

# BONDING WITH THE NATURAL WORLD: THE ROOTS OF ENVIRONMENTAL AWARENESS

by Louise Chawla

*With delicate literary style and allusions, Louise Chawla combines her ecological research and Montessori background to portray the unfolding of childhood in natural places. Starting with "enchantment with the world" as the basis for nature education for the child under six, the article suggests that the "loose parts" in the landscape that children manipulate and use result in optimal creative involvement. The act of finding favorite places in all weather, combined with the companionship of an adult role model, leads to a lifelong appreciation, concern, and activism for the natural world.*

Coming from Kentucky as I do, I'd like to start with a poem by a Kentucky writer, Peggy Steele. It carries us through the transition from the first delight and excitement about the world in early childhood through a sense of fellow-creatureliness in adulthood. Therefore, I'm going to organize my talk around different stages in the poem. Being a poet, Steele didn't have to write chronologically, so I'm going to rearrange her verses a bit in order to follow the stages of a child's growth in sequence. The title of the poem is "Slug."

The foundation of a child's environmental awareness, the absolute foundation on which everything else builds, is *enchantment with the world*. It's the most important quality of all. In the poem, Steele is remembering when she was a little girl growing up in Dothan, Alabama:

I got up with the light  
because every day was so wonderful  
and my mother gave me new  
shirts that looked gorgeous  
on my browned arms, early, early ...

It is not just a matter of her excitement about the natural world. There is also this whole sphere of *the culture of nature*, which makes nature a human space for us. She has that, too:

I read all the time as a girl  
and thought, "God, I love to farm!"  
"Bookworm!" my family called me,  
not meaning anything good.  
But the land, the land,

all those writers made  
all their heroes love the land.  
Lost in the swirl of worlds  
that blew up from pages,  
me and Nancy Drew and Scarlett  
O'Hara, and the little shepherd  
of Kingdom Come  
went out back and planted  
a big radish patch at the foot  
of my best climbing tree, our  
curving, friendly mimosa.

She is learning the value of nature through culture. Another very significant piece is a *role model*—I'll be talking more about that—and unfortunately she has a problematic role model. She goes out in the morning:

... early, early,  
and there they were, snails  
with their homes like belly buttons  
on their backs, and slugs, naked,  
snotty-looking, finger-long sons  
of dog turds, eating my garden.  
I picked off the pretty snails,  
carried them gently  
a block away and turned them loose  
on Mr. John's pecan grove—  
he wouldn't let the kids  
have a few pecans each fall.  
But the slugs. Yuk.  
Harry Bedsole said pour salt  
on them. I couldn't, but watched  
while he turned one into a writhing,  
dissolving, suffering slick of scum.  
I opted to take them on cardboard  
to those undeserving pecan yards.



Courtesy of Chris Trostel, Montessori Borealis Public, Juneau, Alaska

She's still a young child, but she's observing the natural world carefully, so I call this *natural sympathy* and *learning to see*. She begins to watch these creatures she's carrying to the pecan grove:

Even the slug gained in appeal  
as summer passed.  
I saw the coordinated  
ripple along its whole body  
as it moved forward, wrinkling  
a little behind velvet black  
antennae bent like finger  
joints to sniff out the way.  
I grew careful moving their  
green-tinted mahogany bodies  
to places I thought they'd like to be.

Then comes *advanced knowledge*. She is older now, and she's beginning to read about slugs:

Now I learn that Alan Gelperin, PhD,  
at Bell Lab in Murray Hill, N.J.,  
has spent twenty years on the brain  
of a slug—it's a microchip, he says,  
more powerful than Intel can make—  
the algorithms, the computational  
principles—the slug, he says,  
can smell as little  
as a few molecules of anything  
from ten meters away, and go for it  
on his bellyfoot, food or a mate,  
though its speed is one mile a week.  
Its brain keeps working even  
when removed from the slug.  
Omigod! That little circle  
of greenish scum on the sidewalk!  
Pentium beat the slug only  
in multiplying 12-digit numbers.  
In pattern recognition,  
the slug won, hands down.

When she has crossed the stages of having first been fascinated, to beginning to really watch the slug and imaginatively feel herself into its life, to beginning to feel sympathy for it, to then learning about how miraculous this creature actually is, she reaches the stage, ultimately, where she has a sense of its place in the world in co-existence with her own: *a sense of fellow-creatureliness*:

But the little mollusk itself  
of the genus *Limex*  
with no shell to call its home—  
with its foot which is its stomach  
and its stomach which is its foot,  
going toward whatever we plant  
with its prehistoric Pentium  
model mind, knows enough  
to dig beneath the frost line  
in winter and sleep peacefully  
until we plant good things in the spring.  
And wherever we are, it smells  
us out and comes to us,  
no harm intended.

Those are the different stages I'm going to talk about, which we can hold as a model in moving children through their encounters with the natural world. As I go through descriptions of each stage, I'm going to talk about research that indicates how truly vital for children's health and well-being the natural world is. That's what I'm going to emphasize, but of course the other side of it is that it's truly vital for the world we live in to help bring children to that sense of fellow-creatureliness, because the world, this web of life, urgently needs human beings who have that sense of their place in the whole.

#### ENCHANTMENT WITH THE WORLD

Let's begin with enchantment with the world. I want to emphasize this because I think that, as teachers, you live in a world that puts so much emphasis on factual knowledge in the head. I know that you have all these wonderful principles as Montessori teachers, but nonetheless, you are still surrounded by a culture, and probably often by parents, who are primarily interested in how much their children know and how fast. The fact that Montessori children learn so much so quickly, of course, is one of the amazing and wonderful facets of a Montessori education. But it is important to remember that that is ultimately not what it's all about. What it's ultimately all about is this enchantment with the world. Here's a caution from the writer Barry Lopez: "The quickest door to

open in the woods for a child is the one that leads to the smallest room, by knowing the name each thing is called” (151). All of the nomenclature that you do in the Montessori classroom is one of the wonderful aspects of the Montessori program. It is a room and it is a door, but as Lopez says, it’s the smaller room. He continues:

The door that leads to the cathedral is marked by hesitancy to speak at all, rather to encourage by example a sharpness of the senses.... If one speaks, it should be only to say, as well as one can, how wonderfully all this fits together, to indicate what a long, fierce peace can derive from this knowledge. (151)

Even though I talked in terms of stages, beginning with early childhood enchantment with the world and moving to a sense of fellow-creatureliness, each stage leaves an enduring predisposition. You never want to lose this enchantment with the world, and

the ultimate goal is to create schools and programs that preserve this as their foundation.

### **Nature: A Favorite Place**

Information about children’s relationship with nature has been coming out from many studies from all over the world. I’m going to go through some of them that I think are most relevant to you as teachers. One of the things that we’ve been learning is that children really do feel a magnetic attraction to nature as long as they feel secure and safe there. Traditionally, they have been running out to the woods and into the fields—there is no question it was something children did, and parents weren’t afraid when they did it and children weren’t afraid to do it. But one of the critical things in this world where we have a fraying web of life is that we have a more and more dangerous world. We also know from research on television that one of the main



Courtesy of Pacific Crest Montessori School, Seattle, Washington



Courtesy of Erin DeVries, Annie Fisher Montessori Magnet School, Hartford, Connecticut

effects of television is to create what researchers call the *mean world syndrome*. Yes, it is a dangerous world, but the more that people watch television, the more they feel that it is a dangerous world even beyond all the probability of risks actually out there. As you know, we live in a world where television is an overwhelming feature of many families' and children's lives. So not only is the world actually more dangerous than in the past, but there is also a perception that it's even more dangerous than it really is. We also know that children who fear nature will avoid it. But otherwise, children gravitate to it.

There's a wonderful little theory called the Theory of Loose Parts, originated by Simon Nicholson. He was the son of the painter Ben Nicholson and the sculptor Barbara Hepworth, so this is an artist's theory. The theory is that the more loose parts there are for children to manipulate and move, the more creatively they will play. Nature, of course, is the supreme source of loose parts, so it's a landscape children can mold and move. Water, for instance, is infinitely malleable.

When I reviewed studies that observe places that children actually use in comparison to their favorite places, I found that even when children have natural landscapes where they feel safe around their homes, they are never seen to be out there more than about fifteen percent of their time. Even in the best time studies, they're almost always right near home, in the streets and the sidewalks and yards near home—up through the elementary school years. This is where they are within sight and call of their parents, where they can dash inside as they need to. But when you ask them about their favorite place, again and again all over the world, they name natural areas (Chawla, "Childhood Place Attachments").

So why are these places where they actually don't spend so much time so salient to them? Well, for many reasons. A few might include that they can meet friends, explore, get dirty, create new worlds, and find privacy—all free from adult interference. I will be talking about the importance of adults as role models, but one of the great virtues of the natural world is that it's a place where you can go and be *away* from adults. I think that that raises

a question for schools as we have more and more children who don't have access to nature around their homes. We have more and more parents afraid of letting their children go out and explore the natural world around their home. Therefore more and more responsibility falls on the schools to create access to nature, to make those safe natural areas around the school where children can have these experiences and explore. We know from many, many studies working with children in ethnographic ways that one of the great values of the natural world is that you can get away from adults there and make your own worlds yourself. So that raises a problem for the school: How can you be a school that creates access to the natural world and that gives children time to just be in natural settings in their own way? Lots of space, of course, is an advantage, for those of you who have the luxury of farm schools or large campuses, but even small schools can naturalize their school yards. One of the special virtues of the Montessori method is that a teacher learns when to step in and when to step back. In terms of the child's relationship with the natural world, it is particularly important to step back to allow children freedom outside to make worlds of their own.

We also know children have a special attraction to the natural world because when you involve them in design projects they always include natural elements—gardens and trees and natural spaces as something that they especially want to see. There was a very simple little study done by M $\acute{e}$ nie Gr $\acute{e}$ goire in projects north of Paris. The north of Paris is like the South Bronx. These were children who lived in a concrete world. The researchers first asked them to draw what they see when they look outside the window. And they drew the concrete world: other buildings, roads, cars. That's all there was outside the window. And then in a second drawing, they asked the children to draw what they would like to see when they look outside the window. And every single child drew trees and green and flowers and animals.

There's another whole body of studies involving people's place preferences that presents people with slides of different kinds of landscapes and asks them to pick the ones that they prefer. Younger children and adults overwhelmingly pick natural landscapes as their preferred places. Adolescents—this may not be true for Montessori farm school adolescents—

but adolescents in the United States overall have what the researchers Rachel and Stephen Kaplan are calling a "time out" with regard to nature. It's not that they don't also value natural landscapes. It's not that they rate them as not liked, but as their first choices they will frequently pick a bus stop where they can get downtown, a mall, a downtown area—someplace where there is a lot of social activity and things to do. But other than this "time out" in adolescence, children overwhelmingly prefer the slides of natural areas.

### **Nature: A Favoring Place**

So we know that for children, nature is a favorite place. What we're learning recently is that it's also a *favoring* place, a place that's vitally important to children's health and well-being. We talk about moving away from an *anthropocentric* world view, where we value nature only in terms of its utilitarian value—what we can get out of it. That is one important way of valuing it, but in the end we want to be talking about an *ecocentric* world view, where, again, we have that sense of fellow-creatureliness, a sense of the value of nature in its own integrity. We're also learning that there are *childcentric* reasons to value nature, because it's important for the health of children. I think you are familiar with Rachel Carson's wonderful book *A Sense of Wonder*. It's a classic. She began the latest wave of the environmental movement, and nobody was better qualified to speak than she was, as a great naturalist. I think that it is particularly apt that she wrote this classic statement on the young child's contact with nature. She asks this question: "What is the value of preserving and strengthening this sense of awe and wonder, this recognition of something beyond the boundaries of human existence? Is the exploration of the natural world just a pleasant way to pass the golden hours of childhood or is there something deeper?" (88). She presents her own reasons to value the sense of wonder, and I'll close with those. But we're learning many other ways that she did not yet have information about. She probably sensed them intuitively, but now we have accumulating evidence.

People observing how children play have seen that when they play in green spaces where there are trees and vegetation and water, as compared to built concrete play areas, they play much more creatively. Simon Nicholson's theory of loose parts really does work.

There have been some amazing studies done right here in South Chicago. Those of you who know South Chicago—do any of you know the big housing projects in South Chicago? Well, from a social scientist's point of view, these are the perfect setting for natural experiments. You have these vast tracts of public projects where all the buildings are made according to exactly the same plan. This is an experimenter's dream world. You have a population who are all the same socio-economic class. You don't have to worry about how that mixes up your results. When an apartment comes up, people are assigned to that apartment. The bureaucrat hasn't even seen the place, so it's a totally random assignment. Again, the experimenter's dream world.

Taking advantage of these conditions, Andrea Taylor, Angela Wiley, Frances Kuo, and William Sullivan at the University of Illinois at Urbana-Champaign have done a series of astounding studies. One of the things they've done is to go around and look at people's use of the public spaces there—because there is one thing that varies. Around some of these buildings, the original landscaping took hold and the trees grew and they're big, mature trees now and the grass has grown, but around others the trees died and everything was asphalted over. So that is what varies. And they found that, first of all, people gather in the areas with the green, with the trees, much more than in the other areas. They also found that the children in the green spaces play more creatively and interact with adults more frequently and more positively. Another researcher, Mary Ann Kirkby, observed that you're more likely to find play groups of mixed boys and girls in the natural areas of playgrounds.

Research that's been done in Sweden with preschool children studied children in schools that have what Scandinavians call "outdoors in all weathers" programs—and when Scandinavians say outdoors in all weathers, they really mean all weathers. I worked in Norway for two years, and outside the window of my office there was the back of a kindergarten. It would be, from our perspective here, a blizzard, and the children were running around in the snow. The snow would be blowing horizontal and they were having a wonderful time. Of course, if you don't do that, you don't get out very often in Scandinavia. Some of the programs work on the basis that every Wednesday or every Thursday, the class

goes out all day regardless of the weather. In other programs, the class spends five days a week outside, so the children are out almost all the time. Patrik Grahn and other researchers in Sweden compared a preschool that had an "outdoors in all weathers" program with a traditional school that had paved cycle paths, built play equipment, and few trees. They found that the children who were outside playing in natural areas had fewer absences and a greater capacity for concentration. They played more imaginative and elaborated games. They invented stories that would go on from day to day in their play, whereas the play in the built area was more broken up and didn't have these sagas, so to speak, that the children developed. Physically, the all-weather children showed better balance and agility on fitness tests (Grahn, Martensson, Lindblad, Nilsson, & Ekman).

We're also learning that for children who face challenges and obstacles—it could be chemical, it could be from the harmful family backgrounds that they come from—nature is healing. The same people who've done the studies I described in South



Courtesy of Pacific Crest Montessori School, Seattle, Washington

Chicago have also begun to do work with middle-class families in Chicago's suburbs with ADHD children (Taylor, Kuo, & Sullivan). Controlling very carefully that all of the children have the same diagnosis for the same level of attention deficit and hyperactivity disorder, they asked parents to keep logs of their children's symptoms and time logs of what they were doing, when they were playing, and where. Then they had students in landscape architecture go around and rate the levels of nature in these play spaces. Then they put the two records together. They found that the more time children were playing outside in green areas, and the greener the areas according to the landscape architecture students' ratings, the more likely it was that their parents' logbooks recorded a lower level of ADHD symptoms following their play.

There is a doctor, Aaron Katcher, who has been working with clinically aggressive children who come from homes where they've been exposed to high levels of aggression or high levels of neglect. These are abused children. He has created programs where they take care of animals and gardens. The transformation that he records—in Montessori terms, the normalization—of these children under these conditions is remarkable. Each child is responsible for an animal. The children really take to heart that they need to take care of these animals, that the animals need them. And so they feel that they are doing something meaningful.

When I was in Norway, I worked on a study about a city farm in Trondheim. City farms reflect a European belief that all children should have access to farm life on a child-friendly scale. We observed elementary school children coming to visit this farm. We interviewed the farm manager and teachers: What were their goals? What did they want the children to be taking away from their visit? The farm manager wanted the children to have a good time and just have happy associations with farm life. The teachers wanted the students to learn something: How many stomachs does a cow have, and what kind of food does each animal eat? But when we interviewed the children, they thought they had come to the city farm to take care of the animals. They thought that if they hadn't come that day, who would have fed the animals? Who would have cleaned out their stalls? They took their caretaking seriously.

## ROLE MODELS AND THE CULTURE OF NATURE

Another significant piece is role models and the whole culture of nature. You probably know this often quoted statement by Rachel Carson:

If I had influence with the good fairy who is supposed to preside over the christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life.... If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in. (42-44)

We have studies coming in from all over the world that demonstrate the wisdom of her insights. Researchers have approached teenagers in environmental clubs who have made an early commitment to environmental activities, as well as adults who have spent their lives as environmental activists or environmental educators. When asked about the significant life experiences that motivate them to do this work, two things come out overwhelmingly again and again. One is that there is this place I knew in childhood (Chawla, "Significant Life Experiences Revisited")—and the teenagers even say that now. In a study with teenagers by Daniel Sivek, they talked about a childhood place, a special place that they had when they were younger. Sometimes people find a special place in adolescence, such as a favorite hiking trail, but whenever it is discovered, it is some place in the natural world. Then they talk also, again and again, about some special person who showed the value of natural places (Chawla, "Significant Life Experiences Revisited"). There's a researcher, Robert Bixler, who has a nice term for these sources of connection to the natural world. He calls the accumulated time spent outdoors playing in natural areas "outdoor capital." He also emphasizes the importance of a role model who involves the child in a process of "environmental socialization," because he and colleagues have done a study with middle school and high school children that has shown that playing outdoors in nature, by itself, doesn't mean that children will necessarily care for the natural world. They could want to be off-road vehicle drivers. You need to put the two pieces together—being outdoors and having a role model who demonstrates the value of the natural world (Bixler, Floyd, & Hammitt).

There are studies of elementary school children that rate the children's environmental attitudes. The more that children report playing in natural areas—the more they say they do things like taking care of pets and hiking and camping with their families and so forth—the higher they score in terms of pro-environmental attitudes. There was a wonderful study that a landscape architect, Margarete Harvey, did in England. She went around to schools with the same socio-economic population and simply counted the number of trees, the variety of different species of trees and bushes, and the nature areas, like birdfeeders and garden beds and rain gauges and so forth, in the schoolyard. She found that the more trees and the more evidence of nature activities there were in the schoolyard, the higher the children scored in pro-environmental attitudes.

We also know that books and TV programs about nature can be positive environmental influences on people. In research on significant life experience, they come way down the list after the two most frequent responses—a significant person and a special place—but they are also important.

#### LEARNING TO SEE AND NATURAL SYMPATHY

Here again are the words of Rachel Carson, returning to the theme that, yes, facts are important, but never forget that enchantment with the world and sense of wonder come first:

If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow.... It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate. (45)

This principle reminds me of a story that Miss Margaret Homfray told about the St. Nicholas School in London, when a classroom was invaded by ladybugs. The children were stomping on ladybugs everywhere they found them. The teachers kept saying, "Don't stomp on the ladybugs. Please don't stomp on them!" But the children kept killing them. So the class started to study ladybugs. This was a subject that was literally in the air. The children learned the life history of ladybugs. They learned that ladybugs eat aphids and farmers love them. They learned stories about ladybugs in different cultures. They made model ladybugs with shiny

outer wings and tissue paper for the inner wings. And nobody stepped on a ladybug anymore. The teachers no longer had to say, "Don't step on the ladybugs." None of the children would have thought of doing such a thing. Instead, they got down to the ground to observe the ladybugs carefully and see whether they really did these things that the children were learning about.

So learning to see is vital, and you can see the teacher forming the bridge there. That's the role of the significant adult. People rarely remember a significant person as one who says, "You need to protect the environment; the environment is important for all these reasons, so you need to get out there and protect it." That's not what they say. These are people who notice things, who look, who watch. They say, "See this." They show things in the natural world. They validate that it is something worth noticing and worth letting be in its own sphere of existence.



Courtesy of Montessori Center School, Phoenix, Arizona



## ADVANCED KNOWLEDGE

Rachel Carson leads us into this form of connection as well: “Once the emotions have been aroused—a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love—then we wish for knowledge about the object of our emotional response” (45). There are different kinds of knowledge in terms of helping to foster in children ecocentric values and a sense of stewardship for the environment. Yes, environmental facts are important. A research review by Mark Rickinson has shown that children who know more about the environment tend to value it more. Even in studies with urban children who have little access to nature, those who report having more environmental education in their schools also report doing more environmentally friendly things.

But we know there’s another really important piece here: This knowledge needs to begin with the local environment, the world that the children are familiar with, that they see around them, where they can have a positive effect. David Sobel has coined the wonderful word *ecophobia*. His rule is “no tragedies before fourth grade.” He warns that teaching about big, unmanageable, potentially catastrophic environmental problems out there can actually be damaging for young children unless you have this foundation of first beginning with learning about the local world where they can have a positive influence. Eventually, when they are adults, we hope they can have a positive influence even on the global scale. But they need to begin with the local.

Another critical piece of environmental learning is learning the skills for taking action. We know from all of the studies on the sense of competence that there are many pieces here. First of all, children—and adults, too—must *want* to act, so they must *want* to care for the environment—and the emotional foundation is motivating that. They need to know *how* to act, and they need to *believe* that they can take effective actions and that their actions can really make a difference.

I’m the international coordinator of a project for UNESCO called Growing Up in Cities, which has produced many examples of children’s contributions to community development. As part of this project, children in one of the poorest districts of

Buenos Aires, Argentina, participated in a curriculum called The Neighborhood as a Child’s Habitat, which was created by the landscape architect Robin Moore and his Argentinean partner Nilda Cosco (Cosco & Moore). It included, in the end, doing something in the local environment to make a better world for themselves and other people. In a couple of the Buenos Aires neighborhoods, this process involved taking a vacant lot with the goal of being the catalyst to bring community groups together to turn that lot into a functioning plaza. Through these kinds of projects, children learn that they can make positive changes, and that’s a vital piece of knowledge.

Ultimately our goal is that children reach a biospheric or ecocentric world view that includes a sense of fellow-creatureliness. Some relevant research has been done by Wesley Schultz, a social psychologist in California. He showed two groups of people slides of animals, including some pictures of animals being harmed by the effects of human actions, such as a seal caught in a fishing net and an otter in an oil spill. Before people viewed the slides, they were given two different sets of instructions. Half of the people were told to make careful observations, but as objectively as possible, taking a neutral perspective. The other half were asked to imagine how the creatures in the pictures felt—to think about their reactions and try to take their perspectives. After people had viewed the slides, they completed an environmental attitude questionnaire. Those who had been asked to take the animals’ perspectives scored significantly higher for biospheric concern. Considering that this was one short intervention, we can speculate what the effects will be when teachers ask children to imaginatively inhabit other creatures’ lives over the extended period of a school year.

Children have a natural sympathy to identify with individual animals and creatures, given that inspiring role model who shows them how to see, how to really look and see. But how do you go from there to valuing whole habitats—in some ways a much more abstract idea? Beginning with the local, beginning with what’s in their schoolyard, beginning with the individual creatures, that is the way to begin. But then we have to move from there to an understanding of how these creatures depend upon whole habitats, whole ecosystems, whole webs of interdependencies in which we are just one part, which we need to

share with all the other elements of the web of life. To go from individual creatures to respect for whole systems, that's a bridge. That's a bridge people don't cross automatically. I think that's a vital bridge that teachers need to help children across.

In closing, I'll give you Rachel Carson's own answer to her question about the "something deeper" in addition to just the pleasure of encounters with the natural world during the golden years of childhood: "Those who contemplate the beauty of the Earth find reserves of strength that will endure as long as life lasts" (88). Her intuitions were completely right. There is a body of research now that I reviewed in a recent book chapter (Chawla, "Spots of Time") that shows that when you ask adults what these childhood memories of that special place meant to them, people say most often that it left a center of calm and stability that they turn to in moments of emergency, a reserve of calm that they can draw upon.

A woman named Anita Olds, who designed spaces for preschool children, did a workshop exercise and systematically kept records of the responses of more than three hundred people. She first asked people to think back to a place where they or someone close to them was wounded, either a physical wounding or a psychological wounding. She gave them time to imaginatively recall that place. Then she asked them to imagine a place for healing from that wounding. And for more than three hundred people, every single place of healing was a natural place. Occasionally it was an indoor/outdoor space, a room with a big window out to some beautiful view or out to a patio with plants. But always, nature was there in the healing place. She makes the argument that the raw materials for these memories of nature as a place we can return to internally as we need it, our ability to imagine it and reinhabit it, comes from the vividness of the child's early encounter with the natural world and a child's special way of knowing the world, when it is all enchanting.

#### QUESTIONS AND ANSWERS

*Q. In the city farms that you mentioned, has any study been done on the long-term effects of that within the population itself, for the adults who live in that city?*

*A. I haven't seen that coming out, but it would be very difficult to do because the farms are just there. They're there for children in the neighbor-*

hood, like little toddlers and their parents, to just come through. So they're open for one and all; there would be no control group that didn't have access. Some farms do have neighborhood committees where families can become members and sign up to come in at certain hours and help maintain the farms. And there is always at least one paid staff person. So those would be the families most intensively involved, but the farms are open for everybody at all times to just come through. So it would be hard to know who has and who hasn't benefited.

*Q. For the outside-in-all-weather classes that you observed in Scandinavia, were children playing freely or did they have structured time outside?*

*A. Both. Some of these really are outside schools, where the children spend almost all their time outside. There are all kinds of structured activities, where the children learn about ice fishing and berry picking, and they learn about berries and they learn about fish and they learn about historical skills and jobs and Norwegian culture and the stories and folklore that go along with that. So as in a good Montessori program, that's all woven together with the use of the outdoors. And then some schools use it more as just an outdoor play space, those who are not out as much and still primarily use the indoor classroom for other activities.*

*Q. In all the studies that you mentioned, I guess they all put forward the positive ecocentric values that the natural world brought out in the children. Did any of them say why the natural world evokes this response from children and from adults as opposed to the concrete jungle that most of us reside in?*

*A. I think we're only beginning to reach that. Stephen Kaplan and Rachel Kaplan, at the University of Michigan, have led the study of people's preferences among slides of different landscapes. Stephen Kaplan has proposed that nature is a restorative environment because it is mentally tiring for us to focus on non-natural things, whereas—and there are a lot of studies also with adults showing this—when people are in natural environments, that is somehow restful. It's restful in physical terms and restorative to our mind and to our powers of concentration. In the Swedish preschool study, for example, one of the things they observed was the children's power of concentration (Grahn, Martensson, Lindblad, Nilsson, & Ekman). And concentration was also, of course, a big dimension of the study with the ADHD*



Courtesy of Chris Trostel, Montessori Borealis Public, Juneau, Alaska

children (Taylor, Kuo, & Sullivan). These researchers put it in terms of Stephen Kaplan's theory that nature is a mentally restorative environment, particularly in terms of our human powers of concentration. Why, exactly—people haven't gotten that far yet. But observing and testing how people concentrate in natural versus non-natural environments, yes, they're seeing that much.

*Q. I'm experiencing in the past year or so a tendency for parents to be more reluctant to let their children have this extended play free of adults. They want to be there, which totally destroys the freedom and initiative of the children to do their own things.*

**A.** Very much so. As I said, I think schools seriously have to accept that they have yet one more responsibility on their shoulders now, and that is ensuring that children do have secure access to free play in the natural world. They can no longer assume that children are getting that in their play when they go home from school. We know that a lot of children, more and more, are not, exactly as you said. Unfortunately parents haven't had the

Montessori training, and they don't know when to step back and not interfere.

*Q. Could you comment on the bridge a little bit? I know it's probably when you go from local to global or local to cosmic. How would you encapsulate that bridge in one minute or less?*

**A.** I think it's a basic issue. The world is filled with people who care for their individual pets, care for their individual gardens, and don't go any further than that. And so with the children, too: As they care for individual animals in the classroom and care for the garden space and the outdoors around their classroom, the plants in the classroom and so forth, they won't necessarily cross that bridge themselves. So it requires a conscious effort, bridging by the teacher, to place those animals in their larger habitats, to move from the individual, as I said, from the one to the whole, to a sense of that creature's life or that tree's life within the whole ecosystem, the whole habitat and how every element within that habitat is necessary to the whole. Of course, one wonderful way to do this is with

migrating animals: monarch butterflies, birds, creatures that move through habitats. Then you can begin to move from the local to the global. Each of these dimensions of environmental awareness is an essential piece, and I think that's where advanced knowledge is an essential piece.

On the frontispiece of his book *Growing Up Green*, David Hutchison adapts those wonderful chapter titles from Montessori's *To Educate the Human Potential*: "The six-year-old [is] confronted with the cosmic plan. The universe [is] presented to the child's imagination." I think it's so important that Montessori didn't say that the universe presents itself to the child's *knowledge*: She said the universe presents itself to the child's *imagination*. And that's what Wesley Schultz's research about imaginatively taking the perspective of another creature is showing.

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