar things, and afford a basis for future scientific studies, especially along biological lines. They are correlated with drawing and language in such a way that sketching and composition writing may lead to closer observation of the specimens, and that nature study may afford interesting and inspiring subjects for expression with pencil and pen. Most of the cuts are reproductions of photographs by the author.

**Method of Use.** — Throughout this book laboratory methods are outlined. Each lesson is divided into two parts, first, observing, sketching, and describing a specimen that is examined in the schoolroom; and, second, supplementary work which is intended to explain the meaning of what is observed, and to continue the observations by making use of additional specimens which the pupils find at home, or on walks and pleasure trips.

The first part of each lesson is printed in large type, and is designed to be given during a single period; but if time is limited, the drawing and composition work may be given in the succeeding lesson. A pupil first examines a specimen,

following the questions under the heading "**Observation,**" and then draws the specimen and writes about it. A short oral recitation on the observation questions should also be conducted. If the oral work is done at the beginning of a period, the pupils will have a guide for their writing; but if the writing is done first, the pupils can exercise the more originality and independence in their observations and expression. Whether the oral or the written work should be given first will depend on the class.

The supplementary work is printed in smaller type, and is designed to be given either as oral or as written work when the pupils have made their observations. In some of the subjects parts of this work may not be given until months after the first parts of the lessons have been given.

**Method of the Composition Writing.** — In composition writing there are two distinct processes:—

1. Expressing thought clearly.
2. Adjusting expression to accepted standards.

In compositions connected with nature study lessons emphasis should be placed on clearness of expression. Details of grammar, spelling, capitalization, punctuation, and penmanship belong to the period devoted to language proper, and, in a nature study lesson, should not be brought out so prominently that the pupils fear to write. While an advanced student should be able to write correctly without conscious effort, a child can not be perfect in the mechanical details of his composition without devoting more time and effort to them than to the subject-matter itself. A practical method for securing both clearness and correctness is to have the pupils write their nature study compositions during a single unbroken period, paying special attention to directness and clearness. Then let the teacher use these compositions as a basis for work during the language period.

**Paragraphing.** — One of the best means of securing clearness of expression is to have the pupils write in paragraphs, placing the title of each paragraph at its beginning. By this method the whole essay is divided into smaller compositions which are of such a size that a pupil can readily judge of their clearness and unity.

**Personal Help.** — Each composition should have in it something that originates with the writer, and that is not developed from the general class exercises. In both composition and nature study the best and most original work will be done when each pupil works individually. In this book the work is designed to be done by the pupils without direct assistance from the teacher; but bright as well as dull scholars sometimes have difficulty in beginning to write, and therefore, during each lesson, the teacher should go among the pupils and give a few words of personal help to those who are in immediate need of it.

Each pupil should also regularly receive criticisms of his work, and definite suggestions for its improvement. It will be well to make only one criticism and to suggest only one improvement at a time, so as to avoid confusing and discouraging the pupil.

**Notebooks.** — Early in the course of the lessons a dispute is likely to arise concerning the exact appearance of a specimen that some pupil has seen. Then the finder should be encouraged to look again, and while he is looking to write his observation as evidence of the reliability of his statements. If this exercise is done in a natural and informal way, other pupils will be eager to record their home observations, and to report them to the class. When interest has been aroused, have all the pupils keep notebooks in which to make a daily record of observations upon any object, whether it is mentioned in the book or not. Suggestions from the notebooks may often be developed into lessons for the whole class.

**The Specimens.** — In most of the lessons there should be enough specimens so that each pupil may have one, and some

be left over to replace those that are spoiled during the work. In a few of the lessons one or two specimens placed where the pupils can examine them will be sufficient. Have each pupil bring his own specimen if possible; otherwise have a few volunteers bring enough for the whole room.

If it is planned to preserve specimens, those that can not be dried may be kept in the following mixture:—

Formalin, one ounce.

Water, one quart.

This is a safe, reliable, and inexpensive mixture, and preserves both vegetable and animal tissues in nearly their natural colors. Insects may be painlessly killed by putting them in a tightly closed fruit jar containing a few drops of chloroform.

**Kindness to Animals.**—When live insects or animals are kept in the schoolroom the teacher should exercise the greatest care for their comfort, and should set them free as soon as possible, as an example of kindness to animals. While some may die because they have reached maturity, there can be no excuse for allowing any to die from neglect.

**Devices.**—Before giving a lesson the teacher should do the drawing and composition work in order to know what work to expect from the pupils, and what difficulties they will be likely to encounter.

It is often possible to appeal to an indifferent pupil by asking him to get a specimen that is difficult to obtain. The boy at the foot of the class often leads it in knowledge of the woods and fields and brooks.

A fruitful source of specimens is the walk to and from school. Go home with the pupils and show them the wealth of material at their doors. Occasionally take the pupils out for an informal walk or ride to search for specimens, and to observe things growing in their natural homes.

Have growing specimens of plants and animals in the school-

room, and make it a reward of merit for a pupil to be allowed to watch them during school hours.

Sometime during the year have a public exhibition of specimens and class work so as to gain the coöperation of the children's parents and older brothers and sisters. At the end of the year leave suggestions for study and observation which the pupils can follow up during the summer vacation.

Write to the Bureau of Nature Study, Cornell University, Ithaca, N.Y., for information about forming a nature study club among the pupils.

**Knowledge required in Nature Study.**—The object of nature study is not so much to get present knowledge as to develop the power and love of observation by which knowledge may be gained in after life. The teacher should never substitute lecturing for observation and investigation. Any one can observe specimens without possessing previous knowledge of what is seen. The greatest success is attained by those teachers who, whether or not they have had previous knowledge of the subject, are learners with their pupils. In the study of the great "Book of Nature," the best that a teacher or pupil can do is to read a few of its pages, and to get from them the inspiration to continue the reading.



## CONTENTS

	PAGE
I. HOUSE FLY . . . . .	13
II. MOSQUITO . . . . .	17
III. BUTTERFLIES AND MOTHS . . . . .	23
IV. MUSHROOMS . . . . .	31
V. DANDELION . . . . .	35
VI. SPIDER WEBS . . . . .	40
VII. GOLDEN-ROD . . . . .	44
VIII. GOLDEN-ROD GALL . . . . .	48
IX. BURDOCK . . . . .	50
X. NEST OF A PAPER WASP . . . . .	53
XI. NEST OF A MUD WASP . . . . .	56
XII. BIRD'S NEST . . . . .	60
XIII. TREE TRUNK . . . . .	64
XIV. COCOONS . . . . .	69
XV. ICE . . . . .	73
XVI. SNOWFLAKE . . . . .	78
XVII. FROST . . . . .	83
XVIII. PINE TREE . . . . .	85
XIX. PINE LEAVES . . . . .	88
XX. PINE CONE . . . . .	91
XXI. APPLE BRANCH . . . . .	94
XXII. APPLE FRUIT SPUR . . . . .	98

	PAGE
XXIII. EARTHWORM . . . . .	102
XXIV. ONION . . . . .	105
XXV. MAPLE SEED . . . . .	108
XXVI. SPROUTING BEAN . . . . .	112
XXVII. MAPLE BUD . . . . .	115
XXVIII. TADPOLE . . . . .	119
XXIX. WATER STRIDER . . . . .	123
XXX. DUCKWEED . . . . .	126
XXXI. APPLE BLOSSOM . . . . .	129
XXXII. OAK APPLE . . . . .	133
XXXIII. CLOTHES MOTH . . . . .	136
INDEX . . . . .	139

# NATURE STUDY

## I. HOUSE FLY

**Material.** — House flies in large-mouthed bottles.

**Observation.** — What is the shape of a fly's head? What is the shape of its neck? What is the color of its eyes? How much of the head do the eyes seem to cover?

Notice the two divisions of a fly's body. The front part is called the *thorax*, and the hind part the *abdomen*. What is the color of the thorax? What is the color of the abdomen? To which division are the wings fastened? To which are the legs fastened?

How many wings has a fly? What is their color? How are they marked?

How many legs has a fly?

**Drawing.** — Draw the picture of a house fly as you see it when you look down upon its back. Make your picture two or three times as large as the real fly, so that you may have room to draw each part clearly. First, draw it with very light lines, so that you can easily correct your work. When you have drawn it right, go over the lines and make them heavier.

**Composition.** — Write a description of what you have observed about a house fly. In writing this description follow this outline of topics, making each topic a separate paragraph. Write all you wish to say about each topic in its own paragraph.

The House Fly : —

Head	Wings
Body	Legs

### SUPPLEMENTARY WORK

**A Fly's Eating.** — Watch a house fly as it eats. What is the shape of the lower end of the tube that it touches to its



HOUSE FLY (Magnified)

food? Where is the tube carried when the fly is not eating? The mouth parts of a house fly are not made for biting or to be thrust into the skin, but for sucking up bits from the outside parts of soft food.

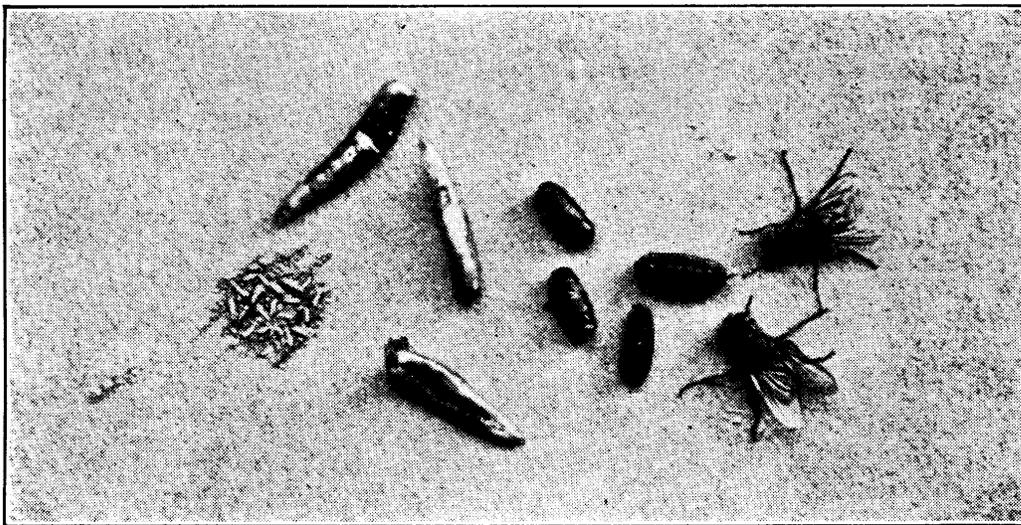
**A Fly's Cleanliness.** — Watch a house fly and notice how it often passes its fore legs over its head as a cat washes

her face. Notice also that it rubs its wings with its hind legs, and that it rubs its legs together as if it were washing them.

Dust a fly with a little flour and see it clean itself. If you

can get a magnifying glass, look at a fly's body and legs, and notice that they are hairy, and that the lower joint of each leg, which the fly uses to clean the rest of its body, is like a stiff brush.

**The Harm done by House Flies.** — House flies may often try to keep themselves tidy, but they can not be perfectly clean, for they seek their food on rubbish heaps as well as in our kitchens and dining rooms. By bringing germs of disease into our houses they may be the cause of sickness. Typhoid fever



LIFE HISTORY OF HOUSE FLIES

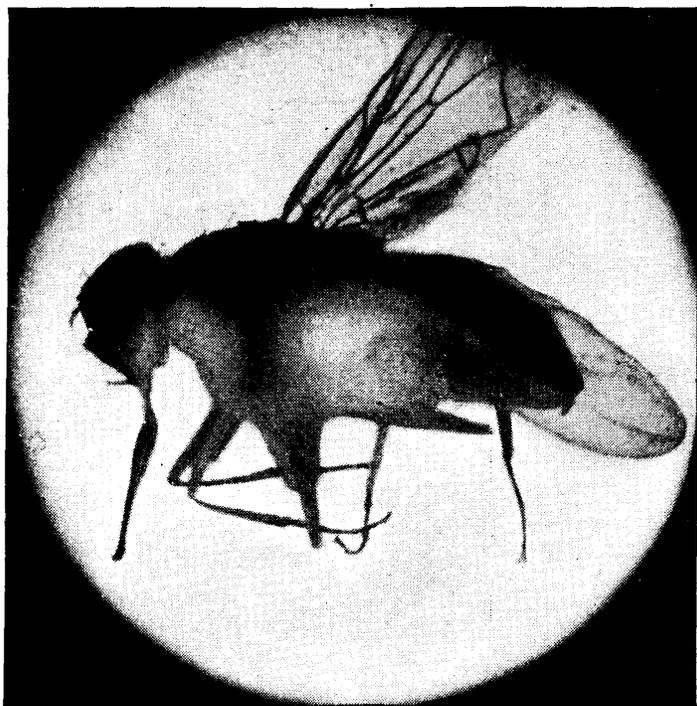
and diphtheria may be caused by flies. As they can carry some diseases, flies should be kept out of a room where any one is sick.

**The Life of a Fly.** — Are all house flies of the same size? Do little house flies grow to become big ones? House flies lay eggs which hatch white or gray worms, called *maggots*. In this state a young fly is called a *larva*. It lives as a larva about a week, and then becomes a brown, hard-shelled object which looks much like a large kernel of wheat. In this state the young fly is called a *pupa*, and can neither eat nor move. After about a week spent as a pupa the insect bursts open one end of its shell, and goes off as a full-grown winged fly.

Like house flies, most other insects pass through the four forms of egg, larva, pupa, and winged insect.

In winter nearly all flies die, but a few crawl away behind chimneys and other sheltered places and there live until warm weather comes again. On sunny windows in the attic and barn you may often see house flies on the first warm days of spring. They, and others that have lived through the winter, will be the parents of the summer swarms of flies.

**Other Kinds of Flies.** — Around stables and on horses and cows you may often see blood-sucking flies that look like house



STABLE FLY (Magnified)

flies. Notice that the stable fly has a sharp bill which it carries pointing forward from the underside of its head. When eating, the fly thrusts the bill into an animal's skin like a needle and sucks blood through it. In stormy weather the stable flies come into houses, and then people often mistake them for house flies.

On decaying meat you may often see black or blue flies somewhat larger than house flies. These flies are called *blue-bottle* flies or *blowflies*. The *flyblows* which you may have seen on old meat are clusters of their yellowish eggs which hatch out larvae as house flies' eggs do.

There are many other kinds of flies. What kinds that come into our houses do you know? What kinds can you find about horses and cattle?

## II. MOSQUITO

**Material.** — Some wigglers in wide-mouthed bottles half full of water, placed on tables where the pupils can examine them at their leisure. Look for wigglers in uncovered cans or pails or barrels of water that have stood outdoors for some days where mosquitoes are flying. In such places any small creatures that swim quickly away from the surface when the water is disturbed are almost certainly wigglers. Keep the wigglers several days for the lessons on pupas and adult mosquitoes. Cover the bottles with mosquito netting to keep the insects from flying away when they become full-grown mosquitoes.

### 1. THE WIGGLER

**Observation.** — What is the size of a wiggler? What is its shape? What is its color? In what part of the water does it usually rest? Does it rest with its head, or with its tail, downward? Does a resting wiggler touch any part of its body to the surface of the water?

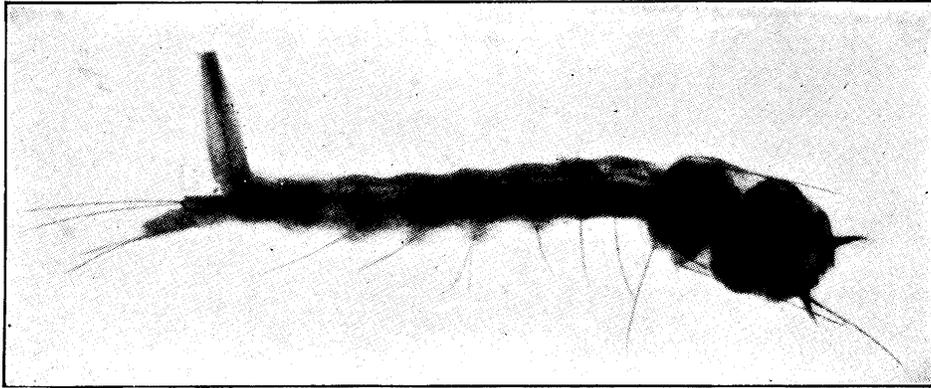
Jar a bottle of wigglers. What do the wigglers do? How does a wiggler move its body when it swims? How long does it remain away from the top of the water? When it stops swimming does it rise, or does it sink? Do you think it is heavier, or lighter, than water?

**Drawing.** — Draw a picture of a jar of water containing wigglers. Draw a line across the jar to show the surface of the water, and then draw some wigglers in the water as you see them at rest.

**Composition.** — Write a letter to some friend telling what you have observed about wigglers. In your letter write what you would say if you were talking to your friend.

### SUPPLEMENTARY WORK

**Mosquitoes' Eggs.** — You may often see black specks floating on the water where you find wigglers. The specks may be flakes of soot from a chimney. Pick up one of them and crush it between your fingers. If it is made up of long grains,



WIGGLER (Magnified)

it is probably a raft of eggs which a mosquito has laid on top of the water. Each egg hatches out a tiny larva called a *wiggler*. In the life of a mosquito the egg is the first stage, and the wiggler the second.

**How a Wiggler breathes.** — A wiggler breathes air through a tube that extends sidewise from its body near the hinder end. It often comes to the top of the water to breathe, and it rests with its breathing tube open to the air.

**What Wigglers eat.** — Look carefully at a wiggler at rest, and observe its mouth parts. Notice how it keeps them moving. It is taking in particles of food too small to be seen with our naked eyes. The natural home of wigglers is in stagnant water, in such places as cisterns, rain barrels, hollow

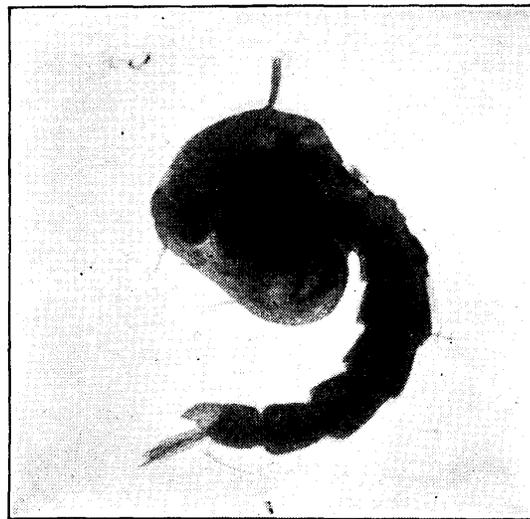
stumps, and pools. In these places the water is often yellow with impurities. The wigglers live on the bits of matter that are in the water.

## 2. THE PUPA

Among the wigglers you may see a few that are different in shape, and that swim with their bodies in a different position from the others. These are in the third stage of the life of a mosquito, and are called *pupas*.

**Observation.** — What is the shape of a mosquito pupa? What is its color? When it is still, does it rest with its head or its tail downward? While it is at rest what part of its body touches the surface of the water? Where are its breathing tubes? What parts of a full-grown mosquito do you see in the pupa? Do you find some empty wigglers' skins in the water with the pupas? In what part of the water are the skins?

**Drawing and Composition.** — Draw a picture of the pupa of a mosquito three or four times as large as a pupa is. Write a short paragraph describing the pupa, and another paragraph telling what the pupa did while you looked at it.



PUPA OF MOSQUITO (Magnified)