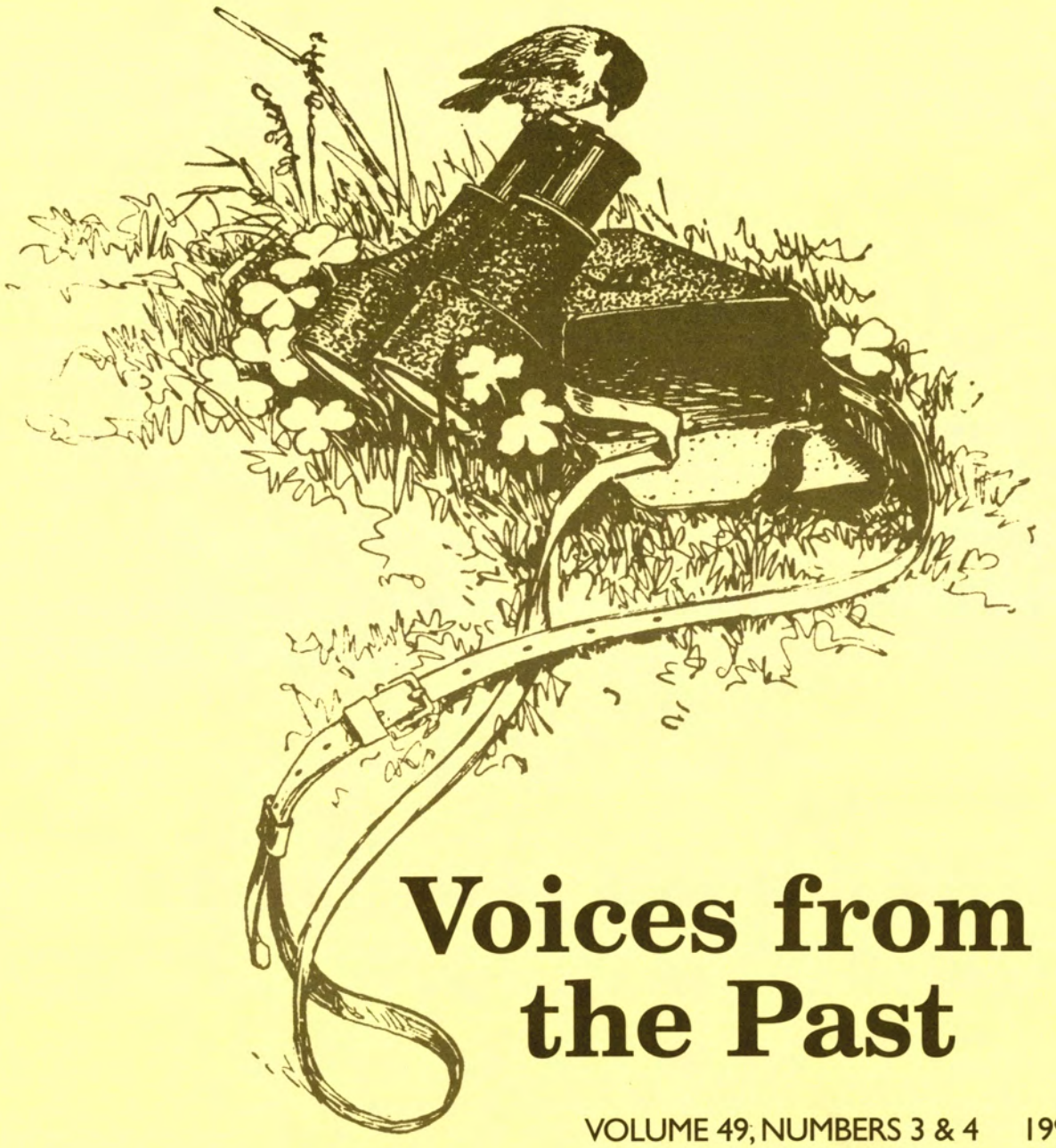
Nature Study

A JOURNAL OF ENVIRONMENTAL EDUCATION AND INTERPRETATION



Voices from the Past

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PRESIDENTS LETTER

The strengths of the American Nature Study Society have been our members, our scholarship, our leadership, and as we approach our 100th anniversary, our history. The list of past presidents and members of the ANSS reads like the 'Who's Who of the Nature Study Movement' in America. Original works by Bailey, Comstock, Palmer and others are still considered the 'Bibles of their Field' and many of those works are experiencing double digit printings. A biography of Liberty Hyde Bailey reads like the 'Indiana Jones' of the plant world traveling to tropical lands, often alone, well into his eighties.



Our strengths are recognized around the world. At a recent environmental education conference I, as president of the ANSS, was asked to travel to Japan, not because we are the largest or the wealthiest environmental education organization but because our past and present leadership represents such a diversity of expertise and our society has an 'Ancestry.' We are hoping to collaborate with Eiichiro Harako of Tokyo Gakugei University and Ju Chou of the National Taiwan Normal School to study and compare the nature study movements in our separate hemispheres, perhaps for a future issue of Nature Study.

I, like many of you, was a classroom teacher for many years. I taught science and agriculture to children in grades 6 through 12 at an Air Force base. The idea of keeping 'critters' and plants in the classroom was looked upon with raised eyebrows. Of course more than eyebrows were raised when hundreds of praying mantes hatched over the weekend, some finding a hiding place in Mrs. Hatches' hair. We always had visitors from the 'natural world' in our classroom. Perhaps a one liter popbottle terrarium or an inherited gerbil from someone who was recently transferred, or one of my Rhode Island Reds or perhaps a visiting Tadpole soon to become Frog. We had a steaming compost pile to feed our small garden. The St. Jones River was our classroom and staging area for many activities created by past president Bill Stapp's Project GREEN. School gardens and nature walks were an innovative idea at the turn of the century. Model schools of Cornell were constructed at the turn of the century to provide a method to show visiting teachers a method to teach rural children about their natural world. The plants and animals the students walked past on their way to school were identified in the school's nature areas. Children would return home to teach their parents the names of plants and how a particularly noxious 'weed' was considered delicate fare on the dinner table in some far off land.

Winter snows have melted, washed away by the rains of April. Now is the time for our friend Mole of Wind and the Willows to 'up we go, up we go' out of his winter hole to the bright sunshine of springtime, to the wonder of a bright meadow full of flowers and damselflies. I encourage you to find a child to walk with you through the glory of nature. You may find you have much to teach each other. The child's questions leading to more questions and as you struggle to answer the onslaught of 'Why?s,' your answers become deeper with meaning as you share them, reworking each answer to include aspects of the mystery. I have found the questions of the innocent help me to better understand that mystery.

Perhaps as an ANSS member, as an ambassador for the world of nature, you could adopt a classroom in your neighborhood. By taking the classroom under your wing you could lead a field trip, support an aquarium or terrarium, help plant a butterfly garden, or serve dandelion greens in a wild 'weed' salad to the children and their parents at an annual spring nature banquet.

I hope you're as proud of the Society's heritage as I. Please share that pride, your knowledge and perhaps this journal with someone this Spring.

Steve Melcher



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Nature Study Ideas

by Ralph H. Lutts, Guest Editor

It is difficult, from our perspective at the end of the twentieth century, to realize just how revolutionary nature study was when the century began. It was at the cutting edge of pedagogy. The living plants and animals in many of our classrooms today, as well as school gardens and nature walks, were revolutionary innovations a century ago.

1998 marked the 90th anniversary of the American Nature Study Society. The creation of ANSS in 1908 marked the movement's coming of age; the culmination of many forces that had emerged and gathered strength over the previous century, or more.

This issue of *Nature Study* examines the historical roots of many ideas that underlie and guide nature study today. Most of the materials in this issue, including the educational activities, are reprinted from nineteenth- and early twentieth-century publications. As we will see, the objectives of nature study were many, including teaching reading skills, the methods of science, an appreciation of the natural world, and the values of rural life. They shared, however, the common recognition that it is somehow important for students to experience the natural world.

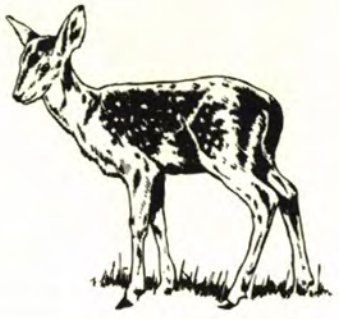
We begin, with two articles about nature study ideas today. David Sobel's article explores the importance of rooting environmental education in positive, direct experiences of nature, especially for young children. Mine suggests that nature study should be linked with the notions of place, home and story that make the environments in which we live emotionally significant.

These are followed by a section of historical articles. Ty Minton's piece reviews the history of nature study as an educational movement. Nature study, he argues, played a large role in progressive education. His article helps to place those that follow within a larger context. (Special thanks go to Ty for his help with this issue of our journal.) The other pieces are accounts of important contributions to nature study: Elizabeth Cary Agassiz writes about her husband Louis Agassiz's famous workshop for teachers conducted on Penikese Island in 1873. Harland H. Ballard's 1887 article tells how he founded a school nature club that grew into a national organization. Anna Botsford Comstock's article reviews the history of Cornell University's widely recognized nature study program. Most of the early nature study programs served schools. Nonformal approaches to nature study, however, were also on the rise. Enda Mills's article tells of her father Enos Mills's method of nature guiding and the roles that the Burnell sisters played in promoting his methods of interpreting nature.

The "Early Visions" section is a collection of early statements about the nature of nature study. It begins with a series of brief excerpts spanning the 19th century. The first snippets are from early nature books, which were often written by women who were required by the sexist conventions of the time to use the format of familial letters or conversations. The remaining pieces were chosen for their diversity of perspectives — from Dallas Lore Sharp's commentary on the tremendous popular interest in nature at the turn of this century, to Edward F. Bigelow's appeal for a loosening of sex role stereotypes.

These articles reflect the early visions and ideals of their time. They are also bound by their times, for although many of these writers were socially liberal, some of their views and language regarding the sexes, classes and races are offensive to us now. Nevertheless, these pieces allow us to witness the birth of new ways of thinking that led to environmental education and present approaches to nature study.

Bruce Chatwin writes in *The Songlines* of how Australian Aborigines give leaves, insects and other local natural objects to their children when they are first learning to speak. The children feel and chew on them as they learn and repeat their names. "We give our children guns and computer games," one of his friends comments. "They gave their children the land." Nature educators have been dealing with similar issues for over a century. And we continue the process, for this is a task that faces each generation of children and adults — learning the land.



From the Editor...
Nature Study Ideas and School Curriculum Through Time

In this issue of Nature Study you will discover many ideas past and present about Nature Study. The study of nature was prominently used as a vehicle to teach reading in schools as shown in the following excerpts from this issue.

1895 ". . . this textbook in Science and Reading . . is to introduce teachers and pupil to a mutual love of the woods and fields, to the study of animals and plants, to the observation of real things in life, and to the methods of a true naturalist. pg. 40, Burt.

1896 ". . . lessons are to be preceded by conversations which shall call vividly to mind the subject of the reading lesson by a direct study of objects at all times when it is possible... When the lesson on fruit, flowers, twigs, stones, or insects are in order the subject them selves can be at hand." pg. 40, Beebe & Kinsley

1896 ". . . It is believed that, while the children are being trained in the art of reading their powers of observation and of reasoning will be developed and that they will be inspired with a lifelong interest in nature." pg. 40, Dana

1900 ". . . we believe that there can be no effective teaching of nature study until it is more generally recognized that just as careful preparation is needed for this subject as for history or English. . . ." pg. 44, Carrs & Lloyd

Beyond reading, natural history was used to organize the entire curriculum in some cases. The use of nature study was intentionally selected as a basis for the curriculum at the Horace Mann School. In establishing the school's course of study would have a natural history base, the founders used the following principles for guidance (article begins on pg. 43).

> "(Nature study) is and must be an essential part of the serious business of education in the school."
>
> "Nature study must not be 'wholly informal and unsystematic. . .' the work must be are fully and systematically laid out, and the plan adhered to."
>
> "Nature study does not confine itself to organic nature; inorganic nature is also within its scope."
>
> ". . . there must be a serious attempt to correlate the nature studies with the other studies of the curriculum. . . "
>
> "The course of study must be planned to make the most of the inductive method, which proceeds from the know to the unknown. .. . The work in the earlier years must be observational. The thought content must gradually increase as the higher grades are reached."
>
> "Finally, the choice of materials must be determined by the seasons."

In today's frenzy of educational reform, it is interesting to note that many of the principles and insights from these earlier publications are still germane. Subsequent formal educational research has tended to verify these earlier ideas about nature study and its relationships to education. As social, political, and educational groups put forth new programs for educational reform, perhaps the complex role of nature education needs to be carefully revisited.

We hope you will enjoy exploring Voices From the Past (and from the present) in this issue and refine some nature study ideas of your own.

Beyond Ecophobia: Reclaiming the Heart in Nature Education

by David Sobel

Just as ethnobotanists are descending on tropical forests in search of new plants for medical uses, environmental educators, parents, and teachers are descending on second and third graders to teach them about the rainforests. From Brattleboro, Vermont to Berkeley, California, school children are learning about tapirs, poison arrow frogs, and biodiversity. They hear the story of the murder of activist Chico Mendez and watch videos about the plight of indigenous forest people displaced by logging and exploration for oil. They learn that between the end of morning recess and the beginning of lunch, more than ten thousand acres of rainforest will be cut down, making way for fast-food, "hamburgerable" cattle.



Photo courtesy of Cayuga Nature Center

The motive for all this is honorable and just: if children are aware of the problems of too many people utilizing too few resources, they will grow up to be adults who eat Rainforest Crunch, vote for environmental candidates, and buy energy-efficient cars. They will learn that by recycling their *Weekly Readers* and milk cartons, they can help save the planet. My fear is that just the opposite is occurring. In our zest for making them aware of and responsible for the worlds problems, we cut our children off from their roots.

I confess to contributing money to the Children's Rainforest Project--a group that teaches kids about the rainforest and then funnels money raised from car washes and bake sales to the actual purchase of endangered lands in Costa Rica and Panama. At least this group doesn't just ring alarm bells – it gives kids a sense that they make a difference. But what really happens when we lay the weight of the worlds environmental problems on eight and nine year olds already haunted with too many concerns and not enough real contact with nature?

If we fill our classrooms with examples of environmental abuse, we may be engendering a subtle form of dissociation. In response to physical and sexual abuse, children learn to cut themselves off from pain. In severe cases, children develop multiple personalities, other selves that aren't aware of painful experiences. My fear is that our environmentally correct curriculum similarly ends up distancing children from, rather than connecting them with, the natural world.

For *Childhood's Future*, a study of the changing nature of childhood at the end of the twentieth century, Richard Louv interviewed children, parents, community groups, and educators across the country. Visiting his own childhood neighborhood and elementary school, he talked with school children and noted that the relationship between children and nature has changed significantly in the last thirty years:

> *While children do seem to be spending less time physically in natural surroundings, they also seem to worry more about the disappearance of nature—in a global sense—than my generation did.... As a boy, I was intimate with the fields and the woods behind my house, and protective of them. Yet, unlike these children, I had no sense of any ecological degradation beyond my small natural universe.*

And in response to Louv's question of whether he liked to play indoors or outdoors better, one fourth grader responded, "I like to play indoors better 'cause that's where the electrical outlets are." Children are disconnected from the world

outside their doors, and connected with endangered animals and ecosystems around the globe through electronic media.

While children are studying the rainforest, they are not studying the northern hardwood forest, or even just the overgrown meadow outside the classroom door. Lucy Sprague Mitchell, educator and founder of Bank Street College of Education, spoke of the "here and now," the local forest or urban neighborhood, as the basis for her curriculum with six through nine year olds. It was not until children are thinking logically and abstractly enough that she would embark on the "long ago and far away." It is hard enough for children to understand the life cycles of chipmunks and milkweed, organisms they can study close at hand. This is the foundation upon which an eventual understanding of ocelots and orchids can be built.

Some teachers can study both local forests and rainforests, and connect one to the other artfully, but many prefer rainforests because, from a curriculum perspective, they are much tidier to teach. To study the northern hardwood forest, you have to send a note home to parents reminding them that the kids have to wear boots next Tuesday. You have to deal with unruly kids and wind blowing the clipboard paper all over the place. To study rainforests, you can stay inside and look at all the pretty pictures of all those strange and wonderful animals, and make a miniature jungle.

In the face of this dissociation, children still try to make ends meet, to connect the faraway and the close-by worlds. A mother recently shared an account of her eight year old daughter's afternoon project. Her daughter had been hard at work in the shed, her mom's studio, for more than an hour when she showed up in the kitchen with an elegant poster to be displayed at the general store across the street.

Around an attractive illustration of a plump elephant read the bold edict, conceived in all seriousness: SAVE THE ELEPHANTS. DON'T USE IVORY SOAP. Saving endangered species is just as much the rage as saving the rainforest these days, and so a recent school project on African wildlife had motivated this girl to take protective action. The mistaken connection between the killing of elephants for their ivory tusks and the ingredients of Ivory Soap illustrates the child's desire to make the world right. But wouldn't it make more sense to have this child feel protective of the muskrats in the pond across the street?

Rainforest curriculum may be perfectly appropriate in middle or high school, but it doesn't belong in the primary grades in elementary schools. When I was training to be an elementary school teacher, my professor in a math methods course speculated that if we waited until sixth grade, we could teach all of elementary school mathematics in eight weeks. He believed that if we wait until children's minds have developed more, mathematics would be easier for them to grasp.

Recently, the use of concrete materials (such as cuisinaire rods, fraction bars, and Unifix cubes) and the grounding of math instruction in the stuff and problems of everyday life has improved the teaching of mathematics and helped reduce math phobia. Unable to connect the signs and symbols on the paper with the real world, many children were turning off to math. Adults describing their math phobia often date the beginnings of their problems to third and fourth grade when they just couldn't keep up — their math skills became frozen at the fourth-grade level. For adult math phobics, just the thought of long division can make them short of breath. As in any phobic reaction, the afflicted person feels anxiety and wants to flee from the situation. But with more child-centered math instruction, the problem of math phobia has diminished perhaps to be replaced by ecophobia. Ecophobia is the fear of rainforest destruction, acid rain, Lyme disease, or fear of just being outside. If we prematurely ask children to deal with problems of an adult world, we cut them off. Let us consider some better ways to support the children's world.



What's Important?

A graduate student of mine stumbled upon an intriguing discovery in his research with children last year. My assignment to the teachers in training was to conduct research that allowed them to open doors into the inner lives and thoughts of children. Steve Moore wanted to find out what was

important to second graders. He selected twenty-five magazine pictures of children on bicycles, people playing baseball, happy families, toys, dogs, eagles, pretty landscapes, farms, the earth from space, workplaces, and the like. Then he encourages children to choose three pictures that seemed important and talk about them.

Moore conducted his interviews with 40 seven and eight year olds in four different second-grade classrooms in adjoining towns. When he analyzed his results, he found a curious pattern. The children's responses fell into two distinct groups, despite the fact that all four classrooms seemed quite similar on the surface. In two of the classrooms, many children chose the picture of the earth from space, the eagle, and the deer. They talked about saving the planet, stopping pollution, and protecting eagles. They participated in the activity but didn't seem to really enjoy the process.

In the other two classrooms, the children chose pictures of Legos, playing baseball, homes, and families as the important things in life. In the interviews, the children seemed energetic and enthusiastically participated in the discussions.

When Moore saw this pattern, he returned to the classrooms, spoke to the teachers and discovered a possible explanation for the differences. The first two classes had done an extensive Earth Week curriculum shortly before he conducted the interviews. Rainforest pictures were up on the walls, books and stories with environmental topics were in evidence, and one of the classes had just visited a new environmental education center. The second two classes had done very little for Earth Week and almost no environmental curriculum. These teachers were a little sheepish about their apparent avoidance of these issues.

When he looked again at his results from this perspective, he found another pattern. In his total sample he found:

■ Eighteen comments of concern for the environment (pollution, extinction, etc.). All these comments were made by children in the Earth Week classes.

■ Sixteen comments of appreciation for the environment (a place where we can live, I like birds, etc.). Seven of these comments were made by children in the Earth Week classes, nine by children in the non-Earth Week classes.

■ Fifteen comments of appreciation of families. Fourteen of these were made by children in non-Earth Week classes and one by a child in a Earth Week class.

The result, from Moore's perspective, was a kind of despondency among the children in the Earth Week classrooms and a submerging of children's natural interests in a sea of problems:

> *The whole issue of the Earth Week curriculum was a big eye opener to me. The interview patterns suggest that kids who had spent a week or more working on environmental issues were fully taken in by them. The Earth Week group made choices that were heavily weighted with concerns about the earth, the animals, homeless children. The non-Earth Week classes made choices about playing about families, about having fun. I think we need to be careful about this kind of curricular brainwashing with children this age.*

Though clearly not an exhaustive study, Moore's findings resonate eerily with a study conducted in West Germany during the 1980's, described to me by George Russell of Adelphi Uniersity. Concerned about acid rain effects on forests, the ozone hole, heavy metal pollution in European rivers, the aftermath of Chernobyl and other environmental problems, the Germans implemented a conscientious national curriculum endeavor. The intent was to raise the consciousness of the elementary student body throughout the country regarding environmental problems. By informing students about the problems and showing them how they could participate in finding the solutions, the education ministry hoped to create empowered global citizens. Follow-up studies conducted some years after implementation indicated just the opposite had occurred. As a result of the curriculum initiative, education officials found that students felt hopeless and disempowered. The problems were seemingly so widespread and beyond the students' control that their tendency was to turn away from, rather than face up to, participating in local attempts at problem solving.

If curriculum focused on saving the earth doesn't work, what's the answer? One way to approach this problem is to figure out what

contributes to the development of environmental values in adults. What happened in the childhoods of environmentalists, some researchers have asked, to make them grow up with strong ecological values? A handful of these studies have been conducted, and when Louise Chawla of Kentucky State University reviewed these studies she found an intriguing pattern. Most environmentalists attributed their commitment to a combination of two sources, "many hours spent outdoors in a keenly remembered wild or semi-wild place in childhood or adolescence, and an adult who taught respect for nature."



What a simple solution. No rainforest curriculum, no environmental action, just opportunities to be in the natural world with modeling by a responsible adult. Chawla noted that "not one of the conservationists explained his or her dedication as a reaction against exposure to an ugly environment." When the Sierra Club wants to raise money for saving old-growth forests, they send photographs of denuded, eroding hillsides with their donation requests. Defenders of Wildlife raises money by showing us the cuddly harp seal being bludgeoned to death. For adults, with a commitment to preservation and a sense of self firmly in place, this technique appropriately motivates us to action. For young children — kindergarten through third or fourth grade — this technique is counterproductive.

Lurking beneath these environmentally correct curricula is the assumption that if children see the horrible things that are happening, then they too will be motivated to make a difference. But those images can have an insidious, nightmarish effect on young children whose sense of time, place, and self is still forming. Newspaper pictures of homes destroyed by California wildfires are disturbing to my seven-year-old New Hampshire daughter because she immediately personalizes them. "Is that fire near here? Will our house burn down? What if we have a forest fire?" she queries, because for her, California is right around a psychic corner.

What's important is that children have an opportunity to bond with the natural world, to learn to love it and feel comfortable in it, before being asked to heal its wounds. John Burroughs cautioned that, "Knowledge without love will not stick. But if love comes first, knowledge is sure to follow." Our problem is that we are trying to invoke knowledge, and responsibility, before we have allowed a loving relationship to flourish.

Bonding with the Earth

We often refer to those moments of wondrous happenstance as being in the right place at the right time. Curriculum often isn't and its usually too early. To get a sense of when to study rainforests or endangered species, or perhaps how to do environmental curricula at different ages, we need a scheme a big picture of the relationship between the natural world and the development of the person.

For parents and teachers, it is most important to focus on the three stages of development that are the concern of elementary education: early childhood from ages three to seven, the elementary years from seven to eleven, and early adolescence from eleven to fifteen. At the heart of childhood, from seven to eleven, is the critical period for bonding with the earth. Though these age frames need to be considered flexibly, my argument is that environmental education should be tangibly different during each period.

Over the past ten years, I have collected neighborhood maps from hundreds of children in the United States, England, and the Caribbean. From my analysis of these maps and interviews and field trips with these children, I have found clear patterns of development in the relationship between the child and her expanding natural world.

From age four until seven or eight, children's homes fill the center of their maps and much of their play is within sight or earshot of the home. Children often describe the worms, chipmunks, and pigeons that live in their yards or on their blocks and feel protective about these creatures.

From eight to eleven, children's geographical range expands rapidly. Their maps push off the edge of the page and they often need to attach extra pieces of paper to map the new terrain they are currently investigating. Children's

homes become small, inconsequential, and often move to the periphery of the page. The central focus in these maps is the "explorable landscape."

From eleven to fourteen the maps continue to expand in scope and become more abstract, but the favored places often move out of the woods and into town. Social gathering places such as the mall, the downtown luncheonette, and the town park take on new significance. Annie Dillard captures this fascination with expanding horizons in her description of growing up in Pittsburgh in *An American Childhood:*

> *I pushed at my map's edges. Alone at night I added newly memorized streets and blocks to old streets and blocks, and imagined connecting them on foot. On darkening evenings I came home exultant, secretive, often from some exotic leafy curb a mile beyond what I had known at lunch, where I had peered up at the street sign, hugging the cold pole, and fixed the intersection in my mind. What joy, what relief, eased me as I pushed open the heavy front door!—joy and relief because, from the trackless waste, I had located home, family and the dinner table once again.*



At the same time as the child's home becomes less significant, forts and dens show up on children's maps. These special places of childhood, both found and built places, appear to be crucially important for many children from ages eight to eleven. Urban, suburban, and rural children find hidden places even in daunting circumstances, attesting to the importance of finding a place of one's own at this age. Kim Stafford describes this movement:

> *Here was my private version of civilization, my separate hearth. Back Home, there were other versions of this. I would take any refuge from the thoroughfare of plain living — the doll-house, the tree-house, furniture, the tablecloth tent, the attic, the bower in the cedar tree. . . .*
>
> *There I pledged allegiance to what I knew, as opposed to what was common. My parents' house was a privacy from the street, from the nation, from the rain. But, I did not make that house, or find it, or earn it with my own money. It was given to me. My separate hearth had to be invented by me, kindled, sustained, and held secret by my own soul as a rehearsal for departure.*

These new homes in the wilds, and the journeys of discovering, are the basis for bonding with the natural world. Children desire immersion, solitude, and interaction in a close, knowable world. We take children away from these strength-giving landscapes when we ask them to deal with distant ecosystems and environmental problems. Rather we should be attempting to engage children more deeply in knowing the flora, fauna, and character of their own local places. The woods behind the school and the neighborhoods streets and stores are the places to start.

The Right Places at the Right Times

The challenge for parents and educators is to match activities and engagements with the periods of development in childhood. First, children need to develop emotional empathy for the creatures of the natural world. Next, they need safe opportunities to explore their urban and rural landscapes, and finally, they need to have opportunities to work on problems in their local communities.

Empathy between the child and the natural world can be a main objective for children ages three through seven. As children move out into the natural world, we can encourage feelings for the creatures of the world outside. Children feel implicitly drawn to baby animals, so let us cultivate this empathy. This natural emotional connectedness as the foundation of the idea that everything is connected to everything else. Stories, songs, close encounters with animals, and seasonal celebrations are excellent activities to accomplish this.

Children love to run like deer; to slither along the ground like snakes, to be clever as a fox and quick like a bunny. There need be no endangered species here--there are more than

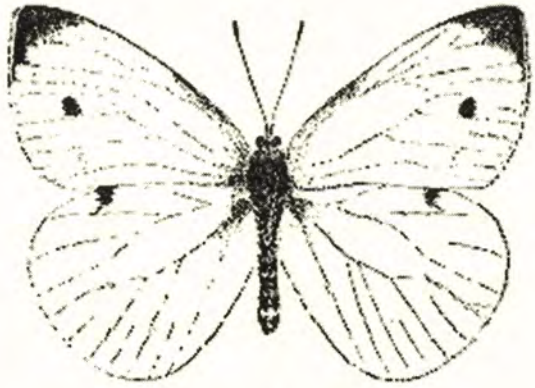
enough common, everyday species to delight young children.

Take birds for example. How boring if is for children to try to identify birds by catching fleeting glimpses and then looking them up in books. Instead, consider what it is about birds that appeals to children; they fly and they make nests. Knowing that children like to become things rather than objectify them, why not make a set of wings for each child and set them out to experience life as a bird. After a few days of bird play, you might encourage children to paint their wings like one of the birds they'd seen nearby and this eventually can lead to looking at bird books and connecting names to the birds. By first becoming birds, children can slowly learn to step back and look at them without becoming separated from them.

Exploration marks the phase from ages seven to eleven. This is the time to immerse children in the stuff of the physical and natural worlds. Constructing forts, creating small worlds, hunting and gathering, searching for treasures, following streams and pathways, making maps, taking care of animals, gardening and shaping the earth are perfect activities during this stage.

School activities and family adventures can mirror the expanding scope of the child's significant world, focusing first on the surroundings of the home and school, then the neighborhood, the community, the region, and beyond. The Brookwood School in Manchester, Massachusetts has recently revised its science curriculum to focus on aquatic environments to take advantage of the range of watery places accessible from the school. Starting with a focus on woodland streams in first grade, the curriculum moves down the watershed to ponds in second grade, freshwater wetlands in third grade and eventually out to the ocean by eighth grade. The first graders' streams are right outside the classroom door, the ponds are a bit of a walk, the ocean is a half mile away, so the curriculum expands outward along with the scope of the children's interest and capabilities.

The water cycle isn't something to be taught in two weeks; it is best done over the six or eight years of elementary and middle school. The water courses of the landscape are the circulatory system of the living earth, and we



can only learn them by following them, literally and metaphorically. With this in mind, David Millstone, a fifth-grade social studies teacher in Norwich, Vermont recently began a local studies unit with a stream-following expedition. Recognizing the allure of stream following, he initiated a class expedition not knowing where the stream would lead. In a student newspaper about this expedition, one child's poem describes the passage through a long, unanticipated culvert encountered along the way:

Cold damp dark
rushing water
screams
yodels
splashes
suddenly a waterfall
spotlighted
like a gray and white curtain.
Finally light
sun
colors.

The children's writing for the newsletter fairly crackles with excitement about discovering something literally in their backyard. This project did not touch directly on acid rain, or groundwater pollution, or drinking water quality, or evaporation and condensation. It did, however, immerse children in exploring streams and understanding, in a personal way, where they go. Wet sneakers and muddy clothes were prerequisites for understanding the water cycle.

Social Action appropriately begins around age eleven and certainly extends beyond age fourteen. While woods, parks, and playgrounds are the landscapes of middle childhood, adolescents want to be downtown. Managing school recycling programs, passing town ordinances, testifying at



hearings, planning and going on school expeditions, all are appropriate activities at this point. Good school programs will also recognize the need for rites of passage toward the end of this period. Initiation signifies the transition into adulthood with the dual challenges of solitude and social responsibility.

When considering appropriate topics for elementary and middle school-aged children, I often suggest the maxim of "No tragedies before fourth grade." Tragedies are big, complex problems beyond the conceptual and geographical scope of young children. Dealing with the nearby sadnesses of children's lives is a different matter. Parents getting divorced, pets dying, a favorite tree being cut down are necessary tragedies to cope with in the early elementary grades. But curriculum that focuses on environmental problems will be most successful when it starts in fifth and sixth grade and then focuses primarily on local problems where children can make a real difference. Community service programs can show students the relevance of the curriculum and gives local organizations a wonderful injection of youthful energy.

In Springfield, Vermont, a partnership program between the Riverside Middle School and the solid waste district is getting students into the community and solid waste managers into the school. After an overview of trash problems and how recycling can play a part in saving the town money and making it a safer place to live, groups of students are challenged to come up with a project that will contribute to the local effort. Kristin Forcier and Lauren Ellis, seventh graders in Pat Magrosky's class, conducted on-the-street surveys and found that only half of the people in the community recycled their car and household batteries. The rest of the batteries were either going into the landfill or getting incinerated, potentially causing groundwater or air pollution.

Kristin and Lauren decided to make recycling batteries easier. They got permission from downtown stores to set up battery collection sites at the supermarket, the gas station, the Ames department store and the local hardware store. They presented the idea to the Springfield Recycling Committee and received a commitment to have volunteers collect the batteries from the collection sites. And they created large informational signs and brochures for each of the collection sites to explain why battery recycling is important for the community. When asked what she had learned from the project, Lauren commented, "A kid can do it, with the help of adults."

Though I have portrayed these stages separately, they are not mutually exclusive. Empathy doesn't stop when exploration starts. Rather, activities that encourage the evolution of empathy should continue throughout the elementary and middle school years. Exploration of the natural world begins in early childhood, flourishes in middle childhood, and continues in adolescence as a pleasure and a source of strength for social action.



After doing the weekly shopping with my seven year old daughter and our four year old son last spring, we would put the groceries in the car and take a short walk across the meadow behind the shopping center to an unused railroad trestle. My children wanted to master their fear of walking on the deck of the bridge; they looked through the railroad ties at the moving water below and saw how far each of them could walk without holding my hand. On the way to and fro, we'd also fill up plastic bags with discarded garbage from along the side of the path. The kids named that activity "cleaning up Mother Earth." We probably only did five minutes of picking up but, week to week, it was easy to see the progress we were making. Such action seems fitting for children this age in the context of an engaging exploration."

Taking Time

I went canoeing with my son Eli and his friend in early April. The plan was to canoe a two-mile stretch of the Ashuelot River, an hour in adult time. Instead, we spent a lot of time netting golf balls swept down from the upstream golf course off the bottom of the river. We hadn't planned this activity, but the boys were thrilled by it and it meant we spent a lot of time looking down into the shallows and depths of the river with a purpose. This meant that we also wound up doing a lot of fish and bug watching too. We stopped at the mouth of a tributary stream for a picnic and went for a long adventure through a maze of marshy streams and abandoned flood plain oxbows. We tiptoed the tops of beaver dams, hopped hummocks, went wading (Eli called it "shallowing"), looked at spring flowers, tried to catch a snake, got lost and found. How fine it was to move at a meandery, child's pace.

"...When I was little, I didn't really think about it. I just thought my water comes from the faucet and it's clean and it's perfect. Unless, it comes from near the landfill. Then its just like spraying a can of Raid in your mouth."

The temptation to rush down the river is a trap waiting to catch parents and educators. Suffering from the timesickness of trying to do too much too quickly, we infect our children with our impatience. We make children do workbooks in kindergarten, we let seven year olds watch Jurassic Park, and we bombard them with tragic anxiety. After the Oklahoma bombing, a sixth-grade teacher asked his students what they thought of the television coverage and one student spoke for many of them when she said, "Its not good to show so much on television because kids see children all bloody and dead and it makes us scared about growing up in the world."



Some teachers are putting on the brakes. Jo Anne Kruschak, a first- and second-grade teacher in Thetford, Vermont, is spending a whole year doing a project on a local beaver pond and marsh this year. Most nature study or environmental education in American elementary schools lasts a matter of weeks. As a result, depth is sacrificed to breadth, and there is little opportunity for immersion in the landscape. But these first and second graders have visited the pond, about a quarter mile from the school, once a week through all kinds of weather. "In the beginning." Kruschak recalls, "I thought we'd run out of things to do and study by Thanksgiving. Now, I realize that there's no way we can follow up on all the neat opportunities by the end of the year."

The Harris Center for Conservation Education, located in the Monadnock highlands of southwestern New Hampshire, is one of the environmental education centers also taking the long view in designing its programs. Since Harris Center educators work with children and students throughout the elementary years, they have the time to let children bond with the natural world. Their school program brochure, entitled "Turning Science Inside Out," says:

> *By the end of their journey with the Harris Center, students will have watched birds, searched for amphibians and insects, studied animal tracks, mushrooms and wild foods, surveyed wetlands, mapped local watersheds, learned the geological history of mountains in their area and tested the air and river quality. With one foot in snowshoe and the other in muck, we trek together learning the sweetness that comes with knowing the terrain.*

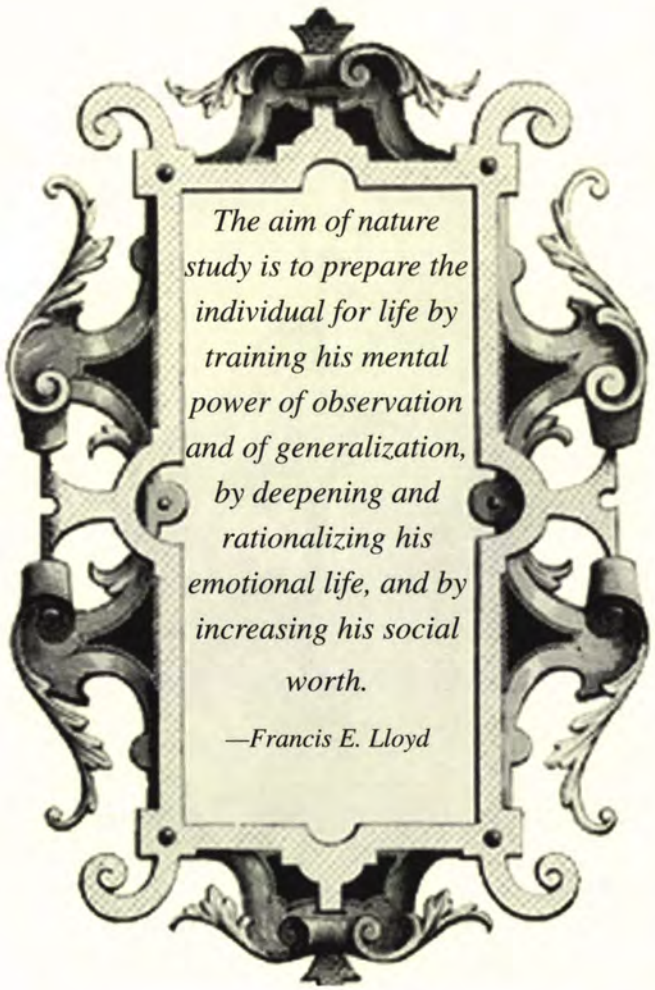


If we want children to flourish, to become truly empowered, let us allow them to love the earth

before we ask them to save it. Perhaps this is what Thoreau had in mind when he said, "the more slowly trees grow at first, the sounder they are at the core," and I think the same is true of human beings.

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Place, Home and Story in Environmental Education

by Ralph H. Lutts

---all landscapes ask the same question in the same whisper. "I am watching you, Are you watching yourself in me?" -Lawrence Durrell

There is no such thing as "the environment." It does not exist. What this term means is "everything," which is to say nothing, because the concept is so broad as to be meaningless. An environment is meaningful only in reference to that of which it is an environs. What we most often mean when we speak of "the environment" is "my environment." When one speaks of protecting the environment, most often one means protecting my environment, however broadly this may be interpreted. This is not simply a matter of language. The issue has a great deal of meaning for Nature study and environmental education, because education about "environment" as an abstract concept and education about real, personally meaningful environments are two very different things.

Environmental education should begin with the question, "What makes a particular environment personally significant?" This question can be answered in terms of our objective physical and biological identity, and it can be answered in terms of our subjective personal and cultural identity. We can and must find our identity and meaning within our world in terms of both. Environmental education should foster both. A great deal of attention has been devoted to our physical and biological connection with the world around us - our ecological environment. Here, though, I want to give some attention to our environment as an expression of our personal and cultural identities within our world – those factors that give our environment personal meaning and significance.

Over one hundred years ago George Perkins Marsh wrote that, "The world is fast becoming an unfit home for its noblest inhabitants," and that, "We are, even now, breaking up the floor and wainscoting and doors and window frames of our dwelling, for fuel to warm our bodies and seethe our pottage..." Marsh's image of the earth as our home is worthy of close attention.

The idea that it is our home is inherent is the language we use. The word "ecology" is derived from the Greek oikos, which means house. Ecology is the study of our home. Sharing the same root, "economy" is the management of our home. Ecology and economy, however, often seem worlds apart, instead of two faces of the same earth. It is as if we live in a world divided; with its two vital parts, nature and culture, at war. But when we think of the earth as our home, rather than simply as something apart from us and impersonal, it becomes precious. We are more likely to act to protect something personal. After all, if we harm our home, we harm ourselves. Perhaps this perspective will help us to make our world and ourselves whole.



The experience of home, however, does not take place in the abstract. It is rooted in the experience of place, and before we can promote a sense of home, we must first promote a sense of place.

Place

By "place", I do not mean simply a geographic location. I mean the location plus the multitude of factors that give that location its unique character. These factors include its physical, biological, ecological, and cultural features, as well as the history and psychological state of the person who experiences it. Together these factors give each location its unique "spirit of place," which is the product of the interaction between specific people and their specific surroundings. It is this "spirit," a phenomenon that is recognized in one way or another by all cultures, that gives each place its special significance.

Landscapes change in response to our actions, just as my native Massachusetts landscape has changed from virgin forest to pastoral landscape and back to forest over the past two centuries. We can learn much about ourselves by watching the landscape around us, for it is a mirror reflecting back to us the images that we have impressed upon it. We can see in it the very shape and condition of our own understanding, values, hopes, and aspirations; both as they are now and as they have changed over time. What we are less likely to notice is how we have been shaped by our environment as we have adapted to its climate, terrain, and resources.

If we are, indeed, joined in a complex and subtle interactive system encompassing humans and the environment, then our personal and cultural identities lie within this system, not apart from it. In a sense, there has been an age-long dialogue between people and their environment. Our lives and the world in which we find ourselves are expressions of the ecological conversation. Consider, for example, the contrast between the forms of beauty, architecture, commerce, and daily style of life associated with a forested mountain valley town in the Berkshires and those associated with a town on coastal Cape Cod, only a couple of hundred miles away. One has been shaped by a forest and agricultural economy, by the abundant waters that once powered the valley mills, and by the isolation of a mountainous terrain. The other has been shaped by the coastal and oceanic fisheries and trade, by poor soils and shifting sands, and by the popularity of beach recreation. Just as we shape our environments, they shape us, and each place evolves its own unique spirit.

Each place, be it a neighborhood or park, city or town, state or region, or even a quiet spot in the woods is unique. It is vital that environmental education pay attention to this uniqueness. Environmental Education has traditionally been very effective at teaching about generalized ecological processes and environmental hazards. Out of the particularized experience and understanding of our own unique places, however, grow personally meaningful relationships with personally significant environments. Environmental Education that combines both is likely to be especially effective in promoting environmental understanding, values, and action. As we teach, though, we must recognize that each place exists in both space and time.

In one of his essays Garrett Hardin pondered the question of why plant a redwood tree when

no one alive today will be around to enjoy its maturity? "A clue is given," he wrote, "by the great English voice of conservatism, Edmund Burk: 'People will not look forward to posterity who never look backward to their ancestors.' His aphorism asserts a sort of symmetry to the psyche. If a man is so brought up that he feels a tie to the past, by symmetry he can perceive and acknowledge a similar tie to the future... When the past disappears the future soon follows." If this observation is correct it has important implications for the way in which we do environmental education.

His childhood and mine were linked by the trees that we both grew to love.

A digital clock is a devilish device. Unlike a dial clock, it converts a moment into a number that is isolated from time and unconnected with past or future. A dial clock represents time as a cyclical process and one cannot read the moment without also seeing its connection with what came before and what will follow. Digital clocks kill time by changing it from a process into a thing. Similarly, Nature study and Environmental Education programs that do not represent a particular place as a moment in a long historical process are in danger of turning that environment into a thing, rather than representing it as the living process it truly is. Each place, each environment has a past, a history out of which its present identity evolved – and each has a selection of options open for its future. What we see here now is one frame in this process. As educators we must help our students understand and appreciate this full process.

The sense of place is the root of the experience of home. But a place is not necessarily a home. We have all experienced places that are uncomfortable, if not disgusting or frightening. When we speak of home we are speaking of a place with a special quality and with which we have a special kind of a relationship. If the earth and our particular spot upon it are to truly feel like home to us, they must become something alive and vibrant and wonderful in our lives. How can Nature study and environmental education be used to help accomplish this? What is it that makes a place a home?



Home and Story

I grew up in Quincy, Massachusetts, in an average house in a middle-class neighborhood. The neighborhood had earlier been an orchard and on one side of my house stood an old pear tree; on the other, an apple tree. The house was not much different from all of the others. Nor were the births, graduations, weddings, and deaths that were associated with each.

What made my house unique to me was that I lived the events that took place within it. My house became a home, because I was a participant in the life of that place - and what I participated in was of great importance to me, even though some of it may have appeared quite trivial or mundane to others. I recall, for example, the Thanksgivings and other holidays: all of the food, relatives and talk, and falling asleep on the sofa in mid-afternoon. I also recall my mother's great patience and tolerance of my rock collection in the cellar, insect collections (living and dead) in my bedroom, and preparing study skins on the kitchen table.

The land around the house was also home. My father had been raised in Maine among people of small farms and shipbuilding. He kept the lawn and hedges trimmed, planted a small plot of vegetables each spring, grew hollyhocks in the backyard and was reluctant to remove the rotting, failing fruit trees that I loved to climb. As I grew older and ranged farther afield, the surrounding parks and marshes become sort of an extended home to me. It is amazing the number of narrow paths and secret places in high marsh grass and forest briers that are well known to generations of children, and long forgotten by adults.

Participation in the life of the place also helps one become intimately familiar with the family and relatives, neighbors and neighborhood, buildings and landscape. The home that we cherish is, in one way or another, familiar and comfortable. There are always new things happening and new visitors, but the sense of home is built upon the foundation of familiarity. Personal participation in



Elizabeth Barrett

a well-known and loved place, with people who are also known and loved, helps to establish a sense of continuity of self and surroundings. We are united by experience and history.

After my father's death, I found one of his college freshman English essays, an autobiography. As I read of the many houses he had lived in as a child, I was struck by how he always wrote of the fruit trees near each. Those trees seemed to provide a stable point in an often unstable childhood. As I read that essay, I had a vision of him later as a grown man with his new bride searching for the place that would become their home. I could see him recognizing the familiar apple tree on the left and the pear on the right, and deciding to purchase the house that would become my home as well. His childhood and mine were linked by the trees that we both grew to love, although I had not realized it until he was gone.

What I was left with was a story of two childhoods and fruit trees. It was the story that established this link, this continuity. Stories can do this. They join together the pieces of our experiences and the experiences of others in a way that gives order, significance, and meaning to the chaos around us. What home is without its stories? Without stories, can there be a home?

I recall the story my grandfather told about how he first met my grandmother. It was a story of a Canadian winter in the late nineteenth century. He had found her on a frozen bay with her foot caught in the ice, surrounded by hungry wolves. To save her life he had to fight them off with his bare hands. I was young then and very gullible. A few years passed before I discovered that it was really the Prince Edward Island ferryboat that was caught on the ice - and the wolves were human. Nevertheless, whenever I think of my grandparents' meeting it is this story that first comes to mind, rather than the real events. Stories can be powerful things. They give shape to our reality.

Towns, regions, and nations also have stories of their own. Our Thanksgiving celebration, for example, provides an important image of the relationship between a people and this land. It is a story of the joining of the New World and the Old in the friendship of Indian and Pilgrim. It is a story of the search for religious freedom and survival in a strange land. It is the eternal grateful story of the annual harvest that all people celebrate in one way or another. Such a story shapes our view of ourselves and our history. It becomes our history.

Harvey Cox has pointed out that within each culture there are two different kinds of stories. One kind he calls "my story." These are the stories told by individuals about themselves and their own personal histories. The other kind of story is "our story." Such stories bind a particular group of people or a society together in a commonly shared narrative. The story about my grandparents is my story. I doubt that my special image of their mythical meeting is even shared by others within my family. The American Thanksgiving story is our story, helping to bind millions of people together in a shared history.

As we tell stories, though, we must tell them with care. They are powerful psychological instruments that can integrate our experience and history, but they can also become instruments of distortion and miseducation. My image of my grandparents' meeting, however engaging, is a falsehood, although harmless, best cherished as revealing my grandparent's humor. Other kinds of stories, though, can be destructive.

The Thanksgiving story, for example, is an incomplete story told by the successful invaders of a continent. We do not often include the part about the diseases introduced from Europe that decimated much of the Indian population of eastern Massachusetts, leaving the few that the Pilgrims found. One of the most despicable distortions of this story appears in the logo of the Massachusetts Turnpike Authority. For years it





depicted a Pilgrim-styled hat pierced by an Indian's arrow - a racist revision of a history and a stab in the backs of those to whom the early colonists owed their very lives.

We are unskilled in linking our cultural heritage with our natural heritage in demonstrating the continuity of people and their environment. Often the stories that we tell of nature are curiously absent of people, or the people who are present are villains. But people and their environment are intimately entwined. It is vital that we recognize this truth and make it an integral part of the stories that we tell. To do otherwise is to perpetuate the dichotomy between people and their environment that gives rise to the very problems that we have set out to solve. To believe that humans are an ecological evil in this world, incapable of anything but a destructive impact upon the earth, is to profess a new and pernicious version of original sin.

Applications

We need to discover and tell stories that embody our participation in our unique place - our home within our environment. We do not live in a generalized, theoretical environment. We live in this place, this home. We must go beyond our books and schooling, science and general principles, and become familiar with the place where we teach and the history of those whom we are teaching. We must find and profess the unique story of the unique place in the world that we wish our students to call home. This is perhaps the most difficult task for us as educators and environmentalists. A sound program for accomplishing this still needs to be developed, but we are already teaching elements of it. We need, however, to gain and to more fully articulate a curriculum based upon home, place, and story as integral elements in environmental education.



There are a number of questions that we should keep in mind as we develop curricula designed to promote a sense of place and home. We should ask first, are we teaching about the unique present: helping people to understand the environments that they experience, to value and celebrate their positive features, and to recognize the threats to them? We should also ask, are we teaching about the unique past: helping people to understand the historical process through which they and their natural environment, cultural and ecological, evolved into this special place? Are we also teaching about the potential futures: helping people to recognize the alternatives, to choose those that preserve and create what they believe to be of value, and to act to bring this about? No single activity need accomplish all of this, but this should be the goal of the overall curriculum.



In addition to evaluating what we teach in terms of its contribution toward creating a sense of continuity in place and time, we should also ask whether our curricula incorporate the elements that foster the experience of home. Our students should become participants in a valued environment through study, sensory and aesthetic involvement, and physical activity. We must help them to become familiar with their family of plants and animals, rocks, soils, landscape, and sunlight, with their more traditional personal and cultural family, and with the intimate and wonderful interactive patterns that join them together as one. We must discover and tell the stories that integrate human culture, nature ecology, and evolution, and that establish our continuity with life on earth in a psychologically meaningful manner.

Educators are generally good at telling stories about nature or history. But where are the stories, both "my stories" and "our stories," that integrate the two? They lie in the stone walls that

lace our forests and the mills that dot our riverbanks. They lie in our town commons and the very placement of our towns in the landscape. They are in our water and sewer systems, power lines, factories, and parks. They are hidden in diaries, newspapers, and the biographies of the people around us. They are everywhere, waiting for us and our students to give them a voice. There are history books in the purple loosestrife in our meadows, cabbage butterflies in our fields, and starlings in our tree tops.



Many environmentalists have looked to native American and Eastern cultures for stories and models of a viable way to live in harmony with our natural world. While it is useful to seek wisdom in other cultures, we must also seek it within our own. We may not find it in the story of Paul Bunyan, but perhaps we can find some value in Johnny Appleseed, portions of the Thanksgiving myth, and the history of the conservation movement. The key to recognizing the environmentally wise stories lies in recognizing that people and nature are parts of the same thing, in place and in time. The tongue for telling them may lie in the combination of Nature study, environmental education and local and regional studies; and in a collaboration of local education centers, schools, historical societies, and other cultural institutions.

In suggesting that nature and environmental educators make use of this approach, I am not urging anything especially new or radical. Many of us already include elements of historical interpretation, cultural ecology, and futures in our programs and activities. It makes rational and intuitive good sense. I do, though, think that it will be useful for us to more self-consciously develop ways to teach for a sense of identity in place and time that can become an integral part of our programs. We should also integrate active participation with activities that rely on passive empathetic participation and appreciation. We can learn much by examining what many of us are already doing; identifying both our present strengths and ways in which we can further improve our teaching methods.

In this mobile society of ours, we often spend only a few years, perhaps even months, living in one place. Our families and careers may take us jumping all over the state, nation, or world. Traditionally, a place becomes home after it has been lived in for a very long time. In a transient society, however, we are less likely to find such a commitment. It is increasingly important, then, that we educate for a sense of place and home in our environment. Programs of this sort should be readily available within each community. They would promote a more caring relationship with the place in which we live, however briefly. They would help us to understand and appreciate the larger story, of which we are all a part.

If we are successful, we will all be able to answer in the affirmative when our landscape whispers, "I am watching you, Are you watching yourself in me?"

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"Nature is our environment, and we can not escape it if we would. The problem of our life is not yonder: it is here. The seeking of truth in fresh fields and for the love of it, is akin to the enthusiasm of youth."

L. H. Bailey

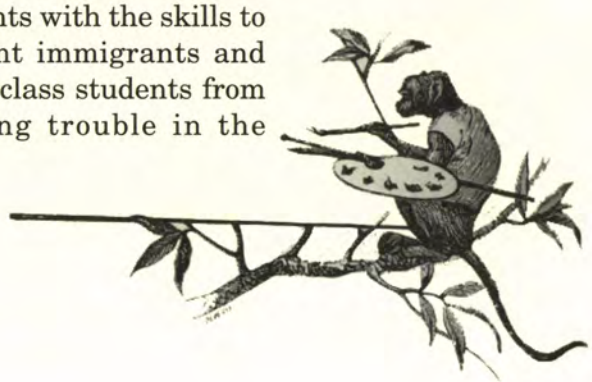
Nature-Study's Partnership with Progressive Education

by Tyree G. Minton

The last half of the nineteenth century in America was a time of turmoil and change. Major growth of mass communications through magazines and newspapers and the rapid advance of the railroads helped to bring about an end to the relative isolation previously experienced by most Americans. New ideas were rapidly shared from around the country and from Europe. Coupled with a newly industrialized and urbanized society, there was a sense that the new century would bring about a major economic and social transformation.

This hope for the new century resulted in a frenzy of reform efforts by every group with a cause, believing that this was a time of opportunity not to be missed. Social, political and educational groups put forth their "progressive" programs, often with little understanding of the complex nature of such undertakings.

A massive effort at educational reform known as the progressive education movement rose out of this matrix, and nature-study was to become a major component of this overall effort to reform the schools. As with other progressive reform movements in science and politics, progressive education experienced a number of contradictory and even antagonistic threads. Before the involvement of the nature-study movement, there were two initial groups involved in educational reform. The dominant group was the "social efficiency educators." Their goal was to create a more efficient and businesslike curriculum. They felt that useless subjects dominated by the humanist curriculum should be replaced with more practical subjects such as vocational education, designed to train students with the skills to prevent immigrants and lower class students from causing trouble in the



classroom. Overall, what was seen as progressive education by this group was largely devoid of pedagogy and little change occurred in the classroom as a result of their efforts.

A second group, know as the "child-centered" educators, sought to bring the new science of child psychology into the school, basing curriculum on the natural order of the development of the child. Their work was heavily based on the work of the early European reformers, John Amos Comenius (1592-1670), Jean Jacques Rousseau (1712-1778), Johann Heinrich Pestalozzi (1746-1826) and Freidrich Froebel (1782-1852). The most significant aspects of the child-centered approach to learning included the realization that children do not learn best by being told what and how to learn, that rote learning and memorizing were not appropriate for the child. Rather giving children an opportunity to explore and experiment with things that interested them produced the most effective results, basing knowledge and learning on direct observation.

Initially, much of the work by the child-centered reformers was infused with romanticism and religious fervor, heavily influenced by two movements in the early to mid-nineteenth century. The first was sacred natural history, an effort to take advantage of children's interest in natural history to teach religion. The second was the development of natural history lessons that focused on learning about nature exclusively through books rather than through working with real objects or through work in the field. These earlier efforts failed to bring any real change in teaching methods and they soon died out. It seems that some of the later child-centered reformers actually learned from the mistakes of these first failed attempts. Some of the best and most successful of these efforts were to come from what many would consider an unlikely source–the cooperative efforts of the child-centered educators and the nature study movement.

Even in the beginning, nature-study was seen as more than natural history study. There was always a major interest in having students learn about their environment, but nature-study was driven by a desire to reform the very heart of American education. No educational reform effort before the time of the nature-study movement reached so extensively into the educational system or drew the attention of so many of the nation's educational leaders. A major national debate raged over whether nature-study or history should serve as the basis of elementary education. The issue was never resolved, but a great deal of progress in school reform was carried out by a group of talented and dedicated nature-study leaders.

It is remarkable how little attention educational historians have given to nature-study, perhaps because it has been viewed primarily as a part of elementary science education. But a closer look at the role of the nature-study movement in educational reform reveals that it had as much to do with the design and process of education as it did with the subject matter. In addition to its focus on natural history education, it played a major role in the effort to reform elementary education along the lines of the early European educational reformers. It followed a philosophy based on the need to directly observe what most interested children within a framework of recognizing the developmental stages of children. Nature-study was believed by many to be the best discipline to serve as the core of the curriculum because children had an innate interest in learning about the natural world around them.

A close look at the leaders of the nature-study movement provides us with the links between child-centered progressive education and nature-study. From them we get insight into the ideas, enthusiasm and dedication of a group of dedicated individuals who directed a movement that reached deeply into the fabric of American education between 1890 and 1920.

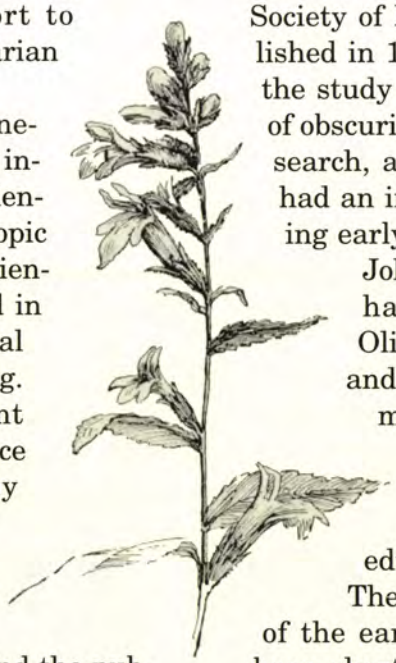
Before the progressive era, two theories dominated educational thought. The first was the knowledge theory and it was largely carried on unconsciously. It asserted that students acquire knowledge through recitation, individual hearing and catechism. The second, the European theory of mental faculties, was based on the premise that observation is the basis of all knowledge and that the first object in education was accuracy in observation, and the second was correct expression of what has been observed.



Education based on faculty psychology was highly structured. Lessons were designed exclusively to exercise the mental faculties with little or no attention given to understanding and reasoning and with little opportunity for input from the student.

So schools moved along, doing pretty much what they always had, only occasionally adapting a new topic here and there to the old catechism format. The early influence of Comenius, Rousseau and others had its initial impact primarily on materials written for use in the home. Almost no impact was made on formal education. Schools were extremely successful at resisting any effort to change and retained their authoritarian model of education.

During the first half of the nineteenth century there was growing interest in natural history among scientists, both as a scientific research topic and as school subject. Often the scientists were the ones most interested in translating for the young the natural world they themselves were studying. Many individuals made significant contributions both to natural science and to education. Asa Gray (1810-1888) and Louis Agassiz (1807-1874) were two men that stand out as shaping the role of science teaching.



Apart from his work in botany and the publication of his classic *Gray's Manual of Botany* (1848), still in print in revised form, Asa Gray was keenly interested in education. In his textbooks for young people he showed his genius by translating the standard scientific terminology into simple clear language. In the introduction to *Botany for Young People,* he writes:

> *"Interesting as this study is to all, it must be particularly so to young people. It appeals to their natural curiosity, to their lively desire of knowing about things . . . To learn how to observe and how to distinguish things correctly is the greater part of education . . . Natural objects, everywhere present and endless in variety, afford the best field for practice . . . to teach young people how to begin to read, with pleasure and advantage, one large and easy chapter in the open Book of Nature."*

From no less a figure than Asa Gray, we have the themes of studying from nature rather than books, focusing on observation and discrimination, nurturing children's interest in nature, and the appropriateness of nature-study for the young. These are all basic components of the nature-study movement and child-centered education.

Ongoing interest in the natural environment was reflected by the founding of natural history societies in many states, including the Boston Society of Natural History which was established in 1830. They made an effort to raise the study of natural history in America out of obscurity by encouraging publications, research, and education. The Boston Society had an impressive list of members, including early reformers such as Louis Agassiz, John James Audubon, Alexander Graham Bell, Ralph Waldo Emerson, Oliver Wendell Holmes, Horace Mann, and Henry Thoreau. It is clear from its membership list that natural history was a major force during this time and helped focus attention on both the subject matter and methods of education.

The natural history lessons movement of the early nineteenth century may have been short-lived but the spirit of school reform was returned to the schools by the enthusiastic leaders of the nature-study movement. Era Meyers of the University of Chicago School of Education was later to observe that "every time natural history lessons were introduced into the school the same cycle occurred. First there was a recognition that children are instinctively interested in their natural environment and that their reactions to these interests exert on them a strong growth influence, physically, mentally, spiritually." In an attempt to use this interest, schools systematized the teaching of nature-study by writing books and training the teachers with the books rather than in the natural environment. Direct contact with nature was replaced with memorization, the students lost interest and the program was discontinued. But with remarkable insight, Meyers wrote that:



The culturing which remains constant in each succeeding generation of children is that same restless interest in their nature environment, their desire to know plants, animals, minerals, and all objects and phenomena about them, to roam the fields and woods, to pry about the streams and ponds and to ask questions about these things. The presence of this spirit is sufficient to insure a return of the schools to this same viewpoint regardless of the number of its failures. It is sufficient to insure our return in the present and the future until that time when we are able to grasp the elements which will bring about a blending of these instinctive interests with the aims, demands and organization of the school.

Changes in science during this period were also beginning to have an impact. Psychological research resulted in a rejection of the long accepted faculty psychology dominant in the schools. This provided the opportunity progressive educators were waiting for and they drew heavily on works such as Charles Darwin's two year observation of his infant child started in 1840 and *Contents of Children's Mind on Entering School*, written in 1883 by G. Stanley Hall, president of Clark University.

Darwin's publication of *Origin of Species* in 1859 shook the very roots of western thought and a new more sophisticated view of nature with a distinct ecological character began to emerge. The work of John Muir and George Perkins Marsh encouraged interest in natural method and scientific research. In 1861 Herbert Spencer wrote *Education Intellectual and Physical*, suggesting that education must conform to the natural process of growth and mental development. He wrote that learning should be pleasurable, engage the spontaneous activity of the child and lead to the acquisition of knowledge. This kind of attention to education by such an influential individual helped to reinforce the reform efforts.

If one factor triggered the beginning of what was to become the nature-study movement and determine that progressive education's first years would focus on the study of nature, it was Louis Agassiz's summer school for teachers on Penikese Island in Buzzard's Bay, off the coast of Massachusetts. This three-month summer school, the dream of Agassiz for many years, finally opened in July of 1873. The teachers that attended Agassiz's school clearly remember his earnest appeals to "help him make the true way of teaching universal throughout the country by leading their pupils to study natural objects." One of the teachers attending that summer, Helen Beedy, wrote that Agassiz "standing before his class, crayon in hand, . . . seemed not to see the eager students before him, but rather the children all over the land for whose faithful instruction he pleaded."

Many of the leading educators of the country spent that summer with Agassiz, accepting his challenge and carrying his cause into the schools. He was deeply conscious of the essentials of learning and of the art of teaching. He also believed that there was sufficient reason why "the study of natural science may be the real foundation of all education." He believed that greater wisdom could be gained from the direct study of nature rather than books. His advice to teachers was to "Lay aside all conceit. Self conceit retards progress. Learn to read the book of nature for yourself."

Arthur C. Boyden, an early nature-study leader in Massachusetts, wrote, "The inspiration of the nature-study movement was in great measure due to the influence of Professor Agassiz." Agassiz would have been pleased with the efforts of those he taught at Penikese. His followers made significant contributions to natural science education as well as educational reform.

Further efforts were also being carried out in New England by Francis Parker (1837-1902), superintendent of schools in Quincy, Massachusetts. John Dewey called Parker the "father of progressive education." Parker, with the sup-



port of his protege, Wilbur Jackman, created the first major school program emphasizing both an understanding of the universe and scientific technique as a method of solving problems. Parker was somehow able to translate the best of Comenius, Rousseau, Pestalozzi, and Froebel into an integrated whole. What was new about his program was his ability to apply the "natural method" without great distortion, focusing always on "the spontaneous tendencies of the child," and trying to "understand these tendencies and continue them in all these directions, following nature."

In 1880, Parker left Quincy and, in 1883, took the principalship of Cook County Normal School in Chicago. It was here that Parker formulated his educational theories and worked his pedagogical techniques into final form, developing the philosophy that natural science should form the core of the curriculum. It was also at Cook County Normal that the methods of Agassiz and the major reform movements, object teaching (using natural objects to guide learning), nature-study and progressive education were to overlap and come together. This melding of methods created the opportunity for progressive education and nature-study to become an important combined force in educational reform during the latter part of the nineteenth century.

It was said of Wilbur S. Jackman (1855-1907) at his death, "to him more than anyone else is due the position of nature-study in the elementary schools." After graduating from Harvard in 1884, Jackman spent several years teaching high school biology in Pittsburgh and then was hired by Frances Parker to teach at the Cook County Normal School in Chicago. Perhaps the most remarkable aspect of Jackman's approach was his emphasis on relationships. He believed the main purpose of nature-study and the reason for using it as the core of the curriculum, was to give children an understanding of their connections with the natural world. This was a radical departure from the classical authority model common in the schools and put him squarely in the progressive reform camp. Addressing the 1895 National Education Association Meeting in Denver, Jackman said

> *The great activity in the educational movement of the present time has resolved itself almost wholly into a search for fundamental principles. We are entering upon an era that will be dominated by a belief in the supremacy of natural law. The innovations in human belief and action produced in the past 35 years by the studies of science have at last reached the heart's core of the schools with revolutionary effect. The introduction of nature-study into the common schools has made it obvious to the most obtuse that complete reorganization of the course of study is imperative. Nature-study found the grammar school utterly poverty-stricken from the standpoint of thought material. . . .*

It was like sunlight breaking through gloomy clouds. The fields of thought opened up to hungry minds were entrancing. It is a small wonder that a movement began which closely resembled a stampede.

John Dewey also worked at the Cook County Normal School, linking him to Jackman and the nature-study movement. Dewey's book *How We Think* (1910) was perhaps the first extensive treatment of the concept of the role of reason and the use of generalizations in the learning and thinking process within a modern educational context.

No discussion of nature-study would be complete without including the work at Cornell University by Liberty Hyde Bailey and Anna Bostford Comstock. Bailey was a true visionary, and under his leadership Cornell became a major center of the nature-study movement and school reform. Under his leadership the Cornell Leaflets (a series of natural history pamphlets) were published between 1903-1911. In 1911, Anna Botsford

Comstock wrote *The Handbook of Nature-Study* based on the very successful leaflets. This book has been in continuous publication ever since. Comstock has been described as "perhaps the most prominent teacher of children who was affiliated with the nature-study movement". She was interested in developing children rather than the subjects of study.

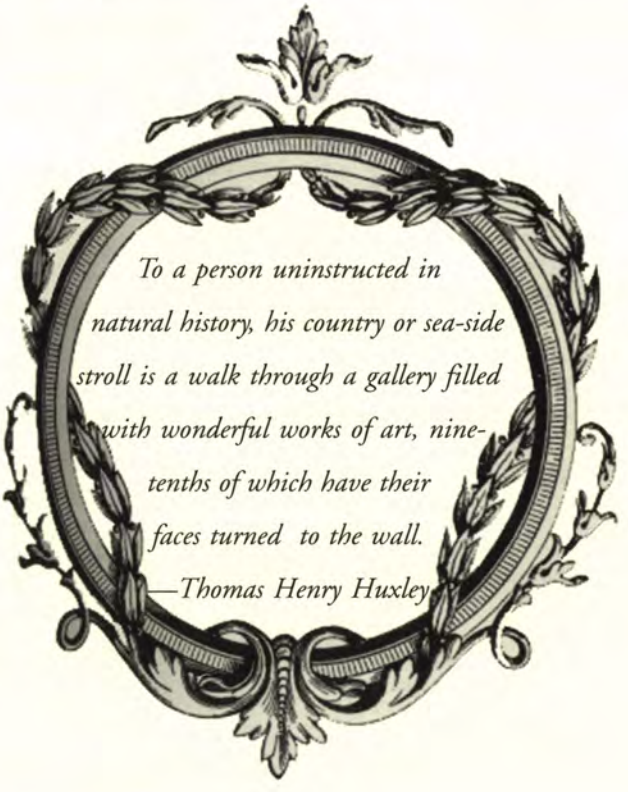


It can be argued that during 1890-1920, the educational reform movement with the most national impact in the schools was the nature-study movement. The leaders of the nature-study movement were clearly set on nothing less than child-centered progressive school reform by making nature-study the basis of the curriculum. A logical step in the growth of the nature-study movement was the formation of the American Nature Study Society in 1908. Its first meeting was held at the University of Chicago. One of the main issues that emerged at this meeting was whether nature-study was primarily a science or something broader. Liberty Hyde Bailey was the Society's first president. In a paper presented at the meeting, Bailey took the position that "Nature-study is not primarily a natural-history subject: It is primarily a pedagogical idea. Natural history subjects are the means, not the end... Nature-study is concerned with the child's outlook on the world." Other members of the society took exception to this view, stating that nature-study was in fact a science, and that any other view would result in the disappearance of accuracy.

The leaders of the nature-study movement never managed to fully agree on the movement's aim. It remained a complex and splintered movement, but it did nevertheless serve to represent, as Bailey pointed out, the new education, reflecting the educational principles of child-centered progressive reform by focusing the nation's schools on the "child as a developing organism with an inner urge or theology acting as a directive form and emphasizing dynamic self-expression, feeling, initiative and spontaneity."

The founding of the Progressive Education Association in 1919 was just the formal response to a long period of progressive educational activity carried on during the period between 1890 and 1920. The nature-study movement clearly deserves a significant place in the history of progressive education.

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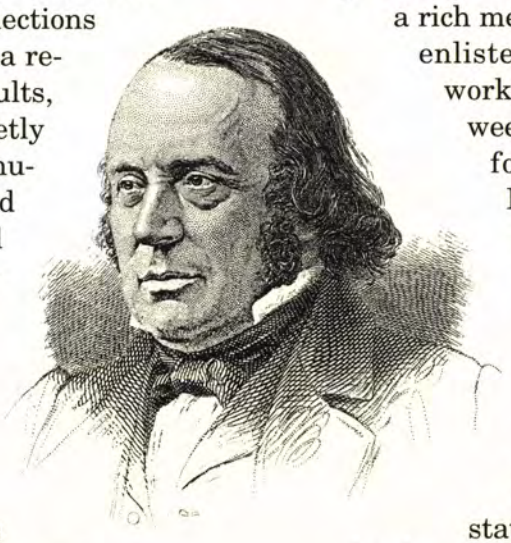


Agassiz at Penikese

by Elizabeth Cary Agassiz

Excerpted from: Elizabeth Cary Agassiz, ed., "Louis Agassiz: His Life and Correspondence" *(Boston: Houghton Mifflin, 1885).*

In October, 1872, Agassiz returned to Cambridge. To arrange the collections he had brought back, to write a report of his journey and its results, to pass the next summer quietly at his Nahant laboratory, continuing his work on the Sharks and Skates for which he had brought home new and valuable material, seemed the natural sequence of his year of travel. But he found a new scheme of education on foot; one for which he had himself given the first impulse, but which some of his younger friends had carefully considered and discussed in his absence, being confident that with his help it might be accomplished. The plan was to establish a summer school of natural history somewhere on the coast of Massachusetts, where teachers from our schools and colleges could make their vacations serviceable, both for work and recreation, by the direct study of nature. No sooner was Agassiz once more at home than he was confronted by this scheme, and he took it up with characteristic ardor. Means there were none, nor apparatus, nor building, nor even a site for one. There was only the ideal, and to that he brought the undying fervor of his intellectual faith. The prospectus was soon sketched and once before the public, it awakened a strong interest. In March, when the Legislature of Massachusetts made their annual visit to the Museum of Comparative Zoology, Agassiz laid this new project before them as one of deep interest for science in general, and especially for schools and colleges throughout the land. He considered it also an educational branch of the Museum, having, as such, a claim on their sympathy, since it was in the line of the direct growth and continuance of the same work. Never did he plead more eloquently for the cause of education. His gift as a speaker cannot easily be described. It was born of conviction, and was as simple as it was impassioned. It kept the freshness of youth, because the things of which he spoke never grew old to him, but moved him to the last hour of his life as forcibly as in his earlier years.



This appeal to the Legislature, spoken in the morning, chanced to be read in the evening papers of the same day by Mr. John Anderson, a rich merchant of New York. It at once enlisted his sympathy both for the work and for the man. Within the week he offered to Agassiz, as a site for the school, the island of Penikese, in Buzzard's Bay, with the buildings upon it, consisting of a furnished dwelling-house and barn. Scarcely was this gift accepted than he added to it an endowment of $50,000 for the equipment of the school. Adjectives belittle deeds like these. The bare statement says more than the most laudatory epithets.

Agassiz was no less surprised than touched at the aid thus unexpectedly offered. In his letter of acknowledgment he says: "You do not know what it is suddenly and unexpectedly to find a friend at your side, full of sympathy, and offering support to a scheme which you have been trying to carry out under difficulties and with very scanty means. I feel grateful to you for making the road so easy, and I believe you will have the permanent gratitude of scientific men here and elsewhere, for I have the utmost confidence that this summer school will give valuable opportunities for original research as well as for instruction." At Agassiz's suggestion the school was to bear the name of "The Anderson School of Natural History." Mr. Anderson wished to substitute the name of Agassiz for his own. This Agassiz absolutely refused to permit, saying that he was but one of many scientific men who had already offered their services to the school for the coming summer, some of whom would, no doubt, continue to work for it in the future, and all of whom would be equally indebted to Mr. Anderson. It was, therefore, most suitable that it should bear his name, and so it was agreed.

Thus the material problem was solved. Name and habitation were found; it remained only to organize the work for which so fitting a home had been provided. Mr. Anderson's gift was received toward the close of March, and in the course of the following month, the preliminaries were concluded, and the property was transferred to the trustees of the Anderson School.

> ...to Agassiz no obstacles seemed insurmountable where great aims were involved...

Few men would have thought it feasible to build dormitories and laboratories, and provide working apparatus for fifty pupils as well as for a large corps of teachers, between May and July. But to Agassiz no obstacles seemed insurmountable where great aims were involved, and the opening of the school was announced for the 8th of July. He left Boston on Friday, the 4th of July, for the island. At New Bedford he was met by a warning from the architect that it would be simply impossible to open the school at the appointed date. With characteristic disregard of practical difficulties, he answered that it must be possible, for postponement was out of the question. He reached the island on Saturday, the 5th, in the afternoon. The aspect was certainly discouraging. The dormitory was up, but only the frame was completed there were no floors, nor was the roof shingled. The next day was Sunday. Agassiz called the carpenters together. He told them that the scheme was neither for money, nor for the making of money; no personal gain was involved in it. It was for the best interests of education, and for that alone. Having explained the object, and stated the emergency, he asked whether, under these circumstances, the next day was properly for rest or for work. They all answered "for work." They accordingly worked the following day from dawn till dark, and by night-fall the floors were laid. On Monday, the 7th, the partitions were put up, dividing the upper story into two large dormitories; the lower, into sufficiently convenient working-rooms. On Tuesday morning (the 8th), with the help of a few volunteers, chiefly ladies connected with the school, who had arrived a day or two in advance, the dormitories, which were still encumbered by shavings, sawdust, etc., were swept, and presently transformed into not unattractive sleeping-halls.

Next, a large barn belonging to Mr. Anderson's former establishment was cleared, and a new floor laid there also. This was hardly finished (the last nails were just driven) when the steamer, with its large company, touched the wharf. There was barely time to arrange the seats and to place a table with flowers where the guests of honor were to sit, and Agassiz himself was to stand, when all arrived. The barn was, on the whole, not a bad lecture-room on a beautiful summer day. The swallows, who had their nests without number in the rafters, flew in and out, and twittered softly overhead; and the wide doors, standing broadly open to the blue sky and the fresh fields, let in the sea-breeze, and gave a view of the little domain. Agassiz had arranged no program of exercises, trusting to the interest of the occasion to suggest what might best be said or done. But, as he looked upon his pupils gathered there to study nature with him, by an impulse as natural as it was unpremeditated, he called upon them to join in silently asking God's blessing on their work together. The pause was broken by the first words of an address no less fervent than its unspoken prelude.

Thus the day, which had been anticipated with so much anxiety, passed off, unclouded by any untoward accident, and at evening the guests had departed. Students and teachers, a company of some fifty or sixty persons, were left to share the island with the sea-gulls whose haunt it was.



We will not enter into the daily details of the school. It was a new phase of teaching, even for Agassiz, old as he was in the work. Most of his pupils were mature men and women, some



of whom had been teachers themselves for many years. He had, therefore, trained minds to deal with, and the experience was at that time as novel as it was interesting. The novelty has worn off now. Summer schools for advanced students, and especially for teachers, have taken their place in the general system of education; and, though the Penikese school may be said to have died with its master, it lives anew in many a sea-side laboratory organized on the same land, in summer schools of Botany and field classes of Geology. The impetus it gave was not, and cannot be, lost, since it refreshed and vitalized methods of teaching.

Beside the young men who formed his corps of teachers, among whom the resident professors were Dr. Burt G. Wilder, of Cornell University, and Professor Alpheus S. Packard, now of Brown University, Agassiz had with him some of his oldest friends and colleagues. Count de Pourtals was there, superintending the dredging, for which there were special conveniences, Mr. Charles G. Galloupe having presented the school with a yacht for the express purpose. This generous gift gave Agassiz the greatest pleasure, and completed the outfit of the school as nothing else could have done. Professor Arnold Guyot, also, Agassiz's comrade in younger years, his companion in many an Alpine excursion, came to the island to give a course of lectures, and remained for some time. It was their last meeting in this world, and together they lived over their days of youthful adventure. The lectures of the morning and afternoon would sometimes be followed by an informal meeting held on a little hill, which was a favorite resort at sunset. There the whole community gathered around the two old friends, to hear them talk of their glacial explorations, one recalling what the other had forgotten, till the scenes lived again for themselves, and became almost equally vivid for their listeners. The subject came up naturally, for, strange to say, this island in a New England bay was very suggestive of glacial phenomena. Erratic materials and boulders transported from the north were scattered over its surface, and Agassiz found the illustrations for his lectures on this topic ready to his hand. Indeed, some of his finest lectures on the ice-period were given at Penikese.

Nothing could be less artificial, more free from constraint or formality, than the intercourse between him and his companions of this summer. He was at home with every member of the settlement. Ill-health did not check the readiness of his sympathy; languor did not chill the glow of his enthusiasm. All turned to him for help and inspiration. Walking over their little sovereignty together, hunting for specimens on its beaches, dredging from the boats, in the laboratory, or the lecture-room, the instruction had always the character of the freest discussion. Yet the work, although combined with out-of-door pleasures, and not without a certain holiday element, was no play. On the part of the students, the application was close and unremitting; on the part of the teachers, the instruction, though untrammeled by routine, was sustained and systematic.

Agassiz himself frequently gave two lectures a day. In the morning session he would prepare his class for the work of the day; in the afternoon he would draw out their own observations by questions, and lead them, by comparison and combination of the facts they had observed, to understand the significance of their results. Every lecture from him at this time was a lesson in teaching as well as in natural history, and to many of his hearers, this gave his lectures a twofold value, as bearing directly upon their own occupation. In his opening address he had said to them:

> *"You will find the same elements of instruction all about you wherever you may be teaching. You can take your classes out, and give them the same lessons, and lead them up to the same subjects you are yourselves studying here. And this mode of teaching children is so natural, so suggestive, so true. That is the charm of teaching from Nature herself. No one can warp her to suit his own views. She brings us back to absolute truth as often as we wander."*



This was the bright side of the picture. Those who stood nearest to Agassiz, however, felt that the strain not only of work, but of the anxiety and responsibility attendant upon a new and important undertaking, was perilous for him. There were moments when this became apparent, and he himself felt the danger. He persevered, nevertheless, to the end of the summer, and only left Penikese when the school broke up. . . .

On the 6th of December he returned early from the Museum, complaining of great weariness, and from that time he never left his room. The thoughts and aims for which he had lived were often on his lips, but the affections were more vivid than the intellect in these last hours. The end came very peacefully, on the 14th of December, 1873. He lies buried at Mount Auburn. The boulder that makes his monument came from the glacier of the Aar, not far from the spot where his hut once stood; and the pine trees which are fast growing up to shelter it were sent by loving hands from his old home in Switzerland. The land of his birth and the land of his adoption are united in his grave.

Elizabeth Cary Agassiz, wife of Louis Agassiz, was founder of the Agassiz School in Cambridge, Massachusetts. Established in 1885 and based in their home, the school provided courses for college aged women. At that time, Harvard would not allow women to attend Louis Agassiz's lectures.

HISTORY OF THE AGASSIZ ASSOCIATION

by Harlan H. Ballard

Excerpted from Harland H. Ballard, "History of the Agassiz Association" The Swiss Cross 1 *(March 1887): 1-7.*

The first hint that ever came to us of the formation of a society for the study of nature is found in one of Jacob Abbott's famous Rollo books, 'Rollo's Museum.' Published more than thirty years ago, that little black volume is still as good a guide as any known to me, to put into the hands of young persons who wish to organize themselves into a society. It was a half-conscious recollection of the pleasure I derived from reading this book when a child, that led me more than ten years ago to propose a similar society to the pupils in the Lenox High School.

The proposition was received with enthusiasm. Nearly half the school joined the society, which was first called, I believe, the Lenox High School Scientific Society. Our work was extremely simple. One boy kept a daily record of the temperature as indicated by a somewhat questionable thermometer; one kept the record of the weather, which was quite laconic, being something like this, "Monday pleasant, Tuesday rain, Wednesday cloudy, Thursday hot, Friday pleasant, Saturday rain." Then we began collecting specimens. I remember one boy



collected buds from twenty or thirty different kinds of trees. He got them all on the same day, and, by comparing them, learned something about the times of leaf development.

One expedition was made to study the sections of trees that had been cut down. We wished to find whether the heart is always in the middle of the tree or not. We found it always nearest the coldest and windiest quarter. "Ye see, the wind blows the wood away from the heart," a contemplative rustic explained; thus unconsciously illustrating the tendency of untenable theory to follow in the wake of observed phenomena. With these and other simple observations our little society busied itself, and prospered for several years. At one time there were on my desk about a hundred cocoons of curious form. One of the boys had found what he called 'pea-pods growing on a lilac-bush,' and brought these cocoons all gathered from one tree. Each was enclosed in a lilac-leaf curiously folded around it. At that time I had never seen a cocoon yield up its imprisoned life. One day our school was visited by Mr. George Walton, one of the Massachusetts board of education. It so happened that while he was listening to some recitation or other, I noticed one of the pea-pods acting in a strange manner. It rolled over of its own accord.

One of the boys had found what he called 'pea-pods growing on a lilac-bush,' and brought these cocoons all gathered from one tree. Each was enclosed in a lilac-leaf curiously folded around it. At that time I had never seen a cocoon yield up its imprisoned life.

I quietly picked it up and handed it to Mr. Walton without a word. While he held it in his hand, there emerged one of those beautiful creatures known as *Attacus Promethea*. It hung down from the dry cocoon by its fore-legs, and slowly expanded its wonderful wings. None of us had seen the bursting of a chrysalis before, and we were all deeply interested and delighted. We then told him of our little society, and showed our other treasures. He urged us to tell our plans to friends about us, and to show them our specimens. So, at a convention of teachers that met soon after, I gave a short account of the matter, and, opening a satchel, covered the table with specimens which had been gathered and prepared by the children. The thing seemed to them so pleasant and so simple and easy to do, that at the close of the meeting no less than fifty teachers crowded around the table to examine the bugs and butterflies, the stones and woods, flowers, ferns, and grasses, and to ask all sorts of questions. Several similar and corresponding societies were formed.

About the same time there appeared in the *New England Journal of Education* a short article by Count Pourtales (a former pupil of Professor Agassiz) on the subject of school scientific societies. From this article we first learned of the Swiss societies of like nature, and of the boys and girls who wear badges of green fir and go together for frequent field and forest excursions. Thus gradually grew the thought of extending to others what had proved so pleasant to ourselves; and as the *St. Nicholas Magazine* had organized, and for a time maintained, a society called 'The Bird-Defenders,' it was natural to apply to that magazine for space in which to print an invitation to all who might be interested to join us in our work. This request was granted, and the invitation appeared six years ago, and was widely accepted.

The word 'association' was chosen instead of 'society' from an impression, perhaps not entirely well founded, that that word could be taken to mean 'a union of societies' just as society means a 'union of individuals.' And our first plan was to have these local societies entirely independent of one another, except in the general name and in the purpose of studying nature. At that time no conventions were thought of, assemblies were not in mind, courses of study had not been contemplated, a badge was not



designed, nor had we supposed it possible that thorough scientific work could be systematically done by many of the chapters, if at all.

We chose the name 'Agassiz' because it was then uppermost in mind. His then recent death was fresh in the hearts of the nation; and his birth in Switzerland, where a similar organization was said to exist, rendered it especially appropriate. The choice was wiser than we knew. No one can read Mrs. Agassiz's life of her husband without feeling that no name could better stimulate us to faithful work.

Having thus selected the name, a letter was sent to Prof. Alexander Agassiz [Louis Agassiz's son], asking permission publicly to adopt it. Professor Agassiz replied that he "cordially assents that this very pleasant and useful plan for children be called the Agassiz Association, and that we have his hearty good wishes for its success."

...the boy who lives in the remotest and smallest village can send his bit of stone or his curious beetle to one of these men, and learn its name and history...

The societies that joined us during the first year or two of our existence, when our plans were still uncertain and our methods comparatively crude, retain in many cases the notion that the Agassiz Association today is the same loose organization it was at first,—an aggregation of local societies united only in name, allowed to drift hither and thither without direction or assistance. But the necessity for careful supervision and guidance has grown more and more apparent. We have been constantly besieged with requests for 'systematic courses of study,' elaborate plans of work, personal counsel and advice. Courses of study have accordingly been added, plans of work sketched, and a regular system of reports established. The conditions of admission have been defined, and, in short, more business-like methods adopted, until we now resemble rather an extended school with numerous classes than an ordinary society.

What, then, is the Agassiz Association as it appears today? And what claims has it upon the interest of the public? It is a union of 986 local societies, each numbering from 4 to 120 members, of all ages from 4 to 84. Our total membership is above ten thousand. We are distributed in all the States and Territories with very few exceptions, and have strong branch societies and active members in Canada, England, Ireland, Scotland, Chili, Japan, and Persia.

I should be unjust if I failed to mention with renewed gratitude and honor the large number of scientists who have voluntarily devoted their valuable time to the cheerful and patient assistance of our needs. More than fifty gentlemen representing all departments of science hold themselves always ready to answer the questions that puzzle us. Thanks to their benevolence, the boy who lives in the remotest and smallest village can send his bit of stone or his curious beetle to one of these men, and learn its name and history, and, better still, be taught how be may best study by himself its structure and its history. Some of these professors have even volunteered to conduct courses of study in various branches. We have had courses in botany, entomology, and mineralogy. The course in mineralogy recently finished by Professor Crosby of Boston has been especially successful. One hundred and forty-four chapters or individuals took this course, and completed it not only to our satisfaction, but to our surprise and delight.

It seems at first thought difficult, if not impossible, to suggest any general principle of study that can apply to the whole Association, for it is composed of elements so diverse. We are of all ages, of varying capacities and differing desires, living in places widely distant and strangely different. Some of us pick our violets in June, others in January.

But there is a common ground on which all stand,—love for nature, and desire to learn. And there is one principle that underlies and determines the methods of our study. It is this: Nature must be studied from her own book.



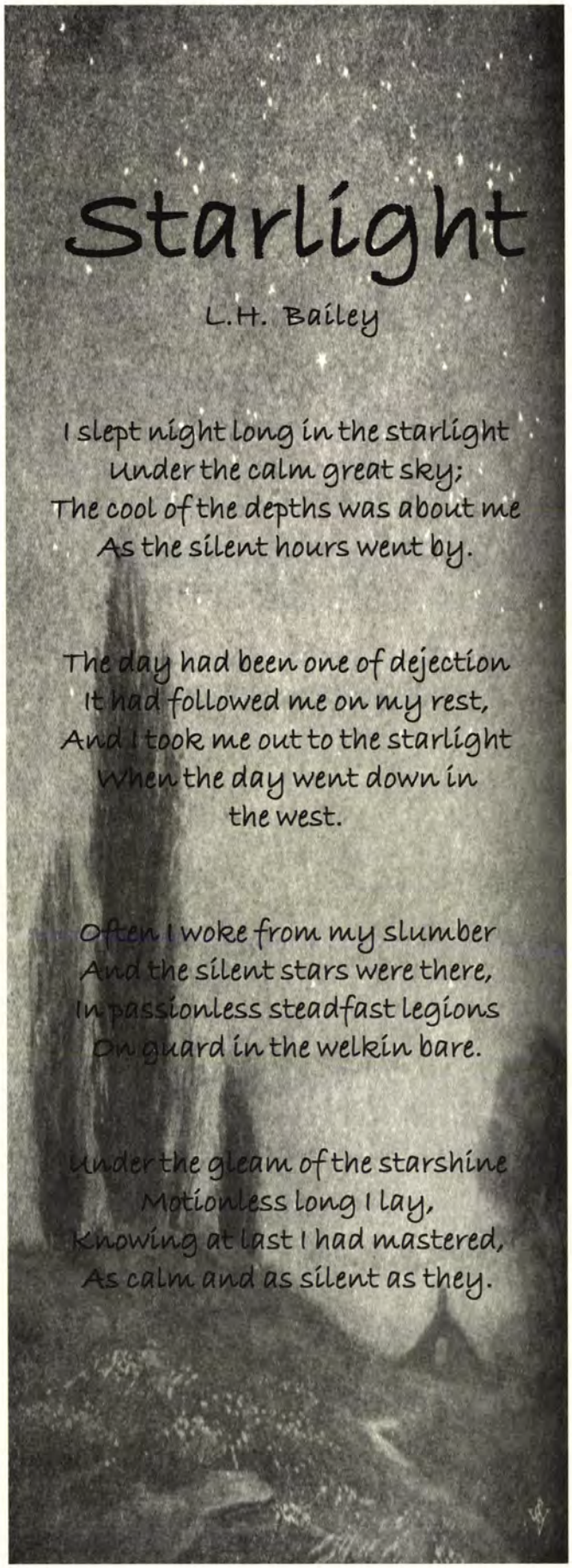
While, therefore, we do not undervalue the printed records of others' work, and while we ever recognize in

printed books and papers necessary and cherished guides, yet we believe that our first business is to meet Nature face to face. Therefore we leave the confines of the library and school, and go out under the open sky, into the forest, and along the stream.

Forgetting theory and useless wrangling, it is our purpose to see things as they are, and to record them as we see them. It is the business of the Agassiz Association to live for the truth.

Many of those who first joined our ranks are growing out of childhood into manhood and womanhood. Many adult chapters, too, are forming; and perhaps today one-quarter of our total membership may be over twenty years of age. What can we do for this increasing class? In the first place, we can give them the opportunity to help the younger, even as they themselves have been helped while young. It is to them, the scientists of the future, that we must soon look for special help, instruction, and guidance. Meanwhile we need them still among us to encourage us by their example, and to aid us by their work. And we want to help them too. We must provide higher courses of study, discover the best books for students more advanced, and help those who need it to secure the best instruction. I was greatly pleased this summer, while resting by the sea, to find in the laboratory at Annisquam, among the twenty-five earnest workers who were bending day after day, and night after night, over the dissecting table and the microscope, no less than seven men and women who either are or have been members of the Agassiz Association. Here is the moral of it: youthful observation of nature, wisely directed, grows into manly and womanly consecration to science.

Harland H. Ballard was founder and president of the Agassiz Association and editor of its journal The Swiss Cross. *He was also principal of Lenox Academy.*

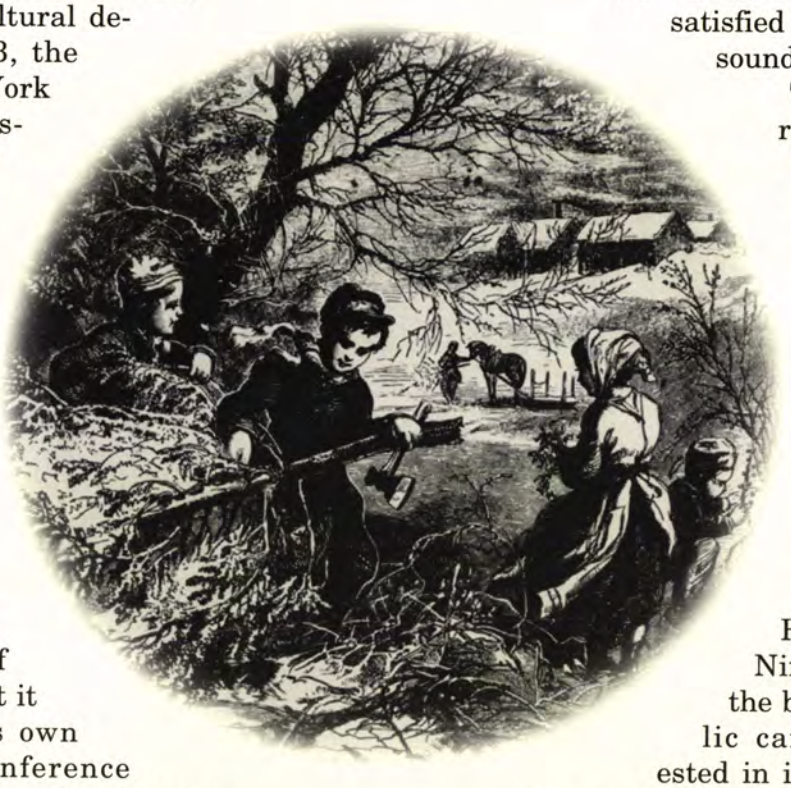


The Beginning of Nature Study at Cornell University

by Anna Botsford Comstock

Excerpted from the "Preface" to: Anna Botsford Comstock, Handbook of Nature Study *(Ithaca, N.Y.: Comstock Publishing Co., 1911).*

The Cornell University Nature study propaganda was essentially an agricultural movement in its inception and its aims; it was inaugurated as a direct aid to better methods of agriculture in New York State. During the years of agricultural depression 1891-1893, the Charities of New York City found it necessary to help many people who had come from the rural districts - a condition hitherto unknown. The philanthropists managing the Association for Improving the Condition of the Poor asked, "What is the matter with the land of New York State that it cannot support its own population?" A conference was called to consider the situation to which many people from different parts of the state were invited; among them was the author of this book, who little realized that in attending that meeting the whole trend of her activities would be thereby changed. Mr. George T. Powell, who had been a most efficient Director of Farmers' Institutes of New York State was invited to the conference as an expert to explain conditions and give advice as to remedies. The situation seemed so serious that a Committee for the Promotion of Agriculture in New York State was appointed.



At the first meeting of this committee Mr. Powell made a strong plea for interesting the children of the country in farming as a remedial measure, and maintained that the first step toward agriculture was nature study. It had been Mr. Powell's custom to give simple agricultural and nature study instruction to the school children of every town where he was conducting a farmers' institute, and his opinion was, therefore, based upon experience. The committee desired to see for itself the value of this idea, and experimental work was suggested, using the schools of Westchester County as a laboratory. Mr. R. Fulton Cutting generously furnished the funds for this experiment, and work was done that year in the Westchester schools, which satisfied the committee of the soundness of the project. The committee naturally concluded that such a fundamental movement must be a public rather than a private enterprise; and Mr. Frederick Nixon then Chairman of the Ways and Means Committee of the Assembly, was invited to meet with the committee at Mr. Hewitt's home. Mr. Nixon, had been from the beginning of his public career deeply interested in improving the farming conditions of the State. In 1894, it was through his influence and the support given him by the Chautauqua Horticultural Society under the leadership of Mr. John W. Spencer, that an appropriation had been given to Cornell University for promoting the horticultural interests of the western counties of the State. In addition to other work done through this appropriation, horticultural schools were conducted under the direction of Professor L. H. Bailey with the aid of other Cornell instructors and especially of Mr. E. G. Lodeman; these schools had proved to be most useful and were well attended. Therefore, Mr. Nixon was open-minded toward an educational movement. He

listened to the plan of the committee and after due consideration declared that if this new measure would surely help the farmers of the State, the money would be forthcoming. The committee unanimously decided that if an appropriation were made for this purpose, it should be given to the Cornell College of Agriculture; and that year eight thousand dollars was added to the Cornell University Fund, for Extension Teaching and inaugurating this work. The work was begun under Professor I. P. Roberts; after one year Professor Roberts placed it under the supervision of Professor L. H. Bailey, who for the fifteen years since has been the inspiring leader of the movement, as well as the official head.

In 1896, Mr. John W. Spencer, a fruit grower in Chautauqua County, became identified with the enterprise; he had lived in rural communities and he knew their needs. It was who first saw clearly that the first step in the great work was to help the teacher through simply written leaflets; and later he originated the great plan of organizing the children in the schools of the State into Junior Naturalists Clubs, which developed a remarkable phase of the movement. The members of these clubs paid their dues by writing letters about their nature observations to Mr. Spencer, who speedily became their beloved "Uncle John"; a button and charter were given for continued and earnest work. Some years, 30,000 children were thus brought into direct communication with Cornell University through Mr. Spencer. A monthly leaflet for Junior Naturalists followed; and it was to help in this enterprise that Miss Alice G. McCloskey, the able Editor of the present "Rural School Leaflet", was brought into the work. Later, Mr. Spencer organized the children's garden movement by forming the children of the State into junior gardeners; at one time he had 25,000 school pupils working in gardens and reporting to him.

In 1899, Mrs. Mary Rogers Miller, who had proven a most efficient teacher when representing Cornell nature study in the State Teachers' Institutes, planned and started the Home Nature study Course Leaflets for the purpose of helping the teachers by correspondence, a work which fell to the author in 1903 when Mrs. Miller was called to other fields.

For the many years during which New York State has intrusted this important work to Cornell University, the teaching of nature study has gone steadily on in the University, in teachers' institutes, in State summer schools, through various publications and in correspondence courses. Later with the cooperation of Dr. Anderew Draper, as Commissioner of Education, many of the Cornell leaflets have been written with the special purpose of aiding in carrying out the New York State Syllabus in Nature study and Agriculture.

Anna Botsford Comstock, author of the best-selling Handbook of Nature Study *was a scientific illustrator, nature educator and author. She was one of the first women admitted to the science honor society Sigma Xi. Her* Handbook, *which became the most successful of all nature study texts, has been reprinted throughout the twentieth century in over 20 editions and 8 languages.*

How Water Gets Into the Air

By Wilford M. Wilson

"The soft gray rain comes slowly down,
Settling the mists on marshes brown,
Narrowing the world on wood and hill,
Drifting the fog down vale and rill."

AT THE RIGHT PLACE, AT THE RIGHT TIME

by Enda Mills

Today there is a new appreciation of interpreting and experiencing nature, using both men and women as what used to be called "nature guides." Colorado naturalist and author Enos Mills was a pioneer in the work of understanding and teaching about nature in the early years of the 20th century. His work with nature guides not only had an enormous impact on Nature study overall, it integrated women into the program and it changed his personal life in ways he could not have imagined.

It began in late spring of 1916 in Cleveland, when the Burnell sisters, Elizabeth, 27, a college physics teacher, and Esther, 25, an interior designer, went to hear a "Trail Talk" by Enos Mills. They were thinking of going to Colorado for their summer vacation and wanted to know more about it.

As Mills enthusiastically told of his outdoor experiences in Colorado, the scenes came alive and the sisters felt as if they were right there. When the program was over, Esther and Elizabeth eagerly hurried over to talk with Mills, bombarding him with questions – about getting to his part of northern Colorado, staying at his inn which was half a day from Denver, and bringing the right kinds of clothes. What one sister didn't think of, the other did. The trip would prove to be a giant step into the future!

After talking with Mills, the sisters' travel plans came together quickly and, in a short time, they were on the train bound for Denver, where there was an overnight stop. The next day they took another train to the foothills. The last leg of their journey was in Mills' Stanley Steamer touring car which met the train. The steamer car climbed steadily, up, up, up. It stopped often for water, which gave Esther and Elizabeth a chance to stretch and admire the scenery.

They were so absorbed with the excitement of the ride that when the car pulled up to the Longs Peak Inn, they felt as if they were dreaming, especially when Enos Mills came out on the porch to welcome them. After catching their breath, Esther and Elizabeth collected their belongings and were taken to their room. Such a glorious room it was, with electric lights, steam heat, plenty of hot water and grand views of the mountains. As early as 1916, Longs Peak Inn had the best of both worlds: mountain atmosphere and modern facilities, including a natural history room, post office, telephone and delicious meals.



Elizabeth Burnell

In 1901 when Mills started Longs Peak Inn at 9,000 feet high in the Rockies, he had two goals: a good place to stay for people from all over the country, and a place that featured outdoor nature discovery. He had already created and perfected nature guiding. He was a nature guide and he trained nature guides, both men and women.



Esther & Enda Mills

The inn had many nature guides who led a variety of hikes, walks, climbs, horseback rides and car trips to many areas. The size of the groups was small, around seven, giving each person many opportunities to have a few words with the nature guide. As Mills wrote in *Adventures of a Nature Guide*: "A wilderness becomes a wonderland with a nature guide."

Esther and Elizabeth had signed up for a hike to timberline for the next day. Their nature guide was Betsy and, before they started, she had introduced everyone and suggested that they all stay together and move slowly. Questions were encouraged but conversation was discouraged. This was a time for everyone to turn on his or her senses: looking, listening, and feeling, and to focus, "tuning in" to nature.

Whenever the group stopped, which was often, everyone looked around to see if they could guess what Betsy would point out or ask a question about. Just a question kept everyone thinking and kept the group from missing any sights of interest, such as the magenta flower with blossoms shaped like a miniature elephant head, trunk and all. Enos Mills said, "The outdoors BURSTS with entertainment, refreshment, surprise and challenge, "– something for everyone to discover and enjoy.

As the group moved slowly up the mountains, gaining altitude, no one asked to sit and rest. At such a slow and steady pace, there wasn't the need, especially with nature diverting them. Looking ahead, Elizabeth stopped and , waved her arm, said, "There it is; there it is" – timberline.

There was the "forest frontier" as Mills called the matted, wind-blasted dwarfed trees; certainly trees with biographies, certainly trees that were survivors.

Right away, Esther was on hands and knees admiring the miniature wild flower garden with blossoms so tiny, yet so colorful. There were the intense blue Forget-Me-Nots, the fragrant Rock Jasmine, and many other wild flowers. It was an unbelievable sight. Silently they ate lunch. Timberline had a spiritual feel, one of awe. It spoke for itself. Betsy was quiet until one or two people stirred.

As the group started down the trail, Elizabeth thought she saw a rock move, and then another! How she laughed when they turned out to be Ptarmigan birds, about the size of chickens, well camouflaged. Watching them was interesting as Betsy told their unique story. Seeing them was one of the benefits of a small, quiet party. Betsy suggested that they go down the trail slowly, for it would look different and they would see different things than they had coming up.

When Betsy stopped at a beautiful tree, she asked what living trees do. No one seemed to have thought about it, so she told about living trees giving oxygen and tree roots holding the soil. She suggested that each person think about other important things living trees do. Saving living trees was one of Mill's great concerns.

All day long, Elizabeth and Esther were impressed with the smoothness of Betsy's nature guiding, especially how she continually focused on what was around them without doing much talking. It was like a treasure hunt. It encour-



Elizabeth Burnell



Esther Mills

aged each person to discover nature for him or herself.

Each trip the sisters took had special features, or the area had its own personality: Twinflowers, or a big hole in a tree where a woodpecker family lived. As each one became more observant, nature seemed to reveal more, especially when they went to the same place often, yet it was never really the same. Each day Elizabeth and Esther added to their understanding of nature's plans. After a few weeks, the sisters had sampled many varied experiences, had joined Mills himself on two trips, been with a dozen different nature guides and talked with many about nature guiding philosophy, – a philosophy that makes sense. And they saw the skill of spontaneous tact, subtle control, ready humor, endless patience and continual enthusiasm in use every day.

After serious consideration they both decided that they wanted to become nature guides! It wasn't just that they enjoyed the outdoors, but also because of what they saw happening to people after experiencing nature. Boredom was gone, disinterest was gone, fatigue was gone. Instead, people found new interests, joy, renewed energy and satisfying activities.

Enos Mills said, "Go out under the open sky and feel gentle influences of nature." Making this happen was a challenge for Esther and Elizabeth. Mills would train them in the months ahead. When the sisters' vacation money ran low, both Esther and Elizabeth offered to work at Longs Peak Inn and Mills gladly accepted their offer, saying that they were "at the right place at the right time." As the weeks and months went by, their contributions would prove invaluable.

Following nature guiding methods took practice; knowing and doing were two different things. Using familiar words, answering questions briefly, correcting misinformation pleasantly, and keeping discussion short all took skill. Learning to avoid the teacher image was hard too. Instead, an informal approach was more effective since nature guides are bridges between people and nature, and nature was always the feature, not the guide.

Elizabeth spent time with boys and girls outdoors as part of Mills' "Trail School" for the guests' children. School it wasn't, but an in-depth, first-hand experience program outside – exploring a forest, feeling different kinds of leaves and rocks, watching wildlife but not disturbing it, or just lying in a meadow. Because there were several beaver ponds nearby, the children could see and imagine what the life of a beaver was like. A trip to a beaver pond was a favorite activity; perhaps it was the first outdoor education for many.

By September, there were fewer and fewer guests, until, abruptly, the summer ended and Longs Peak Inn closed for the season. Elizabeth left to get a degree in mathematics, and Esther became a homesteader in the area! Winter went quickly for them.

The spring of 1917 began another fulfilling year of working at Longs Peak Inn and training to be qualified nature guides. One of Enos Mills' emphases was on the importance of being "more inspirational than informational" to stimulate interests.

By 1918 both sisters had received their licenses from the National Park Service to be nature guides in any National Park in the country. Although Enos Mills had trained other women, they were the first licensed women nature guides. It was an honor and a large responsibility.



Esther, Enda, and Enos Mills

Then, in August of 1918, Esther and Enos were married. In 1919 their daughter, Enda, was born. Until she outgrew the baby-carrier pack made from a pair of Esther's khaki knickers, Enda grew up in it, always going

everywhere with her parents. Talk about early, first-hand experience!

At the end of the summer of 1918, Elizabeth went to California and became a nature study supervisor for the Los Angeles City schools. By using Enos Mills' techniques, Elizabeth stimulated interest in nature study and the nature study department expanded, particularly with the use of excursions and first-hand experiences. These programs were a pattern for later outdoor education and environmental education classes.



Esther and Elizabeth Burnell

After her marriage, Esther's life-style didn't change as much as Elizabeth's. Even when the inn was closed, her challenge was keeping up with Enos, who worked on several projects at once - improvements for the inn, typing a new book, answering forest conservation letters, and working on speeches. Getting outdoors every day for a walk renewed their energy and recharged them. However, his time was running out. Suddenly, in September of 1922, Enos died of blood poisoning. Fortunately, he left two capable, knowledgeable and dedicated ladies who recognized that his work, including conservation of trees and wild life, nature guiding and the preservation of the environment would have an impact that continues today. Elizabeth and Esther were, indeed, "at the right place at the right time."

The summers of 1923 and 1924 were difficult, but with Elizabeth's moral support and her creative development of all the nature activities, Esther was not only able to run the Inn, but took on the responsibility of keeping Enos' books in print. As time went by, Esther had three more books published from his magazine articles and had his photographs reprinted for the inn's book shop. In addition, she wrote the biography, Enos Mills of the Rockies. And Elizabeth, both in Los Angeles and in Colorado before her own marriage, was continuing what Enos Mills started. As Enda grew up, it was Elizabeth who got her interested in birds, flowers, rocks and trees. By the time Elizabeth was married, Enda could tend to the large nature room at the Inn, take guests on short walks, and lead field trips.

Because Elizabeth and Esther told the Enos Mills story as it was, using many quotations, he spoke through them as he speaks through environmentalists today.

Afterward

Today the Enos Mills original 1885 log homestead cabin, filled with displays, is open to the public during the four summer months. Enos Mills' writings and his photographs are available there. The Enos Mills Cabin is on Colorado Highway #7, eight miles south of Estes Park. It is on the National Register of Historic Sites.

Enda is usually around to tell the family history. Granddaughter Elizabeth is curator and is busy keeping books and photographs in print. Great-granddaughter Eryn is typist and budding artist. All are dedicated to continuing the life work of Enos, Esther and Elizabeth.

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Photos courtesy of Enda Mills Kiley, unless otherwise noted.

Editors note: Both Elizabeth Burnell and Enos Mills were contributors to ANSS publications in 1917.

The Enos Mills Cabin has a web page at:
http://home.earthlink.net/~enosmillscbn/index.htm.
Their e-mail address is: ***enosmillscbn@earthlink.net***

Snippets From the Past

The study of nature is not a new enterprise. For centuries, people have been urged to observe, study and appreciate the natural world around us. The rationales for doing this have changed over the centuries. In the seventeenth century, for example, the famous naturalist John Ray proposed that to study nature is to praise God. Therefore, he argued in *The Wisdom of God as Manifest in the Works of the Creation* (1691), those who have the opportunity to study nature, but do not, "do as it were rob God of some part of his glory, in neglecting or slighting so eminent a subject." In *The Natural History and Antiquities of Selborne* (1789), which has been called the first work of literary natural history in English, Gilbert White urged people to study local nature as a part of the study of local history. One cannot write a complete county history, he argued, without including its natural history.

The following snippets are culled from nineteenth century books promoting the study of nature by children and families. Some of them may sound "quaint" and anachronistic; we may disagree with some of their statements; and some of these pieces may disagree with each other. Nevertheless, they reveal many of the cultural predecessors to the nature study movement that arose at the beginning of the twentieth century and still influences education today. The earliest statements often reflected the philosophy of "natural theology," the belief that the study of God's creation, nature, reveals something of God's presence, will and design. Others reveal new views concerning moral education, child psychology, the importance of an understanding of science, and the relationship between experience and "book learning."

♓ ♓ ♓

From Priscilla Wakefield, *Domestic Recreation* (1805)

The Author has been induced . . . to present her young readers with miscellaneous conversations between a well informed mother and her daughters, in which she has endeavored to blend instruction with amusements. The subjects she has chosen are such as are likely to have arisen in a family accustomed to observe with attention the objects around them; and, she trusts, are adapted to cultivate a love for the works of nature and a habit of reflection.

Dialogue 1—Insects

Lucy: Momma, I have found a beautiful insect; pray look at it, and tell me the use of these long horns.

Mrs. Dimsdale: Most insects are furnished with them; they are called the antennae, or feelers. It has been supposed by some people, that they serve for a defense to the eyes, whilst others imagine that the creature uses them as a blind man would do his staff, to feel whether the is any obstacle in the way; but as insects have generally eyes to see on all sides, I am inclined to believe they may be the organs of smell, or of some other sense with which we are not acquainted.

Emily: The antennae of a butterfly are very different from these.

Mrs. Dimsdale: They vary in their form and structure extremely in different insects, and probably in their use, as the habits of the possessor may require.

Lucy: I wish you would tell us how many kinds there are, and in what they differ from each other.

Mrs. Dimsdale: As we happen to be at leisure, I will oblige you Emily, take this key, and in my tortoise-shell cabinet you will find a drawer, in which there are the parts of many insects dried: bring it, and we will examine them.

Lucy: Oh! How glad I am that you will indulge my curiosity. I am so fond of those tiny beautiful creatures, that it is one of my favorite amusements to search for them on the plants in the garden; I mean merely to look at them, for I never hurt or confine them.

[This dialog ends with an ecology lesson written nearly 200 years ago.]

Emily: What a multitude of eggs is laid by one butterfly! If they all hatch, and each lay as many as their parents, the increase must be so prodigious that I am surprised the world is not overrun with them.

Mrs. Dimsdale: Great inconvenience would follow from the vast increase of insects, were



there not means appointed for diminishing their numbers. Birds feed upon them in every state: I have read that a pair of sparrows, having young ones, will destroy three thousand caterpillars in a week. Fish also prey upon the larva of many kinds; and some species are very destructive of those of a different race. Thus Providence wisely restrains the increase of the different kinds of animals within proper limits, and keeps them in a beautiful proportion that is beneficial to the whole.

Emily: But I suppose that insects are useful in other respects than merely supplying food to other creatures. Bees, I know, collect honey and wax, and the silk of the silkworm is made into a variety of useful things; but I do not recollect any other insect that is useful to man.

Mrs. Dimsdale: A great many of them are applied to useful purposes; and the curious habits and structure of all afford a most instructive lesson in the wonders of creation, and lead us to see the hand of a Deity in the most minute of his works. . . .

♓ ♓ ♓

From *Pebbles From the Sea-Shore* (1850)

The following pages were first suggested by the real wants of the Author in the education of his own children. He could not find such a book as he had in his mind; a book, at once moral in its influence, instructive in character; teaching common things; simple in language, and sufficiently lively in style to gain and keep a child's attention. As was the want of such a book a reality – so were the circumstances that struck out the subjects and the manner of treating them. He spent a summer with his children near the sea. There he learned that a child lives in the concrete, and that there is no time so good to teach it, as when the object is right before it, and attracts its attention and solicits its inquiries. . . .

"We have got over the stones, and now we will go down upon the hard sand."

"Oh, how nice, Papa, this is, so fine and so hard! And did the ocean put all this sand here too?"

"Yes, and made it, too. All this fine sand was rubbed off the stones by the action of the water, and every time the water comes up here now, it rubs off a little more, and makes it a little finer."



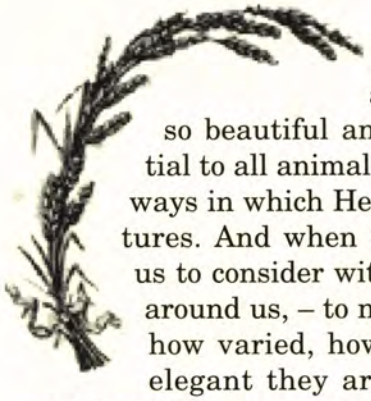
"But see here, Papa, what I have found—a pretty shell! Where did it come from?"

"From the sea; and the water has worked it up, and left it on the beach; and look, there are thousands of them. . . ."

♓ ♓ ♓

From Asa Gray, *Botany for Young People and Common Schools* (1858)

"Consider the lilies of the field . . ." Our Lord's direct object in this lesson of the Lilies was to convince the people of God's care for them.



Now, this clothing of the earth with plants and flowers – at once so beautiful and so useful, so essential to all animal life - is one of the very ways in which He takes care of his creatures. And when Christ himself directs us to consider with attention the plants around us, – to notice how they grow, – how varied, how numerous, and how elegant they are, and with what exquisite skill they are fashioned and adorned, – we shall surely find it profitable and pleasant to learn the lessons which they teach.

Now this considering of plants inquiringly and intelligently is the study of Botany. It is an easy study, when pursued in the right way and with diligent attention. There is no difficulty in understanding how plants grow and are nourished by the ground, the rain, and the air; nor in learning what their parts are, and how they are adapted to each other and to the way the plant lives. And any young person who will take some pains about it may learn to distinguish all our common plants into their kinds, and find out their names.

Interesting as this study is to all, it must be particularly so to Young People. It appeals to their natural curiosity, to their lively desire of knowing about things: it calls out and directs (i.e., educates) their powers of observation, and is adapted to sharpen and exercise, in a very pleasant way, the faculty of discrimination. To learn how to observe and how to distinguish things correctly, is the greater part of education, and is that in which people otherwise well educated are apt to be surprisingly deficient. Natural objects, everywhere present and endless in variety, afford the best field for practice; and the study when young, first of Botany, and afterwards of the other Natural Sciences, as they are called, is the best training that can be in these respects. This study ought to begin even before the study of languages. For to distinguish things scientifically (that is, carefully and accurately) is simpler than to distinguish ideas. And in Natural History the learner is gradually led from the observation of things, up to the study of ideas or the relations of things.

This book is intended to teach Young People how to begin to read, with pleasure and advantage, one large and easy chapter in the open Book of Nature; namely, that in which the wisdom and goodness of the Creator is plainly written in the Vegetable Kingdom.

♓ ♓ ♓

From Eliza A. Youmans, *The First Book of Botany* (1870)

This little book has a twofold claim upon those concerned in the work of education. In the first place, it introduces the beginner to the study of Botany in the only way it can be properly done—by the direct observation of vegetable forms. The pupil is told very little, and from the beginning, throughout, he is sent to the plant to get his knowledge of the plant. The book is designed to help him in this work, never to supersede it. Instead of memorizing the statements of others, he brings reports of the living reality as he sees it; it is the things themselves that are to be examined, questioned, and understood. The true basis of a knowledge of Botany is the familiarity with the actual characters of plants, which can only be obtained by direct and habitual inspection of them. The beginner should therefore commence with the actual specimens, and learn to distinguish those external characteristics which lie open to observation; the knowledge of which leads naturally to that arrangement by related attributes which constitutes classification.

But the plan of the work claims the attention of those interested in education, on other and more important grounds. Valuable as may be a knowledge of the vegetable kingdom, I should hardly have undertaken to make a school-book with reference to this object alone. It is not what Botany is, considered in itself, but what it is capable of doing for the minds of those who pursue it aright, that gives it its highest interest to the educator; and it has been to secure certain important results





in mental cultivation which are but imperfectly provided for in our system of popular education, that has led to the preparation of this series of exercises. It is because Botany, beyond all other subjects, is suited to maintain the mind in direct intercourse with the objects and order of Nature, and to train the observing powers and the mental operations they involve, in a systematic way, that I have undertaken to put its rudiments into such a shape that this desirable work can be rightly commenced.



From Julia McNair Wright, *Sea-Side and Wayside, No. 1* (1887)

This series of nature readers is intended for the use of beginners in reading. The subjects chosen, and their treatment, have been alike subordinated to this object. The Nature Readers are not offered as text-books in natural science, but rather as a contribution to the idea that facts of real and permanent value, may be made known, a noble taste may be cultivated, thought may be developed, and the initiatory steps in an increasingly popular study may be taken, while a child is learning to read a certain number of English words.

Should not the first short, strong Saxon sentences be rather used to convey scientific facts, than such trivial information as, "The boy has a new hat," or, "I had a plate of green corn to eat, on the fourth day of July?"

Lessons fresh from the sea-shore and the field, where life is seen, not in an abnormal state, as captive, but in its own chosen homes and natural development, cannot fail to have an educative power of great value, even to minds of a very early age.

We bring no cat and dog stories, no tales of monkey antics; but we have endeavored to impress upon the little Heir of life, in one of its highest forms, a comprehension of, and a reverence for, life, even in some of its lower manifestations.



From Mrs. William Starr Dana, *Plants and Their Children* (1896)

A Child's reading book, it seems to me, should secure for the child three things, - practice in the arts of reading, amusement and instruction. . . . It is believed that, while the children are being trained in the art of reading, their powers of observation and of reasoning will be developed, and that they will be inspired with a lifelong interest in nature. The child's mind is peculiarly alive to the charm of nature when she is studied in detail, and through her it can be trained to observe accurately and to reason logically.

Through the neglect of nature study, the wits of the country child lose just the sharpening they most need, to say nothing of a stimulus and delight which can ill be spared by one whose mental life in apt to be monotonous.

The wits of the city child may secure in other ways the sharpening so essential to success in life; yet the training afforded by a logical study of plants, and the pleasure which such a study, rightly directed, is sure to yield, are as invaluable to him as to his country cousin.

Experience having proved to my keenest satisfaction that almost invariably children can be


LESSON XXXIII.

BIRDS.

birds good apple-tree
crop has

The apple- tree has a good crop of birds.

TOPICS FOR DISCUSSION.

Why an old tree is hollow. What has happened to the inside of the tree. Trees growing from the outside. Use of hollow trees as homes for animals. Review lesson from blackboard, making new sentences from the vocabulary of the last five lessons such as, "The bird is the friend of the apple-tree." Destroys insects. "The apple-tree is the friend of the bird." Gives it a home.

38

LESSON XXXIV.

BIRDS.

young apples birds but
most bears trees may

Another good crop of birds.

Young trees may be best for apples.
But an old tree bears the most birds.

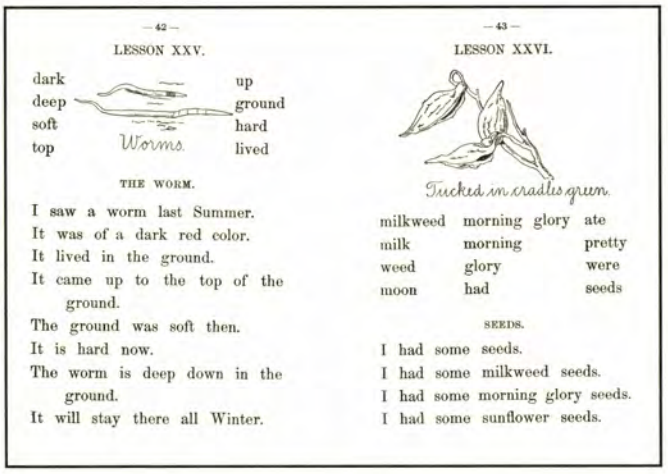
TOPICS FOR DISCUSSION.

The meaning of the writer, "crop of birds," "crop of grain." Why the young tree has more apples. Why the old tree is more easily hollowed out. Birds that live in hollow trees. What kind of beaks.

Reading-lessons should do more than teach reading — they should educate.
WILBUR S. JACKMAN.

39

interested in stories of plants and <u>their</u> children, to the children of the land I offer this little book, in the earnest hope that its pages may



—42—

LESSON XXV.

dark	up
deep	ground
soft	hard
top	lived

Worms.

THE WORM.

I saw a worm last Summer.
It was of a dark red color.
It lived in the ground.
It came up to the top of the ground.
The ground was soft then.
It is hard now.
The worm is deep down in the ground.
It will stay there all Winter.

—43—

LESSON XXVI.

Tucked in cradles green.

milkweed	morning glory	ate
milk	morning	pretty
weed	glory	were
moon	had	seeds

SEEDS.

I had some seeds.
I had some milkweed seeds.
I had some morning glory seeds.
I had some sunflower seeds.

lead at least some few of them to find in life a new joy and deeper meaning.



From Mary E. Burt, ed., *Little Nature Studies for Little People* (1895)

This book is intended as a primary text-book in Science and Reading. The motive in it is to introduce teacher and pupil to a mutual love for the woods and fields, to the study of animals and plants, to the observation of real things in life, and to the methods of a true naturalist. It should take teacher and pupil out-of-doors, into the open air, and to the heart of nature. Incidentally, it will doubtless lead to the acquisition of the power to read and to a taste for the quiet and elegant literature of a pastoral writer.



From Katherine Beebe and Nellie F. Kingsley, The First Year Nature Reader (1896)

Psychologists and Child students have taught us that it is a mistake to begin with analyses in dealing with young children, and that it is processes, moving mental images, and dramas of life which command the interest and attention of unfolding minds. For this reason the authors venture to hope that the reading matter here presented has a psychologic, and, therefore, practical, value to both teacher and pupil.

The lessons are to be preceded by conversations which shall call vividly to mind the subject of the reading lesson by a direct study of objects at all times when it is possible, and by story-telling, in which the written word or phrase is presented at the moment when interest is greatest. For instance, in a study of birds the calling to mind of birds known and observed, as well as stimulus to further observation, must be the preparation and mode of presentation of new words and sentences. When the lesson on fruit, flowers, twigs, stones or insects are in order, the subjects themselves can be at hand.



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Nature Study in the Horace Mann School

by Elizabeth Carrs & Francis E. Lloyd

Excerpted from: "Course in Nature study," Teachers College Record 1, no. 2 *(March 1900). This entire issue of the journal is devoted to describing the Horace Mann School nature study program.*



The question is seldom asked nowadays whether or not the study of nature shall be made a part of the elementary curriculum. The growth of opinion during the past few years has answered the question in the affirmative. The general acceptance by educational authorities of the arguments and views of those who have studied the question has brought the educational world face to face with the problem of handling a subject newly added to what appears to be an overcrowded curriculum.

It will be fitting here to call attention to the main arguments which have brought about this result.

It has been held since the time of Horace Mann that the inductive method of study should be used in our elementary schools. This method calls for recognition of the value of facts, and for training in the various methods of observation and in generalization. Work of this kind cultivates that scientific attitude of mind which is more and more the need of modern civilization. The obvious way to reach this end is through the use of the materials of nature at first hand by means of the laboratory method. And, in point of fact, the laboratory method is valuable just in proportion as it attains these results. It succeeds when it trains the child in inductive reasoning; it fails, at least in elementary education, when it becomes an end in itself.

It has also been argued that an acquaintance with nature reacts upon the individual by deepening and enriching the emotional life. This in turn tends to make people better, purer, and happier. More recently a very important economic bearing has been pointed out as attaching to this effect upon the emotional life. It is said that immigration from rural communities to the city will be checked when the beauty and interest which attach to country life are fully appreciated. If, by the study of nature, the farming classes become more intelligent, if they value properly the advantage and beauty of their natural environment and strive to make their home surroundings more attractive, the importance of such results can hardly be overestimated.

It should be pointed out that the interest which the study of nature fosters is both immediate and subsequent. As an example of the effect of immediate interest, may be cited the fact that it reacts favorably upon the whole work of the school. The crowded curriculum is not so burdensome when the nature study illumines in so many ways the rest of the work. The study of nature may impose new tasks, but they are gladly received because of the difference in the method of attack, and the new and refreshing point of view which is gained spurs the student to self-imposed effort. On the other hand, the subsequent interest leads into life itself. One aim of formal education is to prepare persons for both the duties and the enjoyments of life. The function of natural science as a factor of that formal education is not merely to train scientists. These form at present, and will always form, only a very small fraction of the people. The chief end of such study is to enable the average person to understand and have a share in that scientific spirit which ought to be the common heritage of all; to have a faith in the results of proper scientific investigation which makes for clean living; and finally to have and to possess an abiding satisfaction in the things of nature which will attract the mind at times away from the strife of modern living to a quiet contemplation. Some intimate knowledge of nature will certainly not diminish one's ability



to enjoy it. On the contrary, it insures an intelligent appreciation of the facts of nature which must always carry the mind beyond the working limit of mere curiosity.

It has been mentioned above that nature study may be expected to have certain ameliorating effects upon the rural population. It is also to be desired that those whom fortune forces to live in the city shall have a better understanding and appreciation of the work of the farmer. It is worth much to have the ability to get another's point of view. Those studies which help persons to an intelligent sympathy with the workers in other fields of labor broaden the character. In this respect nature study and manual training stand together; they tend to dignify labor and thus improve social conditions.

It is implied in these statements that people will thus be the better prepared for citizenship. The conservation of our natural resources, such as forests and the like, is dependent on an enlightened public opinion. The bettering of the conditions of community life which depends upon scientific methods depends also upon the willingness of the people of the community to do their personal share of the work. It takes the combined appeal to the reason and to the emotions to compass these ends, and it is the high privilege and duty of the teacher to bring this appeal to the young.

In general, then, we conclude that the aim of nature study is to prepare the individual for life by training his mental power of observation and of generalization, by deepening and rationalizing his emotional life, and by increasing his social worth. We have separated these aims for the sake of definiteness and emphasis. It must not be supposed, however, that there is a separation of the corresponding motives in the mind or in the processes of instructions.

In accordance with these views, an attempt has been made to introduce nature study into the Horace Mann School. In seeking, however, for more definite thoughts for guidance in laying out a course of study, it has been necessary to lay down a few principles which are more or less inferential from the general propositions presented above.

One of these is that nature study is, in reality, a study. It is and must be an essential part of the serious business of education in the school. The amelioration of school work must be sought in changes in the objects and methods of study, rather than in a change from work to dawdling and guessing. It follows that nature study must not be "wholly informal and unsystematic, the same as the objects are which one sees," if by that is meant that there shall be no thoughtful planning for the course of work. On the contrary, the work must be most carefully and systematically laid out, and the plan adhered to. It is to be feared that the promulgation of the doctrine of informality may do much harm in not accentuating the necessity of careful preparation on the part of the teacher.

In the second place, nature study does not confine itself to organic nature; inorganic nature is also within its scope. Again, materials drawn from nature must be the basis of the work. This does not, however, mean that other sources, such as books, may not have their contributory value.

There must also be a serious attempt to correlate the nature studies with the other studies of the curriculum so far as this can be done with advantage to all. Exactly how far the idea of correlation can be carried out will more often depend upon the skill of the teacher than upon scheduled instructions.

Moreover, the course of study must be planned to make the most of the inductive method, which proceeds from the known to the unknown. Nature study at the first must find its material in the immediate environment of the child, and as the mental grasp strengthens and the mental horizon broadens, new sources are made





available. We believe that this is an important principle, for in this way the home and the school life can be woven together in the life of the child. In point of method, then, the work in the earlier years must be observational. The thought content must gradually increase as the higher grades are reached.

Finally, the choice of materials must often be determined by the seasons. It is of the utmost importance that the teacher select wisely from what is available; it is of equally great importance that the pupils learn to follow the seasons and find pleasure and profit in what the seasons offer.

The reader must judge for himself whether the principles above cited are correct. At any rate this course of study is now in actual operation in the Horace Mann School. No claim is made for it, other than that it represents earnest effort to contribute something to the solution of the problem of nature study.

Although a definite plan has been outlined for each grade, it is certainly not desirable that every detail of arrangement be rigidly adhered to. It may be found necessary in some instances to shift certain topics so that closer correlation may be established among subjects in the same grade. It is believed, however, that there are distinct advantages in having a time set apart on the program for carrying out a very definite plan of nature work throughout the School. The more informal method, by which any material that happens to come to hand is utilized, and odd times during the day chosen for nature lessons, is no doubt rich in results when skillfully used by the trained naturalist whose interest is pre-eminently in the out-of-door world, and whose breadth of view and insight render him capable of bringing forward the most vital facts and relationships. Nevertheless, observation has led us to think that there are certain dangers arising from too great freedom in the use of this method by teachers who have had little scientific training.

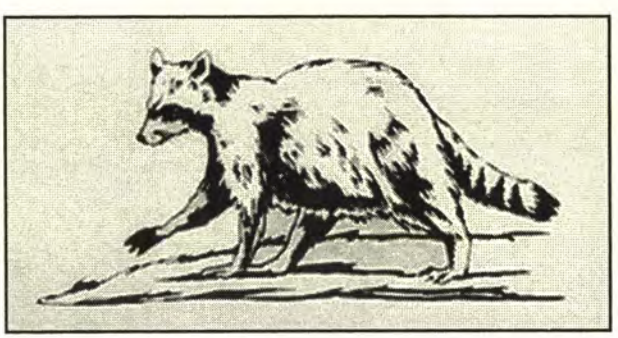
In the first place, we believe that there can be no effective teaching of nature study until it is more generally recognized that just as careful preparation is needed for this subject as for history or English. As nature study is comparatively new in the field of elementary education, and involves a knowledge of so many subjects, teachers should be assisted by every possible means for successfully undertaking the work. With the various duties required, it is impossible for the majority of grade teachers to find for themselves the most reliable sources of information, or to know the most fundamental facts and relations of the various subjects in the field of natural science. It is therefore suggested that a few main units of work be assigned for each grade, thus allowing time for preparation, not only by reading but, more especially, by the study of material and experimentation, so that questions of doubt or inquiry arising may, as far as possible, be settled, and skill in manipulation be acquired, before presenting the subject in class. In this way, greater confidence and caution, as well as a more intelligent interest, will be brought to bear upon classroom work.



Some of the evils resulting from an indefinite plan and lack of preparation are the constant repetition of work throughout the grades, the careless use of analogies, the drifting away from truth by making statements which sound well but too often merely cover ignorance, and, finally, the slipshod performance of experiments, that with a little previous practice in manipulation of simple apparatus, could be made of greatest educational value. One would better confess ignorance and leave experiments undone. There are too many careless workers and superficial thinkers already, to warrant any method of teaching on our part that shall add to their number.

While we would urge a definite plan and good preparation for the bulk of the work, we do not wish to emphasize this to the exclusion of that invaluable spontaneity that comes from the incidental knowledge which teacher and pupils pick up together. It is true here, as elsewhere, that some of the most valuable knowledge that goes to make up the sum of our education has been gained incidentally. If any interest is shown by the teachers, boys and girls will bring all kinds of things to school, and this interest in collecting, unless thoughtless waste of life is shown, should be encouraged, and the specimens cared for if they are of any value. We have also found that pleasant relations may be established between classes if the children give specimens which they have brought to school, to that grade to which such material would be of special value for illustration or study.

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THE MEANING OF THE NATURE STUDY MOVEMENT

by Liberty Hyde Bailey

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

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

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

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

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

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

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

"The getting of information is but the beginning of education. 'With all thy getting, get understanding.'"

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

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





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

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

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

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

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

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





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

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

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

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

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

The teacher will need help both in methods and in facts. The method, however, is not to be a codified series of laws or a hard-and-fast system; but there should be some underlying pedagogical principle which will run through every item of the work. There will be opportunity for endless variation in the details and in the little applications of the work. The personality of the teacher must always stand out strongly. We need the very best of teachers for nature study work—those who have the greatest personal enthusiasm, and who are least bound by the traditions of the classroom. The teacher, to be ideal, must have more time, more inspiration and more knowledge. It is better if the teacher have a large knowledge of science, but nature study may be taught without great knowledge if one sees accurately and infers correctly from the particular subject in hand.

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

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

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

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

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

(1) The fact,

(2) The reason for the fact,

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

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



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

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

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



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

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

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

It is a common mistake to attempt to teach too much at every exercise; and the teacher is also appalled at the amount of information which he must have. Suppose that one teaches two hundred and fifty days in the year. Start out with the determination to drop into the pupils' minds two hundred and fifty suggestions about nature. One suggestion is sufficient for a day. Let them think about it and ponder over it. We stuff our children so full of facts that they cannot digest them. I should prefer ten minutes a day of nature study to two hours; but I should want it quick and sharp. I should want it designed to develop the observing and reasoning powers of the child and not to give mere information. It should be vivid and spontaneous. Spirit counts for more than knowledge.

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

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



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

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

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

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

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

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

I would again emphasize the importance of obtaining our facts before we let loose the imagination, for on this point will largely turn the results — the failure or the success of the movement. We must not allow our fancy to run away with us. If we hitch our wagon to a star, we must ride with mind and soul and body all alert. When we ride in such a wagon, we must not forget to put in the tail-board.

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



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

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





be above its predecessor, but yet not living up to the full stature of its opportunities. It is therefore necessary to begin with the new generation—to begin our chimney at the bottom, rather than at the top. People crowd into the cities largely because of the intellectual entertainment that they find there. If their own intellectual horizon is enlarged, they may find entertainment in the country.

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

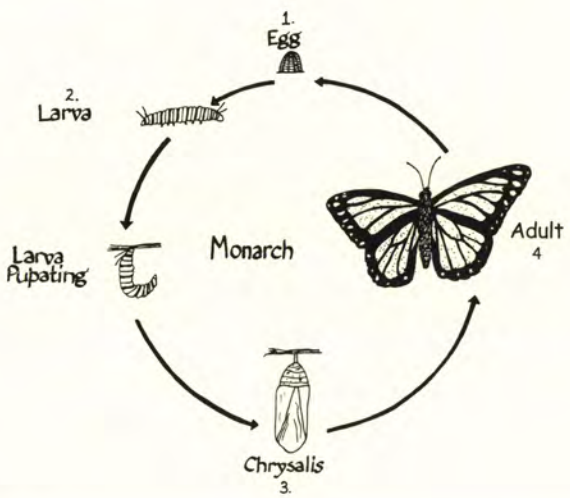
Nature study teaching may seem to be an indirect way of reaching the farmer; but it is not. It is direct because it strikes at the very root of the difficulty. One of the pleasantest comments which we have had on our nature study work came from a country teacher who said that because she had used it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

The nature study effort sets our thinking in the direction of our daily doing. It relates the schoolroom to the life that the child is to lead. It makes the common and familiar affairs seem to be worth the while. Essentially, it is not an ideal for the school any more than it is for the home; but so completely do we delegate all work of teaching and instructing to the school, that nature study effort comes to be, in practice, a schoolroom subject. I wish that every parent, as well as every professional teacher, could see the importance of first instructing the child in the very things that it is doing and the very objects that it is seeing. The ideal of the parent or the teacher should be to bring the child into sympathetic relations with its world; but whatever may be in the mind and hope of the teacher, so far as the child is concerned the nature-sympathy must come as a natural effect of actual observation of definite objects and phenomena.

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

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

Liberty Hyde Bailey, botanist and educator, was dean of the New York State College of Agriculture in the first decade of this century. He served as president of the American Association for the Advancement of Science and the Botanical Society of America. A leading proponent of nature study, he was the first president of the American Nature Study Society.



SISSIES AND TOMBOYS

by Edward F. Bigelow

From: Edward F. Bigelow. The Spirit of Nature Study *(New York: A.S. Barnes, 1907).*

All truths are not whole truths, nor are all lies exempt from a basis of fact. Few laws, if any, are so general as to require no exceptions; even axioms are not self-evident in all cases. The biggest lies have thinkable or possible conditions, and the most imaginative novel ever written has a certain foundation in actual experience, although idealized almost beyond recognition.



No human being has fallen so low as to be without all goodness; and though there are many lovable and angelic men and women, every one, both literally and figuratively, must make changes in his apparel when he becomes so good that he feels his wings beginning to sprout. Dr. Jekyll and Mr. Hyde continue in business at the old stand. The partnership will never be dissolved; the most that can be hoped for is a struggle as to which shall be senior and controlling.

The naturalist finds that all positives have a negative. The wisest of ants are the biggest fools - when you look for the foolishness; and the dullest "clod-hopper" toad may have to his credit a lot of brilliant doings, even reasonings, and clever tricks.

I am not going to argue that we want our boys to be sissies, nor our girls to be tomboys – nor to denounce the characteristics that often entitle them to those nicknames among their schoolmates. Sugar by the mouthful and acid by the glassful are not agreeable, but a little of both in a summer drink make a pleasing combination. A boy wholly or predominatingly a sissy, or a girl a tomboy would be unbearable and intolerable. But a real boy, or a really wholesouled girl is nicely flavored by a fair degree of tomboyishness, or sissyness. Or, perhaps, it would be better put if I should say that they would be nicely flavored by the characteristics of healthy heartiness and loving gentleness, which the terms tomboy and sissy of the old time vernacular maligned and misrepresented. Less and less frequently nowadays do we hear applied to girl or boy these derisive terms, and more and more do we see commended and encouraged under other phrases the qualities which our fathers and mothers denounced.

It is not much more than a decade since I heard it said of a young lady who was the first of her sex in town to get a bicycle and to ride it, "Oh, the immodest Miss ——." "She always was doing rash and bold things." "Nothing but a regular tomboy, anyway," and other derogatory remarks of a similar import. Such remarks applied to bicycle riding sound strange, indeed, at present, to those who do not, in 1905, live in spirit in the first part of last century. But it has not been more than two months since I heard similar remarks about an accomplished and beautiful lady who was wearing a divided skirt and riding astride of a horse.

But we are improving in this matter of the "tomboy". It is not long ago (and there are traces of it still lingering like vestiges of snow banks on the northern side of stone walls in late spring) when the standard of girlhood and young womanhood seemed to be pale eyes, pallid cheeks, mincing steps, and a "prunes and prisms" manner of speech. Hockey, golf, tennis, basketball, and the "exhilarations of the road" in nature interests haven't yet got the upper hand in all aspects of young womanhood. In many a boarding school for young women, we still line them up two by two for the conventional sidewalk out-

ing. Imagine that with a boys' school! It would not take a long search to find many a high school where the young women get all their communion with nature out of formalin and over the microtome, and the standard of excellence is the neatness and primness of the notebook.



But all this you say is not the negative of tomboyishness. No, neither is all flame of the same color. It depends upon what is burning. But it is part and parcel of the same proper, rank-and-file, conventional spirit. Applied to various materials, placed in different environments and the appearance is changed, that is all.

Nature study is dead if it doesn't fill the lungs with pure air, arteries with redder blood, the muscles with better fibre; if it does not quicken the step, brighten the eye, and bring a certain spirit of abandon, a happy-go-lucky, free and easy vivacity that the old folks maligned by calling "tomboy." In Nature study, especially by the girls, bright eyes, rosy cheeks, and happy hearts are worth more than stacks of note books and conventional walks on brick pavements.

Then, too, to the girl belong all the delights and advantages of athleticism as well as to the boy. I have a fellow feeling for that young lady in a Pennsylvania Normal School who insisted upon becoming a member of the class in boxing, the only one of her sex that did so in a class of fifty. And she was soon one of the first in skill. Perhaps she was called a tomboy, but I doubt if she cared for that, and the results are worth it. The training will count for health and long life and happiness, and it counted, too, for a successful buffeting of a big brother of one of the smaller, troublesome boys who, a few months after her graduation, came to the school that she was teaching and interfered with the management. As soon as he regained consciousness, and could pull himself together, he went home, but he went there with more respect for her. It was an argument for and from femininity that he could understand. Some learn by seeing, others by reading, more by thinking, and occasionally certain forms of mental acquirements are best received and retained when pounded straight through the skull!

Not long ago a gentleman formerly active and prominent in business and in society, but now afflicted with an incurable nervous disease, invited me to ride with him in his carriage. He was large and imposing in appearance, he had a noble head and face, but was so nearly helpless that two attendants were needed to help him from his house to the vehicle. After he had with difficulty attained his seat in the carriage, he made an impressive gesture and said: "Let me preach you a sermon – with the text and the sermon in one sentence. Will you preach it to your nature classes – in season and out of season – wherever you go?"

I replied, "I have no doubt that you can give them some good advice. What is it?"

Just this – with good health, everything; with bad health, nothing."

"But," I hear some one say, "that is just what I am trying to get – good health. I employ the best physician in town."

No physician can keep nor regain health for you. The physician is only one of many guides to nature – the storehouse of health. The naturalist likewise guides you to nature. He believes that the living plant is as healthful and much more agreeable than a decoction of its juices. Some things we take to the stomach – other things just as good to heart and lungs. Old Mother Nature is hale and hearty, but with a certain roughness in her character. She coddles not her weakest, nor strongest. She who would be her boon companion must meet her in a similar spirit. You can't get her best when you are in silk gowns nor on velvet cushions. She will give you heartiness when you meet her heartily. Her best life, too, is essentially feminine. It is the pistillate portion, not the staminate, that endures the longest. And these are protected and can endure because the are rough, or tough, prickly, or firm hearty.



So, girl or woman, go to nature, not for fragility, nor for delicacy, but for hardiness and strength. Pick not merely the beautiful flower for a bouquet, but tramp the road, scale the wall, or climb the tree, if necessary; push through the tangle and find health of body as well as of mind. You may tear your clothes and scratch your skin, but your appetite will be good, and you will not need "after-dinner" pills to assist your digestion. "With good health, everything; with bad health, nothing." Let out girls be a little more boyish, aye, even tomboyish, if you please, but in the best sense. Do not, if you please, misinterpret nor misunderstand me; do not decide that I want all girls to be hoydens, to be loud, and coarse, and unrefined; that I want the girls to swear when a briar tears her frock, or to call on any of the heathen gods when a chestnut burr pricks her finger. I want nothing of the kind. One of the most accomplished naturalists that I have known was a woman, gentle, kind, and good. Good? More than that. For a brutal husband pounded her body, and abandoned her to her own resources or to the coldness of charity, and when the beast was dying in a hospital alone she cared for him like any other angel, and the man died with his head on her bosom, blessing her. And she was a nature student, and corresponded with Darwin, and wrote books, and made discoveries, and "liked bugs," and climbed fences, and was not afraid of a cow, and never shrieked when some one cried, "Snake." Oh, no! I don't like hoydens, and I don't like girls that swear. I am trying to tell you what I do like. Please do not misinterpret nor misunderstand.

"With good health, everything; with bad health, nothing."

What a fallacy it is to state that "words are signs of ideas." Frequently they are more than the ideas - they compel, drive, and even warp ideas. The original meaning of barbarian was merely a foreigner. Our "dunce" was but a follower of Dunsman, a famous schoolman who opposed so great prominence of classical studies in education. And now the word is a synonym for fool!

It seems probable that the word "sissy" originated in the days when it was thought necessary for the boy to live in a different world from that occupied by his sister. Men and women in those horrible days must never engage in the same pursuits, never think nor act alike; the standard of conduct and propriety was vastly different for the man and for the woman. Nowadays, when women may engage in almost any business permissible to men, when both sexes enjoy the same outdoor pursuits, is it so very bad for a boy to have at least some resemblance to his sister? Shouldn't he have the same gentleness, refinement, and purity? May she not skate, and ride a bicycle?

He should, of course, be whole-souled and clean souled, hearty and genuine. But shouldn't the sister set him a commendable copy? If he can climb a fence by balancing himself on his stomach across the top rail, and with a yell and a wriggle land on his feet in the next field, why shouldn't she, if she wants so do so and is dressed for it? If he "likes bugs and things" why shouldn't she? She will, if she may be allowed. In brief, what I have maintained that the boy should be that I think the girls should be. And isn't the reverse true? We have been too much dominated by "tomboy" and "Miss Nancy"; we have been frightened away from the truth, and driven back to threadbare notions by "tomboy" and "sissy." It has been said by some one that if you want to kill a good thing, give it a ridiculous nickname. We admit, I think, that the qualities our ancestors mistakingly tried to kill, should now be restored. Then why continue the nicknames? Why not hasten on the restoration — name or no name?

A few months ago, from the high school in Calais, Maine, I took out a large party of young people in a nature study class. Nearly all were manly little men and womanly little women, and heartily enjoyed the afternoon, all in the same road, all climbing the same fences, listening to the same bird songs, watching the same squirrels, picking and examining the same flowers. But not all the pupils in that school thought it within the proper dignity of a manly boy to go on any pursuits in which the girls were engaged. There were two of the kind that brace up buildings on street corners and make tobacco spittle mosaics and splatter dashes of liquid



filth on the pavement. Such manliness always strives to avoid sissiness by leering in the faces and gazing at the ankles of the sisters who pass the corner or cross the street.

These particular youths openly avowed that they were "not going to be sissies and pick flowers," and they hied them away to congenial dirt. Their absence was not noticed by the principal till the party was well on the way along the road. Then he started an investigation and discovered the "manly" non-sissyites in the horse sheds, vigorously taking in cigarette smoke and volubly putting forth profanity and obscenity. This, it is true, may have been an extreme case. But the pitiful part was not so much in the conduct of these two particular boys, as it was in their example to many other boys who, in same or lesser degree, may have a wrong conception of manliness. Strength in character, as well as in muscle, is admirable. But filth and ugliness, a narrow mind, and a stained soul are detestable. What teacher or parent but knows how much bravery it requires on the part of a boy to be what his own conscience tells him he should be in gentleness, truthfulness, and kindness; what he should be in purity, and in a love of the true and beautiful because he fears to be called "sissy," or "Miss Nancy."

Is there any reason why a boy should not pick flowers and give a bouquet to a boy? If the girls do so why should he not, if he wants to do it? Any reason why he shouldn't see and exclaim over the beauties of a landscape as enthusiastically as a girl? Any reason why he shouldn't be as gentle as the girl should be and as free from cruelty or a desire to be cruel? Any reason why he should be more addicted to disagreeable or dirty habits than the girl? Any reason why he shouldn't as much as the girls have high ideals and gentle manners?

Let teachers and parents strive to bring boys to be one hundred percent boys, and girls to be one hundred percent girls. Then for full measure, pressed down and running over, add to the boys twenty-five per cent of girlishness, and to the girls twenty-five percent of boyishness. In either case, the result will be a well-flavored and pleasing mixture.

Your mathematics, your grammar, and spelling may help to produce for boy or girl the one hundred percent. It needs athletics, Nature study, and other outdoor interests to add the finishing and the flavoring, or to drop in the super abundant twenty-five percent qualities.

"But really, would you advise our girls to be tomboys and our boys to be sissies?" See here! If you talk like that, you will see me rise up, and hear me speak words that are not in my new dictionary, nor in yours either. Please do not misinterpret nor misunderstand. No, I would bury those nicknames, and dig up the good qualities they have long enough mantled, distorted, and misrepresented.

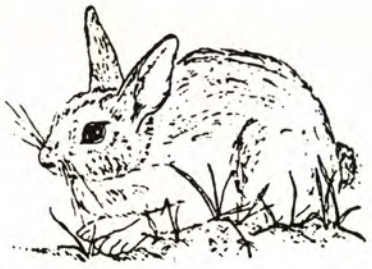
Edward F. Bigelow taught at Columbia University and was editor of The Nature Study Review.



The Nature Movement

by Dallas Lore Sharp

From: Dallas Lore Sharp, The Lay of the Land *(Boston: Houghton Mifflin, 1908).*



I was hurrying across Boston Common. Two or three hundred others were hurrying with me. But ahead, at the union of several paths, was a crowd, standing still. I kept hurrying on, not to join the crowd, but simply to keep up the hurry. The crowd was not standing still, it was a-hurrying, too, scattering as fast as it gathered, and as it scattered, I noticed that it wore a smile. I hastened up, pushed in, as I had done a score of times on the Common, and got my glimpse of the show. It was not a Mormon preaching, not a single taxer, not a dog fight. It was Billy, a gray squirrel, taking peanuts out of a bootblack's pocket. And every age, sex, sort, and condition of Bostonian came around to watch the little beast shuck the nuts and bury them singly in the grass of the common. "Ain't he a cute little cuss, mister?" said the boy of the brush, feeling the bottom of his empty pocket, and looking up into the prosperous face of Calumet and Helca at his side. C. and H. smiled, slipped something into the boy's hand with which to buy another pocketful of peanuts for Billy, and hurried down to State Street.

The crowd on the Common is nothing exceptional. It happens every day, and everywhere, the wide country over. We are all stopping to watch, to feed, and to smile. The longest, most far-reaching pause in our hurrying American life today is this halt to look at the out-of-doors, this attempt to share its life; and nothing more significant is being added to our American character than the resulting thoughtfulness, sympathy, and simplicity - the smile on the faces of the crowd hurrying over the Common.

Whether one will or not, he is caught up by this nature movement and set adrift in the fields. It may, indeed, be "adrift" for him until he gets thankfully back to the city. "It was a raw November day," wrote one of these new nature students, who happened also to be a college student, "and we went for our usual Saturday's birding into the woods. The chestnuts were ripe, and we gathered a peck between us. On our way home, we discovered a small bird perched upon a cedar tree with a worm in its beak. It was a hummingbird, and after a little searching we found its tiny nest close up against the trunk of the cedar, full of tiny nestling just ready to fly."

This is what they find, many of these who are caught up by the movement toward the fields; but not all of them. A little five-year-old from the village came out to see me recently, and while playing in the orchard she brought me five flowers, called them by their right names, and told me how they grew. Down in the loneliest marshes of Delaware Bay I know a lighthouse keeper and his solitary neighbor, a farmer: both have been touched by this nature spirit; both are interested, informed, and observant. The farmer there, on the old Zane's Place, is no man of books, like the rector of Selborne; but he is a man of birds and beasts, of limitless marsh and bay and sky, of everlasting silence and wideness and largeness and eternal solitude. He could write a Natural History of the Maurice River Marshes.

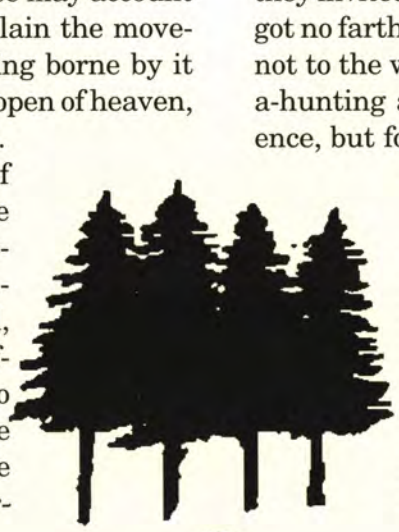
These are not rare cases. The nature books, the nature magazines, the nature teachers, are directing us all to the out-of-doors. I subscribe to a farm journal (club rates, twenty-five cents a year!) in which an entire page is devoted to "nature studies," while the whole paper is remarkably fresh and odorous of the real fields. In the city, on my way to and from the station, I pass three large bookstores, and from March until July each of these shops has a big window given over almost continuously to "nature books." I have found before me from one of these shops a little catalogue of nature books — "a select list" – for 1907, containing 233 titles, varying in kind all the way from "The Tramp's Handbook" to one (to a dozen) on the very stable subject of "The Farmstead." These are all distinctively "nature books," books with an appeal to sentiment as well as to sense, and very unlike the earlier desiccated, unimaginative treatises.

There are a multitude of other signs that show as clearly as the nature books how full and strong is this tide that sets toward the open fields and woods. There are many and as good evidences, too, of the genuineness of this interest in the out-of-doors. It may be a fad just now to adopt abandoned farms, to attend parlor lectures on birds, and to possess a how-to library. It is pathetic to see "nature study" taught by schoolma'ams who never did and who never will climb a rail fence; it is sad, to speak softly, to have the makers of certain animal books preface the stories with a declaration of the absolute truth; it is passing sad that the unnatural natural history, the impossible out-of-doors, some of the recent nature books, should have been created. But fibs and failures and impossibilities aside, there still remains the thing itself – the widespread turning to nature, and the deep, vital need to turn.

The note of sincerity is clear, however, in most of our nature writers; the faith is real in most of our nature teachers; and the love – who can doubt the love of tens of thousands of those whose feet feel the earth nowadays, whose lives share in the existence of some pond or wood or field? And who can doubt the rest, the health, the sanity, and the satisfaction that these get from the companionship of their field or wood or pond?

There is no way of accounting for the movement that reflects in the least upon its reality and genuineness. It may be only the appropriation by the common people of the world that the scientist has discovered to us; it may be a popular reaction against the conventionality of the eighteenth century; or the result of our growing wealth and leisure; or a fashion set by Thoreau and Burroughs, – one or all of these may account for its origin; but nothing can explain the movement away, or hinder us from being borne by it out, at least a little way, under the open of heaven, to the great good of body and soul.

Among the cultural influences of our times that have developed the proportions of a movement, this so-called nature movement is peculiarly American. No such general, widespread turning to the out-of-doors is seen anywhere else; no other such body of nature literature as ours; not other people so close to nature in sympathy and understanding, because there is no other people of the same degree of culture living so close to the real, wild out-of-doors.



The extraordinary interest in the out-of-doors is not altogether a recent acquirement. We inherited it. Nature study is an American habit. What else had the pioneers and colonists to study but the out-of-doors? And what else was half as wonderful? They came from an old urban world into this new country world, where all was strange, unnamed, and unexplored. Their chief business was observing nature, not as dull savages, nor as children born into a dead familiarity with their surroundings, but as interested man and women, with a need and a desire to know. Their coming was the real beginning of our nature movement; their observing has developed into our nature study habit.

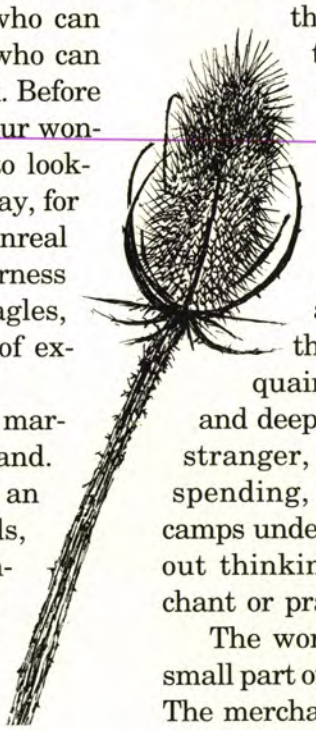
Our nature literature also began with them. There is scarcely a journal, a diary, or a set of letters of this early time in which we do not find that careful seeing, and often that imaginative interpretation, so characteristic of the present day. Even the modern animal romancer is represented among these early writers in John Josselyn and his delicious book, *New England's Rarities Discovered.*

It was not until the time of Emerson and Bryant and Thoreau, however, that our interest in nature became general and grew into something deeper than mere curiosity. There had been naturalists such as Audubon (he was a poet, also), but they went off into the deep woods alone. They were after new facts, new species. Emerson and Bryant and Thoreau went into the woods, too, but not for facts, nor did they go far, and they invited us to go along. We went, because they got no farther than the back-pasture fence. It was not to the woods they took us, but to nature; not a-hunting after new species in the name of science, but for new inspirations, new estimates of life, new health for mind and spirit.

But we were slow to get as far even as their back-pasture fence, slow to find nature in the fields and woods. It was fifty years ago that Emerson tried to take us to nature; but fifty years ago, how few there were who could make sense out of his invitation, to say nothing of accepting it! And of Thoreau's first nature book, *A Week on the Con-*

cord and Merrimack Rivers, there were sold, in four years after publication, two hundred and twenty copies. But two hundred and twenty of such books at work in the mind of the country could leaven, in time, a big lump of it. And they did. The out-of-doors, our attitude toward it, and our literature about it have never been the same since.

Even yet, however, it is the few only who respond to Thoreau, Emerson, and Burroughs, who can find nature, as well as birds and trees, who can think and feel as well as wonder and look. Before we can think and feel we must get over our wondering, and we must get entirely used to looking. This we are slowly doing – slowly, I say, for it is the monstrous, the marvelous, the unreal that most of us still go out into the wilderness for to see – bears and wolves, foxes, eagles, orioles, salmon, mustangs, porcupines of extraordinary parts and powers.



But we know that a real, ordinary, yet a marvelous world does exist, and right at hand. The present great nature movement is an outgoing to discover it – its trees, birds, flowers, its myriad forms. This is the meaning of the countless manuals, the "how-to-know" books, and the nature study of the public schools. And this desire to know Nature is the reasonable, natural preparation for the deeper insight that leads to communion with her – a desire to be traced more directly to Agassiz, and the hosts of teachers he inspired, perhaps, than to the poet-essayists like Emerson and Thoreau and Burroughs.

Let us learn to see and name first. The inexperienced, the unknowing, the unthinking cannot love. One must live until tired, and think until baffled, before he can know his need of Nature; and then he will not know how to approach her unless already acquainted. To expect anything more than curiosity and animal delight in a child is foolish, and the attempt to teach him anything more at first than to know the out-of-doors is equally foolish. Poets are born, but not until they are old.

But if one got no farther than his how-to-know book would lead him, he still would get into the fields – the best place for him this side of heaven – he would get ozone for his lungs, red blood, sound sleep, and health. As a nation, we had just begun to get away from the farm and out of touch with the soil. The nature movement is sending us back in time. A new wave of physical soundness is to roll in upon us as the result, accompanied with a newness of mind and of morals.

For, next to bodily health, the influence of the fields makes for the health of the spirit. It is easier to be good in a good body and an environment of largeness, beauty, and peace – easier here than anywhere else to be sane, sincere, and "in little thing have suffisuance." If it means anything to think upon whatsoever things are good and lovely, then it means much to own a how-to-know book and to make use of it.

This is hardly more than a beginning, however, merely satisfying an instinct of the mind. It is good if done afield, even though such classifying of the out-of-doors is only scraping an acquaintance with nature. The best, good, and deep healing, come when one, no longer a stranger, breaks away from his getting and spending, from his thinking with men, and camps under the open sky, where he knows without thinking, and worships without priest or chant or prayer.

The world's work must be done, and only a small part of it can be done in the woods and fields. The merchants may not all turn ploughmen and wood-choppers. Nor is it necessary. What we need to do, and are learning to do, is to go to nature for our rest and health and recreation.

Dallas Lore Sharp was an English professor at Boston University and one of the major nature writers in the early twentieth century.



Naturalist in the Field
Helen Ross Russell

by Victoria Fullard

She sits next to me at the Cayuga Nature Center in greens and blues. The light in the room is dissipating as the sun slowly sets outside. We haven't turned on any lights, relying, instead, on the natural light that was still streaming in through the windows when we entered the room. I've spoken to her once on the phone, but this is the first time I've met Helen in person. Immediately she sets me at ease with her smile and easy manner and throughout the next few hours it is easy to forget I am supposed to be interviewing her; her natural story telling and funny anecdotes seem too entertaining to be for an interview.



Helen Ross Russell
In The Field
Provided by:
Dr. Jean Smith

Helen Ross Russell came from a family of nature lovers and developed into a naturalist at a very young age. Her grandfather, a pharmacist, seemed to always know about plants. She and her father often took walks in the woods near their home to look at vegetation and other plant life. Even her mother, a native of city life originally, let her collect insects and house them on the front porch in glass jars. Even the family garden was an integral part of their lives as they used the home-grown vegetables as a staple of their diets.

As she grew, Helen Ross Russell's passion for the outdoors and nature continued and she developed a strong interest in teaching. After attending college in Pennsylvania Helen Ross Russell began teaching third grade. She also took on the responsibility of becoming troop leader for a local Girl Scout troop. Her ability to work well with children was quickly established and even now, years later, Helen Ross Russell is remembered by many of the girls in her troop. After gaining teaching experience Helen Ross Russell decided the time was right to return to school for a higher degree. Most programs were very competitive and still dominated by men. Helen Ross Russell applied and was accepted to Cornell University where admitting a woman was rare. The academic schedule was rigorous; however, Helen Ross Russell achieved academic excellence as well as gained scholarships and teaching fellowships. Helen Ross Russell received both her Master's Degree and Doctorate from Cornell University before returning to teaching.

For twenty five years following her graduation from Cornell, Helen Ross Russell made an hour and a half commute to and from the Manhattan Country School where she taught science to students in kindergarten through fourth grade. The school, dedicated to pluralism, has a variety of socio-economic classes as well as various ethnic backgrounds represented in the school. The school farm allows students from a very urban setting to experience some of the more rural aspects of life. When asked about her teaching experiences there, Ross Russell says "to me, it was very enriching."

In addition to teaching Helen Ross Russell wrote many books and articles. Her *Ten Minute Field Trips*, a book offering teachers ideas about how to use their school as a sample of the larger community and to utilize present resources to make teaching more effective, is a best seller on this NSTA list of publications. In conjunction with her published work, Helen Ross Russell promoted her teaching philosophy through workshops she conducted directed at fellow teachers.

In a field historically uninhabited by women, Helen Ross Russell succeeded both personally and professionally. Her early love toward nature grew and expanded through personal experience and formal education. The determination she has shown allowed her to impart her ideas and knowledge not only to her students but to other teachers as well, truly leaving a lasting impact on the study of nature.

Victoria Fullard is a Corporate Communication major with minors in Writing and Politics at Ithaca College. She will be graduating in May 1999.

BOOK REVIEWS

On Women in Nature

Rural Hours, one of the first works of American nature literature was published in 1850, four years before Thoreau's *Walden*. It was written by Susan Fenimore Cooper. Despite its wide popularity and trail-breaking contribution to the genre, Cooper's book was almost entirely forgotten through most of the twentieth century. She was not unique in being neglected. The work of many pioneering women naturalists and nature writers also faded from memory. Fortunately, this is being remedied. In recent years, a happy combination of environmental history, ecocriticism (the study of environmental literature) and feminist scholarship led to the rediscovery of these women. The following books have played important roles in this process.

The study of women's nature writing is an exciting new field and these books are excellent introductions to it. They celebrate the lives of many fine writers whose work deserves attention and help us to take a fresh look at their writing.

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Deborah Strom, ed.. ***Birdwatching with American Women****: A Selection of Nature Writings.* New York: Norton, 1986.

Deborah Strom's anthology was an early contribution to this effort. (Yes, 1986 is early, which shows how long women nature writers have been ignored.) Her introductory essay begins with an brief discussion of the role that many of the women in her book played in promoting bird protection. She also mentions the importance of the nature study movement and Anna Botsford Comstock, whose writing is included. In addition, she discusses the writers' motivating goals and relationships. The majority of women whose writing appears in this anthology were most active before World War II. Some, such as Olive Thorne Miller, did most of their writing in the nineteenth century. Other writers in this volume include Florence Merriam Bailey, Gene Stratton Porter, Cordelia Stanwood, Sarah Orne Jewett, Mabel Osgood Wright and Margaret Morse Nice. Each is introduced with a brief essay describing her life and work.

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Lorraine Anderson, ed. ***Sisters of the Earth: Women's Prose and Poetry About Nature.*** New York: Vintage, 1991.

Other anthologies followed Strom's. Lorraine Anderson's collection, *Sisters of the Earth*, is more wide-ranging than Strom's and does not limited itself to ornithological writing. It includes many early writers, as well as an fine selection of contemporary writers, including Ann Zwinger, Joy Harjo, Annie Dillard and Terry Tempest Williams. Although a paragraph or two introduces each writer, this is primarily a fine collection of women's nature writing, rather than an examination of their work.

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Marcia Myers Bonta. ***Women in the Field: America's Pioneering Women Naturalists.*** College Station: Texas A&M University Press, 1991.

Women in the Field is not an anthology. Rather, each of its twenty-five chapters is devoted to the biography and work of a different naturalist. Beginning with colonial botanist Jane Colden



and Maria Martin, who assisted John James Audubon, Bonta introduces her readers to the lives of women naturalists, botanists, entomologists, ornithologists, and ecologists. Many of these women faced a common problem, they were not welcomed into the male-dominated world of the sciences. Nevertheless, they pursued their studies as amateurs and, sometimes, assistants to male scientists. Often, writing for a popular audience provided a means to gain both income and recognition of their work.

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Marcia Myers Bonta, ed. ***American Women Afield: Writings by Pioneering Women Naturalists.*** College Station: Texas A&M University Press, 1995.

Marcia Myers Bonta's collection, *American Women Afield*, is similar to Strom's in its emphasis on earlier authors. Bonta's focus, though, is on the writing of women naturalists. Her authors are students of nature in the field, often working both as scientists and writers. She treats us to selections from the work of Mary Treat, Martha Maxwell, Katharine Dooris Sharp, Edith Clements, Ann Haven Morgan, Rachel Carson and many more. A short essay introduces each writer. These essays and her selection of authors are based on the wealth of material she found while researching her book *Women in the Field*, a detailed study of early American women naturalists.

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Vera Norwood. ***Made From This Earth: American Women and Nature.*** Chapel Hill: University of North Carolina Press, 1993.

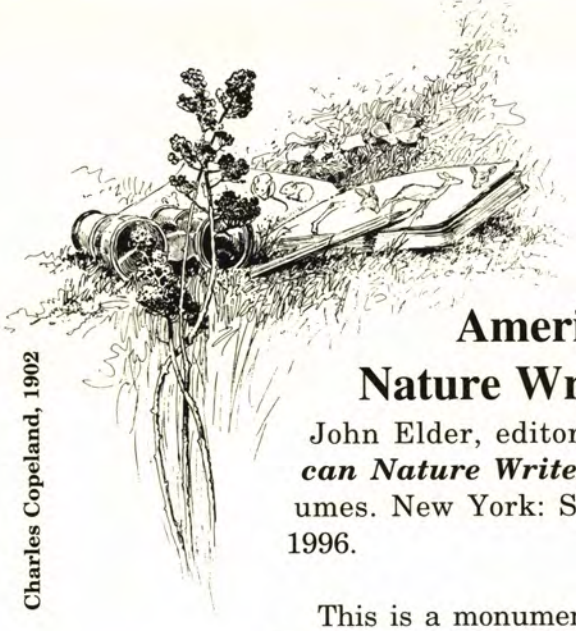
Vera Norwood's *Made From This Earth* played an important role in shaping the study of women nature writers. Historically, she argues, women's roles have been circumscribed by the boundaries of home and domestic responsibilities. This led to a distinctly female voice in nature writing that brought nature within the sphere of domesticity. The familiar scene of a bird on her nest, for example, was often described in terms of traditional notions of the American family and sex roles. While the work and lives of women nature writers are often much more complex than this theory allows, Norwood's is a trail breaking book that is required reading for any student of this field.

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Barbara T. Gates and Ann B. Shteir, eds. ***Natural Eloquence: Women Reinscribe Science.*** Madison: University of Wisconsin Press, 1997.

Gates & Shteir's *Natural Eloquence* is a collection of scholarly papers, most of which examine women nature writers. Their immediate focus, though, is women who wrote about science for a popular audience. They examine the ways in which women used writing for a popular audience to provide entry to the largely male-only domain of science. They take an international approach, including essays about English, Canadian, Australian and United States writers. The book includes a good essay about Anna Botsford Comstock and the nature study movement. (Bonta also includes a chapter about Comstock in *Women in the Field*.)

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Charles Copeland, 1902

American Nature Writers

John Elder, editor. ***American Nature Writers.*** 2 volumes. New York: Scribner's, 1996.

This is a monumental reference work examining the lives and work of the major nature writers of the United States. In its two volumes and 1,210 pages, 64 contributors examine the breadth and depth of the field in 82 chapters. Beginning with Edward Abbey and ending with Ann Zwinger, 70 author are each treated in an extended essay, often of a dozen or more pages in length, reviewing their lives and critically evaluating their work. Each of these chapters concludes with a detailed biography of the writer's work and of related biographical and critical studies. A dozen additional essays explore important themes, including African American writers, bioregionalism, ecofiction, Canadian nature writers, birdwatching literature, nature poetry, mountaineering literature, and more.

Most of the important contemporary nature writers can be found in this book. Nevertheless some had to be omitted, even from this large a work. Olive Thorne Miller is only mentioned in passing, for example, and the index does not include Bradford Torrey or Dallas Lore Sharp. However, there are essays devoted some important figures in the nature study movement, including Enos Mills and past ANSS presidents Anna Botsford Comstock and Edwin Way Teale.

With a price tag of $220, *American Nature Writers* is not intended for every bookshelf. It is, though, an important reference that any student of nature writer will enjoy reading. It is an essential reference for scholars and deserves a place in any college library. It will also find a valued place on the shelves of schools, museums, nature centers, and public libraries.

Nature Study

by James G. Needham *

The trees and the skies and the lanes and the brooks
Are more full of wonders than all of the books
And always out-doors you can find something new;
You never are lacking for something to do;
You never hurt others, or get in the road
In taking the pleasures by nature bestowed;
For there's room on the shore where the great tides roll,
And freedom and peace that are good for your soul;
There's hardly a way you can have so much fun
As in being out-doors with the brooks as they run,
With the birds as they fly, and the stars as they shine,
With the drift of the years as they rise and decline.
It doesn't cost much and it doesn't take long
To get your ear tuned to the mighty world's song.
It brings in its train no unpleasant regrets,
And the farther you go, the better it gets.
So, come where the wild things are waiting outside
And let your sould taste of the joys that abide.

* From: *Cornell Rural School Leaflet,* vol. XXIV, Sept. 1930.

THINGS BROUGHT IN BY PUPILS.

by Frank Owen Payne

From: Frank Owen Payne, *One Hundred Lessons in Nature Study Around My School* (New York: A. S. Barnes, 1895.

Let the teacher bring to school a few objects, picked up haphazard —say, an ear of corn, a piece of leather, a chicken's foot. These things are taken, examined, and talked about. There should be no attempt at formal instruction, but the objects should be centers of observation, and pupils should be encouraged to talk about the thing under discussion. The teacher may remark that there is much to learn from all kinds of common things. She may suggest that tomorrow each pupil bring in whatever may be found, and that the class will then see what can be learned from it.

Let us suppose that the following things are brought in and placed upon the desk:

1. A Pebble: Here is a small rounded stone. Can you tell me what such a stone is called? Are pebbles all alike? How do they differ in color and size? Describe this pebble. Why is it round? What made it round? If a stone were sharp and the water set it to rolling, what would become of its sharp edges? Do stones wear away very fast? Think how very old this little pebble must be to have become so smooth and round.

2. A Snail-shell: Here is a house. Is it not a very pretty one? Can you tell me what lived in this house? Can a snail creep out of his shell? His shell is coiled up. How many turns are there in this snail shell? Did you ever see a snail moving along with his house on his back?

3. A Cherry: Here are some cherries. How large is it? Is it sour or sweet, dry or juicy, hard or mellow, ripe or unripe? Mary may tell me how many seeds a cherry has. What do we call cherry seeds? Can you tell me some other fruit which has pits?

4. A Baking-powder Can: What have we here? What is its shape? Can you tell me some other object like it in shape? Of what is this can made? Is it pure tin? What holds the tin together? Did you ever see a tinner solder? How does he do it?

5. Leaves: What kind of leaves are these? How many parts has a leaf? Can you tell me a plant which has larger leaves? What happens to leaves in autumn? Whence do they come in spring? We shall study more about leaves by and by.

6. A Piece of Slag: Here is a piece of slag. Can you tell me what makes these holes all through it? How does this prove that slag was once melted?

7. A Bird's Egg: See what a beautiful little egg! Can you tell me to what bird it belongs? How thin it is! It must have fallen from the nest when the wind blew.

8. A Nest.-See this nest! Could you make so fine a nest with your fingers? What does the bird use in making a nest? Is it not wonderful that she can make such a beautiful nest with only her bill and claws?

9. A Piece of Wood: What kind of wood is this? Find the grain. Is it a hard or soft wood? Smell it. Cut It. Some day we will learn more about wood.

10. A Living Cricket: Here we have a cricket. We will set this bottle on the window sill and see how the cricket moves about. Does the cricket like light? Oh, no, he prefers darkness. We may hear this cricket chirp for us.

Such talks may be indulged in from time to time until pupils begin to realize that nothing is unworthy their study. Ignore nothing. Manage to find food for talk in everything brought in.

Having gradually introduced nature study in this way, suggest that the study of things about the school-house be taken up.

Editor's note: Frank Owen Payne has been credited as the first person to use the term nature study, in 1884.

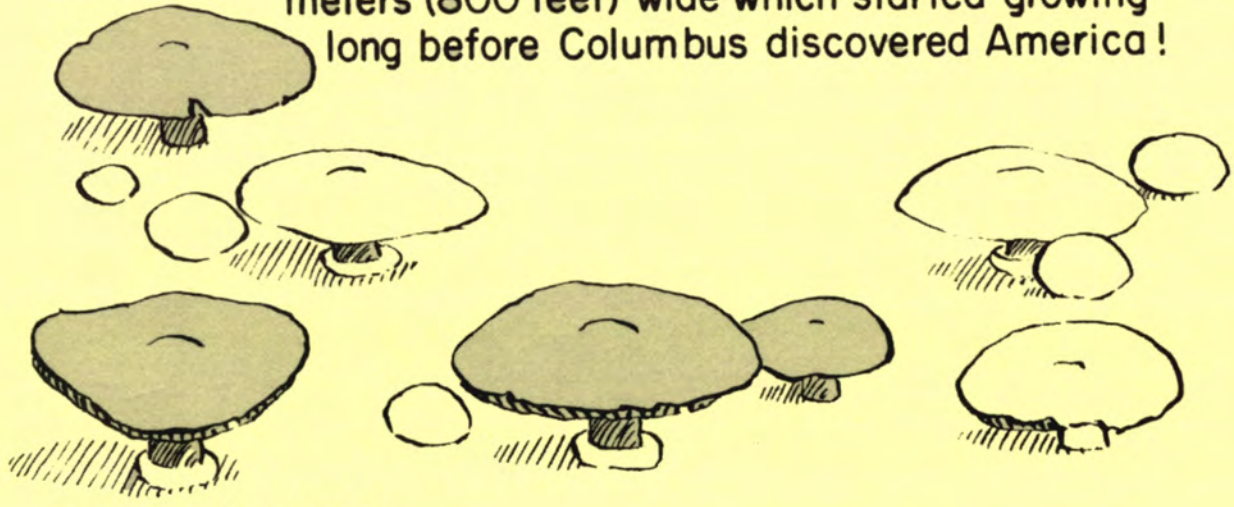
Fairy Rings



In the past, people believed that a "fairy ring" of mushrooms was caused by fairies dancing on moonlit nights, or that it marked the spot where goblins had buried treasure, or that the devil had held a ghostly court there.

Today we know better. As certains kinds of mushrooms use up the food in one location, they continue to send out their underground threads (mycelia), forming a larger and larger circle from a central core. When the above-ground mushrooms appear, usually in the fall, we're able to see just how far the circle has spread.

In some places, there are fairy rings 245 meters (800 feet) wide which started growing long before Columbus discovered America!



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