

Nature Study

Well-Educated Mother's Heart Learning Library

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Compiled by
Marlene Peterson

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INTRODUCTION.

BY PROFESSOR J. P. GORDY, PH.D., LL.D.

EVERY revolution in the history of thought is followed by a revolution in the history of education. It was so in the fifth century before Christ, when the Sophists discredited the idea that the individual exists solely for the State; it was so in Rome two hundred years later, when the old Roman ideal of citizenship gave place to the Greek ideal of individualism; it was so at the beginning of the Middle Ages, when the pagan ideal of culture and enjoyment was supplanted by the ideal of monasticism; it was so at the beginning of the Renaissance, when the ideal of asceticism and self-denial gave place to the ideal of enjoyment and self-culture; it was so in the nineteenth century, when the vast enlargement of our knowledge of the physical universe and its varied application to practical uses, transformed men's attitude towards nature, and made them realize that a servant of almost infinite power stood ready to obey them, whenever they learned enough about the

world to be able to speak the right word of command.

Spencer's famous essay, on "What Knowledge is of most Worth?" may perhaps be said to mark the beginning of the corresponding revolution from the standpoint of theory. For though Bacon and Comenius had insisted on the importance of a knowledge of things, they were as voices crying in the wilderness. When so great a scholar as Erasmus could urge no reason for studying nature except that it would throw light on literature, it was out of the question for others to get a hearing, who insisted, not only that nature was worth investigating on its own account, but that it was the most important subject of study. It was not until the slow progress of discovery and invention had gradually changed men's attitude towards the physical universe, that the appearance of a brilliant and extravagant essay like Spencer's, which put forth the claim that science was the only subject worth studying, could form an epoch in the history of education.

It hardly needs to be pointed out that this revolution in the history of thought has found its practical expression in the history of education. The elaborate and expensive laboratories for the

study of physics, chemistry and biology; the organization and multiplication of scientific and technical schools; the great variety of courses for the study of science; the conferring of degrees upon the completion of curricula in which science is by far the largest element, are a few of the expressions of this revolution in the field of education, as is the insistence upon nature study and elementary science in our primary and grammar schools.

But the stress which is being laid upon the study of science is due, not only to the change in our attitude toward nature, but also to a change in our attitude toward education. Formerly, the question was, What does a man need to know? Now the question is being asked, What does he need to be? It is the emphasis upon this question, in the minds of the leaders of educational thought, which is making it clearer and clearer that we need a knowledge of nature, not only because we want to be able to talk with one another across the ocean; to be able to tunnel our mountains and to throw huge bridges across our rivers, and to navigate the air; not only because we want electricity and steam to do the mechanical work of the world, but because we want to be

men. We are beginning dimly to perceive that the change produced by the study of science upon the mind of man is hardly less great than the change which that knowledge produces in his power over nature.

There was a time when men crouched in abject terror of nature; they trembled at the sound of thunder; they fell on their knees in the presence of an eclipse; a hurricane was the breath of an evil spirit, and an epidemic the expression of the wrath of an offended deity. Nature was an enemy; her powers were wielded by demons, to make the brief and wretched lives of men briefer and more miserable still. Ignorance of nature and the wildest and most fantastic superstitions went hand in hand. The inability to use natural forces involved the inability to think clearly. The inability to command nature by obeying her, involved the inability to understand man's relation to her. He who should stand erect in her presence, and, through penetration of her secrets, command her to do his bidding, crouches in terror before her, and thinks of himself as her victim and toy, and plaything, whenever he fails to understand her. It is as though our beneficent teacher, nature, would beguile us into getting the training

which we need as men, by making it depend on the knowledge which we need for the practical purposes of life.

Is, then, the imparting of a knowledge of nature the one purpose of nature study? To show that it is not is one of the chief purposes of Dr. Bigelow's book. He never tires of insisting upon the difference between elementary science and nature study, because the primary purpose of elementary science is the imparting of scientific knowledge, and the development of habits of scientific thinking, while the primary purpose of nature study is the development of a love of nature. Of course knowing cannot take place apart from feeling, nor feeling apart from knowing. But the cold love of truth, the feeling that the teaching of science seeks to awaken, is a vastly different experience from the feeling of love or of admiration for an animal, or an object,—which the teaching of nature study seeks to awaken. And the concentration of the attention upon the universal aspects or phases (the class relations) of objects, which the teaching of science seeks to bring about, is an entirely different thing from the concentration of the attention upon an object as a whole,—upon those characteristics which make it an individual,

which the teaching of nature study seeks to bring about. You may talk to a boy about the resemblances between a cat and a tiger, in the hope of developing an interest in the relations of animals; if so, you are teaching elementary science, and are trying to stimulate his love of truth. Or you may try to get him to look at a cat as an object not to be pelted with stones, but as a living thing, one that responds to affectionate treatment with affection; if so, you are teaching nature study, and are trying to develop a love of animals. You are making a certain appeal to the intellect in both cases, but in the former, you do not want the boy to consider the cat as an individual at all, for one cat will serve the purpose quite as well as another, since it is the cat as a member of a class in which you wish to interest him; in the latter, it is the cat as an individual, a being with a capacity for individual pleasures and pains, such as the boy himself is conscious of, that you wish him to have in mind. Succeed ideally in the former attempt, and he will not only be perfectly ready to dissect his cat when dead, but to vivisect it when alive, if he can learn something about it that he wishes to know; succeeded ideally in the latter, and he becomes the friend of all living things, and will

quiver with indignation at the infliction of unnecessary pain upon any animal.

Upon second thoughts, however, it is plain that this illustration suggests more than the truth. It is indeed true that elementary science aims to develop an interest in types and classes, while nature study seeks to awaken an interest in objects and individuals. It is also true that the interest which science seeks to arouse is the love of knowledge, while that which nature study would stimulate is some sort of appreciation of an object or an animal. But it is not true that an intense love of knowledge, unaccompanied by the proper development of the emotional nature, has only bad results, nor is it true that a development of the emotional nature unaccompanied by a proper development of the intellect, has only results that are good. Develop the intellect abnormally along with the love of knowledge, which is its inevitable accompaniment, and you have indeed trained a being of the temper of Spinoza, who knows no love nor hate, who responds to no enthusiasm except that which results from the contemplation of the reign of law, who is willing to eliminate all individuality from the universe, to resolve it into the expression of necessary and eternal laws,

because there is nothing in the nature of such a being which demands a world of individuals. But it is equally true that to develop the emotions abnormally, is to develop a being of the temper of Rousseau, a "weltering mass of sensibility," impelled this way to-day and to-morrow that, according as the wind of emotion blows north or south, saved, if saved at all, from debasing superstitions only because he passively accepts the results of other men's thinking. Succeed ideally with your nature study, we said above in commenting upon our cat illustration, and the boy will quiver with indignation at the infliction of unnecessary pain upon an animal. It is now clear that such a boy will never see the necessity for the infliction of pain, unless he has capacities which have not been developed by any training of his emotional nature. Manifestly what is needed is not a training either of the head or the heart by itself, but of the two in conjunction. As Pestalozzi put it, "Let not [the child] attempt to [climb the ladder leading up to Heaven] by the cold calculation of the head or the mere impulses of the heart; but let all these powers combine, and the noble enterprise will be crowned with success."

Nevertheless, the half of the truth upon which

Dr. Bigelow insists is the one which most needs to be emphasized. I have said that the question which the leaders of educational thought are beginning to ask is, What does a man need to be? But it is not true that this question is uppermost even in the minds of most educated men when they are thinking of education; as a rule, men continue to think of themselves as means, not as ends. They look upon their physical and mental powers and capacities as tools for the accomplishment of work. They care more for education than they used to care, because they have learned that it increases their power to do things. Even in this democratic age, we do not undersand the truth upon which Sir William Hamilton used to insist, "On earth there is nothing great but man; in man there is nothing great but mind." It is ignorance of this truth which so often causes statesmen to confuse social progress with growth of wealth, spread of commerce, mere increase of population. Instead of agreeing with Aristotle that the object of the state is to promote good life, they are prone to concentrate their attention on the mere tools of life. They incline to plume themselves on their promotion of the "onward march of civilization," when they have merely promoted national devel-

opment, as though the increase of the mere means of existence necessarily made the life of any man better worth the living; as though such increase might not be made through the sacrifice of the best things in the world.

The same error lies at the bottom of our worship of success. Has the man *done* things? Has he amassed a great fortune? Has he risen to a high office? Has he made himself master of his party? Has he changed the map of the world? We ask, in a word, not what he is, but what outward success he has achieved, and if that success be great enough, we are perfectly willing to excuse him for any violence, no matter how great, which he has done to his own best self.

That is why we lay such undue stress on mere cleverness, pure intellectual ability. If you would get music, or drawing, or painting, or any form of art in the course of study in our schools and colleges, you must show that it develops the intellect, and thereby increases the power to do things. Say that the past generations of the race have bequeathed to us a noble inheritance in music, painting, literature, and that it is our business to enter upon that inheritance not simply because of any use we can put it to, or any power it will develop

in us, but because it constitutes an important part of the spiritual wealth of the world, and the practical man will not listen to you. He demands results, deeds, achievements, and has no use for a training which has anything else in view. He does not realize that the cultivation of the capacity for simple pleasures, for the pleasures of home, for a love of animals and of nature, may be the most practical thing in the world. He does not understand that a system of education which, while it seeks to enrich the student with the garnered wealth of all the ages, lays stress on homely joys and unassuming virtues, may still be as conducive to national well-being, and have as marked a tendency to promote what should be called civilization, as the system that aims at nothing except developing the capacity to do things, and a determination to employ it. Ruskin doubtless was guilty of a gross exaggeration when he said that "All other efforts in education are futile till you have taught your people to love fields, birds, and flowers." But if he had said that the development of the love of such things, in those who have a capacity for it, is second in importance to nothing except the forming of character, who could have questioned his statement?

Not only, then, is the emotional side of the child a thing to be cultivated, but it is equally true that this can be successfully done only through the emotional nature of the teacher. As the teacher reaches the intellect of his pupils through his own intellect, so he touches their emotions by means of his own emotions. That is why the teacher must himself love nature, if he is to succeed in influencing others with a love for it. As Dr. Bigelow puts it, "Do not talk to him [your pupil] about the lovableness of nature, if you have not the genuine article in your own heart, *heart*, not head." That remarkable characteristic of the human mind called by some psychologists plastic imitation, in consequence of which we tend to believe and feel as the people around us believe and feel, which explains the tidal-wave spread of enthusiasm that manifested itself in such great movements as the Crusades, in the prevalence of belief in witchcraft at certain periods in the history of the world, in the contagion-like communication of panic from man to man in a theatre, when a cry of danger is heard, and in the remarkable counteracting influence that may be exerted by a person who keeps his presence of mind, this characteristic

makes it impossible for the feelings of a pupil to be aroused by any purely intellectual activity on the part of the teacher. And this is true, of course, not only of nature study, but universally. Ideas may be conveyed by the intellect. But Ideals can be developed only by one who loves and cherishes them for himself. Not long since, the principal of a certain school was warmly praising his teacher of history. The originality of the teacher, his love of research, his skill in unravelling the tangled web of historical causation, were warmly commended. "Has he the philanthropic impulse?" asked the listener. "Does he seek to know the causes of what has happened, so that he may learn how the errors of the past may be avoided? Does his study of history present itself to him as the way in which he can best contribute "his personal efforts as bricks and mortar for building the walls of the free democratic city, the supreme refuge of human dignity?" To which was given the almost pathetic reply. "I don't know." From such a teacher light can come, but not that sort of stimulation that tends to transform the life.

Dr. Bigelow's "Tests of Proficiency in Nature-Study" will doubtless seem very ridiculous to

those teachers who are afflicted with the worst of all pedagogical manias, the mania for information. But they are perfectly sound, and we might apply the same tests to the teaching of history in a high school or a college. Has it strengthened your determination to do your own thinking in political matters, the pupil might be asked? Has it made you resolve that, come what will, you will never wear any party collar? Has it made you feel the infinite pathos of the situation, if it should eventually appear that after many centuries of struggle, humanity succeeded in throwing off the rule of an oligarchy of birth, only to succumb to the tyrannical and self-seeking rule of the oligarchy of a party organization? If the pupil can honestly answer such questions in the affirmative, he has studied history to the best possible purpose, even though he is confused as to many of the dates upon which the information-mad teacher is in the habit of laying so much stress.

In general, the Pedagogy of this book is entirely sound. The discipline of a school comes to seem an end in itself to the rigid disciplinarian. Not so to Dr. Bigelow. From the average teacher's point of view, the preservation of his

dignity is a matter of so much importance, that the child must be repressed whenever he does anything that might seem to be a reflection upon it. Not so from Dr. Bigelow's point of view. With him, discipline, teacher, subject, method, must all stand in the background. The child, and the child alone, has a right to the centre of the stage.

HOW NATURE STUDY SHOULD BE TAUGHT

CHAPTER I

WHAT IS NATURE STUDY?

The school-boy begins with a definition. "We will first define our subject. Webster says," etc. So, like the school-boy, I will begin with a definition, and thus impress upon my readers the fact that, in one respect at least, this article will harmonize with school-room experiences.

Speaking of Webster and definitions recalls an experience of boyhood, in "the old red school-house."

It was "School Visitor," day, the last Wednesday of the term. School closed on Friday, but we were not expected to do much after the "Visitor" had been there. It was a terrible misfortune when the last day of the school term was "Visitor" day, for then we had no "after" ease!

Of course, on "Visitor" day we wore our Sun-

day clothes. I do not recollect all the events of the occasion, but a few things stand out with vivid prominence. First, there were my new shoes that pinched my toes, and squeaked dismally as I walked. My impression is that it was a quarter of a mile from the door to my desk, and what a row of people I passed in that journey!

There were Mrs. Brocker, who beamed at me over her spectacles in a sort of "I-know-you-and-guess-you-are-a-big-man to-day" sort of way; and Deacon Adams, with an indescribable twinkle in his eye. I thought he was making fun of me on account of my new shoes. Finally, I woke up the Visitor. He opened his eyes, and looked at me over his spectacles, and made my journey longer. He had a learned way of leaning back in his arm-chair, and "going to sleep," as we thought. Woe to the luckless youth that woke him up! But this time I escaped that disaster.

When the teacher had tapped on the desk, and told Frank to shut the door and put the water-pail in the corner, the Visitor said to her: "You may call out the class in 'Webster's Speller and Definer,'" and went to sleep again. He may have waked up more than twice during the class, but I do not remember that he did. Some of the parents

changed their seats, and we young folks lined up against the wall, from the door to the blackboard.

On the final wake-up for "Remarks," the Visitor said, "Now, I like a complete, well-rounded definition. You must know the thing, and then express it concisely and clearly. When you can do that with a common thing, it shows that you think clearly and can express your thoughts concisely. It's a good thing, not only to get acquainted with new words, but to define such a common word as 'boat,' for instance." And he went on to talk encouragingly of other school matters, but chiefly to tell what he did when he was a boy, as I have since learned that many mature men have the habit of doing. Impressions made in childhood are lasting.

Then the teacher started in with, "And now, pupils, I want to say a few words to you." I do not recollect what she said, except that she expressed her appreciation of the Visitor's encouragement, but greatly regretted that he had not given us an ideal definition of the word "boat."

That beat me and my new shoes; it woke the Visitor clear up, away up on his feet, and so suddenly that Frank and I snickered, and he looked

at me again for fifteen minutes, I felt; perhaps, it was really only a second, but I was subdued.

"Why, certainly, Miss Carrier, with the greatest of pleasure; it slipped my mind, when I got to talking of boyhood matters.

"Now, a boat is—of course, we must first know what the thing is; that you already know. There are lots of them just over the hill, on the Babcock pond. Now, get the thing clearly in mind, and then we are prepared to define it. A boat—such as you see on that pond every day—is—a boat is —such a boat as Frank has [that made me jump; it was a close shot, for Frank sat next to me]. I saw him going down there the other day, with another boy and three girls, a good boat-load; going out after some of those pond-lilies, I guess. But, I forgot; that boat like Frank's is—a boat—then there's another one, a beautiful boat, newly painted, with the name 'Lily' on it. I happened to think of that, speaking of pond-lilies. I don't know whether a girl by the name of Lily owns it, or whether some one of you roguish boys named it after your favorite girl."

We looked at the teacher; she smiled, and that told us that it was a joke, at which we might laugh, and we made the most of it. The boys all ya-

ha-ed, the girls tittered, and even the Visitor chuckled, and took off his glasses and wiped them in a deliberate way. Then he continued:

"Well, you're a happy lot, I see; youth is the time to be happy. I was just as happy as you are, at your age—and—and—well, I don't know but I've had some pretty good times since then." He looked at the Deacon, and we boys noticed that the Deacon's twinkle turned to a grin, and we young folks laughed again, but not so loud; we were not quite sure that we could laugh on the Deacon's grin. The teacher's dimple showed a little, then she looked solemn, and the Visitor proceeded:

"As I was saying, you must first see the thing—and yet, one thing isn't enough. Your definition is apt to be one-sided, if you don't take into consideration many specimens of the class. For example, there's Frank's boat. He keeps it for use; always has a good string of fish when he comes home; and I don't suppose he cares so much about the appearance of the boat as does the owner of that one beautifully painted, with the name 'Lily' on it. But you young folks know that these small boats are not all. A definition that would apply to them might not apply to other boats. There's the mass of logs that the boys

have tied together, and go out swimming on, they stand up and dive off into deep water from these. I know how it was when I was a boy; couldn't dive very well, either. We call that a raft, but, after all, it is a boat, of course differing from the others. Then, you know, there's Uncle Standish's big boat, plain, but serviceable; he uses it to take fertilizer, and tools, and crops across the pond, to what he calls his 'westside lot.' And, of course, now you're all thinking about the great ships with their white sails, and the swift steamers, with their powerful engines, that are also boats. So, you see, we have increased our knowledge of boats by broader experiences. Now, we come back home, to the path down through the huckleberry bushes, to the old oak, where so many boats of all kinds that you best know are tied to the shore.

"Now, for the definition. A boat is, such boats as all these—I saw one tied by a rope to a maple tree—but I am wandering [and, by the way, some of the young folks, in spite of the absence of any dimple, were venturing on the twinkle, and tittering a little]; yes, now let me get a definition all around that will be clear cut and apply to any of these boats. A boat is—a boat is—is—a—why,

any of you young people know what a boat is!"

Even the Visitor laughed at his own discomfiture, and the Deacon roared. Mrs. Brocker laughed till she wiped her eyes as if she had been crying, and the teacher, I did not know she could laugh like that, laughed as we young folks did. I do not believe she cared, then, whether she got her certificate for next year or not, she just laughed.

"But," seriously ask the teachers who are reading this chapter with a desire to find out what nature study is, "what has all this to do with defining nature study?"

Now, please, gentle reader, be really gentle and come with me, so that we may together survey the regions occupied by some of the principal workers in this department of our profession. I have been trying for several years, in my love of nature, to ascertain what is meant in pedagogics by this term nature study. I will admit that it has been somewhat of an embarrassing situation. But let us first get the thing in mind, and when we know what nature study is, we shall be ready to formulate a concise definition.

I take up a prominent manual by Professor

Jackman, that bears on its cover the words, "Nature Study." I open to the preface, and read as follows:

> In the preparation of this book, it has been the aim to furnish a guide for teachers in the common schools who wish their pupils to pursue an adequate and symmetrical course in Natural Science. Science teaching, for a few years past, has been gradually working itself downward from the colleges and high schools into those of lower grades, but, in most cases, the plans followed, while fairly well adapted to the demands of advanced pupils, have been poorly fitted to the needs of the beginners.

I look carefully, eagerly, through that preface, and find no reference to nature study, but considerable about "Zoology and botany, one lesson a week; physics, meteorology, astronomy, geography, and geology, one lesson each two weeks," and so on, with bracketing of schedules in which these and other sciences appear.

I look farther and find the words, "Nature Study for Common Schools," above the introductory chapter, the first sentence of which reads:

> It is of primary importance that the teacher who seeks to introduce elementary science into the common schools should make earnest study for the motive of doing such work, and, at the same time, formulate intelligent methods for conducting.

And so on. In that chapter and the next, and

the next, nothing but "elementary science." There are chapters on astronomy, meteorology, physics, but no nature study, except in the running titles at the top of the pages. What is the trouble with this excellent guide in elementary science? Has the author misnamed it, or does "elementary science" mean exactly the same as nature study?

I am forced to that belief, and having become grounded thus far in that faith, I take up the next book at hand, one by that master teacher and student of nature study, Professor L. H. Bailey, of Cornell, and read what shatters that conclusion. He says:

> What is Nature Study? It is seeing the thing which one looks at, and the drawing the proper conclusions from what one sees. *Nature Study is not the study of science*, as of botany, entomology, geology, and the like.

Diverse and antagonistic opinions of the same thing. Which of these excellent teachers is right?

I take up Wilson's "Nature Study in Elementary Schools," and find such expressions as:

> Can I teach this subject without scientific training? This course does not presuppose special training . . . only an earnest effort to become better acquainted with the familiar, yet, to most of us, unknown face of Nature.

And again :

> Perhaps nine out of ten teachers, if asked what is the advantage of Nature Study to the child, would say that it consists in the training of the observation through the senses.

This book refers to success with children in the field ; but again, a writer in POPULAR EDUCATOR concludes an extended article on "Field Work in Nature Study," with these startling words: "On the whole, we have found that more real good can come from taking Nature in to the pupils than from taking pupils out to Nature."

I look at Lange's "Handbook of Nature Study," and read the first paragraph of the introduction :

> The study of Nature with a view to understand the relations of plant and animal life to the welfare and happiness of man, needs no justification in this age of scientific agriculture and applied science.

I wonder what astronomy, grandest of all sciences, physics, chemistry, mineralogy, and geology have done, to be left out in the cold, and attention restricted to plant and animal life! And is "scientific agriculture" and applied science our sole justification for a knowledge of nature? But read the next sentence :

All our most progressive teachers agree that Elementary Science, or Nature Study, should have a place on the programme of every graded and ungraded school of the land.

Oh, the force of that little word, "or"! Have we two things, or have we one thing under two names?

Surely, we need not delve long amid the books and periodicals before we are ready to extend a sympathetic hand to Professor Surface, when he says:

However, were we forced to define the term, we should say that Nature Study is a subject in which the teaching is for the purpose of developing certain mental faculties, such as observation, comparison, reflection, reasoning, judgment, memory, intellect, and even the conscience, and in which the material used to secure this development consists of the objects and phenomena of Nature. Many persons think they have tritely defined and disposed of the matter in saying: "Nature Study is the study of Nature." If this be true, how does it differ from object lessons in which natural objects form the basis of work? If identical, why introduce the new synonyms and consequently confusing term? Or is it equivalent to elementary science? If so, why not call it science work, or elementary science? Or again, is it some branch of science or natural history, such as entomology, botany, or ornithology, as we must infer from the writings and teachings of some specialists, who have been recently devoting more or less time to something they call Nature Study?

Let us get outside of the circle of professional

instructors in nature study, and try to see ourselves as others see us.

John Burroughs' writings have been so read, memorized, and recited in the schoolroom, that he must surely have a good opinion of our nature-study work. Listen to the glowing terms in which he commends the labors of those who use his writings:

Not long since, in a high school in one of our large cities, I saw a class of boys and girls studying Nature after this cold-blooded and analytic fashion: They were fingering and dissecting some of the lower sea forms, and appeared to find it uninteresting business, as I am sure I should have done. If there was a country boy among them, I am sure the knowledge of Nature he had gathered on the farm was worth a hundred-fold for human purposes, or the larger purposes of science, all this biological chaff. Of the books upon Nature Study that are now issuing from the press, to meet this fancied want in the schools, very few of them, according to my thinking, are worth the paper they are printed upon. They are dead, dead, and neither excite curiosity nor stimulate observation.

John Burroughs has written this to me:

I should have said in my *Outlook* paper that I would, by all means teach the young people the elements of the great sciences—geology, astronomy, and chemistry. They are broadening and freeing, especially the two former. They enlarge the whole mental horizon. I would also inculcate the scientific habit of mind, accuracy of observation, care in reading conclusions, etc. Darwin is full of good lessons in this direction. But I would not encourage the young people

to think they can dissect their way into the mystery of Nature, or reach her through the laboratory.

While it is but common-sense opinion, and one almost universally admitted, that nature should be studied in her own domain, as well as in the laboratory, few nature-study or science teachers seem to admit this in a practical way.

Again says John Borroughs: "The purely educational value of nature-study is in its power to add to our capacity of appreciation, our love and enjoyment of all open-air objects."

So we have wandered, from nature study to nature study, and we find that, according to these authorities, it is science and it is not science; it is not to be studied in the fields and it is; it is to be pursued in the schoolroom and it is the biggest piece of nonsense that was ever seen in the schoolroom. We are progressing. Let us keep on, and we shall at some time get a clear idea, so as to be able to formulate a model definition.

Charles B. Scott, in his "Nature Study and the Child," thus attempts to define the subject:

It seems wise, at the very beginning, to determine just what we mean by elementary science, or Nature Study. This will prevent ambiguity and misunderstanding in later discussions. The terms "elementary science" and "Nature Study," are both widely used. Elementary science is, per-

haps, more exact, and, therefore, more scientific. Nature Study has a less formidable sound, and better expresses the spirit in which the work should be undertaken. It seems much the better term, at least, for the work in the first four or five years of the school course. The former term includes two ideas. First, it is elementary, as distinguished from advanced. In the aim or purpose of the work, in the material selected, in the methods pursued, it is elementary: planned for, and adapted to the needs and capacities of the pupils of elementary schools. In the second place, it is science, classified knowledge.

Here is offered the choice of another term for "elementary science." That surely is liberal, and nobody can find fault with the permission to use a term that has a "less formidable sound!"

Let us get a few more examples, and we shall then have the thing clearly in mind. Perhaps one of the best, surely the most "taking," concise, and euphonious, is that by Professor Clifton F. Hodge:

Nature Study is learning those things in Nature that are best worth knowing, to the end of doing those things that make life most worth the living.

This is excellent as a definition of his own idea, and that of many others. We will note, parenthetically, that what I have had in mind is not a matter of learning nature, but of loving her. It is not wholly a means to an end, it is an end in

itself. The child loves his parents for some end? No; the loving is an end in itself. But never mind that, now. Hodge gives us a commendable expression of his idea of nature study.

Even John Burroughs in his famous statement (previously quoted): "The purely educational value of Nature Study is in its power to add to our capacity of appreciation—our love and enjoyment of all open-air objects," fails to tell us what the thing is. He speaks of its resultant values. So he might have told us what the poetical, æsthetic, and other values are, and yet not have defined them. When I consider it seriously, I am really forced to ask, if anyone has ever defined it? Nature study, in the popular pedagogical sense, is science—no, it is not; nature study is a matter of the schoolroom—no, of outdoors; nature study is learning —no, that is natural science; but they are one and the same—no, they are not; nature study is —is—I mean such nature study as you see in the teachers' papers, in the books on the tables at teachers' institutes, such as you hear talked about; it is in the air, like evolution, or wireless telegraphy; nature study, in its ordinary, school sense, is—is—Why, any teacher knows what nature study is!

And, after all, perhaps these excellent nature-study writers and workers are in the same "boat," only they will not admit it. Perhaps the thing is not definable. It seems to me to be as intangible as electricity, or gravitation or life or love. We may tell much about it, what it will do, and will not do; we can go all about, and teach it here and there, and watch for results, but without knowing what it is. We are in as great a difficulty as was Walt Whitman in defining the purport of his own poems, "My final merits I refuse you."

John Burroughs, in "Whitman, a Study," attempts to clear up a difficulty that he thus formulates: "A great many readers, perhaps three-fourths of the readers of current poetry, and not a few of the writers thereof, cannot stand Whitman at all, or see any reason for his being." And in his great love for Whitman, two hundred and sixty-two pages are devoted to an attempt to clear up this difficulty. On the two hundred and sixty-third he thus summarizes his success: "After all I have written about Whitman, I feel, at times, that the main thing I wanted to say about him I have not said, cannot say; the best about him cannot be told about him anyway."

So it is with the spirit of nature study. Words

cannot convey the thing. You must see it, or it is not there. Light is useless to a blind man. So I say as to the popular pedagogical conception of nature study, anybody knows what it is. And it may well be added, that every "anybody's" is different from every other anybody's. I cannot even adequately convey in words my own idea of it. I can feel it, and see it, and live it, but I have difficulty in defining it. Here is an attempt to convey some suggestion of what I have in mind for ideal nature study:

Nature study is the examination of natural objects for your own gratification, to satisfy your own curiosity, to give you something to make your walks for exercise and fresh air more attractive; to free your mind of its work-a-day thoughts, and to supply their place with thoughts of God's work; to lead your attention from the ugliness and the evil that are in the world, to the beauty and goodness that are also in the world; to forget self and the troubles of life, and to sit in the sun, and look at the sky; to wonder if you really understand why it is blue, and why the clouds are white. It is nothing less nor more than taking an intelligent interest in the earth and its products. When you have taught the child to do this, you will have

taught nature study. And when you have taught nature study, you will have taught your pupil to be interested in the objects on the earth in his own vicinage. The result is worth its cost.

Or to express the same thing a little more concisely:

Nature study is the creating and the increasing of a loving acquaintance with nature. This shall begin and continue so informally in love, that, sooner or later, it shall welcome the accompaniment of formal knowledge. Both together, both head and heart, and both in earnest, shall increase our enjoyment of life, and our capacity to enjoy it.

In either case the definition is rather long and entirely superfluous. If you know what the thing is, you do not need the definition; if you do not know, or rather, if you do not feel, it is beyond the power of words to convey the thought.

CHAPTER II

"VAT FOR ISH DAT?"

According to one of the New York daily papers, the principal of a large grade-school in that city had a decidedly inquisitive visitor a few days ago.

He was sitting in his office intently poring over reports and excuses, when the janitor swung open the door and announced:

"A lady to see you, sir."

A German woman of ponderous size and waddling gait strode into the room. Both sleeves were rolled up to her elbows. In her right hand, by her side, she carried a huge lobster, just touching the floor, and swinging in accompaniment with her every pacing step. Her appearance indicated that it was indignation which had separated her from the wash-tub.

She swung the lobster over her head, and slapped it down on the table near the desk with a bang that made the absorbed mind of the principal leap from mental to physical matters.

"Vat ish dat?" shouted the belligerent visitor.

"Why-wh-y, that, madam, is a lobster, but——"

"How many leegz has it?"

"Strictly speaking there are ten, but only eight are——"

"How many claws has it?

"The first pair of the ten legs have large claws, the next pair have small claws, and the other two have only——"

"How many eyeez has it?"

"The lobster has two eyes——"

"Vat color is——?"

"But wait, madam; before I answer any more questions, please explain why——"

"Dat's vat I vant to know—*vat for ish dat* your teacher ask my Shonny all dese fool questions. I vork so hard at mine vash-tub all the day long, send my boy Shonny here to larn, and your teacher tell him all dat shtuff, and ax him all dese fool questions. *Vat for ish dat?*"

The reporter who described this interview in his daily paper saw only the humor of the situation. He did not record the principal's explanation, nor the further interrogations of the excited parent. For him it was enough to show the

ludicrousness of the situation. He may not have repeated the words of the conversation verbatim, as a court stenographer would have done, but it is evident to anyone interested in nature in the school-room, that he has portrayed a phase of parenthood in absolute fidelity to fact.

That this is truth, plain truth without an element of humor, can be vouched for by everyone who has had even a limited knowledge of what often results from the consideration of natural objects in the school-room. To use a current phrase, "This is a practical age." Parents form a jury before which the educator must prove the *cui bono*. He must show results worth the time consumed. The Why? stares him in the face; he must be ready for each parent who has a "Vat for ish dat?" And if the results are not worth while, there will follow a denunciation, as surely as the effect follows the cause. There is more than one Edward Bok, and more than one anonymous editor to voice the opinion of thousands of mothers, and denounce the overcrowding of the child's mind. There are voters to reject school officers if time consumed is worth more than results. There are superintendents like the one whom I met in Massachusetts,

to say, "We didn't have any room for that kind."

But editors, parents, voters, and school officers are not all who ask, "Vat for ish dat?"

Listen to Thoreau for a moment:

"We study botany and zoology and geology, lean and dry as they are, and it is rare that we get a new suggestion. It is ebb tide with the scientific reports, Professor ——— in the chair. How little I know of that arbor vitæ when I have heard only what science can tell me. It is but a word, it is not a tree of life."

This is as true of the dilute as of the condensed, of the kindergarten as of the university.

Regarding those sciences, Thoreau is asking, "Vat ish dat?"

Then we have our own John Burroughs, in an *Outlook* on educational affairs, asking the same question in another form, as he denounces worthless results and lack of vitality:

In our time, it seems to me, too much stress is laid upon the letter. We approach nature in an exact, calculating, tabulating, mercantile spirit. We seek to make an inventory of her storehouse. Our relations with her take on the air of business, not of love and friendship. The clerk of the fields and woods goes forth with his block of printed tablets upon which, and under various heads, he puts down what he sees, and I suppose foots it all up and gets at the

exact sum of the knowledge when he gets back home. He is so intent upon the bare fact that he does not see the spirit or meaning of the whole. He does not see the bird, he sees an ornithological specimen ; he does not see the wild flower, he sees a new acquisition to his herbarium ; in the bird's nest he sees only another prize for his collection. Of that sympathetic and emotional intercourse with nature which soothes and enriches the soul, he experiences little or none.

Professor Hodge had evidently heard of or met the German washerwoman, or other like minded folk with a "Vat for ish dat?" for he writes in "Nature Study and Life":

But, the teacher says, the parents make all sorts of objections to nature study, call it a "fad," "nonsense," complain of "waste of time on new-fangled notions," say that "they never had to learn such stuff." These objections of the home are for the most part right as to what often goes by the name of nature study, and nothing could be more helpful for development of ideal courses adapted to local conditions, than to invite their freest possible expression. If we cannot find a nature study worth while, a nature study so full of human good that it will meet and overcome all such objections, then we should devote the time to other subjects. But from several years' experience, the writer is confident that all reasonable objections can be met, and that we can find a nature study so good that this attitude of parents can be completely reversed and their interest and enthusiasm so thoroughly aroused that they will say: "We had no chance to learn these things, but we wish our children might be given the opportunity and teach us."

The trouble is, as has been so often reiterated, that few teachers swing themselves around to

the child's standpoint. In some studies, the teacher must be a teacher, above the child, telling the child. To overcome the onesidedness of a school limited to mere instruction, nature study has been introduced as the most available field in which to let the child do the telling. But, simple as this is, it seems an exceedingly difficult thing for some teachers to understand. Hence the opposition which it meets in some communities, and the amusing paragraphs so frequently seen in print. One of these (shall we call them sad but literal statements of certain real conditions?) is the following from the *Youth's Companion*. It is a fair example:

> A small girl who has just begun to attend school brought home a pumpkin seed and told her mother that the teacher said that, although the seed was white, the pumpkin would be yellow.
>
> "And what will the color of the vines be?" asked the mother.
>
> The little girl replied that the teacher had not taught her that.
>
> "But," said her mother, "you know, dear, for we have pumpkin vines in our garden."
>
> "Of course I do, but we ain't expected to know anything until we are taught."

It is the parents of those children who are the victims of such nature-study instruction that will

inquire, with frowning brow and threatening tone, "Vat for ish dat?"

The reverse of this lobster-pumpkin teaching is the true doctrine.

C. B. Scott, in his "Nature Study and the Child" occupies the correct standpoint.

> More than is the case with most other studies, probably, science, or nature study, deals with the individual child, and aims to develop each child as an individual. It places the material in the hands of each child, and expects him to see and think and tell for himself. Nature is many-sided; and when pupils observe for themselves, each will have a different point of view, will see a different side. The teacher will thereby be helped to realize the difficulty, the impossibility, and, finally, the viciousness, of teaching *en masse*, of teaching classes rather than individuals, and will recognize, respect, and at length encourage and develop, the individuality and self-reliance of the pupil. . . .
>
> We are more and more endeavoring in our schools, from university to kindergarten, to have our students get more than facts; we are striving to develop their intellectual powers—of seeing or apprehending for themselves, of thinking or combining ideas in their relations, of expressing or conveying these ideas to others, and of doing or making their ideas active or effective.

And it may well be added that this original seeing and telling by the child are not to be confined to nature study. What a glorious thing it would be if education could take the place of instruction, if the nature-study point of view could

be added to all studies. Elbert Howard says, "The kindergarten is the best school ever established for educating—parents." And I add, for educating teachers.

Nature pedagogy is the true pedagogy; let the spirit of it permeate and give vitality to every feature of the schoolroom so strongly, that it will accompany the child through his life.

Dr. J. E. Taylor, late editor of "Science Gossip," and a writer of scientific books, says:

> Is there anything more delightful than the fatigue of an afternoon's long ramble after objects one loves? You are not tired of them but with them. It is a delicious fatigue. Subsequent years of trouble cannot obliterate the charmed impressions. They are the sunniest spots in one's memory. Their recollections come, like angels' visits, to unconsciously relieve us in after years of many a sad trouble and trial. They should be laid up in store when you are young, so that they can be drawn upon when you are old. Then the sunshine of youth is stored to gild the troubled days of matured manhood and the darker shadows of old age.

That is "vat it ish for." That is what we teachers shall not need to explain, if we act so that the question need not be asked. We shall arouse the child, and make that waking so noticeable by the parent that he will fail to observe the lobster.

We would not make the child's mind a dump-

ing ground for fad-zeal facts, nor a target for volleys fired according to schedule. We would put him and his mind into an atmosphere of things good, true, and beautiful. Even his uncultured parents will appreciate that and say, "Dat ish goot. Mine Shonny hab ein goot teacher."

And of this environment, this atmosphere of out-door life, there come words of commendation from cultured writers and thinkers. Take a prominent representative. Hear the words of Hamilton Wright Mabie:

> There, are, however, habits and qualities which are characteristic of those who succeed in establishing this relationship with nature.
>
> They are, in the first place, very constantly in the presence and company of Nature. They not only seize, they make opportunities for getting into the woods, for loitering in the fields, for exploring the streams, for walking across the country. . . .
>
> These persons form the habit, in the second place, of leaving their cares, work, interests, and self-consciousness behind them when they go out under the clear sky, along the country road, or into deep woods. They go with an open mind; they are alert to observe, but they are above all things else ready to receive whatever truth, power, or spirit Nature has to impart.

It is worth while to have all children in such intimate relations with Mother Nature. Her

Dulce Domum will then be *dulce domum* not only in the desire of the teacher, who has the child's welfare at heart, but *dulce domum* in fact.

Perhaps your son cannot be rich in money or gee-gaws, but he can be wealthy in his ownership of the world. As Bunyan said, " I have known many laboring men that have got good estates in this valley," and Bradford Torrey tells us, that, " His private opinion is that the world belongs to those who enjoy it; and taking this view of the matter he cannot help thinking that some of his more prosperous neighbors would do well in legal phrase, to perfect their titles. He would gladly be of service to them in this regard."

I hope that all teachers may be of service to our boys and girls, in this regard. Rightly viewed that " ish vat it ish for." Many persons " want the earth ; " so do we, but we want it with no " fence around it." Let old and young break through the palings, and take possession of their birthright, with all its multitudinous resources of enjoyment, and be at home there.

Thoreau thought that the holder of the deed was not really the best owner:

> How when a man purchases a thing, he is determined to get and get hold of it, using how many expletives and how

long a string of synonymous or similar terms signifying possession in the legal process. What's mine's my own. An old deed of a small piece of swamp land, which I have lately surveyed at the risk of being mired past recovery, says that "the said Spaulding, his heirs and assigns, shall and may from this (?) time, and at all times forever hereafter, by force and virtue of these presents, lawfully, peaceably, and quietly have, hold, use, occupy, possess, and enjoy the said swamp," etc.

I like that kind of socialism. I hope the teacher will help your son to get it. We believe in universal ownership here. We want to be rich and noble. Our philosopher Emerson tells us how to do it, and we are trying to tell your boys.

He who knows what sweets and virtues are in the ground, the waters, the plants, the heavens, and how to come at these enchantments is the rich and royal man.

I think you will agree with me that it is worth while for your son to be rich and royal. If we are not on the right road to riches and royalty with that lobster, we will get something else, and another teacher with it.

"Nature is loved by what is best in us," further says Emerson. We want to bring out the best in your boy; we believe that exercise strengthens and develops. We are going to strengthen and develop that "best" by the persistent exercise of

the nature love, which we sometimes call nature study.

Do not be in haste to go; sit still for a moment, your son is worth more than those clothes in the tub. Let me explain further. You want him to do great deeds, I suppose? Did you ever hear of Ruskin? He was a wise man, who got below the surface of things. He said:

> The greatest thing a human soul ever does in this world is to *see* something, and tell what it *saw* in a plain way. Hundreds of people can talk for one who can think, but thousands can think for one who can see. To see clearly is poetry, prophecy, and religion, all in one.

We want to develop your boy's originality, not to pack his head with useless facts. We want to help him to see things and to tell what he sees. To see them in their right relations; to wake up and realize that life is worth living, and worth living, too, in its fullest capacity, and in the best manner. We want to put him under the influence of Mother Nature, because we can find no other power of development so beneficent.

Your boy may never be rich or great or influential, except in the way that I have indicated. Let him have that at lea—no, at most. He may never be a famous writer, nor a poet, but he may

live a famous and poetical life, about which perhaps he only will ever know, and while he may never be able to express himself with Wordsworth's skill, yet he may live his poetry in all the fullness with which Wordsworth lived it as a boy:

> There was a Boy; ye knew him well, ye Cliffs
> And islands of Winander!—many a time,
> At evening, when the earliest stars began
> To move along the edges of the hills,
> Rising or setting, would he stand alone,
> Beneath the trees, or by the glimmering lake;
> And then, with fingers interwoven, both hands
> Pressed closely palm to palm and to his mouth
> Uplifted, he, as through an instrument,
> Blew mimic hootings to the silent owls,
> That they might answer him.—And they would shout
> Across the watery vale, and shout again,
> Responsive to his call—with quivering peals,
> And long halloos, and screams, and echoes wild
> Of mirth and jocund din! And, when it chanced
> That pauses of deep silence mocked his skill,
> Then, sometimes, in that silence, while he hung
> Listening, a gentle shock of mild surprise
> Has carried far into his heart the voice
> Of mountain torrents; or the visible scene
> Would enter unawares into his mind,
> With all its solemn imagery, its rocks,
> Its woods, and that uncertain heaven, received
> Into the bosom of the steady lake.

Many young folks do live in this way, until they are given too much lobster!

The Point of View.

The prime necessity for good nature-study "teaching" is the point of view, what the thing is from your own appreciation of it, and then the purpose in transferring that appreciation to each child. I say, "your own appreciation," because we get, in this world, what we prepare for, and what we give. If you want to develop the individuality and love of the child, first develop and make sure of your own individuality and love, and then give generously to the child. Establish a comradeship with every pupil.

I fancy that some one may object to the reply which the principal made to the German washerwoman, when he tried to explain the purposes of nature study, and that some one may claim that he expected too much, because the woman's son may not have the ability to be a Wordsworth boy. And if you do say that, it is right there that you make a mistake. He loves something exactly as Wordsworth loved. It probably is not "ye cliffs and islands of Winander." But it is something else with an equal love. Your duty is to find out that love. If it is worthy, then develop it. If it is not worthy, then guide it to

something that is. Therein is your mission as a nature-study teacher, to find out, develop, guide, a love for natural objects. Few can write as Wordsworth wrote of his boyhood. But where is the boy that cannot, that does not live it in all the fullness of spirit that Wordsworth lived it as a boy. Few can write good poetry, but every one can and does live it to a greater or lesser extent. Every man, woman, and child is a poet-naturalist. The child's play, the woman's hopes, the man's ambitions, the philosopher's hypotheses are all poetry, though we may call them fancies or the building of air-castles. They are all true poetry, the charm that makes life worth living, the illumination of life by the light that was never on sea or land.

And every one is a naturalist. No one is so senseless as not to appreciate sunshine, flowing water, the ocean, trees, flowers, something. Find out that poetry, that something, then develop it. It is a high calling that comes to you, nature-study teacher. It is for you to develop your poet-naturalists, and you are responsible for just as many as there are pupils in your school.

"Nature Study trains us to keep our eyes open to the living things about us and to an earnest inquiry into the meaning of what we see."—A. C. BOYDEN.

"It can never be too strongly impressed upon a mind anxious for the acquisition of knowledge, that the commonest things by which we are surrounded are deserving of minute and careful attention."—RENNIE.

I wrote a sober, scientific account of all its parts, without a spark of life in it—but I threw it away. I know now that there is something better than the botany of the Horse Chestnut tree, and that is the poetry of it. . . There is poetry and beauty all around us in every common thing, and we, who have had health and eyes, have not seen it. Let us wake up and look about us and get the most out of life every day that we live! Happiest are they who can still look out upon Nature with the eyes of childhood! . . . The first thing is to open the heart. The next thing is to open the eyes.

JULIA ELLEN ROGERS, *in* "*Among Green Trees.*"

"As a rule, children observe well; but a false method of teaching especially that which reduces all school work to a study of books, often destroys this natural tendency. When we reflect what an important factor in mental growth the habit of close and accurate observation is, we can but deplore that so much of our school work tends to diminish rather than to increase this power. Nature study if so taught as to awaken interest, rather than fatigue the pupil, can be made an important aid in the development of this power."—Education through Nature Study, JOHN P. MUNSON, Ph. D.

CHAPTER III

WINNING LOVE FOR NATURE STUDY

"Nature study is never a task, but a tonic. It recreates."
DR. C. C. ABBOTT.

There often comes to my mind a paradoxical story heard in my boyhood days, of an Irishman (for the Irishman is proverbially and everywhere a wit), who at a country store was endeavoring to secure a proper-sized pair of cowhide boots.

He maintained that No. 10 was the required size, but the storekeeper insisted that No. 14 would be a better fit. It seemed evident that the merchant was right, for Pat could not draw on the No. 10's. Still, as he tugged at the straps he declared that 10 was the number, and that his inability to get them on was due only to the stiffness of the leather. Suddenly his flushed and perspiring face lit up with a mingling of smiles and inspiration. The problem was solved. Yet there was a shade of disgust apparent because his bright idea had not come sooner, to save him some hard and futile work.

"Shure," he said, "and why didn't I think of it before? All the trouble is I've got to wear thim boots a few days to limber thim up, an' thin they'll go on aisy."

My interest in the story, and hence my vivid recollection, is not due so much to the absurdity of the situation, as to my sympathy with Pat! The remembrance of the amusing phases of the tale are mingled with my attempt to reconcile with boyish logic, the two facts, that, while Pat in the main was wholly wrong, yet, from a certain standpoint, he was more than half right.

The Irishman's logic has a host of sympathizers among those who attempt to do certain things. As the architect's plans precede the building, so in most cases, the object must be completed in spirit, before it is even begun in reality. This is emphatically true in winning love for the study of nature; the germ must exist before the love can be developed. Something can seldom be made out of nothing.

As Wordsworth says of his poet,—

> "You must love him, ere to you
> He will seem worthy of your love."

There must be an inherent love for nature before

nature will seem to be lovable. We may talk about the lovableness of nature, but we must inspire an interest, and arouse a curiosity, before we exhibit nature's wonders and beauties. At first thought and in the first attempt, this would not seem to be the correct method. The non-lover might reasonably argue, that if nature is so instructive and so lovable, then the best method must be to collate her interesting and winning points, and by their graceful and attractive presentation, win the affection that we are seeking. That process applied where there is no inherent and dormant love, may obtain a transient result, but it will be illusive and hypocritical. Do not mistake open-mouthed wonder and open-eyed exclamations of surprise for love of nature. Such dime-museum interest is worse than none. It is repellant and ludicrous. How well Mark Twain has presented this method of viewing interesting things. You will recall his experience with the European guide:

"All their lives long, they are employed in showing strange things and listening to bursts of admiration. It is human nature to take delight in exciting admiration.

"After we discovered this, we never went into ecstasies any more, we never admired anything,

we never showed any but impassible faces and stupid indifference, in the presence of the sublimest wonders a guide has to display. We found their weak point. We have made good use of it ever since.

"'Come wis me, gentlemen! come! I show you ze letter writing Christopher Colombo! write it himself! write it with his own hand! come!'

"He took us to the municipal palace. After much impressive fumbling of keys and opening of lock, the stained and aged document was spread before us. The guide's eyes sparkled. He danced about us and tapped the parchment with his finger:

"'What I tell you, gentlemen! Is it not so? See! Handwriting Christopher Colombo! Write it himself!'

"We looked indifferent, unconcerned. The doctor examined the document very deliberately, during a painful pause. Then he said, without any show of interest: 'Ah, Ferguson, what did you say was the name of the party who wrote this?'

"'Christopher Colombo! ze great Christopher Colombo!'

"Another deliberate examination.

"'Ah, did he write it himself, or—or how?'

"'He write it himself! Christopher Colombo! He's own handwriting; write it by himself.'

"Then the doctor laid down the document and said:

"'Why, I have seen boys in America only fourteen years old that could write better than that.'

"'But zis is ze great Christo——'"

"'I don't care who it is! It's the worst writing I ever saw. Now you mustn't think you can impose on us because we are strangers. We are not fools by a good deal. If you have got any specimens of penmanship of real merit, trot them out! If you haven't drive on!' We drove on."

You will recall the conversation (with a touch of sympathy perhaps for the guide), as he shows a bust of Columbus and an Egyptian mummy.

As the humorist was apparently impressed by his frantic efforts to present his wonders so as to win exclamations of admiration, and to arouse the traveler's interest in those antiquarian affairs, so in reality many a boy or girl is impressed, and often likewise those of older growth, but the impression vanishes with the Oh, and Ah, and Oh my, which the efforts excite.

Therein partly lies the explanation of the quizzical, semi-amused sentiment so commonly felt for the naturalist, by his ignorant aquaintances. For the learned and loving naturalist to attempt to win for nature the love of such unimpressionable persons, is like an attempt to talk with the inhabitants of another planet, or as some one has humorously expressed the same principle, like a young man trying to throw kisses at a pretty girl across a dark room.

It is as paradoxical with us as it was with Pat, if we try to win a love for the study of nature where it does not originally exist. The result of that will always be failure, and a waste of nerve force. The adage, "You can never make a silk purse out of a sow's ear," is ugly. Yet, it is beautiful because it is true. Watch an enthusiastic herpetologist, entomologist, or botanist, at his studies, and hear him tell of their delights, and observe how much love for his pursuits he will arouse where there is no dormant love to be excited. "Poor man, you may be all right in the main, but there is a 'brick' loose somewhere." Is not that the poorly concealed opinion? Such futile efforts are made in many a school-room, partly from a lack of true understanding of the

situation, and partly, perhaps largely, from very force of circumstances. *Instruction* may be imparted, but the real educational value to be had in learning of some detail of nature, is about as valuable as to learn the population of some little village a thousand miles distant. Neither fact will be the child's own. The instruction has been given, but the value of the educational property is not appreciated and is lost.

There may be a large love of nature, yet wholly unknown because dormant. To suggest a method for the winning of this love is the purpose of this chapter. A love for nature must be won and increased by a corresponding love on the part of the teacher, expressed freely and practiced fully. As Barnet Phillips in the preface to "Eye Spy" has it:

"What I want to discover is the precise time, in the lives of certain boys and girls, when the steel first struck the flint, the spark flew, and out streamed that jet of fire which never afterwards was extinguished."

William Hamilton Gibson tells us how this was in his boyhood days:

"I was very young and playing in the woods. I tossed over the fallen leaves, when I came across

a chrysalis. There was nothing remarkable in that, for I knew what it was. But wonderful to relate, providentially I deem it—as I held the object in my hand a butterfly slowly emerged, then fluttered in my fingers. I was more than pleased with its beauty. I do not know whether I was or was not a youngster with an imagination, but suddenly the spiritual view of a new or of another life struck me. I saw in this jewel born from an unadorned casket some inkling of immortality. Yes, that butterfly breaking from its chrysalis in my hand shaped my future career."

As the child never truly makes such instruction his own if it does not find response in his heart, so pitiable as it is, many older "children in the kindergarten of God" never utilize their most valuable inheritance, because it does not reach the heart.

The deed to such possession of the world is love of nature, the love that you must win by love and by the telling of it. You must have a love for nature before you can win it for her from others. Then "both head *and* heart and both in earnest." You must wear the boots for the child first; you must get him into your world and to understand the language of nature, for indeed "Nature speaks a varied language." She may have her surprises, but

it is to be doubted whether she has loveliness and beauty, except as reflected from the human heart. The pathway to this is not through the surprises, but through us, and our heartfelt appreciation. More than that, it is ourselves. Or, as Bryant tells us,

> "Yet these sweet sounds of the early season,
> And these fair sights of its sunny days,
> Are only sweet as we fondly listen,
> And only fair as we fondly gaze.
>
> There is no glory in star or blossom,
> Till looked upon by a loving eye;
> There is no fragrance in April breezes
> Till breathed with joy as they wander by."

You must wear the boots before you can put them on. The youthful David felt this, for, of the new armor which Saul gave him, he said, "I cannot go with these for I have not proved them. And David put them off." Practically, he could not wear them until he had previously worn them.

There must be the stock before the graft; the seed before the plant can develop. Therefore, talk about the attractions of nature and of her beauties, especially of the beauties. It was the Christ himself that exclaimed at the beauty of the lilies of Palestine. It is the Eternal God himself that looked at his completed work and

said, "It is good." And he put the first man in a garden, with the perfect beauty of nature surrounding and embracing him.

Show the child the beauty surrounding him, provided you are sufficiently skillful and sufficiently in love with that beauty to find it. But it is everywhere. You can teach the pupil to appreciate it, although he may have no inherent love for so called Natural History. The greatest artists are rarely naturalists. The sculptor studies human anatomy, not because he wants to be an anatomist, but to make his work more nearly perfect. Expatiate to your pupils on the beauty of nature. Then show them some, and keep on showing them if you want to do good work. We all crave the beautiful. Even the paper on our wall is now what we call artistic; even the iron register through which the demon in the cellar dashes his hot blasts, are made graceful and alluring to the eye. We all crave beauty, when we have been taught that there is such a thing outside of heaven.

Life, progress, and growth are always interesting. We all like to watch a train leave the station, men digging a cellar, carpenters building a house, or a plant or an animal in its development. This

fact can be utilized, and is successfully utilized in the school-room and in out-of-door work in sense training. Notice the changes in foliage color in a landscape; recognize the changes that take place in the prevailing hue of flowers as season follows season, from the white of the earliest to the dark purple of the autumn Asters. Seeing the actual changes awakens interest, and when awakened, it will branch out in other directions. Then your battle is won.

A healthy child is an animated interrogation point. When he learns that many of his questions can be answered by keeping his sense alert, he will find his appetite in this direction wonderfully and joyously growing. He will need help and guidance. But the desire and determination to dig a thing out for himself, is of inestimable value for increasing his happiness, and should never be repressed.

Nature study in its present pedagogical meaning, is not systematic study of nature, for that is science. Nature study is emotional, as science is intellectual. Anna Botsford Comstock has well expressed this opinion.

"When the idea of nature study first dawned in the educational world, it was inevitably con-

fused with the sciences on which it is based. To-day nature study and science, while they may deal with the same objects, view them from opposite standpoints. Nature study is not synthetic; it takes for its central thought the child, and for its field work the child's natural environment."

But some one may still insist, if nature is so interesting and lovable, it is sufficient to allow her interests and attractions to speak for themselves. Yes, but they never will. They need an interpreter. When the young man goes a-wooing, does he constantly talk only of his own excellences and possessions? or when a man is seeking his wife's happiness, does he depend on his intention to furnish her with a good home and plenty of money? Does not something come in ahead of temporal considerations. The expression of love, is it not?

Yet mere oral expression is not enough. A child can detect a hypocrite quicker than you can detect a misspelled word or a grammatical error. He can do it unerringly, and he will. If your pupil brands you as a fraud, your fate is sealed. You can never teach him anything good. Do not talk to him about the lovableness of nature

if you have none of the genuine article in your own heart; heart, not head.

We who would teach and inspire the young folks, must learn our own lesson before we try to instruct them. Otherwise the child will find our teaching as interesting and impressive as Frank Stockton's bookseller found the "Logarithm of the Diapason."

Let me quote again from John Burroughs:

"A great many people admire nature; they write admiring things about her; they apostrophize her beauties; they describe minutely pretty scenes here and there; they climb mountains to see the sun set, or the sun rise, or make long journeys to find waterfalls, but nature's real lover listens to their enthusiasm with coolness and indifference. Nature is not to be praised or patronized. You cannot go to her and describe her; she must speak through your heart. The woods and fields must melt into your mind, dissolved by your love of them.

"The passion for nature is by no means a mere curiosity about her, or an itching to portray certain of her features; it lies deeper and is probably a form of, or closely related to, our religious instincts."

And from Bradford Torrey:

"I hope I am not lacking in a wholesome disrespect for sentimentality and affectation; for artificial ecstasies over sunsets and landscapes, birds, and flowers; the fashionable cant of nature worship, which is enough to seal a true worshiper's lips under a vow of everlasting silence. But such repugnances belong to the library and the parlor, and are left behind when a man goes abroad, either by himself or in any other really good company. For my own part the first lisp of a chickadee out of a wayside thicket disperses with a breath all such unhappy and unhallowed recollections. Here is a voice sincere and the response is instantaneous and irresistible."

CHAPTER IV

CORRELATING NATURE STUDY

"Oh, yes, we know all about correlation; we have had full instructions, read topical outlines and schedules in our teachers' journals; had it reiterated to us at the Institutes; seen it advocated in the schedules of nature study for each month, and, therefore we know all about it. Of course we correlate nature study. We correlate it with drawing, language lessons, writing, and even with arithmetic and geography, so we are all right on that, and we need no further instruction."

If you really have correlated nature study in all those ways, and insisted upon it in all cases, you have done exactly what you should not have done. You have shaken water and oil together and made a compound, good neither for lubrication nor for quenching thirst. Or, to use another simile, you have flavored a dose of castor oil with wintergreen, and made a mess. You may have helped the oil, but you have made it mighty bad for the wintergreen!

Have you really been using nature study,

that is, original investigation on the part of the child? Have you not simply used a few natural objects in the various kinds of work that you have mentioned? If so, and, I really hope it is so, you are after all not guilty of spoiling the wintergreen.

Not long ago I attended, in a high school assembly-room, an exhibition of the work of the grade schools in the town. As I entered the hall, a supervising teacher came forward and said, "I am glad you came; I know you will be interested in everything, but I want especially to show you what we have done in nature study. I know you are interested in 'such things.'"

Indeed, I was interested and proud too, of the good results attained by the schools, for the exhibition showed lines of work that were truly remarkable.

"There," said my fair guide, as we approached a particularly attractive table, "I know you'll like this. Isn't that beautiful? How well our children do it! Isn't it surprising? Don't you think they've done well?"

Truly it was a beautiful exhibit; the children had done well. I said so frankly, and expressed surprise that so excellent work should have been

accomplished by children who were so young, as shown by their ages marked on the specimens.

"Aren't you glad that our schools are doing so good nature work?" exclaimed the enthusiastic teacher.

"Nature work! Where is it?"

I was not diplomatic, I know, with such an interlocutor and after so cordial a greeting. The words slipped out without a thought.

"Here, here; what are you thinking about? This nature work; isn't it beautiful?"

"Yes, it is beautiful drawing, neat writing, correct capitalization and punctuation," I hesitatingly equivocated, as I picked up a prose paraphrase of Bryant's "Fringed Gentian," decorated with "original" drawings. There was at the end a little angel with wings, and an anchor with a chain gracefully twined around it.

"Hope blossoming within my heart,
May look to heaven as I depart."

Then came Emerson's beautiful fable of "The Mountain and the Squirrel."

"The mountain and the squirrel
Had a quarrel;
And the former called the latter "Little Prig;"
Bun replied
You are doubtless very big."

I read no further, but I am sure the mountain backed out of the fight, if I may judge from the squirrel's attitude and expression. It was artistic, and certainly artistically realistic from the child's standpoint.

Then appeared "Seaside and Wayside" stories retold with drawings, almost as good as the originals.

Perhaps the most attractive was the work in water-color. A bouquet of roses painted by a child eight years of age was indeed remarkable, and so I went over the drawings of daisies, maple keys, wild geraniums, dogs, and horses. I felt a tinge of disappointment when I saw that the flowers had been drawn in the winter term, some with the aid of outlines on the sheets, and had been colored *ad libitum*, or by the direction of the teacher.

Yet it was all good work in drawing and language, most of it having been made from outlines and books, while only a few samples had been made directly from nature.

The trouble was that I was talking to the nature supervisor and not to the teacher of drawing or of language, and my questioner was persistent. She

repeated, "Don't you think this nature work is good?"

And so I was forced to say, as I do to you, that it seems to me that the mere drawing of natural objects and writing about them, even if from the objects themselves is not necessarily nature study. A talent for original seeing, a love of natural objects may be stunted by the requirements of drawing and writing. The wintergreen seemed to be pretty nearly all castor oil, judging by the taste. You can correlate nature study in this manner till there is no nature study left.

Professor Hodge in his "Nature Study and Life" (I like especially that word *life* in the title) tells us regarding the experience of the children in rearing plants:

"No skilled gardener can even tell, much less write down, a hundredth part of what he knows about plants. . . . It was thought at first that the children might be induced to keep diaries or records of their plants, giving just what they did and just how fast the plants grew; but it was found that their writings were of little value, and *were even thought to act as a chill to the spontaneous interests of some of the children. Some children have a passion to write, while in others*

thought of writing seems to benumb every impulse." The author's italics are expressive.

But if you must correlate nature study and language exercises—and there are some teachers who will persist in doing it—never lose sight of the original-seeing nature study.

Then, again, be sure that you know which is nature study, and which is the drawing and language, and just wherein is the correlation.

Not long ago I had occasion to examine several hundred letters from children engaged in a contest of nature-study writing and drawing. Please note that it was nature-study writing and drawing, not a contest on writing and drawing nature study.

Among the many letters was a particularly attractive package of eighty, all from one school. "Here is the prize," I thought, as I cut the pink string and opened the neat foldings of firm manila and delicate tissue paper within. The letters were written on only one side of the sheet and not folded which alone was enough to make them attractive to an editor. What beautiful vertical writing (not that I am especially an advocate of that system) but beautiful because it was so perfectly legible. It was a pleasure to read. And the capitalization and punctuation? All perfect.

Then, too, what beautiful drawings. I envied the child whose letter I first picked up. So neat and pretty. After my hard work over nearly a thousand others, this instalment was indeed refreshing. But when I had thus enjoyed about a half dozen, there began to creep over me a feeling that I had somewhere previously read that last one, and not so long ago, either. Then I studied them with keener interest and with growing amazement. How could so many children have ascertained certain facts with a clearness so uniform, and have described them in expressions so similar? It was bewildering. Eighty of them, and all cut on the same bias. But that bias was really bright and fresh. I could not gainsay that.

After I had read about two dozen, my mind recalled a visit to a factory in Waterbury, where I saw a coil of wire fed into a machine and reappear as a stream of glittering pins that were rolled around in a "hopper," and shot out of a spout neatly arranged in rows on paper. Some enthusiastic teacher had correlated a coil of a "nature-study" story into a school machine, and the hopper had evolved attractive language-pins beautifully arranged on eighty papers, and then, alas and alack! she sent them to me. The thing I

wanted was not there. In sadness I laid them aside.

Next I picked up an unattractive letter written on the leaves of a pocket note-book. The drawing that accompanied it was crude and the paper was soiled by finger marks. With difficulty I read it, but was fascinated as I deciphered the story of a boy's seaside investigation of the fiddler crab. He wanted to know how they lived underground; what they did; what food they ate; what kind of quarters they occupied. He made inquiries of the fishermen. No one knew. He said, "I'll find out if it takes a week." He borrowed pick, shovel, and crowbar. He went to work and he found out. Then he wrote the story, as he sat beside the hole that he had dug after several hours' hard work. He made the drawing after careful watching of the living object. He wrote the article on the field of battle, where the weapon was a spade, the enemy a crab. I was sorry that I had not a basketful of prizes to give that boy, because he wrote his letter for the love of it, and not for a reward, of which he knew nothing.

The story of a little girl's watching the sexton beetles burying a dead snake "hour after hour, with her little rocking-chair and parasol, in the

broiling hot sun," as her mother expressed it in a letter written without the child's knowledge, showed nearly as much determination to find out things, and the description was good enough for second prize. The drawing like a huge letter S was explained to be "the snake;" two little rings like miniature pennies, were explained to be "the beetles." It was charming.

I found some others nearly as good, which lost high rating by only a slight deficiency of the right spirit; such letters were a prize in themselves, but I regret that in numbers they were small. The greater part showed too much correlation of language-work and drawing. The nature study, if indeed there had been any, had been buried out of sight. Yet many accompanying letters from parents and teachers showed that the importance of nature study was appreciated.

There is danger of correlating nature study until it is annihilated.

There is danger too of thinking that you have some nature study and some drawing when you really have none.

"But do you mean to say, that we shall not correlate nature study with language-work and drawing?"

Yes and no. It all depends upon where you stand and what you do and how you do it. You may find natural objects useful in your language teaching and in your drawing lessons, but do not let it end there. Have some nature study sometimes uppermost in your mind, with or without language lessons, according to circumstances and the preferences of the pupils. "These ought ye to have done, and not to leave the other undone."

All these things are from the negative, that is, from the prohibitive or cautioning point of view. The positive also exists, but with it there is no danger of correlating too much.

Incidentally and to such limited extent as may be found necessary, there is manual training. Instead of having the pupils in that department wholly occupied in making patent boot-jacks, wooden nutmegs, or in engraving Chinese hieroglyphics on blocks, good as all these things may be from an artistic point of view, let some of the most active and practical boys make things to be used in nature study. There is the doing before the seeing, and spontaneous activity and original observation are the prime essentials of true nature study.

For plant life we want the germinating case, the

boxes for indoor and outdoor gardens, the miniature hot-house with roof of window-frame and shingles of glass, the fernery, and plant presses.

For insects, there are the net, the breeding-cages in great variety of designs, the tanks for aquatic insects, amphibia, and fish. There are the vivaria for the turtles or snakes. And speaking of snakes reminds me that the same vivaria covered with wire netting may have the bottom turfed over and used as a cage, in which to watch grasshoppers shed their coats from time to time.

As we go higher in animal life, there is even greater scope for the manual training correlation, and that is in the development of the artistic talent. What scope is here given for the designing and building of bird-houses! What a variety of grades and styles of workmanship are possible! For our four-footed animals we need a cage, one box-like section lined with sheet-tin, the other an open framework on which wire netting is neatly tacked. Let the boys make these.

Would you develop originality? Then increase ingenuity, quicken powers of observation, correlate manual training with nature-study interests and see how the whole child-life wakes up. You wake

him up to one thing and he is awake to all. "I take a deeper interest in my geometry and Latin since I became interested in nature study. I'm going to be somebody," is an extract from a letter from a high-school boy. And then he goes on to tell of his "air castles," about being a scientist and making some great discovery. That boy woke up. He came to himself, and the life developed by nature study will be useful and efficient in any occupation.

Nature study is a valuable correlation in teaching true democracy, the American idea. There is no aristocracy or oligarchy in nature. Even the queen of the communal Hymenoptera is not an aristocrat, but the most prodigious worker of them all. She is even "elected" from among the plebeian worker-eggs, and held to her position by the most perfect democracy in the world, an absolutely universal approbation.

The naturalist who sees things in their true relation sees no high nor low, but universal co-operation and mutual interdependence. The scarlet tanager is attractive, but it is easy to show the young folks that the earthworm has a mission quite as important. Nature study impresses one with respect for high and low, large and small,

and binds all together in universal sympathy and brotherhood.

> "He prayeth best who loveth best
> All things both great and small;
> For the dear God who loveth us,
> He made and loveth all."

Nature study impresses one with the importance of the so-called lowly things. The balance may at many a point be easily upset. In the natural world as well as in the spiritual this is true. "For God hath chosen the foolish things of the world to confound the wise; and God hath chosen the weak things of the world to confound the things that are mighty; and base things of the world, and things which are despised, hath God chosen, to bring to naught things which are."

How often is this exemplified in the study of nature. A world all lilies, butterflies, goldfinches, peacocks, generals, lawyers, or policemen would not be a well balanced world. You must have corn and potatoes and chickens, and men with the hoe. Such truths of the balance of nature and of civic life should be correlated with nature study. There is a mighty lot of such truth expressed in this statement by Richard Jeffries:

"Could imperial Rome have only grown sufficient wheat in Italy to have fed her legions, Cæsar would still be master of three-fourths of the earth. Rome thought more in her latter days of grapes and oysters and mullets that change color as they die, and singing girls and flute-playing, and cynic verse of Horace—anything rather than corn. Rome is no more, and the lords of the world are they who have mastership of wheat."

In an interesting account of searchings for the wild mouse, Dr. C. C. Abbott interpolates this statement:

"The whole world is thick with fools who have lost all because of their insane desire to better their conditions. Early in life we reach our proper level, and he is blessed who has no ambition to soar above it."

Then he goes on to tell us about his mouse. At first reading this seems incongruous. It is merely nature study illumined by a flashlight of true democracy.

Correlate nature study in large quantity and persistently with patriotism, that important part of a child's education which is somehow erroneously supposed to have its root in fighting and in political intrigues. It is not *civil* history but

natural history that should primarily be correlated with patriotism.

What is patriotism? Love of country, is it not? the country including the little congestions which we call villages and cities, the country itself, not mere pride in victories of warfare, ability to fight, nor in political intrigues past or present, but

> "I love thy rocks and rills,
> Thy woods and templed hills;
> My heart with rapture thrills
> Like that above.
>
> "Let music swell the breeze
> And ring from all the trees.
>
> From every mountain side
> Let freedom ring."

That is patriotism; that is love of country, our beautiful lovable country. Is not a great deal of what we call patriotism missing the main thing, mere machinery of patriotism? Is not much of our so-called patriotic teaching the mere mechanics of warfare and politics—so much so that the real love of our country is lost sight of? Let us talk less about our savage fighting and "the men behind the guns," and more of the real thing that we have been seeking to establish—love of our beautiful country. So correlate nature study with

patriotism and let patriotism grow out of our love of nature study. For nature study, rightly understood, is not a matter of bugs and snakes, but of the highest and best patriotism. It is a matter of the trees, the roads, the sunsets, the clouds, the old homestead, the city home and its surroundings, although in the city there may not be much that is attractive except the blue sky and the stars. And here comes in the fighting part but only secondarily. The naturalist—using the term in its broadest sense—is your true patriot. The naturalist so loves the hills, the valleys, the fields that he would lay down his life for them, and his brothers and sisters of dear Mother Nature.

The native land *and* God. That sums it all. Love of native land—nature study—brings our thoughts and our life to a higher plane.

And right here is another important part of a child's education, his moral training, to be thoroughly correlated with and produced by nature study.

"The sunset is unlike anything underneath it; it wants men." You can never improve that child by preaching words alone. Influence by example and association. The story of the naughty boy that came to some bad end, and of the goody-

goody boy that became a millionaire and played golf and drove an automobile is not effective because it is not true to life, and the child soon detects the sham. But the flower is ever beautiful, the bird is ever joyous, and nature *is* always true. More than stories with a moral do I value nature for morality.

> "Nor hev a feelin' if it doesn't smack,
> O' wut some critter chose to feel 'way back;
> (Why, I'd give more for one live bobolink
> Than a square mile o' larks in printer's ink.)"

Would you have the child pure? Let him associate with purity. Says Thoreau:

"Exquisitely beautiful and unlike anything we have is the first water-lily just expanded in some shallow lagoon where the water is leaving it, perfectly fresh and pure before the insects have discovered it. How admirable is its purity. . . . It is the emblem of purity and *its scent suggests it.*"

Would you have the child beautiful—real beauty permeating every fiber? Says Burroughs:

"Nature does nothing merely for beauty; beauty follows as the inevitable result. . . . Indeed, when I go to the woods or fields, or ascend to the hilltop, I do not seem to be gazing upon beauty at all, but to be breathing it like air. . .

It rises from every tangle and chasm. . . . I am not a spectator of, but a participator in it."

Would you have the child joyous? Says the Rev. Dallas Lore Sharp:

"The joy in wild things is the joy of being wild with them—vacation joy."

And so we can go to nature for all excellencies, and she is constantly trying to win us. Or, as Walter Savage Landor has expressed it:

> "We are what suns and winds and waters make us;
> The mountains are our sponsors, and the rills
> Fashion and win their nurslings with their smiles."

Correlate the child's moral training with the truth, beauty, and loveliness of nature. With nature study *may* be correlated the minor matters which you are so accustomed to associate with it. With your nature study *must* be correlated these higher matters if you would rightly teach. What a suggestion has Walt Whitman given us for correlation:

> "There was a child went forth every day,
> And the first object he looked upon, that object he became;
> And that object became part of him for the day, or a certain part of the day, or for many years, or stretching cycles of years.

The early lilacs became part of this child,
And grass, and white and red morning-glories, and white and red clover, and the song of the phœbe-bird.
And the fish suspending themselves so curiously below there, and the beautiful curious liquid,
And the water-plants with their graceful flat heads—all became part of him."

But your nature study must be correlated with something even higher than all this. It must reach the highest spiritual faculties, reaching out, aye, taking hold of the Great Infinity. Your nature study must be correlated with a religious life. If you are doing that, you are doing the best correlating. You are realizing what nature study means! You are agreeing with Emerson:

"Every earnest glance we give to the realities around us, with intent to learn, proceeds from a holy impulse, and is really a song of praise. What difference can it make whether it take the shape of exhortation, or of passionate exclamation, or of scientific statement? These are forms merely. Through them we express, at last, the fact that God has done thus or thus."

"To lead a little child into this beautiful world and open his eyes to the marvels which await him, is a most precious privilege. He could stumble along without leadership, and he would see many things. But how much a guide is worth! Parents may well put themselves to great pains for the sake of introducing their children to Nature. No effort will bring any greater reward. They may open these young eyes to the color of the birds, to the varieties of the trees, to the delicate beauty of the commonest wayside flower, to the intricate traceries of a butterfly's wing, or the grace of a clinging vine, to the glory of the sunset and the grandeur of the lightning. Children may be taught to distinguish bird notes and name the common birds. Their eyes may be trained to the harmonies of color and the marvellous detail in the frost and the snowflake. No child will be cruel to birds or insects or animals of any sort, if he is properly introduced to them and learns their true place in God's marvellous universe. A sensitiveness to the beauty of the world and the infinite love manifested in its wonderful resources, means much to develop the mature character. This is wanting in many a man and woman because there was no one to guide their early years."—REV. EDWARD HERRICK CHANDLER.

CHAPTER V

"KEEPING THEM DOWN"

"Well, I suppose that is all right, but please tell me how I am going to get them down again?" she said in a low tone to the superintendent, as I went out of the room. The words were not intended for my ears, but I caught them, and they touched me, every bit of me.

She was a teacher who thoroughly believed in discipline. Every action in the school favored of militarism. She was famous throughout the town for her good government. When the superintendent and I entered the room she came forward very primly, and I thought grimly, but perhaps that was imagination, the result of the superintendent's casual remark, "You will have to be a little careful with this teacher. She is great on discipline and routine, and says that she doesn't believe in modern fads." The good old methods of the days when Webster's blue-covered spellin' book was paramount, were good enough for her.

After acknowledging the introduction, she turned and said:

"Now, children, this is Mr. Bigelow. He knows everything about the trees, and flowers, and birds, and bugs, and such things, and he has come here to tell you all about them. [A large contract, I thought.] Lay aside your books and papers; now sit up and fold your arms and pay strict attention. You must be very still. He is going to talk for three-quarters of an hour, and he will tell us a great many interesting things, I am sure."

After a minute or two made noisy by the putting of books into desks, one could almost painfully hear the *tick-tock* of the clock. The teacher turned to me, and, as she nodded her head, said:

"Now, Mr. Bigelow."

Then she went to the opposite corner and stood there, with eagle eye wide expanded to detect the earliest sign of disorder. In the meantime she had sent an assistant to the rear of the room. I paused for a moment to enjoy the air of expectancy and the almost breathless stillness I noted the glistening eyes of a few, and the soldier-like indifference of most of the pupils. Three or four big boys in the rear seats had especially attracted my attention, by the look, half of disgust, half of protest, with which they had swung books out of sight, and stuffed their hands into

their pockets. I had seen that look before! I knew how to translate it into, "Oh, this is going to be a goody-goody talk to tell us how we ought to enjoy this beautiful world and be very grateful to the One that has given it all to us." With an air of resignation they leaned back, and I remembered the factory that we had just passed, and what the superintendent had told me of the dull work, the long hours and the low pay of the operatives.

Then I said:

"I am trying to find out how young folks feed their pet animals. Will some one please tell me what he thinks is the best for his special pets? A friend of animals has written to me that bread and milk should not be fed to any pet animal, and I am trying to learn about the experience of others. Will some one please speak and tell me?"

Simple as this inquiry was, it had the effect of a bomb-shell. The mental attitude was completely upset and I had to wait a minute for it to settle. Here was every one, other than myself, expecting a sermon on the wonders and beauties of nature about which the young folks had from earliest childhood been told and told again. And I felt

almost culpable as I thus jerked their minds "the other end to." They to give information and I to be the learner! Impossible! It took a minute for the idea to penetrate, for the hands to come out of the pockets and the legs to be drawn up, while looks of astonishment passed from one to another. Faces brightened, eyes began to sparkle, a hand here and there came up hesitatingly. I had touched the known in a place dear to the hearts of those young people. The matter of food was soon explained. Then what stories of dogs, cats, parrots, canaries, hens, rabbits, and even of a pet crow. The story of this crow's capture led to an experience, related by one of the big boys about his dog and a woodchuck killed in the stone wall, and how the little woodchucks were brought home. I was delighted; the superintendent's countenance beamed with pleasure, I saw that he was convinced, and later I was not surprised to have him write to me, "We have room for the kind of nature study which you exemplified." But the teachers were alarmed, almost excited. The eagerness of some of the children to tell experiences actually pushed them out of the seat and several steps forward, with outstretched hand. Oh, the joy of telling!

the joy of being appreciated, of being recognized as actually knowing something worth listening to! Every mind woke up, because each was appealed to individually, and every one was eager to respond. The assistant expressed volumes when she whispered to me, as I shook her hand in parting, that she "Didn't think those children knew so much."

But the principal apologetically said, "I never saw them act so badly. I'm afraid you'll think we don't have any order. I was ashamed to have two or three talking at once."

To her I said, that they had been only a little over-eager in telling me their experiences. But to you I say that I commend the young folks. I regretted that there was only one opportunity of telling; that there must be a condensation of what should have been extended.

The principal then made the remark to the superintendent, as quoted at the beginning of the chapter.

Discipline, and instruction are for your school, as a whole. Nature study is for the pupil—this one, that one—a recognition and development of individuality. Restrain *and* develop. Not one, but both. Not everlastingly keeping them

down, but sometimes letting, helping, encouraging, to spring up. That is why I appeal to you for informal nature study, for the very young folks, not instruction in science, however elementary, or however dilute and interesting you may be able to make it. Think and act sometimes from the child's standpoint. That in relation to natural objects is nature study.

CHAPTER VI

WHY NO SCHEDULES FOR NATURE STUDY

What is nature study? It is a point of view. It is the acquirement of sympathy with nature, which means sympathy with what is.

As a pedagogical ideal, nature study is teaching the youth to see and to know the thing nearest at hand, to the end that his life may be fuller and richer. Primarily, nature study, as the writer conceives it, is not knowledge. He would avoid the leaflet that gives nothing but information. *Nature study is not method.* Of necessity each teacher will develop a method; but this method is the need of the teacher, not of the subject.

Nature study is not to be taught for the purpose of making the youth a specialist or a scientist. Now and then a pupil will desire to pursue a science for the sake of the science, and he should be encouraged. But every pupil may be taught to be interested in plants and birds and insects and running brooks, and thereby his life will be the stronger. The crop of scientists will take care of itself.—Professor L. H. Bailey, Professor of Horticulture at Cornell university.

Books of natural history aim commonly to be hasty schedules, or inventories of God's property, by some clerk. They do not in the least teach the divine view of nature, but the popular view, or rather the popular method of studying nature, and make haste to conduct the persevering pupil only into that dilemma where the professors always dwell.—HENRY D. THOREAU, the sage of Walden.

Professor Bailey is a prominent scientist of the present day, whose writings are chiefly scientific.

He occasionally views nature informally, as in his famous article on nature study from which the foregoing is quoted.

Henry D. Thoreau was the first and is generally accredited to be the greatest of American naturalists. He occasionally looks at nature from the scientific point of view, as is evinced by his assistance to Agassiz. Thoreau is a naturalist; Professor Bailey a scientist. These are two different points of view, although there is no opposition nor hard and fast lines. The most successful scientist must have much of the naturalist ("Nature Study") in him, and the naturalist's love leads him to more and more of scientific knowledge. It is not a question as to whether one has a naturalist's love, and his ability to see things, or whether he has a scientist's knowledge. Each man must have both qualities. The question is, of which quality has he the most? and the answer decides whether he is a scientist or a naturalist. I take these two men as typical of the two classes, notwithstanding the fact that each has much of the spirit of the other. Both Bailey and Thoreau have recognized that there is a difference between nature study and science. Here is Bailey's way of making the distinction:

HOW NATURE STUDY SHOULD BE TAUGHT

Nature study is not the study of a science, as of botany, entomology, geology, and the like. That is, it takes the things at hand and endeavors to understand them, without reference to the systematic order or relationships of the objects. It is wholly informal and unsystematic, the same as the objects are which one sees. It is entirely divorced from definitions, or from explanations in books. It is therefore supremely natural. It simply trains the eye and the mind to see and to comprehend the things of life ; and the result is not directly the acquirement of science, but the establishing of a living sympathy with everything that is.

Thoreau in "Spring" draws the distinction in his characteristic style as follows :—

As it is important to consider nature from the point of view of science, remembering the nomenclature and systems of men, and so, if possible, go a step further in that direction, so it is equally important often to ignore or forget all that men presume that they know, and take an original and unprejudiced view of Nature, letting her make what impression she will on you, as the first men, and all children, and natural men do. For our science, so called, is always more barren and mixed with error than our sympathies are.

It has been seen in the two introductory paragraphs of this chapter, that both denounce schedules or definite method. "Why is this?" asks many a teacher. "Isn't it a good thing to have your work assigned in advance?" Yes, but nature study is not *your* work. *It is from the standpoint of the loves and interests of the child,* not from that of your knowledge. You will make

schedules of assignments in advance, when you can predict in advance what each child will find of interest or will desire to tell you. Bailey and Thoreau denounced schedules in nature study because they recognized this distinction. And the trouble with you who clamor for machine-made schedules, is that you fail to recognize the two points of view. If you did not, you would not ask for schedules.

Schedules are useful in science, even the most elementary. It is right that you assign the consideration of the stem the day after that of the root, or *vice versa*, if you so please. You may assign newts after the fishes in zoological work. You are instructing in that; that is *in struere*, building in, to the child's mind, but in nature study you have the true education, *e ducere*, leading forth the child's ideas.

The pernicious custom of ignoring the child's individuality in assigning the same thing to all, and of having a definite assignment for each day, without regard to the excellent and unusual available things that may come to hand, reminds me of a farce, entitled "The Railroad Restaurant," that I once saw acted by the young men of a literary society. I do not mean to assert that

nature study in definite assignment for each day, and uniform to each pupil, is a farce. By no means, for the farce pleases, even if there is no definite instruction. On the other hand a scheduled assignment may do positive harm by stunting growth of interest.

The "Railroad Restaurant" farce was extremely simple and ridiculously funny. The waiter pounded the gong, the passengers rushed in and took seats at the bare tables. The waiter threw the gong into the corner, and hurried from one to another of the would-be diners, hastily inquiring, "What will you have?" but ignored all the answers. From an armful of huge soup plates he slammed one on each table. Then he rushed to the pantry, tugged forth a pail of soup and set it in the middle of the room.

Filling a Brobdignagian squirt-gun with the entire contents of the pail at one tremendous pull of the plunger, he rushed from diner to diner, shouting as he filled the plates to overflowing, "You've only five minutes before the train goes, and we've only soup ready to-day; you'll have to make out on soup." Hastily returning the squirt gun to its place, he sounded the gong; the locomotive bell rang; the conductor shouted

through the half opened door, "All aboard!" and there was a rush for the train.

Perhaps the audience saw only a burlesque on the methods in vogue at railroad restaurants, but into the mind of at least one who was present there floated a remembrance of a certain schoolroom. Flushed and eager from outdoor exercise and interests, a crowd of happy children walked briskly into the room and took their seats.

"What have you, there, John, that is attracting so much attention?" sharply inquired the teacher.

"A little spotted turtle; we found it down by the spring and——"

"Carry it right outdoors and leave it there. You ought to know better than to bring such a thing into the schoolroom—of all——"

"But please, ma'am, I thought you might want it in nature study," replied the boy, as a few in his immediate vicinity pressed forward to see it, and in various parts of the room a dozen or more hands came up from excited children, who had evidently participated in the capture of the turtle, or who wanted to see it. "No, we don't want it to-day. Don't you know that we commence the study of the local amphibia on the 15th

of April? To-day our schedule says we are to have buds. I have an armful of specimens here on my desk, as you can all see. I was out hunting for them before some of you children were out of bed."

John, rather crestfallen, in a mystifying guilt as to his "amphibia" stumped along in the manner that only a boy of repulsed interests can do, and carried the turtle out of doors. The other children wilted in their eagerness, and slumped into their seats. The hand-bell rang snappishly, the children stiffened, with rigidly folded arms, and perfect order reigned in that schoolroom. No *a la carte* in that mind restaurant, but a public institution of diet changed only after long routine and per schedule.

And yet as I day-dreamed there, I thought what an ideal teacher she is. What a good disciplinarian, how perfect in her manner, how conscientious and thorough, in everything that she does. Her principal has required "Fifteen minutes a day for nature study, preferably after the opening exercises." (Get it off your hands as early in the day as possible, so that you will be ready to do something—this was not in the schedule, but I felt it; perhaps I was wrong, perhaps not.) The

teacher congratulated herself because she could not do a thing half way. She must have a time for everything and everything for a time. She had therefore met a few other teachers in the building, and they had prepared this schedule, which had met with the heartiest approval of the principal.

"That teacher is so thorough," said he with emphasis and with pride, as he exhibited the schedule, "she does everything thoroughly."

Do you not know that you have systematized and scheduled *in* elementary or dilute science and *out* every particle of nature study? I saw the boy carry it out in his heart, face, and hand.

Again I visited that school. I knew Sam. He lived not far from my home, and we had had many an enjoyable walk together in the great outdoor world. He had a general interest in all natural objects, but he dreamed of pet mice. That boy was an enthusiast, and consequently an authority on pet mice. I heard the teacher read a part of the interesting chapter, "Wild Mice," in Ernest Ingersoll's book on "Wild Life of Orchard and Field." Sam and the other children listened attentively as the teacher read:

These jumping mice are the prettiest of all the Eastern

wild species. If you should look at a kangaroo through the wrong end of a telescope you would have a very fair idea of our little friend's form, with hind legs and feet very long and slender, and forelegs very short; so that when he sits up they seem like little paws held before him in a coquettish way. His tail is often twice the length of his body, and is tipped with a brush of long hairs. He has a knowing look in his face, with its upright furry ears and bright eyes.

Then the teacher took down her new copy of Witmer & Stone's "American Animals," and let the children enjoy those two plates of photographs of the skins of various mice and shrews.

I watched Sam. And Sam looked at me occasionally in an eager way. He reminded me of my old dog Daisy, when I held her trembling in eagerness, with the woodchuck only two feet from her nose, and plainly visible under the boulder at the bottom of the dilapidated wall.

The teacher read on, about the meadow mice that "are the homeliest of their tribe," and about the deer mice and the white-footed. And again the photographs of the skins were passed around.

Sam, I thought, I know that you would like to get right into this, right up here with the mouse that you caught in the meadow day before yesterday, and bring in that wood mouse, and a few of those "fancy" pet mice, the waltzing ones in particular, and tell us more than the books and we

have ever known, perhaps not about mice, but about the enthusiastic pleasure of keeping them and caring for them. It takes a boy to know that! If the big man that writes books really knows that, it is because he has remained a boy; he may have the man's body, yet he retains the boy's heart.

One scientist with a grown up body and a boy's heart, Professor Clifton F. Hodge, writes:

> But after all, childhood—active, fresh spontaneous childhood—and its need of the normal environment for growth and vigor, supplies the imperative demand for a natural and active nature study. Truly "trailing clouds of glory do we come"; and when we discover the right way, there shall be no "shades of the prison-house" to "close upon the growing boy!" In rare cases now we find the charm of childlikeness, the open interest and rapid growth, extending on through boyhood and to the end of old age. When we learn how to educate normally, this may become the rule rather than the exception.

The teacher read on in her book, while I had been silently soliloquizing. The schedule was one on mice in the last of two weeks' assignment on rodents.

I fear that my mind wandered from the reading for I know the children and their interests. Sam let me have a pair of waltzing mice, and had been giving me lessons in feeding them. I asked him

after school if the teacher had ever been down to see his pets, and he said he had once invited her, and she seemed somewhat interested, but she must walk that afternoon with another teacher in the woods by Reginald park to get some leaves for the next day's lesson. He guessed she forgot it afterwards.

Then I forgot that Sam was walking with me, and my mind wandered again. I was thinking about some of the others in the school that had special interests, and I wondered and I wondered till there floated through my mind another thing that I had read in Professor Hodge's "Nature Study and Life:"

> In adult science we have been studying dead things so long, dissecting and analyzing type-forms, that we have well-nigh gone blind to the living, active side of nature; but this has furnished the primitive and fundamental, and must furnish the larger future, interest of mankind in nature. So completely does this side monopolize our college and even university courses in biology that our teachers know nothing else to teach.
>
> However much value this may have for the adult thought, *when we attempt to teach little children we must moult it all, heed every suggestion of the Great Teacher, and become as little children ourselves.*

There you have the solution. Just so long as you let dilute or elementary science (good as it

may be in its place) crowd out all nature study, just so long will you need schedules. Every time you ask for a schedule, every time you make all the pupils do the same work on the same object, *you are teaching science.* Not that I love science less, but, for the young folks, that I love nature study more. I appeal to you to take the things that come to hand and as they come to hand, and let your young people develop along the line of individual preferences. For nature study is not to be taught. Never make a mill of your school with an everlasting grind, grind, grind, and everything going into one hopper. You are developing human beings, *human beings* (not naturalists nor teachers) trained uniformly in some things, but with enough nature study and some other things to preserve and develop individuality.

And yet a mere objection to schedules does not seem to get wholly at the heart of the matter. There surely is no harm in intelligently planning a line of thought, or of suggesting to the young folks what they will find of interest for the week or month.

Perhaps we get at the real difficulty from another point of view, if we summarize by saying that it is *all right for the teacher to make the schedules;*

all wrong for the schedules to make the teacher. Keeping a diary may be a pleasant and profitable outpouring and developing of one's best self; the diary may be a drudge-making master. So it is with schedules. It is all in the way the teacher uses them. This does not mean a compromise with a thing of evil; it means the right use of a thing that in itself is essentially good. But it is a thing so commonly misused that it most often seems best to omit it entirely. "If thy right eye offend thee, pluck it out."

Perhaps my strong dislike for schedules in nature study, amounting almost to repugnance, is due not so much to anything intrinsically wrong in having schedules as in misusing them. Your nature study must develop the spontaneity, individuality, and interest of the child. *It must wake him up and lead him out* as no other study can. So far as a method or definite line of thought on your part will aid in doing this, so far it is good. When your method tends toward machine instructing, then it is wholly bad. I have seen much of this bad kind, hence, not because I love schedules of the right kind less, but because I love the child more, I have said "out with them." They are dangerous unless used with extreme skill.

"Whoever has not in youth collected plants and insects, knows not half the halo of interest which lanes and hedgerows can assume. Whoever has not sought for fossils has little idea of the poetic associations that surround the place where imbedded treasures are found. Whoever at the seaside has not had a microscope and aquarium, has yet to learn what the highest pleasures of the seaside are."—HERBERT SPENCER.

"Culture consists less in wide knowledge than in wider sympathy; not so much in stores of facts as in ability to transmute facts into knowledge; not only in well-grounded conviction, but in toleration; not alone in absorption of wisdom, but as well in its radiation; in patriotism that is without provincialism; in the development of character. But since individual minds differ much in their composition, no one kind of treatment can be best for all, and the ideal system will be that which is elastic enough to allow each to receive what is best for it. True culture, then, cannot be obtained by forcing all minds into any one mould however carefully that may be made, but it is rather attained by allowing each mind to expand for itself under a proper combination of nourishment from within and stimulus from without."—WILLIAM F. GANONG, Ph. D., in "The Teaching Botanist."

CHAPTER VII

WHAT I DO CARE FOR

"Oh, I don't care for that!"

"And neither do I!" I did not say so to him, but I say it to you.

I thought (and I still think), that the principal of that normal school spoke somewhat sneeringly. I had made a distinction between the study of nature as the informal, intimate, sympathetic, unsystematic view of living things, and the pursuit of science as the formal, intellectual, professional, systematic, and synthetic treatment of animate objects. But I made no reply to the covert sneer. The conversation dropped with his remark. He seemed inclined to think that I was quibbling over a matter of names, and I felt that if I attempted an explanation it would be like showing the east where the west is.

The trouble was right here. So far as he had any views of nature he was scientific. He was a systematist. Everything that came to his mill always dropped in at the same place, and was

ground out in the same style. A peck took the same course as a carload.

If you say that nature study is merely the study of nature (and that is natural science whether for the university or the kindergarten), and that all this talk about a distinction in the terms nature study and elementary science is bosh and you do not care for that, then I say too: "And neither do I."

You may call your systematizing and your generalizing all the way from your Ph.D. down to the little fellow whom you are helping to put on his rubber shoes, you may call it nature study or what you please. You may demonstrate to the one that the centralizing tendency in the nebulæ is the same that draws the apple to the ground. You may draw as many diagrams and make as many x, y, z's, as you please. You may classify and arrange and evolutionize to your heart's content. You may even dilute the same method and apply it to the little fellow if you want to, and as you pull on the second overshoe, you may tell him that he has two feet and the Tom-turkey gobbling outside the window has the same number, and the chicadee the same, and then you can inform him, if you are determined

to do it, that they are all in the one class of bipeds. You may generalize still further, since the pussy cat is purring to say good-bye, as the boy's father drives up with a prancing horse, that cat and horse are both quadrupeds, and that the elephant is likewise a quadruped. The next day you may put down the whole list on the blackboard, and talk till you are exhausted, and the children, too. And your only reward will be exhaustion!

"But I don't care for that," with these little folk. I want you to let the little fellow get acquainted with that particular Tom-turkey, not some other one, and that chicadee, that cat, that horse, without reference to any other biped or quadruped in the world.

I would give more for the boy's ability to see that one cat, and for his power to develop his originality in his own way, and for his skill in saying what he wants to say about the cat, than to have him tell you of all the kangaroos and lemurs and platypusses that ever ornamented the finest chromo-chart that ever an enterprising agent sold to your school board.

But for that child, have something in nature-viewing that will let him find himself (not be

machine made, with others like pins on a paper), that will bring out his love for living things, increase his ability to admire, to see and to enjoy, and to tell you in his own way, about the objects that interest him, not such things as you provide uniformly according to some schedule. For this I plead and for this I do most emphatically care. You may call it nature study, elementary science, nature love, observation lessons, as you please. But I plead with you not to monopolize all the names into your dilute science, and leave out what I call nature study. No, I do not call it quite that. If I were asked to suggest a more expressive title for what I commonly express by the term nature study, and for what I most desire, I should call it nature sympathy and appreciation.

CHAPTER VIII

LOVE OF NATURE AND THE LOVE OF MOTHER

Nature study is not one of the utilitarian studies. It must not be expected to do something it should not do. It may coalesce with other departments of an education, and should do so, but it is not a stepping stone to them; it stands alone. Language-study, drawing, and even mathematics, may be benefited by companionship with it, but they should never be allowed to use nature study as a tool for their own purposes.

In its effect on character building, nature study is closely akin to patriotism, as I have already said in a previous chapter, and to the life of the individual.

The sentiments are so closely allied that they may be said to be companions; and what ex-President Harrison writes in the introduction to "This Country of Ours," may well be remembered for the excellence of his proposed methods toward character building.

After citing examples of love, indifference and

disregard as characteristic of various nations, he says:

"If we would strengthen our country, we must cultivate a love of it in our own hearts and in the hearts of our children and neighbors; and this love for civil institutions, for a land, for a flag, if they are worthy and great and have a glorious history, is widened and deepened by a fuller knowledge of them.

"A certain love of one's native land is instinctive, and the value of this instinct should be allowed, but it is short of patriotism. When the call is to battle with an invader, this instinct has a high value. It is true that the large majority of those who have died to found and to maintain our civil institutions were not highly instructed in constitutional law; but they were not ignorant of the doctrines of human rights, and had a deep, though perhaps very general, sense of the value of our civil institutions. If a boy were asked to give his reasons for loving his mother, he would be likely to say, with the sweetest disregard of logic and catalogues,

"'Well, I just love her.' And we must not be hard on the young citizen who just loves his country, however uninstructed he may be.

Nevertheless, patriotism should be cultivated, should in every home be communicated to the children, not casually, but by plan and forethought. For too long our children got it as they did the measles, caught it.

"Now, in the schools, American history and American institutions as serious and important studies are beginning to have more, but not yet adequate, attention.

"The impulse of patriotism needs to be instructed, guided, brought to the wheel if it is to do the everyday work of American politics."

"Sentiment, yes, never too much; but with it, and out of it, a faithful discharge of prosy routine of a citizen's duty. A readiness to go to the fields? Yes, and equally to the primaries and to the polls."

That is patriotism in the elementary schools from the natural standpoint, that is building the citizen from the heart. That is beginning at the right end. What a foundation on which to rear the various superstructures required in the upbuilding of a community!

Loves his mother, "Well I just love her." I like that standpoint of loving his country, and the same spirit in loving this wonderful and beautiful world.

Oh, no, some scientific appreciator of a mother may say, that is crude; it flavors of the Middle Ages, of the amateur, of those who love their mother from the heart. This is an age of scientific spirit, an age of the intellect rather than of the affections.

Do nothing so simple as that; learn really to know your mother, and then you can love her with solid, intellectual appreciation.

First collect some pictures and drawings of all the mothers you can find; arrange them side by side and compare your mother with them. That will add to your knowledge of the comparative merits of mother's personal appearance.

Devote a half-hour at a certain time every day to the study of mothers. Draw pictures of them; make a detailed list of color of hair, number of eyes, nostrils, ears; length of chin, height, weight, number of fingers on each hand; state the age, past history and a hundred or more other facts. Arrange these details under a few heads, draw a bracket before each, and collocate these in line under one big brace, with the word *Mother* written in capital letters.

Make a drawing of your own mother standing erect, and also bending down to kiss you as you

start for school in the morning. Sketch in detail her eyes, fingers and nose.

Write a list of nouns, adjectives, verbs and adverbs that will apply to your own mother, and from these compose ten sentences each day from 10:15 to 10:45 A. M., in connection with the drawing work, and if the task is completed before the time has expired, we will fold our arms and sing about our mothers. Bear in mind that you must never really go to see your mother for the enjoyment of seeing her, nor only for the enjoyment of her loving presence, but you must learn to love her, and to let her influence permeate every fiber of your life, by noting down with pad and pencil, all possible details of her physical structure.

But we all know that this is not the method of securing the highest degree of love for nature; in fact such a method would tend to obtain a heartfelt love for one's own mother.

Too much detail, too much method, too much correlating kills it.

"Nature Study is the means of training persons to come into thoughtful contact with Nature. It thus becomes an art and not a science, excepting in its relations to the Science of Pedagogy. It is the art of training in the methods of studying those things which are the foundations of the natural sciences. It differs from science in many respects. It also differs from Object Lessons based upon natural material. The success of Nature Study depends upon the teacher and not upon the subject."

—PROF. H. A. SURFACE.

"For many years it has been one of my most constant regrets that no schoolmaster of mine had a knowledge of natural history, so far at least as to have taught me the grasses that grow by the wayside, and the little winged and wingless neighbors that are continually meeting me with salutations which I cannot answer, as things are. Why did not somebody teach me the constellations, too, and make me at home in the starry heavens which are always overhead, and which I do not half know to this day."

—THOMAS CARLYLE.

"All things are beautiful,
Because of something lovelier than themselves,
Which breathes within them, and will never die."

—LUCY LARCOM.

CHAPTER IX

SCIENCE IS NOT ALL

We all want science in our colleges, science in our high schools, and we want it systematically taught. Our educational periodicals should head their departments of science, as science. We teach science, then why not, in the name of common sense, call it science.

But that is not all. We want, previous to it and with it, hand in hand as closest companions, another important factor, a daily communion with the natural things of this world.

Before and during our study of science we need an acquaintance with nature like that of a child with his mother.

"To teach young people or old people how to observe nature, is a good deal like trying to teach them how to eat their dinner. The first thing necessary in the latter case is a good appetite; this given, the rest follows very easily. And in observing nature, unless you have the appetite, the love, the spontaneous desire, you will get little

satisfaction. It is the heart that sees more than the mind. To love nature is the first step in observing her. If a boy had to learn fishing as a task, what slow progress he would make; but as his heart is in it, how soon he becomes an adept.

"The eye sees quickly and easily those things in which we are interested. A man interested in horses sees every fine horse in the country he passes through; the dairyman the cows; the bee culturist the bees; the sheep grower the flocks, etc. And it is even said that the ladies require no effort to note the new bonnets and cloaks on the street. If one is a lover of birds or flowers, he easily sees birds or flowers everywhere. The fact is we all see and observe easily in the line of our business, our tasks, our desires."

I would not teach a beautiful, rhythmical recitation about the sturdy oak, its leaves and acorns, and then find, as I did in one city schoolroom, that not a child there had ever seen an oak leaf nor an acorn.

See the bird capturing insects for food; see the insects feeding on the plant which draws its nourishment from the ground under the influence of the beneficent sunshine. That is nature study,

and it covers ground that the individual sciences do not even touch.

Teach nature study by the natural, boy-and-girl method. That is the way John Burroughs, William Hamilton Gibson, and others got more than seventy-five per cent. of their knowledge of nature, and from that rough-and-ready natural method of acquiring it, they gained a full storehouse, from which each drew according to his own testimony, for all the rest of his life.

We should teach this nature study in this haphazard, natural unsystematic manner, just as things come to hand, or as we are able to plan for their coming to hand. With it and beyond it we should teach and study science, strict, accurate, scientific science.

I would give to every boy or girl as nearly as possible the same that the wide-awake child in the country has, or what Whittier calls the "Knowledge never learned of schools." And on that solid foundation I would build the noble, valuable superstructure called science.

I would have the boys and girls rush over to the apple tree, pick up handfuls of apples, putting some in pocket and munching the rest. That is nature study in the natural manner. I would have

those same boys and girls sit at the table and make cross sections and vertical slices of some of those apples, noting the structure, the relation of seeds, cases, pulp and epidermis. That is science, and a science not injured by previous "nature study."

I would have the young folks climb on the ledge, stand near the boulder, and have a general good-time in fun and frolic. That is nature study. I would tell them a little of the history of this ledge, its relations to the surrounding country, its geological structure and perhaps its chemical composition. That is science.

Enjoy the beautiful moonlight; note the bright stars and planets, and construct the fanciful pictures of the constellation. That is nature study. Tell of the surface of that moon, the distance of the stars, the various physical characters of the planets. That is science.

CHAPTER X

"WHAT DID YOU GET?"

"We are indebted," says a writer in "Science Gossip," "to the humorous pencil of Leach for a sketch of a languid gentleman, who, pining for a new sensation, is trying the effect of riding up and down the Strand, seated on the roof of an omnibus and picking out periwinkles with a pin. Should you ever feel as though you had exhausted all the resources of the civilized portions of the globe, do not seek for distraction in boiled cockles or in pickled whelks, but go away to the top of a hill, with woods and streams, and smiling fields dotted with farmsteads and villages spread before your feet, and there rest in solitude and wait on Nature, and listen and watch for all that her offspring will do above, below and around you, while the teeming planet turns once around its axis. Then seek a similar communion with the sea; study it from even-fall to broad daylight from the top of some lone, unfrequented cliff; or better still, commit yourself to the heaving bosom of the great waters,

and unless your soul be blind and deaf, you shall learn things never before dreamed of in your philosophy."

"What did you get?" Castellar tells you:

"Oh, Nature; immovable in the midst of movement, unique amid variety, surrounded with ether which penetrates every pore, forming the spirit and its atmosphere, with the continual succession of organic beings which change and are transformed. Oh Nature! durable and unchangeable; subject to death and to eternity; to the limited and the infinite; diffused over the immensity of space and compressed into organic beings from the stars which irradiate the heavens to the flowers which perfume the air with their aroma; from the unspeakable gases that evaporate, to the great mountain chains with their glaciers, where the snow whitens the volcanoes struggling with internal fires; from the almost imperceptible nebulæ, the great worlds which travel through space; from the grain of sand drifted by the wave, to the furthest stars of the Milky Way, whose light reaches us in twenty thousand centuries."

"What did you get?" Hear John Tyndall's answer:

"The lilies of the field have a value for us be-

yond their botanical one, a certain lightening of the heart accompanies the declaration that 'Solomon in all his glory was not arrayed like one of these.' The sound of the village bell which comes mellowed from the valley to the traveler upon the hill has a value beyond its acoustic one. The setting sun where it mantles with the bloom of roses the Alpine snows, has a value beyond its optical one. The starry heavens, as you know, had for Immanuel Kant a value beyond their astronomical one."

What did you get? What did you learn that you did not know before? Get? We got a foundation to all the Sciences. In meteorology we got the sunshine, the beautiful blue sky, the invigorating air, and the refreshing breezes. In geology we got a delightful tramp over the hills, through the moist and shady gorges, across the blooming fields. In entomology, ornithology, and botany we obtained not only enjoyment but inspiration.

Within my own personal experience, a science teacher expressed surprise that, in my field work with the pupils, so few names were mentioned, so few pencils and so few pads of paper used. Enjoyment? So you want to have a good time?

Certainly. For a good time the pure pleasure of a delightful tramp.

"Walking should be cultivated as an accomplishment. Excursive legs help to make an excursive intellect, and among the aids to reflection, not enumerated by Coleridge, are long strolls. Children, especially, should be trained to walk long distances, and to despise short ones. Walking is a cheaper and more healthful exercise than riding, and it has the added advantage of training to endurance."

On the same subject, hear what Rousseau has to say:

"Je ne conçois qu'une manière de voyager plus agreéable que d'aller à cheval; c'est d'aller à pied. On part à son moment, on s'arrête à sa volonté, on fait tant et si peu d'exercice qu'on ne veut. Quand on ne veut qu'arriver, on peut courir en chaise de poste; mais quand on veut voyager, il faut aller à pied."

CHAPTER XI

COMMONPLACE NATURE

In stating facts never search for the most startling. Nature in her simplicity is amply wonderful and instructive. I know a girl that came home from school, and said that the teacher had been giving talks on astronomy. Upon being questioned she told how long it would take a man to walk to the sun; how long for an express train to get there; the size of a cylinder of ice that could be driven into it at a certain rate and be converted into steam as fast as it touched the hot surface.

Upon being questioned further she replied, "That is all I can tell. I remember only the things I didn't believe!"

In its broadest sense, Nature Study is a keen, appreciative interest in the common things about us. It means accurate seeing and clear thinking. Nature Study is the most vital idea to-day in education. It is the getting of God's truth at first hand. It is studying things instead of studying about things. Do not call it Elementary Science. The true spirit of Nature Study is opposed to cold, formal study of lifeless things. It is the informal study, for short periods, of things that interest. It opens a new world of delight. Under it, the commonplace becomes transfigured. It shows us how we may get the very best out of life no matter where we are, how to realize the possibilities of happiness that exist even in the most unpleasant environment.—JULIA ELLEN ROGERS in "Among Green Trees."

The Wonderland of childhood must henceforth be sought within the domains of truth. The strange facts of natural history, and the sweet mysteries of flowers and forests, and hills and waters, will profitably take the place of the fairy lore of the past.—JOHN G. WHITTIER.

"For hark! how blithe the throstle sings!
He too, is no mean preacher.
Come forth into the light of things,
Let Nature be your teacher."

—WORDSWORTH.

CHAPTER XII

VICE VERSA

Once upon a time there was a man who read in his newspaper:

"WONDERS IN OTHER WORLDS.
GREAT DISCOVERIES BY ASTRONOMERS
CAN BE SEEN BY AID OF A SMALL TELESCOPE,"
ETC., ETC.

And this man said to himself I will forthwith get me a small telescope that I too may see some of these strange visions before I die. In his eager waiting, the machine arrived. Then the big man, taking his little boy, the box with the long tube and the three legs, hastily proceeded to the back yard.

"Which way does the thing go?" quoth the little boy.

"I don't know; I find no instructions on that point," said the big man, fumbling amidst the packing. "But," he meditated, "I think that little glass is for the little star, and this big glass is

for my two eyes, so far apart." Then he looked at the little star and at the big moon, and slowly said, "They are so very, very, very small."

But the little boy roguishly pulled down the small end and peered through it. "Am I too so very, very small? Why, you are very, very big."

Haec fabula docet, 'tis easy to get things t'other end to.

. . . . . .

There once was a man (perhaps there has been more than one), who, looking through the big end of the university, said, "I will now view the child in Nature." So he wrote in a book:

"Science teaching for a few years past has been gradually working itself downward from the colleges and high schools into those of lower grades." And realizing that the thing did not work, he proceeds apologetically to state that "In most cases, the plans followed, while fairly well adapted to the demands of advanced pupils, have been poorly fitted to the needs of beginners." So this book (Professor Jackman's "Nature Study") starts out with "the aim to furnish a guide for teachers in the common schools who wish their pupils to pursue an adequate and symmetrical course in Nature Science."

In other words, he pulled out the object glass from "the college and high school" end that seemed to be "poorly fitted," and substituted another in the form of a series of chapters on technical science, diluted and labeled, botany, zoology, chemistry, and mineralogy.

I am not asserting that this is not a helpful book. It is. It has many excellencies, but it is wrong end to, and in this misfortune it is not alone.

But recently a few educators have pulled the telescope sharply around. Probably the most marked and efficient movement has been made by Professor Bailey. Here is his acute *vice versa*:

"Nature study is a revolt from the teaching of mere science in the elementary grades. . . . Nature study is not science. It is not fact. It is spirit. It is concerned with the child's outlook on the world. . . . On the main thesis, that Nature-study teaching is one thing and that science teaching for science's sake is another, I have no hesitation."

Strange that it took so long to realize this fact in nature-study work, and to get the thing *vice versa*. For, after all, it is merely applying to

this branch of education the fundamental principles of general pedagogy. What is claimed for nature study is no exception from what is claimed for other studies. Professor Preston W. Search, in "An Ideal School," puts the same thing in this way:

"There may be virtue of a kind in the class room where the teacher carefully plans all the steps of procedure, and insists on the performance of work according to her ideals; but, in educative worth, it cannot compare with that where the pupil feels the glow which comes from personal discovery and accomplishment. It is a little thing to be an imitator; a great thing to be a creator. The father who insists on his son holding the board while he drives the nail may drive the nail well, but he who holds the board while the son drives the nail does better. The nail may not be so well driven, but he educates his son. Even so in the schoolroom the child must be permitted to do his own work. Dead time must give place to active endeavor. The child must be a discoverer, an originator, a creator. He must be permitted to drive the nail."

This is the same kind of *vice versa*, or trying to hoist the father over to one side of the board, and

to push the son to the other, where he may use the nail. At first thought it seems as if more can be seen by looking into the big glass, but a trial of both ends of the telescope, or better still an understanding of the optical principles involved in its construction, informs which end is the right end. Perhaps, at first thought, and not understanding the child, it may seem that the right way to teach is to begin with a teacher who can tell a great deal. But the more experience you have with the child, the more firmly will you be convinced that this first impression is not the right impression. Begin and continue with him as an original discoverer, so far as you are able, and as far as he will admit of such treatment.

It may, indeed, be quicker for the father to drive all the nails, yet the purpose in pedagogy is not to do the work, but to teach the pupil how to do it. Telling the boy how to swim, or letting him stand on the bank while you swim, will never teach him the art. Let him get into the water and splash and sink. He will gain strength and skill and pleasure every time he goes under and comes spluttering up.

Even if you have made, and enjoyed some original discovery in natural history, do not tell

the boy about it. Do a little of the *vice versa*. Skillfully put him in the way to repeat your observation, if possible. At the very least, let him tell you about some of his own personal observations. You hold the board. He may pound his fingers occasionally. It will toughen them. You rest on the bank while he splashes and sinks. He will soon come up for breath. Never fear for the lad. You have only to keep an eye to him and a hand outstretched, as you keep an eye at the right end of the reversed telescope, and a hand on the focusing adjustment.

CHAPTER XIII

PLANT LIFE

I desire to emphasize both of these words. The teacher should assist the pupil to study and to love plants, not parts of plants, but the plant, root and all. The flower may be the most attractive, but it should not monopolize attention. Rather let it, however beautiful, be an attraction toward the entire personality of the plant.

A sweet and beautiful face wins us, not to the face alone, but to the person, and to the individuality. We love many persons whose countenances are neither beautiful nor sweet, but whose characteristics, whose personal qualities are so sweet and so beautiful, that they seize our affection, because they are so exactly and so mysteriously adapted to fill a vacant place in our own soul. We crave exactly these, and none but these will supply our need. We find such winning characteristics in habits, in kindness of heart, in general culture, and especially in the manifestation of good will toward us. Some persons are so

blessed that they combine all these qualities. So should it be with our love and interest for plants. We are attracted by the bloom of one, by the unique or interesting life history of another, by the method of growth or by the adaptation to its environment of another. We admire still another because it is useful. A well-balanced man is poetical as well as utilitarian. A well-balanced teacher is especially both. But each of these qualities, whether it be beauty of bloom, novelty of growth, utilitarian service, or some other feature, should draw us to the plant as a whole, not to a single bit of its anatomy.

Tennyson was attracted by the flower, but his interest was in the plant. He uses the word flower as a synonym for the entire structure, and there found something more interesting, instructive, and important than beauty only, however valuable beauty may be, and its beauty is indescribable and immeasurable.

> "Flower in the crannied wall,
> I pluck you out of the crannies,
> Hold you here, root and all, in my hand,
> Little flower, but if I could understand
> What you are, root and all, and all in all,
> I should know what God and man is."

That is the right spirit for nature study in

teacher or pupil, a desire led from the flower at first uppermost in mind, to a greater interest, which is, or should be, to know the whole, "root and all." I fear that many of us make the mistake of saying in action, if not in words:

> Flower in the crannied wall,
> I pluck you from the crannies,
> Pull to pieces all your parts, in my hand,
> Little flower, but if I could understand
> Pistils, stamens, and pollen, all in all,
> I should know what botany is.

I can see no better reason, at least in the teaching of young children, for administering doses of the biology of sex, and of histology diluted, than for teaching the same things regarding animals. The study of sex, and of basic life-functions, should be postponed till we reach science in the higher grades in the high-school or college. There is enough to see and to study in those grades where the nature study phases of the plant are introduced; that is, in getting acquainted with the plant as a whole, from seed to maturity. How to know the wild flowers is good; how to know plants is vastly better.

Let me now emphasize the second word in my title. Our knowledge and our love of plants are

poorly manifested by chasing them over hill and into forest, down the ravine, through the meadow and across the swamp, in killing them, drying them, pressing them, sticking them on paper, poisoning them, and last, but not least, by hurling jaw-breaking polysyllabic Latinized names at them. Better let us know them as living things. The child who *cares* for pets, loves them better than the taxidermist who kills them, stuffs them, and sells them for an advertisement in a saloon, or in the window of a cheap restaurant. Cultivate in the young folks, then, the nourishing, caring love of living plants. Better one plant grown from seed to maturity, and watched in all its stages, than a hundred mummified in an herbarium. Have you seen the sprouting (no, I don't mean peas and beans, too often with a few tadpoles and a cocoon or two, the all-embracing synonym of nature study), but have you really seen the first steps in the life of the daisies, wild carrot, "butter- and eggs," tick trefoils, acorns, all easily gathered on a "thousand hills," and all easily germinated? Why is it that we commonly study seeds from the garden in early spring, and then go to the wild flowers of the field in May and June? Would it not have been better to begin with the

seeds of the wild plants, or to continue with the growing plants of the garden?

Beans and peas are germinated in many schools, but in few are they grown to maturity, or brought from home gardens, so that the flower and the bud may be admired as buttercups and daisies are adored. I protest that it is illogical to begin in May with peas and beans, jump in June to wild flowers, and land in the autumn on tick trefoils, stick-tights, and chestnut burrs. It is confusing. Let us know one plant thoroughly, if we have no time to do more. Let us know the sprouting chestnut and the bean pod, let us know the dandelion and the milkweed seeds, sprouting as well as floating with a puff, puff in mid air. Of course, they are pretty, and the children do not need to be told that they are, nor to have the floating seeds blown about the schoolroom. Too often such an illustration of a well-known fact makes the teacher ridiculous.

Feed the same growing plants on different soils, and different plants on the same soil, and note results. Let them grow in sunshine and in shade, even in darkness. Let them grow from the dark toward the light. Let us have also aquatic plants, submerged and floating plants.

Let us have common plants, and more glorifying of the commonplace, more of the spirit of Rennie, the naturalist:

"It can never be too strongly impressed upon a mind anxious for the acquisition of knowledge, that *the commonest things* by which we are surrounded are deserving of minute and careful attention."

If there is not room for all, set aside the geranium, and substitute a squash vine; set aside the calla, and substitute a beet; a turnip is as interesting and a good deal more important than a fuschia. There is much wisdom wrapped up in a cabbage head, provided it comes from the field.

Keep in mind that the object is to make the child not a botanist, but a lover of natural beauty, to develop his capacity to appreciate Nature's commonplace things. As Professor Bailey puts it:

"The happiness of the ignorant man is largely the thoughts born of physical pleasure; that of the educated man is the thoughts born of intellectual pleasures. One may find comradeship in a groggery, the other may find it in a dandelion; and inasmuch as there are more dandelions than groggeries in most communities, the educated man has the greater chance of happiness.

"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 to-morrow; 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."

Study these common plants of the garden and of the field, in the schoolroom as well as in their natural habitat. Then do not look down so often that you fail to note the glorious things above and the grand plants in the forest. Note the struggle for existence in the shrubs and tangled undergrowth on the borders of the meadows and in the swamps. In the forest you may see the victors that have fought successfully with their rivals of long ago, and now have the field pretty completely to themselves. Thus viewed, the plants become sentient things. We discover life in them, and love them.

"The nature study that is true to child life must first of all afford free scope to the passion for activity and guide this toward wholesome channels. It should at the same time infuse life and spontaneity into school work, and so lighten rather than increase the task of the teacher."

PROF. CLIFTON F. HODGE.

"Nature Study should lead to a sympathetic acquaintance with living plants and animals in their natural environment."—A. C. BOYDEN.

"This introductory relationship with Nature is a resource of inexhaustible delight and enrichment; to establish it ought to be as much a part of every education as the teaching of the rudiments of formal knowledge; and it ought to be as great a reproach to a man not to be able to read the open pages of the world about him as not to be able to read the open page of the book before him. It is a matter of instinct with a few; it may be a matter of education with all. Even those who are born with the eyes and ears of naturalists must reinforce their native aptitude by training."—HAMILTON WRIGHT MABIE.

"Is there anything more delightful than the fatigue of a summer afternoon's long ramble after objects one loves? You are not tired of them, but *with* them. It is a delicious fatigue. Subsequent years of trouble cannot obliterate the charmed impressions. They are the sunniest spots in one's memory. Their recollections come, like angels' visits, to unconsciously relieve us in after-years of many a sad trouble and trial. They should be laid up in store when you are young, so that they can be drawn upon when you are old. Then the sunshine of youth is stored to gild the troubled days of matured manhood and the darker shadows of old age."—DR. J. E. TAYLOR, in "The Playtime Naturalist."

CHAPTER XIV

SCHOOL GARDENS

Plants need food, not necessarily earth, because earth is merely the matrix that contains the food in a more or less extended form. The rootlets of the plant will explore every tiny space about and among the particles of soil for a bit of nutriment in solution.

I never see a rootlet or a root-hair without thinking of the proboscides of honey bees. The bee explores many a flower for a drop of nectar. She gathers from all sources, till by her efforts, combined with those of thousands of others, sufficient food is provided for the entire colony. As each bee explores the flowers of a certain territory, gathering the greater portion of the nectar within that region, so each root-hair searches over, around, under, its small domain of perhaps a dozen microscopic granules, or within its little mass of partly decayed vegetable mould, each working in cooperation with legions of others, so that the entire plant is provided with sustenance, as the bees

working in company collect for the whole swarm. This is the natural method of gathering honey. To understand it fully, the work of a swarm should be actually seen. But to enable us to make a careful study of their actions, it is not really necessary for the bees to collect the nectar in the manner ordained by nature. They may be artificially fed.

So in studying plants, it is well to know at least a few as they grow in the soil, whether in the field, the garden, or a box of earth. But, fortunately, it is not necessary that all our investigations should be made in this manner. The method can be adapted to the materials at hand in the country; indeed, the young people's study of plants should be mostly of those in their natural environments, with a few artificially fed, so as to bring the entire organism under immediate and close inspection.

The conditions are reversed for the city child. He has few opportunities for access to plants in their native places, limited as he is to the trees and shrubs in the public park, or to those seen on an occasional visit in the country. Here enters the special advantage of artificial culture.

As has been said, the plant does not want the

earth, since it absorbs the inorganic matters which it needs for its food, as they percolate in solution through the soil. The student of inorganic chemistry knows what these are, and that they may be supplied to the plant under investigation, without the intervention of the soil. All that is needed is some material, be it sawdust, pebbles, shot, beads, or any other substance through which the roots may pass, to seek the food artificially applied to this artificial soil. As honey may be purchased in the market, and supplied to the bees by spreading it on almost any convenient material, so that they may have easy access to it, so this chemically isolated nutriment may be manufactured in a form convenient for solution in the water which is poured over the substance that upholds the plant and gives the rootlets easy access to their food supply.

Several botanical chemists have provided such food. Perhaps the best is that made according to the following formula by Professor Sachs, and pressed into tablets for the sake of convenience. Each of these tablets is composed of the following:

	Metric weight (nearly)
Common table salt (Sodium chloride, NaCl), 2 grains.	.162 grams.
Plaster of Paris—Gypsum (Calcium sulphate, $CaSO_4$), 2 grains.	.162 grams.

Epsom salts (Magnesium sulphate, $MgSO_4$),
2 grains. .162 grams.
Phosphate of lime, nearly the same as burned bones.
(Calcium phosphate, $Ca_3(PO_4)_2$,
2 grains. .162 grams.
East India saltpetre—Nitre (Potassium nitrate, KNO_3),
5 grains. .325 grams.
Compound of iron and chlorine (Ferric chloride, $FeCl_3$),
nearly 1-10 grain.

To make the food solution, two tablets are required for each pint (500 ccm nearly) of water. Crush them, and be sure that they are entirely dissolved, and always shake the solution before using it. Keep the plants thoroughly moistened with this, and it will supply them with both food and drink.

This is well known in all botanical laboratories. It makes an ideal food for our common plants, and the device solves the problem of school gardens in which little soil can be used. Let the seeds germinate in warm, moist air supplied in any convenient manner, the most convenient perhaps being wet cotton batting. Let the plant grow on mosquito netting stretched across the top of a tumbler, or other receptacle full of the solution, or in sawdust, pebbles, or in almost any convenient material kept wet with it. A luxurious crop may be grown in brick-dust, or in an old tomato can, or in a bowl filled with sand or with pulverized stone from a macadamized road. All you need is a receptacle for the material through which the

roots may penetrate in darkness. You supply the food and nature does the rest. If the growth is on a net stretched across a transparent vessel containing only the liquid, with no opaque objects among which the roots may naturally shun the light, heavy paper or black cloth should be wrapped around the glass, the wrapper to be removed whenever it is desired to examine the plant.

Children like novelty. By this artificial feeding there is no limit to the novelty. A cup-like depression may be chipped in the side of a brick, and the fragments put back into the hole. Place the brick on a plate, supply the food, and germinate the seed on the chippings. The bits of brick hold the plant and you feed it.

A cloth may be stretched between two supports, and the nutrient solution applied by allowing it to drip through a hole in the bottom of a suspended can. The plants may be grown on this cloth like epiphytes. It is not absolutely necessary that the roots be kept in darkness, but growth is hastened and improved, by placing a box with openings so arranged that the plant may be in the light and the roots in the dark.

The roots are almost seen to grow. The appearance of new root hairs is looked for eagerly.

The writer has experimented with these food-tablets in a great variety of methods and always with success. They are used in the university and in the kindergarten. The technical botanist appreciates their convenience, and the youngest child, mixing a little sawdust in a teacup and growing a few plants in it, finds entertainment and instruction.

Plants may also be easily grown without even a shelf or a table. All that is needed is a wide-mouthed bottle, filled with pebbles. Climbing plants may thus be easily trained around the window, from jars hanging at the side of the frame.

When large plants are growing in small vessels, I am often asked, "Where are the roots?" The only explanation that I can offer is, that under this artificial feeding the plants seem to require the roots to be few and short. I have grown at least a dozen plants to a height of more than two feet from sawdust held in two-thirds of an egg shell.

CHAPTER XV

THE MICROSCOPE IN NATURE STUDY

No one who possesses a pocket-microscope of even the most limited powers can fail to find amusement and instruction even though he were in the midst of the Sahara itself. There is this great advantage in the microscope, that no one need feel in want of objects as long as he possesses his instrument and a sufficiency of light.—REV. J. G. WOOD.

If normal eyesight is so valuable that even a slight defect promptly brings forth efforts to remedy it, then why do we not hail with joy the aid of even a small microscope, that will add so greatly to our capacity of seeing? The microscope is not an occult instrument of a special science, necessitating a knowledge of that science in order to appreciate the instrument. It is true that the microscope is used extensively in scientific work, and this fact is so generally accepted that the statement, at least in popular thought, seems to prove too much, since the instrument is believed to be inseparable from the science. But the microscope is in itself nothing but an instrument with which to see. This is as true of optical aids for

viewing distant objects. The Yerkes telescope, or an opera-glass used to view the skies, is nothing more nor less than seeing; it is another set of eyes, if you please, with which to peer into the infinitely great and distant world; and to use the microscope is to see into an equally wonderful, but infinitely minute creation. As the reader now knows, nature study, in its school sense, is informal observation of nature. When we synthesize, classify, and note details carefully, our observations are scientific. Of the same objects we may thus have with the unaided sight, either nature-study or science. The seeing is not made science by optical aid, but by our purpose and the standpoint from which we view the objects. You do not think it necessary to be an astronomer in order to look up and enjoy the beauty of the glittering stars. No one regards John Burroughs as an astronomer deeply versed in that science, and yet no one has expressed better than he this nature-study phase of celestial seeing:

"How often do we really see the stars? Probably a great many people never see them at all, that is never look upon them with any thrill of emotion. If I see them a few times a year, I think myself in luck. If I deliberately go out to see them, I am quite sure to miss them; but occasionally, as one glances up to them in his lonely night walk, the mind

opens or the heavens open—which is it?—and he has a momentary glimpse of their ineffable splendor and significance. How overwhelming, how awe-inspiring! His thought goes like a lightning flash into that serene abyss, and then the veil is drawn again."

That is nature-study star-gazing, the pleasures of seeing, simply seeing without science, so far as unaided sight will extend, but because the eye has the aid of a 40-inch refractor, or of only an opera-glass, it does not for a moment follow that there may not be the same enjoyable emotions. The lens does not make science, but its method of use does. Nowadays, no plea is needed for the use of the microscope in scientific seeing. In the biological sciences it is indispensable and universal, so universal that I fear its use is erroneously regarded as necessarily scientific. But the microscope is merely an instrument for aiding the sight. What a vast amount of knowledge comes to unaided eyes from scientific seeing. But even this is only a small amount in comparison with the pleasure that comes to unaided eyes from informal seeing, the nature-study use of them. Would all your informal nature-study seers for one moment think of allowing all eyes to be used only for systematic, scientific seeing? I think not, most decidedly not. The very proposition appeals to one,

not as an argument or enticement, but as an absurdity. Equally absurd is your relinquishing to the scientists all use of the microscope. Just about as absurd as it would be to let the scientific ornithologist in the fields have the sole right to use opera-glasses. You recognize their value to him in their scientific use, but you are not willing that he should monopolize them. You rightly continue their use for pleasurable seeing. The scientist derives both pleasure and scientific knowledge from their employment. Even if you do not care for the science, continue their use for the pleasure. As soon abandon the gratification of unaided seeing, as to forego the pleasure of such magnificent pictures as are obtained by the use of the microscope.

You notice the attractive foliage and graceful outlines of the tree, and your heart is warmed by the sight; it dilates in appreciation of the beauty, and, if you rightly consider the subject, your experience increases your ability to observe better at the next trial. As was previously stated, let there be but some defect in the eyesight, and then how we strive to remedy it. The clouds, the trees, the green grass, the variegated flowers, the birds, familiar forms and faces, are all sealed to

the blind, but you, who know not the delights of a microscope, are suffering from exactly the same misfortune, for you, too, are blind. You see that tree and its foliage, but the microscopist sees the structure of the mosses, lichens, and tiny algæ that ornament the trees. You exclaim over the scarlet tanager that is flitting about in the topmost branches. What a pleasure to you and what a loss to the blind man! But the microscopist says, "I have seen the wonderful structure, and learned the interesting habits of the aphides and leaf miners," although his use of the microscope may have been as unskillful as your use of your unaided eyes. You have lost in relation to him exactly the same in quality if not in quantity as the blind man has lost in his relation to you. Strange, is it not, that so many are microscopically blind? and the pitiable phase of it is, that the victims are ignorant of their loss. In this sense, the use of high-power lenses and of showy instruments is not a guarantee against microscopical blindness. Sometimes "the heavens open" in the infinitely near world after years of microscopical skill. But that is another matter.

What I would especially impress upon teach-

ers, are the pleasures of observing, and especially the importance of observing as much as possible. If you have missed the charms of even a pocket microscope, you have to that extent been pitiably blind. It is not, as too often believed, the loss of a certain science in which you maintain that you are not interested, and which you do not care to understand, but a loss of pleasurable seeing, which you can only appreciate when you begin to learn what you have been for so long losing. "Having eyes yet seeing not:" telescopically and microscopically blind to all but a small part of the delights of "both great and small." I extend to you, not alms in your blindness, but a sincere appeal for a self-cure. Get at least a simple pocket-microscope, and apply it as persistently as possible to seeing eyes that they may see more. Having done that, see some more, and more. We learn to see by intelligently seeing, not by merely looking.

And what a beautiful world is this, for seeing things. The Infinite does not know how to make a better. He pronounced this one "good." He has given us His best. Shall we be lacking in appreciation through indifference? Let us see everything possible with our unaided eyes, and

get a microscope and use it faithfully that we may see more, and, let me repeat, still more.

Then, when you have faithfully used this wonder-working instrument, used it with the mental labor and diligence demanded for well doing in anything worth doing at all, used it in freedom from the "constitutional weariness" so common in all pursuits except that of money-getting, then will you appreciate what Gosse, a pleasure-seeing as well as scientific microscopist, has affirmed :—

"Great and gorgeous as is the display of Divine power and wisdom in the things that are seen of all, it may safely be affirmed that a far more extensive prospect of these glories lay unheeded and unknown till the optician's art revealed it. Like the work of some mighty genie of Oriental fable, the brazen tube is the key that unlocks a world of wonder and beauty before invisible, which one who has once gazed upon it can never forget, and never cease to admire."

"Nature Study aims to cultivate in the child what may be termed the elementary equivalent of the genuine scientific spirit, so that out of his nature fondness for things about him shall come an enthusiastic, truth-seeking, reverent attitude toward nature, with boldness to question her, patience to study her, and readiness to be taught by her."—A. C. BOYDEN.

"As the child understands his own environment he is prepared to appreciate geography as the study of the home of man. The thoughts of the life throbbing through the plant and animal, and of the forces at work about us, all in perfect harmony, and for definite purposes, are suggestions of infinite law."—A. C. BOYDEN.

"There are two forms of Autumn: there is the misty and dreamy autumn: there is the vivid and brilliant autumn: almost the difference between the two sexes. The very word autumn is both masculine and feminine. Has not every season, in some fashion, its two sexes? Has it not its minor and major key, its two sides of light and shadow, gentleness and force perhaps. All that is perfect is double; each face has two profiles, each coin two sides. The scarlet autumn stands for vigorous activity: the gray autumn for meditative feeling. The one is expansive and overflowing; the other still and withdrawn. Yesterday our thoughts were with the dead. To-day we are celebrating the vintage."—AMIEL'S JOURNAL.

CHAPTER XVI

NATURE STUDY IN THE AUTUMN

Special prominence should be given to nature study in the last two weeks of September and all of October. Full-grown plants, flowers, fruit, and an almost infinite variety of insects may be obtained. The four-footed animals are busily interesting. Aside from the birds (to which chief attention is usually given in May and June), all outdoor interests are now at their best.

During September, the schools have resumed their usual regularity of exercises; the warm weather still continues, with a clearness of air that makes one grateful for the pleasure of mere existence; the young folks retain the enthusiasm of the experiences during the long vacation, and they still have the accumulated wealth of outdoor spirits.

By way of contrast, the newness and awakening of spring, the bursting of buds, the germination of seeds, the growth of the early spring flowers, and the coming of the birds, it may be maintained,

have charms and advantages excelling those of autumn even at her best. It must be admitted that the outdoor attractions of spring are many, but at that time their availability is somewhat lessened by the examinations, the approaching end of the school year and the eager anticipations of the long vacation.

It is easy to advance arguments for the superiority of any of the seasons for nature interests. They are all good, all best, the best of the good things of life. As Sir John Lubbock has said: "Happy, indeed, is the naturalist; to him the seasons come round like old friends; to him the birds sing as he walks along, the flowers stretch out from the hedges, or look up from the ground; and as each year fades away, he looks back on a fresh store of happy memories. Every month has its own charms and beauty."

But taking all things into consideration, it seems to me that after a short time for the readjustment of the affairs of the schoolroom, there should be at least six weeks for rich harvesting of outdoor knowledge, a gathering of a store of happy memories for the coming winter.

How attractive now is everything in its perfection of life and beauty; how exhilarating the

delicate mingling of warmth and cold, the sunshine and the showers! The clear day holds the essence of the previous rain in every breeze. As Dr. Abbott has so truly expressed it: "There is a beady sparkle in every breath we draw, a sane intoxication in every lungful of the October breeze . . . . There is never a lack of good company when October sunshine and frosty autumn winds meet upon the meadows. He who goes there at such a time with a clear conscience, will return better fitted to meet all of life's vexations. For the old man it is a cure for pessimistic thought; for the youth it is a safeguard against distorted views of life. Nature is then rejoicing, why should not we?"

And the things that we thoroughly enjoy in nature reciprocate in benefits to us. We go to her with our best, and her best is given freely to us. "Nature is loved by the best that is in us."

"For him who has the eye to see it, beauty, like thought, has an intrinsic right to a place among the realities of the world. He who demands to know why our children should be trained to an appreciation of the beautiful only proves by his question that he does not know what beauty is, that it is to him a mere name."

"In order to perform it, the school must rid its pupils of what Plato called the lie in the soul, self-deception, as to the ultimate goods of life. It must make them realize that not in their wealth, not in their social position, not in their reputation, but in themselves is to be found that which makes life a success or a failure."

"Every way I was happy, as idler, as painter, as poet. Forgotten impressions of childhood and youth came back to me—all those indescribable effects wrought by color, shadow, sunlight, green hedges, and songs of birds upon the soul just opening to poetry. I became again young, wondering and simple, as candor and ignorance are simple. I abandoned myself to life and to nature, and they cradled me with an infinite gentleness. To open one's heart in purity to this ever pure nature, to allow this immortal life of things to penetrate into one's soul, is at the same time to listen to the voice of God. Sensation may be a prayer, and self-abandonment an act of devotion."—AMIEL'S JOURNAL.

CHAPTER XVII

A PLEA FOR WALKING

In our outings the means as well as the end has value ; the getting there as well as the things obtained or seen or studied. Let us, then, regard walking as a nature-study subject.

Diversified as is nature, so is the variety of her lovers' devotion. Her every phase has an admirer, from the largest to the smallest, from the most conspicuous to the least noticed, and from the most beautiful to the things called unattractive by those who do not love them.

St. Paul, writing of spiritual gifts, says :

" Now there are diversities of gifts, but the same spirit.

" And there are differences of administrations, but the same Lord.

" And there are diversities of operations, but it is the same God which worketh all in all.

" But the manifestation of the Spirit is given to every man to profit withal. . . .

" But all these worketh that one and selfsame Spirit, dividing to every man severally as he will."

So in all the diversities of interests in the natural world there should be one spirit, that of walking. Indeed, I am so strongly convinced of this that I sometimes think there is but one thing, one gift, the ability to walk, and that all other matters are diversities of pretexts, excuses for going out to walk.

The sportsman carries gun and game bag; the fisherman fishing rod and tackle; the naturalist camera and collecting box; each has an all-day's tramp and comes home with but little to show for miles of walking. Tired out? Discouraged? Regretting the trip? Yes, tired out, yes, and tired with them, but not of them, but happy, even jubilant, and with full determination to go again as soon as possible. Was that one squirrel, one trout, one photograph, one specimen worth all the time and labor? If it was not, then we may well expect discouragement and regret. But these visible trifles were only souvenirs of the real thing, the walk. That was obtained in all its fullness, and that was happiness and an inspiration for another similar journey. Never mind the little excuses. Now that the real thing has been obtained in such fullness, the excuses are forgotten.

The Rev. Dallas Lore Sharp is delightfully

confidential and candid in exposing the mycologist's real motif.

"And the collecting of mushrooms is, after all, their real value. Our stomachs are too much with us. It is well enough to beguile ourselves with large talk of rare flavors, high per cents of proteids, and small butcher's bills; but it is mostly talk. It gives a practical, businesslike complexion to our interest and excursions; it backs up our accusing consciences at the silly waste of time, with a show of thrift and economy; but here mushroom economy ends. There is about as much in it as there is of cheese in the moon. No doubt tons and tons of this vegetable meat go to waste every day in the woods and fields, just as the mycologists say; nevertheless, according to my experience, it is safer and cheaper to board at a first-class hotel, than in the wilderness upon this manna, bounty of the sky though it be.

"It is *the hunt* for mushrooms, the introduction through their door into a new and wondrous room of the out-of-doors, that makes mycology *worthy* and *moral*. The genuine lover of the out-of-doors, having filled his basket with fungi, always forces his day's gleanings upon the least resisting member of the party before he reaches home, while

he himself feeds upon the excitement of the hunt, the happy mental rest, the sunshine of the fields, and the flavor of the woods."

The more I observe my fellow enthusiasts in other departments of nature the more firmly am I convinced that this assertion applies equally well to them, and in full force, too.

Go on, happy mortal, in your innocent delusion. Dream of your diatoms, birds, snakes or boulders. They are only agents to entice you to the real thing, walking and its accompaniments. It is the accompaniments that give it the charm. These are not the minutiæ of nature magnified into importance, nor yet the larger interests hampered within the folds of scientific environments. But you will, O scientist, artist, photographer, not go into the fields only to rake up the straws, but to look at the real things. Your soul will and does drink in the influence of things. You will walk in this paradise, and be happy, though perhaps you may be ignorant of the reason.

What a boon is walking to every child and youth. It is not only in our infancy that heaven lies about us, but through our youth. In the merry rambles of childhood, we get near to this paradise. It may be that later, as Colonel Thomas

Wentworth Higginson has said, "We strive to picture heaven, when we are barely at the threshold of the inconceivable beauty of earth." If so, it is then that a walk abroad restores us to the heaven of childhood and of youth. All the senses combine to suggest and restore perpetual youth. Walking is the storing of priceless wealth for maturity and old age. It is the link connecting with things eternal, not the eternal things promised in some distant future, but the eternal, priceless things of the present. It gives health of body and wealth of soul, enjoyable for the present and stored for the future.

Walking in the full strength of maturity! Is there any other luxury that can equal it? It puts all earth beneath us and heaven around and above. No toiling horse shall drag us, no freaky bicycle claim our undivided attention, no smoky locomotive shall pull our car, rank with the odor of varnish, except when we cannot have what nature intends us to have, the glorious privilege of walking. Walking brings into play every muscle. It fills the lungs with pure air and the arteries with rich blood. It restores us to ourselves. It gives independence. We do as we please. It may be to saunter leisurely along this road, to climb that

fence and go down that picturesque path, to rest by the spring, to worship in the forest, to hear the music of the brook, to discover primeval dells and grottos, these are some of the rewards of walking. It takes us to scenes that no vehicle can reach; it gives us wealth which no money can buy.

"Light-hearted to take to the open road,"

and in firm strides go to the top of that hill. There we look across the valley. And Paradise lies over yonder in the blue distance. We rejoice in the possession of vast territory that is ours, for the mere walking to it.

And so we walk on to gain the riches of yonder forest, and still farther on. But even the best is limited in extent, yet the riches of the territory to be obtained by walking are limitless. We find that the distant place, when reached, is no better than that we have left behind. We learn that the actual wealth is not to be obtained by rapid walking but by leisurely sauntering, by making the most of the present. Not least among the values of walking is the lesson of contentment. It is this place, this day, this world here and now, that we are to know, and in which we are so to

live that it may become to us a paradise. Even if there is a better and greater, how shall we comprehend it if we cannot apprehend this? Let us learn to walk well in the paradise which we now possess. Let us heed the great Teacher with whose walks were interwoven lessons from the fields, whose entire ministry was peripatetic. Let no more Beloved Disciple lament, that "from that time many of his disciples went back, and walked no more with him." But rather,

"He that saith he abideth in him ought himself so to walk, even as he walked."

"Even so we also should walk in newness of life."

Ever new. Ever a walker. The thought of the walk spiritualizes the walk, and that kind of walk spiritualizes the walker.

And every nature-study teacher, every nature-study pupil should be a walker. The ability to walk, to get enjoyment from it as well as knowledge from the things seen, is worth more to teacher or pupil than to find out what is inside of a caterpillar, or how many rings there are in the abdomen of a dragon-fly.

"Nature Study is studying nature, in its own environment by the natural method, through the self-activity of the child.

"When Nature Study is directed, as by our teachers, the child is impressed with the fact that in order to make the knowledge brought to him through the senses serve him in the best possible way he must train himself to so judge this knowledge, to so compare it and to so arrange it in his mind as to be ready to use it in different forms of thought expression, drawing, modelling, speaking, writing, or to turn it to practical account in the affairs of his life." —MATTIE ROSE CRAWFORD, author of "Guide to Nature Study."

"If nature is to be a resource in a man's life, one's relation to her must not be too exact and formal, but more that of a lover and friend."—JOHN BURROUGHS.

"It is one of the laws of our being that by seeking interests rather than by seeking pleasures we can best encounter the gloom of life."—LECKY.

CHAPTER XVIII

OUTINGS

"How many pupils do you usually take with you on your outings?" recently inquired a school superintendent.

"I most usually don't take any," was my reply.

"Don't take any with you!" he exclaimed. "Why, I thought you conducted parties of school children on natural history excursions?"

"So, indeed, I do," I replied; "but if I didn't have a love of nature that would take me out alone into the fields and forests many, many times to once that I go with a natural-history party, I am confident that I should not have sufficient love of my own for nature to inspire any of it in others."

And I went on to say to him, as I now say to you, that you cannot give to others what you yourself do not possess. The first essential is to get into harmony with the infinite, into loving intimacy with nature, so that through your influence a responsive chord may be set into vibration within

the hearts of your companions; or, to revert to the other figure, you may introduce your companions to your loving Mother Nature when you know and love her so well yourself that you may in the introduction transfer some of that knowledge and affection to your friends. Therefore you must "usually" go alone; then when you go with others you will have something genuine to transfer, and not merely a perfunctory task to perform. Nature should be so resourceful to every teacher of nature study, that he could go and live with her for days and weeks, until the longer he stayed the longer he would like to stay.

A superintendent of the schools in one of the largest cities in New Jersey said to me: "I don't know what is the trouble with nature study in our schools. We have tried it, and the children don't seem to be much interested in it. We devote fifteen minutes a day regularly to it, and I often have my doubts whether it is worth while to assign even that small amount of time."

I was puzzled.

Later, in a conversation regarding other matters, he jokingly referred to a visit which some of the teachers had made in the Adirondacks. A club went up there to stay for four weeks. They came

home at the end of two, reporting that it was the dullest place they had ever seen.

My puzzle was solved.

That reminds me of a story that I have somewhere read. A wealthy business man had sent his wife and children to their country home. He spent the week in the city at his business office. One day, as he thought of the inequalities of fortune, he said to himself,—" Isn't it strange that my family can have so much, when there are so many women and children that must toil all the week in the hot city, and have none of the joys of country life. If I were the ruler of the universe, I would have things different. Come to think of it, although I can't rule the universe, I can remedy a part of this injustice. I will send a part of these women with their children to a boarding-house near my own country home."

So he had his secretary make the arrangements, and a party of seven washerwomen and twenty-three children were sent to the country. Then as the man toiled at his desk, he was the happier, not only in anticipating his own weekly visit to the country, but in feeling that he was giving much pleasure to those thirty poor persons. Imagine his amazement when, at the end of the first

week, he received a letter from the country, stating that the entire company had deserted and returned to the city. He waited for no secretary to transact this business. He grabbed hat and cane and started for the East Side, to search for, and find, too, the woman who had been prominent in organizing the party. She came to the door, wiping her hands on her apron. He inquired as to the board, the location, and the treatment of the children. All these had been satisfactory. Finally, almost in exasperation he said, "Tell me, madam, frankly, why did you come home? Doesn't my kindness to you merit at least some candor on your part?"

"Yes, sir, it does; you're a good man. I tell you, sir, we all came home because there was nothin' doin'!"

I have read of a similar experience on the part of a Boston lady, who, upon investigation, found that a poor woman whom she had sent to the country had come home, because she "liked people better than stumps!"

And yet, absurd as are these excuses from these uncultured persons, it is to be feared that they have far too many followers who everlastingly want to be where there is "somethin' doin'," or

where there are greater aggregations of people, rather than in the land of stumps and trees, fields and brooks, flowers and birds. It is only the greatest teachers and poets, and the greatest souls, that seek the wilderness and the mountains, to find strength and comfort. It is ever true that outdoor life must be a pleasure to the teacher first, before that teacher can make it a power to benefit others. First of all, then, go alone, and make it to yourself what you would have it be to others.

> "Nature ever yields reward
> To him who seeks, and loves her best."

And this seeking and loving must be done in all seasons, and in the rain as well as in the sunshine. Nature exists in the winter, in the snow storm and the rain, and even at night. Know nature; woo her even under difficulties; you will appreciate her all the more. Take the young folks with you to find and admire icicles and snow crusts; do not look for daisies and scarlet tanagers only. Is there anything more beautiful than the lace-fringed brook in winter?

Lowell's love of nature was not limited to spring and summer. He found joy in the winter:

"For my own part, I think Winter a pretty

wide-awake old boy, and his bluff sincerity and hearty ways are more congenial to my mood, and more wholesome for me than any charms of which his rivals are capable. . . . However, when you do get a crust that will bear, and know any brooklet that runs down a hillside, be sure to go and take a look at him, especially if your crust is due, as it commonly is, to a cold snap following eagerly on a thaw. You will never find him so cheerful. As he shrank away after the last thaw, he built for himself the most exquisite caverns of ice to run through, if not 'measureless to man' like those of Alpha, the sacred river, yet perhaps more pleasing for their narrowness than those for their grandeur. What a cunning silversmith is Frost! The rarest workmanship of Delhi or Genoa copies him but clumsily as if the fingers of all other artists were thumbs. Fernwork and lacework and filagree in endless variety, and under it all the water tinkles like a distant guitar, or drums like a tambourine, or gurgles like the tokay of an anchorite's dream. Beyond doubt there is a fairy procession marching along those frail arcades and translucent corridors."

> "Their oaten pipes blow wondrous shrill,
> The hemlock small blow clear."

Then what infinite variety in the snow crystals; what marvelous silky beauty in the blocks of "frost coming out of the ground;" what delicate traceries on the lower side of the ice from beneath which the water has dried away; what exquisite tapering outlines of the leafless twigs against the background of the cold, blue sky!

Birds now are to be observed, but they do not confuse by their numbers. Winter birds seem to say, We are worth your careful study, therefore there are few of us.

Go frequently to the winter fields and woods, to the marshes, and into the mazes of the swamps where you cannot so easily go in summer; go to see things, and for the sake of long walks; go alone and with companions; in sunshine and in storm; go with that elasticity of step, that joy of heart and brightness of eye that only winter can produce.

Then go again.

"For many years it has been one of my most constant regrets that no schoolmaster of mine had a knowledge of natural history, so far at least as to have taught me the grasses that grow by the wayside, and the little winged and wingless neighbors that are continually meeting me with salutations which I cannot answer, as things are. Why did not somebody teach me the constellations, too, and make me at home in the starry heavens which are always overhead, and which I do not half know to this day."—THOMAS CARLYLE.

"The true naturalist is a true poet. Into his mind the influences of natural scenery, of natural history, unconsciously sink down. There is an unmentionable bliss in the unrecognized sympathy which goeth forth toward all things into which He hath breathed the breath of life. The scent of the opening buds; the sad, soft sighing of summer winds; the unobtruding kaleidoscope of floral form and color, scattered so freely and bountifully; cannot these get hold of the soul of a man! One feels constrained to adopt the language of the principal talker among the favorite disciples—'Lord, let us build three tabernacles,' etc. The disciple was in no hurry to depart."—DR. J. E. TAYLOR, in "The Playtime Naturalist."

CHAPTER XIX.

GIVE THE YOUNG OBSERVERS A CHOICE

Nature study should be spontaneous on the part of the pupil. To most pupils nature study is a privilege and a pleasure. To these it is a very simple matter to make it a tonic and not a task.

But the problem comes when we regard the few who do not regard it as a privilege or a pleasure, and the few larger pupils in the class who, perchance, may regard the bringing in of specimens or the telling about them as "kiddish" as I once heard a boy express it.

If there is a certain period assigned to nature study, shall this period be merely one of laziness or indifference on the part of these few? That is a question that often confronts a teacher. Or shall certain pupils be allowed to hold entirely aloof from the informal work, even if there is not a definite nature-study period?

It is true that nature study should be a pleasure, and it is a pleasure to most pupils, but this does not annul the fact that it should be required.

To attain both ends, I have found it convenient to make a threefold assignment, from which a choice may be taken:

1. Bringing in a specimen and telling where it was obtained, with statement of any interesting facts connected with it.

2. A story of entertaining truths that I have seen, read or been told, about natural objects.

3. Assignment of some topic to be investigated from books or other sources of information. Thus, for example, asbestos has been for the past weeks a timely topic, because it has been referred to so frequently in the newspapers in connection with theater curtains, since the fire that caused so great a loss of life in the Chicago theater. Radium is another good topic. The pupils should tell what they have read or heard regarding this wonderful metal. The teacher corrects any wrong impressions that the children may have acquired, and states any facts of interest she may have readily obtained from the many popular articles in various periodicals.

By this method of choice in nature-study work or interests, the pupils have no odious task to perform, neither is the period one of shirking, nor an exhibition of laziness on the part of a few.

CHAPTER XX

PROGRESS BY AVOIDING REPETITION

(Extracts from a letter.)

Whole classes are taken out on clear days to the woods, fields, stream, hillsides, and gorges to observe and enjoy Nature. When out on these rambles they collect various things of interest and bring them back for further study.

In this study we aim to connect it with other studies in such a way as to give added life and meaning to them. These excursions, wheat, corn, trees, etc., are made the themes for compositions. Thus we give the children something to write about that they have seen and experienced—the only theme that a child can tell of intelligently. Nature poems are learned and recited in connection with the objects studied. Nature songs are sung in school. These compositions written by the children are neatly written out and kept in a composition book. The books are passed on from grade to grade each year, so that each teacher may know what has been done by the grade she has during previous years, and thus avoid repetition, which kills interest. This method enables us to progress in the subject from grade to grade.

My aim is to teach those things which have some influence upon our lives in some way or another. Thus we study plants and animals useful to man, also plants and animals which, directly or indirectly, are a detriment to man's interests.

The æsthetical, ethical, and religious growth comes with contact, but is not directly alluded to, for preaching kills.

My aim is to give the pupils something which is related to their own lives and the lives of others, and thus make them more useful men and women in after years.

Since I have changed my plan of teaching botany from that of knowledge for the sake of knowledge, to knowledge for the purpose of becoming better and more useful in the world, I find that the pupils have a new interest in the subject. It is a subject now with meaning and purpose, closely related to the lives of the pupils. Formerly, it was a subject to be memorized for the sole purpose of passing the examination.

I have not worked out my ideas fully in our course as yet, but have progressed far enough to satisfy myself that it is better than the old.

Assuring you that I appreciate your interest in our work, and hoping to hear from you again, I am, with kindest regards,

Very respectfully,
V. A. SUYDAM,
Principal Public Schools, Ripon, Wis.

I like this method of avoiding repetition, but to accomplish the object it is not necessary to avoid using the same subject. Some one has said in substance that truth is like an ocean, in which a child may play or an elephant easily get drowned. It is all in the manner of using it.

The director of the zoological department of one of our leading universities, once had a student who said of a requirement for the dissection of a grasshopper, "I don't want to do that. I had that in the kindergarten!" That is what one may call dilute science in the place of nature study.

And yet a grasshopper may be used in kindergarten or in university with profit and without repetition.

Said Linnæus to a pupil, as he laid his hand on a bit of moss: "Here lies sufficient material for the study of a lifetime." Perhaps some of us would regard that remark as a little hyperbolic, but if taken literally, without doubt we should all agree that the child's relation to the mosses is entirely different from that of the expert technical botanist. I suppose that it is the avoidance of repetition of relation that Principal Suydam has in mind. We may live for decades in the same home, but the point of view changes rapidly and opens up new vistas as years go by.

"The author knows by experience, both on the farm and in the schoolroom, that the possession of a better knowledge of nature by country youths is one of the crying needs of the hour. With such a knowledge generally diffused there would be less dissatisfaction with country life and fewer farmers' sons and daughters would flock to the cities, because, as a recent writer expresses it, "they wish to get rid of the prosy, stunting, isolated life on the farm." With a knowledge of some of nature's objects and a desire to ferret out for themselves some of her secrets, they would have something of which to talk and think besides crops, stock, work, neighborhood gossip and local politics, and the attractions of the city would seldom excel those to be found on the old homestead."—W. S. BLATCHLEY, in "Gleanings from Nature."

"It seems as if the day was not wholly profane in which we have given heed to some natural object . . . He who knows the most, he who knows what sweets and virtues are in the ground, the waters, the plants, the heavens, and how to come at these enchantments, is the rich and royal man."—EMERSON.

CHAPTER XXI

NATURE AND LIFE

Of all the subjects in this world, there is nothing so great to which we can give our attention as the world itself. Offspring of nature as we are, surrounded on every hand by her wonderful products and existences, it is no less than our duty to give her our earliest attention, as a powerful factor in the complete development of our own or of any other human life.

"Nature never did betray
The heart that loved her; 'tis her privilege,
Through all the years of this, our life, to leap
From joy to joy; for she can so inform
The mind that is within us, so impress
With quietness and beauty, and so feed
With lofty thoughts, that neither evil tongues,
Rash judgments, nor the sneers of selfish men,
Nor greetings where no kindness is, nor all
The dreary intercourse of daily life,
Shall e'er prevail against us, or disturb
Our cheerful faith, that all which we behold
Is full of blessings."

"It is of course evident that a scientific interest and an æsthetic interest in Nature Study are widely different things. The æsthetic interest is the result of the appeal Nature makes to our sense of beauty; the scientific, the result of the appeal she makes to our desire to know. If, in the case of the average man, we had to choose between them, it is at least doubtful whether it would not be wise to sacrifice the scientific to the æsthetic interest. The life of the average man is probably more enriched by the capacity to derive pleasure from listening to the knell of the parting day, from watching the lowing herd as it winds slowly over the meadow, than by a scientific interest in nature. But the two interests are in no wise antagonistic. And if the teacher of the nature subjects be herself a lover of nature, if she looks upon the changes that pass over the face of nature as spring blooms into summer, and summer fades into autumn, and autumn gives way to winter, with something of the same fondness with which the mother watches the changes in her child as she traverses the road to womanhood, there is no danger that the æsthetic interest of her pupils will suffer through a development of their scientific interest. Not only will the bugs and grasshoppers and butterflies, the trees and the leaves, the soil and minerals, claim her attention, but the broad valleys, the gently sloping hills, the sycamores bending over running streams and, as it were, gravely bowing to the trees on the other side; and her enthusiastic love of nature will be as contagious as her intense interest in science."—DR. J. P. GORDY, in "A Broader Elementary Education."

CHAPTER XXII

BOOKS AND NATURE

Indoor studies and outdoor studies, are they antagonistic or co-operative? They are both, anomalous as it may seem. The same is true in a comparison of city culture and country culture. Sometimes we observe the antagonism in the same person. We may see in our best poets, now the praise of books and now the praise of nature. A double spirit, a mingling in one, comparable to the mingling of the good and the bad of Stevenson's "Dr. Jekyll and Mr. Hyde." Wordsworth first sounds the praises of books:

> "Yet it is just
> That here in memory of all books which lay
> Their sure foundations in the heart of man,
> Whether by native prose, or numerous verse,
> That in the name of all inspired souls—
> * * * * * * *
> 'Tis just that in behalf of these, the works,
> And of the men that framed them, whether known
> Or sleeping nameless in their scattered graves,
> That I should here assert their rights, attest
> Their honors, and should, once for all, pronounce
> Their benediction; speak of them as Powers

Forever to be hallowed, only less,
For what we are and what we may become,
Than Nature's self, which is the breath of God,
Or His pure Word, by miracle revealed."

Then he declaims against books as injurious:

"Up! up! my Friend, and quit your books;
Or surely you'll grow double:
Up! up! my Friend, and clear your looks;
Why all this toil and trouble?

"Books! 'tis a dull and endless strife;
Come, hear the woodland linnet,
How sweet his music! on my life,
There's more of wisdom in it."

This double view is likewise shown in **Lowell**, whom Stedman styles "our representative man of letters," and adds, that "He is regarded as a fine exampler of culture." Lowell, though "the poet of nature," was pre-eminently a man of books. His writings and addresses were chiefly on literary subjects. Yet in a burst of passion for nature, the supremacy of a great surging part of his own character, he counts books and literary culture as of little worth, and in pleonastic verse makes them for the time shrink into nothingness:

"Jes' so with poets: wut they've airly read
Gits kind o' worked into their heart an' head,
So 's 't they can't seem to write but jest on sheers,
With furrin countries or played-out ideers,

Nor hev a feelin', ef it doosn't smack
O' wut some critter chose to feel 'way back;
This makes 'em talk o' daisies, larks, an' things,
Ez though we'd nothin' here that blows and sings,—
(Why, I'd give more for one live bobolink
Than a square mile o' larks in printer's ink)."

Books and Nature are antagonistic and yet they are co-operative. As Hamilton Mabie says:

"Since I turned the key on my study I have almost forgotten the familiar titles on which my eyes rested whenever I took a survey of my book-shelves. Those friends staunch and true, with whom I have held such royal fellowship when skies were chill and winds were cold, will not forget me, nor shall I become unfaithful to them. I have gone abroad that I may return later with renewed zest and deeper insight to my old companionships. Books and nature are never inimical; they mutually speak for and interpret each other; and only he who stands where their double light falls sees things in true perspective and in right relations."

I like that expression, "stands where the double light falls." There is a difference between the compound light and the extreme colors of the spectrum. One needs to *know* the details; *to live and see*, in the combination. The poet needs

the eye of the naturalist for his facts, and the naturalist needs "the light that was never on sea or land" for his life.

The quarry is antagonistic to the castle. The one must be depleted for the other. Yet both are co-operative; the first is useless and the second impossible without the other. The mine means something, it has its real value and beauty brought out only in the hands of the assayist. The two are antagonistic, yet co-operative. So you, teacher, must not merely go to nature for things, things, things, nor to books for words, words, words. One part of your mental make-up must be to lay hold of the real things of nature; the other must be to let in the illumination of books. Then only will you see facts in their true relations.

Remember always that the result is not to be naturalists and scientists, nor yet literati, but living men and women.

CHAPTER XXIII

"HUSH ALL THE CLASSES AND . . . HUG HIM"

He has a secret; wonderful methods in him; he is, every child, a new style of man; give him time and opportunity. Talk of Columbus and Newton! I tell you the child just born in yonder hovel is the beginning of a revolution as great as theirs. But you must have the believing and prophetic eye. . . . If a child happens to show that he knows any fact about astronomy, or plants, or birds, or rocks, or history, that interests him and you, hush all the classes and encourage him to tell it so that all may hear. Then you have made your school-room like the world. Of course you will insist on modesty in the children, and respect to their teachers, but if the boy stops you in your speech, cries out that you are wrong and sets you right, hug him!

And you, dear Ralph Waldo Emerson, how all child lovers should love you for that wise statement! You have practised what you preach; you have lived true to that other loving statement in your essay on "Education," "rather let us have men whose manhood is only the continuation of their boyhood, natural characters still." You had the boy nature in your heart, and sympathy for the spontaneity of the boy.

"Hush all the classes," and let the individual

child tell his story in his own way. Then, in that spirit, even if he disputes you, "hug him." Know with joy and love that you are educating, actually leading out individuality, not "minding" a series of buzzing spools and spindles on a school loom.

A few weeks ago at a teacher's institute, in a lecture on "School Discipline," a fellow instructor told of a teacher of physiology, who, to illustrate how the muscles are strengthened by use, referred to the arm of the blacksmith, and as an example, swung her right arm behind her back and over her head in windmill style that would have thrown a blacksmith into convulsions of laughter.

One of the pupils, who was a frequent visitor at a blacksmith's shop, was an interested listener. The reference to his good friend made his eyes snap and his heart beat. He was an expert in smithy work. He knew something, and he knew that somebody was wrong. But it was not his blacksmithing chum. Up went his hand with a confident flourish.

The teacher inquired, "Well, what is wanted, now, James?"

The little fellow replied, "Please, ma'am, I don't think the blacksmith swings his arm in that way. Mr. Johnson doesn't, anyhow; this is the

way he does," and his clenched fist flew up and down, and up and down, and banged the desk every time it came down, and did it gladly, too.

"Well, never mind," said the teacher; "we won't talk about that; we are talking about physiology now. We will consider that at some other time. But, James, when you speak you should not be so vehement, and your gestures should not be so violent. You should cultivate repose, James."

I was amazed, almost stunned, when that learned professor of pedagogy commended the teacher's action, as an excellent example of adroitness in avoiding a confession of ignorance, and of her skill in thus maintaining discipline. He claimed that if she had admitted her error, she would, to a certain extent, have allowed the school to get the best of her, and would, therefore, have lost her dignified hold of the discipline.

I claimed then, and I claim now, that it was a case in which knowledge was snubbed by ignorance, and the weak oppressed by the strong. Talk about losing the respect of her little men and little women! In the schoolroom, as in the greater world of which it is an epitome, there is nothing more repugnant than deceit, hypocrisy, or unfairness.

Had that teacher at once accepted the correction, with a few words expressing pleasure at the little fellow's power of observation in a field in which no one could expect her to be so well informed as the daily visitor to the blacksmith's shop, she would have gratified the boy and have won the good will and respect of all the little folks. Can you not see them all looking at James, and then at the teacher, with a pleased expression that says, "I wish I could have done that, told my teacher something she didn't know and got such a pleasant answer."

And then James; see him. How his eyes glisten with pleasure, but how embarrassed he is, and how he wriggles in his seat! It is so much good fortune, and it came so suddenly that it is almost uncomfortable. He is in haste to get home to tell about it; and eager, too, to see something else and tell his teacher, and so are the others.

But stop, we are dreaming, this was not the real situation commended by that professor of pedagogy. Drag yourselves back from the Utopia to the real thing. Look at the quick glances of the class as at a culprit; look at the assumed dignity on that teacher's face. Oh, James, I

want to hug you; and you, too, dear champion, Emerson, for you are right when you say:

> I believe that our own experience instructs us that the secret of Education lies in respecting the pupil. It is not for you to choose what he shall know, what he shall do. It is chosen and foreordained, and he only holds the key to his own secret. By your tampering and thwarting and too much governing he may be hindered from his end and kept out of his own. Respect the child. Wait and see the new product of Nature. Nature loves analogies, but not repetitions. Respect the child. . . . One burns to tell the new fact, the other burns to hear it.

The spirit of hushing the class to allow the child to speak, and of loving that child for what he tells of his own experiences and observation, is the spirit of nature study.

The dignity of that teacher, the unswerving class instruction, the claim that this is true because I say it is true, whether we call it science or whether we call it hypocrisy, is not the spirit needed to bring young folks into relation with nature. I do not state, nor even imply, that most of our teachers have this method of teaching what they term elementary science. Many excellent instructors in what they call science have the spiritual insight that I have styled the spirit of nature study. It is a commendable and enviable faculty, with which some of us, I fear,

have no speaking acquaintance. You must have, in justice to the little folks, the nature-study faculty, even if you do call it the teaching of science.

Call it what you will. If you are contending for class instruction, with a mass of facts presented according to schedule, and are ignoring individual interests, then out on such teaching. There is plenty of time in high school and college for facts, facts, facts, and science, science, science; banish them from the young folks' schools.

As Professor Hodge so truly puts it:

> Recent developments of the sciences have completely dazzled our modern education with their bewildering array of newly-discovered facts, and the temptation has proved irresistible to introduce their technicalities into the elementary curriculum. But the childhood of the race was very long, and we should not wish to force its period, brief at best, in the life of the individual. The weathering of rock and the formation of soil afford interesting lessons in modern geology; but men dug and planted, and established fruitful relations with Mother Earth thousands of years before geology was even dreamed of. So with combustion and the various forms of water: why not let children wonder about them for a few years, and then come with interest keen and fresh to their study in the chemistry and physics of the high school and college.

I heartily agree with this. Do not introduce technicalities into the elementary curriculum.

But do put in generous proportions of viewing nature that will "hush all the class and encourage him to tell it so that all may hear." Then, if you have the right spirit, you will want to "hug him," that bright little James.

That is the thing needed in the schoolroom; you may call it anything you please. I call it nature study "from the child's standpoint."

By the way, Thoreau said, "There is something of spring in all seasons." There should be something of the nature-study spirit in all school exercises, very frequently so "from the child's standpoint."

"All that is needed to give the child an impulse to talk is to fill his mind with facts that interest him. You may indeed by discipline, or by appeals to emulation or to the child's desire to please, create an artificial motive. But discipline which does not strengthen a natural impulse to action, appeals to emulation or to the desire to please for the sake of making a pupil do what he has no inclination to do at all, is perverted. What a child does under such influences is always done in a half-hearted, perfunctory way."

"The value of work, however, should not be measured by the acquisition of knowledge or the power to express it, but rather by the love and the sympathetic interest awakened in nature and the profound reverence for the design and the protecting care revealed in the works of earth and sky by an all-wise Creator."—ANNA E. McGOVERN, B. S., in "Nature Study and Related Literature."

CHAPTER XXIV

WOVEN INTO CHILD NATURE

"Is this Mrs. Durant?" inquired a caller, rising as the lady of the house entered the drawing-room.

"Yes, and you are Miss Plimpton, my Dorothy's teacher. I am glad to see you. I should have known you at once, even if you had not sent up your card, and in spite of the fact that this is the first time I have had the pleasure of meeting you."

"How is that?" surprisingly inquired the teacher. "I feel as though I were a perfect stranger, except to my boarding-mistress and the little folks in school. I have been so busy that this is my first call in Van Wert, but I have been here only three weeks."

"Let me explain that perhaps you haven't known just what you have been doing. I see that you are not aware that you have been calling on about forty families every day; that is, if all your pupils are like my little Dorothy. It is in this way that you multiply yourself. Dor-

othy plays keeping school, and morning, noon, and night we are served with Miss Plimpton in voice, in walk and even in every little action. So you see I am well acquainted. I recognized and welcomed your voice and manner as of at least three weeks' acquaintance."

There are good contagions and "catchings" of good things, as well as of bad things and diseases, in the life of every child. We quarantine from the bad, but too often, I fear, forget to supply the good. That supply should come from various sources, nature, associates, books, playthings, and the greatest of these is nature. Mother Nature is truly loved by the best that is in us, and never did she betray the heart that loved her. Let us weave her in large proportions into the heart, head, and muscles of the child.

The ingredients of child-life are fresh air, sunshine, trees, flowers, birds, and all the other happy life of the fields and forests. Weave in generous proportions. Do not skimp and carve, and trim, and minimize, and scrutinize too much. Pour in the generous cupfuls, hours rather than minutes. The strength, the happiness, the life, all are good. You appreciate them and the child needs them. Let him have them in their fullness of enjoyment.

You will cordially welcome and recognize the ingredients. They transform the whole make-up. There are the strength, the joy, the beauty, the purity.

"Culture consists less in wide knowledge than in wider sympathy; not so much in stores of facts as in ability to transmute facts into knowledge; not only in well-grounded conviction, but in toleration; not alone in absorption of wisdom, but as well in its radiation; in patriotism that is without provincialism; in the development of character. But since individual minds differ much in their composition, no one kind of treatment can be best for all, and the ideal system will be that which is elastic enough to allow each to receive what is best for it. True culture, then, cannot be obtained by forcing all minds into any one mould, however carefully that may be made, but it is rather attained by allowing each mind to expand for itself under a proper combination of nourishment from within and stimulus from without."—WILLIAM F. GANONG, Ph. D., in "The Teaching Botanist."

"Nature Study should appeal to the imagination; the artist and the poet should be called upon to help the child interpret the beautiful."—A. C. BOYDEN.

CHAPTER XXV

SOME TESTS OF PROFICIENCY IN NATURE STUDY

How shall we make these tests? The requirements are too intangible for measurement by the usual method. It is not so much "What do you know?" as "What do you appreciate?" Not so much the amount and detail of acquired information, as it is the extent of your ability and willingness to continue to acquire.

From the pupil's standpoint, the following model series of test questions, with answers, that merit high grading, has been given us by Principal Gowing of the Rhode Island normal school:

Question.—Do you enjoy going on rambles across the fields, through the woods and down the ravines to the meadows and swamps?

Answer.—Yes, sir.

Question.—Do you like to pick the flowers, hear the birds sing, and watch all forms of life?

Answer.—Yes, sir.

Question.—Do you select from the library and

read outdoor books that tell of nature's interesting plants and animal life?

Answer.—Yes, sir.

Teacher.—Marking, 100.

Then, too, there is an important observational, as well as a questioning, examination. The enthusiastic teacher will find it a pleasure to note the effects of nature study on the life and character of the pupils. If nature study gives pleasure for the time being only, it is still good; but if wisely and patiently done, it will surely refine the mind and open out avenues for active sympathy and helpfulness, and so uplift those who do not, at first hand, know anything of the teaching and refining spirit that Mother Nature imparts to those who communicate with her.

Tests for these results should be made, but they are not to be found easily in written monthly examinations. They will show themselves in little acts that may escape the notice of some teachers. Watch for these little evidences. They are among the most important tests of the proficiency of your pupils in nature study.

So much for the pupil. Now what shall be the test of the teacher? The writer suggests the following questions, not to be asked by others, but

as beneficial for self-examination. A conscientious teacher is her own best critic. Every one desires success, but success depends on fitness. If you are not achieving the results that you desire in nature study, look carefully for the causes. If you cannot mark at least "fifty per cent." on these test questions, and cannot soon bring them to a higher mark through your own efforts, then beg the principal to allow you to exchange duties with some other teacher who can lead your pupils in nature study. Adaptation and enthusiasm are keynotes to success. One hundred per cent. of teaching ability in science strongly implies, but does not guarantee, an equal grading in nature study.

Here are a few of the useful questions. They will suggest others adapted to special cases:

1. If I were to leave teaching and take up other duties, such as those of married life, for example, how much time each day would I devote or wish to devote to an increasing acquaintance with nature?

2. Do I regard the time devoted to nature study as a recreation, a duty, or a burden?

3. How much time each day do I devote to observing or reading about facts in nature that I

never intend to make use of in the schoolroom? That is, how much of my nature-study work is personal and how much utilitarian?

4. How long could I visit at an isolated home in the country, or at the seaside, and not find life a burden?

There is no element of injustice in question 1, as it may at first suggest. The right kind of nature study in its continuance under varied circumstances and vocations is not comparable to science, mathematics, or classics, but to music, poetry, general literature, and art. It should be a favorite avocation as well as vocation, a pursuit that recreates.

Now for a test as to the amount of nature study in a school.

1. After eliminating every method of viewing natural objects to which the term science may not be inappropriately applied, how much remains?

2. Without in the least detracting from the merits and advisability of correlating other school interests with nature study, take away all studies so correlated, and how large a nature study nucleus remains?

3. A country boy out of the schoolroom gets a vast amount of nature study, but very little of

science. Especially applicable to him is Emerson's saying that "The most important part of a boy's education is that which he gets to and from his way to school." How much of such country boy's relation to natural objects is there in my school?

Such questions, it seems to the writer, will be found helpful in bringing out the exact state of affairs in this informal acquaintance with nature as separated from exact systematic science yet perhaps leading to it. As nature study should lead to science, perhaps the best single question to pupil, school, or teacher is, "How much science does our nature study inspire?"

Or, from a more practical out-of-the-schoolroom standpoint, how much has your nature study led "to the end," as Professor Hodge has so admirably expressed it, "of doing those things that make life most worth the living?"

"The teacher who hopes to guide her pupils wisely will find it advisable to go directly to nature for inspiration; she must learn to know and to love the birds, the flowers, and the trees, if she hopes to lead her pupils to know and to love them; she must learn to observe in order to direct and test the observation of her pupils. After having studied, sketched and written descriptions of a few typical plants and animals and verified the descriptions by reference to good text books, a teacher will begin to realize something of the enjoyment in store for her pupils."—ANNA E. MCGOVERN, B. S., in "Nature Study and Related Literature."

The writer was once a boy himself, and vividly remembers the never-to-be-forgotten rambles and observations of the objects in the country; and moreover, as he treasures up such reminiscences as the most pleasant and innocent of an active man's life, he thought he could not do better than enlist this younger generation in the same loves and the same pleasures. He has endeavored to do his best for his human hobbies, and hopes their lives may be richer and sweeter and more manly, for what he has introduced them to in this book.

CHAPTER XXVI

INSPIRATIONS OF NATURE STUDY

In an opera-house in Clearfield, Pennsylvania, it was my pleasure and honor to occupy an easy chair on the stage and near the orator of the evening. How much I enjoyed that lecture, how I forgot opera-house, stage, easy-chair, everything except the speaker's eloquence and the pleasure of following his inspiring and virile thought, I cannot well describe. I shall never forget the memorable occasion, and I shall always remember the eloquent speaker's peroration. He was eulogizing the earth as an inspiration to any world that may succeed this one. His concluding words were those of the following beautiful poem by M. F. Butts :

A WHITE WATER-LILY.

" O star on the breast of the river,
  O marvel of bloom and grace,
Did you fall straight down from heaven,
  Out of the sweetest place ?
You are white as the thoughts of an angel ;

Your heart is steeped in the sun;
Did you grow in the golden city,
My pure and radiant one?"

"Nay, nay, I fell not out of heaven;
None gave me my saintly white;
It slowly grew from the blackness
Down in the dreary night.
From the ooze of the muddy river
I won my glory and grace.
White souls fall not, O my poet!
They rise to the sweetest place."

When the same speaker later invited me to write an article on some phase of nature study for his biennial Report of the Fish and Game Commission, I at once thought of his eloquent and impressive lecture, and with that as an incentive, as it has been during all these years, I have taken "Inspirations of Nature Study" as my subject.

And I assume the risk of seeming egotistical when I say that under this title I think can be properly portrayed the *real* aim of fish and game interests, for this title represents the vital substance of his entire report more truly than what he really spoke at the time. Fish and game! Why, the people for the most part care nothing for a fishing rod nor a ramrod, nor for the fish and game neither. They seek the inspiration of the woods. They are a lot of commend-

able, excusable, harmless, admirable hypocrites, although they don't know it or refuse to acknowledge it, or do so only with what Brer Rabbit calls "a spell of the dry grins."

General Sweeney's constituents nominally seek for a few pounds of fish and game, but in reality they go for the rest and the refreshment of nature. What a delicious lot of hypocrites are all these so called lovers-of-out-doors. They beneficially delude themselves. They are all in the same family, brothers and sisters with the mycologists whom Dallas Lore Sharp thus describes:

"And the *collecting* of mushrooms is, after all, their real value. Our stomachs are too much with us. It is well enough to beguile ourselves with large talk of rare flavors, high per cents of proteids, and small butcher's bills; but it is mostly talk. It gives a practical, business-like complexion to our interest and excursions; it backs up our accusing consciences at the silly waste of time with a show of thrift and economy; but here mushroom economy ends. There is about as much in it as there is of cheese in the moon. No doubt tons and tons of this vegetable meat go to waste every day in the woods and fields, just as the mycologists say; nevertheless, according to

my experience, it is safer and cheaper to board at a first-class hotel than in the wilderness upon this manna, bounty of the skies though it be.

It is the *hunt* for mushrooms, the introduction through their door into a new and wondrous room of the out-of-doors, that makes mycology worthy and moral. The genuine lover of the out-of-doors, having filled his basket with fungi, always forces his day's gleanings upon the least resisting member of the party before he reaches home, while he himself feeds upon the excitement of the hunt, the happy mental rest, the sunshine of the fields, and the flavor of the woods."

Consciously or unconsciously to us the woods and fields, the meadows and ravines are calling us to our own. They are inspiring us to seek a higher life. They want us to be like them.

> "We are what suns and winds and waters make us;
> The mountains are our sponsors, and the rills
> Fashion and win their nursling with their smiles."

And how readily comes the response in a language varied, but always signifying the same thing. As Thoreau has expressed it, "I would be as pure as ye, O woods!" They are as nature originally makes them or as she later fashions, cuts and trims them. This may be through

icthyology, ornithology, botany, geology, photography, art or poetry. Like the spokes of the wheel held in by the tire, all pointing to the hub, so the various occupations, struggles and tensions of mankind, all eventually lead to attempted restoration by the soothing hand of nature.

In my back yard, in a wire cage about ten feet long, I have a brood of ducks. It is amusing, especially to the young folks, to see the characteristic and unique manner in which these fuzzy waddlers take their food. Since we have learned that they must have one or two sips of water between every few mouthfuls of food, we have, in order to add to the entertainment of the row of youngsters, who so often come to watch them, placed the dish of food at one end of the cage, and the pan of water at the other. Laboriously the birds scoop up the food in their broad bills, and strenuously jerk their heads back and forth to shake it down their throats. The material things of life are serious matters to them. They continue their exertions as long as they can, and then wearily waddle over to the basin of water and delightedly take a few sips. Now the labored "quacks" give way to a sort of musical chipper,

as they gleefully trot back to the strenuous work of getting a living. The row of young folks see lots of fun in all this.

But isn't it after all an epitome, a sort of parallel, to what a visitor from another planet might observe if suspended in a balloon over this weary, living-getting world of ours? The people are the ducks, the basin of food the place of occupation and the vessel of water the seaside, the lake, the rivers, the books, the fields, the mountains, the wilderness. Vigorously we labor at the centre of material things, then tired out with much work, or large accumulations, or both, we hurry away for the dilutant, or that which shall make us digest, absorb and enjoy all that we have succeeded in picking up in the scramble. Every train load of excursionists to or from a city reminds me of those ducks hurrying to or from the food and the water. You can always tell by the appearance of the people (and of the ducks, too !) which place has been visited last, even if you canno surmise it from the point of the compass which they are leaving, or that toward which their faces are looking.

My son, who attends to the needs of these ducks, stops me at this point, and says that he has dis-

covered an error in the parallel. He makes the suggestion that there is a blunder in my figure of speech. He says: "They don't act that way so often when they get older. It is only when they are young that they are so erratic. Then they take a sip between every mouthful, but when they get older, the members of the flock drink only once or twice during the entire meal." This suggestion of an error in the parallel but points out all the more effectively the truth of what I maintain. This alleged discovery, instead of crushing me and my parallel, actually proves my position, makes my comparison all the more impressive and my meaning all the more incisive. The younger folks should go and need to go to nature more frequently than their elders; indeed they should be almost constantly in the presence of nature. This is the true theory of the kindergarten. Liberal and continuous sips of nature. The business man can be, must be, content with one or two or refreshing drops now and then in the form of a few hours or of a few days' vacation from the office, or with a more exhilarating "drink" that shall last for a week or a month in the woods once a year. An author can labor continuously on a book or two, then back he

must go to nature for a long, refreshing recuperating draught. John Burroughs says of the man who writes:

"I once saw a cow that had lost her cud. How forlorn and desolate and sick at heart that cow looked. No more rumination, no more of that second and finer mastication, no more of that sweet and juicy revery under the spreading trees, or in the stall. Then the farmer took an elder and scraped the bark and put something with it, and made the cow a cud, and after due waiting, the experiment took, a response came back, and the mysterious machinery was once more in motion, and the cow was herself again."

Have you, O poet, or essayist, or story-writer, never lost your cud, and wandered about days and weeks without being able to start a single thought or an image that tasted good,—your literary appetite dull or all gone, and the conviction daily growing that it is all over with you in that direction? A little elder-bark, something fresh and bitter from the woods, is about the best thing you can take.

Bryant also tells us that the author must make visits to the "lonely stream" for refreshment and inspiration:

" Though forced to drudge for the dregs of men,'
And scrawl strange words with the barbarous pen,
And mingle among the jostling crowd,
Where the sounds of strife are subtle and loud—
I often come to this quiet place,
I breathe the airs that ruffle thy face,
And gaze upon thee in silent dream,
For in thy lonely and lovely stream
An image of that calm life appears
That won my heart in my greener years."

David says, " I will lift up mine eyes unto the hills from whence cometh my strength."

The child, the business man, the teacher, the housekeeper, the writer, the minister, everybody seeks inspiration from nature, everybody is a naturalist, or a student of nature in spite of himself. The fisherman and the sportsman are members of one branch of the many that form the great company which we style " everybody."

May fishermen and sportsmen " confess and forsake " their cruelty ; may they get their out-of-door inspiration, and their collection of fish and game chiefly by means of the camera and not by rod and gun. When his followers go out with their nerves stretched to the breaking point, and their shoulders bowed beneath the load that civilized life heaps upon them, until they ache and sting and throb with the pain of such living, may

they return from the water as gleefully as do my ducks. All nature shall combine to win them. Even the grass by the brook along which they cast the artificial fly, shall add to this inspiration. Says Richard Jefferies :

"As a few strokes from a loving hand will soothe a weary forehead, so the gentle pressure of the wild grass soothes and strokes away the nervous tension born of civilized life."

The carol of a bird is more soothing to weary nerves than the explosive bang of a gun, and never harmful to any living creature. A wild rose in the buttonhole is as valuable, and as nourishing to one's esthetic nature, as a dead fish to his animal instincts. The tendency of most of us is to allow the animal within us to develop at the expense and final extinction of the spiritual. The slightest observation, even a casual reading of the daily newspaper, will prove that. We shall be better for this world, and for the next one too, if we can have a few more bird songs and a few more wild roses in our daily experience.

Type Lessons

for

Primary Teachers

IN THE STUDY OF

Nature, Literature and Art

Arranged by Seasons for the First Four Grades by

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SUMMER PLEASURES—*By Plockhurst*

NATURE STUDY AND LITERATURE

CHAPTER I

INTRODUCTORY DISCUSSION

Nature is one of the child's first teachers.

"Hand in hand with her he walks,
Face to face with her he talks,
Part and parcel of her joy."

He says with Lowell:

"For the whole year long, I see
All the wonders of faithful nature
Still worked for the love of me."

When he enters school he is

* * * rich in flowers and trees,
Humming-birds and honey-bees."

He knows,

"How the robin feeds her young,
How the oriole's nest is hung,
Where the whitest lilies blow,
Where the freshest berries grow,
Where the ground-nut trails its vine,
Where the wood-grapes clusters shine;
Of the black wasp's cunning way,
Mason of his walls of clay,
And the architectural plans
Of gray hornet artisans."

—Whittier's "Barefoot Boy."

NATURE STUDY

Nature is a skillful teacher and her books contain wonderful pictures. Memories of the happy days spent wandering in the woods and fields, discovering the secrets of birds and bees, cannot fail to stimulate a strong desire in the child's heart to broaden his horizon and increase his knowledge.

Jackman writes: "The child comes to the teacher with his eyes filled with a thousand pictures, but these are ignored and he is robbed of them one by one, until the beauty of this world fades from his sight, and it is changed to a vale of tears."

Childhood is, certainly, the most fruitful period for the culture of the emotions, the period best adapted to build up the positive side of character, and no one should question the desirability of fostering a love for those things which will tend to elevate, refine, and ennoble the child's higher life and bring him into harmony with the Designer and Author of nature, before he becomes absorbed in unworthy pursuits.

There was a Country Club on Storm King Mountain above the Hudson river, where they used to celebrate a festival of flowers every spring. Some of the seekers may have had a few gray hairs; but for that day at least they were all boys and girls. Nature was as young as ever and they were all her children. * * The hidden blossoms of friendship unfolded; laughter and merry shouts and sketches of half forgotten songs rose to the lips; school was out and nobody listened for the bell. *From Fisherman's Luck, Copyright, Chas. Scribner's Sons.*—HENRY VAN DYKE.

Nature has furnished inspiration for many of the most illustrious writers and painters of the world and the sympathetic insight which enabled them to reveal the beauty and the grandeur of God's handiwork, could be acquired only by the most loving investigation.

Wordsworth, Bryant, Lowell and a host of other nature-lovers who held "communion with her visible forms," suggest many messages beautifully adapted to the culture of the imagination and the child should be led to realize that he is

but "thinking God's thoughts after Him" when he discovers the beauty or the utility of one of nature's treasures, whether it be a giant oak decked in royal splendor or a lovely butterfly flitting from flower to flower. Contact with nature supplemented by art in the form of choice literature and beautiful pictures cannot fail to minister to the child's spiritual life and thus prove invaluable in the formation of good character.

In genuine nature study, personal investigation is an essential element and from every point of view must be recognized as the most effective means of stimulating thought. The establishing of a truly sympathetic appreciation of nature will prove most valuable to the child in furnishing a sure foundation for future acquirements in scientific knowledge. Through nature study properly presented, the power of expression has wonderful opportunity for development; the child's eyes are opened to see something of the wonders and beauties around him, his sympathies are enlarged and he is enabled to appreciate better the literature inspired by nature.

The sketching, modeling and painting of natural forms sharpens the power of observation, and oral and written expression follows as a natural result. Nature study gives the child something definite to discover, something interesting to draw, paint, and describe, and this concrete instruction, this habit of exact and truthful expression, based on observation, will furnish a basis for correct reasoning and thus serve as a means of developing power and self-reliance.

"The value of drawing as an educational agency is simply incalculable. It is the first step in manual training. It brings the eye and the mind into relations of the closest intimacy, and makes the hand the organ of both. It trains and develops the sense of form and proportion, renders the eye accurate in observation and the hand cunning in execution."—*From Mind and Hand, by Chas. H. Ham.*

The value of the work, however, should not be measured by the acquisition of knowledge or the power to express it, but rather by the love and the sympathetic interest awakened in nature and the profound reverence for the design and the protecting care revealed in the works of earth and sky by an all-wise Creator.

If this is not the leading purpose in nature work, the child has been deprived of the most beautiful and important lesson nature is capable of teaching.

THE BOOK OF NATURE

We scarce could doubt our Father's power,
  Though His greatness were untold
In the sacred record made for us
  By the prophet-bards of old.
We must have felt His watchfulness
  About us everywhere;
Though we had not learned, in the Holy Word,
  How He keeps us in His care.

I almost think we should know His love,
  And dream of His pardoning grace,
If we never had read how the Savior came,
  To die for a sinful race.
For the sweetest parables of truth
  In our daily pathway lie,
And we read, without interpreter,
  The writing on the sky.

The ravens, fed when they clamor, teach
  The human heart to trust;
And the rain of goodness speaks, as it falls
  On the unjust and the just.
The sunshine drops, like a leaf of gold,
  From the book of light above;
And the lily's missal is written full
  Of the words of a Father's love.

So, when we turn from the sacred page
  Where the holy record lies,
And its gracious plans and promises
  Are hidden from our eyes;
One open volume still is ours,
  To read and understand;
And its living characters are writ
  By our Father's loving hand!

—PHOEBE CARY.

TEACHER'S PREPARATION

It is undoubtedly true that lack of preparation on the teacher's part is the most serious drawback in the nature study problem. Many teachers have given the subject no special attention and the ordinary text books in natural science are not well adapted to give the preparation demanded for practical work.

The teacher who hopes to guide her pupils wisely will find it advisable to go directly to nature for inspiration; she must learn to know and to love the birds, the flowers, and the trees, if she hopes to lead her pupils to know and to love them; she must learn to observe in order to direct and test the observation of her pupils. After having **studied, sketched,** and **written** descriptions of a few typical plants and animals and verified the descriptions by reference to good text books, a teacher will begin to realize something of the enjoyment in store for her pupils.

The writings of Wordsworth, Burroughs, Bryant, Gibson, Van Dyke, Thompson, Seton, and other nature lovers will give the inspiration and enthusiasm needed to guide teachers and pupils in discovering the beauty and the utility of common things.

The Creator has provided an abundance of choice material

ful a means of attaining success as the co-operation of her patrons, and will not fail to consider carefully, in the beginning work at least, the subjects which will be most likely to meet with favor in her locality.

A living interest on the teacher's part will soon induce enthusiasm in the pupils, and when parents realize that the children are interested and are doing better work in geography, language, and other subjects, because of their interest, the teacher will be permitted to exercise her judgment in the selection of material without having her motives questioned, even though she might dare to claim a share of attention for subjects especially adapted to cultivate the higher aims of nature study.

Continue nature study, then, after the child enters school. Select types which can be studied in their own natural environment, and make every aim subordinate to the controlling motive in education—character growth.

SUMMARY OF AIMS

To develop the child's higher nature, spiritual, æsthetic, and ethical.

To increase his happiness by making him better acquainted with his physical environment.

To prepare him to appreciate the literature that nature has inspired.

To develop a sympathetic interest in living things.

To develop the intellectual powers.

To lead the child to love nature and the Author of nature.

COLOR IN NATURE

Color has great attraction for children and should play an important part in the nature work. Little children respond

to beauty as readily as they do to kindness, and the golden glory of autumn appeals to them in a special manner.

The trees are beautiful and wonderful at any and all seasons of the year, but in autumn their gorgeous colors cannot fail to open the eyes of the least observant to the loveliness of the season. Wordsworth says:

"The world is too much with us; late and soon,
Getting and spending, we lay waste our powers;
Little we see in nature that is ours."

The teacher who is in perfect accord with the harmony of color and form displayed so lavishly in the bright flowers, ripened leaves and fruits will find ways and means of imbuing the child's spirit with the influence exerted by this season, so rich in choice color material.

A series of lessons on color will prove exceedingly valuable in enabling children to recognize and appreciate the harmony and gradation of the different colors ranging from the somber tones of grays and browns in the trunks of trees to the brilliant hues seen in the sumach and maple leaves.

Some day, at the beginning of the term, when the schoolroom is flooded with light, hang prisms in a sunny window and let the children enjoy the beautiful bars of color thrown in the room.

Ruskin says:

"Nature has a thousand ways and means of rising above herself, but incomparably the noblest manifestations of her capability of color are in the sunsets among the high clouds.

"The whole sky, from the zenith to the horizon, becomes one molten, mantling sea of color and fire; every black bar turns into massy gold, every ripple and wave into unsullied, shadowless crimson, and purple, and scarlet, and colors for which there are no words in language and no ideas in the mind."

The spectrum colors are found everywhere in earth and sky, and children delight in painting and grouping them. The

elms, golden-rod, dandelion and many other trees and flowers give the tones of yellow, and the maples many hues of red, orange and green. The oaks give purple, reddish brown and a variety of deep rich broken colors.

A spectrum and scales of color, should be made on gray mounting board for the purpose of developing color perception. A mixture of water color paints can be used to advantage in showing tints, shades and intermediate colors, and the color tablets in matching colors in the spectrum and scales of colors.

Direct attention to color in nature and in decorations.

Encourage children to invent pleasing combinations.

Lay scales of colors—violet, blue, green, yellow, orange and red, using two tints and two shades of each.

Let the children blow soap-bubbles, find spectrum colors in fruits and flowers, and make a collection of grasses, ripened leaves, and seed pods.

Decorate the school-room with flags, leaves, flowers and pictures of birds, for an October Color Day.

The enjoyment of outdoor life will be greatly increased when the children are capable of discovering and appreciating harmonious combinations.

Color songs, poems and games should be emphasized.

THE RAINBOW

"The sun went out to shine one day,
Said he, "I'll drive the rain away;"
The raindrops laughed to see him try
To drive them back into the sky.
Each raindrop caught a sunbeam
And split it into rays of light,—
Red, yellow, blue, three rays in one,
And made a rainbow just for fun."

(*Cooley's Language Book.*)

THE RAINBOW

Eternal seal of peace from God,
With heavenly colors bright,
Spanning this earth with rays of love
Wrought in divinest light;
Arch of the hours, the days, the years,
Since our new faith began,
Symbol of Faith, Hope, and Love
A threefold gift to man.

—THOMAS O'HAGAN.

THE BLUEBELL

There is a story I have heard—
A poet learned it from a bird,
And kept its music, every word.
A story of a dim ravine,
O'er which the towering tree tops lean,
With one blue rift of sky between;

And there two thousand years ago,
A little flower, as white as snow,
Swayed in the silence to and fro.
Day after day, with longing eye,
The flower watched the narrow sky,
And fleecy clouds that floated by.

And through the darkness, night by night,
One gleaming star would climb the height
And cheer the lonely floweret's sight.
Thus watching the blue heavens afar,
And the rising of its favorite star,
A slow change came,—but not to mar;

For softly o'er its petals white,
There crept a blueness, like the light
Of skies upon a summer night;
And in its chalice, I am told
The bonny bell was formed to hold,
A tiny star that gleamed like gold.

Now, little people, sweet and true,
I find a lesson here for you,
Writ in the floweret's bell of blue.
The patient child whose watchful eye
Strives after all things pure and high,
Shall take their image by and by.

NATURE STUDY

FOR DISCUSSION AND REPRODUCTION

THE LINE OF GOLDEN LIGHT

Once upon a time there lived a child whose name was Avilla. She was sweet and loving and fair to look upon. Her little sister, whom she dearly loved, could not see God's beautiful world, nor enjoy His bright sunshine. Avilla heard of a wise old woman who lived in a cave many miles away. People said this woman knew a secret, by means of which the blind could receive their sight, so Avilla went to the cave. The happy thoughts in her heart made the time pass quickly and the soft, cool breeze seemed to be whispering a song to her all the way.

When she reached the dark cave the thought of her little blind sister gave her courage to enter it.

In a dark corner sat the queer old woman on a stone chair, spinning flax into fine thread.

Avilla said, "I have a little blind sister, can you tell me how to open her eyes?" "Yes," said the wise old woman, "I can tell you, but you will not do it. People who can see, trouble themselves very little about those who are blind!" "I will do anything to help my dear sister," said Avilla. "Oh, please tell me." The old woman looked earnestly at her and then stooped down and picked up a very long thread. She handed it to Avilla, saying: "Take this, carry it all around the world, and when you return, come to me and I will show you, how your blind sister may be cured." Avilla thanked her and started on her journey, trailing the long thread after her. * * * * Her heart was full of joy as she thought of her little sister. She looked back to be sure the thread had not broken. Imagine her surprise to see that instead of a gray thread of spun flax it was a thread of golden light that glittered and shone in the sunlight. She reached the forest. Her heart almost stopped beating. "I can never go through that gloomy forest," she said. A soft breeze seemed to whisper "Look at the thread, look at the golden thread." She looked back and, strange to say, each tiny blade of grass, which the thread had touched, had blossomed into a flower. "How beautiful!" she exclaimed, as she looked at the flowery path.

She hurried forward into the dark woods and after a tiresome journey she reached the glad sunshine again. A new difficulty faced her. As far as she could see stretched a low, swampy marsh. The thought of her little sister encouraged her and she bravely plunged on through the mire with the golden thread trailing after her.

She looked back and wherever the mysterious and beautiful thread had touched the earth, the water and mud had dried up. She said to herself, "this will help others to cross," and the thought made her sing for joy.

After a time her singing ceased. She reached a dreary desert. She toiled on, cheered by a swarm of yellow butterflies that fluttered just ahead of her. At last, the end of the desert was reached, just as the sun disappeared behind a crimson cloud. What did Avilla see when she looked at the golden thread, which had trailed behind her all day on the hot sand? Tall shade trees had sprung up along the path, and each grain of sand that the thread had touched was now changed into a diamond, or ruby, or emerald, or some other precious stone. It was a lovely sight to behold, the beautiful trees and the sparkling gems. Avilla thought she heard the birds singing their evening songs. One by one the bright stars came out in the quiet sky as if to keep guard while she slept.

The next morning she started again on her long journey round the world. After a time she reached a great mountain. It seemed to say, "How dare you attempt to climb to my summit?" Just then two strong eagles with outspread wings rose from their nests on the side of a steep cliff near by and soared majestically and slowly aloft. "Be brave and strong and you shall meet us at the mountain top," they seemed to say. She climbed on, keeping the soaring eagles always in sight. As she neared the top she looked back and saw that the sharp, broken rocks had changed into broad and beautiful white marble steps. She rejoiced to see the beautiful pathway she had made for others.

Avilla reached the cave, ran forward to the wise old woman and cried out: "I have done all you told me to do! will my little sister see?" The woman seized the golden thread and exclaimed, "At last! at last! I am freed!" In an instant she resembled a beautiful princess, with long golden hair and tender blue eyes, her face radiant with joy, and this is the story she told Avilla: "I was a king's daughter, but I was so selfish and idle that I never thought of the happiness of others. I was compelled to live in this cave, until I could find some one

who would be generous and brave enough to take the long dangerous journey around the world for the sake of others. I have looked and looked a long time. Now I can be happy again. Your line of light—love—has brought joy and happiness to my life and now we will go to your little blind sister and open her eyes. Emphasize "Love," the Light of the World." *Abridged. Told by Elizabeth Harrison in Story Land.*

STUDY OF POEM

THE WATER-BLOOM

A child looked up in the summer sky
Where a soft, bright shower had just passed by;
Eastward the dusk rain-curtain hung,
And swiftly across it the rainbow sprung.

"Papa! Papa! what is it?" she cried,
As she gazed, with her blue eyes opened wide,
At the wonderful arch that bridged the heaven,
Vividly glowing with colors seven.

"Why, that is the rainbow, darling child;"
And the father down on his baby smiled.
"What makes it, papa?" "The sun, my dear,
That shines on the water-drops so clear."

Here was a beautiful mystery!
No more questions to ask had she,
But she thought the garden's loveliest flowers
Had floated upward and caught in the showers.

Rose, violet, orange, marigold—
In a ribbon of light on the clouds unrolled!
Red of poppy, and green leaves, too,
Sunflower yellow, and larkspur blue.

INTRODUCTORY DISCUSSION

A great, wide, wondrous, splendid wreath
It seemed to the little girl beneath;
How did it grow so fast up there,
And suddenly blossom, high in the air?

She could not take her eyes from the sight;
"Oh, look!" she cried in her deep delight,
As she watched the glory spanning the gloom,
"Oh, look at the beautiful water-bloom!"

—CELIA THAXTER.

Preparation.—Hang a prism in the sunlight and make a "prism rainbow."

Review "The Rainbow."

Children tell what the sun said. Tell what the raindrops did.

Tell story of a water-drop.

What do we call the water-drops that fall from the clouds?

Presentation.—Teacher, read and re-read "The Water-Bloom."

Children image, and describe pictures suggested by the poem.

Help children to see the child, the man, the sky, and the wonderful arch. Request children to watch the sky from day to day and when a "dusk rain-curtain" appears, observe it very carefully.—How was it formed? What will become of it? Then what may we see? Do you see the expression on the child's face? Find the rainbow colors in flowers. Repeat the conversation between child and father. What change came over the child after her father answered her question? Tell what she thought about the rainbow. Recall the little Hiawatha's question. What did Nokomis answer? Children repeat, " 'Tis the heaven of flowers you see there," etc. What is meant by beautiful mystery? Can you suggest other mysteries? Repeat Tennyson's lines for children, "Flower in the

crannied wall," etc. Do you think the little girl's father was glad to see the rainbow?

No doubt he thought of what a great man named Wordsworth, said—

> "My heart leaps up when
> I behold a rainbow in the sky,
> So was it when I was a child,
> So is it now I am a man;
> So shall it be when I grow old."

Do you wonder at the *child's* surprise and delight?

How many colors in the rainbow? How are they arranged? What flowers would give the red? the blue? the yellow?

Let children make a flower rainbow and memorize the poem.

RELATION OF NATURE STUDY TO LITERATURE

Literature should be regarded as an important contributor to the study of nature. The permanent, inspiring truth, the creative fancy, and the forcible expression of classic literature, have power to impress the child with true ideals of beauty and to cultivate a love for choice literature that will influence his future life.

Burroughs says, "Unless science is mixed with emotion and appeals to the heart and imagination, it is like dead, inorganic matter; and when it is so mixed and transformed, it is literature." This power to beautify and transform the most commonplace objects and cause the susceptible nature of the child to respond to this inspiring influence, is possessed by literary artists.

Messages fraught with untold beauty are written in large type on every page of nature's book, for him whose soul is capable of interpreting their meaning. Here are instances:

> These are thy glorious works, Parent of good,
> Almighty! Thine this universal frame,
> Thus wondrous fair! Thyself how wondrous then,
> Unspeakable! who sittest above these heavens,
> To us invisible, or dimly seen

In these thy lowest works; yet these declare
Thy goodness beyond thought, and power divine.
Speak, ye who best can tell, ye sons of light,
Angels; for ye behold Him, and with songs
And choral symphonies, day without night,
Circle His throne rejoicing; ye in heaven.
On earth join, all ye creatures, to extol
Him first, Him last, Him midst, and without end.

—MILTON.

SILENT CATARACTS!

Who made you glorious as the gates of heaven
Beneath the keen full moon? Who bade the sun
Clothe you with rainbows? Who with living flowers
Of loveliest blue, spread garlands at your feet?—
God! Let the torrents, like a shout of nations,
Answer! and let the ice-plains echo "God."

* * *

Ye living flowers that skirt the eternal frost;

* *

Ye eagles, playmates of the mountain storm;
Ye lightnings, the dread arrows of the clouds;

* *

Utter forth God, and fill the hills with praise!

—SAMUEL T. COLERIDGE.

(From Hymn to Mount Blanc.)

The teacher who earnestly desires to lead children to see, to enjoy, and to love nature, must dwell with the poet and the artist as well as with the scientist; she must learn to appreciate something of the beauty they saw in forest and stream and the joy they felt in its portrayal.

The true poet's interpretation of the Creator's messages is

"Of such unstain'd, sublime, impassioned song
That angels, poising on some silver cloud,
Might listen mid the errands of the skies,
And linger all unblamed."

Rufus Choate attributes much of his power as an orator to the habit formed when a boy, of committing the most beautiful passages of everything he read. Poetry, which Wordsworth calls "the breath and

finer spirit of all knowledge," will help the child to see and to feel the beauty of his surroundings. When the teacher recognizes clearly the power of literature as a spiritualizing element in her own life, she will earnestly endeavor to bring the child under the influence of writers who will touch his heart, quicken his perception of beauty and give him great and beautiful thoughts as a permanent possession.

The thoughtful repetition of an ideal nature poem must enlarge the child's horizon and give him a deeper, fuller sense of the beauty of his surroundings, and for this reason the memorizing of poems should be considered an important part of the work in nature study.

The entire poem should be read by the teacher, then re-read and committed by the children after they have discussed it and made the thought their own.

Burroughs tells us that he was not conscious of any love for nature until his mind was brought in contact with literature.

BURROUGHS ON NATURE

* * * * What knowledge I possess of her creatures and ways has come to me through contemplation and enjoyment, rather than through deliberate study of her. I have been occupied more with the spirit than with the letter of her works. In our time, it seems to me, too much stress is laid upon the letter. We approach Nature in an exact, calculating, tabulating, mercantile spirit. We seek to make an inventory of her store-house. Our relations with her take on the air of business, not of love and friendship. The clerk of the fields and woods goes forth with his block of printed tablets upon which, and under various heads, he puts down what he sees, and I suppose foots it all up and gets at the exact sum of his knowledge when he gets back home. He is so intent upon the bare fact that he does not see the spirit or the meaning of the whole. He does not see the bird, he sees an ornithological specimen; he does not see the wild flower, he sees a new acquisition to his herbarium; in the bird's nest he sees only another prize for his collection. Of that sympathetic and emotional intercourse with nature which soothes and enriches the soul, he experiences little or none.

INTRODUCTORY DISCUSSION

The knowledge of nature that comes easy, that comes through familiarity with her, as through fishing, hunting, nutting, walking, farming—that is the kind that reaches and affects the character and becomes a grown part of us. We absorb this as we absorb the air, and it gets into the blood. Fresh, vital knowledge is one thing; the dessiccated fact is another. Do we know the wild flower when we have analyzed it and pressed it or made a drawing of it? Of course this is one kind of knowledge and is suited to certain minds, but if we cannot supplement it with the other kind, the knowledge that comes through the heart and the emotions, we are poor indeed.

I recently read a lecture on "How a Naturalist is Trained," and I was forced to conclude that I was not and never could be a naturalist at all, that I knew nothing about nature. It seems, from this lecture, that the best naturalist is he who can cut a fish-egg up in the thinnest slices. * * * Are the great naturalists really trained in this way? I could but ask. * * * A large and open-eyed study of Nature and of natural forms, how much more fruitful it is than this minute dissection of germs and eggs! A naturalist is to be trained through his ordinary faculties of human observation, as Humboldt and Goethe were.

Not long since in a high school in one of our large cities, I saw a class of boys and girls studying Nature after this cold-blooded analytical fashion. They were fingering and dissecting some of the lower sea forms, and appeared to find it uninteresting business, as I am sure I should have done. If there was a country boy among them, I am sure the knowledge of Nature he had gathered on the farm was worth a hundred fold, for human purposes or the larger purposes of sciences, all this biological chaff. * * * The purely educational value of Nature Study is in its power to add to our capacity of education—our love and enjoyment of all open-air objects. In this way it adds to the resources of life, and arms a man against the *ennui* and vacuity that doth so easily beset us.

I recently had a letter from the principal of a New England high school, putting some questions to me touching these very matters: Do children love Nature? how shall we instill this love into them? how and when did I myself acquire my love for her? etc. In reply I said: "The child, in my opinion, does not consciously love nature; it is curious about things, about everything; its instincts lead it forth into the fields and woods; it browses around; it gathers flowers—they are pretty; it

stores up impressions. Boys go forth into Nature more as savages: they are predaceous, seeking whom they may devour; they gather roots, nuts, wild fruit, berries, eggs, etc. At least this was my case. I hunted, I fished, I browsed, I wandered with a vague longing in the woods, I trapped, I went cooning at night, I made ponds in the little streams, I boiled sap in the maple woods in spring, I went to sleep under the trees in summer, I caught birds in their nests, I watched for the little frogs in the marshes, etc. * * * I was not conscious of any love for Nature, as such, till my mind was brought in contact with literature. Then I discovered that I, too, loved Nature, and had a whole world of impressions stored up in my subconscious self upon which to draw. I found I knew about the birds, the animals, the seasons, the trees, the flowers, and that these things had become almost a grown part of me. I have been drawing upon the reservoir of youthful impressions ever since.

Anything like accurate or scientific knowledge of nature which I may possess is of later date; but my boyhood on the farm seems to have given me the feeling and to have put me in right relation with these things. Of course writing about these subjects also deepens one's love for them. If Nature is to be a resource in a man's life, one's relation to her must not be too exact and formal, but more that of a lover and friend."—*Permission of Mr. Burroughs.*

By all means then, give the child the rich heritage of literature with its messages of truth and beauty, which will help him to read the poems written by the Creator, "too grand for words or rhyme."

Prepare him to appreciate the inspirational literature of nature by leading him to watch closely and interpret sympathetically the life story of a few of nature's most beautiful types. Heine says: "Nature, like a great poet, knows how to produce the grandest effects with the fewest materials. You have only a sun, trees, flowers, water, and love. In sooth, should this last be absent from the heart of the beholder, the aspect is poor enough; for then the sun is only so and so many miles in diameter, and trees are good for fuel, and flowers classified scientifically, and water is wet."

INTRODUCTORY DISCUSSION

The influence of ennobling sentiment is something to be felt rather than analyzed. Here are examples:

A CHILD'S THOUGHT OF GOD

They say that God lives very high;
But, if you look above the pines,
You cannot see our God, and why?

And if you dig down in the mines,
You never see Him in the gold;
Though from Him all that's glory shines.

God is so good He wears a fold
Of heaven and earth across His face,
Like secrets kept from love untold.

But still I feel that His embrace
Slides down by thrills through all things made—
Through sight and sound of every place.

* * *

—ELIZABETH BARRETT BROWNING.

POEMS IN NATURE

In the oldest wood I know a brooklet,
That bubbles over stones and roots,
And ripples out of hollow places,
Like music out of flutes.

There creeps the pungent breath of cedars,
Rich coolness wraps the air about
Whilst through clear pools electric flashes
Betray the watchful trout.

I know where wild things lurk and linger
In groves as gray and grand as time;
I know where God has written poems
Too strong for words or rhyme.

—MAURICE THOMPSON.

NATURE STUDY

CHILDREN MEMORIZE:

SONG OF CREATION

The spacious firmament on high,
With all the blue, ethereal sky,
And spangled heavens, a shining frame,
Their great Original proclaim;
Th' unwearied sun, from day to day,
Does his Creator's power display,
And publishes to every land
The work of an Almighty hand.

Soon as the evening shades prevail
The moon takes up the wondrous tale
And nightly to the listening earth,
Repeats the story of her birth;
While all the stars that round her burn,
And all the planets in their turn,
Confirm the tidings as they roll,
And spread the truth from pole to pole.

What though no real voice or sound
Amid their radiant orbs be found?
In Reason's ear they all rejoice,
And utter forth a glorious voice,
Forever singing as they shine,
"The Hand that made us is divine!"

—ADDISON.

THE GLORY OF GOD IN CREATION

Thou art, O God, the life and light
  Of all this wondrous world we see;
Its glow by day, its smile by night,
  Are but reflections caught from thee.
Where'er we turn, thy glories shine,
And all things fair and bright are thine.

—THOMAS MOORE.

INTRODUCTORY DISCUSSION

NATURE'S MIRACLES

What prodigies can Power Divine perform
More grand than it produces year by year,
And all in sight of inattentive man?
Familiar with th' effect, we slight the cause,
And in the constancy of nature's course,
And regular return of genial months,
And renovation of a faded world,
See naught to wonder at.

Should God again,
As once in Gabaon, interrupt the race
Of the undeviating and punctual sun,
How would the world admire! But speaks it less
An agency Divine, to make him know,
The moment when to sink, and when to rise,
Age after age, than to arrest his course?

All we behold is miracle: but, seen
So duly, all is miracle in vain.
Where now the vital energy that moved,
While summer was, the pure and subtle lymph
Through th' imperceptible, meandering veins
Of leaf and flower? It sleeps; and th' icy touch
Of unprolific winter has impressed
A cold stagnation on the intestine tide.
But, let the months go round, a few short months,
And all shall be restored. These naked shoots,
Barren as lances, among which the wind
Makes wintry music, sighing as it goes,
Shall put their graceful foliage on again,
And more aspiring, and with ampler spread,
Shall boast new charms, and more than they have lost.

The beauties of the wilderness are His,
That makes so gay the solitary place,
Where no eye sees them. And their fairer forms,
That cultivation glories in, are His.
He sets the bright procession on its way,
And marshals all the order of the year;

NATURE STUDY

He marks the bounds, which winter may not pass,
And blunts its pointed fury: in its case,
Russet and rude, folds up the tender germ
Uninjured, with inimitable art;
And, ere one flowery season fades and dies,
Designs the blooming wonders of the next.

The Lord of all, Himself through all diffused,
Sustains, and is the life of all that lives.
Nature is but a name for an effect,
Whose cause is God. One spirit—His,
Who wore the platted thorns with bleeding brows—
Rules universal nature. Not a flower
But shows some touch, in freckles, streak or stain,
Of His unrivaled pencil. He inspires
Their balmy odors, and imparts their hues,
And bathes their eyes with nectar and includes,
In grains as countless as the seaside sands,
The forms with which he sprinkles all the earth.

Happy who walks with Him! whom what he finds
Of flavor or of scent in fruit or flower,
Or what he views of beautiful or grand
In nature, from the broad majestic oak
To the green blade that twinkles in the sun,
Prompts with remembrance of a present God.

—COWPER.

THE FOREST HYMN

The groves were God's first temples. Ere man learned
To hew the shaft, and lay the architrave,
And spread the roof above them—ere he framed
The lofty vault, to gather and roll back
The sound of anthems; in the darkling wood,
Amid the cool and silence, he knelt down,
And offered to the Mightiest solemn thanks
And supplication. For his simple heart
Might not resist the sacred influences
Which, from the stilly twilight of the place,
And from the gray old trunks, that high in heaven

Mingled their mossy boughs, and from the sound
Of the invisible breath that swayed at once
All their green tops, stole over him, and bowed
His spirit with the thought of boundless power
And inaccessible majesty. Ah, why
Should we, in the world's riper years, neglect
God's ancient sanctuaries, and adore
Only among the crowd, and under roofs
That our frail hands have raised? Let me, at least,
Here, in the shadow of this aged wood,
Offer one hymn—thrice happy, if it find
Acceptance in His ear.

Father, Thy hand
Hath reared these venerable columns. Thou
Didst weave this verdant roof. Thou didst look down
Upon the naked earth, and, forthwith rose
All these fair ranks of trees. They, in Thy sun,
Budded, and shook their green leaves in thy breeze,
And shot toward heaven. The century-living crow
Whose berth was in their tops, grew old and died
Among their branches, till, at last they stood
As now they stand, massy, and tall, and dark,
Fit shrine for humble worshipper to hold
Communion with his Maker.

These dim vaults,
These winding aisles, of human pomp or pride
Report not. No fantastic carvings show
The boasts of our vain race to change the form
Of thy fair works. But thou art here—thou fill'st
The solitude. Thou art in the soft winds
That run along the summit of these trees
In music; thou art in the cooler breath,
That from the inmost darkness of the place
Comes, scarcely felt; the barky trunks, the ground,
The fresh moist ground, are all instinct with thee.
Here is continual worship—Nature, here,
In the tranquility thou dost love,
Enjoys thy presence. Noiselessly, around,

NATURE STUDY

From perch to perch, the solitary bird
Passes; and yon clear spring, that, midst its herbs,
Wells softly forth and wandering steeps the roots
Of half the mighty forest, tells no tale
Of all the good it does.

Thou hast not left
Thyself without a witness, in these shades,
Of thy perfection. Grandeur, strength, and grace
Are here to speak of thee. This mighty oak—
By whose immovable stem I stand and seem
Almost annihilated—not a prince,
In all that proud old world beyond the deep,
E'er wore his crown as loftily as he
Wears the green coronal of leaves with which
Thy hand has graced him. Nestled at his root
Is beauty, such as blooms not in the glare
Of the broad sun. Thou delicate forest flower,
With scented breath and look so like a smile,
Seems, as it issues from the shapeless mould,
An emanation of the indwelling Life,
A visible token of the upholding Love,
That are the soul of this wide universe.

My heart is awed within me when I think
Of the great miracle that still goes on,
In silence, round me—the perpetual work
Of thy creation, finished, yet renewed
Forever. Written on thy works I read
The lesson of thy own eternity.
Lo! All grow old and die—but see, again,
How on the faltering footsteps of decay
Youth presses—ever gay and beautiful youth
In all its beautiful forms. These lofty trees
Wave not less proudly that their ancestors
Moulder beneath them. * * *

There have been holy men who hid themselves
Deep in the woody wilderness, and gave
Their lives to thought and prayer, till they outlived
The generation born with them, nor seemed

Less aged than the hoary trees and rocks
Around them;—and there have been holy men
Who deemed it were not well to pass life thus.
But let me often to these solitudes
Retire, and in thy presence reassure
My feeble virtue. * * *

Be it ours to meditate
In these calm shades, thy milder majesty,
And to the beautiful order of thy works
Learn to conform the order of our lives.

—W. C. BRYANT.

CHAPTER II

FALL NATURE STUDY

PURPOSE OF THE WORK

To inspire and develop an inquiring, reverent spirit by leading the child to discover some of the secrets of the types studied.

To cultivate a sympathetic interest and a love for nature.

Outdoor lessons are necessary in order to enlist the child's sympathy and permit nature to speak to his soul as well as to his senses. Relation to environment, life, habits, function, beauty, protection, unity, and dependence should be emphasized in the lower grades.

The child's own experience should form the basis of what he acquires, and the more spontaneity and enjoyment there is in the nature study the more it will add to the resources of his life. Emerson's inspiring poem reveals the beauty of the perfect whole in nature and serves as a broad foundation for the study of types in their true home.

EACH AND ALL

* * *

All are needed by each one;
Nothing is fair or good alone.
I thought the sparrow's note from heaven,
Singing at dawn on the alder bough;
I brought him home, in his nest, at even;
He sings the song, but it cheers not now,
For I did not bring home the river or sky;—
He sang to my ear,—they sang to my eye.
The delicate shells lay on the shore;
The bubbles of the latest wave
Fresh pearls to their enamel gave,
And the bellowing of the savage sea
Greeted their safe escape to me.
I wiped away the weeds and foam
I fetched my seaborn treasure home;
But the poor unsightly, noisome things
Had left their beauty on the shore
With the sun and the sand and the wild uproar
* * * —RALPH WALDO EMERSON.

LESSONS ON PLANTS

From the first, children should be led to think of each plant as a working organism, closely related to its environment, and it should under no circumstances be studied as an isolated thing.

It is related to, and dependent upon soil, air, sunlight and rain. It supplies insects, birds and other animals with food. It furnishes clothing, food and shelter for man, and is a constant reminder of the Creator's power and goodness.

Bryant says:

"Thou hast not left
Thyself without a witness, in these shades,
Of thy perfection. Grandeur, strength and grace
Are here to speak of Thee."

"Not a flower
But shows some touch, in freckles,
Streak or stain,
Of His unrivaled pencil."

—COWPER.

"The Primrose of the Rock" read to the older children will help them to see unity and interdependence in nature.

Wordsworth calls the Primrose—

A lasting link in Nature's chain
From highest heaven let down.
The flowers, still faithful to the stems
Their fellowship renew;
The stems are faithful to the root,
That worketh out of view;
And to the rock the root adheres
In every fibre true.
Close clings to earth the living rock,
Though threatning still to fall;
The earth is constant to her sphere;
And God upholds them all. * * *

—WORDSWORTH.

FLOWERS

"Flowers are the thoughts of the spirit of God
Their love is love of his grace,
Their fragrance is breath of divinity,
Their beauty the light of his face."

Nature Study and Life.—HODGE.

Flowers are among the purest, loveliest things in nature and the teacher who develops a genuine abiding love of flowers in the heart of a child is instrumental in enriching his whole life by enabling him to treasure up a wealth of happiness for future years.

A teacher may begin this work by asking children: What flowers do you know? Tell about flowers you have seen growing in the woods, the garden, the park, the greenhouse. What flowers do you like best? Why? What flowers have you cared for? What flowers close on the approach of rain? Close at night? Where do water-lilies grow? Ferns? Cat's-tail? Wild roses? What plants sprout quickly in water? What plants grow from slips? Why does putting the ends of flower stems in water keep the leaves and blossoms fresh? What fruits are ripening this month? Name fruits cultivated near our homes. What fruits can be obtained at the grocery store? Find ten seed cradles. Name five important food plants. How many seeds in a cone? What yellow flowers may be seen now? What blue flowers? What seeds can you find on your way to school? What nuts? How many colors can you find in leaves? What trees do you know? What stories or poems do you know about flowers and trees?

Questions answered by individual observation, will help children to read some of the messages which the wayside flowers and trees have for them.

MEMORIZE:—

Hast thou named all the birds without a gun?
Loved the wood-rose and left it on its stalk?
* * *
O be my friend and teach me to be thine.

—EMERSON, *Forbearance.*

Outdoor observation with the class as a whole, and individ-

ual work out of school hours is absolutely necessary in order to secure the best results in this subject.

Choice poems and legends will strengthen the child's love for plant life and give him a deeper, fuller sense of their loveliness and symbolism.

THE FORGET-ME-NOT

When to the flowers so beautiful
The Father gave a name
Back came a little blue-eyed one,
All timidly it came,
And standing at its Father's feet,
And gazing in His face,
It said, in low and trembling tones,
And with a modest grace,
"Dear God, the name thou gavest me,
Alas! I have forgot."
The Father kindly looked him down
And said, "Forget-me-not."

THE MOSS ROSE

The angel of the flowers one day,
Beneath a rose-tree sleeping lay,—
That spirit to whose charge 'tis given
To bathe young buds in dews of heaven.
Awakening from his light repose,
The angel whispered to the rose:
"O fondest object of my care,
Still fairest found, where all are fair;
For the sweet shade thou giv'st to me
Ask what thou wilt, 'tis granted thee."
"Then," said the rose with deepened glow,
"On me another grace bestow."
The spirit paused, in silent thought,
What grace was there that flower had not?
'Twas but a moment,—o'er the rose
A veil of moss the angel throws,
And, robed in nature's simplest weed,
Could there a flower that rose exceed?

—From the German Krummacher.

NATURE STUDY

THE PANSY

Once upon a time a flower of exquisite beauty and fragrance grew under a tall leaf in a lonely dell. One day an angel flying down to earth on a mission of love happened with her wing to brush aside the leaf and discover the flower.

"Ah!" cried the angel as she bent down to inhale its sweet fragrance; "You are far too lovely to live here in this forsaken spot. I will breathe upon you and give you an angel's face. You shall go forth and bloom in every land and carry with you sweet thoughts of love and heaven. From year to year you shall grow in beauty; and the richness and the splendor of your dress shall be a marvel and a joy to all who behold you." Then the angel kissed the flower and left the imprint of her beauty upon it. That is why the pansy has such a lovely face and has been called the flower that means loving thoughts.—*Adapted.*

FOR READING AND DISCUSSION

THE USE OF FLOWERS

God might have made the earth bring forth
  Enough for great and small,
The oak tree, and the cedar tree,
  Without a flower at all.
We might have had enough, enough,
  For every want of ours,
For luxury, medicine and toil,
  And yet have had no flowers.

Then wherefore, wherefore were they made
  All dyed with rainbow light,
All fashioned with supremest grace,
  Upspringing day and night—
Springing in valleys green and low,
  And on the mountains high,
And in the silent wilderness,
  Where no man passeth by?

FALL NATURE STUDY

Our outward life requires them not,
  Then wherefore had they birth?
To minister delight to man,
  To beautify the earth;
To whisper hope—to comfort man
  Whene'er his faith is dim;
For who so careth for the flowers
  Will care much more for Him!

—MARY HOWITT.

"Flower in the crannied wall
I pluck you out of the crannies;
Hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

TENNYSON.

Secretary James Wilson says: "Flowers should abound in the school grounds. They are among the best educators, for they develop taste and a love for the beautiful, and make men sensitive to the attractive and lovely, in town or country, in field or forest."

READ AND DISCUSS THIS POEM:

BRING FLOWERS

Bring flowers, pale flowers, o'er the bier to shed,
A crown for the brow of the early dead!
For this through its leaves hath the white rose burst,
For this in the woods was the violet nursed!
Though they smile in vain for what once was ours,
They are love's last gift. Bring ye flowers, pale flowers!
Bring flowers to the shrine where we kneel in prayer,—
They are nature's offering, their place is there!
They speak of hope to the fainting heart,
With a voice of promise they come and part,
They sleep in dust through the wintry hours,
They break forth in glory. Bring flowers, bright flowers!

—MRS. HEMANS.

If the teacher has awakened a deep interest in plant life by means of informal talks and outdoor lessons, some common flower may be chosen for special study.

The Life History of a Plant.—Tell children they may help to awaken the wonderful life hidden in the seeds they find in the garden. Let children plant seeds, morning-glory, poppy, and others, daily for a couple of weeks so that specimens in different stages of development will be ready when needed.

Spring is, of course, the best time of the year to plant seeds and study germination, but the needs of growing plants and the value of a seed should be emphasized at this time.

In the heart of a seed, buried deep, so deep,
A dear little plant lay fast asleep.
"Wake," said the sunshine "and creep to the light."
"Wake," said the voice of the rain-drops bright.
The little plant heard and rose to see
What the wonderful outside world might be.
—SELECTED.

THE MORNING-GLORY

Aims.—1. To lead children to think of the unity of plant life.

2. To direct attention to the beauty and the perfection to be found in common plants.

3. To call special attention to the importance and the formation of seeds.

Preparatory Work.—Review "The Use of Flowers" and "The Water Bloom."

Give questions, to be answered by studying the plants out of doors. Why called morning-glory? How many colors do you find in the open flowers? When do they go to sleep and when wake up? Does the same flower open day after day? What insects visit the morning-glory? Review observations made on morning-glory in the window-box and lead children to recall the needs of growing plants—soil, heat, light, and moisture. Talk about the habits of this flower.

Material.—Put several long sprays of morning-glories containing all the different parts of the plant in jars of water.

Plan of Work.—Compare the plant to a household. The Flower Household includes Flower mistress or queen, the stem servants, the leaf servants, and the root servants. Examine the morning-glory and see how the different members in this interesting household are dressed for their work. The mistress or queen in rainbow colors, the leaf and stem servants in green and the root servants in brown. Teacher, hang prism in a sunny window and let children match morning-glory and spectrum colors.

Incidentally name the parts of the flower—calyx, corolla, stamens, and pistil, while directing attention to its beauty. Note position and appearance of the buds. Decorate blackboard by sketching sprays of morning-glories.

The pupils have been watching the growth of the morning-glory in the window-box and are now ready to study the plant from the standpoint of function. Tell children they are to find out about the work of the plant and of each of its parts. Read selections that will bring the children into sympathy with the subject.

> The flowers still faithful to the stems,
> Their fellowship renew;
> The stems are faithful to the root,
> That worketh out of view.
> —WORDSWORTH.

Work of the Root.—Lead children to see that the roots hold the other members of the family in place and aid in supporting the stem. Examine seedlings grown on cotton or moist blotting paper, to see the root-hairs. Oats and corn will show root-hairs without a microscope better than most plants.

Dig up carefully five or six growing plants, destroy the root-hairs on two or three and immerse roots of all the plants in a jar of water. Try several similar experiments and lead children to see that the plants will not live without the root-hairs.

Let children get the thought from the *plants.*

Cut off the stem of a vigorously growing plant and observe the drop of water forming on the cut end of stem. The water

came from the root, was absorbed from the soil through the root-hairs.

Work of the Stem.—By questioning, help children to see and tell that the stem holds up the leaves, buds and flowers to the sun and takes food from the roots to the leaves and the flowers.

Let a corner of a sheet of blotting paper touch the surface of colored water and watch the liquid creeping upward. Lamp-wick, twine, or a block of sugar will show this also.

Put stems of a plant with white flowers, as begonia, in a red liquid and notice the color of the petals a few hours later. Experiment with leaf of bleached celery also.

Measure the growth of the morning-glory in the window-box daily. Observe the stem twining around a support. Turn back and fasten a morning-glory stem and see what happens.

Work of the Leaves.—Remove leaves from a morning-glory vine to show that the stem with leaves is much prettier than the one without. Call attention to the fresh leaves; veins firm and strong, color bright green and outlines perfect.

Leaves Give Out Moisture.—Place a handful of fresh leaves on a table and cover with a glass dish. Place another jar without leaves near the first. Children discover that the glass over the fresh leaves contains moisture and the other glass does not. Try several similar experiments until children are convinced, that the leaves give out moisture. The moisture came from the leaves, the leaves obtained it from the stem, the stem from the root, and the root from the soil.

Observe petiole, shape of leaf, and the uses of the veins in spreading out the leaf blade.

Direct attention to the arrangement of the leaves on the stem, turning and spreading out to catch the sunlight.

The flower is the most beautiful part of the plant and should be approached most thoughtfully.

FALL NATURE STUDY

THE MORNING-GLORY

Up it sprang from the soft, dark earth
The morning-glory vine;
Higher and higher, brave and green,
With many a twist and twine,
Bird and butterfly wheeled to see,
And children stopped a-row,
To point with rosy fingers sweet,
And watch the blossoms grow.
Purple and crimson, white and blue,
Out from the lightsome green,
They swing and rustle, the dainty bells,
Their sheltering leaves between,
Low by the grass and high by the roof,
And beautiful all the way;
"And the prettiest flowers grow highest up,"
The children wisely say.

—SELECTED.

Flower.—The Mistress or Queen of the Household.

The corolla is the attractive part of this plant. Notice differences in color; corolla in one piece. Children, find dividing lines and compare with the number of parts in calyx. The corolla protects the most important part of the flower. Count the notches on the border and notice the lines that extend from each notch down to the end of the tube. Urge children to handle specimens carefully as something very precious. Teacher, open a flower and paste on card so that the inside of the flower may be examined.

Here we find five stamens fastened to the lower part of the blossom. One stamen attached to each part of the corolla. Take a good look at the stamens because they have very important work to do for the flower, they bear something that makes the seeds grow. Children, touch stamens and see the white pollen grains on their fingers.

NATURE STUDY

Find the favorite number in this flower. Five stamens, five nectar tubes, five notches on the corolla, and five sepals.

Observe the morning-glory out of doors. Children, notice bees at work getting pollen from the stamens and nectar from the openings at the base of the flower. Call attention to the pistil in the center of the flower with the stigma at the top and the seed vessel at the bottom.

Examine the morning-glory vine and find a calyx without a blossom. Find pistil and calyx without corolla. Find seed-pods protected by calyx.

Children, examine a seed-pod containing soft, delicate ovules. How does the pollen reach the ovules? It falls on the little knob (stigma) at the top of the pistil. The bees are constantly flying from flower to flower, getting honey from one part of the flower and pollen from another part, and in doing this, they leave pollen grains on the stigma of the ripe pistil, the pollen passes down the tube to the seed-pod and the ovules begin to grow. The flowers soon fade so that the plant's energy may be devoted to the manufacture of seeds.

Open a ripe seed-pod and find three rooms in this little house and two seeds (three-sided seeds) in each room. If the vine is shaken, the seeds fall, when they are ripe. Children, find germinating seeds near the vines. Mark the growth by tying colored twine on the support each morning. Children, save seeds to plant next year.

Teacher, sketch morning-glory vine as directed by children, in order to lead them to observe carefully. Erase and let pupils sketch plant as a whole. Agassiz says, "A pencil is a good eye."

SUMMARY OF PLANT HOUSEHOLD

Includes how many members? Appearance of each? Interteresting habits? Work of the delicate root-hairs? stems? leaves? flowers?

Flower.—Emphasize beauty of color, beauty of form and beauty of use. Describe and picture calyx, corolla, stamen, and pistil. Work of each? How do the flowers help the bees? How do the bees help the flowers? Picture a morning-glory vine from memory. What is the mission of this flower? To beautify the earth and to make seeds. Tell the story we have been reading since we planted our morning-glory seeds. Lead children to think of the beauty wrapped up in the seed.

Compare the morning-glory with its relative, the bind weed (wild morning-glory) that is found twining over fences in the country. Our morning-glory is a member of a very distinguished family (Convolvulus) and has a number of beautiful and useful cousins, moonflower, cypress vine, sweet potato, and many others.

A LITTLE MORNING-GLORY SEED

One sunny day in May a little girl planted a morning-glory seed. It was a tiny seed with a hard brown coat.

This little girl put the seed in the ground and covered it with earth.

Then she said: "Now, little seed, grow, grow, grow! Grow until you are a tall green vine. I want to see your pretty green leaves. I want to see your lovely trumpet flowers."

Little Mary went into the country to visit her grandma. John forgot the little seed, and it was left to take care of itself.

The ground where it lay was very dry. There had been no rain for a long time, so the wee seed could not grow at all.

It lay in the dry earth many days. It was very tired, and said to the ground: "O ground, please give me a few drops of water. Please

soften my coat. It is so hard and tight I cannot get my arms out. shall never be a vine."

The ground answered, "I have not a drop of water to give you, little seed. You must ask the rain."

The little seed called to the rain: "O rain, I am a little morning-glory seed, deep down in the ground. I want to get out into the bright world, but I cannot. Won't you come down and wet the ground? My coat will then become soft. I shall be able to burst it open, and push out my two seed-leaves. Then I shall soon be a vine."

"I would like to help you," said the rain, "but I cannot, unless the clouds hang lower."

"O clouds," said the little seed, "please hang lower. Please let the rain come down. I need a few drops of water to soften my coat. I want to be a beautiful green vine. Won't you please help me?"

"The sun must hide first," said the clouds.

The little seed called to the sun, "O sun, please hide your bright face for a little while. Then the clouds can hang lower and the rain can come to me. My coat will be soft and I can push up into the world."

The sun loved the beautiful flowers. He loved the little seed, and he wanted to make it happy. He said, "Yes, I will hide."

Soon the clouds began to hang lower and lower. The warm raindrops began to fall faster and faster. The ground grew wetter and wetter. The little seed felt its coat grow softer and softer. Soon open it burst.

Out came some little rootlets and two bright green seed-leaves. Upward they pushed their way through the soft ground. At last, out they came into the warm air and bright sunshine.

How beautiful the world looked! How sweetly the birds sang! How happy the little flower was! It grew very fast. The warm rain and sun helped it. It became a tall, green vine, and sent out some little flower buds.

One morning the little buds opened, and out came the lovely trumpet flowers, to help make the world bright and happy.

When the little girl came back from her visit at grandma's, she ran to see if the morning-glory seed had begun to grow. How pleased and surprised she was when she saw the tall green vine and the pretty flowers.

"Can this be the little seed that I planted?" she said. "How fast it has grown!"

Just then she thought she heard a low, soft voice. It said: "Yes, little girl, I have grown. But I would still be the same tiny brown seed but for some kind friends. The soil, the sun, and the rain helped me to grow into this vine."—SELECTED.

TERMS USED IN DESCRIBING FLOWERS

Peduncle or flower stem.

Calyx: Outer whorl of green flower-leaves, (sometimes colored).

Corolla: Inner whorl of colored flower-leaves.

Perianth. The calyx and corolla taken together.

Sepals: Part of calyx. Petals: Part of corolla.

Stamens: Thread-like parts inside the corolla.

Pistil: The central part of the flower.

Filament: The stem of stamen.

Anther: The head of stamen. Pollen: Dust in anther.

Style: Stem of pistil. Stigma: Head of pistil.

Ovary: The base of pistil, holding seed.

Fruit: The ripened ovary with its adhesions.

THE BUTTERFLY

Aim.—To cultivate a sympathetic interest in living things. To give children an opportunity to observe the development of one of the most interesting types of animal life.

The graceful forms and beautiful colors of the many different kinds of butterflies are remarkably attractive and their life history is as fascinating as a fairy tale.

Preparation.—Informal talk with children about flowers and their insect friends.

Send pupils to the garden to get acquainted with their most attractive friends—the butterflies.

What flowers do they visit?

Compare their flight with the flight of birds and dragon-flies.

In what position does the butterfly hold its wings when at rest? Observe one for several minutes some day and report observation. What do they get from the flowers?

Lead children to see the butterfly with the poet's eye. This is what one great poet says:

> Oh! pleasant, pleasant, were the days,
> The times when in our childish plays
> My sister Emmeline and I
> Together chased the Butterfly!
> A very hunter did I rush
> Upon the prey; with leaps and springs
> I followed on from brake and bush;
> But she, God love her! feared to brush
> The dust from off its wings.—WORDSWORTH.

Emphasize beauty of color and form and make children desire to imitate Emmeline's example. Tell them, that the story this beautiful creature has to tell is very, very wonderful, and not too difficult for them to understand. Center the study of scale-winged insects about some particular kind that can be easily observed.

Cabbage Butterfly.—They are white with a few black lines or spots upon upper surface of wings and yellowish upon the under surface. They may be seen from early spring until late autumn. The different stages—eggs, larva, pupa and adult can be found in early fall and the entire transformation watched by children. To obtain the eggs, place an empty box with top and bottom removed, over a box containing a growing food plant (cabbage, nasturtium, or radish). Cover with mosquito netting. Teacher, capture a number of butterflies and put them in the box with cabbage, or other plant, where they will be likely to deposit eggs. If eggs are not secured let children find caterpillars and observe their habits for two or three days before formal study is begun.

Care of Caterpillars.—Keep some in a glass jar and some in a box, with sides removed, covered with netting. Supply the plants on which they were found feeding.

Habits.—Observe the caterpillar crawling on glass, also on

netting. Watch the movement of the jaws from side to side when eating. The little creature eats nearly all the time. He grows so rapidly that his skin becomes too tight for him and he is obliged to cast it off (moult). Watch and see how often he changes his skin covering before he is full grown.

Structure.—Direct attention to shape of body (cylindrical), size, number of segments, number of legs and eyes. To which segments are the legs attached? What is the difference between the first three pairs of legs and the other five pairs? Children will delight in watching the change into pupa or chrysalis,—a resting stage.

Spinning.—When full grown, observe restlessness and change of color. Watch it spinning a tuft of silk and fastening it to a support. Children will soon have an opportunity to read the most interesting chapter in the life of a butterfly. The beauty of the chrysalis cannot compare with the beauty of the white winged creature that makes its appearance when the chrysalis opens. The chrysalis formed in August or September may become a butterfly in a few weeks. Children, watch the change in form and size of wings and body.

Review the life history; egg, larva, chrysalis, butterfly, and develop the following facts with as few questions as possible.

BUTTERFLY

Study the living butterfly.

Body divided into three parts; head, thorax, and abdomen.

The tongue is long and slender and when not in use is coiled like the spring of a watch. Provide a few drops of sugar and water and let children see the tongue uncoil. It is fine enough to thrust into the narrowest and longest flowers for nectar.

Feelers, or antennae, long and slender with little knobs at the end.

Six slender, weak legs. It uses its legs only when eating or resting.

Wings, four in number, are covered with scales, which overlap like the scales of a fish. Scales are attached to the wings by tiny stems. Let children examine the scales with a magnifying glass, if possible. They are very beautiful and give the wings their color. The fore wings are triangular and the hind ones rounded.

The legs and wings are attached to the thorax. Let children sketch and paint the butterfly in different positions on flowers. Compare caterpillar and butterfly as to habits, structure, form, and color.

The life of a butterfly is very brief. Give the little creatures their freedom and watch them on the flowers in the sunshine.

READ:

I've watched you now a full half hour,
Self-poised upon that yellow flower;
And little butterfly, indeed,
I know not if you sleep or feed.
How motionless!—not frozen seas
More motionless—and then
What joys await you when the breeze
Hath found you out among the trees,
And calls you forth again.
This plot of orchard ground is ours,
My trees they are, my sister's flowers;
Here rest your wings when they are weary,
Here lodge as in a sanctuary.
Come to us often, fear no wrong,
Sit near us on the bough.
We'll talk of sunshine and of song,
And summer days when we were young;
Sweet childish days, that were as long
As twenty days are now.

—WORDSWORTH.

FALL NATURE STUDY

Try to lead the children to see, in imagination, the scenes pictured in the poem.

Compare with moth and milkweed butterfly.—Development, structure, habits, etc.

Compare with the dragon fly which has four beautiful gauze-like net-veined wings, long slender body, large head with gem-like eyes. Home near the water; lives on insects; always on the wing; flight direct.

"The Butterfly," by Mrs. Sigourney, contains a beautiful thought:

A butterfly basked on a baby's grave,
Where a lily had chanced to grow:
"Why art thou here, with thy gaudy dye,
When she of the blue and sparkling eye,
Must sleep in the church yard low?"
Then it lightly soar'd through the sunny air,
And spoke from its shining track:
"I was a worm till I won my wings,
And she whom thou mourn'st like a seraph sings:
Wouldst thou call the bless'd one back?"

Hamilton Gibson says:

It was a day in early June, and nature was bursting with exuberance. The very earth was teeming with awakened germs—here an acorn, with its biformed hungry germ—parody on the dual mission of mortal life—one seeking earth, the other heaven; here an odd little elf of maple, with his winged cap still clinging as he danced upon his slender stem; while numerous nameless green things clove the sod, and matted leaves and slender coils of ferns unrolled in eager grasp from their woolly winter nest.

But dear to my heart as were these familiar tokens, how quickly were they all forgotten in my contemplation simply of a little stone that lay upon a patch of mould directly at my elbow, and my wondering eyes were riveted upon it, for it seemed as though in the universal quickening even this also had taken life.

I can see it this moment. It moves again, and yet again, until now, with a final effort, it is lifted from its setting and rolled away, while in its place there protrudes from the ground a chrysalis risen

from its sepulchre. Filled with wonder, I sit and watch as though in a dream, awaiting the revelation from this mysterious earthly messenger, when suddenly the encasement swells and breaks, the cerements are burst, and the strange shape gives birth to the form of a beautiful moth—a tender, trembling thing, which emerges from the empty shell and creeps quivering upon an overhanging spray.

Now followed that beautiful and wondrous unfolding of the winged life—the softly-falling crumpled folds, the quivering pulsations of the new born wings eager for their flight, until at length their glory shone in purity and perfection—a trial flutter, and the perfect being took wings and flew away. * * * *

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A LITTLE POET

Out in the garden, wee Elsie
  Was gathering flowers for me;
"O, mamma," she cried, "hurry, hurry,
  Here's something I want you to see."
I went to the window. Before her
  A velvet winged butterfly flew,
And the pansies themselves were not brighter
  Than the beautiful creature in hue.

"O, isn't it pretty?" cried Elsie,
  With eager and wondering eyes,
As she watched it soar lazily upward
  Against the soft blue of the skies.
"I know what it is, don't you, mamma?"
  Oh, the wisdom of these little things
When the soul of a poet is in them,
  "It's a Pansy—a Pansy with wings."

—*Eben E. Rexford, in Pri. Education.*

THE MILKWEED

Purpose of the Work.—To call attention to the way seeds are protected.

To emphasize the necessity for seed distribution.

Center study of seed dispersal about the Milkweed and the Dandelion.

FALL NATURE STUDY

Preparation.—Talk with pupils about animals moving from place to place at will. How do the birds manage to see so many different places and people? The spiders have no wings, how do they change their homes? Some of the children will know that the spiders spin a long, silken web, accept the services of the wind and start on their journey. Let them suggest names of different animals that have power to flee from danger or go in search of food when occasion demands. Children, name other things around us besides animals that are useful and beautiful. Flowers, trees, grasses and grains will, no doubt, be suggested.

Field Lesson.—Take pupils out doors to see the milkweed. Give children something definite to look for. Find a milkweed in blossom. One with green or brown pods. Why called milkweed? What kind of soil does it like? Name the flowers and trees growing near. Call children together, talk over their discoveries, and correct mistakes in the presence of the growing plants. Pull up a large plant and account for the spongy appearance of the roots with ripe seeds. The milky appearance of the roots and stems in plants with unripe seeds. Call attention to the shape, number, and arrangement of leaves on the stem. Examine flowers.

THE MILKWEED CASE

Cover and case locked close together,
Filled with a curious kind of feather,
Open the box, you'll need no key,
Oh! pretty green case did you grow for me?
'Twas only the other day I said,
I must make my dolly a feather bed,
And here is the softest fluffiest stuff,
Silky and white and plenty enough.

Children open a seed cradle and notice how beautifully the seeds are arranged. Examine the lining and the outside covering. They will discover the delicate, smooth lining next to the seeds, and the tough, firm outside coat.

Place special stress upon protection at this stage of the work. Direct attention to the position of the pods near the top of the stems, the firm ridge along the middle of the pod, and the

spring that enables the little brown cradle to rock in the breeze.

Lead children to think of the baby milkweed plant wrapped up in each seed. Watch the seeds flying in all directions in search of a home. Some may travel on the "wings of the wind" to the end of their journey, some may be carried far away by beautiful birds, others may find a place to grow near their own brown cradle. Dig up two or three milkweeds in different stages of development and plant near the school so that children may have a chance to see the flowers withering, pods forming, green pods turning brown, and the seed cradles opening.

Again direct attention to the work of the growing milkweeds. Lead children to think of the dependence and interdependence of the different parts of the plants,—root, stem, leaves, flowers; discuss the work of each; all parts working to produce seeds. Seeds must be very precious.

Let a pupil open a ripe pod and crowd the seeds into a glass jar, so that the class may see how many seeds were packed in this little house. Estimate the number of seeds growing on a single milkweed. Suppose the seeds fell from the cradles and settled down near the plant on which they grew. Recall experiments with morning-glory and other flowers, in which children discovered that growing plants must have food, heat, moisture, and light, and they will readily see that the crowded seedlings would have too great a struggle for food and sunshine,—for life. Think of the thousands of little rootlets searching for food in one direction for a time and then in another, only to meet hosts of hungry, little workers like themselves. Children will understand that when the seeds are alike the struggle is greater than when they are different. When they are alike all need the same kind of nourishment and sometimes the parent plant takes so much food from the

soil in which it grows that it is impossible for the seedlings to get a foothold.

Hang a number of pods where children can watch them opening and the seeds flying away. How eager they seem to get out of the old home! Why are the seeds provided with sails? In order to fly away to a spot that is not occupied by some other plant. The wind is a good friend to the seeds with sails or wings. Why?

It was only a little plant,
But on it did shine the sun,
The wind did caress, the birds did sing,
And it lived till its work was done.
It was only a little plant;
But it took a gladsome part
In the great earth's life; and at last
Earth clasped it to her heart.
—M. J. Savage.

Lead children to compare the milkweed with the dandelion. Home; characteristics; work of root, stem, leaves, and flowers; structure; how seeds are protected; number of seeds; how scattered; uses; draw plants.

Let children make a collection of seeds and fruits.

How are seeds protected? (Burrs, shells, flesh, etc.)

Some of nature's devices for the dispersal of seeds and fruits.

Sails—dandelion, milkweed, cat's-tail, thistle. Springs—touch-me-not.

Hooks—burdocks, stick-tights. Wings—maple, linden.

How Scattered.—Wind, water, and animals; man scatters more seeds than all other agencies combined; he is constantly buying and selling plants and seeds.

Make a collection of edible seeds. Wheat, oats, corn, peas, nuts, etc.

Children, tell how the blue-jays and squirrels distribute seeds.

Let pupils group seeds that have pods. Catalpa, beans, pepper, etc. Which has the prettiest color and shape? Which grow on trees? Which contains the greatest number of seeds? What becomes of all the seeds that ripen every year? Do you think all the seeds not used for food will be likely to fall upon

good soil? The earth would be overrun with plants if even a small per cent of all the seeds that ripen grew.

Children, collect seeds to plant next spring.

MILKWEED BABIES

Dainty milkweed babies, wrapped in cradles green,
Rocked by Mother Nature, fed by hands unseen.
Brown coats have the darlings, slips of milky white,
And wings—but that's a secret,—they're folded out of sight.

The cradles grow so narrow, what will the babies do?
They'll only grow the faster, and look up toward the blue.
And now they've found the secret, they're flying through the air,
They've left the cradles empty,—do milkweed babies care?

—ELEANOR SMITH'S *Songs for Little Children*, No. 2.

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THE WIND PRINCESS

Little Ben Lee had a pretty flower bed in his mother's garden. All the long summer he had cared for it, never once seeing the fairy Wind Princess, who often stood by his side, she too helping the plants to grow and blossom.

One day in the late fall this fairy whispered to the flowers, "It has grown so cold I will ask the North Wind to bring you a fluffy blanket of white to keep you warm through the cold winter," and away she went in her magic car to the North Wind's home.

He lived high up among the snow mountains with his father, Ice King, in a wonderful crystal palace. It was hung with dainty curtains of frost work made by the roguish Jack Frost himself, and the walls and towers were painted in beautiful rainbows whenever the sunshine came to visit it.

Soon the flowers heard the great North Wind coming, and sure enough he brought with him the soft snow blanket that helped them to sleep safe and warm until spring time.

FALL NATURE STUDY

After many months the sleepy blossoms heard the Wind Princess whisper to them, "I will ask the South Wind to come with its warm breath, and help the sun to take away your winter covering so you may see the garden and the sky." Then off she drove in her magic car to the South Wind's Home. This wind lived with the lovely Flora in an arbor of flowers and vines in the midst of a wonderful garden. The air was laden with perfume, and the birds sang there all the day long.

Soon the flowers felt the breath of the gentle South Wind and knew the snow mantle had gone from their bed, and they opened their sweet eyes.

After a few days the Fairy Princess came again, this time to tell them she was going to bring the East Wind to visit them, for she saw how the velvet blossoms needed some warm rain drops.

So early next morning, the kind Princess flew to the eastern home where Aurora lives, to ask the East Wind's help to send rain to the garden bed. Oh! how beautiful the palace of the dawn looked! With its walls and domes and columns all of shining silver, and its entrance hung with rosy cloud curtains, pinned back by a silver star.

As the East Wind hurried the rain drops down to the waiting plants, they bowed their heads as if in thanksgiving for the refreshing shower.

Just at night, one rainy day, the flowers saw the Princess of the Winds driving her car as fast as she could to the golden palace of the West Wind, and they said among themselves: "The dear Princess has gone to ask West Wind to blow away the clouds that we may have a fair day to-morrow."

The rain ceased soon after the Princess reached the sunset palace on her errand of love. The queen of this gorgeous home drew aside the curtain of crimson and gold and stood at the entrance of the palace to receive her royal guest.

"Oh! what a grand sunset," cried little Ben Lee, as he looked toward the west that evening, but he never guessed who stood in the cloud palace asking the kind West Wind to come next day and help his plants to grow; he only knew that God loved flowers and birds and little children, and in His own wise way helped them to live and make the world more beautiful.

—Sophia S. Bixby.

CHILDREN MEMORIZE:

SEVEN TIMES ONE

There's no dew left on the daisies and clover,
  There's no rain left in heaven;
I've said my "seven times" over and over,
  Seven times one are seven.

I am old, so old, I can write a letter,
  My birthday lessons are done;
The lambs play always, they know no better;
  They are only one times one.

O Moon! in the night I have seen you sailing
  And shining so round and low;
You were bright! ah, bright! but your light is failing—
  You are nothing now but a bow.

You Moon, have you done something wrong in heaven
  That God has hidden your face?
I hope if you have, you will soon be forgiven,
  And shine again in your place.

O velvet Bee, you're a dusty fellow,
  You've powdered your legs with gold!
O brave Marsh-Marybuds, rich and yellow,
  Give me your money to hold!

O Columbine, open your folded wrapper
  Where two twin turtle-doves dwell!
O Cuckoo-pint, toll me the purple clapper
  That hangs in your clear green bell!

And show me your nest with the young ones in it;
  I will not steal them away;
I am old! you may trust me, linnet, linnet—
  I am seven times one to-day.

—JEAN INGELOW.

FALL NATURE STUDY

THE POPPY

Direct attention to the poppy. Give questions to be answered by studying the plants in the garden. Bring a whole plant to the school-room and compare it with one or two flowers previously studied—nasturtium, pansy, etc.

Celia Thaxter's exquisite poem will help to impress the beauty and the mystery of a seed.

In "An Island Garden" she says: Of all the wonderful things in the wonderful universe of God, nothing seems to me more surprising than the planting of a seed in the black earth and the result thereof. Take a poppy seed, for instance: It lies in your palm, the merest atom of matter, hardly visible, a speck, a pin's point in bulk, but within it is imprisoned a spirit of beauty ineffable, which will break its bonds and emerge from the dark ground in a splendor so dazzling as to baffle all powers of description.

POEM FOR READING AND DISCUSSION

A POPPY SEED

A poppy seed in your hand I lay!
You hardly see it! "Does anything hide
In that wee atom of dust?" you say.
Yes, wonderful glory is folded inside!

Robes, my dear, that are fit for kings;
Scarlet splendor that dazzles the eyes;
Buds, flowers, leaves, stalks,—so many things!
You look in my face with doubting surprise.

You ask, "Is it really, truly true?"
No fairy story at all this time!
Don't you remember the poppy that grew
At the foot of the trellis, where sweet peas climb?

NATURE STUDY

Last summer, close to the doorstep, where
You and I loved to sit in the sun
And see the butterflies float in the air
When the long bright day was almost done?

Don't you remember what joy we had,
Watching the poppy grow high and higher,
In its lovely gray-green garments clad,
Till the buds one evening showed streaks of red?

Then the flowers, like banners of silken flame
Unfurled, stood each on its slender stem,
While the soft breeze over them went and came
Lightly and tenderly rocking them.

You haven't forgotten! I was sure of it! Well,
All that perfection of shape and hue,
That wreath of beauty no tongue can tell,
Lies hid in this seed I have given to you.

Just such a speck in the friendly ground
I planted last May by the doorstep wide;
The self-same marvel that then we found,
This atom of dust holds shut inside.

You can't believe it? But all are there,—
Leaves, roots, flowers, stalks, color, and glow,
Tell me a story that can compare
With this for a wonder, if any you know.

—CELIA THAXTER.

Children, save poppy seeds to plant next spring so that they may see what the writer has pictured.

GENTIANS

Flowers large and handsome.

Fringed Gentian.—Corolla a rich blue, with beautifully fringed lobes. Flowers single, on a naked stalk.

Closed Gentian.—Flowers in clusters. Corolla blue; five fringe-toothed plaits.

The "Fringed Gentian" is a great favorite with poets and artists. Compare the gentian with the aster and the golden-rod.

COMMIT:

THE BLUE GENTIAN

"Oh! gentian I have found you out
And you must tell me true;
See, I'll put my ear close down,
Where did you get your blue!"

"I found it, little one, here and there,
It was ready made for me;
Some in your eyes, and some in the skies
And some in the dark blue sea."

"And where did you get that love fringe,
Gentian, that you wear?"
"I caught a hint from your dark eyelash
And one from your curling hair."

"And why do you stand so straight and tall
When they say that you are wild?"
"Oh! that I learned in a different way
And not from any child."

—SELECTED.

Study Bryant's poem, "The Gentian"

LEGEND OF THE GENTIAN

The closed Gentian never opens. The Fringed Gentian closes before dark. This is the story that accounts for the difference in the flowers.

Once upon a time the Queen of the Fairies was out very late. Indeed, it was midnight and the silvery moon had disappeared. The fairy hurried to a Gentian and asked for shelter. The sleepy Gentian said, "How dare you disturb me at this late hour. Find shelter wherever you can." "I am the Queen of the Fairies," said the poor frightened

little one. "I do not care for queens or kings," said the Gentian, "I cannot help you." The Fairy Queen hurried away to another Gentian and begged for a resting place. "Dear little friend," she said, "I shall be happy to shelter you until the sun appears." The Queen slept soundly until nearly dawn and then disappeared. Before going she said, "Dear Gentian, in future you and all your children shall have power to open and receive the light."

—ADAPTED.

MAKE A SPECIAL STUDY OF THIS POEM:

FLOWERS

Spake full well, in language quaint and olden,
One who dwelleth by the castled Rhine,
When he called the flowers, so blue and golden,
Stars, that in earth's firmament do shine.

Stars they are, wherein we read our history,
As astrologers and seers of old;
Yet not wrapped about with awful mystery,
Like the burning stars, which they beheld.

Wondrous truths, and manifold as wondrous,
God hath written in those stars above;
But not less in the bright flowrets under us
Stands the revelation of His love.

Bright and glorious is that revelation,
Written all over this great world of ours;
Making evident our own creation,
In these stars of earth, these golden flowers.

Everywhere about us are they glowing,
Some like stars, to tell us Spring is born;
Others, their blue eyes with tears o'erflowing,
Stand like Ruth amid the golden corn;

Not alone in Spring's armorial bearing,
And in summer's green-emblazoned field,
But in arms of brave old Autumn's wearing,
In the center of his brazen shield;

FALL NATURE STUDY

Not alone in meadows and green alleys,
On the mountain top, and by the brink
Of sequestered pools in woodland valleys,
Where the slaves of nature stoop to drink;

Not alone in her vast dome of glory,
Not on graves of bird and beast alone,
But in old cathedrals, high and hoary,
On the tombs of heroes, carved in stone;

In the cottage of the rudest peasant,
In ancestral homes, whose crumbling towers,
Speaking of the Past unto the Present,
Tell us of the ancient Games of Flowers.

—LONGFELLOW.

TREES

Aim.—To lead children to appreciate and love the trees.

Trees are of universal importance and interest; they exert a refining influence of untold value and are generally available for study in every locality. We are indebted to them in numberless ways for many of the comforts and luxuries of life. The varied forms and colors have a great attraction for children and they should be taught to know and to love the trees.

"How beautiful you are, green trees! * * *
How nobly beautiful! Here ye stand,
Your moss-grown roots by hidden moisture fed,
And on your towering heads the dews that fall
From God's right hand. Methinks an angel's wing
Floats o'er your arch of verdure, glorious trees!
Luring the soul above."

—MRS. SIGOURNEY.

Froebel declares that no more perfect representation of organic life and the mutual relation of its parts can be found in nature than a tree.

Irving says, "There is something nobly simple and pure in a taste for the cultivation of forest trees. It argues, I think,

a sweet and generous nature to have this strong relish for the beauties of vegetation and this friendship for the hardy and glorious sons of the forest. He who plants a tree looks forward to future ages, and plants for posterity. Nothing could be less selfish than this."

The very best gifts of God are so common, we do not half appreciate their worth. The poet Holmes speaks of the "trees holding their green sunshades over our heads, talking to us with their hundred thousand whispering tongues." Take the children "forth amid the breeze-swept trees and learn their language."

All honor to the forest!
Each breeze a message brings,—
"Be brave," from Oaks and Cedars,
"Look up," the Pine tree sings,
"Oh, earth is fair," the Elm calls,
"And Heaven is just above!"
"Do good," the Maples whisper,
All chorus, "God is love."

—ALICE ALLEN.

Impress the fact that the trees are living things and have important work to do. What? Why? Let children find a good tree for a swing. A tree that has food for the squirrels and birds. What is its name? How many of its neighbors are we acquainted with? Which one begins to branch lowest down? Which one has the smoothest bark? Find a tree with a bird's nest. Find seedlings growing.

Teacher, picture the life of one of the tall trees. It was once a small seed; the parent tree sent it down to the earth to begin its life work; the warm sun visited the spot where it lay hidden and it began to increase in size and strength, and year by year it became more deeply rooted and its leafy boughs stretched farther and farther from the trunk. The birds and the flowers sent sweet messages of good will and the

FOREST SONG

A song for the beautiful trees,
A song for the forest grand,
The pride of His centuries,
The garden of God's own hand.
Hurrah for the kingly oak,
The Maple, the forest queen,
The lords of the emerald cloak,
The ladies in living green.

—W. H. VENABLES.

grand old trees whispered, "Grow, grow."

At this time the great aim is to arouse interest and lead children to go to the trees for answers to the questions asked from day to day. Inspiration and information should go hand-in-hand. Let children tell what they know about the uses of trees,—fruit, fuel, lumber, medicine, etc. In addition to the endless number of uses, their beauty alone would warrant us in cultivating, protecting and loving them. Addison says: "There is something unspeakably cheerful in a spot of ground which is covered with trees, that smiles amid all the rigors of winter, and gives us a view of the most gay season in the midst of that which is the most dead and melancholy."

THE AMERICAN ELM

Children, select a typical Elm for continuous study throughout the year and contrast it with the maple.

Field Lesson.—Visit the tree with pupils and lead them to discover some of its characteristics,—height, shape of head, appearance of trunk, etc. Lead children to talk about its life, its work, and its helpers,—sun, rain, and soil. Emphasize dependence and interdependence.

Imagine some of its probable experiences during its life time. The birds that have built and sung in its branches; the squirrels, insects and other visitors it has sheltered; the many seeds it has sent into the world to grow tall and majestic like itself. Tell children we came to the tree to discover the reasons why the elm is so well liked, by people in the cities as well as in the country.

By studying the head of the tree they will discover why it is a great favorite as a shade tree. The arching character of the branches and the drooping, lace-like twigs give the tree a very graceful appearance and has won for it universal admira-

tion as a shade tree. Teacher, read for children "The Wonderful One Horse Shay." The toughness of the wood is immortalized by this poem. The branches bend but rarely break in a wind-storm. The wood is valuable for wheel-hubs, yokes and cabinet work. Orioles' nests are often found in its branches.

Historic Elms.—The Treaty of Wm. Penn was made beneath the shade of an elm in Philadelphia. Washington took command of the American Army at Cambridge, Mass., under an elm. The Burgoyne Elm at Albany, N. Y., was planted the day Burgoyne was brought to Albany a prisoner. The Liberty Elm stood on Boston Common until within a few years ago.

To know a tree is not merely to know its name, but rather to know its distinguishing features, its needs, its work, its rank, its mission.

Enemies.—The canker-worm and the black caterpillar are among its worst enemies.

Call attention to the difference in shape of elms growing in open places and those growing where they are crowded.

Children should visit the favorite tree very often; watch its leaves change color and disappear in autumn; observe and sketch the tree after the leaves have fallen; examine it when it is in blossom, also when the fruit is maturing; watch the development of buds and leaves and the changes in color of foliage from month to month; in a word, study its life history all through the year.

Develop the following facts by questioning as far as possible. Elm—dome, umbrella or vase-shaped; the bark, dark gray and rough, and the wood reddish brown, strong, and tough.

The elm branches are arching, drooping, and graceful, with fine, delicate spray and small shiny buds.

The leaves are simple, medium sized, rough, alternate arrangement, with short petioles, and deep green in color.

The flowers are tiny, brownish yellow or reddish clusters, which develop into samaras, winged fruit.

It is highly prized as a city shade tree except where soft coal is constantly used. The soot sticks to the rough leaves and after a time injures the tree.

SPRING HAS COME

The elms have robed their slender spray
With full-blown flower and embryo leaf.
Wide o'er the clasping arch of day
Soars like a cloud their hoary chief.
—HOLMES.

Consider the space required for the branching of the elm and decide how far apart the trees should be planted.

THE OAK

Aim.—To discover the character and the uses of the tree.

The majestic beauty and strength of the oak make it the glory of the forest; and in all ages, among all people, it has been looked upon with reverence. It is famous alike in poetry and prose. This is Bryant's tribute,—

"This mighty oak
By whose immovable stem I stand and seem
Almost annihilated—not a prince
In all the grand old world beyond the deep,
E'er wore his crown as loftily as he
Wears the green coronal of leaves with which
Thy hand has graced him."

This monarch may be visited at any time without the least ceremony, and if approached with a teachable spirit, his individuality must leave its impress upon the character. Everything about the oak suggests benevolence, power, and concentration,—the gnarled root, the rugged bark of the trunk, the hard, durable wood, and the firm, tough leaves.

If there is an oak growing near your school by all means induce pupils to make friends with it and learn to admire its noble qualities. Tell children that the oak with its broad base and curving trunk suggested to a thoughtful man across the ocean the best model for the Eddystone Light-house, which

has battled with the storms and tempests for nearly one hundred and fifty years, and to-day stands firm as a rock.

Direct attention to the sturdy appearance of the tree,—short, broad trunk; low, gnarled, outstretched branches, each one resembling a tree. The oak sends a strong tap root deep into the ground, while its wide-spreading, horizontal roots remain nearer the surface. When you visit him in the spring and see nearly all his neighbors decked in green, you may think that he has been forgotten. Watch daily and you will see that Mother Nature has a very beautiful crown for her forest king.

"Children, have you seen the budding
Of the trees in valleys low?
Have you watched it creeping, creeping
Up the mountain, soft and slow?
Weaving there a plush-like mantle,
Brownish, grayish, reddish, green,
Changing, changing, daily, hourly,
Till it smiles in emerald sheen?"

—Mother Truth's Melodies.

The oak has hundreds of years to live and can afford to wait longer for his "green coronal of leaves" than his short lived neighbors.

Let children tie a string around an acorn, hang it in a bottle of water and watch the beginning of an oak.

Plant in window-box and find out how the growing end is protected from injury while pushing up through the soil.

Try to find an acorn with two kernels; find two or three young oaks coming up together and see if they belong to one acorn.

Compare germination of oak and maple.

Visit in imagination a tan-yard; a forest of cork oaks in Spain.

Study the beginnings of galls on the trees in May. It is estimated, that about fifteen hundred insects make their homes in the oak.

Compare the oak with the pine.

The oak bears two kinds of flowers on the same tree. The staminate flowers grow in catkins. The pistillate flowers re-

semble tiny pink balls. The pistil becomes the nut of the acorn. Some oaks drop their acorns at the end of about six months (annual fruited); others wait for a year and a half (biennial fruited).

There are perhaps three hundred kinds of oak in the world.

Much of the beautiful carving, which is seen in the great cathedrals in Europe, is on oak wood.

The Greeks believed it was the first tree that grew upon earth.

A chaplet of oak leaves was the highest honor that could be given to a Roman soldier.

There are oaks in England that are known to be over a thousand years old.

The Round Table of King Arthur at Winchester is a cross section of an old oak eighteen feet in diameter.

The Charter Oak is the most famous American oak. Why?

The monarch oak, the patriarch of trees,
Shoots rising up, and spreads by slow degrees;
Three centuries he grows, and three he stays
Supreme in state, and in three more decays."

Sum up uses of the oak.

Acorn, important article of food in parts of Asia.

Bark used for tanning and dyeing.

Wood unsurpassed for durability and strength.

THE LAST DREAM OF THE OLD OAK

In the forest, high up on the steep shore, and not far from the open sea-coast, stood a very old oak tree. It was just three hundred and sixty-five years old, but that long time was to the tree as the same number of days might be to us; we wake by day and sleep by night, and then we have our dreams. It is different with the tree; it is obliged to keep awake through three seasons of the year and does not get any sleep till winter comes. Winter is its time for rest; its night after the long day of spring, summer and autumn.

The oak remained awake through the morning of spring, the noon

of summer, and the evening of autumn; its time of rest, its night, drew nigh—winter was coming. Already the storms were singing, "Good-night, good night." Here fell a leaf and there fell a leaf. "We will rock you and lull you. Go to sleep, go to sleep. We will sing you to sleep, and shake you to sleep, and it will do your old twigs good; they will even crackle with pleasure. Sleep sweetly, sleep sweetly, it is your three-hundred-and-sixty-fifth night. Correctly speaking, you are but a youngster in the world. Sleep sweetly; the clouds will drop snow upon you, which will be quite a coverlid, warm and sheltering to your feet. Sweet sleep to you and pleasant dreams."

And there stood the oak, stripped of all its leaves, left to rest during the whole of a long winter, and to dream many dreams of events that happened in its life, as in the dreams of men.

The great tree had once been small; indeed, in its cradle it had been an acorn. According to human computation, it was now in the fourth century of its existence. It was the largest and best tree in the forest. Its summit towered above all the other trees, and could be seen far out at sea, so that it served as a landmark to the sailors. It had no idea how many eyes looked eagerly for it. In the topmost branches the wood-pigeon built her nest, and the cuckoo carried out his usual vocal performance, and his well-known notes echoed amid the boughs; and in autumn, when the leaves looked like beaten copper plates, the birds of passage would come and rest upon the branches before taking their flight across the sea.

But now it was winter, the tree stood leafless, so that every one could see how crooked and bent were the branches that sprang forth from the trunk. Crows and rooks came by turns and sat on them, and talked of the hard times which were beginning, and how difficult it was in winter to obtain food.

THE DREAM

It was just about holy Christmas time that the tree dreamed a dream. The tree had, doubtless, a kind of feeling that the festive time had arrived, and in his dream fancied he heard the bells ringing from all the churches round, and yet it seemed to him to be a beautiful summer's day, mild and warm. His mighty summit was crowned with spreading fresh green foliage; the sunbeams played among the leaves and branches, and the air was full of fragrance from herb and blossom; painted butterflies chased each other; the summer flies danced

around him, as if the world had been created merely for them to dance and be merry in. All that had happened to the tree during every year of his life seemed to pass before him as if in a festive procession.

The wood-pigeons cooed as if to explain the feelings of the tree, and the cuckoo called out to tell him how many summer days he had yet to live. Then it seemed as if new life was thrilling through every fibre of root and stem and leaf, rising even to the highest branches. The tree felt itself stretching and spreading out, while through the root beneath the earth ran the warm vigor of life. As he grew higher and still higher, with increased strength, his topmost boughs became broader and fuller; and in proportion to this growth so was his self-satisfaction increased, and with it arose a joyous longing to grow higher and higher, to reach even to the warm, bright sun itself.

Already had his topmost branches pierced the clouds, which floated beneath them like troops of birds of passage, or large white swans; every leaf seemed gifted with sight, as if it possessed eyes to see. The stars became visible in broad daylight, large and sparkling, like clear and gentle eyes.

These were wonderful and happy moments for the old tree, full of peace and joy; and yet amidst all this happiness, the tree felt a yearning, longing desire that all the other trees, bushes, herbs, and flowers beneath him, might be able also to rise higher, as he had done, and to see all this splendor, and experience the same happiness. The grand, majestic oak could not be quite happy in the midst of his enjoyment, while all the rest, both great and small, were not with him. And this feeling of yearning trembled through every branch, through every leaf, as warmly and fervently as if they had been the fibres of a human heart.

The summit of the tree waved to and fro, and bent downwards as if in his silent longing he sought for something. Then there came to him the fragrance of thyme, followed by the more powerful scent of honeysuckle and violets; then he fancied he heard the note of the cuckoo.

CAUSE OF HAPPINESS

At length his longing was satisfied. Up through the clouds came the green summits of the forest trees, and beneath him, the oak saw them rising, and growing higher and higher. Every native of the wood, even to the brown and feathery rushes, grew with the rest, while the birds ascended with the melody of song. May beetles hummed,

bees murmured, birds sang, each in its own way; the air was filled with the sounds of song and gladness.

"But where is the little blue flower that grows by the water?" asked the oak, "and the purple bell-flower, and the daisy? I want them all."

"Here we are, here we are," sounded in voice and song.

"But the beautiful thyme of last summer, where is that? and the lilies-of-the-valley, which last year covered the earth with their bloom? and the wild apple tree with its lovely blossoms, and all the glory of the wood, which has flourished year after year?"

"We are here, we are here," sounded voices higher in the air, as if they had flown there beforehand.

"Why, this is beautiful, too beautiful to be believed," cried the oak in a joyful tone. "I have them all here, both great and small; not one has been forgotten. Can such happiness be imagined?" It seemed almost impossible.

"In heaven with the Eternal God, it can be imagined, for all things are possible," sounded the reply through the air.

And the old tree, as it still grew upwards and onwards, felt that his roots were loosening themselves from the earth.

"It is right so, it is best," said the tree, "no fetters hold me now. I can fly up to the very highest point in light and glory. And all I love are with me, both small and great. All—all are here."

Such was the dream of the old oak: and while he dreamed, a mighty storm came rushing over land and sea, at the holy Christmas time. The sea rolled in great billows towards the shore.

There was a cracking and crushing heard in the tree. The root torn from the ground just at the moment when in his dream he fancied it was being loosened from the earth. He fell—his three-hundred and sixty-five years were passed.

On the morning of Christmas day, when the sun rose, the storm had ceased. From all the churches sounded the festive bells, and from every hearth, even of the smallest hut, rose the smoke into the blue sky. The sea gradually became calm, and on board a great ship that had withstood the tempest during the night, all the flags were displayed, as a token of joy and festivity.

"The tree is down! The old oak—our landmark on the coast!" exclaimed the sailors. "It must have fallen in the storm of last night. Who can replace it? Alas! no one!" This was a funeral oration over the old tree; short but well meant.

There it lay stretched on the snow-covered shore, and over it sounded the notes of a song from the ship—a song of Christmas joy, and every one on board the ship felt his thoughts elevated, through the song and prayer, even as the old tree had felt lifted up in its last, its beautiful dream on that Christmas morn.

—HANS ANDERSON.

THE GRAVE IN THE FOREST

"A great tree fell in the forest,
With a crashing, thunderous sound,
Slowly and terribly stretching
His ponderous length on the ground,
And lay at the feet of his brothers
Mangled and dead,
Just as a mighty giant
Would pillow his head.

—SELECTED.

THE OAK

"Sing for the oak tree, the monarch of the wood.
Sing for the oak tree, that groweth green and good!
That groweth broad and branching within the forest shade;
That groweth now, and still shall grow when we are lowly laid.

The oak tree was an acorn once, and fell upon the earth;
And sun and shower nourished it, and gave the oak tree birth;
For centuries grows the oak tree, nor does its verdure fail;
Its heart is like the iron wood, its bark like plaited mail.

—SELECTED.

TREE LEGENDS

There are stories enough, beautiful little stories, too, about the trees to fill a whole book, and to enable you to entertain your friends in the woods for days and days.

The Ash tree, as well as certain other trees, was believed to be weather-wise. You people say now, "See the leaves of the Poplar

turning their silver side up. It must be going to rain." The Bay tree was supposed to be a protection from lightning. The Willow was an emblem of sadness. * * * But what about the Aspen tree? A German legend tells us that when Joseph and Mary were fleeing with the infant Jesus, they entered a very dense forest.

As soon as they were beneath the shelter of the forest, the trees all bowed their heads in reverence to the Divine Child. All except the Aspen, that lifted its head only a little higher, refusing to pay homage to anything on earth.

Then Christ cast one sad reproachful look upon this tree, so full of sorrow and reproof, that it pierced straight to its very heart. And lo! it began to tremble and has never for one moment ceased in all these centuries.

—*Fairyland of Flowers.*

Do you know how oddly the boughs of the Lombardy Poplar grow? Straight up in the air; making the tree look, as some one has said, for all the world, like an umbrella turned inside out by a gale. Of course, in the Legend world there must be a reason for this. Here it is. Some one had stolen the pot of gold which is said to be at the end of the rainbow.

The Wind messengers were sent to search for it. The Elm, the Oak, the Pine, all the trees had been asked if they knew the thief. All pointed their leaves toward the Poplar, saying, "The Poplar knows! the Poplar knows!"

"I know?" said the Poplar, raising its branches in pretended surprise. "Why, how should I know?"

But just then the pot of gold was seen shining through the leaves. The Wind messengers at once seized upon the gold, and as a punishment, the Poplar was doomed to hold its arms in just that position forever, as a warning to all other trees to be honest.

It seems rather a pity to tell such a story of so beautiful a tree. But it doesn't hurt the tree after all; and as nobody believes it, no harm is done, and we are amused for the time by the story.

"All my Master's works are fair, no flaw in them is seen;
And yet the dear trees best of all I love to see, I ween."

Stories told of us, if they are not true, do us little harm; for like spatters of mud, they will come off when they're dry.

—*Fairyland of Flowers.*

FALL LEAVES

Beauty of Leaves.—The beauty of color and texture combined with the endless variety of leaf forms cannot fail to prove a constant source of wonder and delight to the children during this season of bright, blue weather. Thoreau says,

"October is the month of painted leaves. Their rich glow now flashes round the world. As fruit and leaves, and the day itself acquire a bright tint just before they fall, so the year near its setting. October is its sunset sky. November the later twilight."

—*"Excursions."*

There are stupendous questions even in leaves, questions yet unanswered in opening buds, questions that glisten in the air on plumy seeds, riddles in rainbow colors imprisoned in a petal, and an endless catechism hangs on many a fragile stem.

—*Gibson Highways.*

It is desirable to center observation chiefly upon one or two trees, as the maple and the oak. Visit trees with pupils and impress the fact that the beauty of the leaves is scarcely equalled by their use.

Encourage children to collect and press leaves for the decoration of the school-room. Group trees dressed in red and yellow, crimson, purple and green.

Notice which trees change color first, which send their leaves to the earth first. Some day when the leaves are whirling down read "October's Party," or "How the Leaves Came Down."

Let pupils sketch leaves related to the branches and fruit, as oak branch with leaves and acorns, pine branch with needles and cones.

NATURE STUDY

BEFORE THE LEAVES FALL

I wonder if oak and maple,
Willow and elm and all,
Are stirred at heart by the coming
Of the day their leaves must fall.
Do they think of the yellow whirlwind,
Or know of the crimson spray,
That shall be when chill November
Bears all their leaves away?

Perhaps—beside the water
The willow bends, serene
As when her young leaves glistened
In a mist of golden green;
But the brave old oak is flushing
To a wine-red, dark and deep,
And maple and elm are blushing
The blush of a child asleep.

"If die we must," the leaflets
Seem one by one to say;
"We will wear the colors of gladness
Until we pass away,
No eyes shall see us falter;
And, before we lay it down,
We'll wear, in the sight of all the earth
The year's most kingly crown."

So, trees of the stately forest,
And trees by the trodden way,
You are kindling into glory
This soft autumnal day.
And we who gaze remember
That more than all they lost,
To hearts and trees together,
May come through the ripening frost.

—MARGARET SANGSTER.

FALL NATURE STUDY

POEM TO BE MEMORIZED:

HOW THE LEAVES CAME DOWN

"I'll tell you how the leaves came down,"
  The great tree to his children said;
"You're getting sleepy, Yellow and Brown.
  Yes, very sleepy, little Red;
  It is quite time to go to bed."

"Ah!" begged each silly, pouting leaf,
  Let us a little longer stay!
Dear Father Tree, behold our grief;
  'Tis such a very pleasant day
  We do not want to go away."

So, for just one more merry day,
  To the great tree the leaflets clung,
Frolicked and danced, and had their way
  Upon the autumn breezes swung,
  Whispering all their sports among,—

"Perhaps the great tree will forget,
  And let us stay until the spring,
If we all beg and coax and fret."
  But the great tree did no such thing;
  He smiled to hear their whispering.

"Come, children, all to bed," he cried.
  And ere the leaves could urge their prayer,
He shook his head, and far and wide,
  Fluttering and rustling everywhere,
  Down sped the leaflets through the air.

I saw them; on the ground they lay,
  Golden and red, a huddled swarm,
Waiting till one from far away,
  White bedclothes heaped upon her arm,
  Should come and wrap them safe and warm.

The great bare tree looked down and smiled;
"Good-night, dear little leaves," he said,
And from below, each sleepy child
Replied, "Good-night." Said little Red,
"It is so nice to go to bed!"

By Permission of author.—SUSAN COOLIDGE.
(Little, Brown & Co., Publishers.)

By questioning lead children to see the pictures in this poem and let each one paint the one he likes best. Commit poem.

READ AND DISCUSS:

OCTOBER'S PARTY

October gave a party; the leaves by hundreds came,
The Chestnuts, Oaks, and Maples, and leaves of every name.
The Chestnuts came in yellōw, the Oaks in crimson dressed,
The lovely Misses Maple, in scarlet looked their best.

—SELECTED.

Why do the Leaves fall?

Let children examine leaves that are ready to fall, and lead them to discover the layer of tissue which has been built across the end of the petiole; this loosens the leaf so that only a slight breeze is necessary to take it to the ground.

The falling leaves in autumn,—the beginning of the year as far as the tree's life is concerned—should serve to remind pupils of the promise of life in the new bud.

When the leaves finish their work on the tree, the sap is withdrawn to the branches and trunk and the leaves fall to the earth and cover the seeds and roots of the grasses and flowers during the cold weather.

Ruskin says of the leaf—

"It leads a life of endurance, effort and various success, issuing in various beauty; and it connects itself with the whole previous edifice by one sustaining thread, continuing its appointed piece of work all the way from top to root."

Let children name leaves used as food by animals. Name insects that make their homes in leaves.

Study leaves related to the trees and impress the following facts: The leaves are to plants what lungs are to animals.

Where there are no trees the water from melted snow disappears too rapidly; moisture that is needed in the soil is taken away by floods.

Forests build up a wall and protect the farmers' crops.

We would have greater extremes of heat and cold if it were not for the trees.

The leaves catch the rain and hold it for a time before sending it to the earth. There are few birds where there are no trees.

The old leaves make a deep carpet in the woods and keep the ground from freezing.

Trees prevent dangerous floods. The roots and trunks stop the water that comes pouring down the hillside.

We have severe drouths in places where there are no trees.

It has been estimated that a large plant (sunflower) gives off over a quart of water a day. Estimate the amount given off by a large tree.

Make a general comparison of leaves—

Those which are widest near the base.

Those which are widest at the middle.

Those which are widest near the apex.

TERMS NEEDED IN DESCRIBING LEAVES

Leaf:—

Blade: The flattened part of the leaf.

Petiole: The stem of the leaf.

Stipules: Leaf-like parts at base of the petiole.

Venation: Net-veined, parallel-veined.

Shapes of Leaves:—

Oval, arrow-shaped, heart-shaped, and lance-shaped.
Simple leaves have but one blade.
Compound leaves have more than one blade.
Leaves deeply cut like the oak are called lobed leaves.
The base is near the petiole.
The apex is opposite the base.

Edges or Margins of Leaves:—

Entire, serrate or saw-toothed; crenate or scalloped; and dentate, with sharp teeth pointing outward.

Teach poems and songs that will appeal to the children and influence them to love this month of "painted leaves."

AUTUMN LEAVES

"Come, little leaves," said the wind one day,
"Come over the meadows with me and play;
Put on your dresses of red and gold;
Summer is gone and the days grow cold."

—SELECTED.

POEM TO BE MEMORIZED:

OCTOBER

O suns and skies and clouds of June
And flowers of June together,
Ye cannot rival for one hour
October's bright blue weather.

When loud the bumble-bee makes haste,
Belated, thriftless vagrant,
And golden-rod is dying fast,
And lanes with grapes are fragrant;

When gentians roll their fringes tight
To save them from the morning,
And chestnuts fall from satin burrs,
Without a sound of warning;

When on the ground red apples lie,
In piles like jewels shining,
And redder still, on old stone walls,
Are leaves of woodbine twining;

FALL NATURE STUDY

When all the lovely wayside things
  Their white-winged seeds are sowing,
And in the fields, still green and fair,
  Late aftermaths are growing;

When springs run low and on the brooks,
  In idle golden freighting,
Bright leaves sink noiseless in the hush
  Of woods for winter waiting.

O suns and skies and flowers of June,
  Count all your boasts together,
Love loveth best of all the year,
  October's bright blue weather.

—HELEN HUNT JACKSON.

Study "October."

Meaning of rival; thriftless; vagrant; etc. What did Lowell say about June? What flowers may be seen in June? in October? Do you agree with the author? Compare bumble-bee with honey-bee. Describe the gentian. Sketch the plant. Describe chestnut burrs, woodbine, etc. Math means mowing. Aftermath is the crop after the first mowing. Why do springs run dry in October? Name the beautiful white-winged things to be seen during this month. Which do you like the better, June or October? Why?

THE PAINTER

A fairy brush he must have used;
And color he has not abused;
The tints and tones are blended right—
The tracery is all in white!

The morning sun comes peeping through.
With glist'ning gleams of pink and blue,
To view the picture Jack has made
With glittering jewels all inlaid.

NATURE STUDY

The Sun and Jack are mortal foes;
One treads upon the other's toes.
The hills and valleys melt, and run—
And poor Jack's work is all undone!

—MARY REDMOND.

BIRDS

Birds, birds! ye are beautiful things,
With your earth-treading feet and your cloud-cleaving wings,
Where shall man wander, and where shall he dwell—
Beautiful birds—that ye come not as well?

—*Birds and All Nature.*

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Teacher's Preparation for Bird Lessons.—The following books will prove invaluable in bird study: Birds and Poets, Wake Robin, Citizen Bird, Bird Craft, A Bird Lover in the West, and Birds and all Nature (A Monthly Serial).

The teacher should read and re-read the loving tributes and ennobling sentiments of the poets, also: The Vision of Sir Launfal, The Birds of Killingworth, To a Water-fowl, To a Skylark, and similar classic poems.

The poet's sympathetic interpretation of bird life will foster a love for birds,—for all nature, and lead to a fuller appreciation of Wordsworth's thought,—

"Nature never did betray
The heart that loved her; 'tis her privilege,
Through all the years of this our life, to lead
From joy to joy; for she can so inform
The mind that is within us, so impress
With quietness and beauty and so feed
With lofty thoughts, that neither evil tongues,
Rash judgments, nor the sneers of selfish men,
Nor greetings where no kindness is, nor all
The dreary intercourse of daily life,
Shall e'er prevail against us, or disturb
Our cheerful faith, that all that we behold
Is full of blessings."

In the primary grades the children gladly follow where the teacher leads, thus giving her the blessed privilege of establishing a living sympathy with all God's creatures.

Bird life is wonderfully interesting and our feathered friends



SWALLOWS—*By Laux*

at all times and seasons are challenging young and old to discover their secrets. The children should be encouraged to make friends with the birds, to watch their graceful movements, and listen to their songs.

Picture the life of these beautiful little creatures, the time they spend collecting material for the nest, the ingenuity exhibited in building, care of the little bird family, bravery in defending the nest against enemies, and their joy when the young birds are ready to fly.

If the teacher is interested and enthusiastic, the pupils will catch her spirit and surprise her by their discoveries. In order that children may have the privilege of observing the birds daily, ears of corn, small boxes or sheaves of grain should be fastened to the trees near the school or home, and a dish of fresh water kept in a convenient spot where the birds may drink and bathe.

Tell interesting stories and incidents of bird life. Long, long ago, when Mother Nature gave the birds their plumage, the thrush came last and the attractive colors were all gone; the oriole had selected the orange; the canary, the yellow; the bluebird had chosen the blue; the tanager, the red, and the humming-birds and doves had monopolized the rainbow colors. The thrush looked admiringly at her friends and said, "Never mind, dear Mother, a plain brown dress is good enough for me, but give me a sweet voice, so that I can make the children happy."

Tell them about the polite bird (cedar-wax-wing) with the high head-dress, and the beautiful little points like red sealing-wax on the wings. A flock will often perch on the bare branches, stroke each other's plumage, bow, twitter, and pass choice morsels of food back and forth again and again before any one of the number can be persuaded to eat it.

In the lower grades the living bird should be studied out of

doors, and six or eight birds known and loved as a result of the first year's study may be considered good work. Ask questions that cannot be answered except by observing the birds.

What birds walk? What birds hop? What bird has a red patch on its head? Name birds that are black or nearly so. What time of the day do the birds begin to sing? How many have heard birds singing in the rain? Do they sing at night? What have you seen birds eating? Where do they sleep at night? How many have fed birds in the winter time? What bird was Celia Thaxter thinking of when she wrote "Don't you remember his glowing red breast, and his olive brown coat and his shining black eye?" Robin. What birds tell us their names? Bobwhite, whipporwill, chickadee, bobolink, pee-wee, and others.

Let children try to imagine the wonderful sights witnessed by the birds as they fly over land and sea.

BIRDS IN SUMMER

How pleasant the life of a bird must be,
Flitting about in each leafy tree;
In the leafy trees so broad and tall,
Like a green and beautiful palace hall,
With its airy chambers light and boon,
That open to sun and stars and moon;
That open to the bright blue sky,
And the frolicsome winds as they wander by.

To pass through the bowers of the silver cloud;
To sing in the thunder-halls aloud;
To spread out the wings for a wild, free flight
With the upper cloud-winds—oh, what delight!
Oh, what would I give like a bird, to go
Right on through the arch of a sunlit bow,
And see how the water-drops are kissed
Into green and yellow and amethyst!

—MARY HOWITT.

Children should be requested to report their observations from time to time. They will have many questions to ask about the birds as soon as they become really interested.

Where do the birds go in autumn? They go south where the flowers are in bloom, when we have snow and cold weather.

Why do they go? In search of food. In their new home they find the same kind of food that they had here all summer. Some birds eat vegetable food, some animal, while others prefer a mixed diet. The locality is determined by the abundance of food suited to their nature.

Will all the birds leave us? The blue jay, English sparrow, brown creeper, and several other birds remain with us all the year round. Some birds, as the chickadees, winter-wrens, tree sparrows, Bohemian wax-wings, come here from colder regions of the north to make us a visit during the winter. Some members of the great bird family are going or coming nearly all the time.

Which birds go first? Those whose food consists mostly of insects. The swifts and swallows go in August or early September. Humming-birds also go early. Robins eat animal and vegetable food and occasionally remain until we have snow.

Do they go singly or in flocks? Many birds congregate in flocks before they start, as the swallows, bobolinks, king birds, robins, and others.

What do the birds eat that remain here all winter? They find grubs hidden under the bark of trees, and seeds on the grasses above the snow.

Do they fly very high? Those that fly at night generally do, unless prevented by fogs.

Can birds fly very fast? Many birds fly a mile a minute and, if the wind is favorable, they are able to continue at that rate hour after hour. Swifts have been known to travel two hun-

dred miles an hour. Wild geese travel from twelve to fifteen hundred miles a day. It is claimed that the tiny flame-breasted humming-bird builds its nest as far north as Alaska and winters in Lower California and Mexico, traveling a distance of over two thousand miles twice a year.

HUMMING-BIRDS IN THE AMAZON REGION

It is enough to make one dumb with awe and wonderment even to contemplate the inexhaustible variety in their freaks of outward form alone, and it will be a day long to be remembered by any one who is fortunate enough to spend an hour or two within the fairy tropics of a conservatory devoted to these blossoms of the air. Here are colors and tones that are not of this world, but rather radiations borrowed from the celestial rainbow and the sunset and the pure blue sky. Here are scintillating textures woven with yellow light, and twilight purples of a hundred hues. * * * *

—GIBSON—*Highways and Byways.*

Why can some birds fly faster than others? The wings of birds that have very long journeys to take are long, pointed, and very strong, while the wings of those that fly only short distances are generally short, rounded and weak. Wild geese, ducks, and swans are first-class flyers as well as swimmers. The migration of a flock of geese is an interesting sight. A leader flies ahead at the point where the two lines of birds meet, and when he decides to change his position, a neighbor takes his place and the flock keeps in perfect order while the leaders are changing. They fly thousands of miles to build their nests in summer in northern regions.

Do the birds lose their way? Sometimes during storms it is supposed that they are not able to recognize the land marks,—rivers, coast lines, and mountains, and they often fly against high buildings, towers, or electric wires and thus meet their death. The eyes of birds magnify objects and enable them to see their land-marks when the weather is clear.

How do the young birds know where to go the first year? Bird lovers tell us that they are guided by the calls of the old birds the first year, and the next year they act as guides for other birds.

"Little bird! little bird! who'll guide thee
Over the hills and over the seas?
Foolish one! Come in the house to stay,
For I'm very sure you'll lose your way."

"Ah, no, little maiden! God guides me
Over the hills and over the sea.
I will be free as the rushing air,
And sing of sunshine every where."

—LYDIA MARIA CHILDS.

"There is a Power whose care
Teaches the way along that pathless coast,
The desert and illimitable air,
Lone wandering but not lost."

—BRYANT.

Do birds wear the same plumage all the year? Their feathers get worn by storms and by brushing against the branches of trees and they drop out one by one and are replaced by new ones. The tips of the smaller feathers give the bird its color; the breast feathers of a bluebird, for instance, are reddish only at the tips and for this reason birds often present a very different appearance during the year. Many birds are provided with more than one new suit a year. What is the color of the bobolink in spring time? in the fall?

Is the bird's body warmer than ours? The temperature of the human body is 98 degrees; that of a bird from 104 to 108 degrees.

NOTE.—Mr. Brewster, a noted ornithologist, made many interesting discoveries on the nocturnal flight of migrants at a New Brunswick light-house a few years ago. On the subject of migrations there still remains a large field for original research, many ornithologists claim.

Why is it warmer? The rapid movements of the birds through the air increases the circulation of the blood, making it warmer than that of any other animal, and the small, downy feathers covering the bird's body, prevent the heat from escaping.

How is the bird's body adapted for flight? The bird's plumage is very light; that of a large owl is said not to weigh two ounces. The shape of the body and the arrangement of the feathers (directed backwards) aid the bird in flying. The hollow bones and quill feathers are filled with air, and the air sacs extending through the body, even through the bones, are connected with the lungs. The light feathers, the expansion of the warm air and the strength of the tail and wing feathers enable the bird to move through the air with a graceful, gliding motion.

Have the birds many enemies? Yes, they have all sorts of enemies. Rats, squirrels, cats, weasels and snakes destroy a great number of eggs and young birds. Hawks, owls, crows, bluejays, shrikes, and several other birds prey upon their neighbors, and man, too, must be regarded as perhaps their worst enemy. It is estimated that the yearly slaughter of birds in America is about five millions—a million killed in one month near Philadelphia; forty thousand birds killed in a single season on Cape Cod; twenty thousand supplied to a New York dealer from one village. Why? To ornament the hats of American women. May Riley Smith says:

"What does it cost this garniture of death?
It costs the life which God alone can give;
It costs dull silence, where was music's breath;
It costs dead joy, that foolish pride may live;
Ah! life and joy and song, depend upon it,
Are costly trimmings for a woman's bonnet."

—By permission of E. P. Dutton & Co.

Do all birds build nests? The chick-a-dees, nut-hatches, brown creepers and others are satisfied with a second-hand nest. Some birds repair last year's nest, as the owl, wren, and bluebird. The cow-bird lays its eggs

in the nest of other birds; when the warblers find a strange egg in their nest they often build a new nest above the old one.

Ye have nests on the mountains, all rugged and stark,
Ye have nests in the forest, all tangled and dark;
Ye build and ye brood 'neath the cottagers' eaves
And ye sleep on the sod 'mid the bonnie green leaves;
Ye hide in the heather, ye lurk in the brake,
Ye dine in the sweet flags that shadow the lake;
Ye skim where the stream parts the orchard decked land,
Ye dance where the foam sweeps the desolate strand."

—***Birds and All Nature,*** Copyright 1900, by A. W. Mumford, Chicago.

Make a special study of the domestic pigeon, or the canary, parrot, or hen, in the school-room in order to prepare the children for intelligent observation out of doors. A skeleton wire-covered box will make a nice home for the pretty pigeon until the children become better acquainted with her. Find out what they know about this meek little bird. Let them imitate the plaintive sound it makes. (Coo, coo.) Watch it drinking. It does not raise its head as other birds do. Notice its dainty steps while walking.

CHARACTER OF THE BIRD

It is an innocent, gentle bird and has always been the symbol of tenderness and devotion. Let children tell what they have observed about the nest. Both birds help in building and they take turns in sitting upon the nest. They raise several broods in one season.

Tell stories of pigeons.

FABLE

Long ago one bright day in spring many of our distinguished birds assembled in a beautiful grove to exchange compliments and welcome new arrivals from the sunny south. All at once, an unexpected visitor appeared before them. Her graceful manners, dainty ways and low,

soft voice won the approval and admiration of all the lovely company. The birds gave the pretty stranger a very cordial greeting and bestowed upon her favors unheard of in bird life previous to that day. They not only offered to assist the new comer in the choice of a desirable location, but promised to give her lessons in the art of nest building.

The swallows tried to persuade her that they had invented the most wonderful nest of all the birds, the orioles described the beauty of a swinging cradle in an elm tree, the meadow-lark assured her that for safety and ingenuity no nest could be compared with her's, the woodpecker offered to choose the finest tree in the grove and show her how to make an ideal nest. The little pigeon listened attentively to all her friends, but said with a toss of her pretty head, "I am very thankful to you all, but I understand the art of nest building far better than any of you." Of course, the birds were very much offended and they all flew away and left her there alone. No doubt she was sorry for her independence, because she has every reason to be ashamed of her nest. Her relatives (mourning dove and passenger pigeon) need instruction in the art of nest building as well as our little favorite.

Call attention to the plumage so difficult to describe,—sometimes bluish, slate-colored, white, rainbow colors; the bright round eyes; the grooved bill; nostrils in the upper bill.

Notice the short, slender legs covered with tough skin, the four toes, three in front and one behind, and the strong, sharp claws.

Call attention to the fluttering noise made by striking the long, pointed wings in flight.

Let children learn the names of the parts of a bird,—crown, beak, throat, breast, wings, tail, claws, etc.

The carrier, or messenger pigeon has a very interesting history. It has been trained to carry messages in a short time over long distances. The training is begun when the bird is very young by taking it a short distance from home and setting it free. It soars upward until it determines the right direction and then returns to its cote. Day after day it is taken in the same direction from its home, each time a little

further, until it becomes very familiar with the route it is to travel.

A message is written on the finest paper, placed in a cylinder made of aluminum and is attached to one of the tail feathers. From forty to fifty miles an hour is about the average speed of the messenger.

THE DOVE AND THE WOODPECKER

A FABLE

A dove and a woodpecker had been visiting a peacock. "How did you like our host?" asked the woodpecker, after their visit. "Is he not very disagreeable? His vanity, shapeless feet, and his harsh voice are unbearable. Don't you think so?" "Indeed I had no time," said the gentle dove, "to notice these things; I was so occupied with the beauty of his head, the gorgeousness of his colors, and the majesty of his train."

Tell children one of the legends connected with the Doves of Venice.
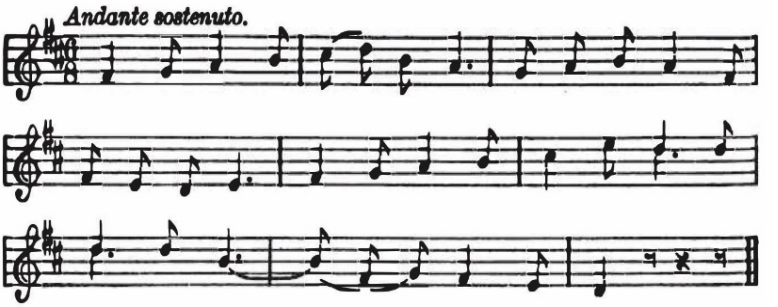
Centuries ago this "City of the Sea" was nearly conquered by enemies. Doves arrived with messages just in time to save the city and ever since the doves have been protected and loved by the people. Strangers enjoy watching them in the beautiful St. Marco Square near the grand cathedral.

High on the top of an old pine tree
Broods a mother-dove with her young ones three.
Warm over them is her soft downy breast,
And they sing so sweetly in their nest.
"Coo," say the little ones, "Coo," says she.
All in their nest on the old pine-tree.

NOTE.—The name "dove" and "pigeon" are not quite synonymous, but because "dove" is so commonly used in literature and it is so nearly correct, "Howe" advocates the use of the term dove in primary grades.

NATURE STUDY

Fast grow the young ones, day and night,
Till their wings are plumed for a longer flight;
Till unto them at last draws nigh
The time when they all must say "Good-bye."
Then "Coo," say the little ones, "Coo," says she,
And away they fly from the old pine-tree.



BIRDLING'S GOOD-NIGHT TO THE FLOWERS

Shadows creep along the sky,
Birdies now must homeward fly;
Hear the songs they sing to greet
All their friends—the flowers sweet.

Good-night darling mignonette,
Good-night little violet;
Good-night pinks and four o'clock,
Good-night, homely holly-hock!

Good-night lily; good-night rose;
Good-night every flower that blows;
Thank you for your lovely bloom,
Thank you for your sweet perfume.

From *Songs for Little Children* by Eleanor Smith. By permission of Milton Bradley Co. and Thomas Charles, Chicago, Publishers.

Birds are divided into families according to their form, habit, and manner of obtaining food.

Perching Birds, Ex.—Robin, oriole.

Climbing Birds, Ex.—Woodpecker and parrot.

Scratching Birds, Ex.—Hen, pigeon.

Wading Birds, Ex.—Crane, heron. Swimming Birds, Ex.—Goose and duck.

Running Birds, Ex.—Ostrich. Preying Birds, Ex.—Eagle.

Find out the characteristics of each family.

DUCK

A type of water birds compared with the hen, or some other bird previously studied.

Call attention to the boat shaped body of the duck, the legs strong and short and placed far back on the body.

The hen's rounded heavy body. What shape better adapted for swimming? What does the duck eat? How obtain food? What is the advantage of the broad, shovel shaped bill with its rough plate along the sides? Serves as a strainer and enables the duck to retain the food and reject mud, etc. What does the hen eat? How does she get her food? Examine the strong membrane between the toes of the duck, adapted for wading, the strong, sharp claws of the hen, adapted for scratching.

Plumage of duck. Sometimes a dark, glossy green, reddish brown, beautiful soap-bubble colors. Why so glossy? The supply of oil in the oil gland is sufficient to keep the feathers saturated with oil. (Waterproof.) Heavy coat of soft down next to body. Why? Protection against changes of temperature in air and water. Compare with hen.

MAKE A SPECIAL STUDY OF THIS BEAUTIFUL POEM:

ODE TO A WATER-FOWL

Whither 'midst falling dew,
While glow the heavens with the last steps of day,
Far, through their rosy depths, dost thou pursue
Thy solitary way?

NATURE STUDY

Vainly the fowler's eye
Might mark thy distant flight to do thee wrong,
As, darkly painted on the crimson sky,
Thy figure floats along.

Seek'st thou the plashy brink
Of weedy lake, or marge of river wide,
Or where the rocky billows rise and sink
On the chafed ocean side?

There is a Power whose care
Teaches the way along that pathless coast,
The desert and illimitable air,
Lone wandering, but not lost.

All day thy wings have fanned,
At that far height, the cold, thin atmosphere,
Yet stoop not, weary, to the welcome land,
Though the dark night is near.

And soon that toil shall end.
Soon shalt thou find a summer home, and rest,
And scream among thy fellows; reeds shall bend,
Soon o'er thy sheltered nest.

Thou'rt gone; the abyss of heaven
Hath swallowed up thy form; yet, on my heart,
Deeply has sunk the lesson thou hast given,
And shall not soon depart.

He, who, from zone to zone,
Guides through the boundless sky thy certain flight,
In the long way that I must tread alone,
Will lead my steps aright.

—William Cullen Bryant.

How can we tell when the poet saw the bird? The appearance of the sky? Number of birds? Why useless for the fowler to try to harm the bird? Meaning of plashy brink? Marge? Chafed? Might the bird seek a home in a forest? Why is the first letter in Power a capital? Meaning of path-

less? Illimitable? Abyss of heaven? Boundless? What lines show confidence in God? Paint the pictures suggested by the following lines:

"As darkly painted on the crimson sky
Thy figure floats along."

"Reeds shall bend
Soon o'er thy sheltered nest."

What is the message contained in the poem?

STUDY OF POEM

Children have studied "The Sparrows," "The Poppy Seed," and visited in imagination the White and Appledore Islands.

Review the story of Celia Thaxter's childhood days. Her father was the keeper of an island light-house on the Atlantic coast. Celia loved the stormy ocean, the seagulls, the sandpipers—everything connected with her home. In the following poem she has given us a picture of herself and one of her dear little friends.

POEM TO BE MEMORIZED AFTER THOUGHTFUL DISCUSSION:

THE SANDPIPER

"Across the lonely beach we flit,
One little sandpiper and I,
And fast I gather bit by bit,
The scattered driftwood bleached and dry,
The wild waves reach their hands for it;
The wild wind raves, the tide runs high,
As up and down the beach we flit,
One little sandpiper and I.

"Above our heads the sullen clouds
Scud black and swift across the sky.
Like silent ghosts in misty shrouds
Stand out the light-houses high.
Almost as far as eye can reach
I see the close-reefed vessels fly,
As fast we flit along the beach,
One little sandpiper and I.

"I watch him as he skims along
Uttering his sweet and mournful cry;
He starts not at my fitful song,
Or flash of fluttering drapery,
He has no thought of any wrong;
He scans me with a fearless eye.
Staunch friends are we, well tried and strong,
The little sandpiper and I.

" 'Comrade, where wilt thou be to-night
When the loosed storm breaks furiously?
My driftwood fire will burn so bright!
To what warm shelter canst thou fly?
I do not fear for thee, though wroth
The tempest rushes through the sky;
For are we not God's children both,
Thou, little sandpiper, and I?' "

—CELIA THAXTER.

Teacher, read poem to children. Show pictures of ocean vessels, light-house and sandpiper. Describe bird. Explain close-reefed, beach, staunch, etc. Teacher, read poem again and help children to see the pictures in each stanza. Group expressions that suggest fear and loneliness; expressions that suggest hope and confidence. Sketch a picture you can see in second stanza. Repeat the last stanza of Bryant's poem "The Water-fowl." Do you like this poem as well as "The Sandpiper"? Give reasons for your choice.

THE GRAY SQUIRREL

This handsome, nimble, little fellow is perhaps the most interesting member of the large family of rodents.

In studying an animal, its manner of life in its native haunts should be the first thing observed. Ask questions to guide children in their outdoor study.

When and where did you see the squirrel? Describe his movements. How does he run up a tree? How come down.



PIPER AND NUTCRACKERS—*By Landseer*

Compare with the cat in this respect. What does he eat? How does he carry his food? Where does he live? Describe his nest. When running, in what position does he carry his tail? Imitate the noise he makes.

If teacher and pupils are so situated that it is impossible to study the squirrels in their own natural environment procure one alive in a revolving cage for study in the school-room. One of the pupils may have a tame squirrel, which he will be glad to bring to school for a week or so.

Children, watch the squirrel in his cage and find out his way of eating, drinking, and bathing. Notice his teeth. In the front of his mouth he has four long, chisel shaped teeth, two in the upper jaw and two in the lower. For grinding he has strong, broad back teeth.

How does he hold the nut? How does he eat it? He seems to like fruit, grain, buds, and cones as well as nuts. Observe the squirrel when asleep.

Body.—The long slender body is covered with two coats of soft fur. The coat next to the body is very compact and warm; the hair on the outer coat is long and it determines the color. The gray squirrel is variable in color, ranging from very light gray to black. He has bright, round eyes, ears of medium size, and very long whiskers. The hind legs are longer than the front ones. The fore paws are each provided with four toes and a thumb, while the hind paws have five toes each. The long bushy tail is used as a rudder in jumping and it also serves to keep the body warm during the winter.

Children notice that the squirrel often hides food under leaves, bark, or other objects in the cage.

Habits when free.—The squirrel selects a deep hollow in a decayed tree, lines it with moss and leaves, and sleeps there securely the greater part of the time in winter. He stores his

food in autumn; sometimes hiding it in old trees near his home and sometimes burying a portion in the earth; occasionally he wakes up during the winter and runs out and finds something to eat. His teeth continue to grow as long as he lives and he must keep them worn down by gnawing.

THE SQUIRREL

In the joy of his nature he frisks with a bound
To the topmost twigs, and then to the ground;
Then up again, like a winged thing,
And from tree to tree with a vaulting spring;
Then he sits up aloft, and looks waggish and queer,
As if he would say, "Ay, follow me here!"
And then he grows pettish, and stamps his foot;
And then independently cracks his nut. * *

—MARY HOWITT.

COMPARE THE GRAY, WITH THE RED SQUIRREL.

INDIAN CORN

The children above the first grade have been watching with great interest the growth of the corn they planted in early spring. Before the close of the term their observations should be summed up. Teacher, direct attention to a field of corn, if convenient. Let children tell what they know about the manner of planting corn, its cultivation, and the soil best adapted for its growth.

Study of the Plant as a Whole

What is the average height of the stem? Pupils measure.

How many joints in the stalk?

Are they alike? Examine the roots. How are the leaves arranged on the stem?

Stem.—Tall, straight, smooth, lower nodes prominent; pithy inside the stalk.

Roots.—Numerous, tough, and fibrous; strong roots branching from the lowest nodes give the plant a broader base and

help to support the stalk with its wealth of leaves and golden grain.

Leaves.—Long, narrow, parallel-veined; spread out from the joints in graceful curves.

Flowers.—Two kinds,—the tassel, a tall branched spike at the top of the stem containing only stamens; bunches of silk in the axils of the lower leaves,—the styles of the pistillate flowers.

Have children picture the corn stalk.

Pollen must fall on the silk in order to mature the corn,—it may fall from the tassel above, or it may be carried by the wind from another plant.

Have children examine the silky threads, and find out where they are attached to the kernels.

Has each kernel a thread? Observe arrangement of the kernels on the cob. How many rows do you find?

Uses.

The kernels yield "Oswego," or corn starch.

The kernels ground, form Indian meal.

The stalks are used for fuel and in making baskets.

The husks are used in packing fruits, in stuffing saddles, beds and chairs, and in the manufacture of paper.

History.

Early writers describe the corn of Peru and Chili.

Maize is probably a native of Mexico.

Early explorers of America found it cultivated by the Indians.

It was taken by Columbus to Spain in 1520.

Edward Everett said:

"Drop a grain of California gold into the ground, and there it will lie unchanged to the end of time, the clods on which it falls not more dead and lifeless. Drop a grain of our gold, of our blessed gold, into the ground and lo! a mystery. In a few

days it softens, it swells, it shoots upwards; it is a living thing. It is yellow itself, but it sends up a delicate spire which comes peeping, emerald green, through the soil; it expands to a vigorous stalk; revels in the air and sunshine; arrays itself more glorious than Solomon in its broad fluttering leafy robes, * * still towers aloft, spins its verdant skeins of vegetable floss, displays its dancing tassels, surcharged with fertilizing dust, and at last ripens into two or three magnificent batons, each of which is studded with a hundred grains of gold, every one possessing the same wonderful properties as the parent grain."

Literature.

"Feast of Mondamin"—from Song of Hiawatha, and "Maize, the Nation's Emblem."—*Houghton, Mifflin & Co.*

Not forgotten nor neglected
Was the grave where lay Mondamin
Sleeping in the rain and sunshine * * *
* *
Day by day did Hiawatha
Go to wait and watch beside it;
Till at length a small green feather
From the earth shot slowly upward,
Then another and another,
And before the summer ended
Stood the maize in all its beauty
With its shining robes about it
And its long, soft yellow tresses. * * *

(Mondamin was the Indian name for maize, or Indian corn.)

Teacher, read the description of "This New Gift of the Great Spirit," and children, memorize after discussion.

THE FARMER AND HIS SONS.

The farmer was industrious and wealthy; the sons were lazy and thoughtless. "Father, do tell us where to find your treasure," they said; "My treasure lies in the cornfield," answered the father. The boys went

to work and dug the fields day after day to find the pot of gold. They never found it, but the field yielded a fine crop of corn. This was the father's wealth.

READ AND DISCUSS THE FOLLOWING POEM:

MAIZE FOR THE NATION'S EMBLEM

Upon a hundred thousand plains
  Its banners rustle in the breeze,
O'er all the nation's wide domains,
  From coast to coast betwixt the seas.

It storms the hills and fills the vales,
  It marches like an army grand,
The continent its presence hails,
  Its beauty brightens all the land.

Far back through history's shadowy page
  It shines a power of boundless good,
The people's prop from age to age,
  The one unfailing wealth of food.

God's gift to the New World's great need,
  That helps to build the nation's strength,
Up through beginnings rude to lead
  A higher race of men at length.

How straight and tall and stately stand
  Its serried stalks upright and strong!
How nobly are its outlines planned!
  What grace and charm to it belong!

What splendid curves in rustling leaves!
  What richness in its close-set gold!
What largeness in its clustered sheaves,
  New every year, though ages old!

America, from thy broad breast
  It sprang, beneficent and bright,
Of all the gifts from heaven the best,
  For the world's succor and delight.

Then do it honor, give it praise!
A noble emblem should be ours:—
Upon thy fair shield set thy Maize,
More glorious than a myriad flowers.

And let the states their garlands bring,
Each its own lovely blossom-sign;
But leading all, let Maize be king,
Holding its place by right divine.

—CELIA THAXTER.

THANKSGIVING DAY

The autumn nature lessons and literature have enabled the teacher to instill into the hearts of the children true feelings of gratitude for the many blessings they enjoy.

Discuss the following topics: The Pilgrims Leaving England; The Pilgrims in Holland; The Voyage of the Mayflower; The Two Children—Peregrine White and Oceanus Hopkins; The Landing; etc. Show pictures of the life of that time.

THANKSGIVING DAY

"Over the river and through the wood
To grandfather's house we'll go;
The horse knows the way
To carry the sleigh
Through the white and drifted snow.

Over the river and through the wood,
Trot fast, my dapple gray!
Spring over the ground
Like a hunting hound!
For this is Thanksgiving Day. * * *

—SELECTED

Teach—"Montgomery's Hymn," Lucy Larcom's "Thanksgiving," and similar selections.

THE LANDING OF THE PILGRIMS

The breaking waves dashed high.
On a stern and rock-bound coast;
And the wood against a stormy sky
Their giant branches tossed;
And the heavy night hung dark
The hills and waters o'er,
When a band of exiles moored their bark
On the wild New England shore.

FALL NATURE STUDY

Not as the conqueror comes,
They, the true hearted came;
Not with the roll of the stirring drums
And the trumpet that speaks of fame;
Not as the flying come,
In silence and in fear;
They shook the depths of the desert gloom
With their hymns of lofty cheer.

Amidst the storm they sang,
And the stars heard and the sea;
And the sounding aisles of the dim woods rang
With the anthems of the free.
The ocean eagle soared
From his nest by the white waves foam;
And the rocking pines of the forest waved—
This was their welcome home.

There were men with hoary hair
Amidst that Pilgrim band;
Why had they come to wither there,
Far from their childhood's land?
There was woman's fearless eye,
Lit by her deep love's truth;
There was manhood's brow serenely high
And the fiery heart of youth.

What sought they thus afar?
Bright jewels of the mine?
The wealth of seas, the spoils of war?
They sought a faith's pure shrine.
Ay, call it holy ground,
The soil where first they trod!
They have left unstained what there they found
Freedom to worship God!

—Felicia Hemans.

By reading, re-reading and questioning help children to catch the spirit of Mrs. Heman's poem.

NATURE STUDY

THANKSGIVING HYMN

(TUNE—"AMERICA.")

The God of harvest praise;
In loud thanksgiving raise
Heart, hand and voice,
The valleys laugh and sing,
Forests and mountains ring,
The plains their tribute bring,
The streams rejoice.

Then God of harvest praise;
Hands, hearts and voices raise,
With sweet accord;
From field to garner throng,
Bearing your sheaves along,
And in your harvest song,
Bless ye the Lord.

—JAS. MONTGOMERY.

A THANKSGIVING

For the wealth of pathless forests,
Whereon no axe may fall;
For the winds that haunt the branches;
The young bird's timid call;
For the red leaves dropped like rubies
Upon the dark green sod;
For the waving of the forests,
I thank Thee, O my God!

For the sound of waters gushing
In bubbling beads of light;
For the fleets of snow-white lilies
Firm-anchored out of sight;
For the reeds among the eddies;
The crystal on the clod;
For the flowing of the rivers,
I thank Thee, O my God!

For the rosebud's break of beauty
Along the toiler's way;
For the violet's eye that opens
To bless the new-born day;

FALL NATURE STUDY

For the bare twigs that in summer
  Bloom like the prophet's rod;
For the blossoming of flowers,
  I thank Thee, O my God!

For the lifting up of mountains,
  In brightness and in dread;
For the peaks where snow and sunshine
  Alone have dared to tread;
For the dark of silent gorges,
  Whence mighty cedars nod;
For the majesty of mountains,
  I thank Thee, O my God!

For the splendor of the sunsets,
  Vast mirrored on the sea;
For the gold-fringed clouds that curtain
  Heaven's inner mystery;
For the molten bars of twilight,
  Where thought leans, glad, yet awed;
For the glory of the sunsets,
  I thank Thee, O my God!

For the earth, and all its beauty;
  The sky, and all its light!
For the dim and soothing shadows
  That rest the dazzled sight;
For unfading fields and prairies,
  Where sense in vain has trod;
For the world's exhaustless beauty,
  I thank Thee, O my God!

For an eye of inward seeing;
  A soul to know and love;
For these common aspirations,
  That our high heirship prove;
For the hearts that bless each other
  Beneath Thy smile, Thy rod;
For the amaranth saved from Eden,
  I thank Thee, O my God!

NATURE STUDY

For the hidden scroll, o'erwritten
With one dear Name adored;
For the Heavenly in the human;
The Spirit in the Word;
For the tokens of Thy presence
Within, above, abroad;
For Thine own great gift of Being,
I thank Thee, O my God!

—LUCY LARCOM.

Teacher, read the entire poem and then read it stanza by stanza. Children describe pictures. Count the blessings named in each stanza. Meaning of eddies? rubies? scroll? mystery? aspirations? Commit sixth, seventh and eighth stanzas.

CHILDREN MEMORIZE POEM AFTER DISCUSSION.

NOVEMBER

The leaves are fading and falling,
The winds are rough and wild,
The birds have ceased their calling,
But let me tell you, my child,

Though day by day, as it closes,
Doth darker and colder grow,
The roots of the bright red roses
Will keep alive in the snow.

And when the winter is over,
The boughs will get new leaves,
The quail come back to the clover,
And the swallow back to the eaves.

The robin will wear on his bosom
A vest that is bright and new,
And the loveliest way-side blossom
Will shine with the sun and dew.

The leaves to-day are whirling,
The brooks are all dry and dumb,
But let me tell you, my darling,
The spring will be sure to come.

FALL NATURE STUDY

There must be rough, cold weather,
  And winds and rains so wild;
Not all good things together
  Come to us here, my child.

So, when some dear joy loses
  Its beauteous summer glow,
Think how the roots of the roses
  Are kept alive in the snow.

—ALICE CARY.

Why are the leaves falling? Why have the birds ceased calling? Even though the days grow darker and colder what are we sure of? What will happen when the winter is over? Name way-side blossoms to be seen this month. Find lines that tell what happens in November. Describe pictures you like best.

MEMORIZE "NOVEMBER."

* * *

Each day I find new coverlids
Tucked in, and more sweet eyes shut tight;
Sometimes the viewless mother bids
Her ferns kneel down full in my sight;
I hear their chorus of "good-night,"
And half I smile and half I weep,
Listening while they lie "down to sleep."

—HELEN HUNT JACKSON.

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Meaning of coverlids. Name "eyes" (flowers) that close in November. Meaning of "viewless mother." Why half smile and half weep?

The year has lost its leaves again,
  The world looks old and grim;
God folds his robe of glory thus,
  That we may see but Him.

—ALICE CARY.

CHAPTER III

WINTER NATURE STUDY

THE EVERGREENS

An acquaintance with the evergreens, our most beautiful winter trees, should awaken lofty ideals, strong feelings and a desire to discover the secret of their loveliness.

Preparation.—Read and discuss with children "How the Leaves Came Down." What did the bare tree say after sending the red and yellow leaves to the earth? What trees did not send their leaves away? Tell children we must discover some of the evergreens' secrets.

Field Lesson.—White Pine. Direct attention to the tree as a whole and let children compare it in a general way with the maple studied last autumn.

Emphasize symbolism and reverently lead the children to associate the pine and its relatives with the sweet story of the Christ-Child and his message of peace and love to men.

O, Christmas tree! O, Christmas tree!
A story sweet you tell to me;
You tell of that best gift to men
The Christ-Child born at Bethlehem.

O, Christmas tree! O, Christmas tree!
Your branches green I love to see;
Though years may pass and we grow old,
Your blessed tale will still be told.

—LUCY WHEELOCK.

Make a special study of the White Pine and contrast it with the Balsam Fir and the Hemlock.

The pine tree has sheltered and fed many birds and squirrels and prepared many choice gifts for man's use.

Tell children that this tall pine was once a tiny seedling. Picture some of the struggles of its early life after leaving its brown cradle in the tree, its efforts to get a foothold, the storms that it witnessed year after year. Picture its victories in bringing so much beauty to the earth in its rich, green dress; also in its mantle of spotless white after a snow-storm. Let children close their eyes and see the picture Lowell gives us.

"Every pine, and fir, and hemlock
Wore ermine, too dear for an earl,
And the poorest twig on the elm-tree
Was ridged inch deep with pearl."

A lively interest and a close sympathy with the pines will lead to many interesting discoveries. Visit the trees frequently with pupils, not to examine for them, but to direct their senses. Children will not forget the facts revealed by the tree itself.

Trunk.—Direct attention to the central shaft growing upwards, straight as an arrow. What a fine flag-staff it would make! The white pine is the tallest and most stately of all our cone-bearing trees. Let children examine the bark. It is smooth and reddish green or brown on young trees. Search for gum, moss, and lichens.

Read or tell the story of "The Amber Beads" by Jane Andrews.

Branches.—Let children show by extending their arms the horizontal branches whorled on the trunk and shortest toward the top. Direct attention to a group of trees if convenient. Visit in imagination the home of the pines. Show pictures and read for children, "By the Shores of Gitche Gumee."—Hiawatha.

Emphasize the beauty of a pine forest. The great, reddish-brown trunks pointing heavenward always, and supporting a roof of deep, restful green; the carpet of needles and cones, soft yellowish-brown and gray with an occasional touch of some bright color; the fragrance, the silence, the dim light and

the ceaseless murmuring of the wind through the needles, all combine to suggest feelings of reverence.

Leaves.—Compare shape and color of needles with leaves of maple and oak studied in autumn. Observe arrangement on branches, length of needles, and the number in a group. The soft, slender, bluish-green leaves from three to five inches long, grouped in bundles, five in a group, these bundles growing from all sides of the twigs.

The foliage is indeed beautiful.

> If Mother Nature patches the leaves of trees and vines,
> I'm sure she does her darning with the needles of the pines;
> They are so long and slender and somewhere in full view,
> She has her threads of cobweb and her thimble made of dew.
>
> —Wm. H. Payne.

Cones or Seed Cradles.—Talk with pupils about the seeds and fruit of trees previously studied. What kind of seed cradle has the oak? The chestnut? Observe arrangement of seed cradles on pines, generally near the top of the trees and near the ends of the branches. Children sing "Rock-a-by Baby on the Tree Top." The cones are from four to six inches long, slightly curved, and have strong, woody scales. Compare old cones with this year's growth. Why are the doors wide open in the old cones? The pine sent some of her children away to find new homes. Why can we not open all the cones easily? The gummy resin keeps the doors closed so that the seeds cannot get out until they are ripe. The cones mature in autumn of the second year, discharge seeds in September, and fall during the winter and spring. Find seeds in pairs at the base of the cone. Find out how many pairs of brown wings may fly away from each cradle.

Let children plant a seed and see how the tips of the needles are held together by a little cap. When the seed-cap disappears the five needles spread out. The seedlings are very delicate and must be protected from the wind and the sun.

Let children search for cones beautifully marked and carved. Tell them that sculptors noticed this beauty long ago and in many of the great cathedrals of the world we see them copied in stone and choice woods. How many beautiful patterns the Creator has given his children in trees and flowers alone!

We are told in a legend that once the pine lived on an island home and learned to sing many beautiful songs while listening to the ocean waves as they rose and fell year after year, and that this accounts for the strains of sadness we often hear while visiting the pines. The pine grosbeak, many warblers, and other birds visit the tree and sing their sweetest songs, but the pine cannot forget its island home.

What advantage has the pine as a winter tree over maples and elms? The snow sifts through the needles and enables the tree to brave most successfully the strong winds, even on the mountains.

Uses.—It contributes in so many ways to man's comfort and happiness that it is often referred to as a symbol of benevolence. It beautifies the earth when other trees are bare. The fragrance of the pines tells us of wonderful things hidden under the bark. It is one of our most valuable timber trees. The wood is compact, straight grained, and takes a high polish. It is used for building purposes, masts of ships, toys, and numberless other things. Squirrels and birds eat the seeds.

Take children on an imaginary journey to a pine forest and see the men at work cutting down the trees, hauling them to the river, and in the spring when the ice has disappeared, see the great raft floating down the river to the saw mill. What will become of them?

Children, sketch a branch containing cones and needles.

Summarize by asking a few questions. What reasons can you give why the pine is so well liked by us all? Compare the

white pine with the maple. Make the questions broad enough to include several answers.

Burroughs says in "Signs and Seasons": "How friendly the pine-tree is to man,—so docile and available as timber, and so warm and protective as shelter! Its balsam is salve to his wounds, its fragrance is long life to his nostrils; an abiding perennial tree, tempering the climate, cool as murmuring waters in summer and like a wrapping of fur in winter."

"Who shall reckon our debt to the pine? It builds us roofs; no other keeps out the sun so well. It spreads a finer than Persian mat under our feet; provides for us endless music and a balsam of healing in the air; then, when it finds us in barren places where bread is hard to get, it loads itself down with cones full of a sweet and wholesome food, and at last in its death, it makes our very hearth-stones ring with its resonant song of cheer and mirth."—HELEN HUNT JACKSON. *From Hide-and-Seek Town.* By permission Little, Brown Co. Copyrighted.

BALSAM FIR

This cone-shaped evergreen attains a height of about sixty feet. The bark is gray and smooth and is marked by blisters, from which clear resin is obtained. Canada Balsam, as it is called, is considered very valuable for its healing properties. The aromatic perfume is one of the distinguishing features of this evergreen. Balsam pillows are made from its leaves. The tree is exceedingly attractive in form and foliage. The needles are about three-fourths of an inch long, deep green and shining above and silver color below. Flowers in May and June. The cones are cylindrical, purple in color, two to four inches long, and are erect in rows on the branches.

HEMLOCK

This is the most graceful and ornamental of all the evergreens. The bark is used for tanning leather. The wood is coarse grained and is valuable only for rough boarding. The flat leaves are a deep lustrous green above, with a delicate white tint beneath; the tips of the bright green sprays are yellow green and resemble dainty tassels. The cones are bright reddish brown and are about an inch long. The branches are slender and heavily clothed with drooping foliage.

O, hemlock tree! O, hemlock tree! how faithful are thy branches!
Green not alone in summer time,
But in the winter's frost and rime!
O, hemlock tree! O, hemlock tree! how faithful are thy branches!
—H. W. LONGFELLOW.

Compare the White Pine with the Hemlock.

CHRISTMAS THOUGHTS

Christmas is very sacred and should be approached with reverence. There is no song that was ever sung or story that was ever told that brings such happiness as does the Christmas song and story.

Love, the ruling spirit of the season, should cause the child's best impulses to assert themselves in action, and influence him to look forward to Christmas as a day of great rejoicing, because of his giving, rather than receiving. Tell him why we give.

Christmas is a solemn time,
Because beneath the star,
The first great Christmas gift was given
To all men near and far.
—SELECTED.

By poem, picture, song, and story arouse the feeling of joy at Christmas time, because of the good tidings of the birth of a Redeemer.

Tell of the long ago Christmas made glorious by angelic

messengers, the wonderful lights from Heaven and the glorious song of praise to be re-echoed till the end of time.

This story of Bethlehem is one of which the world never wearies and should be told in a way that will enable the children to absorb something of the meaning of the "Light of the World" and "Love, the Greatest Gift."

O'er hill and vale, through wood and dale,
Ring out the tidings sweet again:
"Be glad; rejoice in heart and voice;
Glory to God, and peace to men."
No room within the way-side inn
Was there for Him, the Christ, the King,
But we, who know the debt we owe,
Our hearts to Him in welcome bring.
O, Babe most dear, our pleadings hear;
Dwell Thou within our lives; and be
The Light and Goal of heart and soul,
In time and through eternity.
May word and thought, and fight hard-fought
The glory of Thy name increase,
And swell the strain of glad refrain:
"On earth, to men, good will and peace!"

Donahue Magazine.—AMEDEUS.

CHRISTMAS

The moon that now is shining
In skies so blue and bright,
Shone ages since on shepherds
Who watched their flocks by night.
There was no sound upon the earth,
The azure air was still.

When lo! a white winged angel,
The watchers stood before,
And told how Christ was born on earth,
For mortals to adore;

WINTER NATURE STUDY

He bade the trembling shepherds
Listen, nor be afraid,
And told how in a manger
The glorious child was laid.

When suddenly in the Heavens
Appeared an angel band,
(The while in reverent wonder
The Syrian shepherds stand.)
And all the bright host chanted
Words that shall never cease,
Glory to God in the highest,
On earth good-will and peace!

—ADELAIDE PROCTOR.

THE THREE KINGS

Who are these that ride so fast? They are Eastern monarchs three,
Who have laid aside their crowns, and renounced their high degree;
The eyes they love, the hearts they prize, the well known voices kind,
Their peoples' tents, their native plains, they've left them all behind.
The very least of faith's dim rays beamed on them from afar,
And that same hour they rose from off their thrones to track the star;
They cared not for the cruel scorn of those who called them mad;
Messia's star was shining, and their royal hearts were glad.
Oh glory be to God on high for these Arabian kings,
These miracles of royal faith, with Eastern offerings;
For Gaspar and for Melchior and Balthazzar, who from far,
Found Mary out and Jesus by the shining of a star!

—FREDERICK W. FABER.

Dickens' "Christmas Tree" will suggest many beautiful pictures.

NOTE.—The teacher should make special preparation for this most important of all stories by studying Bible chapters in which Christ's birth is recorded—pictures of "Holy Night," "The Shepherds," "The Wise Men" and the geography of the Holy Land.

NATURE STUDY

A CHRISTMAS TREE

* * * * Straight in the middle of the room, cramped in the freedom of its growth by no encircling walls or soon-reached ceiling, a shadowy tree arises; and looking up into the dreamy brightness of its top I look into my youngest Christmas recollections! * * * * But hark! The Waits are playing, and they break my childish sleep! What images do I associate with the Christmas music, as I see them set forth on the Christmas Tree? Known before all the others, keeping far apart from all the others, they gather round my little bed. An angel speaking to a group of shepherds in a field; some travelers, with eyes uplifted, following a star; a baby in a manger; a child in a spacious temple, talking with grave men; a solemn figure, with a mild and beautiful face, raising a dead girl by the hand, again, near a city gate, calling back the son of a widow, on his bier, to life; a crowd of people looking through the open roof of a chamber where he sits, and letting down a sick person on a bed, with ropes; the same in a tempest, walking on the water to a ship; again on a sea-shore, teaching a great multitude; again with a child upon his knee, and other children round; again, restoring sight to the blind, speech to the dumb, hearing to the deaf, health to the sick, strength to the lame, knowledge to the ignorant; again, dying upon a cross, watched by armed soldiers, a thick darkness coming on, the earth beginning to shake, and only one voice heard. "Forgive them, for they know not what they do!" * * * * A moment's pause, O vanishing tree, of which the lower boughs are dark to me as yet, and let me look once more! I know there are blank spaces on thy branches, where eyes that I have loved have shone and smiled; from which they are departed. But, far above, I see the Raiser of the dead girl and the widow's son; and God is good! * * * * O may I, with a gray head, turn a child's heart to that figure yet, and a child's trustfulness and confidence. * * * *

Teacher read, explain and lead children to describe the scenes associated with the Christmas music. Let each one tell which scene he likes best. Show pictures: Holy Night—Correggio, Christmas Chimes—Blashfield, Madonnas—Raphael, Shepherds—Plockhorst, Nativity—Lerolle.



HOLY NIGHT—*By Antonio Allegri (Correggio)*

CORREGGIO'S HOLY NIGHT.

An old German Christmas carol interprets this beautiful picture.

Silent night! Holy night!
All is calm, all is bright!
Round you, virgin mother and child;
Holy infant, so tender and mild,
Sleep in heavenly peace.

Silent night! Holy night!
Shepherds quake at the sight,
Glories stream from Heaven afar,
Heavenly hosts sing alleluia,
Christ the Savior is born!

Silent night! Holy night!
Son of God, love's pure light
Radiant beams from Thy holy face
Jesus, Lord, at Thy birth.

Correggio has been called a painter of "light and space and motion." Compare "Holy Night" with the word picture.

Mary and Joseph had come to Bethlehem to pay the taxes exacted by the ruler. "There was no room for them in the inn" because so many people had come to the town on the same mission. An angel made known the birth of Christ to some shepherds on the neighboring hill-side. Suddenly there was with the angel a multitude of the heavenly host praising God. The shepherds, guided by the star, hurried to Bethlehem, where they found the Divine Child wrapped in swaddling clothes and lying in a manger. In the picture you see the shepherds paying homage to the new-born King.

Observe the bright light in the center of the picture, the surrounding darkness and the beautiful spiritual face of the mother. The Holy Child is the source of illumination in the picture. The symbolic meaning is plain—"Christ is the Light of the World." When Titian saw Correggio's paintings he declared that if he were not Titian he would wish to be Correggio.

NATURE STUDY

LEARN THIS POEM BY HEART:

LITTLE TOWN OF BETHLEHEM

O, little town of Bethlehem!
How still we see thee lie;
Above thy deep and dreamless sleep
The silent stars go by:
Yet in thy dark street shineth
The everlasting Light;
The hopes and fears of all the years
Are met in thee to-night.

How silently, how silently,
The wondrous gift is given;
So God imparts to human hearts
The blessings of His heaven,
No ear may hear His coming,
But in this world of sin,
Where meek souls will receive Him still
The dear Christ enters in.

For Christ is born of Mary,
And gathered all above,
While mortals sleep, the angels keep
Their watch of wondering love.
O, morning stars together
Proclaim the holy birth!
And praises sing to God the King!
And preach to men on earth.

O, Holy Child of Bethlehem!
Descend to us we pray!
Cast out our sin and enter in.
Be born in us to-day,
We hear the Christmas angels,
The great glad tidings tell,
O, come to us, abide with us,
Our Lord Emanuel.

—PHILLIPS BROOKS.

CHILDREN REPRODUCE STORY AFTER DISCUSSION.

THE STRANGE CHILD'S CHRISTMAS

There went a stranger child, as Christmas eve closed in,
Through the streets of a town whose windows shone
With the warmth and light within.

It stopped at every house, the Christmas tree to see,
On that festive night when they shone so bright,
And it sighed right bitterly.

Then wept the child, and said: "This night hath every one
A Christmas tree that he glad may be
And I alone have none.

"Ah, when I lived at home, from brother's and sister's hand
I had my share; but there's none to care
For me in the stranger's land.

"Will no one let me in? No presents I would crave,
But to see the light and the tree all bright,
And the gifts that others have."

At shutter and door and gate, it knocked with a timid hand,
But none will mark, where alone in the dark,
The little child doth stand.

Each father brings home gifts, each mother kind and mild;
There is joy for all, but none will call
And welcome that lonely child.

"Mother and father are dead—O, Jesus, kind and dear,
I've no one now, there is none but Thou,
For I am forgotten here."

The poor child rubs its hands, all frozen and numbed with cold,
And draws round its head with shrinking dread,
Its garments worn and old.

But see—another child comes gliding through the street,
And its robe is white, in its hand a light,
It speaks and its voice is sweet.

"Once on this earth a child, I lived as thou livest yet,
Though all turn away from thee to-day,
Yet I will not forget.

NATURE STUDY

"Each child with equal love, I hold beneath my care,—
In the street's dull gloom, in the lighted room,
I am with them everywhere.

"Here in the darkness dim, I'll show thee child, thy tree;
Those that spread their light through the chambers bright,
So lovely scarce can be."

And with its white hand, points the Christ-child to the sky.
And lo! afar, with each lamp a star,
A tree gleamed there on high.

So far and yet so near, the light shone overhead;
And all was well, for the child could tell
For whom that tree was spread.

It gazed as in a dream, and angels bent and smiled,
And with outstretched hands, to the brighter land,
They carried the stranger child.

And the little one went home with its Savior Christ to stay,
All the hunger and cold and the pain of old
Forgotten and passed away.

—*Classic Stories for the Little Ones.*

What do we learn regarding the stranger child in the first three stanzas? In the next four? Which stanza tells about his friends and his sufferings? Describe the Child that came to meet him. What did he say and do? Compare the pictures in the first three stanzas with the pictures in the last three.

CHRISTMAS EVE

God bless the little stockings all over the land to-night
Hung in the choicest corners, in the glory of crimson light.
The tiny scarlet stockings, with a hole in the heel and toe,
Worn by the wonderful journeys that the darlings have to go.
And Heaven pity the children, wherever their homes may be,
Who wake at the first gray dawning, an empty stocking to see.

—SELECTED.

FOR DISCUSSION AND REPRODUCTION

THE CHRISTMAS BELLS

Many, many years ago in a far away land, stood a beautiful church. On top of the church was a great tall steeple, and in the steeple hung three bells. There was a great iron bell that said, "Clang! Clang! Clang!" a smaller bell that said, "Cling! Cling! Cling!" and a tiny silver bell that said, "Ting! Ting! Ting!" When Christmas came the bells all rang out in chorus the glad tidings of peace and good will. But one Christmas day something dreadful happened—no bells were heard ringing out across the snow. Year after year passed by and on each Christmas day the people gathered at the church bringing beautiful gifts, but the bells did not ring. At last there was only one old man who could remember the time when the bells had tolled the Christmas story, and indeed many people said that the bells had never rung.

Not far from the church lived a dear little boy named Pedro, and with him "Little Brother." One day an old lady gave Pedro a lily bulb and told him to plant it and some day it would grow into a beautiful lily. So Pedro watered and watched the bulb until at last he saw two tiny green leaves peeping from the dark earth. How happy he was and how happy Little Brother was too. They cared for it very tenderly and on Christmas day a beautiful blossom unfolded its white petals.

Early in the morning the people began to gather at the church, bringing their gifts to place on the altar, for it was the birthday of the Christ-Child. Pedro looked at his lily and said: "Little Brother, we, too, may take an offering to the church to-day," and he gazed wistfully at the tall church spire. "Surely Christ would love the beautiful flower."

So they took the lily, wrapped it securely to protect it from the cold, and started for the church. As they trudged along they heard a pitiful sound, and looking down in the snow, found a poor little bird almost dead from cold and hunger. Pedro gave the lily to Little Brother to carry to the church while he returned home with the bird.

When Little Brother entered the church he found it filled with people, so he stole very softly to a seat and waited. At last all was ready. Then the people began to bring their offerings.

First came the king, and with majestic step walked to the altar. He took from his head his beautiful jeweled crown, laid it upon the altar.

The people waited—but the bells did not ring. Next came the queen, and with proud and haughty step walked up the aisle and placed her beautiful jewels upon the altar, and the people waited—but the bells did not ring. Next came the soldiers in their bright uniforms and brought their swords to lay upon the altar, and still the bells did not ring.

At last all had taken their offerings—all except Little Brother. The altar was piled with beautiful gifts and the people had all hoped that once more the bells might ring. Then Little Brother looked at the lily and thought how sad Pedro would feel when he found that it had not been offered to the Christ-Child, for no one had brought a flower that day—only gold and silver and jewels.

Then Little Brother took the lily and going timidly up the aisle he placed it upon the altar. Some of the people smiled, for it was such a little thing, they said. But just as Little Brother turned to go back to his place something very wonderful happened—the bells began to ring. The great iron bell said, "Clang! Clang! Clang!" and the smaller bell said, "Cling! Cling! Cling!" and the tiny silver bell said, "Ting! Ting! Ting!" Little Brother ran from the church to tell Pedro the glad news —his lily had made the bells ring and together they stood in the snow and listened and then went joyfully back to their cottage.

Many years after, Pedro grew to be a wonderful musician. When he was asked who taught him this beautiful music he would say: "The bells brought me the message when they rang out across the snow that happy Christmas-day."

Adapted by Grace Sullivan.

Teacher, tell the story and lead pupils to reproduce it and discover the beautiful meaning.

The whole world is a Christmas tree,
And stars its many candles be,
O, sing a carol joyfully,
The world's great feast in keeping;
For once on a December night,
An angel held a candle bright,
And led three wise men by its light,
To where a Child was sleeping.

—SELECTED.

POEM FOR READING AND DISCUSSION:

A JEWISH LEGEND

I like the old, kind legend, not found in Holy Writ,
And wish that John or Matthew, had made Bible out of it.
But though it is no gospel, there is no law to hold
The heart from growing better, that hears the story told:—

How the little Jewish children, upon a summer day,
Went down across the meadows with the Christ-Child to play.
And in the gold-green valley, where low the reed-grass lay,
They made them mock mud-sparrows, out of the meadow clay.

So, when these all were fashioned, and ranged in rows about,
"Now," said the little Jesus, "we'll let the birds fly out."
Then all the happy children, did call and coax and cry—
Each to his own mud-sparrow: "Fly, as I bid you! Fly!"

But earthen were the sparrows, and earth they did remain,
Though loud the Jewish children, cried out, and cried again—
Except the one bird only, the little Lord Christ made;
The earth that owned Him Master,—His earth heard and obeyed—

Softly He leaned and whispered, "Fly up to Heaven! Fly!"
And swift His little sparrow, went soaring to the sky.
And silent all the children stood, awestruck, looking on,
Till, deep into the heavens, the bird of earth had gone.
Our souls are like the sparrows, imprisoned in the clay;
Bless Him who came to give them wings, upon a Christmas day!

—ELIZABETH STUART PHELPS (MRS. WARD.)

Houghton, Mifflin & Co.

Where were the Jewish children? What did they do? What did the Christ-Child say? Do you see the children? Explain the last stanza.

Teacher, tell the story and lead children to reproduce it after thoughtful discussion.

St. Christopher

A great Italian artist named Titian painted the picture of Saint Christopher on the wall of the Dodge's palace in Venice.

The picture was so placed that the Dodge must look upon it every morning when he left his room. Near the painting the following words were written, "Whoever shall behold the image of St. Christopher, on that day shall not faint or fail."

Helen Hunt Jackson says:

"For many a year Saint Christopher
Served God in many a land;
And master painters drew his face,
With loving heart and hand,
On altar fronts and churches' walls;
And peasants used to say,
To look on good Saint Christopher
Brought luck for all the day." * * *

—*By permission of Little, Brown & Co.*

LEGEND OF SAINT CHRISTOPHER

St. Christopher wandered far and near in search of the greatest king and was determined to obey no other. After serving various masters, whom in turn he deserted because each recognized a ruler greater than himself, he heard of Christ, the king of heaven and earth, and begged a holy hermit to tell him where to find Christ and how he might serve Him. The hermit said:

"Knowest thou a certain river, stony, and wide, and deep, and often swollen by the rains, so that many people perish who attempt to pass over?"

And Saint Christopher answered, "I know it."

Then said the hermit, "Go to that river, and use thy strength to aid and to save those who struggle with the stream, and those who are about to perish." To which Christopher replied joyfully, "This I can do."

So he went as the hermit had directed, and he dwelt by the side of the river; and having rooted up a pine tree from the forest—so strong he was and tall,—he used it for a staff to support and guide his steps; and he aided those who were about to sink, and the weak he carried on his shoulders across the stream; and by day and by night he was always ready for his task, and failed not, and was never weary while helping those who needed help.

Christopher one night heard a voice which called to him from the shore; it was the plaintive voice of a child, and it seemed to say: "Christopher, come forth and carry me over!"

And he rose and looked out, but he saw nothing; then he lay down again; but the voice called to him in the same words a second and a third time; and the third time he sought round about with a lantern;

and at length he beheld a little child sitting on the bank, who entreated him, saying, "Christopher, carry me over this night."

And Christopher lifted the child on his strong shoulders, and took his staff and entered the stream.

And the waters rose higher and higher; and the waves roared, and the wind blew; and the infant on his shoulders became heavier and heavier, 'till it seemed to him that he must sink under the great weight; and he began to fear. But nevertheless, taking courage and staying his tottering steps with his palm-staff, he at length reached the opposite bank; and when he had laid the child down, safely and gently, he looked upon him with astonishment and he said:

"Who art thou, child, that hath placed me in such peril? Had I carried the whole world on my shoulders the burden had not been heavier!"

And the child replied:

"Wonder not, good Christopher; for thou hast not only borne the world, but Him who made the world, upon thy shoulders. Me wouldst thou serve in this work of charity; and, behold, I have accepted thy service and thee; plant thy staff in the ground, and it shall put forth leaves and fruit!"

Christopher did so, and the dry staff flourished as a palm-tree in the season, and was covered with clusters of fruit; but the Divine Child vanished.

(Adapted.)—Miss Wiltse Kindergarten Stories.

HIAWATHA

The poetic side of Indian life so beautifully portrayed in Longfellow's poem, appeals to children and little effort is required to lead them to find

"Tongues in trees
Books in running brooks, sermons in stones
And good in everything."

Hiawatha's knowledge of his environment is an inspiration and cannot fail to stimulate a desire to learn the secrets of the flowers, the birds and the beasts that the little Indian boy knew.

NATURE STUDY

The poet's description of Hiawatha's home, childhood, and school, suggest many beautiful pictures of Nature, and also tell us how this child of the forest learned his lessons.

By reading, conversation, and pictures help the children to see the wigwam, the Big-Sea Water, and the dark and gloomy pine trees. Children, compare Hiawatha's home with their homes.

Location, size, material, furniture, comfort, etc.

Compare Hiawatha's food with theirs as to ways of obtaining, preparing and serving it. Study fish, maple-sugar, and corn.

Compare Hiawatha's clothing with that of the children in school as to material, durability and beauty. Visit the forest in imagination and see the animals that Hiawatha knew; the plants. Compare animals that live in the forest with those that live in the water. Compare beauty of the forest with beauty of the lake. Compare uses of each to man.

Locate a linden, a pine, and other trees that Hiawatha knew, and compare linden with pine.

Describe Hiawatha's lamp (fire-fly). How did Nokomis heat the wigwam? What did this little boy hear and see on summer evenings?

MEMORIZE:

HIAWATHA'S SCHOOL

Then the little Hiawatha
Learned of every bird its language;
Learned their names and all their secrets;
How they built their nests in summer,
Where they hid themselves in winter;
Talked with them where'er he met them,
Called them "Hiawatha's Chickens."

Of all the beasts he learned their language;
Learned their names and all their secrets;
How the beavers built their lodges;
Where the squirrels hid their acorns;

WINTER NATURE STUDY

How the reindeer ran so swiftly;
Why the rabbit was so timid;
Talked with them where'er he met them,
Called them "Hiawatha's Brothers."

What did Nokomis and Iagoo teach Hiawatha? Children compare Hiawatha's school with their own as to size, comfort, subjects taught, etc.

What can you tell of the animals named in the poem?

Hiawatha learned his lessons on the lake, on the river, and in the fields.

The whispering of the wind through the branches, the clouds, the stars, the rainbow—everything in nature delighted him.

Let children compare the birds that Hiawatha knew with the birds they know.

Study clouds, frost, snow, rain, and make a weather report each day.

Emphasize the thought of co-operation in nature—sunshine, soil, rain, working together to build up the forest, the forest contributing food and shelter for animal life.

Children compare their friends with those of Hiawatha and their games with those of the Indians.

Compare industrial life of Indians with ours,—dishes of horn, shell, clay, etc. Hiawatha's canoe compared with our cars and steamboats. Study life history of material used by Hiawatha for food and clothing.

Children reproduce by drawing, modeling or painting the objects studied and commit description of home, school, social and industrial life.

INDIAN CRADLE SONG

Swing thee low, in thy cradle soft,
Deep in the dusky wood;
Swing thee low and swing aloft;
Sleep as a pappoose should,
For safe in your little nest,
Quiet will come, and peace and rest,
If the little pappoose is good. * * *

What message had the rainbow for Hiawatha?

This is the message it has for us:

Yet not alone to charm thy sight
Was given the vision fair;—
Gaze on that arch of color'd light,
And read God's mercy there.
It tells us that the mighty deep,
Fast by th' Eternal chain'd,
No more o'er earth's domains shall sweep,
Awful and unrestrain'd.
* * * *

—SELECTED.

THE CAT

Aim.—To guide children into the careful observation of the domestic animals.

Preparatory Work.—Give children definite questions to answer by studying the cat at home. Tell how the cat drinks. Tell how she finds and catches her food. Watch her at play and describe her movements. Examine her eyes in the dark and tell how they look. How do you know when she is angry? when she is pleased? Can you tell when she is hungry? How? Watch her washing herself and tell how she does it. Examine her feet and tell how it is that she can walk so quietly. Have you seen her climbing? How are her claws



FOUR LITTLE SCAMPS ARE WE—*By J. Adam*

fitted for climbing? How are her teeth fitted for tearing flesh? Have you seen a mother cat caring for her kittens? How did she carry them? wash them?

Observe the flexibility of the joints. Note the ease with which she jumps and springs.

Repeat:

"And often we run races,
And play at hide and seek;
Or she will climb the cherry tree
And through the branches peep."

Give children an opportunity to tell interesting things about their kittens—how they care for them, play with them, etc.

TELL THE STORY OF

"THE CAT AND THE MONKEY."

Once upon a time a cat and a monkey lived in the same family. One day as they were walking together, they saw some chestnuts roasting in a hot fire. The monkey said, "There, my friend, is an excellent dinner for us. It is a good thing that you have such fine paws. No animal in the world has paws so well adapted for getting chestnuts out of the fire. I am always ashamed of my clumsy claws. You use your paws so gracefully, I love to watch you. Hurry and pull out the nuts and you shall have half of them." Pussy was very much flattered, and thrust her paws into the hot fire, burning them severely, of course.

The monkey began to eat the chestnuts as fast as the cat pulled them out of the ashes, and when pussy was ready for her dinner the chestnuts were all gone, the monkey had eaten every one of them.

Children, tell the meaning of this fable.

After the children have observed the cat at home for a week or so and described her manner of eating, climbing, playing, etc., request one of the pupils to bring her kitten to school.

Study structure of the body and lead children to see how well adapted each part of the body is for its use.—Smooth pads or cushions on the under side of her paws so that she can move noiselessly. Why is that necessary? Each toe has a very strong, sharp claw. She stretches out her claws when she wishes to seize her prey, or to defend herself.

Her long whiskers (feelers) help her to feel her way in the dark.

The erect ears enable her to catch sounds quickly when she is hunting for food.

The teeth are long and sharp. Four of them, two in each jaw, are very strong and sharp pointed "tearing teeth."

The tongue is covered with sharp points which enable her to tear the flesh from the bone. She can bend her tongue into a form almost like a spoon, when she laps milk.

The pupil of her eye is round and large in the dark, and long and narrow in bright light.

She can brush her fur with her tongue and comb it with her paws.

Examine her soft warm fur. Let children tell about the color of different cats. Watch the cat playing with a ball or string, and see how the fore legs are fitted for catching things quickly.

Tell children about the old cat that was so noted for killing mice. The mice held a council. One said, "Let us hang a bell on the cat's neck." Excellent plan all agreed. They found a bell. Who will hang it on her neck? "I am lame and cannot run fast enough," said one. "I have too many home duties," said another. Finally all stole quietly away and nothing more was heard about belling the cat.

KITTEN PLAYING WITH LEAVES

See the kitten! how she starts!
Crouches, stretches, paws, and darts
First at one, and then its fellow,
Just as light and just as yellow!
There are many now; now one;
Now they stop, and here are none;
What intenseness of desire
In her upward eye of fire!
* * * —WORDSWORTH.

Let pupils compare the cat with the dog,—characteristics, food, service they render, etc.

Tell children about the St. Bernard, Newfoundland, Eskimo, and other interesting dogs.

WATER

ITS FORMS AND USES

Aim.—To help children to appreciate the beauty and the importance of water.

To furnish a basis for geography work.

Suggestions.—Informal talks with pupils, to impress the thought of the dependence of all life on water.

Lead children to tell ways in which it is useful to animal and plant life, to the soil, and to the air.

Great interest may be awakened in the subject by having a few simple experiments performed to show the importance of the dissolving and penetrating power of water (soil, salt, sugar, etc.).

EVAPORATION

Direct attention to the changing of water into water-dust, which is visible, and into vapor, which is invisible. Lead pupils to discover the effect of heat in increasing evaporation.

A bottle of water, a small oil stove or alcohol lamp, a shallow dish, and three or four jelly glasses are all the apparatus required.

Call attention to the drying of clothes, the disappearance of water on pavements, streets, and roads after a rain.

Heat water and observe rising of air bubbles, evaporation, formation of clouds, etc. Heat changes the water into vapor, and vapor gives rise to mist, clouds, rain, dew, fog, and frost.

Let children fill several glasses with water, cover one, put one in the sun, one in the shade, pour a glass of water into a shallow dish and leave it in the sun. Account for the difference in the amount of water in the four dishes after a day or two. Let children report their observations and help to perform many experiments illustrating evaporation.

Hold a cold plate in vapor, or "water-dust" and note what happens.

Bring a pitcher of ice water into a warm room and see how quickly a fine film of mist is formed on the outside—watch the tiny particles of water unite, form large drops, and trickle down the side of the pitcher. Insist upon personal observation. When the invisible vapor in the air becomes visible, it is said to be condensed.

Children, watch the cloud rising from a locomotive and report appearance and movements.

The sun's heat causes constant evaporation from the surface of all bodies of water exposed to its rays.

Water vapor is lighter than the atmosphere and is continually rising into colder regions where it is condensed (clouds).

The observation in the home of what may be seen on washday will help children to understand the formation of clouds, fog, dew, etc.

DEW

When is dew formed and where does it come from? Have you seen dew-drops sparkling upon the grass? upon cobwebs? Review evaporation and condensation. Does the dew form on windy or calm nights? on clear or cloudy nights?

Dew comes from the air by condensation as the mist formed upon the pitcher in the warm room.

CLOUDS

Children will delight in discovering palaces, cities, mountains, and animals in the clouds. Observe the colors in the sky at sunset, sunrise, and before and after a storm. Where do the clouds come from? Have you ever seen clouds in the house? Have you seen clouds moving in different directions at the same time? Have you seen the "silver lining"?

Tell the story of Franklin and his kite.

Direct attention to the different kinds of clouds—feather or cirrus clouds, rain or nimbus clouds, etc.

Uses—They beautify the world, they hold the sun's hot rays and thus make the earth cooler for us, and produce by condensation rain and snow.

Older children memorize two or three stanzas of Shelley's "The Cloud" after thoughtful discussion.

THE CLOUD

I bring fresh showers for the thirsting flowers
From the sea and the streams;
I bear light shade for the leaves when laid
In their noonday dreams.
From my wings are shaken the dews that waken
The sweet birds every one,
When rocked to rest on their Mother's breast,
As she dances about the sun.
I wield the flail of the lashing hail
And whiten the green plains under,
And then again I dissolve it in rain,
And laugh as I pass in thunder.

I sift the snow on the mountains below,
And the great pines groan aghast;
And all the night 'tis my pillow white,
While I sleep in the arms of the Blast.
That orbed maiden with white fire laden
Whom mortals call the Moon,
Glides glimmering o'er my fleece-like floor
By the midnight breezes strewn;
And wherever the beat of her unseen feet,

Which only angels hear,
May have broken the woof of my tent's thin roof
The Stars peep behind her and peer,
And I laugh to see them whirl and flee
Like a swarm of golden bees,
When I widen the rent in my wind-built tent—
Till the calm rivers, lakes, and seas,

Like strips of the sky fallen through me on high,
Are each paved with the moon and these.
I bind the Sun's throne with a burning zone,
And the Moon's with a girdle of pearl;
The volcanoes are dim, and the stars reel and swim,
When the whirlwinds my banner unfurl.
From cape to cape with a bridge-like shape,
Over a torrent sea,
Sun-beam proof, I hang like a roof;
The mountains its columns be.
The triumphal arch through which I march,
With hurricane, fire and snow,
When the Powers of the air are chained to my chair
Is a million-colored bow;
The Sphere-fire above, its soft colors wove,
Whilst the moist Earth was laughing below.
I am the daughter of Earth and Water,
And the nursling of the Sky;
I pass through the pores of the ocean and shores;
I change, but I cannot die.

—Percy Bysshe Shelley.

What does the cloud do for the earth? the sun? the moon? Which stanza do you like best?

CLOUDS

Plump little baby clouds, dimpled and soft,
Rock in their air cradles swinging aloft.
Snowy cloud mothers, with broad bosom white,
Watch o'er the baby clouds, slumbering light.
Tired little baby clouds, dreaming of fears,
Turn in their air-cradles, dropping soft tears.
Great snowy mother clouds, brooding o'er all,
Let their warm mother tears tenderly fall.

FROST

Recall what children learned about evaporation and condensation in preceding lessons.

Observe, when possible, the frost work growing or spreading over the window-panes.

WINTER NATURE STUDY

Find trees, ferns and flowers in the frost pictures. What is Jack Frost sometimes called?

This poem tells us about his work:

If a wooden pail is partly filled with a mixture of salt and finely chopped ice it will soon become coated with star-like frost crystals. Children, observe beauty.

What is the difference between dew and frost? Frost is vapor condensed to the solid instead of to the liquid form.

Does the frost ever do harm?

What good does it do?

THE LITTLE ARTIST

Oh, there is a little artist
  Who paints in the cold night hours
Pictures for wee, wee children,
  Of wondrous trees and flowers—
Pictures of snow-capped mountains
  Touching the snow-white sky;
Pictures of distant oceans,
  Where pigmy ships sail by;
Pictures of rushing rivers,
  By fairy bridges spanned;
Bits of beautiful landscapes,
  Copied from elfin land.
The moon is the lamp he paints by,
  His canvas the window-pane,
His brush is the frosen snow-flake;
  Jack Frost is the artist's name.

—SELECTED.

Decorates trees and grasses with diamonds, makes fairy pictures on our windows, makes all the snow-flakes. Improves some fruits. Forms the beautiful cirrus clouds.

Children, sketch pictures.

The frost breaks up the ground for the farmer. Breaks up the rocks to help form soil. Helps to open nuts for the children and the squirrels. Tells the trees and the flowers when it is time to rest. Covers ponds and rivers with ice. Emphasize beauty in discussing the work of the frost. This picture is worthy of special study.

"The little brook heard it and built a roof
'Neath which he could house him, winter proof;
All night by the white stars' frosty gleams
He groined his arches and matched his beams;
Slender and clear were his crystal spars
As the lashes of light that trim the stars;
He sculptured every summer delight
In his halls and chambers out of sight;

Sometimes his tinkling waters slipt
Down through a frost-leaved forest crypt,
Long, sparkling aisles of steel-stemmed trees
Bending to counterfeit a breeze;
Sometimes the roof no fretwork knew
But silvery mosses that downward grew;
Sometimes it was carved in sharp relief
With quaint arabesques of ice fern leaf;
Sometimes it was simply smooth and clear
For the gladness of heaven to shine through, and here
He had caught the nodding bulrush-tops
And hung them thickly with diamond drops,
That crystalled the beams of moon and sun,
And made a star of every one;
No mortal builder's most rare device
Could match this winter-palace of ice.—J. R. LOWELL.

From the Vision of Sir Launfal.

Why did the frost build the ice palace? When did he work? Do you see the aisles? the arches? the roof? How did the roof look sometimes? Have you heard of the Crystal Palace? Children, memorize poem.

ICE

Set a pie tin or other dish containing water on the window sill where the sun does not shine, and let children watch water freeze into ice.

Impress the thought contained in the following selection taken from "The Music of Nature." (Silver, Burdett Co.)

And the frost, too, has a melodious "ministry." You will hear its crystals shoot in the dead of a clear night, as if the moonbeams were splintering like arrows on the ground; and you will listen to it the more earnestly, that it is the going on of one of the most cunning and beautiful of Nature's deep mysteries. I know nothing so wonderful as the shooting of a crystal. God has hidden its principle, as yet, from the inquisitive eye of the philosopher, and we must be content to gaze on its exquisite beauty and listen, in mute wonder, to the noise of its invisible workmanship. It is too fine a knowledge for us. We shall comprehend it when we know how the morning stars sang together.

WINTER NATURE STUDY

Direct attention to the beauty and purity of the snow. Watch the falling of the flakes. Tell ways in which the snow beautifies the earth; ways in which it protects plants and animals.

Children, collect flakes on slate or on a piece of black cloth and see how many kinds you can find. Note beauty. Find pine and elm trees covered with snow and repeat stanza from Lowell's "First Snowfall." Read and discuss "Snow Bound" and "Little People of the Snow."

Let children tell about their favorite winter sports. Read "A Snow Song."

SNOW-FLAKES

Once upon a time a little raindrop thought it had played long enough up in the clouds, and said it would go down to the earth and see what good it could do. So it started.

While it was falling, it had to pass through a cloud that was very cold, and this little raindrop, instead of shrinking together as we do when we are cold, stretched out and stretched out, until it was not round any more, but was long, and thin, and hard like a needle; and that is just what it was—a little ice needle.

As it went on falling, it met another just like itself.

The second said, "Little Ice Needle, where are you going?"

"Down to the earth, to see what good I can do."

"I'll go too." So the second ice needle joined the first, and they fell together.

Pretty soon they met a third, who said, "Little Ice Needles, where are you going?"

"Down to the earth, to see what we can do."

"Then I'll go too." So it joined the others, and they fell together. Then they met another, and another, and another, who all joined them. Then there were six little ice needles falling together, and they had a new name—"Snow-flake."

Little Snow-flake met others, who asked where it was going. "Down to the earth, to see what good I can do."

"We'll go too. But where shall we go?"

"I know," said one of the little flakes. "Last summer, when I was

warm and round, I saw a place where a poor little sick boy had planted some seeds which a kind lady had given to him. Let us fall on that place and keep it warm, so that the seeds in the ground may not freeze, and the little boy may have some flowers next summer."

"O! so we will," said they all; and they fell faster and faster, so that they might get there sooner. Other snow-flakes saw them and went, too, and the ground was covered more and more thickly with snow, till there was enough to keep the seeds from freezing during the winter.

When the weather began to be warm, the snow turned into water and ran down into the earth, and the seeds drank it, and swelled and swelled, until by and by little leaves came out above the ground from each seed. Then other leaves grew, and when summer came, little Frank had his flowers again, and all because one little raindrop wanted to do some good in the world.

This is the way the snow comes down,
Softly, softly falling,
So He sendeth His snow like wool.
Soft and white and beautiful,
This is the way the snow comes down,
Softly, softly falling.—LONGFELLOW.

—JOSEPHINE JARVIS.

How does the snow help the Eskimos? Picture the life of Agoonack.

Compare the little Eskimo's life with Hiawatha's.

A SNOW SONG

There's a wonderful weaver,
  High up in the air,
And he weaves a white mantle
  For cold Earth to wear.
With the wind for his shuttle,
  The cloud for his loom,
How he weaves, how he weaves,
  In the light, in the gloom!
Oh! with finest of lace
  He decks bush and tree;
On the broad barren meadows
  A cover lays he;
Then a quaint cap he places
  On pillar and post,
And he changes the pump
  To a silent, grim ghost.

WINTER NATURE STUDY

But this wonderful weaver
  Grows weary at last,
And the shuttle lies idle
That once flew so fast.
Then the sun peeps abroad
  On the work he has done.
And cries, "I'll unravel it all,
  Just for fun."

GEO. COOPER.

He who marvels at the beauty of the world in summer will find equal cause for wonder and admiration in winter. * * Look up at the miracle of the falling snow: the air, a dizzy maze of whirling, eddying flakes, noiselessly transforming the world; the exquisite crystals dropping in ditch and gutter, and disguising in the same suit of spotless livery all objects upon which they fall. How novel and fine the first drifts! The old dilapidated fence is suddenly set off with the most fantastic ruffles, scalloped and fluted after an unheard-of fashion! Looking down a long line of decrepit stone wall, in the trimming of which the wind had fairly run riot, I saw, as for the first time, what a severe artist old winter is. Ah, a severe artist! How stern the woods look, dark and cold and as rigid against the horizon as iron. * * No longer the canvas and the pigments, but the marble and the chisel.

* * * The sunbeams are welcome now. They seem like pure electricity,—like friendly and recuperating lightening. Are we led to think electricity abounds only in summer, when we see in the storm-clouds, as it were, the veins and ore-beds of it? * * Behold the frost work on the pane,—the wild, fantastic linings and etchings! Can there be any doubt but this subtle agent has been here? Where is it not? It is the life of the crystal, the architect of the flake, the fire of the frost, the soul of the sunbeam. This crisp winter air is full of it.

* * * *

But with March our interest in winter begins to decline.

Vague rumors are afloat in the air of a great and coming change. We are eager for winter to be gone, since he, too, is a fugitive and cannot keep his place. Invisible hands deface his icy statuary; his chisel has lost its cunning. The drifts, so pure and exquisite, are now earth-stained and weather-worn, —the flutes and scallops, and fine firm lines, all gone; and what was a grace and an ornament to the hills is now a disfiguration. Like worn and unwashed linen appear the remains of that spotless robe with which he clothed the world as his bride.

But he will not abdicate without a struggle. Day after day he rallies his scattered forces, and night after night pitches his white tents on the hills, and would fain regain his lost ground; but the young prince in every encounter prevails. Slowly and reluctantly the gray old hero retreats up the mountain, till finally the south rain comes in earnest and in a night he is dead.—BURROUGHS. *Winter Sunshine.* By special permission of and arrangement with Houghton, Mifflin & Co.

RAIN

Observe the clouds before a rainstorm. Review evaporation and condensation. Children, watch the rain coming down, listen to its patter on the window, and its splash in the pond.

What do you infer respecting currents of air when you see clouds moving in one direction and at the same time other clouds moving in a different direction?

If a warm current of air comes in contact with a cold current what may happen? Which is heavier water or ice? (The vapor may be condensed into ice crystals or into mist particles. In the summer many of the clouds you see are banks of ice crystals).

What becomes of the water after a rain? A part of it changes to vapor; a part of it flows over the ground to the nearest streams, while another part sinks into the ground. Find out uses of water that sinks below the surface.

How are springs formed?

How are the roots of plants nourished? Put salt in a cup of boiling water, hold plate over cup, taste the drops of water that collect on plate.

Talk with the pupils about the work of the sun in taking up water from the ocean (evaporation).

Children, trace a raindrop from its home in the lake to the clouds and back to the earth again.

Uses of Water.—In the air? As a motive power? To plants and animals? As a means of travel? In the home? In the soil? In purifying the atmosphere? Some of the inequalities of the surface of the earth may be traced to the action of water.

WORK OF STREAMS

Field Lesson.—Direct children's attention to the work of water in carrying and depositing soil, width of river, windings, etc.

In what kind of soil does it wear most rapidly? Read:

O tell me pretty brooklet!
Whence do thy waters flow?
And whither art thou roaming,
So smoothly and so slow?
My birthplace was the mountain,
My nurse the April showers;
My cradle was a fountain
O'er curtained by wild flowers.—ANON.

Little brook that floweth by,
Under vine and willow,
Fair thou lookest on the sky,
Hastening to the billow.
Brooklet, thou and I are one,
Both in mood and motion;
Fair the fields, but brief the run
To the soundless ocean.

—DANIEL J. DONAHOE.

NATURE STUDY

SPRINGS

A spring is always a vital point in the landscape; it is, indeed, the eye of the fields. * * Here the Sunday saunterer stops and lounges with his book, and bathes his hands and face in the cool fountain. Hither the strawberry-girl comes with her basket and pauses a moment. The plowman leaves his plow, and in long strides approaches the life-renewing spot. * * Here the cattle love to pass the heat of the day, and hither come the birds to wash themselves and make themselves clean. * * It is a creative and generative center. It attracts all things to itself,—the grasses, the mosses, the flowers, the wild plants, the great trees. * * An intermittent spring is shallow; it has no deep root and is like an inconstant friend. But a perennial spring, one whose ways are appointed, one whose foundation is established, what a profound and beautiful symbol!—*From Pepacton.* JOHN BURROUGHS. By permission of and special arrangement with Houghton, Mifflin & Co.

MAKE A SPECIAL STUDY OF THIS POEM:

THE BROOK

I come from haunts of coot and hern,
  I make a sudden sally,
And sparkle out among the fern,
  To bicker down a valley.

By thirty hills I hurry down,
  Or slip between the ridges;
By twenty thorps, a little town,
  And half a hundred bridges.

I chatter over stony ways,
  In little sharps and trebles,
I bubble into eddying bays,
  I babble on the pebbles.

WINTER NATURE STUDY

With many a curve my banks I fret,
  By many a field and fallow,
And many a fairy foreland set
  With willow-weed and mallow.

I chatter, chatter, as I flow
  To join the brimming river;
For men may come and men may go
  But I go on forever.

I wind about, and in and out,
  With here a blossom sailing,
And here and there a lusty trout,
  And here and there a grayling,

And here and there a foamy flake
  Upon me, as I travel,
With many a silvery waterbreak
  Above the golden gravel.

I steal by lawns and grassy plots,
  I slide by hazel covers;
I move the sweet forget-me-nots
  That grow for happy lovers.

I slip, I slide, I gloom, I glance,
  Among my skimming swallows;
I make the netted sunbeams dance
  Against my sandy shallows.

I murmur under moon and stars
  In brambly wildernesses;
I linger by my shingly bars;
  I loiter round my cresses.

And out again I curve and flow
  To join the brimming river,
For men may come and men may go
  But I go on forever.

—TENNYSON.

A SONG OF THE SEA

The sea! the sea! the open sea!
The blue, the fresh, the ever free!
Without a mark, without a bound,
It runneth the earth's wide regions round,
It plays with the clouds, it mocks the skies,
Or like a cradled creature lies.

I love (oh! how I love) to ride
On the fierce, foaming, bursting tide
When every mad wave drowns the moon,
Or whistles aloft his tempest tune,
And tells how goeth the world below
And why the southwest blasts do blow.

—BRYAN WALTER PROCTOR (Barry Cornwall).

Henry Van Dyke writes:

A river is the most human and companionable of all inanimate things. It has a life, a character, a voice of its own, and is as full of good fellowship as a sugar-maple is of sap. It can talk in various tones, loud or low, and of many subjects, grave and gay. Under favorable circumstances it will even make a shift to sing; not in a fashion that can be reduced to notes, but in a vague, refreshing manner, and to a wandering air that goes "O'er the hills and far away."—*From Little Rivers.* HENRY VAN DYKE. Copyright, 1895, by Chas. Scribner's Sons.

APOSTROPHE TO THE OCEAN

Roll on, thou deep and dark blue ocean—roll!
Ten thousand fleets sweep over thee in vain;
Man marks the earth with ruin—his control
Stops with the shore;—upon the watery plain
The wrecks are all thy deed, nor doth remain
A shadow of man's ravage, save his own,
When for a moment, like a drop of rain,
He sinks into thy depths with bubbling groan,
Without a grave, unknelled, uncoffined, and unknown.

* * * *



AURORA—*By Guido Reni.*

And I have loved thee, ocean! and my joy
Of youthful sports was on thy breast to be
Borne, like thy bubbles, onward; from a boy
I wantoned with thy breakers—they to me
Were a delight; and if the freshening sea
Made them a terror, 'twas a pleasing fear;
For I was, as it were, a child of thee,
And trusted to thy billows far and near,
And laid my hand upon thy main—as I do here.

—LORD BYRON.

THE SUN

Behold the miracle!
Thou saw'st but now the twilight sad
And stood beneath the firmament,
A watchman in a dark gray tent,
Waiting till God create the earth,—
Behold the new majestic birth!
The mottled clouds, like scraps of woof,
Steeped in the light, are beautiful.

—EMERSON (*Sunrise*).

Direct attention to the appearance of the sky at sunrise and let children note changes that come with morning. Light, heat, birds, etc.

Sweet is the breath of Morn, her rising sweet
With charms of earliest birds; pleasant the sun
When first on this delightful land he spreads
His orient beams, on herb, tree, fruit, and flower,
Glistening with dew.

—MILTON.

Work of the Sun.—Gives beauty to earth and sky (clouds, rainbow, etc.). Recall experiments showing the influence of the sun upon vegetation.

Direct attention to the leaves of plants—arranging themselves so as to get as much light as possible.

NATURE STUDY

Repeat observations made in preceding lessons on evaporation—sun lifts water from rivers, lakes, and oceans up to the mountains, gives light and heat to all the world, and rears the whole vegetable kingdom.

"Sunbeam of summer, oh what is like thee,
Hope of the wilderness, joy of the sea?
One thing is like thee, to mortals given;
The faith touching all things with hues of heaven." * * *

—MRS. HEMANS.

Call attention to shadows.

When is your shadow longest? When is it shortest? Which way does it point in the morning? at noon?

Observe your shadow at different times during the day, for a week, and tell direction in which it falls.

THE FERRY FOR SHADOWTOWN

Sway to and fro in the twilight gray;
This is the ferry for Shadowtown;
It always sails at the end of the day,
Just as the darkness closes down.
Rock slow, more slow in the dusky light,
Silently lower the anchor down:
Dear little passenger, say "Good-night."
We've reached the harbor of Shadowtown.

—SELECTED.

THE SUN'S TRAVELS

The sun is not abed, when I
At night upon my pillow lie;
Still round the earth his way he takes,
And morning after morning makes.

While here at home in shining day,
We round the sunny garden play,
Each little Indian sleepy-head
Is being kissed and put to bed.

WINTER NATURE STUDY

And when at eve I rise from tea,
Day dawns beyond the Atlantic sea;
And all the children in the West,
Are getting up and being dressed.

Rand, McNally Co. —ROBERT LOUIS STEPHENSON.

THE SUN

"The sun comes forth;—each mountain height
Glows with a tinge of rosy light,
And flowers that slumber'd through the night
Their dewy leaves unfold;
A flood of splendor bursts on high,
And ocean's breast reflects a sky
Of crimson and of gold.

"Oh! thou art glorious, orb of day!
Exulting nations hail thy ray,
Creation swells a choral lay,
To welcome thy return;
From thee all nature draws her hues,
Thy beams the insect's wings suffuse,
And in the diamond burn."

—SELECTED.

THE SUN

Eye of thy Maker, which hath never slept
Since the Eternal Voice from chaos said,
"Let there be light!" Great monarch of the day,
* * * * Unresting orb!
Pursuest thou, mid the labyrinth of suns,
Some pathway of thine own? Say, dost thou sweep,
With all thy marshall'd planets in thy train,
In grand procession on, through boundless space,
Age after age, towards some mysterious point
Mark'd by His finger?

—SELECTED.

NATURE STUDY

THE MOON

Request children to observe the moon frequently during the month and note changes from night to night.

READ AND DISCUSS:

THE SILVER BOAT

There is a boat upon a sea;
It never stops for you or me.
The sea is blue, the boat is white;
It sails through winter and summer night.

The swarthy child in India land
Points to the prow with eager hand;
The little Lapland babies cry
For the silver boat a-sailing by.

It fears no gale, it fears no wreck;
It never meets a change or check
Through weather fine or weather wild.
The oldest saw it when a child.

Upon another sea below
Full many vessels come and go;
Upon the swaying, swinging tide
Into the distant worlds they ride.

And strange to tell, the sea below,
Where countless vessels come and go,
Obeys the little boat on high
Through all the centuries sailing by.

—SELECTED.

Compare the light of the full moon with the light of the sun. How often do we have a new moon? Draw the different shapes you have seen. Watch for the crescent of the new moon. Tell children that the sun shines on the moon and the moon sends its light to us after the sun has disappeared—shines by light reflected from the sun.

CHILDREN MEMORIZE:

THE NEW MOON

Dear mother, how pretty
The moon looks to-night!
She was never so cunning before;
Her two little horns
Are so sharp and so bright,
I hope she'll not grow any more.

If I were up there,
With you and my friends,
I'd rock in it, nicely you'd see;
I'd sit in the middle
And hold by both ends;
Oh, what a bright cradle 'twould be!

I would call to the stars
To keep out of the way,
Lest we should rock over their toes;
And then I would rock
Till the dawn of the day,
And see where the pretty moon goes.

And there we would stay
In the beautiful skies;
And through the bright clouds we would roam.
We would see the sun set,
And see the sun rise,
And on the next rainbow come home.

(Silver, Burdette & Co.) —MRS. FOLLEN.

THE STARS

Observe the stars.

Which gives us the most light, the sun or the moon? the stars or the moon? Which looks to be larger, the moon or the sun? the moon or the stars?

Some of the stars are suns, but they are far, very far away

from us. Learn to find the North Star. Do you know the Great Dipper?

Observe the number and arrangement of the stars in the Dipper. How many stars form the handle? the bowl? If one has lost his way on a clear night how may he know which star is the North Star?

* * *

Child of the earth! oh! lift thy glance
To yon bright firmament's expanse,
The glories of its realm explore,
And gaze, and wonder, and adore!
Doth it not speak to every sense
The marvels of Omnipotence?
See'st thou not there th' Almighty name
Inscribed in characters of flame?"

—MRS. HEMANS.

Recall the story of the wise men from far Eastern lands, who studied the stars so long ago and were guided to Bethlehem by that wonderful star which stood still over the place "where the Divine Child was."

The stars guide people over land and sea. On dark nights they are invaluable aids to the mariner.

MEMORIZE:

STARS

They glide upon their endless way,
Forever calm, forever bright;
No blind hurry, no delay,
Mark the daughters of the night;
They follow in the track of day,
In divine light.

Shine on, sweet orbed ones for aye;
Forever calm, forever bright;
We ask not whither lies your way,
Nor whence ye came, nor what your light,
Be still a dream throughout the day,
A blessing through the night.

—BARRY CORNWALL.

FOR REPRODUCTION:

A LEGEND OF THE GREAT DIPPER

The faces of the stars shone so brightly one night that the earth-children thought the moon was telling a pretty story. And so she was, and this is the story:

The great Dipper which you, my dear children, love to see has a deep meaning which you are not to forget as long as the stars shine. I will tell you the story.

In another world than ours, said Lady Moon, there was once great trouble and sorrow. No, it was not in the earth world, my dear, she said to a small star who always asked questions, it was not in the heaven world either, but in another far-away world, where many children lived.

For some good reason, which only the Father knows, the people and children, the animals and every living thing, were suffering great thirst; and no water, nor dew, nor a drop of moisture could they find anywhere. A little child of that world went out alone in the dry, dark night, carrying a small tin dipper, and prayed very earnestly for just that little cup of water; and when she lifted the cup, it was brimming with clear cold water, which would not spill, though she ran rapidly, her hand trembling with her faintness; for she did not taste the water, having prayed for another's need. As she ran, she stumbled and fell, for she was very weak; and when feeling about, trying to rise, she touched a little dog that seemed to be dying of thirst, and the good child poured a few drops of the precious water in the palm of her hand and let the dog lap it. He seemed as refreshed as if he had drank from a river.

The child could not see what happened to her cup; but we saw and sang for joy. The cup turned to silver, and grew larger, the water not having become less, but more, by her giving.

She hurried on to give the water to one who was quite unable to come to meet her,—none other than her own dear mother, who took the water eagerly, as one in a deadly fever, but without putting it to her lips; for she heard just then a weak moan which came from the faithful servant who tried to raise her mistress's head, but found she had not the strength. The mother pressed the dipper into the hands of the maid, and bade her drink, feeling her own life so wasted that one little cup of water could not renew it. And neither servant nor mistress noticed that the dipper changed from silver to gold, and grew larger than before.

The good servant was about to give each member of the family one spoonful of the precious water, when a stranger entered, dressed in a costume unknown in that country, and speaking in a strange tongue, but showing the same signs of thirst and distress as themselves. The

servant said, "Sacred are the needs of the stranger in a strange land," and pressed the dipper to the parched lips of the fainting man.

Then the great wonder was wrought! and the golden dipper flashed forth incrusted with the most precious diamonds, containing a fountain of gushing water, which supplied the thirsting nation, as freely and surely as it had quenched the thirst of the little dog.

And the Stranger stood before them, a glorious, radiant Being; and as He faded from their sight, a silver trumpet tone was heard to proclaim: "Blessed is he that giveth a cup of water in My name."

And the possession of a dipper blazing with diamonds is in that country a sure badge of royalty; for no one can buy or receive one as a gift, nor can fathers bequeath them to their children. Each child is given a tin dipper at its birth, and only by purely unselfish acts can a diamond one be wrought.

Some of the foolish people have not yet learned its secret, and they go about trying to exchange their tin for silver by doing kind deeds. Sometimes they accuse the Father of All very bitterly because they grow old possessing only the tin dipper; for the secret of the exchange can no more be told than the beautiful, flashing, sparkling diamonds can be purchased. Sometimes there are great surprises, when people give up the hope of such a possession, and forget themselves; for then they often find the castaway tin bearing evidence in silver, gold, or even diamonds, that they have become royal; but by that time they have no vanity because of their fortune. Only modest, thankful, brave, happy feelings possess the owners of diamond dippers.

The Lady Moon now lifted a white finger toward the east, which was growing rosy, and the baby stars all knelt a moment, looking like white-robed nuns at prayers. Then the morning wind swept aside the great blue silken curtain of the sky, and the Moon followed her children into Heaven, to do whatever the Father had planned for them while they were out shining for His earth children.

—Told by Sara Wiltse in *Stories and Morning Talks.*

What was the trouble in the far away world? What did the child do? What caused the first great change in the dipper? the second? the third? How may a diamond dipper be obtained? What lesson is taught in this story?

CHILDREN, MEMORIZE THE FOLLOWING BEAUTIFUL LULLABY. It is full of childish fancies. One of the offerings at Eugene Field's funeral was a shoe of white carnations with the words, "Wynken, Blynken, and Nod."

WYNKEN, BLYNKEN, AND NOD

Wynken, Blynken, and Nod one night
Sailed off in a wooden shoe—
Sailed on a river of crystal light,
Into a sea of dew—
"Where are you going, and what do you wish?"
The old moon asked of the three.
"We have come to fish for the herring fish
That live in this beautiful sea;
Nets of silver and gold have we!"
Said Wynken,
Blynken,
And Nod.

The old moon laughed and sang a song,
As they rocked in the wooden shoe,
And the wind that sped them all night long
Ruffled the waves of dew!
The little stars were the herring fish
That lived in that beautiful sea,—
"Now cast your nets wherever you wish—
Never afeard are we;"
So cried the stars to the fishermen three,
Wynken,
Blynken,
And Nod.

All night long their nets they threw
To the stars in the twinkling foam—
Then down from the skies came the wooden shoe,
Bringing the fishermen home;
'Twas all so pretty a sail, it seemed
As if it could not be,

And some folks thought 'twas a dream they dreamed
Of sailing that beautiful sea—
But I shall name you the fishermen three,
Wynken,
Blynken,
And Nod.

Wynken and Blynken are two little eyes,
And Nod is a little head;
And the wooden shoe that sailed the skies,
Is a wee one's trundle-bed.
So shut your eyes while mother sings
Of wonderful sights that be,
And you shall see the beautiful things
As you rock in the misty sea,
Where the old shoe rocked the fishermen three,
Wynken,
Blynken,
And Nod.

—FROM *With Trumpet and Drum*

Copyright Chas. Scribner's Sons.

CHILDREN MEMORIZE THIS POEM AFTER THOUGHTFUL DISCUSSION:

BIRDS

* * *

Do you ne'er think what wondrous beings these?
Do you ne'er think who made them, and who taught
The dialect they speak, where melodies
Alone are the interpreters of thought?
Whose household words are songs in many keys,
Sweeter than instruments of man e'er caught!
Whose habitations in the tree-tops even
Are half-way houses on the road to heaven!

Think, every morning when the sun peeps through
The dim, leaf-latticed windows of the grove,
How jubilant the happy birds renew
Their old melodious madrigals of love!
And when you think of this, remember too

WINTER NATURE STUDY

'Tis always morning somewhere, and above
The awakening continents, from shore to shore,
Somewhere the birds are singing evermore.

Think of your woods and orchards without birds!
Of empty nests that cling to boughs and beams.
You call them thieves and pillagers; but know,
They are the winged wardens of your farms,
Who from the cornfields drive the insidious foe,
And from your harvests keep a hundred harms;
Even the blackest of them all, the crow,
Renders good service as your man-at-arms,
Crushing the beetle in his coat of mail,
And crying havoc on the slug and snail.

—LONGFELLOW, *Birds of Killingworth.*

CHICKADEE

Do you know the little chickadee
In his brownish ashen coat,
With a cap sò black and jaunty
And a black patch on his throat?

—SELECTED.

The chickadee, snow-bird, bluejay, English sparrows, and a few other birds can be studied before the snow disappears.

Chickadee.—"Little friend" is what it means. Black-capped Titmouse is another name for this cheery, fearless, sociable little bird. Insects can seldom escape his bright eyes. He finds the tiny eggs hidden under the bark and destroys numberless destructive insects that live in the buds and the tender bark of trees. The nest is generally in an old knot hole and with its four or five white eggs delicately touched with pink, is very pretty. He sleeps in the thick pine shrubs, so that it is hard for the owls and other enemies to find him.

Let children watch his movements and learn as many of his habits as possible.

NATURE STUDY.

In studying a bird observe:

Length of bird.

Color,—of upper parts, lower parts, head, neck, breast, wings, tail and feet.

Beak,—shape, length and color.

Feet,—number and arrangement of toes.

Tail,—long, short, square, wide, narrow, etc.

Find out about its:

Food, disposition, habits, song.

Nest building—when, where, materials used, etc.

AN EASTERN LEGEND

There's a tender Eastern legend,
In a volume old and rare,
Of the Christ-child in his garden
Walking with the children there.
And it tells—this strange, sweet story—
(True or false, ah, who shall say?)
How a bird with broken pinion
Dead within the garden lay.

And the children, children cruel,
Lifted it by shattered wing,
Shouting, "Make us merry music,
Sing, you lazy fellow, sing."
But the Christ-child bent above it,
Took it in his gentle hand,
Full of pity for the suffering
He alone could understand.

Whispered to it—oh, so softly!
Laid his lips upon its throat,
And the song-life, swift returning,
Sounded out in one glad note.
Then away, on wings unwearied,
Joyously it sang and soared,
And the little children kneeling
Called the Christ-child "Master—Lord."

—GRACE DUFFIELD GOODWIN in *Our Dumb Animals.*



MADONNA OF THE LILY—*By Leonardo da Vinci*

Help children to understand the beautiful thought in this sweet story.

The Blue Jay.—This pretty bird is not a great favorite. Learn to recognize his song, scream, laugh, and whistle. He has many queer habits.

He stores acorns and nuts in hollow trees and has thus planted forests. Describe the blue jay and discover his good qualities.

This poem is a tribute to his beauty:

THE BLUE JAY

O, Blue Jay, up in the maple tree,
Shaking your throat with such bursts of glee,
How did you happen to be so blue?
Did you steal a bit of the lake for your crest,
And fasten blue violets into your vest?
Tell me, I pray you,—tell me true!

Did you dip your wings in azure dye,
When April began to paint the sky,
That was pale with the winter's stay?
Or were you hatched from a bluebell bright,
'Neath the warm, gold breast of a sunbeam light,
By the river one blue spring day?

O, Blue Jay, up in the maple tree,
A-tossing your saucy head at me,
With ne'er a word for my questioning,
Pray, cease for a moment your "ting-a-link,"
And hear when I tell you what I think,—
You bonniest bit of the spring.

I think when the fairies made the flowers,
To grow in these mossy fields of ours,
Periwinkles and violets rare,
There was left of the spring's own color, blue,
Plenty to fashion a flower whose hue
Would be richer than all and as fair.

NATURE STUDY

So, putting their wits together, they
Made one great blossom so bright and gay,
The lily beside it seemed blurred;
And then they said, "We will toss it in air;
So many blue blossoms grow everywhere,
Let this pretty one be a bird!"

—SUSAN HARTLEY SWETT.

THE FOLLOWING STORY IN VERSE MAY BE USED FOR REPRODUCTION:

THE SPARROWS

In the far-off land of Norway,
  Where the winter lingers late,
And longs for the singing birds and flowers
  The little children wait;

When at last the summer ripens
  And the harvest is gathered in,
And food for the bleak, drear days to come
  The toiling people win;

Through all the land the children
  In the golden fields remain,
Till their busy little hands have gleaned
  A generous sheaf of grain;

All the stalks by the reapers forgotten
  They glean to the very least,
To save till cold December,
  For the sparrows' Christmas feast.

And then through the frost-locked country
  There happens a wonderful thing;
The sparrows flock, north, south, east, west,
  For the children's offering.

Of a sudden, the day before Christmas,
  The twittering crowd arrive,
And the bitter, wintry air at once
  With their chirping is all alive.

WINTER NATURE STUDY

They perch upon roof and gable,
On porch and fence and tree,
They flutter about the windows
And peer in curiously;

And meet the eyes of the children,
Who eagerly look out
With cheeks that bloom like roses red,
And greet them with welcoming shout.

On the joyous Christmas morning,
In front of every door,
A tall pole, crowned with clustering grain,
Is set the birds before.

And which are the happiest, truly
It would be hard to tell;
The sparrows, who share in the Christmas cheer,
Or the children who love them well!

How sweet that they should remember,
With faith so full and sure,
That the children's bounty awaited them
The whole wide country o'er!

When this pretty story was told me,
By one who had helped to rear
The rustling grain for the merry birds
In Norway, many a year,

I thought that our little children
Would like to know it too,
It seems to me so beautiful,
So blessed a thing to do;

To make God's innocent creatures see
In every child a friend,
And on our faithful kindness
So fearlessly depend.

—CELIA THAXTER.

BIRDS

"I have seen no bird walk the ground with just the same air the crow does. It is not exactly pride; there is no strut or swagger in it, though perhaps just a little condescension; it is the contented, complaisant, and self-possessed gait of a lord over his domains. All these acres are mine, he says, and all these crops; men plow and sow for me, and I stay here or go there, and find life sweet and good wherever I am. The hawk looks awkward and out of place on the ground; the game birds hurry and skulk; but the crow is at home, and treads the earth as if there were none to molest or make him afraid.

The crows we have always with us, but it is not every day or every season that one sees an eagle. Hence I must preserve the memory of one I saw the last day I went bee-hunting. As I was laboring up the side of a mountain at the head of a valley, the noble bird sprang from the top of a dry tree above me and came sailing directly over my head. I saw him bend his eye down upon me, and I could hear the low hum of his plumage as if the web of every quill in his great wings vibrated in his strong, level flight. I watched him as long as my eye could hold him. When he was fairly clear of the mountain he began that sweeping spiral movement in which he climbs the sky. Up and up he went, without once breaking his majestic poise, till he appeared to sight some far-off alien geography, when he bent his course thitherward and gradually vanished in the blue depths. The eagle is a bird of large ideas; he embraces long distances; the continent is his home. I never look upon one without emotion; I follow him with my eye as long as I can. I think of Canada, of the Great Lakes, of the Rocky Mountains, of the wild and sounding sea-coast. The waters are his, and the woods and the inaccessible

cliffs. He pierces behind the veil of the storm, and his joy is height and depth and vast spaces.—*From Idyl of the Honey Bee.* JOHN BURROUGHS. By permission of and special arrangement with Houghton, Mifflin & Co. Publishers.

CHILDREN REPRODUCE STORY.

WINTER AND SPRING

Old Winter sat all alone in his hut beside a frozen river.

The winds were howling and shrieking, and the flowers had hid themselves away in the earth.

Even the big round sun had crept away toward the south, for he did not like Old Winter and the North.

One morning Old Winter heard a gentle tap at his door; a soft perfume came in upon the air.

"Ah! you have come, good Springtime," Old Winter said.

"Come in, the Red children will be glad that you have come. Sit down and let us talk together.

"I shall have to creep away to my own home very soon, now that you have come. You have never seen my home. It is very beautiful, I think, and it is white and shining. The waters have a beautiful roof over them. It is smooth, and one can see the river underneath sometimes; and when the sun looks upon it, it shines like silver."

"Of course, it is beautiful," said the Spring, "but I like mine better. There is no sparkling snow there; but we have sparkling waters. There are green leaves on the trees and the fields are full of flowers. When the soft wind comes, then the waters dance, and the grasses bend before it."

"But I have great power," Old Winter said, "for when I breathe, the rivers and the whole earth become hard."

"If I shake my long white locks of hair, then the earth is covered with glistening snow-flakes. The leaves drop from the trees and the flowers disappear."

"I, too, have power," said the Spring. "My voice is not very loud, but when I whisper, all the trees and the flowers hear me, though they are fast asleep. When I breathe, the grasses spring up and all the flowers burst forth to greet me. I shake my golden hair, and soft shadows fall upon the earth. The raindrops help the flowers and grasses to

come out into the sunlight; and the hearts of the Red Children are full of joy."

But already the sun had begun to creep back towards the north. He thought he heard the voice of Spring and was coming to see. He felt the softness in the air, and he smelled the sweetness.

The birds, too, thought they heard the voice of Spring, so they came and perched upon the roof of Old Winter's hut.

The rivers, too, had heard their names called; and already they were beginning to dance and sparkle.

There was a sweet odor, like new grass, in the hut; then Old Winter began to grow very still. "I am sleepy," he said.

By and by, the water dripped from his long, white hair, he grew very, very small and very weak, until at last no sign of Winter was left; and on the floor of the hut where he had been, sprang up a beautiful pink flower.

"It is a Spring Beauty!" the Red children say, and when they see it they rejoice, for they know that old Winter has crept away to his home, and that Spring has come to dwell in his place.

—DOROTHY BROOKS.

Describe winter and tell what he had to say about his home. What did spring say? What did the birds and the rivers do when they heard Spring calling? What happened when Winter grew small and weak? Describe the Spring Beauty.

ALMOST TIME

Almost time for the pretty white daisies
  Out of their sleep to waken at last,
And over the meadows, with grasses and clover
  To bud and to blossom, and grow so fast;
Almost time for the buttercups yellow,
  The ferns and the flowers, the roses and all,
To waken from slumber, and merrily listen
  To gladden our hearts at the spring's first call.

—SELECTED.



SPRING—*By Corot*

CHAPTER IV

SPRING NATURE STUDY

"What prodigies can Power Divine perform
More grand than it produces year by year,
And all in sight of inattentive man?"

In February and March we catch glimpses of the beauty and the glory ahead, when,

Earth is crammed with heaven,
And every bush alive with God,
But only he who sees,
Puts off his shoes.

—Mrs. Browning.

Nature's awakening is a revelation to young and old, and furnishes numberless beautiful lessons of purpose, protection, and order, lessons of beauty and unity by which the wisdom and power of the Creator are daily manifested. If, however, the unfolding buds, the fresh awakened flowers, and the joyous bird songs cause no thrill of delight in the teacher's soul; we may safely assert that she is not ready to guide, to influence the child, that poetic investigator whose every heart throb is a response, a greeting to the divine power that quickens the seed, the bud—all things to life and beauty.

The mystery and loveliness of this season, so full of life and promise, has been interpreted by those whose responsive insight into nature cannot be questioned and the teacher must go to them for inspiration and uplift.—Wordsworth, Tennyson, Burroughs and a host of others.

NATURE STUDY

Bryant writes:

"My heart is awed within me when I think
Of the great miracle that still goes on
In silence round me—the perpetual work
Of the creation, finished, yet renewed forever."

THE VOICE OF SPRING

I come, I come! ye have called me long;
I come o'er the mountains with light and song;
Ye may trace my step o'er the waking earth
By the winds which tell of the violets' birth,
By the primrose stars in the shadowy grass,
By the green leaves opening as I pass.
I have breathed on the South, and the chestnut flowers
By thousands have burst from the forest flowers,
I have looked o'er the hills of the stormy North,
And the larch has hung all his tassels forth,
And the pine has a fringe of softer green,
And the moss looks bright where my steps have been.
I have sent through the woodpaths a glowing sigh
And called out each voice of the deep blue sky.

—Mrs. Hemans.

FIND FIVE PROOFS OF THE ARRIVAL OF SPRING.

I LISTEN TO THE VOICE OF GOD

While blades are breaking through the sod;
Amid the greening dells and hills
I listen to the voice of God.
The earth has passed beneath the rod,
And vales are musical with rills,
While blades are breaking through the sod.

A sound of wondrous joy abroad
Forth issues from a thousand hills;
I listen to the voice of God.
I walk with joy where late I trod,
'Mid snows and rains and wintry chills;
While blades are breaking through the sod.

SPRING NATURE STUDY

Oft, when in weariness I plod
Life's highway, bowed 'neath aches and ills,
I listen to the voice of God.
Reviving glory from the clod
My soul with dreams of rapture fills,
While blades are breaking through the sod
I listen to the voice of God.

—D. J. DONAHOE.

Mrs. Hemans asks:

"Have ye not *seen* Him, when through parted snows
Wake the first kindlings of the vernal green?
Have ye not *heard* Him, when the tuneful rill
Cuts off its icy chains and leaps away?
In thunders echoing loud from hill to hill?
In songs of birds, at break of summer's day?
Have ye not *felt* Him while your kindling prayer
Swelled out in tones of praise, announcing God was there?"

In the spring nature work, train the child to recognize the evidences of law, order, and sequence while studying the life story of the plant from seed to seed.

Cultivate in him an abiding friendship for the flowers, the trees, the birds—for all living things. Nature loved in youth will prove a blessing and an inspiration in mature life.

GERMINATION

Germination, one of the most fascinating phases of plant life, appeals to the children with wonderful force and they should be led to watch with interest the mysterious changes taking place during the early spring time.

"Each thing upward tends, by necessity decreed,
And a world's support depends on the shooting of a seed!"

Talk with pupils about the signs of spring; snow disappearing, birds returning, and the buds unfolding.

The Laughing Chorus will serve as an introduction to the planting of seeds.

NATURE STUDY

A LAUGHING CHORUS

Oh, such a commotion under the ground
  When March called, "Ho, there! ho!"
Such spreading of rootlets far and wide,
  Such whispering to and fro;
And "Are you ready?" the Snowdrop asked,
  "'Tis time to start, you know."
"Almost, my dear," the Scilla replied;
  "I'll follow as soon as you go."
Then "Ha! ha! ha!" a chorus came
  Of laughter soft and low,
From the millions of flowers under the ground—
  Yes—millions—beginning to grow.

"I'll promise my blossoms," the Crocus said,
  "When I hear the bluebirds sing."
And straight thereafter, Narcissus cried,
  "My silver and gold I'll bring."
"And ere they are dulled," another spoke,
  "The Hyacinth bells shall ring."
And the Violet only murmered, "I'm here,"
  And sweet grew the air of spring.
Then "Ha! ha! ha!" a chorus came
  Of laughter soft and low,
From the millions of flowers under the ground—
  Yes, millions—beginning to grow.

Oh, the pretty, brave things! through the coldest days,
    Imprisoned in walls of brown,
They never lost heart though the blast shrieked loud,
  And the sleet and the hail came down,
But patiently each wrought her beautiful dress,
  Or fashioned her beautiful crown;
And now they are coming to brighten the world,
  Still shadowed by Winter's frown;
And well may they cheerily laugh, "Ha! ha!"
  In a chorus soft and low,
The millions of flowers hid under the ground—
  Yes—millions—beginning to grow.

—From Emerson's *Evolution of Expression.*

SPRING NATURE STUDY

Let children name rootlets they see in imagination spreading far and wide. Name flowers they will be glad to see this spring. What do the flowers need in order to grow? Call to mind last autumn's study of seeds. Tell them about the life and beauty contained in a seed. Read and discuss with pupils, "Waiting to Grow" and "The Little Brown Seed in the Furrow."

WAITING TO GROW

Little, white snowdrop, just waking up,
Violet, daisy, and sweet buttercup!
Think of the flowers that are under the snow,
Waiting to grow!

Nothing so small, or hidden so well,
That God will not find it, and very soon tell
His sun where to shine, and His rain where to go,
To help them to grow!

—AUTHOR UNKNOWN.

THE LITTLE BROWN SEED IN THE FURROW

A little brown seed in the furrow
Lay still in its gloomy bed,
While violets blue and lilies white
Were whispering overhead,
They whispered of glories strange and rare,
Of glittering dew and floating air,
Of beauty and rapture everywhere,
And the seed heard all they said.

O, little brown seed in the furrow,
At last you have pierced the mold;
And quivering with a life intense,
Your beautiful leaves unfold
Like wings outspread for upward flight;
And slowly, slowly, in dew and light
A sweet bud opens—till, in God's sight,
You wear a crown of gold.

—IDA W. BENHAM, FROM *Arbor Day Manual.*

Awakening Life in Seeds.—Soak some of the seeds collected last fall, such as the bean, the pea, the morning-glory, the pumpkin, and the corn, and let each child discover for himself the awakening life, and watch the development of roots, stems, buds, and leaves.

Plant many seeds in window-boxes filled with clean sand, for observation during the term. Cover boxes with panes of glass till the seedlings are well started. Make the conditions different for the same kind of seeds. Keep some warm; others cool. Plant some in the dark. As soon as the first sprouts appear above the ground plant another set, and continue this plan until a series is obtained, ranging from a foot high to those just beginning to grow.

The growth of the roots may be observed by placing seeds on a piece of coarse mosquito netting, over a glass dish containing water. Seeds just touch the water.

They may also be grown on moist blotting paper or sponge for observation.

Place a moist sponge in a jelly glass containing water and cover with a large inverted glass. If the blotting paper is used it should be covered, and the seeds should not be exposed to the light while they are germinating. Pupils will discover that growing seeds need air, moisture, and warmth.

The lessons on germination are suitable for all children after they enter school. The treatment, of course, should vary according to the age and the ability of the pupils.

In the first grade, study bean (Lima) from seed to seed. Plant the Lima bean edgewise with the eye down.

In the second grade, compare the life story of the bean and the pea.

In the third and fourth years, acorn, maple, pumpkin, and others, according to the teacher's judgment.

The children should plant and care for seeds at home and

report changes in appearance from week to week. Tell the children that each seed has a story to tell and we must learn to read it correctly. Examine seeds several times daily after placing them in water and decide why they are larger and softer than the dry seeds.

Watch the changes that are taking place in the seeds planted in the sponge.

After a week or so pupils will notice the arched stems pushing up the soil in the box. Older pupils will see and feel the truth and beauty of the following lines:

> Every clod feels a stir of might
> An instinct within it that reaches and towers
> And groping blindly above it for light,
> Climbs to a soul in the grass and flowers.
>
> —LOWELL

Why is the stem of the bean bent into a loop as it comes up to the light? Is this the way it protects the tender growing apex? Compare with the pea and corn seedlings.

Where did the bean get its first food before it had a leaf or a root outside the seed coat? Children may be led to discover that the bean has the plumule ready formed in the seed, while the morning-glory seed has not. Why? The bean stored up food enough to develop the plumule before it formed a root, while the morning-glory seed has only food enough to enable the young plant to form its roots.

Compare the bean with the pea, pumpkin, and sunflower in this respect. Observe the bean seedling backing out of the ground and straightening up—picture the plumule and the spreading leaves between the cotyledons. Compare with the pea, the pumpkin, and the corn.

Children should be led to see differences, not told.

Find out what parts of a plant children recognize. By this time they have observed what each part—coat, cotyledon, caulicle, and plumule, does for the plant.

Pupils watch the germination of the acorn and compare with the pine and maple seeds.

Let each pupil care for one or two plants and record by drawing the first appearance of the root, stem (caulicle), buds, leaves, etc.

How is the plumule of the bean different from that of the corn? Which of these seedlings has the greatest number of root hairs? Let each child mark off a square yard of ground at home and count the different kinds of plants it contains.

SWEET PEA

How does the pea seedling come above the ground? Do you find the pea at the end of the stem? What is the use of the coiling threads or tendrils on the plant? Children furnish sticks or some support for the peas. Leave two or three unsupported and see how they behave. They seem so eager to reach up to the sunlight. Cover one of the unsupported plants so that the sun cannot reach it.

How are the leaves arranged on the stem? What is the root doing for the plant? Measure a plant daily and see how rapidly it grows.

What is the difference in the appearance of the plant that was deprived of sunlight and those growing in the sun? The vine growing in the dark has a spindling weak stem and the leaves are small and yellowish. The other plants are strong and green; their leaves took in a gas (carbon dioxide) from the air, and the sunlight helped them to manufacture nourishing food.

Count the leaves on a plant. They have so much work to do. What is the work of the stem? The root? Root, stem, and leaves all worked together to make the flower.

Watch the bud unfolding. What insects visit the flower?

The fragrance, the color, and the form of the blossom all combine to make it very attractive.

The flower is nodding, five-parted, and the shape of the corolla resembles a butterfly. The large petal is called the banner, the two petals on the sides are the wings, and the two small petals joined in the middle are the keel petals.

"Here are sweet peas on tip-toe for a flight,
With wings of gentle flush o'er delicate white,
And taper fingers catching at all things,
To bind them all about with tiny rings."
—KEATS.

Carefully open a couple of flowers and paste on cards to show children how beautiful they are. Do not allow pupils to pull flowers to pieces.

Examine calyx; count the thread-like bodies (ten stamens) surrounding a long boat-shaped part (pistil); nine stamens are united toward the base (one brotherhood), while the tenth is separate and free.

Call attention to pollen case at the end of each stamen, and the flat pistil covered with tiny hairs. Pollen from the stamens falls on the pistil and when it reaches the seed-box the little ovules begin to grow. Watch the pod increasing in size.

Children, sketch the pea vine frequently during the term.

TEACHER, TELL THE STORY OF "THE PEA BLOSSOM."

There were once five peas in one shell; they were green, and the shell was green, and so they believed that the whole world must be green also, which was a very natural conclusion.

The shell grew and the peas grew; they accommodated themselves to their position, and sat all in a row. The sun shone without and warmed the shell, and the rain made it clear and transparent; it was mild and agreeable in broad daylight and dark at night, as it generally is; and the peas, as they sat there, grew larger and larger, and more thoughtful as they mused, for they felt there must be something for them to do.

"Are we to sit here forever?" asked one; "shall we not become hard by sitting so long? There must be something outside; I feel sure of it."

And so weeks passed by; the peas became yellow.

"All the world is turning yellow, I suppose," said they,—and perhaps they were right. Suddenly they felt a pull at the shell; it was torn off, and held in hungry hands, then slipped into the pocket of a jacket, in company with other full pods. "Now we shall soon be let out,"—said one,—just what they all wanted.

"I should like to know which of us will travel farthest," said the smallest one of the five; "we shall soon see now."

"Crack!" went the shell as it burst and the five peas rolled out into the bright sunshine. There they lay in a child's hand. A little boy was holding them tightly; he said they were fine peas for his pea-shooter. And immediately he put one in and shot it out. "Now I am flying out into the wide world," said the pea; "catch me if you can;" and he was gone in a moment.

"I," said the second, "intend to fly straight to the sun; that is a shell that lets itself be seen, and it will suit me exactly;" and away he went.

"Wherever we find ourselves we will go to sleep," said the two next; "we shall still be rolling onwards;" and they did certainly fall on the floor, and roll about before they got into the pea-shooter; but they were put in for all that. "We will go farther than the others," said they.

The last, as he was shot out of the pea-shooter, flew up against an old board under a garret window, and fell into a little crevice, which was almost filled up with moss and soft earth. The moss closed itself about him, and there he lay a captive indeed, but not unnoticed by God.

Within the little garret lived a poor woman, who went out to work every day; for she was strong and industrious. Yet she remained always poor; and at home in the garret lay her only daughter, not quite grown up, and very delicate and weak. For a whole year she had kept her bed.

Quietly and patiently she lay all day long, while her mother was away from home at her work.

PEA WOKE UP

Spring came, and early one morning the sun shone brightly through the little window, and threw his rays over the floor of the room.

Just as the mother was going to her work, the sick girl fixed her gaze on the lowest pane of the window. "Mother!" she exclaimed, what

can that little green thing be that peeps in at the window? It is moving in the wind." The mother stepped to the window and half opened it. "Oh!" she said. "There is actually a little pea that has taken root and is putting out its green leaves. How could it have got into this crack? Well, now, here is a little garden for you to amuse yourself with." So the bed of the sick girl was drawn nearer to the window, that she might see the budding plant; and the mother went out to her work.

"Mother, I believe I shall get well," said the sick child in the evening; "the sun has shone in here so brightly and warmly to-day and the little pea is thriving so well; I shall get better, and go out into the warm sunshine again." "God grant it!" said the mother. She propped up with a little stick the green plant which had given her child such pleasant hopes of life, so that it might not be broken by the winds; she tied the piece of string to the window-sill and to the upper part of the frame, so that the pea-tendrils might twine round it when it shot up. And it did shoot up; indeed, it might almost be seen to grow from day to day. "Now, really here is a flower coming," said the mother one morning. She remembered that for some time the child had spoken more cheerfully, and during the past few days had raised herself in bed in the morning to look with sparkling eyes at her little garden which contained but a single pea-plant.

A week later the invalid sat up for the first time a whole hour, feeling quite happy by the open window in the warm sunshine, while outside grew the little plant, and on it a pink pea-blossom in full bloom. The little maiden bent down and gently kissed the delicate leaves. This day was like a festival to her.

"Our heavenly Father himself has planted that pea, and made it grow and flourish, to bring joy to you and hope to me, my blessed child," said the happy mother, and she smiled at the flower.

But the young maiden stood at the open garret window, with sparkling eyes and the rosy hue of health upon her cheeks, and folded her thin hands over the pea-blossom, thanking God for what he had done.

(Ginn & Co.) —ANDERSON.

A SEED

I held a little brown flax-seed in my fingers. I dropped it on the surface of the water in my glass, upheld by a thin layer of cotton-wool. In a few days white threads descended into the water from that little seed, and a green shoot rose into the air. Delicate leaves unfolded above and the threads below became a silky tassel of roots. The pretty

plant grew and throve. Day by day the leaves opened more and more. Buds and lovely blue flowers appeared, and as the sun shone in my window upon the growing plant, seeds were born and ripened and the wonder was multiplied. All had gone on by degrees. Step by step, cell by cell, it had been built up, and bud and flower and fruit had come in due course. So I knew what to expect in my little human plants. Not the ripe seed all at once; not the perfect conduct nor the whole lesson at the first trial; but slowly, one by one, thought by thought, effort by effort, the mind and heart will grow. Surely but gradually, day after day and year after year, the child will learn and become wise and good; for this is God's eternal law, that all things grow gradually in good order, from less to more.

By Permission of Lee & Shepard. —LOUISA P. HOPKINS.

In March the teacher should distribute seeds—give instruction in planting—offer prizes for the best plant reared at home, and assist children in making flower-beds in the school yard.

SOIL

Once a week, or oftener during the spring term, arrange for "field lessons." The work of water in soil-making serves as an introduction to earth-study or geography, and can be best studied in the springtime, after the snow and the ice have disappeared, when the children can see the water at work wearing down hills, and furrowing out valleys.

The brook near the school can be studied as a type of larger streams.

Let children visit a stream after a heavy rain and find out why the water is so muddy. Which will a stream carry further, fine sand or pebbles? What colors have you seen in clay? How were the pebbles rounded and polished? Find crumbling rocks. What causes rocks to crumble? What is leaf mould?

Direct attention to the wasting sandstone, the slowly crumbling limestone, and the washing away of the river banks. Take home pebbles, crumbling rocks, etc.

The outdoor lessons should be followed by indoor discussions relating to the things studied.

Talk with pupils about the importance of soil. Animal life depends upon plant life, and plant life depends upon the existence of soil.

Review what was learned about the expansion of water when it freezes.

Pupils examine rocks out of doors, and tell what the seams or fissures are filled with. (Soil, roots, water). Suppose the seams were larger and more numerous? How can roots break rocks?

In "Boy Travelers in South America" you will find an interesting account of the way roots pull down walls in the tropics.

Shaler defines soil as the wreckage of the rocks as they wear down under the action of air, rain, and frost, the roots of plants, and the stomachs of earthworms.

Pupils, collect specimens of pebbles, clay, sand, quartz, and limestone.

Pebbles and Quartz

Show pictures of huge rocks. Let children tell what happens when water freezes in the crevices of rocks.

Children, put pieces of sharp stones in a bottle containing water, give the stones a thorough shaking backward and forward every day for a week or two, and note the result. Examine the chipped-off sand grains, under a magnifying glass. Sand grains vary in color, some being transparent, others yellow, others milky white. Sand is used in the manufacture of mortar, plaster, and glass. Tell children about the beautiful colored glass made in Venice.

Pebbles are made from sharp stones which are rubbed against other stones by moving water, making sand, mud, and gravel.

Quartz is one of the hardest of the common minerals. It is

very abundant. Try to scratch glass with it. How many colors do you find? Violet, yellow, rose, smoky, etc. The well known forms of quartz are amethyst, carnelian, flint, jasper, onyx, and agate. Pure quartz is transparent like glass—resembles diamond. Give uses of quartz.

Feldspar

Feldspar has a pearly luster. Its color is usually light, ranging from white to gray, pink, red, brown, and green. This is the mineral that gives the granites their characteristic colors.

Clay is in most cases derived from disintegrated feldspar. Porcelain, china, crockery, and bricks are made out of clay.

Feldspar is softer than quartz, harder than glass. Compare quartz with mica, and mica with feldspar. Continue the study of rocks and running water.

Show pictures of waterfalls, rapids, gorges, etc.

Read "The Cataract of Lodore" and try to imagine the wonderful work of water as a sculptor.

EARTHWORMS

He prayeth best who loveth best
All things, both great and small;
For the dear God who loveth us,
He made and loveth all.

—COLERIDGE.

Purpose of the Lesson.—To encourage outdoor observation. To call attention to one of the earliest signs of spring.

Preparation.—Talk with children about preparing the soil to make garden, the need of plowing and raking to make it fine. Tell them we must become better acquainted with a little animal that is busy in nearly all parts of the world helping to loosen the earth as the plowman does.

Field Lesson.—Let children find out where and when the

earthworm works. In what kind of soil? What does it eat? How does it crawl? Find castings on the lawn or in the garden. Estimate the quality of the soil in the castings found in a space three or four feet square.

Material and Care.—Live worms may be obtained by digging for them in damp ground; they may also be found under boards or stones that have not been disturbed for some time. Worms can be kept in a large glass jar containing moist earth covered with dead leaves. Fasten netting over jar.

Presentation—Pour cold water over a piece of glass and let children see the worms crawling. Notice from day to day what they do with the leaves. Earthworms are nocturnal, and the children will be obliged to use a lantern in order to see them at work out of doors. After a heavy rain is the best time to watch them.

Let children examine the worms in the jar. Can they see, hear, and smell? Hide a piece of onion in the bottom of the jar and see if the worms will find it. Hold a light near the head of a worm. What did the worm do? It has no eyes, but the head end can distinguish light from darkness. The worm cannot hear at all, but it has a very delicate sense of touch. Account for the number found on the sidewalks after a rain. They get lost and dry up before they find a place to burrow.

Body.—The body tapers at each end and is made up of ring-like joints. Each ring has on its under side very small bristles which help the worm to move over the ground by keeping it from slipping.

Habits.—Worms move easily in loose soil, but find it impossible to pierce through hard or close earth on account of their soft bodies. They breathe through their skin and need moisture in the air or in their surroundings. Worms devour anything that can be eaten. They burrow into the soil to a depth of from three to eight feet. They eat their way through the

ground. Their tiny eggs are found in June near the openings of the burrows.

Importance of the Work Done by Earthworms.—Shells, bones, and leaves are constantly being covered with castings and these decay and enrich the soil. They take great quantities of leaves into their burrows and convert them into vegetable mould. The fine rootlets penetrate the earth to a great depth, by means of the worm-tubes, and obtain nourishment from fresh soil. The worms sift and loosen the soil so that the rain can sink into it and supply the roots with air and moisture. It has been estimated that there are about fifty-three thousand worms in an acre of ground and that they bring up about ten tons of soil to the acre yearly. For interesting facts concerning the work and habits of earthworms read "Vegetable Mould and Earthworms," and "The Great World's Farm."

COWPER SAYS:

> "I would not enter on my list of friends
> (Though graced with polished manners and fine sense,
> Yet wanting sensibility) the man
> Who needlessly sets foot upon a worm.
> An inadvertent step may crush the snail
> That crawls at evening in the public path;
> But he that has humanity, forewarned,
> Will tread aside, and let the reptile live."

THE PUSSY WILLOW

The middle of March is a good time to surprise the "pussies."

Aim.—To emphasize protection.

Field Lesson.—Take children to the willows.

Direct attention to the signs of spring.

Material.—Branches of the pussy willow in jars of water in a cool place. It is desirable to gather twigs from several willows in order to secure the two kinds of flowers. Staminate and pistillate.

SPRING NATURE STUDY

Preparation.—Call attention to the long winter's rest. Why did your mother give you warmer clothing for the winter than you had during the summer? We must examine the buds and see how they were prepared for the cold weather.

READ AND DISCUSS THE FOLLOWING POEM TO DIRECT THE CHILDREN'S THOUGHTS:

Perhaps you may think, because I am buttoned
And folded and wrapped in my little cloak so,
That I always dress this way in all sorts of weather,
With never a frill or a ruffle to show.

But it's only because I have come out so early,
That only Jack Frost and the winds are astir,
They're hard on the dresses, but under my wrappings
Is my pretty new party dress hidden with fur.

—SELECTED.

Plan of Work.—Give each child an opportunity to observe the tough, varnished scales on the outside, the silk and fur next to the scales, and the long hairs which help to protect the buds. When the buds develop call attention to the pistils on the green (pistillate) catkins and the powder on the yellow (staminate) catkins. Let children draw stems and watch their development in water. Shake some of the pollen on the catkins containing the ovules and explain the importance of this yellow powder. Remind children that the two kinds of catkins are not found on the same shrub.

How do the seeds out of doors manage to get the pollen? Pupils may suggest the wind. Lead them to see that the willow containing pistillate catkins may not be near the willow with staminate catkins and the wind might not blow in the right direction when the pollen is ripe. Take children to the willows some day and find an answer to this question.

The color and fragrance of the willows attract the attention of many insects very early in the spring before the other flow-

ers venture above the ground. Children discover many bees on the catkins; they are smaller than honey bees and their bodies, especially the head and thorax, are covered with hairs. What do they get from the flowers? What do they give? They look as though some one had sprinkled them with "gold dust." The pollen grains are as precious as gold to the flowers

Use of Hairs on the Bee's Body.—They gather up the pollen from the stamens and take it to the pistils containing the ovules,—they exchange pollen for nectar.

Find a tree or shrub that has been cut down to the earth; the new twigs develop rapidly into strong branches.

Let children stick willow twigs into moist ground near school or home and report observations. Examine fibrous rootlets growing from nodes of the twigs kept in water. Thrust a few branches into the earth upside down. Break branches to test strength and toughness. Direct attention to color of bark and the arrangement and shape of the leaves and pods. The opening seed pods are very pretty; each seed appears with a plume of long silky hairs to help it fly away to a new home and give it a chance to become a large willow.

Characteristics of the Willow Family.—Stamens and pistils are separate and borne on different trees and shrubs.

Difficult to classify because two trees must be studied in order to decide one species, and the trees are not always near together.

The leaves are simple, feather-veined. In color, many varieties of greens, ranging from blue to yellow.

Many species are satisfied with almost any kind of soil if they have plenty of water. The willow finds its greatest commercial value in the manufacture of wicker work. The catkins appear before or with the leaves. Nearly all the willows have soft, pliant, tough wood.

SPRING NATURE STUDY

Important Points to Impress:

Beauty of the catkins. Protection of buds. Leading thought. Stamens and pistils on different shrubs. How the flowers help the bees. How the bees help the flowers. Decorate board with pictures of pussy willow. Let children picture branches and catkins frequently.

Now sweet and low, the south wind blows,
And through the brown fields calling goes
"Come, Pussy! Pussy Willow!
Within your close brown wrapper stir!
Come out and show your silver fur!
Come, Pussy! Pussy Willow!"

—SELECTED.

TERMS USED IN DESCRIBING BUDS

Buds, As to Position:—

Terminal: At the end of the twig.

Lateral: Along the sides of the twig.

Axillary: In the leaf-axil; that is the upper angle between the leaf and the stem.

Adventitious: Buds produced irregularly on the branch or trunk.

Accessory: Buds clustered about the axillary buds.

Nodes are the points on the stem at which the buds are produced.

Internodes are the spaces between the nodes.

As to Arrangement:—

Opposite: Two at the same node and opposite.

Whorled: Three or more arranged around the same node.

Alternate: In ranks along the stem, not being opposite or whorled.

NATURE STUDY

EASTER DRAWETH NEAR

Willow branches whit'ning 'neath the April skies;
Sodden meadows bright'ning, where the warm sun lies,
Robin Red-breast swinging, in a tree top high,
Swollen brooklets singing—Easter draweth nigh!

Tender fledgelings hushing, eager to take wing;
Trees and hedges flushing, with the joy of spring.
Crocus buds up-springing, through the cold dark sward,
Living incense bringing, to the the risen Lord.

—MARY M. REDMOND.

EASTER TIME

Preparation.—Let children get acquainted with the Pasque Flower in natural surroundings.

Review "The Laughing Chorus" and emphasize the awakening of all life after the winter's rest. Study of poem.

OUR PASQUE-FLOWER

The winter snows were hardly gone,
  When in her robes of fur
The pasque-flower came to cheer our hearts
  We ran to welcome her.

We knew her in her soft gray cloak,
  Her purple silken gown,
And in the sunshine, too, we saw
  Her dainty golden crown.

"Oh, tell us, little flower," we cried,
  "How dared you come so soon?
The winds are cold. The other flowers
  Will scarce be here till June."

"I came because the boys and girls
  Were waiting for the spring.
I knew it would seem nearer if
  I helped by blossoming.

SPRING NATURE STUDY

"I wrapped me in my warm fur coat,
I donned my purple gown,
And borrowed sunshine from the skies
To wear upon my crown.

"I gathered courage then, and pushed
The soft brown earth aside;
For, since the warm spring sun had come
What need to longer hide?

"I came to tell you how God's care
Had kept the tiny seed,
And that he cares much more for you.
Will you my message heed?"

—From *Arnold's Waymarks for Teachers.*

Copyright, 1894, by Silver Burdett & Co.

In England it was once the custom to use this flower in coloring eggs for Easter. When did the flower make its appearance? How was it dressed? Why did it come? Repeat last stanza.

Bring an Easter Lily to the school-room and give the children an opportunity to feel the silent influence of this messenger of love and joy.

Christ it was who disdained not the use of objects and symbols, remembering that it was the childhood of the race. He it was who spake in parables and stories, laying bare soul of man and heart of nature, and revealing each by divine analogy. He it was who took the little ones in His arms and blessed them.

—KATE DOUGLAS WIGGIN.

Children plant bulbs and watch development. The lily appeals to the soul with more force than any other flower.

Repeat: "Consider the lilies of the field, how they grow: they labor not, neither do they spin. But I say to you, that not even Solomon in all his glory was arrayed as one of these."

The children saw the butterfly spread its wings from the chrysalis and the dragon fly come forth from the grub-case.

Is it possible that the pure white lily with its heart of gold was contained in the ugly brown bulb?

TEACHER, READ POEM TO DIRECT CHILDREN'S THOUGHTS.

EASTER

Oh! the lilies are white in the Easter light,
The lilies with hearts of gold;
And they silently tell with each milk-white bell,
The story an Angel told.

And they've whispered it long to the weak and the strong,
The rich and the poor among men;
Each Easter day till time dies away
They will tell the tale again.

In the tomb new-made where the Christ was laid,
The Angel told the story,
Of how he rose from death's repose,
The Son of Eternal Glory.

Donahoe's Magazine. —MARGARET E. JORDAN.

What story did the angel tell? Emphasize the spiritual meaning of the lilies. Explain last stanza.

Teacher, read the story of the Resurrection in the Bible. The artists and the poets will help children to realize the significance of this great event in the world's history. Compare Bethlehem and Galilee. Recall the song of the angels at Bethlehem.

THE LILY OF THE RESURRECTION

While the lily dwells in earth,
Walled about with crumbling mould
She the secret of her birth
Guesses not, nor has been told.

Hides the brown bulb in the ground,
Knowing not she is a flower;
Knowing not she shall be crowned
As a queen, with white-robed power.

SPRING NATURE STUDY

Though her whole life is one thrill
  Upward, unto skies unseen,
In her husks she wraps her still,
  Wondering what her visions mean.

Shivering, while the bursting scales
  Leave her heart bare, with a sigh
She her unclad state bewails,
  Whispering to herself, "I die."

Die? Then may she welcome death,
  Leaving darkness underground,
Breathing out her sweet, free breath
  Into the new heavens around.

Die? She bathes in ether warm;
  Beautiful without, within,
See at last the imprisoned form
  All its fair proportions win!

Life it means, this impulse high
  Which through every leaflet stirs.
  Lo! the sunshine and the sky
  She was made for, now are hers!

Soul, thou too art set in earth,
  Heavenward through the dark to grow;
Dreamest thou of thy royal birth?
  Climb! and thou shalt surely know.

Shuddering Doubt to Nature cries,—
  Nature, though she smiles, is dumb,—
"How then can the dead arise?
  With what body do they come?"
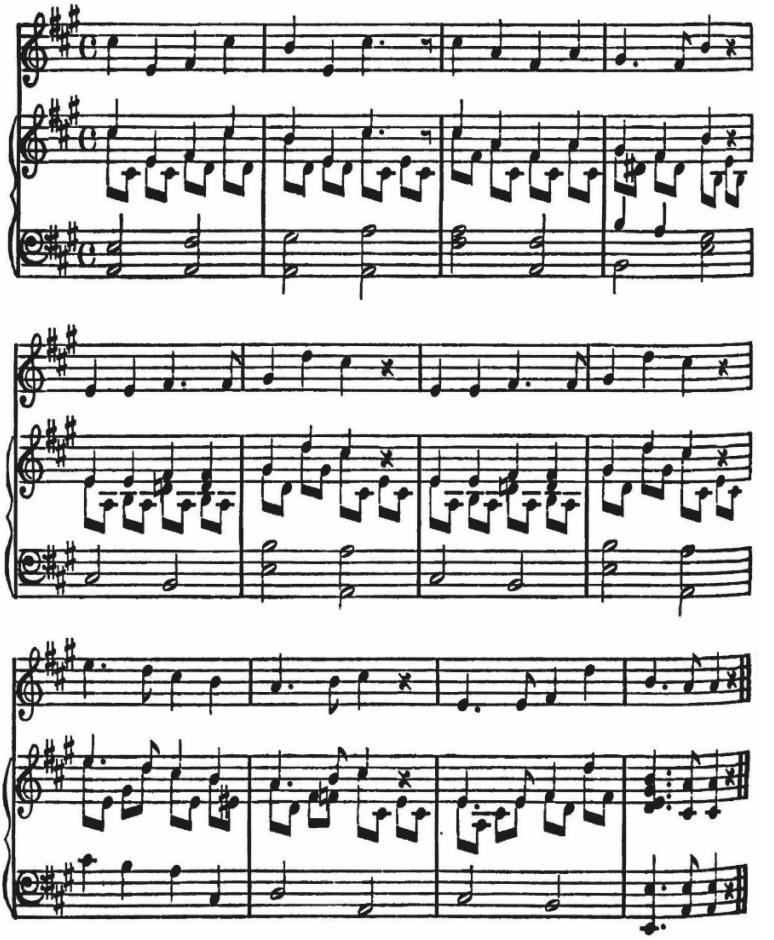
Lo, the unfolding mystery!
  We shall bloom, some wondrous hour,
As the lily blooms, when she
  Dies a bulb, to live a flower!

—LUCY LARCOM.

NATURE STUDY

EASTER

LYDIA AVERY COONLEY. JESSIE L. GAYNOR.



SPRING NATURE STUDY

1. Snow-drops, waking from your sleep,
   Violets, that from blue hoods peep,
   Bloodroot, blooming by the rill,
   Stately lily, daffodil,—
   What sweet message do you bring?
   Is it only: "This is Spring?"

2. Snow-drops, violets, lilies white,
   In the answer all unite:
   "Through the mold we heard a voice
   Calling to the earth: 'Rejoice!'
   So we left the ground to rise,
   Off'ring incense to the skies."

3. Little birds the chorus swell,
   Humming bees the tidings tell,
   Butterflies lift shining wings,
   Ev'ry child with gladness sings;
   With the flow'rs rejoicing, say:
   "Christ is ris'n on Easter day!"

Permission from "Songs in Seasons," of A. Flanagan Co., Publishers.

MAKE A SPECIAL STUDY OF THIS POEM:

NATURE'S EASTER-MUSIC

The flowers from the earth have arisen,
  They are singing their Easter-song;
Up the valleys and over the hillsides
  They come, an unnumbered throng.

Oh, listen! The wild flowers are singing
  Their beautiful songs without words!
They are pouring the soul of their music
  Through the voices of happy birds.

Every flower to a bird has confided
  The joy of its blossoming birth—
The wonder of its resurrection
  From its grave in the frozen earth.

NATURE STUDY

For you chirp the wren and the sparrow,
  Little Eyebright, Anemone pale!
Gay Columbine, orioles are chanting
  Your trumpet-note, loud on the gale.

The buttercup's thanks for the sunshine
  The goldfinch's twitter reveals;
And the violet trills, through the bluebird,
  Of the heaven that within her she feels.

The song-sparrow's exquisite warble
  Is born in the heart of the rose—
Of the wild-rose, shut in its calyx,
  Afraid of belated snows.

And the melody of the wood-thrush
  Floats up from the nameless and shy
White blossoms that stay in the cloister
  Of pine-forests, dim and high.

The dust of the roadside is vocal;
  There is music from every clod,
Bird and breeze are the wild-flowers' angels,
  Their messages bearing to God.

"We arise and we praise him together!"
  With a flutter of petals and wings,
The anthem of spirits immortal
  Rings back from created things.

And nothing is left wholly speechless;
  For the dumbest life that we know
May utter itself through another
  And double its gladness so!

The trees have the winds to sing for them;
  The rock and the hill have the streams;
And the mountain the thunderous torrents
  That waken old Earth from her dreams.

She awakes to the Easter music;
  Her bosom with praise overflows;
The forest breaks forth into singing,
  For the desert has bloomed as the rose.

And whether in trances of silence
We think of our Lord arisen,
Or whether we carol with angels
At the open door of his prison.

He will give us an equal welcome
Whatever the tribute we bring;
For to Him who can read the heart's music
To blossom with love is to sing.

—LUCY LARCOM.

What flowers have arisen? Where are they to be found? What are they doing? Repeat third stanza. What can you tell about the birds and the flowers named in the poem? What did each flower tell a bird? The birds and the flowers have many beautiful messages for poetic souls.

Wordsworth says:

The birds pour forth their souls in notes
Of rapture from a thousand throats.

Emerson writes:

"I thought the sparrow's note from heaven,
Singing at dawn on the alder bough."

"That's the wise thrush; he sings each song twice over,
Lest you should think he never could recapture
The first fine careless rapture."

—BROWNING.

"To me, the meanest flower that blows can give
Thoughts that do often lie too deep for tears."

—WORDSWORTH.

Who are the wild flowers' angels? Who sings for the trees? the rock and the hill? the mountain? Give the pictures in order. What effect has the Easter music on the earth? Give the meaning of the last two stanzas.

THE STAR THAT BECAME A LILY

Once a beautiful star came down to earth. For a long time it had watched the children at play in the green fields, and the star said, "I

love those little Red children, I would like to go down and live with them."

So one night the star shot down, down, till at last it stood out upon a big plain. The people in the wigwam village saw it, and ran to look at it.

"I have come, O good people," said the star, "to dwell with you on the earth. I love to watch you in your wigwams. I love to see you make your birch canoes. I love to watch your children at their play. Tell me, then, where I may dwell. It must be where I can see you all, and where at night I can look up to my home in the skies."

Then one chief said, "Dwell here upon the mountain top; where you can overlook the plain. The clouds will come down and rest upon the high peaks, and each morning you may greet the sun."

"Dwell here upon the hillside," said another chief, "for there the flowers grow brightest, and the sun is warmest."

"Dwell in the forest," said a third chief, "for there the sweet violets grow, and the air is cool, and the smell of spruce is in the air."

But the star thought the mountain was too far away, as it could not see the children from such a height, and it was they it wanted to be near.

The hillside, too, the star thought, was far away, and the forest, it was sure, was too dark and dreary.

But one day, the star saw a beautiful little lake. The water was very clear,—one could see the skies and the clouds in it. At night the stars shone down into its waters. The water was soft and warm, and the star was pleased to see it ripple and dance. It liked to see the sunlight glimmer on the waters.

The children loved the lake, too; they played all day on its banks, and often paddled out upon it in their little canoes.

"I will dwell right here," the star said, "for then I can be near the children."

And so, when the sun had set, the star floated down upon the waters. It sent its rays away down beneath the waters; and the Red children thought these rays took root, for the very next morning there was a beautiful lily upon the waters. Its roots reached away down into the rich earth, its petals were pure white, and it had a heart of rich yellow gold.

"No flower has a perfume so sweet," the children cried.

Then they rowed out to look at it.

"It is the star," the children said; "it will dwell with us forever, and we will call it the Lily Star."

Then the children rowed back to the shore. They did not pluck the lily, but each morning they went to see it.

"Dear, beautiful lily!" they would say.

By and by it opened wide its petals; and the air was filled with sweetness.

Then other lilies grew up around it; and after a time these Water Lilies, or Lily Stars, as the children called them, were floating on the waters of the lake everywhere.

—DOROTHY BROOKS.

Children, reproduce story after free discussion. Sketch hillside, mountain, lake, etc.

FLOWER-DE-LUCE

In the twelfth century King Louis made this flower the national emblem of France; he strewed it on his son's mantle at the coronation in the Rheims cathedral.

Iris is the classical name. Blue Flag is the common name.

Let children visit a marshy meadow some day and get acquainted with the Flower-de-luce.

Take home two or three plants.

Examine the rhizome, the strong, sword-like, parallel-veined leaves guarding the purple flower. Observe the three arching petals and the three sepals, each sepal bearing a tuft of yellow fuzz arranged to catch pollen.

Observe also three more petal-like parts, the stigmas of the three-cleft pistil.

Let older pupils study the "Flower-de-luce." Longfellow will help them to see the beauty of this common flower.

Visit the Blue Flag in its home again after having studied the poem and the legend, "Iris," and see the reeds, rushes, and dragon-flies.

NATURE STUDY

THE RAINBOW QUEEN

A great many years ago, when even grown-up people were not very wise, they used to look up to the mountains and wonder if their tops reached the sky. Sometimes a big cloud would rest upon a mountain-top, and when the sun shone upon it, this cloud would look like gold. Sometimes rain would fall from the cloud, even when the sun shone upon it, and then the beautiful rainbow would shine out. By and by these people, called Greeks, began to think that a great king dwelt upon the mountain-top. They named this king Jupiter. They thought the golden cloud was his palace. Of course, there was a beautiful queen in the golden palace; they named her Juno. She had many princes and princesses about her, who loved her and were always glad to serve her; but of all the princesses, none were so beautiful as Iris. For her the queen made a rainbow bridge, and no one but Iris was allowed to step upon the beautiful arch. There are many old Greek stories about this princess and her journeys to the earth over the rainbow bridge. One of them is about a flower, that is named after her.

IRIS

Princess Iris loved the waters of the earth, for in them she could always see the bright rainbow colors of her own magic bridge. One day she wished to come down, to wander by the bright waters of the rivers and lakes. So she wrapped herself in a red and purple cloud, and stepped into her golden chariot drawn by two handsome peacocks, whose splendid tails spread out in the sun and shone like the colors in the rainbow itself. On her way, she shook water-drops from the clouds to see them sparkle in the light, as they went splashing down upon the earth. Down she came to the earth, and by the side of a lake, she stepped from her golden chariot. Here she found blue flowers, growing stately and tall. "As blue as the blue waters of the sea," she cried. She bent over the bright blue flowers, and touched their petals. Down from her hair the raindrops fell; straight down upon one petal of every flower. And there they are sparkling and shining to this very day, showing the colors of the rainbow when the warm sun shines down upon it. Soon after that some children went down to the water to play. "See, see!" they cried, "a blue flower, as blue as the blue in the rainbow. Iris herself must have been here. Here are her own

beautiful colors." And so, to this day, the tall blue flower that grows by the water's edge, half hidden among its own sword-like leaves, is called Iris, in memory of Iris, "the rainbow queen."

—Adapted From the Story as Told by MARA PRATT.

STUDY OF POEM.

FLOWER-DE-LUCE

Beautiful lily, dwelling by still rivers,
Or solitary mere,
Or where the sluggish meadow-brook delivers
Its waters to the weir!

Thou laughest at the mill, the whir and worry
Of spindle and of loom,
And the great wheel that toils amid the hurry
And rushing of the flume.

Born in the purple, born to joy and pleasance,
Thou dost not toil nor spin,
But makest glad and radiant with thy presence
The meadow and the lin.

The wind blows, and uplifts thy drooping banner,
And round thee throng and run
The rushes, the green yeomen of thy manor,
The outlaws of the sun.

The burnished dragon-fly is thine attendant,
And tilts against the field,
And down the listed sunbeam rides resplendent
With steel-blue mail and shield.

Thou art the Iris, fair among the fairest,
Who, armed with golden rod
And winged with the celestial azure, bearest
The message of some god.

Thou art the Muse, who far from crowded cities
Hauntest the sylvan streams,
Playing on pipes of reed the artless ditties
That come to us as dreams.

O flower-de-luce, bloom on, and let the river
Linger to kiss thy feet!
O flower of song, bloom on, and make forever
The world more fair and sweet.

—H. W. LONGFELLOW.

The home of this flower? Do you see the "still river"? the meadow brook? the mill-race? the great mill-wheel toiling to store up force from the river to do its great work? Observe some of the delicate fabrics in dress goods. What is the color of royalty? Without noise or worry the flower obtains strength from the river to weave a dress far surpassing in beauty the work of the mill-weaver. Why does the flower laugh at the mill?

In the fourth stanza Longfellow refers to feudal times when the majority of the people flocked to the banners of the lords or knights to serve and protect them. A lord or knight was often defended by bands of outlaws. The rushes crowd around the flower to protect it. Do they remind you of soldiers? Why? Dragon-fly tilts against the field—tilt refers to a military exercise of thrusting with a lance—a tournament. Mail —defensive armor. Iris was Juno's messenger. Read legend Iris. Muse: The sweet music played on the reed pipes beside the streams were supposed ages ago to inspire the poets. Why called flower of song? How long has it been a national emblem?

BIRDS

SWEET WARBLERS

Sweet warblers of the sunny hours,
Forever on the wing,
I love thee as I love the flowers,
The sunlight and the spring.

SPRING NATURE STUDY

In the green and quiet places,
Where the golden sunlight falls,
We sit with smiling faces
To list their silver calls.

And when their holy anthems
Come pealing through the air,
Our hearts leap forth to meet them
With a blessing and a prayer.

Amid the morning's fragrant dew,
Amidst the mists of even,
They warble on as if they drew
Their music down from heaven.

—*Birds and All Nature.*

Copyright, 1900, by A. W. MUMFORD.

In order to prepare the children to watch with interest the spring work in bird land, it will be advisable to have them examine a few typical nests. They cannot fail to be impressed with the wonderful skill and ingenuity exhibited in the construction of bird homes found in every locality.

READ:

THE EMPTY NEST

We found it under the apple tree
Torn from the bough where it used to swing.
Softly rocking its babies three,
Nestled under the mother's wing.

This is the leaf all shrivelled and dry
That once was a canopy overhead;
Doesn't it almost make you cry
To look at the poor little empty bed?

All the birdies have flown away;
Birds must fly or they wouldn't have wings,
Don't you hope they'll come back some day?
Nests without birds are lonesome things.

—EMILY MILLER.

Secure, if possible, a nest made by the Baltimore oriole. Where was it found? Lead children to see the advantage of this position. Why is this little hammock so closely woven and compact at the bottom? What tools had the bird to work with? Take the nest to pieces and notice the material used. While examining the nest of this artistic weaver the children are amazed to see the knots tied so securely and the cord, hair and milkweed fibre woven together so skillfully.

The nest of the humming-bird is also a model of artistic skill, a small cup about half the size of a hen's egg, made of a white felt-like substance covered with gray lichens as beautiful as its owner. The nest of the wood pewee closely resembles the humming-bird's and is more easily found. Compare the nest of the robin or bluejay with the oriole's or pewee's nest.

Colored pictures of birds, such as those issued by Nature Study Publishing Co., will be found exceedingly valuable in familiarizing children with the bird's form, color, and environment. The metallic colors, glossy plumage, and delicate markings of many birds will be more fully appreciated by examining stuffed specimens, but as they suggest the loss of life, colored pictures and outdoor observation, combined with a study of the living specimens brought to school occasionally (pigeon, canary, parrot, and chicken), will prove more desirable for children in the lower grades.

In the spring of the year the birds wear their brightest plumage and sing their sweetest songs. Their activity while selecting a suitable spot and suitable material for the new home affords children an excellent opportunity to observe their most interesting habits at this season. Encourage children to watch daily for their arrival.

THE HUMMING-BIRD

"A flash of harmless lightning,
A mist of rainbow dyes,
The burnished sunbeam brightening,
From flower to flower he flies."

JOHN B. TABB, p. 59.
Small, Maynard Co.

"Cleaving the clouds with their moon edged pinions,
High over city and vineyard and mart;
April to pilot them; May speeding after;
And each bird's compass his small red heart."

—EDWIN ARNOLD.

THE BLUE BIRD

Every one loves the bluebird. It is because he is so gentle, modest, brave, and useful. He is called the color-bearer of the spring songsters, the banner-bearer of Birdland, the minstrel of April, and Mabel Osgood Wright says he is a model citizen.

He belongs to the Thrush family.

Song.—Teach the children to distinguish his liquid note in the spring choir. Burroughs tells us that he calls, Bermuda! Bermuda! or Purity! Purity!; other admirers think the plaintive warble sounds like, Dear! Dear! Think of it! Think of it!

What message has he for your ears?

This is Eben Rexford's tribute:

THE BLUE BIRD

Listen a moment, I pray you; what was that sound that I heard?
Wind in the budding branches, the ripple of brooks, or a bird?
Hear it again above us! and see a flutter of wings!
The blue bird knows it is April, and soars toward the sun and sings.

Never the song of the robin could make my heart so glad;
When I hear the blue bird singing in spring, I forget to be sad.
Hear it! a ripple of music! sunshine changed into song!
It sets me thinking of summer when the days and their dreams are long.

Winged lute that we call a blue bird, you blend in a silver strain
The sound of the laughing water, the patter of spring's sweet rain.
The voice of the winds, the sunshine, and fragrance of blossoming things.
Ah! you are an April poem, that God has dowered with wings!

—EBEN EUGENE REXFORD.

Appearance.—Let children discover the following facts:

The bluebird is smaller than the robin and larger than the canary. The throat and breast are a reddish brown with white feathers on the under side of the body and the back and wings are a clear bright blue.

Nest.—It chooses a bird house made by some friend, a hole in a tree or post, the deserted nest of a woodpecker; almost anything that will afford protection will do.

The eggs are light blue, four to six in number.

Food.—Fruit, spiders, and all sorts of injurious insects.

It generally remains with us until very late in autumn. Before it leaves us its song is very sad and plaintive.

Compare the bluebird with the robin.

Give gems of bird poetry; connect the work with the reading, language and literature.

Who called the bluebird the angel of the spring? The peace harbinger? Who said, "The warble of this bird is innocent and celestial like its color?"

Read "Wake Robin"—Burroughs.

IN APRIL

April is here!
Listen, a bluebird is caroling near!
Low and sweet is the song that he sings,
As he sits in the sunshine with folded wings,
And looks from the earth that is growing green
To the warm blue skies that downward lean,
As a mother does, to kiss the child
That has looked up into her face and smiled.
Earth has been sleeping and now she wakes
And the kind sky-mother bends and takes
The laughing thing in her warm embrace.
And scatters her kisses over its face,
And every kiss will grow into a flower
To brighten with beauty a coming hour.

—Eben Eugene Rexford.

SPRING NATURE STUDY
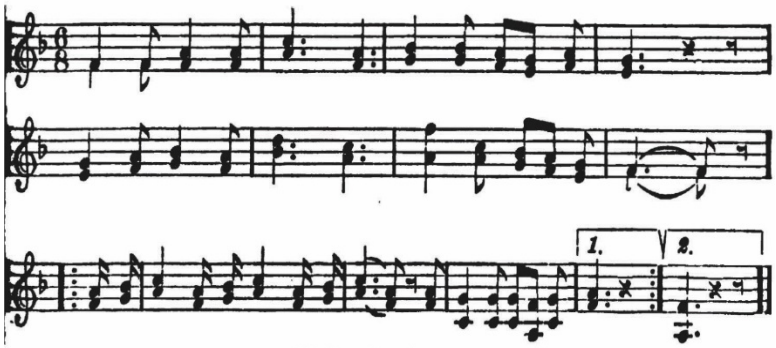
THE BLUE BIRD

High up in the clear sky flies the bluebird, among the first to herald the coming spring. He flies swiftly above the clouds, in sunshine and in storm, singing a joyous carol. His wings are the color of the deep blue sky, and here he and his tribe stay with their cheerful song from March to October, first to come, and last to go, and always finding something to be happy about, even in the early spring or the late autumn. He is like the cheerful and trustful soul that pursues its onward flight above the clouds of trouble through the clear sky of love and trust. It sings its sweetest songs when the cold winds of discouragement and disappointment blow about its path. It reaches its home, at last, safe and happy because trusting in God's care, and finds its shelter and food, though the whole earth looks empty and barren. It flies at the call of God, who never misleads it, but guides it through the trackless air safely to the very place where it would go. * * * *

By permission of Lee & Shepard. —LOUISA P. HOPKINS.

BIRDIES IN THE GREENWOOD

FROM KOEHLER A. WEBER.



1 Birdies in the greenwood
Sing so sweet and clear,
Of the merry sunshine
And the flowers so dear.

La, la, la, la, la, la, la, la, la,
La, la, la, la, la, la
La, la, la, la, etc.

2 Birdies in the greenwood
Built their little nest,
Never do disturb them.
In their place of rest.—**Cho.**

3 Birdies in the greenwood
Sing themselves to sleep,
With each head tucked under,
Snug and warm they keep.—Cho.

From *Songs, Games and Rhymes*, by EUDORA HAILMANN. By permission of Milton Bradley Co. and Thomas Charles, Chicago, Publishers.

SONG SPARROW

The song sparrow in his plain brown dress will return very early in an ecstacy of delight. What news does he bring? Thousands of visitors are on the way dressed in the loveliest colors. Song sparrow is telling the trees, the children in particular, and everyone in general.

How is he dressed? Above, he is brown and gray with many stripes. Beneath, gray, slightly striped with dark forming two spots on his breast; his head, wings, and tail are brown. He has a short, thick, brown bill.

Habits.—He is a sweet singer and pours out his song early and late until he changes his dress in August. In a few weeks he begins again and continues until November. The nest is made of dry grass and is placed in a secluded spot on the ground or in a low bush. The four or five speckled eggs are very pretty.

READ:

"BIRDS CANNOT COUNT"

First Boy.

Six eggs there were, in the nest of a bird,
Under four brown wings' protection.
"Now, 'birds can't count,'" said John, "I've heard."
And so, without saying another word,
He took one for his collection.

Second Boy.

Five eggs there were in the sheltered nest
Karl knew from John's direction,
"As 'birds cannot count'" said Karl "'tis best
To take one of these to go with the rest
Of the kinds in my collection."

Third Boy.

Four eggs there were in the nest on the tree.
Said Dick: "Upon reflection,
As 'birds cannot count,' I think it will be
No harm to them and just right for me,
To take one for my collection."

Fourth Boy.

Three eggs there were in that harassed nest;—
And I don't know what connection
There was to the thoughts in the poor birds' breast
If birds cannot count,—but they left the rest,
For anybody's collection.

All.

Oh, egg-collectors, don't you suppose
You might have some slight objection,
Though you should forget how to count, if those
Who look at your treasures, should, as they chose,
Each take one from your collection.

—*Popular Educator.*

It is claimed by the Directors of the New York Zoological Park that our birds have decreased forty-six per cent. during the past fifteen years in thirty states and territories.

According to this report it is certainly time to make an extra effort to draw the birds closer about our homes by providing shallow dishes of water, nesting places, materials for nest building, etc.

Olive Thorne Miller tells us that a robin has been known to dip herself in water, fly directly into the dust of the street and then pick off the mud from her feet and feathers. A pan of

mud placed in a convenient spot would save the bird this trouble. Strings, twine, yarn, etc. would also be appreciated for building purposes by many of our sweet singers.

It is to be hoped that Shelly's prediction may soon be fulfilled:

"No longer now the winged habitants,
That in the woods their sweet lives sing away,
Flee from the form of man; but gather round,
And prune their sunny feathers on the hands
Which little children stretch in friendly sport
Towards these dreadless partners of their play."

—*From Demon of the World.*

ROBIN

In March, remind children to watch for Robin Redbreast with his calm, dignified air. Report when and where he is first seen.

Describe his spring dress.—Olive gray above, with long, slender, brown wings; brick-red breast; throat, black and white; head and tail black, and bill, yellow.

Song.—He is up before daybreak and makes the woods ring with his cheerful song—"Cheerily, cheerily, cheer up, cheer up!" What is his call note? "Quick! Quick!" Many people imagine that he says during the day, "Do you think what you do?" Children listen for his rain song.

Habits.—Call attention to his movements. He hops or runs along in the yard and turns his pretty head from right to left and listens. Every few minutes he pulls up a worm. His flight is rapid, straight, and decided. He eats grubs, worms or insects until the fruit is ripe. His legs are of medium length and his four toes are placed on a level. He is a percher.

Nest.—Children watch, if possible, the robins carrying sticks and straws for the foundation, then the mud for plastering, and

finally moss or grass for lining. How long did it take to build the nest? Did they begin early? Did they sing while at work? Where do they build? In a hedge, strong vine or tree? Teacher sketch nest with eggs. Blue-green. Generally four in number.

CHILDREN MEMORIZE POEM:

THE BUILDING OF THE NEST

They'll come again to the apple-tree—
Robin and all the rest—
When the orchard branches are fair to see,
In the snow of the blossoms drest;
And the prettiest thing in the world will be
The building of the nest.

Weaving it well, so round and trim,
Hollowing it with care,—
Nothing too far away for him,
Nothing for her too fair,—
Hanging it safe on the topmost limb,
Their castle in the air.

Ah! mother-bird, you'll have weary days
When the eggs are under your breast,
And shadow may darken the dancing rays
When the wee ones leave the nest;
But they'll find their wings in a glad amaze,
And God will see to the rest.

So come to the tree with all your train
When the apple blossoms blow;
Through the April shimmer of sun and rain,
Go flying to and fro;
And sing to our hearts as we watch again
Your fairy building grow.

—MARGARET SANGSTER.

What is the character of our little friend? Cheerful, confiding, industrious, and brave. Fights jays, squirrels, and

other enemies in defense of young. Sings early and late, even in the rain. Builds near our homes, sometimes in porches.

Teacher, tell stories and read poems about the robin. Lead children to see the birds with the poet's eye.

ROBIN'S RETURN

Robin on the tilting bough,
Redbreast rover, tell me how
You the weary time have passed
Since we saw and heard you last.

"In a green and pleasant land,
By a summer sea-breeze fanned,
Orange trees with fruit are bent,—
There the weary time I've spent."

Robin, rover, there, no doubt,
Your best music you poured out;
Piping to a stranger's ear,
You forgot your lovers here.

"Little lady, on my word,
You do wrong a true-hearted bird!
Not one ditty did I sing,
'Mong the leaves or on the wing,

In the sun or in the rain;
Stranger's ears would list in vain,
If I ever tried a note,
Something rose up in my throat.
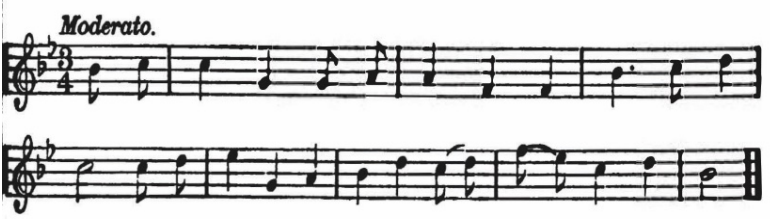
"'Twas because my heart was true
To the North and springtime new;
My mind's eye, a nest could see
In yon old, forked apple tree!"

—EDITH THOMAS.

NOTE.—It is said that the robin does not sing during its winter stay in the South.

SPRING NATURE STUDY

WE ARE RED BIRDS



We are red birds, we are red birds,
So fearless and bold;
We are out in all weather,
And fear not the cold.

We are blue birds, we are blue birds,
So pretty and light;
We are busy, we are happy,
Be the sky dark or bright.

We are orioles, we are orioles;
Our nests are hung high,
Where the soft breezes sing us
A soft lullaby.

We're canaries, we're canaries,
We care not to roam;
We love our kind friends,
And stay always at home.

We are humming-birds tiny,
Deep purple our breasts,
'Mid the blossoms so fragrant
We build our small nests.

—From *Songs for Little Children,* ELEANOR SMITH.

By permission of Milton Bradley Co. and Thomas Charles, Chicago, Publishers.

NATURE STUDY

CRADLE SONG

What does little birdie say
In her nest at peep of day?
"Let me fly," says little birdie;
"Let me rise and fly away."
"Birdie, rest a little longer,
Till the little wings are stronger."
So she rests a little longer,
Then she flies away.

What does little baby say
In her bed at peep of day?
Baby says, like little birdie,
"Let me rise and fly away."
"Baby, sleep a little longer,
Till the little limbs are stronger,"
If she sleeps a little longer,
Baby, too, shall fly away.

—ALFRED TENNYSON.

BIRD GAME

(For this game divide the children into six groups, letting each group represent one kind of bird. The children, in their seats, sing or recite the first verse together and then all fly away to some selected part of the school-room. The first group flies back to place, sings or recites its verse and then sits down. The other groups follow in order, and when all are seated the last verse is given in concert, after which all the children fly freely about the room for a time, playing birds, *being* birds, and dramatizing bird life according to inclination and ability).

Brave little Snow-birds in white and gray!
Summer is coming so *we* cannot stay!
The place for our nesting is far in the North,
You think it is cold here, but it is our South.

We are Tree Creepers, so speckled and small,
We were almost the last to go south in the fall;
We were almost the first to come back, and you see
We go creeping around and around up the tree.

SPRING NATURE STUDY

We are Grackles, so shiny and black;
We wonder if farmers are glad we are back!
They will hear our gay chatter from night until morn
As we keep a sharp eye on their wheat and their corn.

And now Robin Redbreast comes back with the spring.
On the high tree-tops he'll whistle and sing.
He knows everybody is happy to see
Both him and his mate on her nest in the tree.

Blithe, bonny Bluebirds the south wind has sent,
Each hoping to find a new bird-house to rent.
Or else a snug hole in a post, fence or tree,
Where wee baby Bluebirds well sheltered may be.

Gay flashing Orioles, whistling clear,
Tell you that springtime is certainly here.
We wait for the elm-leaves to cover the nest
On the high swaying branches which we love the best.

Swift darting swallows way up in the sky
Tell that the summer is very close by.
Frosts must be over and warm weather come
Before we risk leaving our safe southern home.

Now the days are full of music!
All the birds are back again;
In the tree-tops, in the meadows,
In the woodlands, on the plain.
See them darting through the sunshine!
Hear them singing loud and clear!
How they love the busy springtime,
Sweetest time of all the year!

—KATHERINE BEEBE. *Primary Education.*

SNAILS

Aim.—To lead children to observe habits and adaptation of structure to environment.

To awaken an interest in soft-bodied animals. (Mollusks).

Preparatory Work.—Talk with pupils about the kinds of material used in building homes for people, birds, and other animals. Ash children to look under leaves, stones, and logs in damp, shady places for snails and shells.

Material.—Living snails, together with some of the leaves or other food they like, in a glass jar with damp earth.

Deserted shells of different sizes and colors.

Plan of Work.—Direct attention to the color and form of snail shells. Are people's houses all of the same color? same shape?

Children group shells according to color. The owners of the white houses have been dead some time, no doubt, because their homes look as though they needed painting.

Are people's houses all made of the same material? Pour strong vinegar or acid on different substances, as granite or quartz. What happens when it is poured on the snail shell? It bubbles or effervesces. This tells us that the material consists of lime-carbonate.

Shape.—The shell is spiral. Each turn is called a whorl; the largest one is the body whorl. The spaces between the whorls are the sutures, and the upper part is the spire. The apex is the tiny shell that covered the young snail. Place the shell containing the living snail upon a piece of warm glass, or in a glass of tepid water, and the little creature will be likely to make his appearance.

> The frugal snail, with forecast of repose,
> Carries his house with him where'er he goes;
> Peeps out, and if there comes a shower of rain,
> Retreats to his small domicile amain.

Touch but a tip of him, a horn,—'tis well,—
He curls up in his sanctuary shell.
He's his own landlord, his own tenant; stay
As long as he will, he dreads no quarter-day;
Himself he boards and lodges; both invites
And feasts himself; wheresoe'er he roams
Knock when you will, he's sure to be at home.

—CHARLES LAMB.

How does the snail walk? Look on the under side of the glass and watch his broad muscular foot which creeps along with a gliding motion. As it travels it covers the glass with slime or mucus from its body.

How does it eat? Let children feed the snail peavine, toadstool, cabbage, etc. It has a long, ribbon-like tongue covered with points that serve the purpose of teeth. The snail moves the ribbon backward and forward against the upper jaw until he cuts his food.

Where are the eyes? Notice the four feelers, two of which are much shorter than the others. The eyes are situated at the ends of the long feelers.

How does the snail breathe? The little creature has a breathing hole under the edge of the shell, which leads to a small sac or lung in the mantle.

Habits.—Lives on decaying leaves and other vegetable matter and can easily be found crawling about after a rain. The young hatch from eggs. The shells of young snails are transparent. In the fall the snail withdraws into its shell, seals up the opening by a layer of slimy mucus which forms a thin membrane. It hibernates during the winter and when spring comes it opens its door and stretches out its head.

Lead children to see how well adapted the hard shell is to a soft bodied animal.

Children, bring cowry, conch, and other ornamental shells from their homes and observe their exquisite beauty.

"See what a lovely shell!
Small and pure as a pearl.
Frail, but a work divine,
With delicate spire and whorl;
A miracle of design.
The tiny cell is forlorn
Void of the little living will
That made it stir on the shore;
Did he stand at the diamond door
Of his house in a rainbow frill?
Did he push when he was uncurled
A golden foot of a fairy horn,
Thro' his dim water world?" —TENNYSON.

Uses.—In European countries, especially in France and Italy, several kinds of snails are used for food and are very frequently pictured on the sign-boards of restaurants. In Paris it is estimated that one hundred thousand pounds of snails are eaten daily. In Pompeii great heaps of shells may be seen.

POND SNAILS

The pond snail may be kept in a jar of water. The general form of the shell is like a cone and is composed of whorls. This snail has two feelers and the eyes are situated at the base of the feelers. The little animal finds it necessary to come to the surface of the water for fresh bubbles of air occasionally.

Compare with garden snail. Let children picture shells. The clam, mussel and oyster shells divide into two parts and are called bivalves. The snail and its relatives having but one shell are called univalves.

I have seen
A curious child who dwelt upon a tract
Of island ground, applying to his ear
The convolutions of a smooth-lipped shell;
To which, in silence hushed, his very soul
Listened intensely; for from within were heard
Murmurings whereby the monitor expressed
Mysterious union with its native sea. —WORDSWORTH.

STUDY OF POEM.

THE CHAMBERED NAUTILUS

This is the ship of pearl, which, poets feign,
Sails the unshadowed main,—
The venturous bark that flings
On the sweet summer wind its purpled wings
In gulfs enchanted, where the Siren sings,
And coral reefs lie bare,
Where the cold sea-maids rise to sun their streaming hair.

Its webs of living gauze no more unfurl;
Wrecked is the ship of pearl!
And every chambered cell,
Where its dim dreaming life was wont to dwell,
As the frail tenant shaped his growing shell,
Before thee lies revealed,—
Its irised ceiling rent, its sunless crypt unsealed!

Year after year beheld the silent toil
That spread his lustrous coil;
Still, as the spiral grew,
He left the past year's dwelling for the new,
Stole with soft step its shining archway through,
Built up its idle door,
Stretched in his last-found home, and knew the old no more.

Thanks for the heavenly message brought by thee,
Child of the wandering sea,
Cast from her lap, forlorn!
From thy dead lips a clearer note is born
Than ever Triton blew from wreathed horn!
While on mine ear it rings,
Through the deep caves of thought I hear a voice that sings:—

Build thee more stately mansions, O my soul,
As the swift seasons roll!
Leave thy low-vaulted past!
Let each new temple, nobler than the last,
Shut thee from heaven with a dome more vast,
Till thou at length art free,
Leaving thine outgrown shell by life's unresting sea!

—OLIVER WENDELL HOLMES.

NATURE STUDY

The poet once wrote a letter to the Cincinnati school children in which he said, "If you will remember me by 'The Chambered Nautilus,' 'The Living Temple' and 'The Promise,' your memories will be a monument I shall think more of than any bronze or marble." "The Chambered Nautilus" was his favorite. He wrote the last stanza in the album of Princess Louise.

Why called Nautilus? Why "poets feign"? "The animal frequents deep waters, and though it is occasionally found at the surface, it sinks upon the least alarm, so that it has been rarely captured, although the shell is so common."—Elements of Zoology. Why "venturous bark"? It is not afraid to sail on its purple wings into enchanted gulfs. Sirens—sweet singers in the ocean that were supposed to lure to destruction. Not afraid of coral reefs or mermaids. What was the result of this fearlessness and daring?

"Why "dim, dreamy life"? The Nautilus and all other mollusks have few nerves. Compare with the activity of birds. Why "irised ceiling"? Iris rainbow queen—note color of shells. "Silent toil" and "lustrous coil"—explain. What did the poet hear while studying the shell? Heavenly message. Tritons were the bold trumpeters of the sea-god Neptune.

What is the message? The meaning? It told the poet to grow. Let every year be a mansion with a more beautiful dome. Live nearer to God. Then death will be leaving an outgrown shell. Commit last stanza.

THE FROG

Material.—A live frog in a large glass jar containing a sod of grass. Cover jar with coarse netting.

Some frog's eggs in a jar of water. Care should be taken not to place too many eggs in the jar and not to expose eggs to direct sunlight.

Pupils should be encouraged to assist the teacher in procuring material for class work. In March or April tiny dark eggs enclosed in a gelatinous membrane may be found in the shallow water of ditches and along the edges of ponds.

Habits and Structure.—Let the children bring in a variety of live insects. Many destructive kinds can easily be found. Watch the frog eating his dinner. How many insects did he catch in a minute?

The tongue is very curious. It is two-forked and has its base in front instead of at the back of the mouth. The tip points toward the throat and is covered with a thick, sticky substance resembling glue.

Notice the broad, short body and the large triangular head.

Let the children study the frog's movements in a large dish of water. Direct attention to the limbs,—hind limbs long, each foot five-toed and webbed; the fore limbs short, each foot four-toed. Watch the frog leaping when taken from the water. Compare movements of rabbit and frog.

Let children notice the difference in color of the back and the under portion of the body. Compare with color of surroundings near ponds and streams. Who can think of a use for the green and brown coloring? Blends with surroundings. How many have seen frogs diving into the mud to escape from their enemies? How many have seen them eating worms?

Notice the large projecting eyes and the small piece of thin, tight skin back of each eye, stretched over a hard ring that forms the ear-drum.

Breathing.—The frog breathes by means of his skin as well as by his lungs. He closes his lips, expands the cavity of the mouth, and draws air in through his nostrils. He swallows air as a person swallows food, and if his mouth were kept open any length of time he would suffocate.

Where are the frog's teeth? Open his mouth carefully and

pass your fingers along the upper and lower jaws and find out.

Why do frogs frequent ponds and ditches? Without plenty of moisture the skin dries and shrinks and the frog soon dies.

In the winter they find a resting place in the mud, and sleep there securely until the return of spring. How many have seen the frog shedding its coat? Imitate the frog's croak. Notice the position a frog takes while at rest; while jumping.

Frogs destroy large numbers of slugs and insects and serve in their turn as food for other animals. Fishes, birds and snakes devour thousands of tadpoles and frogs. In Europe and America frogs' legs are sold for food.

In studying the life history of the frog we seem to have before us the life of two different animals. Its place of abode, its habits, its food, and even its structure, are different in the early period of its existence from what they are later. Develop facts by questioning.

Eggs.—The children have been watching the development of the eggs.

What is the use of the jelly-like mass in which the eggs are deposited? It not only protects the eggs from cold and from being washed away, but it serves as food for the life it contains. As soon as the children see the little wigglers in the jar they should provide them with a few water plants.

Notice the small tufts (gills) on each side of the head which enable the tadpole to breathe in the water.

Observe change in the shape of the body, appearance of the legs, hind ones appearing first. The body continues to change shape, the tail is absorbed, the legs grow longer, and in place of gills, lungs are formed; our tadpole has become a frog and is ready for the land.

Compare tadpole with frog in regard to structure and habits.

If two jars were arranged, one with frogs' eggs and the other with toads' eggs, (toads' eggs are found in strings and are some-

what darker in color than frogs' eggs) the comparison would certainly prove interesting.

A record of the dates of changes in appearance from day to day placed on the blackboard will lead to careful observation. Compare frog with toad.

Let children study frogs and toads in natural environment.

Watch to see the toad shedding his warty skin and report observation.

THE WIND

Lead children to talk about the wind. What is wind?

From which direction is the wind blowing to-day? In what way does spring differ from winter?

What work has the wind to do in spring?

The wind melts ice and snow; brings the rain clouds; wakens the life in roots, seeds, and buds, and drives the clouds away.

What work has the wind to do in autumn?

Let children tell about the wind shaking down the leaves and nuts, scattering seeds, etc.

When does a windmill turn most rapidly? Of what use is the wind to sailors? What results to air, water, and iron when heated? Why do soap bubbles rise? Name all the uses of wind that you know. Question pupils to incite continued observation.

CHILDREN MEMORIZE:

THE WIND

I saw you toss the kites on high
And blow the birds about the sky;
And all around I heard you pass,
Like ladies' skirts across the grass—
O wind, a-blowing all day long!
O wind, that sings so loud a song!

NATURE STUDY

I saw the different things you did.
But always you yourself you hid.
I felt you push, I heard you call,
I could not see yourself at all—
O wind, a-blowing all day long!
O wind, that sings so loud a song!

O you that are so strong and cold,
O blower, are you young or old?
Are you a beast of field or tree,
Or just a stronger child than me?
O wind, a-blowing all day long!
O wind, that sings so loud a song!

—ROBERT LOUIS STEVENSON.

By Permission of Rand, McNally & Co.

CHILDREN MEMORIZE:

SWEET AND LOW

Sweet and low, sweet and low,
Wind of the western sea,
Low, low, breathe and blow,
Wind of the western sea!
Over the rolling waters go
Come from the dying moon and blow,
Blow him again to me;
While my little one, while my pretty one sleeps.

Sleep and rest, sleep and rest,
Father will come to thee soon;
Rest, rest, on mother's breast,
Father will come to thee soon;
Father will come to his babe in the nest,
Silver sails all out of the west
Under the silver moon;
Sleep, my little one, sleep, my pretty one, sleep.

—TENNYSON.

SPRING NATURE STUDY

FOR REPRODUCTION AFTER DISCUSSION:

ORPHEUS, A MYTH OF THE SOUTH WIND

In the land of Thrace lived, years ago, one who was called Orpheus. He was the sweetest singer ever known. His voice was never loud, but low and sweet and soft.

When men heard this voice all anger ceased, and they thought only thoughts of peace.

Orpheus went into the woods one day and took nothing but his lyre with him.

No quiver of arrows was on his back nor hunting spear at his side.

He sang and sang till the birds flew down on the ground about him, and seemed to think that a creature with such a voice must certainly be another kind of bird.

A wildcat came slyly creeping between the trees, trying to catch the little feathered friends. Orpheus took his lyre and the wildcat became as tame as the birds. They all followed Orpheus farther into the forest.

Soon, from behind a rock, a tiger sprang to attack the wildcat. The birds and the wildcat called to Orpheus. When he saw the trouble he took his lyre again and, while he sang, the tiger came trembling and purring to his feet, and the birds, the wildcat, and the tiger followed Orpheus into the forest.

He sat down by a tree to rest and the honey bees came and showed him where their honey was hidden in the tree. He fed his friends and himself, and the tiger led the way to the river, where there was the purest water.

Trees bent low before him, and young trees tore themselves from the ground and followed in his train.

Foul waters parted, so that Orpheus and his band might pass through unharmed, for they knew no longer any evil thing.

Before they reached the river of pure water, to which the tiger was leading them, a lion, fierce with hunger, sprang madly at his old enemy.

Orpheus took his lyre and played so wonderfully, that even the pine trees sighed with sorrow, and the lion loosed his hold on the tiger, and his voice changed from a growl to a wail, and he, too, followed the sweet singer of Thrace. At the river, birds, wildcat, tiger, and lion drank together with Orpheus, with not one thought of harming each other.

"We are tired," said the birds. "Let us stay here by this river," and Orpheus agreed. The birds flew to the trees, while the others tried to rest on the huge rocks by the shore, but these were jagged and rough. They would give no rest to anyone.

When Orpheus began to play, the hardest rocks were stirred. They rolled over and over into the river, and in their places the softest beds of white sand were ready for them all. Orpheus rested, with the lion and the tiger for his night watchers, and the wildcat asleep in the tree with the birds.

In the morning, the lyre sounded again, and the strange company wandered away, happy to be near Orpheus. The three wild beasts had fed together on the river mussels and forgot that they had been life-long enemies.

Orpheus had said, before he entered the forest, that he was tired of men and their quarrels; that wild beasts were easier to tame than angry men; and so he had found it these two days in the forest.

He took his lyre and played and sang a sweet wild song of love and peace, and, overhead, the leaves and branches of the oaks danced and waved for joy of living. Not one growl, not one quarrel was heard even where the echoes of the music went, for even the rocks answered the voice of Orpheus, and everything was at peace.

Then came the sound of the hunting dogs. The lion raised his shaggy head, but put it down again. A green light came into the eyes of the tiger and of the wildcat. The dogs came nearer. Orpheus played on his lyre and the dogs came and lay down at his feet, but the hunters went home without their prey. That night Orpheus led them all back to the paths where he found them, and went home to his cave in Thrace.

For years, hunters told, over their camp fires, strange stories of a tiger and a lion who lived together in the deep forest, and of a wildcat with eyes like a pet fawn.

Sometimes, even in these days, it seems as if Orpheus were singing again.

When the wind strikes the trembling wires there comes sweet music. The pine trees sigh, and leaves and branches of the forest trees dance as in the days when Orpheus first went into the woods of Thrace.

When the South wind blows, sounds like the lyre of Orpheus come to us from these trembling leaves.

When the South wind comes, Earth's voices become low and sweet, and the birds sing soft melodies to greet its coming.

The old books tell us that Orpheus was but the South Wind.

—MARY CATHERINE JUDD.

(Rand, McNally & Co.) Adapted.

SPRING FLOWERS

Stedman says of Lowell: "It does me good to see a poet who knows a bird or flower as one friend knows another, yet loves it for itself alone."

Approach the spring flowers with the higher thought of their symbolism.

"They sleep in dust through the wintry hours,
They break forth in glory with the spring's warm showers."

Here is a sweet poem which will help the children to appreciate the loveliness of the anemone when they find it nodding to them in its home in the woods.

Nothing sweeter is to me, than the wind anemone,
Lifting up her fair, pink face, in some lonely, wildwood place.
Children in the April days, when you search the hillside ways,
Search the valleys through and through, for buttercups and violets blue.
Here and there you'll surely see, pretty wind anemone,
In her simple, pale green gown, and her dear eyes looking down.
Then with me I pray you say: sweetest flower I've found to-day,
Type of grace and purity, lovely wind anemone!

By MARY GRANT O'SHERIDAN.

Have several plants dug up carefully and taken home as a contribution to the wild-flower garden in the school-yard. If children cultivate flowers they will soon learn to appreciate their beauty.

ANEMONE

This plant has a slender stem and three compound leaves, forming a pretty vase for the one white flower tinged with pinkish purple. The anemone has no petals. Let children ex-

amine seeds and root-stock (rhizome). Discuss work of root, stem, leaf, and flower. Sketch plant. Repeat poem on "Flowers" by Mary Howitt.

THE BLOODROOT

Children find this frail flower in April in the damp woods.

Examine the rhizome or root-stock growing horizontally, filled with red, acrid juice. Leaf comes up from the ground clasping the flower-bud. The blade is rounded, margin lobed, and base deeply heart-shaped.

Flower loses its sepals as soon as it opens. The pure white petals open only in the sunshine. Sketch the plant and compare it with some flower previously studied.

THE BLUE VIOLET

I know blue modest violets,
Gleaming with dew at morn—
I know the place you came from,
And the way that you were born!
When God cuts holes in heaven,
The holes the stars look through,
He lets the scraps fall down to earth,
The little scraps are you.

—PHOEBE CARY.

Request children to look for violets early in the spring, and see who will be first to bring one to school.

Field Lesson.—Home of the violet?

Why did the leaves come before the flowers?

The leaves, with the help of the sun, prepare food for the flowers and other parts of the plant.

Take home several plants and observe their growth in the school-yard. Describe root, leaf, and flower.

Children sketch and paint the violet.

SPRING NATURE STUDY

Hamilton Gibson says:

"We cannot all be scientists or explorers, but we can at least learn to lend an answering intelligent welcome to those little faces that smile at us from among the grass and withered leaves, that crowd humbly about our feet, and are too often idly crushed beneath our heel. The darkest pathless forest is relieved of its gloom to him who can nod a greeting with every footstep; who knows the pale dicentra that nods to him in return; who can call by name the peeping lizard among the moss, the pale white pipe among the matted leaves, or even the covering mould among the deep debris."

—From *Highways and Byways.*

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CHORUS OF THE FLOWERS

I am the honeysuckle with my drooping head,
And early in the spring time I don my dress of red.
I grow in quiet woodlands, beneath some budding tree;
So when you take a ramble, just look at me.

I am the dandelion, yellow, as you see,
And when the children see me they shout for glee.
I grow by every wayside, and when I've had my day
I spread my wings so silvery, and fly away.

When God made all the flowers, he gave each one a name;
And when the others all had gone, a little blue one came,
And said, in trembling whisper, "My name has been forgot,"
Then the good Father called her Forget-me-not.

A fern the people call me, I'm always clothed in green;
I live in every forest—You've seen me oft I ween.
Sometimes I leave the shadow to grow beside the way;
You'll see me as you pass some nice, fine day.

I am the gay nasturtium, I bloom in gardens fine;
Among the grander flowers, my slender stalk I twine.
Bright orange is my color, the eyes of all to please.
I have a tube of honey for all the bees.

I am the little violet, in my purple dress;
I hide myself so safely, that you'd never guess
There was a flower so near you, nestling at your feet;
And that is why I send you my fragrance sweet.

—LUCY WHEELOCK.

JACK-IN-THE-PULPIT

(INDIAN TURNIP.)

By the time Jack-in-the-Pulpit makes his appearance we realize the force of the following lines:

The year's at the spring
And day's at the morn;
Morning's at seven;
The lark's on the wing;
The snail's on the thorn;
God's in his heaven—
All's right with the world.

—ROBERT BROWNING.

In this lesson emphasize the symbolism of flowers and lead pupils to image Whittier's poem.

Preparation.—Informal talk with children about the work of the sun and the rain in waking up the flowers. Which flowers answered the call first? How many of the children have become acquainted with the little flower-preacher?

Field Lesson.—Visit Jack in his home, give him a cordial greeting and thank him for making his appearance so early. Find out about his home life, his friends, and his work.

Direct attention to the beauty of his surroundings; carpet green, decorated with many colors; ceiling blue, white, and gray—constantly changing.

Why called Jack-in-the-Pulpit?

After the children have become acquainted with the flower and discussed its environment they will enjoy the poem.

SPRING NATURE STUDY

JACK-IN-THE-PULPIT

Jack-in-the-pulpit preaches to-day
Under the green trees just over the way.
Squirrel and song-sparrow, high on their perch,
Hear the sweet lily-bells, ringing to church.

Come, hear what his reverence, rises to say,
In his low, painted pulpit, this calm Sabbath day.
Fair is the canopy, over him seen,
Penciled by Nature's hand, black, brown and green.

Green is his surplice, green are his bands,
In his queer little pulpit, the little priest stands.
In black and gold velvet, so gorgeous to see,
Comes with his bass voice, the chorister bee.

Green fingers playing, unseen on wind-lyres—
Low singing bird voices—these are his choirs.
The violets are deacons—I know by the sign
That the cups which they carry are purple with wine;

And the columbines bravely as sentinels stand
On the lookout with all their red trumpets in hand.
Meek-faced anemones, drooping and sad;
Great yellow violets, smiling out glad;

Buttercups' faces, beaming and bright;
Clovers, with bonnets—some red and some white;
Daisies, their white fingers half clasped in prayer;
Dandelions, proud of the gold in their hair;

Innocents,—children, guileless and frail,
Meek little faces upturned and pale;
Wildwood geraniums, all in their best,
Languidly leaning, in purple gauze dressed;—

All are assembled this sweet Sabbath day,
To hear what the priest in his pulpit will say.
Look! white Indian pipes on the green mosses lie!
Who has been smoking profanely so nigh?

NATURE STUDY

Rebuked by the preacher, the mischief is stopped;
But the sinners, in haste, have their little pipes dropped.
Let the wind, with the fragrance of fern and black birch,
Blow the smell of the smoking, clean out of the church.

So much for the preacher; the sermon comes next.
Shall we tell how he preached it and what was his text?
Alas! like too many grown-up folks who play
At worship in churches, man builded to-day,

We heard not the preacher expound or discuss;
But we looked at the people, and they looked at us.
We saw all their dresses, their colors and shapes,
The trim of their bonnets, the cut of their capes.

We heard the wind-organ, the bee and the bird,
But of Jack-in-the-Pulpit we heard not a word.

—WHITTIER'S *Child Life*.

Examine the pulpit, the canopy, the decorations. Are all the canopies "penciled" alike? Do you see "sentinels" here? "lily bells?" How many of the flowers named in the poem can you find? Which is your favorite? Why? What message do you think Jack has for the flowers and trees in his neighborhood? They seem well pleased, even the great trees bow approvingly.

Do you hear the music? wind lyres? the bird choir?

Children tell what they think the birds say. "Cheer up! cheer up! Spring of the year. Quick! Quick!" etc.

Dig up two or three flowers in different stages of development and plant in a window box. Jack likes damp soil and a shady nook. After an informal talk about the plant as a whole, direct attention to the work of root, stem, leaves, and flower. The underground part of the plant is enlarged into

"Every flower to a bird has confided
The joy of its blossoming birth—
The wonders of its resurrection
From its grave in the frosen earth.

'We arise and we praise Him together
With a flutter of petals and wings,
The anthems of spirits immortal
Rings back from created things.'"

a solid bulb called a corm. It contains starchy matter and is acrid in taste. Let children picture the plant as a whole.

Our little declaimer is shaded by an arched roof and also by the large green leaves. Encourage the children to study the plants in their true home—damp soil in the woods. Observe the small flies that exchange pollen for nectar. Note the frill of fine hairs that point toward the honey cells. How will the fly get out of the flower?

The flowers that have seed cases will soon have berries.

Watch the plants and find the red berries after awhile.

The Flower.—The spadix bears the flowers. In some flowers the spadix contains pistils only, and some, stamens only. The showy envelope (spathe) serves as a "sounding board" for the little preacher. Sounding boards are often seen in churches over pulpits to increase the resonance of the speaker's voice. Jack always has a crowd of listeners.

The starch in many species of this plant is used as food. It furnished the stiffening for the immense lawn ruffs worn in the days of Queen Elizabeth.

THE ROSE

Aim.—To develop a love for a flower that is interwoven with all poetry and art—the queen among flowers.

To learn about the plant as a whole, the relation and work of its parts and its history.

Preparatory Work.—Lead pupils to talk about the beauty of flowers. Read poems to give direction to their thoughts. Help pupils to interpret:

"Earth is crammed with heaven,
And every bush alive with God,
But only he who sees
Puts off his shoes."
—BROWNING.

In May, direct children to observe the shrub, find and report where it grows, general appearance, environment, height of shrub, kind and arrangement of leaves, appearance of buds, etc. Two or three days before the

field lesson a few questions may be asked which can be answered only by a study of the plant in its home.

Field Lesson.—Observe plant as a whole. Give each child something definite to find out for himself. Give a few general questions to all the children. Find out how many of this plant's neighbors the children know. Which is the most useful? Which is the most beautiful? Recall the lessons on apple blossoms. Tell children that the rose and the apple blossom are members of the same family. Let children discover resemblances and differences. Find a shrub well filled with buds and blossoms. By conversation lead pupils to discover the beauty of color, form and use. Observe visitors. Has the plant enemies? Dig up two or three rose bushes and take them to the school-room or school-yard for study. The parts of the plant should be considered from the standpoint of function.

Root.—Is a rose bush hard to pull? Examine root and review function.

Stems.—Uses, height, shape, size, color, compare prickles with the thorns of the thorn apple.

Leaves.—Uses of leaves, arrangement on stems, kind, leaflets venation, etc.

Flowers.—Number, position. Describe the flower, parts of corolla, calyx, stamens and pistils.

Fruit.—Examine the fleshy red fruit, generally called hip.

Examine the thorns or prickles.

What is their use? Rabbits peel bark from trees and shrubs in the spring time. Would they be likely to injure shrubs with thorns?

Expression.—Children, sketch plant as a whole. Paint branch containing leaves, buds and blossoms. Children commit:

"The rose has one powerful virtue to boast,
Above all the flowers of the field;
When its leaves are all dead and its fine colors lost,
Still how sweet a perfume it yields."

Compare the wild rose with garden varieties. Tell children that the rose was a great favorite with the Greeks and Romans. It was customary for warriors to wear wreaths of roses. Nero caused showers of roses to be sprinkled on his guests at banquets. This flower suggested silence and a rose hanging over a guest table was a hint that conversation was to be "sub rosa." In later years the rose was dedicated to the Madonna and in Dante's Paradise she is called the "Mystic Rose." The Attar of Roses, an oil of great fragrance, is distilled from this flower. Forty thousand flowers are required to make an ounce, which sells for one hundred dollars. About one hundred and twenty species of roses grow wild in the whole world, while the garden varieties are numbered by thousands.

Pupils picture roses related to the bush. Let children observe a beautiful rose and teacher read:

AND YOU SWEET ROSE

Ah! crimson rose,—deep fused with gold,
Your perfumed heart rare secrets hold!
Unfold your petals, flower most fair,
And tell me what lies hidden there!
Your rosy lips—what would they speak?
What says the dew-drop on your cheek?
Within your heart lurks there a tear,
The while you smile upon me, dear?
Smile on, smile on, while yet you may—
Have no regrets for yesterday!
Live for to-day, my crimson rose!
To-morrow, ah! Your radiance goes
Forth with the sands in Time's frail glass—
And you, sweet rose, must fade—alas!

Not from my memory shall you die—
Within my breast enshrined you'll lie
Forever more. * * *

—AGNES HELEN LOCKART.

A week ago the sparrow was divine;
The bluebird shifting his light load of song
From post to post along the cheerless fence,
Was as a rhymer ere the poet come;
But now, O rapture! sunshine winged and voiced,
Pipe blown through by the warm wild breath of the West
Shepherding his soft droves of fleecy cloud,
Gladness of woods, skies, waters, all in one,
The bobolink has come, and, like the soul
Of the sweet season vocal in a bird,
Gurgles in ecstasy we know not what
Save June! Dear June! Now God be praised for June.

From Under the Willows.—LOWELL.

FERNS

Visit the woods with pupils in May or early June and see the growing ferns. A few tufts, root-stock and all, should be taken to the school-room.

The Osmund Fern is very common. Wordsworth says:

That tall fern,
So stately of the queen Osmunda named
Plant lovelier, in its own retired abode
On Grasmere's beach, than Naiad by the side
Of Grecian brook.

The root is of many fibers with branches numerous, short, and spreading.

The stem is subterranean, a thick dark colored rhizome living many years (perennial).

When starting from the ground in early spring each leaf or frond, as it is called, is rolled from the top inward and downward, gradually unfolding as it grows.

Observe the brown wool which serves to protect the leaves against changes of temperature.

The fern has no flowers. It is reproduced by means of spores which are borne on the leaflets.

Compare with Maiden Hair Fern and with flowering plants.

In what particulars do they agree? differ?

Plant ferns near school and watch development. Remember the kind of soil they like best.

Picture ferns.

THE GRASSES

SONG OF THE GRASS BLADES.

"Peeping, peeping, here and there,
In lawns and meadows everywhere;
Coming up to find the spring,
And hear the robin redbreast sing,
Creeping under children's feet,
Glancing at the violets sweet,
Growing into tiny bowers,
For the dainty meadow's flowers:—
We are small, but think a minute
Of a world with no grass in it."

The grasses are by far the most useful of all plants. They are everywhere to be seen carpeting meadows, hills and valleys with their soft beautiful green. Our cereals—wheat, oats, rye, barley and Indian corn—are simply cultivated grasses.

Field Lesson.—Visit a grass plot. Let children make a collection of pretty grasses for the school-room table.

Count the number of stalks growing in a square foot of meadow.

What part of the stalk is the hardest and strongest? On what part of the stem are the nodes closest together? Break a stem. Have all the grasses hollow stems?

The jointed, hollow stem is called a culm. Can you find branching culms? Have grasses flowers? Are the flowers fragrant? bright colored? Are they visited by insects? Watch and decide. Examine the leaves. Compare shape and venation with leaves previously studied.

Dig up some of the sod, take home, wash soil out of it and examine roots.

Children, name different places where grasses are found growing.

"Here I come creeping, creeping everywhere;
By the dusty roadside,
On the sunny hillside,
Close by the noisy brook,
In every shady nook,
I come creeping, creeping everywhere."

The grasses, by their many roots, hold the soil together and prevent it from being washed away—most grasses are perennials. Find the tiny stamens in the chaff-like scales? Find pistils. Most of the grasses are fertilized by the wind. They furnish food and shelter for cattle, horses, sheep, birds and insects.

Timothy is one of the very common varieties. The flowers grow on a long spike, cylindrical in shape. The root looks like a small bulb. Picture and compare with clover.

Timothy seed was brought to this country from Europe many years ago by a man named Timothy Herd.

Sweet Vernal Grass.—Examine root, culm, leaves and flowers. The internode is very long, the leaf blade and sheath are very short.

Note the adaptation of the flowers to wind-fertilization—the long stamens and stigmas—the beautifully balanced tremulous anthers. Compare Timothy with Sweet Vernal Grass.

THE DANDELION

"There surely is a gold mine somewhere underneath the grass,
For dandelions are popping out in every place you pass.
But if you want to gather some you'd better not delay,
For the gold will turn to silver soon and all will blow away."

—SELECTED.

The dandelion's golden discs may be found near the home and school from early spring until late in autumn and children admire this common flower as much as many older people dislike it.

Preparatory Work.—Give children definite questions to answer by studying the plant. Let them pull up a dandelion. Was it hard to pull? What change takes place after it is taken from the earth unless kept in water? Cover a growing plant in the yard and compare its appearance after a couple of weeks with one growing in the sun. Examine the flowers after dark. Children tell why they like the dandelion. They have curled the hollow stems, made chains of the blossoms, and by blowing away the seeds found out when "mother calls."

Material.—Two or three plants in different stages of development growing in window boxes. Children observe changes from day to day. A couple of whole plants in glass jars of water.

Root.—Direct attention to the strong central root and the number of branches extending in every direction. Compare root of a plant that has formed seed with one that has not. Why has one so much milky juice and the other so little? The plant that has ripe seed has a spongy root. Milky juice used in making seeds.

Sum up Uses of Root

Holds the plant firmly in the earth.

Central thickened root stores up food for all parts of the plant.

The fine rootlets take up nourishment from the earth.

Leaves.—Lead children to discover that the leaves form a rosette around the buds and flowers. The leaf is oblong in shape and the margins are cut into large lobes.

Let children find dandelions growing among high weeds and compare with those growing in open places; the leaves are flat on the ground in open places, and extend upward to catch the sun's rays among the tall weeds.

Call attention to the large vein in the middle of the leaf to guide rain to the roots. Show by experiment that growing leaves give off watery vapor. Fit a piece of oilcloth or heavy paper under the leaves of a plant growing in the sunshine and cover with a glass jar; moisture collects on inner surface of jar. Recall experiment with morning-glory. Watery vapor passes through the breathing pores of the leaves.

Sum up the Work of Leaves

They protect the buds and flowers. Direct water to the roots.

Breathe for the plant.

With the help of the sun they make food for the plant.

The seeds are very dainty, but the strong old trees will send a warm blanket of leaves, and later the snow will cover leaves and seeds until the warm sun and the spring rains awaken them from their long sleep. Read "November," by Alice Cary.

THE FLOWER

"Bright little dandelion, downy yellow face
Peeping up among the grass with such gentle grace,
Minding not the April wind blowing rude and cold,
Brave little dandelion with a heart of gold."

The heart of gold is a pretty center for the rosette.

Watch the dandelion's visitors. Children keep a record for a week of the different insects they find on the flower. The bees like the dandelion because the nectar is easily obtained

from the tubes of the florets. How do they pay for the nectar? When they visit a flower in search of food they carry a precious dust called pollen from one flower to another that needs it in order to develop the best seed. If pollen is not obtained from another flower the dandelion ovules manage to get it from the plant on which they grow. This process of self-pollination, in case cross-pollination (pollen from one flower to another of the same kind) is not secured, accounts for the great number of dandelions to be found. The stem takes the flower up to the sun when it is necessary, is hollow, and has a bitter taste.

Children, discover the habit of the flower in closing at night and upon the approach of rain to save the nectar, also the involucre closing upon the fading corolla while the seeds are ripening, and becoming convex to hold up the seeds so as to catch the wind when they are ready to fly. Children notice that after the flower withers, a white, downy mass appears, the silky hairs spread apart and a beautiful white sphere rivals the golden yellow flower. Count the number of seeds on a head. A light puff of wind will start them on their journey. Children blow seeds from the receptacle and see how they sail; try to imagine where the silk wings will take them.

O dandelion yellow as gold,
What do you do all day?
I just wait here in the tall green grass
Till the children come to play.

O dandelion yellow as gold,
What do you do all night?
I wait and wait till the cool dews fall
And my hair grows long and white.

And what do you do when your hair is white
And the children come to play?
They take me up in their dimpled hands
And blow my hair away.

—SELECTED.

Summary

The flowers close in unfavorable weather.

The flowers close while seeds are ripening.

The bright color attracts the insects.

The flower stem (scape) grows upwards to give the seeds a chance to fly away. Determined to grow near our homes.

Change in shape of receptacle after the disappearance of the blossom.

The small, green bracts protect buds at night.

Teacher, draw plant as a whole, directed by pupils in order to lead them to observe carefully. Erase, and let children draw and paint the dandelion.

Sum up uses of root, stem, leaves, and flowers. Again impress interdependence in nature.

Tell children that the dandelion belongs to a very noted family and has a great many distinguished relatives. They grow in all parts of the world and comprise about one-tenth of all the flowering plants. (Aster, golden-rod, sunflower, thistle, chrysanthemum, dahlia, marigold, and many others.) Compare dandelion with chrysanthemum.

Uses of Dandelion

Beautifies the earth at least half the year. Leaves used for food. Root used for medicine. Blossom has nectar for insects.

Tell story of the Pot of Gold.

I suppose you have heard of the pot of gold that was hidden at the end of the rainbow. No doubt there are people in the world who think it is there yet, but it is not, for a long, long time ago, somebody found it. Indeed, nobody knows how in the world it happened because a great many people have searched and searched for it and finally decided that the rain-

"There's a dandy little fellow
Who dresses all in yellow,
In yellow with an overcoat of green.
With his hair all crisp and curly
In the spring time bright and early,
A tripping o'er the meadows he is seen."
SELECTED.

bow has no end. This is the story. A very, very selfish man found the gold and resolved to hide it where no one would ever find it. So one night he put the money in a sack and hurried away to the woods to hide it. There was a hole in the sack and the man did not know that one by one the gold pieces fell in the meadow. When he discovered that all his money was gone, you may be sure he hurried back to find it.

He stooped to pick up the bright gold coins, but was very much disappointed to find bright yellow flowers instead of money. How did it happen?

Indeed, I do not know. I only know that yellow flowers give joy to the children, and selfish people are never joyous or happy.—ADAPTED.

MEMORIZE:

TO THE DANDELION

Dear common flower, that grow'st beside the way,
Fringing the dusty road with harmless gold,
First pledge of blithesome May,
Which children pluck, and, full of pride, uphold,
High-hearted buccaneers, o'erjoyed that they
An Eldorado in the grass have found,
Which not the rich earth's ample round
May match in wealth, thou art more dear to me
Than all the prouder Summer-blooms may be.

* * * *

My childhood's earliest thoughts are linked with thee,
The sight of thee calls back the robin's song,
Who from the dark old tree
Beside the door, sang clearly all day long,
And I, secure in childish piety,
Listened as if I heard an angel sing
With news from Heaven, which he did bring
Fresh every day to my untainted ears,
When birds and flowers and I were happy peers.

NATURE STUDY

Thou art the type of those meek charities
Which make up half the nobleness of life,
Those cheap delights the wise
Pluck from the dusty wayside of earth's strife;
Words of frank cheer, glances of friendly eyes,
Love's smallest coin, which yet to some may give
The morsel that may keep alive
A starving heart and teach it to behold
Some glimpse of God where all before was cold.

Full of deep love thou art, yet not more full
Than all thy common brethren of the ground,
Wherein, were we not dull,
Some words of highest wisdom might be found;
Yet earnest faith from day to day may cull
Some syllables, which, rightly joined, may make
A spell to soothe life's bitterest ache,
And ope Heaven's portals, which are near us still
Yea, nearer ever than the gates of Ill.

—LOWELL.

LEGEND OF THE CHRYSANTHEMUMS, OR CHRIST FLOWERS.

It was Christmas Eve in the Black Forest. The whirling snow touched the tree tops; the starry flakes clung to the branches or fluttered down, pure as rose petals wafted about by the breath of angels. Soon the frozen earth was hid from view and a great white world waited, in solemn expectation, the coming of the Christ-Child. Silence lay upon the forest. The charcoal burners tended their smoldering fires and dreamed of home or, with simple faith, listened for the shepherd's message and the angels' song.

When the midnight hour was nigh, a sound broke the stillness, the wail of a child in distress.

"'Tis the cry from Bethlehem," said Johann reverently. "The Christ-Child is born."

"No child of the Black Forest would be about to-night?" asked Hans, uneasily. "It might not be one of our little children?" "Not so," said Michael; "content thee, Hans, thy little ones snug in their cot, dream of the angels, while thy good frau guards their sleep. It is as Johann says, 'the echo from Bethlehem.'"

Hans was silent, but presently stole away into the snow-wreathed depths of the forest. A voice in his heart was urging him on.

"May the star of Bethlehem guide me aright," he prayed. "If a child

be abroad this holy night, lead me, dear God, to Thy little one." Again the wail of distress smote upon his ear; a sob was the answer to his prayer; and stooping down, the charcoal burner lifted from the snow a babe scantily wrapped in swaddling clothes. It's feeble strength was almost spent, so placing it in his breast, Hans sped through the forest toward his home.

The hausmutter sat by her babes, her face, beautiful with mother-love, radiant in the glow of the Christmas lights burning on the humble tree, and so Hans found her.

"I have brought thee one more, Gretchen," he said as he placed the babe on her bosom. "Succor it for the Christ-Child's sake."

"Who was born to-night," answered the mother gently, and her love flowed out to the waif, warming it back to life.

The slumbering children stirred and wakened, and seeing the stranger, rose from their cots, and presently the hut rang with their rejoicing. The lights on the tree twinkled like stars. The children bore their guest toward it, loaded him with its choicest gifts, and played about him merrily, Hans and Gretchen looking on, a great content in their hearts. Suddenly a radiance, not of earth, illumined the humble abode; the waif was encircled by a glory that deepened and spread, till the charcoal burner's hut became as an ante-chamber of heaven. Hans and Gretchen fell on their knees in adoration. The Babe they had harbored was passing from their vision, floating upward as if borne by angels' wings. His tiny hands outspread in parting benediction. The children wept for the loss of their playmate.

"Hush thee, my darlings," whispered the mother. "Know you 'twas the dear Christ-Child, who came to us and hath returned to Heaven. To-morrow thy father shall show thee the spot where he found the Holy Babe."

When the morrow came Hans led the little ones into the forest and where had been a bed of snow, lo! flowers bloomed, great waxen blossoms with hearts of gold and petals like silken floss!

"The Christ flowers!" cried little Gretta, and kneeling before them, as at a shrine, the peasants solemnly recorded a vow to succor each Christmas day some poor child in honor of the Holy One, who had been their guest.

And so in the Black Forest, is still held this legend of "How the Chrysanthemums or Christ Flowers Came."—MARY BLANCHE O'SULLIVAN.—*Donahoe's Magazine; by permission of the author.*

THE APPLE TREE

"Doth thy heart stir within thee at the sight
Of orchard blooms upon the mossy boughs?
Doth their sweet household smile waft back the glow
Of childhood's morn—the wondering fresh delight
In earth's new coloring, then all strangely bright
A joy of fairyland?"

Aim.—To make the child realize that beautiful stories can be read from trees as well as from books.

To impress and reinforce the out-of-door lessons by literature.

Preparation.—Lead pupils to talk about the gifts they like best. Tell them that our trees produce numberless gifts every year that we prize very highly. Let children name trees that have gifts for the birds and for the squirrels. Gifts for man. Ask them to tell why the apple tree is so great a favorite. They will be likely to suggest many reasons.

Field Lesson.—Visit the apple tree with pupils very early in the spring before there are any visible signs of growth. Get acquainted with the tree and its surroundings. Compare its height, its mode of branching and its general appearance with one of the evergreens studied during the winter. Ask questions that can be answered only by examining the tree.

Read "Talking in Their Sleep" to direct the children's thoughts.

"You think I am dead," the apple tree said,
"Because I have never a leaf to show—because I stoop,
And my branches droop, and the dull gray mosses over me grow!
But I'm all alive in trunk and shoot; the buds of next May
I fold away, but I pity the withered grass at my root."

"You think I am dead," the quick grass said,
"Because I have parted with stem and blade? But under the ground
I am safe and sound, with the snow's thick blanket over me laid,
I'm all alive, and ready to shoot, should the spring of the year
Come dancing here—but I pity the flower without branch or root."

"You think I am dead," a soft voice said,
"Because not a branch or root I own! I have never died,
But close I hide, in a plumy seed that the wind has sown,
Patient I wait through the long winter hours; you will see me again—
I shall laugh at you then, out of the eyes of a hundred flowers."

—Edith Thomas.

Request children to visit the tree daily, examine the branches and report changes in the appearance of the buds. Place a branch in a jar of water and let children watch the buds unfolding.

READ AND DISCUSS

"AN APRIL WELCOME"

Come up, April, through the valley,
In your robes of beauty drest,
Come and wake your flowery children
From their wintry beds of rest;
Come and overblow them softly
With the sweet breath of the south;
Drop upon them, warm and loving,
Tenderest kisses of your mouth.

Touch them with your rosy fingers,
Wake them with your pleasant tread,
Push away the leaf-brown covers,
Over all their faces spread;
Tell them how the sun is waiting
Longer daily in the skies,
Looking for the bright uplifting
Of their softly-fringed eyes.

* * * * *

Come up, April, through the valley,
Where the fountain sleeps to-day,
Let him, freed from icy fetters,
Go rejoicing on his way;
Through the flower-enameled meadows
Let him run his laughing race,
Making love to all the blossoms
That o'erlean and kiss his face.

—PHOEBE CARY.

What flowers have opened their eyes? How many kinds of plants are to be found near the apple tree? What birds sing in its branches?

Second Field Lesson.—Where were the leaves and the buds when we made our first visit? What has caused such a differ-

ence in the appearance of the tree? Lead children to talk about the tree's helpers—soil, rain, air, and sunshine.

Impress the lessons of mutual dependence and mutual helpfulness. Let children tell what man does for a fruit tree. He plants the tree; he loosens the soil so that the rain can reach the roots; he trims and grafts the tree; he protects it by destroying its enemies, caterpillars, worms, etc. Children tell what they know about planting trees. Question parents and others.

Read and discuss and let older pupils commit the first three or four stanzas of "Come Let Us Plant the Apple Tree."

COME LET US PLANT THE APPLE TREE

Cleave the tough greensward with the spade;
Wide let its hollow bed be made;
There gently lay the roots, and there
Sift the dark mold with kindly care,
And press it o'er them tenderly—
As, round the sleeping infant's feet,
We softly fold the cradle-sheet;
So plant we the apple tree.

What plant we in this apple tree?
Buds, which the breath of summer days
Shall lengthen into leafy sprays;
Boughs where the thrush with crimson breast,
Shall haunt and sing and hide her nest;
We plant upon the sunny lea,
A shadow for the noontide hour,
A shelter from the summer shower,
When we plant the apple tree.

What plant we in this apple tree?
Sweets for a hundred flowery springs
To load the May wind's restless wings,
When from the orchard row he pours
Its fragrance through our open doors;
A world of blossoms for the bee,

Flowers for the sick girl's silent room,
For the glad infant sprigs of bloom,
We plant with the apple tree.

What plant we in this apple tree?
Fruits that shall swell in sunny June,
And redden in the August noon,
And drop, when gentle airs come by,
That fan the blue September sky,
While children come, with cries of glee,
And seek them where the fragrant grass
Betrays their beds to those who pass,
At the foot of the apple tree.

—WILLIAM CULLEN BRYANT.

What does the apple tree give man in return for all his care? Visit the tree again with pupils when it is in full bloom. The delicate colors, the fragrance, the hum of insects, and the songs of birds all combine to delight the senses. Help children to appreciate the beauty of the apple tree. By questioning lead pupils to describe calyx, corolla, stamens, and pistils. Note the number of flowers in a cluster, the arrangement on the stem, etc. Examine leaves, length of petiole, arrangement on branch, shape of leaf, etc. Draw and paint an apple branch.

Discuss the Work of the Tree.—The root takes food from the soil; the trunk and branches carry food from the root and leaves to the flowers; the leaves take carbon dioxide from the air, and out of this gas and water make starch, set free ogygen, and give off moisture.

THE FLOWER

There's a wedding in the orchard, dear,
I know it by the flowers;
They're wreathed on every bough and branch
Or falling down in showers.

—MARY MAPES DODGE.

The flower beautifies the earth and makes seed. The apple tree sends forth a continuous murmur after it blossoms. Let

children watch the bees at work and get acquainted with their ways. We are told that a single swarm has been known to gain twenty pounds in weight while the tree is in bloom. Do the bees help the apple tree? Encourage children to watch the beautiful corollas blowing away. Examine a branch frequently and note the growth of the apples.

Recall the appearance of the tree in early spring. Review the influence of physical environment,—man's work, the tree's work. Lead children from nature to the Author of nature. The Creator controls and directs all. Whittier's poem will help to impress this thought.

O, Painter, of the fruit and flowers,
We own Thy wise design,
Whereby these human hands of ours
May share the work of Thine!

Apart from Thee we plant in vain
The root and sow the seed;
Thy early and Thy later rain,
Thy sun and dew we need.

And North and South and East and West
The pride of every zone,
The fairest, rarest, and the best
May all be made our own.

In earliest shrines the young world sought
In hill-groves and in bowers,
The fittest offerings thither brought
Were Thy own fruits and flowers.

And still with reverent hands we cull
Thy gifts each year renewed;
The good is always beautiful
The beautiful is good.

—WHITTIER.

Sum Up Uses of the Apple Tree

It beautifies the earth. It furnishes nectar for the bees.

Birds build their nests among its branches. The fruit is valuable.

Cider and vinegar are made from the apples.

Study the apple in the fall after having watched its growth from the beginning. Cut the apple across through the center.

How many parts or cells in the seed box?

Count the seeds. Tell the number and the arrangement in each cell. How are the seeds protected? By the skin; by the pulp which is the fleshy, ripened cup or calyx; and by the core, which is the wall of the seed-box. How can you help to awaken the life in the apple seed?

How do you know when the seeds are ripe?

In what way does the brilliant color help the seeds? Read "Apple-Seed John" for children.

APPLE-SEED JOHN

Poor Johnny was bended well-nigh double
With years of care, and toil, and trouble;
But his large old heart still felt the need
Of doing for others some kindly deed.

"But what can I do?" old Johnny said;
"I, who work so hard for daily bread?
It takes heaps of money to do much good;
I am far too poor to do as I would."

The old man sat thinking deeply awhile,
Then over his features gleamed a smile;
And he clapped his hands with childish glee,
And said to himself, "There's a way for me!"

He worked and he worked with might and main,
But no one knew the plan in his brain.
He took the ripe apples in pay for chores,
And carefully cut from them all the cores.

NATURE STUDY

With a bag full of cores he wandered away,
And no man saw him for many a day.
With knapsack over his shoulder slung,
He marched along and whistled or sung.

With pointed cane, deep holes he would bore,
And in every hole he placed a core;
Then covered them well and left them there,
In keeping of sunshine, rain, and air.

Whenever he'd used the whole of his store,
He went into cities and worked for more;
Then he marched back to the wilds again,
And planted seed on hillside and plain.

Weary travelers, journeying West,
In the shade of his trees find a pleasant rest;
And they often start with glad surprise,
At the rosy fruit that round them lies.

And if they inquire whence came such trees,
Where not a branch once swayed in the breeze,
The answer still comes, as they travel on,
"These trees were planted by 'Apple-Seed John.'"

—LYDIA MARIA CHILD.

TREE PLANTING

What does he plant who plants a tree?
  He plants the friend of earth and sky;
He plants the flag of breezes free;
  The shaft of beauty hovering high;
  He plants a home to heaven a-nigh,
For song and mother—croon of bird
In hushed and happy twilight heard,—
The treble of heaven's harmony,—
These things he plants who plants a tree.

What does he plant who plants a tree?
  He plants cool shade and tender rain,
And seed and bud of days to be,
  And years that fade and flush again;

SPRING NATURE STUDY

He plants the glory of the plain;
He plants the forest heritage;
The harvest of a coming age;
The joys that unborn eyes shall see,—
These things he plants who plants a tree.

What does he plant who plants a tree?
He plants in sap and leaf and wood
In love of home and loyalty,
And forecast thought of civic good,—
His blessings on the neighborhood
Who, in the hollow of His hand
Holds all the growth of all the land,
A nation's growth from sea to sea
Stirs in his heart who plants a tree.

—COOLEY'S *Language Book.*

THE APPLE

The apple is the most common and yet the most varied and beautiful of fruits. A dish of them is as becoming to the center-table in winter as was the vase of flowers in the summer,—a bouquet of Spitzenburgs and Greenings and Northern Spies. A rose when it blooms, the apple is a rose when it ripens. It pleases every sense to which it can be addressed, the touch, the smell, the sight, the taste; and when it falls, in the still October days, it pleases the ear. It is a call to a banquet, it is a signal that the feast is ready. The bough would fain hold it, but it can now assert its independence; it can now live a life of its own.

Daily the stem relaxes its hold, till finally it lets go completely and down comes the painted sphere with a mellow thump to the earth, toward which it has been nodding so long. It bounds away to seek its bed, to hide under a leaf, or in a tuft of grass. It will now take time to meditate and ripen! What delicious thoughts it has there nestled with its fellows under the fence, turning acid into sugar, and sugar into vinegar.

How pleasing to the touch! I love to stroke its polished rondure with my hand, to carry it in my pocket on my tramp over the winter hills, or through the early spring woods. You are company, you red-cheeked spitz, or you salmon-fleshed greening! I toy with you; press your face to mine, toss you in the air, roll you on the ground, see you

shine out where you lie amid the moss and dry leaves and sticks. You are so alive! You glow like a ruddy flower! You look so animated I almost expect to see you move! I postpone the eating of you, you are so beautiful! How compact; how exquisitely tinted! Stained by the sun and varnished against the rains. An independent vegetable existence, alive and vascular as my own flesh; capable of being wounded, bleeding, wasting away, or almost repairing damages! * * * *

An apple orchard is sure to bear you several crops beside the apple. There is the crop of sweet and tender reminiscences, dating from childhood and spanning the seasons from May to October, and making the orchard a sort of outlying part of the household. You have played there as a child, mused there as a youth or lover, strolled there as a thoughtful sad-eyed man. Your father, perhaps, planted the trees, or reared them from the seed and you yourself have pruned and grafted them, and worked among them, till every separate tree has a peculiar history and meaning in your mind. Then there is the never-failing crop of birds,—robins, goldfinches, king-birds, cedar-birds, hair-birds, orioles, starlings,—all nesting and breeding in its branches and fitly described by Wilson Flagg as "Birds of the Garden and Orchard."

—*From Winter Sunshine.*—JOHN BURROUGHS.

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HONEY BEES

Purpose of the Lesson.—To emphasize interdependence by directing attention to the relation of flowers and bees.

To become better acquainted with the life and habits of one of the most intelligent of insects.

Material Useful for Illustrating the Lesson.—Bees, honeycomb, wax, and flowers containing pollen.

Preparatory Work.—Talk with pupils about flowers, their beauty and use. Let children tell about the home, appearance, and habits of their favorite flowers. What insects visit them? Why are the flowers and the bees such good friends? Request pupils to watch a bee for five or ten minutes each day for a week or so, and report observations daily. How many different flowers did it visit? Were the flowers all alike or did it

go from one flower to another? Children find nectar in flowers. How many have visited a hive? Tell pupils that the bees seem grateful for the apple blossoms, clover, linden, buckwheat, and many other trees and flowers, but they never seem to appreciate man's kindness in giving them a hive.

After interest has been awakened by out-door observation a few bees may be secured almost any sunny day, put in a glass jar, and covered with netting. A lump of moistened sugar or a little honey and some fresh flowers will satisfy their hunger while the children are getting better acquainted with them. Continue study out-of-doors.

Habits and Structure.—Direct attention to the bees in the window jar and bring out as many of the following facts by questioning, as possible:

The bee's body is divided into three parts,—head, thorax, and abdomen.

The long tongue is used in getting nectar from the flowers.

Wings.—Four transparent wings. The fore large wing and the hind small one are hooked together and spread out when flying, but when walking are folded so that the smaller wing slips under the larger one. Advantage of this arrangement?

Eyes.—Two large compound eyes on the side of the head and three single eyes on the top of the head.

Antennae.—By means of the antennae or feelers the bee hears, smells, discovers the nature of objects and communicates with other bees.

The bee has six legs attached to the thorax. The hind legs of the workers are provided with pollen baskets.

Examine a piece of honeycomb and see the advantage of the six-sided cells,—no waste.

Let children find answers to the following questions: How is wax made? The workers eat all the honey they can, hook themselves together in long lines that hang in festoons from

the top of the hive until tiny scales of wax appear between the rings of the abdomen of each bee. In about twenty-four hours the honey is changed to wax. It takes about twenty-five pounds of honey to make one pound of wax.

It is estimated that a colony of forty thousand workers can make about four thousand cells in twenty-four hours.

How far do they travel for nectar? As a rule, only a short distance, but bees have been known to fly many miles.

Prof. Hodges tells us that a swarm can make a thousand pounds of honey in a season.

What trees yield honey? Basswood, maple, willow, apple, etc.

What flowers? White clover, buckwheat, raspberry, corn, wheat, dandelion, etc. The red clover gives its honey to the bumble-bee and the Italian bee.

What time do bees begin their day's work? Before sunrise.

Let older pupils discover the importance of their work in carrying pollen from one flower to another of the same kind (cross-pollination).

Cover a cluster of buds with netting before the flowers open, —strawberry, apple, plum, cherry, etc. Compare strawberries on covered cluster with berries on exposed stems. In autumn compare apples and plums on covered and uncovered branches. The superior quality and quantity of the fruit on uncovered branches is due to cross-pollination.

The bee family, swarming, and the life story of bees are topics of great interest.

In case pupils have no opportunity to watch a swarm of bees at work, it may be advisable to conclude the study in the lower grades with the pollination of flowers.

Read to children part of "Birds and Bees" and "Locusts and Wild Honey" by John Burroughs. Read "King Solomon and the Bees" told in verse by J. G. Saxe.

SPRING NATURE STUDY

KING SOLOMON AND THE BEES

Many, many years ago there lived a very wise king named Solomon. He knew all the flowers of the field and the trees of the forest; the secrets of birds, bees, ants and butterflies, where they lived and how they obtained their food. When people had disputes to settle they appealed to him, believing that he would tell them what was right.

The Queen of Sheba heard of Solomon's fame and resolved to visit him and make a test of his wisdom. She required the most skillful workmen in her kingdom to make a bouquet of artificial flowers, and so perfect were they that it was almost impossible for the keenest observer to distinguish them from the flowers that grew in the garden. The queen brought the artificial flowers and a bunch of natural flowers to the king and asked him to tell her which were the real flowers. Solomon was puzzled and realized that it was not easy to answer this question. He caught sight of a bee outside the window and requested a servant to open the window and admit this welcome visitor. The bee at once made its way to the heart of the real flowers. Then the king said: "The answer to your question is plain, O Queen; the strong and wise may learn from the smallest creature if he will but watch for its teaching."

The queen said: "I have traveled far to learn the secret of your wisdom, O King, and my journey is not in vain. I am convinced that you are truly wise."

—ADAPTED.

BEES

There is no creature, with which man has surrounded himself that seems so much like a product of civilization, so much like the result of development on special lines and in special fields, as the honey-bee. Indeed, a colony of bees, with their neatness and love of order, their division of labor, their public-spiritedness, their thrift, their complex economics, and their inordinate love of gain, seems as far removed from a condition of rude nature as does a walled city or a cathedral town. Our native bee, on the other hand, "the burly, dozing humble bee," affects one more like the rude, untutored savage. He has learned nothing from experience. He lives from hand to mouth. He luxuriates in time of plenty, and he starves in times of scarcity. He lives in a rude nest, or in a hole in the ground, and in small communities; he builds a few deep cells or racks in which he stores a little honey and

bee-bread for his young, but as a worker in wax he is of the most primitive and awkward. The Indian regarded the honey-bee as an ill-omen. She was the white man's fly. In fact she was the epitome of the white man himself. She has the white man's craftiness, his industry, his architectural skill, his neatness and love of system, his foresight, and, above all, his eager, miserly habits. The honey-bee's great ambition is to get rich, to lay up great stores, to possess the sweet of every flower that blooms. She is more than provident. Enough will not satisfy her; she must have all she can get by hook or crook. She comes from the oldest country, Asia, and thrives best in the most fertile and long settled lands.

—*From An Idyl of the Honey Bee.*—JOHN BURROUGHS.

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RABBITS

The domesticated rabbit is very common; it is a great favorite with children, and an excellent type-animal for the study of the "gnawers" or rodents.

By a little effort, one or two rabbits can be obtained and their life and habits observed in the school-room or school-yard.

The study will be of comparatively little value, without the living rabbits.

Aim.—To awaken a sympathetic interest in animal life.

To lead children to observe the habits and structure of the rabbit, and to discover the adaptation of structure to life and habits.

Material

One or two rabbits in a wire cage.

A box or large tray of sand in which the rabbits can dig. Pictures of rabbits.

Preparatory Work.—Find out how many of the pupils have pet rabbits. Let children tell some of the interesting things they have discovered while caring for their pets. What does the rabbit eat? Can he hear well? How does he drink?

What can you tell about his disposition? Do you think the rabbit is pretty? Why?

Observation of Habits

Playing.—Rabbits are very active and enjoy frolicking about when they have plenty of room. Children, watch them at play and describe their actions.

Compare with cat.

Washing.—Watch the rabbit brushing his fur with his foot and then sponging it with his tongue. Tell how he washes his face. How does he hold down his ears? How does the cat wash herself?

Eating.—Give the rabbit some cabbage, and notice how he bites it off. He moves his lower jaw up and down, sideways, and from front to back. Examine his chisel-shaped, sharp, front teeth.

Burrowing.—Let children tell how the rabbit digs with his fore feet, and pushes the earth back with his hind feet. Give the rabbit a chance to burrow in the box of sand. Tell the pupils about the hares, often called "wild rabbits," that burrow under the snow in winter.

Children read about Hiawatha's rabbits.

Of all beasts he learned their language;
Learned their names and all their secrets;
How the beavers built their lodges;
* * *
Why the rabbit was so timid;
Talked with them where'er he met them
Called them "Hiawatha's Brothers."

Positions

Notice the rabbit's position when resting, sleeping, and sitting.

When resting he draws his head close up to his body, turns his ears backward, partly closes his eyes, and draws his feet under him. Looks like a ball of white fur.

When sleeping he sometimes stretches his body out full

length, rests his head on his fore paws, and turns his ears back close to his body.

When sitting he doubles his hind legs under him, straightens out his fore legs, and raises his ears; or he rests his body on the hind legs, and uses his fore legs for hands.

Have you seen rabbits listening? Describe position.

Have you seen them huddle close together?

Picture rabbits in three or four different positions.

Movements.—Study the rabbit's movements in the cage. When he walks he generally brings his two hind feet together very quickly. Open the cage and let Bunny show how well he can hop. Hopping and jumping are his usual means of locomotion. When he is frightened he will show how well he can jump.

Can you describe the position of his feet when he springs forward a yard or more at a bound? Sprinkle sand on the floor and examine the rabbit's tracks.

Read and discuss Hamilton Gibson's "How Bunny Writes His Autograph" (Sharp Eyes).

Which legs are the longer? the stronger?

Does the rabbit make much noise when he moves from place to place? Why not?

Examine the feet and find out how they are adapted to prevent noise. Insist upon personal observation.

The long, spreading, flexible foot with pad near end is covered with brush-like hairs. Use of pad or cushion? Use of brush-like hairs?

The hind legs are longer and stronger than the fore legs. Used mainly for hopping or jumping. The fore legs are used mainly for grasping things.

Body as a Whole.—Measure length of body when the rabbit is stretched out.

Shape.—Cylindrical. Head somewhat oval in shape; about

one-third as long as the trunk; neck very short. Notice the position and attachment of legs of rabbit. Fine, soft, furry covering, variable in color. Use: To beautify and to protect from cold.

Ears.—The large, delicate, more or less transparent ears are situated on top of head. Note shape of base. Note freedom of movement.

Eyes.—Compare the eye of the rabbit with the eye of the cat.

Large "bulging" eye on side of head, usually pinkish, has three eyelids. The rabbit can turn his eyeball and see behind him with a slight movement of the head.

Whiskers.—Notice position with reference to mouth and ears.

Nose.—Observe size and openings, also movements when cabbage or other favorite vegetable is near.

Mouth.—Upper lip cleft up to the nose. Is this an advantage?

Teeth.—Examine the two long, sharp, incisor teeth in the front of each jaw. Teacher, tell pupils about the flat, grooved, grinding teeth, and the small teeth hidden by the incisors in the upper jaw.

How does the rabbit keep his incisor teeth sharp enough to eat bark, twigs, and vegetables? The teeth grow out from the jaw as fast as they wear away. How does the rabbit keep his teeth worn down? Do they ever grow out faster than they wear away? Yes, sometimes Bunny's teeth grow so long that he cannot eat. What will he do then? Recall what children learned about the squirrel's teeth last fall.

Compare teeth of rabbit with teeth of squirrel.

Disposition.—Are rabbits gentle or rough, when they play together? Why do you think so? Are they easily frightened? Are they timid? Trustful? Give reason for your answer.

When eating together, how do they act? Are the two rabbits we have been studying alike in disposition?

Food.—Rabbits like clover, oats, meal, carrots, cabbage, lettuce, turnips, parsnips, etc. They often kill young trees by gnawing the bark.

Enemies.—The rabbit has a great many enemies: hawks, owls, weasels, foxes, hedgehogs, cats, and man.

Read John Burroughs' "Life of Fear in Riverby."

Home Life.—The true home of the wild rabbit is not in the school-room.

Teacher, tell children about the free. happy life of the rabbit in the woods.

Compare home and life with the home and life of the squirrel and the cat.

Rabbits frequently burrow in the hillside, and many burrows often communicate, forming what is called a "warren" in which great numbers may live together.

Describe zigzag arrangement of burrows. Why? Enemies cannot enter without great effort.

Care of the Young.—Tell children about the mother making a special home for the young,—collecting leaves and pulling hair from her own body to make a nice bed for the little rabbits, and remaining in the burrow a couple of days at a time without food, carefully covering the opening to the burrow when she finds it necessary to go out in search of food.

Tell story of "Battle Bunny" by Bret Harte. Europe, Asia, and Africa, the original home of the wild rabbit.

Why is this little animal so well liked as a pet?

Let children recall desirable characteristics, its gentleness, its kindness, its cleanliness, the ease with which it can be cared for, etc.

Summary.—Adaptation of structure to habits. The ears: freedom of movement, size, form, etc. The eyes: how adapted

to needs. The mouth and teeth: how adapted for gnawing? By shape, size, and strength of teeth, free movement of lower jaw, cleft upper lip.

The legs and feet: how adapted for locomotion?

The two hind legs longer and stronger than the two fore legs, the cushions, brush-like hairs and strong nails on the feet enable the rabbit to move noiselessly, brush his fur, and dig or burrow in the earth.

THE WILD RABBITS

They live in burrows with winding ways,
And there they shelter on rainy days.
The mother rabbits make cosy nests,
With hairy linings from their breasts.
—SELECTED.

If the study of adaptation is not based on careful observation the work will be of little value.

How is the rabbit distinguished from the hare?

THE HARE AND THE TORTOISE

A Hare one day ridiculed the slow pace of the Tortoise, and boasted of his own speed in running.

The Tortoise said, "Let us try a race. I will run with you five miles, and our friend the Fox may act as judge."

"All right," said the Hare, and away they went together. The Tortoise jogged along with a slow and steady pace to the end of the journey.

The Hare first outran the Tortoise, then fell behind and began to nibble at the grass and to play hide and seek with other hares. Finally he became tired with play and lay down for a nap, saying, "If the Tortoise should get ahead of me I could catch up with her and pass her without the least trouble." The Hare woke up but the Tortoise was not in sight; and running as fast as he could he found her at her goal fast asleep, while the Fox stood waiting to tell the Hare he had lost the race. —FROM *Aesop's Fables.*

FISHES

Fishes are quite as interesting as their neighbors that live upon the land.

The following outline is only suggestive, but it is intended

to indicate some of the things that the children may learn about the fish.

Goldfish or minnows in glass jars.

Children observe movements and habits in living fish. How adapted to live in water? Examine the scales. Which way do they point? Why? Of what use are the scales to the fish? How does the fish breathe? Does it open its mouth? Has it eyelids? Where are the gills? How is the tail used? What does the fish eat? Has it teeth? Describe your favorite fish.

Count the fins. Where situated? structure? use of fins? Describe the gills.

Shape of Body.—A fish is shaped as a wedge at both ends. This is the typical form.

Is this the shape that can be moved through the water with the least amount of force?

Do you suppose boats are patterned after fishes?

The Covering of Fishes.—Direct attention to the arrangement of the scales. The front edges are embedded and held firmly in folds of the skin. The scales form a protecting skeleton and admit of great freedom of motion. Are all fishes provided with scales?

Note the slimy covering.

The Fins and Tail.—Children, watch the fish at rest—the fish swimming.

Teacher, make a blackboard drawing and show fins, gills, etc.

The fins vary in number and position, but most fishes have five kinds.

The pectoral fins are behind the head, one on each side of the body.

The ventral fins are below and still further back. In some fishes these are placed as far back as the tail, in others as far forward as the throat.



THE SHEPHERDESS—*By Henri Lerolle.*

The dorsal fin is on the back. Some fishes have two dorsal fins. The anal fin is on the under side near the tail.

Last is the tail or caudal fin.

The fins are folds of the skin strengthened by bony spikes. With the exception of the caudal fin, the chief use of the fins is for balancing.

The tail-fin is the important propeller,—the oar.

Besides the tail-fin the other two vertical fins—the anal and dorsal—may aid the fish in swimming.

How does the Fish Breathe?—Direct attention to the gill cover on the side of the head. The gills are so arranged as to bring the cold red blood of the fish in contact with the air which is in the water. The water flows in at the mouth, over the gills and out under the gill cover. The gills serve the purpose of lungs. Does the fish hear?

It is claimed that gold fishes have been trained to respond to the ringing of a bell at their meal time. Some fishes are provided with teeth. Is the minnow? the gold fish?

Compare the minnow with the cat-fish. Find out about the habits of the flying-fish, cuttle-fish, stickleback, and other interesting fishes.

Tell the children of the salmon fisheries, the fishing off the banks of Newfoundland, and the migration of fishes.

Describe the world renowned aquarium in Naples.

The teacher must, from general suggestions, make detailed outlines to suit her school if she hopes to succeed with the fish, or other nature lessons.

THE SHEEP AND THE COW

As the facts concerning this lesson are well known, only a few topics are suggested which the teacher should expand.

The sheep and the cow eat the same kind of food—grasses,

grains, etc.—are cud-chewers, have no front teeth in upper jaws, have four stomachs, have divided hoofs.

Character

The sheep is gentle, patient, timid, social.

The cow is social, shows strong attachment for her young.

The cud-chewing animals furnish a very important part of our food and clothing.

Let children make a list of the things that are given by the sheep. By the cow.

Which is the most useful animal?

Lead the children to get as much of the information as possible from their own observation.

Procure good pictures of country life, "The Return of the Flock," "The Shepherdess," "The Sheep Pasture."

SLEEP, BABY, SLEEP!

Sleep, baby, sleep!
Thy father watches his sheep;
Thy mother is shaking the dreamland tree,
And down comes a little dream on thee.
Sleep, baby, sleep!

Sleep, baby, sleep!
The large stars are the sheep;
The little stars are the lambs, I guess;
And the gentle moon is the shepherdess.
Sleep, baby, sleep!

Sleep, baby, sleep!
Our Saviour loves His sheep;
He is the Lamb of God on high,
Who for our sakes came down to die.
Sleep, baby, sleep!

—E. PRENTISS (*from the German.*)