

Entomology in Country Schools

W. H. Phipps, '95.

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Entomology in County Schools

- W. S. H. Shipp -

Western civilization claims to surpass the old in fine institutions, and in all that germinates the fullest and truest development of all human possibilities into the most perfect results.

Out of our educational institutions grow the highest and the grandest achievements of the present age. The pedestal that supports "Liberty's statue" is our public schools. Free and universal education is the only stay to free government. Intelligent American youth insures the noblest citizenship and the safety, stability, and perpetuity of our nation.

If evils and dangers threaten, if discontent and anarchy culminate in dissection and revolution, our schools are to blame. How important, then, that our boys & 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

young 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 pass beyond the district school.

The almost universal discontent among country youth - causing them to abandon farm life for the city is not uncalled. But why do country boys & girls, the children of Nature, surrounded with the myriad beauties of earth & air & sky, so soon want to leave the joys of rural life for the city? Are they blind to the beauties about them? During school life, were they taught to "Go out and list to Nature's teaching," which makes of the universe, during a whole life, - a grandly taught school?

A glance at the course of study pursued or a moment's 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
 single pleasure to farm life. How much val-
 uable time of his short school-course was
 wasted upon insurance, customs, stocks, and
 bonds; in the analysis of sentences and
 conjugation of verbs; in reading about bat-
 tles and maneuvers of armies; in learning
 the names and locations of African rivers
 and Asiatic cities! Do these things help
 him to more completely live, or bring con-
 tinent 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 part of the
 world in which the child must daily
 move. When in school, every farmer boy
 and girl should be intelligibly introduced
 to nature and its phenomena; for, with this,
 their lives are to ever be intimately asso-
 ciated. Then rural life would offer some-
 thing more inviting than a continual war-
 fare against the unconquerable host of
 enemies upon every side. Then the veg-
 etable world ^{would} not be only noxious weeds

increasing with inconceivable ratio to choke the growing crops; and among the insects would be found something beside injurious "bugs" preying upon grain, fruit, and stock; for the good and beautiful in nature everywhere would now be seen. Finding his proper place in harmony with all things else, drinking in the beauties of flower, insect, bird, and rock, 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 most needed, especially in country districts, is that which will best fit farmers' children for the application of their best efforts to the pursuits of agricultural life. This preparation must begin in school, by the study of subjects relating to their future daily work.

A knowledge of natural science, and especially of the insect world, is wholly neglected in country schools; and yet, in rural districts, it is of vast importance.

It is not with the thought of detracting aught 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 & 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;" "adding beauty to body and to soul;" "developing in man all the perfection 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 perfect educator, affording the best opportunity for mental, moral, 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 is revealed much, if not all, 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 quickness 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 in 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 things.

The training of all the perceptive 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 to be taught only to see and hear and touch, he is not better prepared 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 before by others. Monkeys watched coconuts 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 one else.

Other than the perceptive faculties are trained.

Without attention little advancement can be made in any line. After

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." Duffon said that genius is "a long patience." The child who has learned to concentrate his mind upon the subject before him is sure to succeed. I know of no subject so nicely adapted to the training of this faculty, as that of entomology. The natural interest possessed by all country children for living things, especially for 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 dullest pupils as the teacher helps them to discover some of the wonderful traits and strange things of insect life, while each child may hold one of the living creatures in his hand. Then, too, the child is always finding something new, for novelty is found in life everywhere from

The little egg to the fully developed form.
With what interest every pupil will
watch the metamorphosis of the bat-
terfly!

The desire for change, another charac-
teristic 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 discrim-
ination is another result of entomology
study; and this would be impossible
without the mind concentrated upon
the subject.

A better 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 percep-
tion, resulting from a study of entomol-
ogy, so essential to precision of knowl-

edge, is equally important in the imagination, for a vivid imagination must begin and result from vivid perception. 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 insect life - such stories are certainly less objectionable than many of the unreasonable fairy tales told to children - all have a place in entomology study and afford abundant food for the imagination. At the same time the teacher will find ample opportunity for supervision, restraint, and direction.

Thought, fanciful-conception, judgment and reason - are developed in harmony with the presentation and representation. The power of comparison and drawing of inferences - analysis, abstraction, synthesis, and generalization - are strengthened in a most perfect manner 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 insects. 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 method. Precise method is necessary in entomology, and the lesson learned here is beneficial in every other study.

But boys and girls possess something more than intellectual natures - they are endowed with sensibilities, the culture of which is also of great importance. Outdoors is 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 where may be seen one grand picture gallery and where strains of soul stirring music may always be heard, than is that emotional nature with which they are endowed and which makes it possible for each one to feast upon the rich beau-

ties everywhere.

A Study of the beautiful, even in an insect, must elevate the mind above the selfish and the sensual passions, while, to contemplate the harmony and see the perfect adaptation of parts with so many wise provisions must lead the thoughts away from the material to the great Cause - to the Infinite. The mind is thus led "Through nature up to Nature's God." A perfect unity of plan is seen; parts are found to be specialized to particular purposes; the evolution of organs is traced; and the preying of one upon another for support teaches the child to recognize and appreciate the law of the Survival of the fittest.

Nature's exhaustless resources everywhere teach humility 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 insect 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 His benevolence is adored as the child perceives that every insect 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 schoolroom 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 those 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 training for the battle 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 development and prevention of "one sided growth", a natural and wholesome sympathy with nature is preserved; new "windows of the soul" are opened, giving new faculties of observation; men are broadened and put in sympathy with all creation. The study of entomology 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 pays a direct tax of from ten percent to one hundred percent to the insects which ripen them. Every plant, tree, and animal supports an average of four species of insects; and through this source 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's child, and much of this loss could be prevented. Then it would afford a delightful source of recreation during moments of rest from toil; for it may be studied at all times and in every place, by the farmer, his wife, and by their children. As a recreation it is both innocent and instructive for either

The learned & 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 into structure, organization, and physiology; we may admire their economy, instinct, and relation; or we may be led up to that which involves the destiny of man, by speculating about their probable cause and future.

Habits formed in pursuit of this study influence the work in other branches, & its result may be seen in a very marked degree in whatever is undertaken in after life. Good perception gives accuracy, patience is developed, and quickness of eye and hand are encouraged.

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. I know 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.

On 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 lecture to them. Judicious questioning will draw out simple words, and, later, simple sentences describing color, action, etc. Reproduction stories about the insect, its life history, & 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.

Drawing and cutting forms of insects or parts of insects will be interesting and instructive "busy work" for little folks. The

use of pencil, slate, paper, and scissors should be encouraged; and very small children will soon be able to do some very excellent work. Care and neatness must be required of all. This work will be enjoyed by the little fellows, for they are naturally active and creative and want 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 toothpicks, 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. Instruction must be based upon the insects to be found, since it is not

desirable to use a text 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 person above the lowest grade: a knife, a needle, a lens, a pencil, and a note book. Small bottles or boxes in which to carry insects caught on the way as the pupils pass to and from school, are also necessary; and the teacher should have a killing bottle on his desk for the use of all. Older pupils may be trusted with poison bottles of their own.

Lead pupils to see where insects belong in the animal kingdom, illustrating by familiar examples when possible. 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 questions will lead up step by step from the simple to the complex.

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 reviews in such a manner that there will be unity and harmony in the subject. The amusement which may at first be occasioned by the live insect will soon be lost in genuine interest.

Too much use can not be made of the note book at all times, in analysis, describing & drawing; and older pupils should take notes when collecting. Note the arrival and disappearance of insects, their habits of feeding and places frequented, & the places where eggs are deposited. Incomplete 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. Ligar boxes appropriately arranged are inexpensive & neat.

The few minutes devoted to this study, although it were time taken from other studies, is sure to bring a good return in the more excellent work done in all other branches. An 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 birds - afford delightful exercise 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 thus extend his opportunity for doing good. Here, too, is an excellent place to teach practical lessons in manners, general conduct toward one another, and in the many little things outside of book

life. The teacher's influence here, more than in the school-room, will tell in the lives of his pupils during all future time. There is a grand opportunity for good.

At best, the most 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.