Entomology in Country Schools

W.H. Phipps, '95
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W. H. Phillips

Western civilization claims to surpass the old in free institutions, and in all that permit the fullest and truest development of all human possibilities with the most fruitful results.

Out of our educational institutions grew the highest and the grandest achievement of the present age. The federal that supports "Liberty's Statue" is our public school. Free and universal education is the only stay to free government. Intelligent American youth insures the noblest citizenship and the lofty, stability, and perpetuity of our nation. If evils and dangers threaten, if discontent and anarchy culminate in dissection and revolution, our schools are a balm. Now important, then, that our boys and girls should find in the common schools that which will help them to become good citizens and to most grandly live. That our public schools at the present time are not doing for American
youth what they should do is evident to all who will think.

A few months each year in a country school is the measure of our national intelligence, for only a small percent of American citizens ever goes beyond the district school.

The almost universal discontent among country youth causing them to abandon farm life for the city is not uncaused. But why do country boys and girls, the children of nature, surrounded with the myriad treasures of earth and sky, so soon want to leave the joys of rural life for the city? Oftentimes they think to the farmer about them: During school life, were they taught to "Go out and hit the nature teaching," which makes of the universe, during a whole life, a grandly taught school?

A glance at the course of study pursued or at moments conversation with the pupils reveals the fact that not one thought is given to many of the most practical and most interesting subjects of country life while much school time is spent in the study
of branches that are in no way related to agricultural pursuits, or that can add one 
individual pleasure to farm life. How much valuable time of the short school term was 
worth upon insurance, customs, stocks, and 
shares; in the analysis of sentences and 
conjugation of verbs; in reading about the 
and manners of armies; in learning 
the names and locations of African rivers 
and Asian cities! Do these things help 
him in more completely live, or bring con 
scendence and beauty into his life in 
the fields and orchards and gardens? The 
time given to these things, or at least a 
part of it, should have been devoted to 
a careful study of some facet of the 
world in which the child must daily 
move. When in school, every farmer boy 
and girl should be intelligently introduced 
to weather and its phenomena; for, with this, 
their lives are to sure to intimately associ 
ated. Rural life would offer something more inviting than a continual war 
fare against the unconquerable host of 
enemies upon every side. Then the ve 
grétable world, not only notions well
inclosing with inconceivable rain to choke
the growing crops, and among the insects
would be found something besides injurious
"bugs," preying upon grain, fruit and
steak; for the good and grateful in nature
everywhere would now be seen. Guiding his
proper place in harmony with all things
else, drinking in the sweetness of flowers,
insect, bird, and root, all of which are
then subservient to his will, the farmer
would be content, and he would forget
the drudgery of manual work in the
pleasures of his intellectual life.

Schoolmen are fast learning that we live
in an age of material progress, and that
the teaching must model, especially in coun-
try districts, in that which will best fit
farmers' children for the application of
their best efforts to the comforts of agri-
cultural life. This preparation must be
began in school, by the study of subjects
relating to their future daily work.

A knowledge of natural science, and es-
specially of the insect world, is wholly req-
ient to country scholars, and yet, in
 rural districts, it is of vast importance.
It is not with the thought of diminishing anger from the excellence or value of other lines in natural science that entomology is now spoken of at more length; but of them all, none is so important and so practical as the insect world.

One of the intellectual activities characteristic of modern times is the investigation of nature, and no division of the subject of biology surpasses entomology as an introduction to all the rest.

But this is not all; for education in its truest sense is not a simple thing, it is complex. Three distinct processes are involved in all good teaching: Education, or the harmonious development of all the faculties—physical, intellectual, and moral; "awakening beauty to body and to soul;" "developing in man all the impressions which his nature admits;" the preparation for complete living; instruction, or the imparting of knowledge that will be of use to the child in life; and training, or the formation of habits of thought and work.
No education is complete which fails to provide each and all of these, and any subject, from the study of which most is derived in these three lines, should receive at least some attention in the school life of country pupils.

Entomology is a great educator, of finding the best opportunity for mental, mental, and physical growth. Of the first, only, shall we speak here. It constantly trains the senses, which are absolutely essential to the growth of the mind. The eye is trained, especially, while the other senses grow with its development. Although this sense seems to be very highly developed in the child when first entering school, it does not follow that its training is not essential. The perceptions gained through this faculty are more rich and important than those acquired through any other. It has been called, truthfully, the "scientific sense," and through it we know of color, size, and form of objects.
The child must learn to see the truth to see things as they are. A careful study of insects—their size, form, and color; the accuracy of sight developed in the analysis of simple forms; the detection of family characteristics; the discovery of varieties; and the looking for specimens give a quietness and an accuracy of vision which is still more fully developed by the drawing and coloring of many insects.

With the collecting, handling, and mounting or analyzing, the sense of touch—second only to that of sight—is importance in the acquisition of knowledge is developed, and the child learns to know that listening ears are as useful as open eyes, in the discovery of some concealed prize.

The training of all the receptive faculties, or of the senses, through this study develops the observation, which is often wholly neglected in the education of country children. Of the child it is taught only to see and hear and touch, he is not better trained to live; he
must learn to observe, to listen, and to feel. Much of our knowledge comes through observation, and the boy who leaves the school-room with this faculty well trained will never find the field a lonely place. The development of no faculty or power is more essential to farmers than that of observation. It must be his constant guide in sowing and in reaping. Herbert Spencer declares that upon the power of observation all success depends. It was this faculty that led Newton to see more in the falling apple than was seen by others. Mondays watched, comets fall long before, but no law was seen. It was observation that helped Galileo see more in the swinging chandelier than the cat sees in a wind blown string. This faculty is more necessary to the agriculturist than to any other class.

Other than the purifying faculties are trained.

Without attention little advancement can be made in any line.
Newton observed the falling of the apple. It required years of attention to discover the "Laws of Gravitation." He was "always thinking on the subject," Cuffe said that "Genius is a long famine." The child who has learned to concentrate his mind upon the subject before him is sure to succeed. I know if no subject is early adapted to the training of this faculty, as that of entomology, the natural interest possessed by all country children for living things, especially such insects as moths and butterflies, leaves the teacher free from all anxiety as to how interest may be created.

Curiosity, another source of attention, is easily awakened in the minds of the oldest pupils as the teacher helps them to discover some of the wonderful things and strange things of insect life, while each child may hold one of the living creatures in his hand. Then, but the child is always finding something new, for certainly is found in life everything from
The little egg is the fully developed form.
With what interest every pupil will watch the metamorphosis of the little fly!
The desire for change, another characteristic of child-mind, is satisfied in
the countless variety found here.

Language and literature are considered
to be ideal studies for cultivating the
memory; but entomology rightly taught is
equally good. Mental concentration and,
therefore, strengthening of the memory, is not
unknown among scientists. A careful
cultivation of the power of delicate discrimi-
nation is another result of entomology
study; and this would be impossible
without the mind concentrated upon
the subject.

A further opportunity for exercising
the imagination can be found in no
other field. The artist, poet, and
musician turn to nature for the in-
spiration that they need. Ability to
see clearly, the development of perception - resulting from a study of entomol-
ogy, so essential to precision of knowl-
edge, is equally important in the imagin- 
ination, for a vivid imagination must
begin and result from vivid perceptions.
The recalling of insect characteristics and
forms, the representing of these forms by
means of drawings and cutting from paper
The reproduction of stories concerning in-
sert life - such stories are certainly less
objectionable than many of the unreason-
able fairy tales told to children - all form
a place in entomology study and afford
abundant food for the imagina-
tion. At the same time the teacher will
find ample opportunity for supervision,
restraint, and direction.
Thought, feeling, conception, judg-
ment and reason are developed in
harmony with the presentation and rep-
resentative. The form of comparison and
drawing of inferences - analysis, abstrac-
tion, synthesis, and generalization - are
strengthened in the most perfect man-
ner in the analysis and classification
of insects. Closely related to this are the
powers of judgment and of reason, both
of which are trained in the forming of
hypotheses and testing for error, in the application of various means to verify, in the suspension of judgment when there is doubt, in finding true analogy concerning even the simplest facts. From a study of this branch of natural science a vast number of facts are accumulated which are to be carefully classified, thus exercising the mind in its last. This method is necessary in Entomology, and the lesson learned here is transferable in every other study.

But toys and quilts possess something more than intellectual nature; they are endowed with sensibility, the culture of which is also of great importance. Emotions are of no more value to the man and woman who are to spend their days upon the farm in constant association with the world of nature than may be seen in a grand picture gallery and where strains of soul-stirring music may always be heard. Than lie that emotional nature with which they are endowed and which makes it possible for each one to feast upon the rich fare.
his everywhere.

A study of the truthful, even in an insect, must elevate the mind above the selfish and the general passions while to contemplate the harmony and see the perfect adaptation of facts with so many wise provisions must lead the thoughts away from the material to the greatest Cause - to the Infinite. The mind is thus led "through nature up to Thee, God." A perfect unity of plan is seen; facts are found to be specialized to particular purposes; the evolution of organs is traced; and the striving of the upon another for support fas the Child to recognize and appreciate the law of the survival of the fittest.

Nature's expansiveness resonates everywhere teach. Simplicity when the Child contemplates his own insignificant resources, and discovering the laws of nature he learns to admire their author. The sublime thoughts inspired lead the mind to adore the Cause of all things and the Being that regulates the laws of reproduction, preservation, and de-
struction in the natural world as in the world of nature everywhere. Here also the child sees the dependence of all upon each, and the law that binds all things into one, that nothing is independent, and that even man, subsisting upon lower forms, must lean for support upon some higher power.

The laws of variation and inheritance, the existence of families and species, lead the mind to wonder why all this is so. God’s wisdom and thoughtful care are seen, and the benevolence is adored as the child perceives that very mind is endowed with some means of protection or defense.

But is the knowledge gained in the study of this subject of practical value to country children, and finally to them when they leave the school to take up agricultural pursuits?

Child life should be nourished, if possible, upon that which will be of most immediate value in life. The mind should be developed by a study
Of these things, a knowledge of which will make living more complete.
Entomology study satisfies both views held with respect to the purpose of
education—the one that it is an "intellectual aiming for the truth of life",
and the other that it is an end, not a means," that it is mental development
or intellectual power. This study not only strengthens every faculty, but at
the same time affords the most valuable
instruction. With this harmonious devel-
opment and prevention of one-sided
growth," a natural and wholesome
sympathy with nature is preserved;
new "wildows of the soul" are opened,
giving new faculties of observation;
men are broadened and put in sympa-
thy with all creation. The study of En-
tomology introduces the child to other
natural sciences, and the farm, with
its fields and orchards, is no longer
a lonesome place, for it supplies
an abundance for the satisfaction
of man's desires.
The economic importance of this
subject must not be overlooked, for the study of no other branch can bring so large a return in material wealth. It is estimated that every cultivated crop of grain and fruit and vegetable past a certain size of fruit is ten per cent to one hundred per cent to the insects which injure them. Every plant, bird, and animal supports an average of four species of insects; and through this some alone the farmers of the United States annually lose hundreds of millions of dollars, with no return. A study of these insects, their habits, and the remedies against their ravages should occupy a place in the course of study for every farmer child, and much of this loss could be prevented. Then it would afford a delightful source of recreation during moments of rest from tillage, for it may be studied at all times and in every place, by the farmers, his wife, and by their children. As a recreation it is both innocent and instinctive for either
The learned or the simple-minded.
Nor is there an end to its extent.
We may be content with a study of
form, color, habit, we may look in
its structure, organization, and physiology;
we may admire their economy, instinct,
card and relation; or we may be led up
to that which involves the destiny of
man, by speculating about their prob-
able cause and future.

Habits formed in pursuit of this study
influence the work in other branches;
it is also seen in a very marked degree in whether is under-
taken in later life. Good practice
but accuracy, patience is developed,
and quickness of eye and hand are en-
couraged.

It is a help in other branches, for
pupils become more wide-awake, learn
more easily, and can do more work after
studying it. Many other studies are closely
related to it and may draw upon
it for material. This is most easily
seen in language and in drawing.

A knowledge of nothing better adapted to
The development of language. The child's observation may be directed to so many points—form, size, color, odor, many of which are familiar to him.

In this, as in all other studies, much will depend upon the animation of the teacher. He should lead up to the first lesson by a familiar talk about some common insect, and thus excite the curiosity and interest of the pupil. Each child should then be provided with a common insect (always encourage pupils to collect their own specimens). About which the teacher must talk with them—never lecturing to them. Judicious questioning will draw out simple words, and, little by little, simple sentences describing color, action, etc. Reproduction stories about the insect, its life history, its habits, may be introduced to advantage, and should take the place of some of the unreasonable fairy tales, his so often imposed upon receptive minds.

Tracing and cutting forms of insects or parts of insects will be interesting and instructive. "Every word for little folk." The
may of pencil, slate, paper, and scissors should be encouraged; and very small children will soon be able to do some very expert work. Care and neatness must be required of all. This work will be enjoyed by the little fellows, for they are naturally active and curious, and would want something to do.

The insect may also be used to advantage in number work. It will be as interesting for the child to count the wings and legs of a fly or a grasshopper as to count tally-pits, grains of corn, or beans; and it certainly can be no less instructive.

At first insects may be made incidental to language, drawing, and numbers but it soon should be given a place second to none. Several things may help to determine just what course should be pursued—The kind of specimens available, the intelligence and ability of pupils, and the amount of time that may be given to the subject. Construction must be based upon the insects to be found, since it is not
desirable to use a bit book except one
for reference, and the specimen being
studied should always be in the hand
of the pupil.

The following helps should be in the
possession of each group above the low-
est grade: a knife, a needle, a louse, a
pencil, and a note book. Small tools
or boxes in which to carry insects caught
on the way as the pupils pass from
school, are also necessary, and
the teacher should have a filling tool
on his desk for the use of all. Older
pupils may be taught with poison
bottles of their own.

Lead pupils to see what insects be-
long in the animal kingdom, illustrat-
ing by familiar examples, when pos-
sible. Use terms that are understood
in classifying and in explaining; but
introduce scientific terms as soon as
possible.

The teacher must always prepare the
lesson in such a way that his ques-
tions will lead up step by step from
the simple to the complete.
Here, as in all other work, good language, correct grammatical constructions, correct spelling, and proper punctuation must be insisted upon; and the pupil must not be permitted to forget good order in his enthusiasm.

All lessons must be connected by review in such a manner that there will be unity and harmony in the subject. The amusement which may at first be occasioned by the subject will soon be lost in genuine interest.

Too much may not be made of the note book at all times, in analysis describing the drawing; and older pupils should take notes when collecting. Note the arrival and disappearance of insects; their habits of feeding and plans frequent. If the plans where eggs are deposited. Unimportant forms may be brought in, and their metamorphosis studied. Changes in habits of feeding, locomotion, etc. And each day a record be made showing the history of its growth. Each pupil will be interested in
arranging for himself a cabinet of specimens, and in helping to collect for one for the school. Cigar boxes appropriately arranged are inexpensive and neat.

The few minutes devoted to this study, although it was time taken from other studies, is sure to bring a good return in the more excellent work done in all other branches. The occasional collecting tour with the pupils at recess or noon will add to their wealth of insect knowledge, give the teacher an opportunity to point out other things in nature—geography, geology, botany, and biology. It will be delightful excise and recreation for all and establish a harmony, respect, and friendship between teacher and pupils that will add much to the influence of teacher over the lives of his pupils, and those extend his opportunity for doing good. First, it is an excellent place to teach practical lessons in manners, general conduct toward one another, and in the many little things outside of book.
The teacher's influence here, more than in the schoolrooms, will tell in the lives of his pupils during all future time. There is a grand opportunity for good. Of all that we can do in country schools is to introduce the subject in such a way that the pupil will realize and appreciate his own bright possibilities, go out full of a desire to know more of nature, and continue to study, investigate, and grow after leaving the teacher's care.