

# THE MEANING OF THE NATURE STUDY MOVEMENT

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by *Liberty Hyde Bailey*

*From: Liberty H. Bailey, The Nature Study Idea  
(New York: Doubleday, page, 1904).*

It is one of the marks of the evolution of the race that we are coming more and more into sympathy with the objects of the external world. These things are a part of our lives. They are central to our thoughts. The happiest life has the greatest number of points of contact with the world, and it has the deepest feeling and sympathy for everything that is. The best thing in life is sentiment; and the best sentiment is that which is born of the most accurate knowledge. I like to make this application of Emerson's injunction to "hitch your wagon to a star"; but it must not be forgotten that one must have the wagon before one has the star. Mere facts are dead, but the meaning of the facts is life. The getting of information is but the beginning of education. "With all thy getting, get understanding."

Of late years there has been a rapidly growing feeling that we must live closer to nature; and we must perforce begin with the child. We attempt to teach this nature-love in the schools, and we call the effort nature study. It would be better if it were called nature-sympathy.

As yet there are no codified methods of teaching nature study. The subject is not a formal part of the curriculum; and thereby it is not perfunctory. And herein lies much of its value - in the fact that it cannot be reduced to a system, is not cut and dried, cannot become a part of rigid school methods. Its very essence is spirit. It is as free as its subject-matter, as far removed from the museum and the cabinet as the skeleton is from the living animal.

It thus transpires that there is much confusion as to what nature study is, because of the different attitudes of its various exponents; but these different attitudes are largely the reflections of different personalities and the working out of different methods. There may be twenty best ways of teaching nature study. It is essentially the expression of one's outlook on the world. We must define nature study in terms of its



purpose, not in terms of its methods. It is not doing this or that. It is putting the child into intimate and sympathetic contact with the things of the external world. Whatever the method, the final result of nature study teaching is the development of a keen personal interest in every natural object and phenomenon.

There are two or three fundamental misconceptions of what nature study is or should be and to these we may now give attention.

Fundamentally, nature study is seeing what one looks at and drawing proper conclusions from what one sees; and thereby the learner comes into personal relation and sympathy with the object. It is not the teaching of science — not the systematic pursuit of a logical body of principles. Its object is to broaden the child's horizon; not, primarily, to teach him how to widen the boundaries of human knowledge. It is not the teaching of botany or entomology or geology, but of plants, insects and fields. But many persons who are teaching under the name of nature study are merely teaching and interpreting elementary science. Again, nature study is studying things and the reason of things, not about things. It is not reading from nature-books. A child was asked if she had ever seen the great dipper. "Oh, yes," she replied, "I saw it in my geography." This is better than not to have seen it at all; but the proper place to have seen it is in the heavens. Nature-readers may be of the greatest use if they are made incidental and secondary features of the instruction; but, however good they may be, their influence is pernicious if they are made to be primary agents. The child should first see the thing. It should then reason about the thing. Having a concrete impression, it may then go to the book to widen its knowledge and sympathies. Having seen mimicry in the eggs of the aphids on the willow or apple twig, or in the walking-stick, the pupil may then take an excursion with Wallace or Bates to the tropics and there see the striking mimicries of the leaf-like insects. Having seen the wearing away of the boulder or the ledge, he may go to Switzerland with Lubbock and see the mighty erosion of the Alps. Now and then the order may be reversed with profit, but

this should be the exception: from the wagon to the star should be the rule.

Yet again, nature study is not the teaching of facts for the sake of the facts. It is not the giving of information merely — not withstanding the fact that some nature study leaflets are information leaflets. We must begin with the fact, to be sure, but the lesson is not the fact but the

significance of the fact. It is not necessary that the fact, have direct practical

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application to the daily life, for the object is the effort to train the mind and the sympathies. It is a common notion that when the subject-matter is insects, the pupil should be taught the life-histories of injurious insects and how to destroy the pests. Now, nature study may be equally valuable whether the subject is the codlin-moth or the ant; but to confine the pupil's attention to insects that are injurious to man is to give him a distorted and untrue view of nature. A bouquet of daisies does not represent a meadow. Children should be interested more in seeing things live than in killing them. Yet I would not emphasize the injunction, "Thou shalt not kill." Nature study is not recommended for the explicit teaching of morals. I should prefer to have the child become so much interested in living things that it would have no desire to kill them. The gun and sling-shot and fish-pole will be laid aside because the child does not like them any more. We have been taught that one must make collections if he is to be a naturalist. But collections make museums, not naturalists. The scientist needs these collections; but it does not follow that children always need them. To be taught how to kill is to alienate the pupil's affection and sympathy from the object he is studying. It may be said that it is necessary to kill insects; the farmer had this thought in mind when he said to one of our teachers:

"Give us more potato-bug and less pussy willow." It is true that we must fight insects, but that is a matter of later







practice, not of education. It should be an application of knowledge, not a means of acquiring it. It may be necessary to have war, but we do not teach our children to shoot their playmates.

Nature study is not merely the adding of one more thing to a curriculum. It is not coordinate

with geography or reading or arithmetic. Neither is it a mere accessory, or a sentiment, or an entertainment, or a tickler of the senses. It is not "a study." It is not the addition of more "work." It has to do with the whole point of view of elementary education, and therefore is fundamental. It is the full expression of personality. It is the practical working out of the extension idea that has been so much a part of our time. More than any other recent movement, it will reach the masses and revive them. In time it will transform our ideals and then transform our methods.

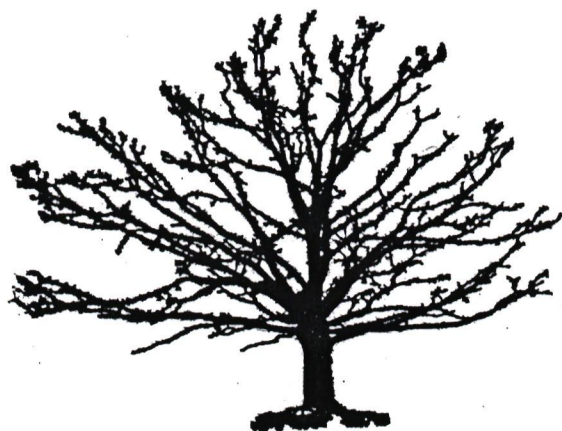
Nature study stands for directness and naturalness. It is astonishing, when one comes to think of it, how indirect and how unrelated to the lives of pupils much of our education has been. Geographies begin with the earth, and finally, perhaps, come down to some concrete and familiar object or scene that the pupil can understand. Arithmetic has to do with brokerage and partnerships and partial payments and other things that mean nothing to the child. Botany has to do with cells and protoplasm and cryptograms. History deals with political affairs, and only rarely comes down to physical facts and to those events that have to do with the real lives of the people; and yet political and social affairs are only the results or expressions of the way in which people live. Readers begin with mere literature or with stories of things that the child will never see or do. Of course these statements are meant to be only general, as illustrating what

is even yet a great fault in educational methods. There are many exceptions, and these are becoming commoner. Surely, the best education is that which begins with the materials at hand. A child asks what a stone is before it asks what the earth is.

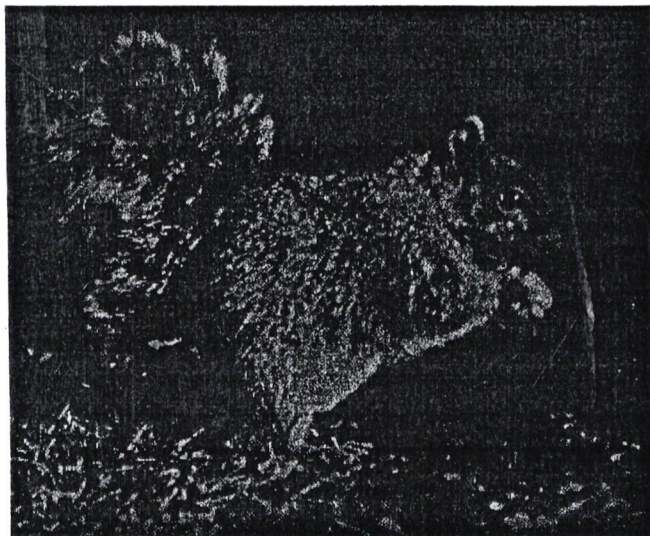
There are two ways of interpreting nature — by way of fact and by way of fancy. To the scientist and to the average man the interpretation by fact is often the only admissible one. He may not be open to argument or conviction that there can be any other truthful way of knowing the external world. Yet, the artist and the poet know this world, and they do not know it by mere knowledge or by analysis. It appeals to them in its moods, not in its details. Yet it is as real to them as to the analyst. Too much are we of this generation tied to mere phenomena.

We have a right to a poetic interpretation of nature. The child comes to know nature through its imagination and feeling and sympathy. Note the intent and sympathetic face as the child watches the ant carrying its grains of sand and pictures to itself the home and the bed and the kitchen and the sisters and the school that comprise the little ant's life. What does the flower think? Who are the little people that teeter and swing in the sunbeam? What is the brook saying as it rolls over the pebbles? Why is the wind so sorrowful as it moans on the house-corners in the dull November days? There are elves whispering in the trees, and there are chariots of fire rolling on the long low clouds at twilight. Wherever it may look, the young mind is impressed with the mystery of the unknown. The child looks out to nature with great eyes of wonder.

The good New England poets, did not they know nature? Have they not left us the very essence and flavor of the fields and the woods







and the sky? And yet they were not scientists, not mere collectors of we of this generation tied to mere phenomena.

*Child unwedded to care,  
Softly speedeth the hours—  
Thou buildest castles in air  
And strew'st thy path with flowers.*

*Build on in thy dreaming,  
Nor thy fancies are vain;  
The best of life's seeming,  
Are its castles in Spain!*

Do not misunderstand. I would not teach nature-subjects in order that the poetic point of view may be enforced. I plead only that the poetic interpretation is allowable on occasion.

How shall nature study be taught? By the teacher, not by the book. The teacher will need help. There are books and leaflets that will help him. These publications may be put in the hands of pupils if it is always made plain that the recitation is to be from things which the pupil has seen, not from the book. There can be no textbook of nature study, for when one studies a book he does not study nature. Nature study books and leaflets are guides, not texts. The book should be a guide to the animal or plant: the animal or plant should not be a guide to the book.

The teacher will need help both in methods and in facts. The method, however, is not to be a codified series of laws or a hard-and-fast system; but there should be some underlying pedagogical principle which will run through every item of the work. There will be opportunity for endless variation in the details and in the little

applications of the work. The personality of the teacher must always stand out strongly. We need the very best of teachers for nature study work—those who have the greatest personal enthusiasm, and who are least bound by the traditions of the classroom. The teacher, to be ideal, must have more time, more inspiration and more knowledge. It is better if the teacher have a large knowledge of science, but nature study may be taught without great knowledge if one sees accurately and infers correctly from the particular subject in hand.

The teacher should studiously avoid starting with definitions and the setting of patterns. Definitions should be the result or summary of the study, not the beginning of it. Mere patterns should only afford means of comparison, and not be regarded as useful in themselves; and even then they are often misleading. The old idea of the model flower is an unfortunate one, simply because the model flower does not exist in nature. The model flower, the complete leaf, and the like, are inferences; and the pupil should begin with things and not with mere ideas. In other words, the ideas should be suggested by the things, and not the things by the ideas. Here is a drawing of a model flower, the old method says; "go and find the nearest approach to it." "Go and find me a flower," is the true method, "and let us see what it is."

Two factors determine the proper subjects for nature study. First, the subject must be that in which the teacher is most interested and of which he has the most knowledge; second, the subject must be that which is commonest and which can be most easily seen and appreciated by the pupil, and which is nearest and dearest to his life. The tendency is to go too far afield for the subject matter. We are more likely to know the wonders of China or Brazil than of our own brooks and woods. If the subject matter is of such kind that the children can collect the objects as they come and go from the school, the results will be the better.

With children, begin with naked-eye objects. As the pupil matures and becomes interested, the simple microscope may be introduced now and then. Children of twelve years and more may carry a pocket lens; but the best place to use this lens is in the field. The best nature study observation is that which is done out-of-doors; but



some of it can be made from material brought into the schoolroom.

It is a sound pedagogical principle that the child should not be taught those things that are necessarily foreign to the sphere of its life and experiences. It should not have mere dilutions of science. The young child cannot understand cross-fertilization of flowers and should not be taught the subject. The subject is beyond the child's realm. When we teach it, we are only translating what grown-up investigators have discovered by means of faithful search. At best, it will only be an exotic thing to the child. Pollen and stamens are not near and dear to the child. There are three factors in the teaching of nature study.

(1) The fact,

(2) The reason for the fact,

(3) The interrogation left in the mind of the pupil.

It is impossible to find a natural history object from which these three factors cannot be drawn, for every object is a fact and every fact has a cause, and children may be interested in both the fact and the cause. It may be better, of course, to choose definite subjects, taking pains, at least at first, to select those having emphatic characters. But even in the dulllest days of winter sufficient material may be found to keep the interest aflame. A twig or branch may be at hand. There should be enough specimens to supply each child. Let the teacher ask the pupils what they see. The replies will discover the first factor in the teaching — the fact. However, not every fact is significant to the teacher or to the particular pupils. It remains for the teacher to pick out the fact or answer that is most significant. The teacher should know what is significant and he should keep the point clearly before him. One pupil says that the twig is long; another that it is brown; another that it is crooked; another that it is from an apple tree; another that it has several unlike branchlets or parts. Now, this last reply may appeal to the teacher as a most significant fact. Stop the questioning and open the second epoch in the instruction—the reason why no two parts are alike. As before, from the great number of responses the significant reason

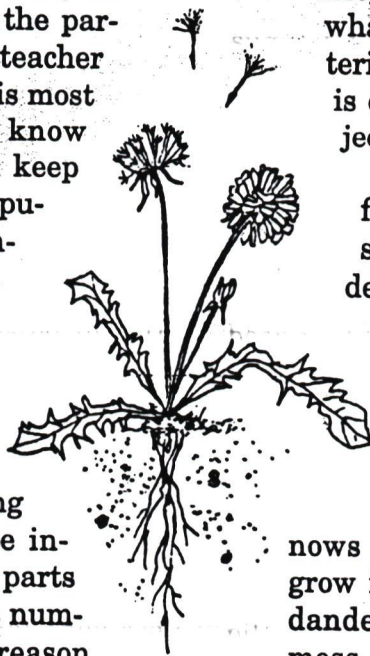
may be developed: it is because no two parts have lived under exactly the same conditions. One had more room or more sunlight and it grew larger. The third epoch follows naturally: are there any two objects in nature exactly alike? Let the pupils think about it.

Choose a stone. If similar stones are passed about to the pupils, you ask first for the observation or the fact. One says the stone is long; another, it is light; another, it is heavy; another, that the edges are rounded. This latter fact is very significant. You stop the observation and ask why it is rounded. Some one replies that it is because it is water-worn. Query: Are all stones in brooks rounded? Numberless applications and suggestions can be made from this simple lesson. What becomes of the particles that are worn away? How has soil been formed? How has the surface of the fields been shaped and molded?

It is not necessary that the teacher always know the reason. He can ask the pupils to find out and report next day. It is the strong teacher who can say: "I do not know." If a problem had been sent to Agassiz or Asa Gray and he had not understood it, would he have dissimulated or have evaded in the answer? Would he not have said boldly, "I do not know"? Such men delve for knowledge, but for every fact that they discover they turn up a dozen mysteries. Knowledge begins in wonder. The consciousness of ignorance is the first result of wonder, and it leads the pupil on and on: it is the spirit of inquiry. These illustrations are given merely as examples.

They may not be ideal, but they show what can be done with very common material. In fact, the surprise and interest is often all the greater because the objects are so very common and familiar.

To my mind, the best of all subjects for nature study is a brook. It affords studies of many kinds. It is near and dear to every child. It is an epitome of the nature in which we live. In miniature, it illustrates the forces which have shaped much of the earth's surface. It reflects the sky. It is kissed by the sun. It is rippled by the wind. The minnows play in the pools. The soft weeds grow in the shallows. The grass and the dandelions lie on its sunny banks. The moss and the fern are sheltered in the







nooks. It comes from one knows not whence: it flows to one knows not whither. It awakens the desire to explore. It is fraught with mysteries. It typifies the flood of life. It "goes on forever."

In other words, the reason why the brook is such a perfect nature study subject is the fact that it is the central theme in a scene of life. Living things appeal to children. To relate the nature study work to living animals and plants is the fundamental idea in Hodge's ideal, as expressed, for example, in his book, *Nature study and Life*. He holds that the appreciation of inanimate things is a later development in the child-life than an appreciation of objects that are living. He would, therefore, not begin with the weathering of rock and formation of soil, combustion and the like, although he would "not wish to insinuate that the study of living things is all of nature study." With this I agree for the very young, and I would study a brook or a fence-corner or a garden-bed or a bird or a plant. However, the teacher and the way of teaching are more important than the subject matter, and there are good nature study teachers who are better fitted to teach inanimate than animate subjects.

One of the first things that a child should learn when he comes to the study of natural history is the fact that no two objects are alike. This leads to an apprehension of the correlated fact that every animal and plant contends for an opportunity to live, and this is the central fact in the study of living things. The world has a new meaning when this fact is understood. This is the key that unlocks many mysteries, and it is the means of establishing a bond of sympathy between ourselves and the world in which we live.

It is a common mistake to attempt to teach too much at every exercise; and the teacher is also appalled at the amount of information which he must have. Suppose that one teaches two hundred and fifty days in the year. Start

cannot digest them. I should prefer ten minutes a day of nature study to two hours; but I should want it quick and sharp. I should want it designed to develop the observing and reasoning powers of the child and not to give mere information. It should be vivid and spontaneous. Spirit counts for more than knowledge.

Taught in this way, nature study work is not an additional burden to the teacher, but a relief and a relaxation. It may come at the opening of the school hour, or at the close of a hard period, or at any other time when an opportunity offers. It can often be combined with the regular studies of the school, and in that way it can be introduced in places where it would otherwise meet with objection. For example, the subject-matter of the lesson may be used for the exercise in drawing or in geography. Let the child draw the twigs; but always be careful lest the drawing become more important than the twigs.

What may be the results of nature study? Its legitimate result is education – the developing of mental power, the opening of the eyes and the mind, the civilizing of the individual. As with all education, its central purpose is to make the individual happy; for happiness is nothing more nor less than pleasant and efficient thinking.





It is often said that the ignorant man may be as happy as the educated man. Relatively, this is true; absolutely, it is not. A ten-foot well is not so deep as a twenty-foot well; and although the ten-foot well may be full to the brim, it holds only half as much water as the other.

My remarks on methods are meant, of course, to apply to children. As the pupil advances, the work will naturally become more systematic, until, in the high school, it may develop into science-teaching. Those who complain that nature study is desultory are really thinking of science, not of nature study. Although not the teaching of science, as such, nature study is not unscientific.

Nature study not only educates, but it educates nature-ward; and nature is ever our companion, whether we will or no. Even though we are determined to shut ourselves in an office, nature sends her messengers. The light, the dark, the moon, the cloud, the rain, the wind, the falling leaf, the fly, the bouquet, the bird, the cockroach — they are all ours.

If one is to be happy, he must be in sympathy with common things. He must live in harmony with his environment. One cannot be happy yonder nor tomorrow: he is happy here and now, or never. Our stock of knowledge of common things should be great. Few of us can travel. We must know the things at home.

Nature-love tends toward naturalness, and toward simplicity of living. It tends country-ward. One word from the fields is worth two from the city. "God made the country."

I expect, therefore, that much good will come from nature study. It ought to revolutionize the school life, for it is capable of putting new force and enthusiasm into the school and the child. It is new, and therefore is called a fad. A movement is a fad until it succeeds. We shall learn much, and shall outgrow some of our present notions, but nature study has come to stay. It is in much the same stage of development that manual-training and kindergarten-work were twenty-five years ago. We must take care that it does not crystallize into science-teaching on the one hand, nor fall into mere sentimentalism on the other.

I would again emphasize the importance of obtaining our facts before we let loose the imagination, for on this point will largely turn the results — the failure or the success of the movement. We must not allow our fancy to run away

with us. If we hitch our wagon to a star, we must ride with mind and soul and body all alert. When we ride in such a wagon, we must not forget to put in the tail-board.

Another most important result of the nature study movement will be its effect, along with manual-training and other forces, in gradually overturning present systems of schoolwork. The system of memorizing from books will eventually have to go. The pupil will first be put into sympathetic contact with objects, not put into books. In many ways we are now in a transition period in our school systems. For one thing, we are living in an era of the material equipment of schools — the erecting of magnificent buildings, the gathering of extensive outfits. This is true of colleges and universities as well as of the common schools. When this era is past, we shall have more money to spend for teachers. Teaching will be a profession requiring better training and commanding more pay, and men teachers will come back to it.

In this evolved and emancipated school, the nature study spirit will prevail, even though the name itself be lost. This spirit stands for naturalness and the natural method, for freedom, spontaneity, individual initiative, because it deals first-hand with actual things. It stands for doing and accomplishing. It is the active and creative method. It is a developing of the powers of the pupil, not hearing him recite. In spirit and method it is opposed to the pouring-in-and-dipping-out process.

In recent years there has been great activity in disseminating information amongst the farmers. The results have been gratifying. Not only have farmers learned more, but there has been a general uplift in the tone of many rural communities. But the discouraging fact is, that the young people do not often come to the farmers' meetings in any numbers. There will be a constantly recurring crop of ignorance and prejudice. Each crop, to be sure, must







be above its predecessor, but yet not living up to the full stature of its opportunities. It is therefore necessary to begin with the new generation—to begin our chimney at the bot-

tom, rather than at the top. People crowd into the cities largely because of the intellectual entertainment that they find there. If their own intellectual horizon is enlarged, they may find entertainment in the country.

The teacher, the clergyman, the progressive merchant or farmer here and there, are the persons that are willing to help along the work of uplifting the rural communities. Education is the only salvation for the farmer - not the development of facts merely, but the development of power through the enlargement of capability. The results will come slowly. We must not be impatient. There are centuries of inertia to be overcome. The best and most permanent things are of slow growth.

Nature study teaching may seem to be an indirect way of reaching the farmer; but it is not. It is direct because it strikes at the very root of the difficulty. One of the pleasantest comments which we have had on our nature study work came from a country teacher who said that because she had used it her pupils were no longer ashamed of being farmers' children. If only that much can be accomplished for each country child, the result will be enough for one generation. What can be done for the country child can be done, in a different sphere, for the city child. Fifty years hence the harvest will be seen.

The nature study effort sets our thinking in the direction of our daily doing. It relates the schoolroom to the life that the child is to lead. It makes the common and familiar affairs seem to be worth the while. Essentially, it is not an ideal for the school any more than it is for the home; but so completely do we delegate all work of teaching and instructing to the school, that nature study effort comes to be, in practice, a schoolroom subject. I wish that every parent, as well as every professional teacher, could see the importance of first instructing the child in the

very things that it is doing and the very objects that it is seeing. The ideal of the parent or the teacher should be to bring the child into sympathetic relations with its world; but whatever may be in the mind and hope of the teacher, so far as the child is concerned the nature-sympathy must come as a natural effect of actual observation of definite objects and phenomena.

If, in conclusion, I were asked for a condensed statement of the nature study idea, I should choose the following definition of it by Professor Thomas H. Macbride, of the University of Iowa:

*I should say that by nature study a good teacher means such study of the natural world as leads to sympathy with it. The keynote, in my opinion, for all nature study is sympathy. Such study in the schools is not botany; it is not zoology; although, of course, not contravening either. But by nature study we mean such a presentation, to young people, of the outside world that our children learn to love all nature's forms and cease to abuse them. The study of natural science leads, to be sure, to these results, but its methods are long and have a different primary object.*

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