Nature Experience of 8-to-12-Year-Old Children

Marjan Margadant-van Arcken
Research and Advice Bureau "People-Animals-Environment," The Netherlands

Introduction

In this article, I discuss the results of a research project at six primary schools, grades 5 to 8. In the Netherlands, primary schools have eight grades. Children usually enter primary school at the age of 4. In grade 8, the children are 11 or 12 years old, as were the children in this study.

The project was commissioned by the Dutch Ministry of Agriculture, Nature Management and Fisheries. This ministry gives financial support to many environmental organizations and the education programs they develop. In Holland, environmental education is called nature and milieu education. Milieu education is about the same as environmental education in the United States and Canada. However, we have added the term *nature*. Our programs thus also encompass plants, animals, living and nonliving nature, ecology, and so forth. The Dutch environmental organizations are developed out of nature conservation groups and the more recently organized milieu defense groups. These environmental organizations are currently developing all kinds of nature and milieu education programs, which are financed mostly by the Ministry of Agriculture, Nature Management and Fisheries.

A complication is that we also use the term *nature education* which is a new but compulsory program for all primary schoolchildren. It is a combination of general science, biology, and environmental education. A special institute for curriculum development was commissioned by the Ministry of Education and Science to design an experimental program. The six schools in this study were using this program for the third year, sometimes in combination with other nature and milieu education programs. To simplify things, I group all these programs together under the name nature education. All these programs take children's daily experiences and nature perceptions as a starting point. However, little is known about how children experience and perceive nature.

In the past, I have researched nature education in the light of the relationship between young children (4-8 years old) and animals. The outcomes of these studies are summarized below.

A young child's concept of life and death is not the same as that of an adult. If a thing doesn't move, it must be dead; if it does, it must be alive. An immobile grasshopper, for instance, is dead in the mind of the child.

Green nature such as trees and plants does not move by itself; the autonomous movement of vegetation is not directly visible to the human eye. To young children, therefore, this part of nature is not alive.

The sight of a beautiful landscape probably does not give children esthetic pleasure. To them, a landscape is alluring when it allows all kinds of activities. Children want to be able to do something out there: build huts, climb trees, gather flowers, play hide-and-seek, and so forth. Their natural surroundings are made up of *active nature.*

Children usually have a greater interest in living animals than in inanimate forms of nature.

Currently, I am studying 8-to-12-year-olds. At about the age of 9 years, children start to develop a different attitude toward the world around them including nature and the environment. Their life world starts to expand and their thinking becomes more functional (Piaget, 1923; Stückrath, 1942; Hansen, 1965; Plötz, 1963).

In conjunction with the Ministry of Agriculture, Nature Management and Fisheries, the following research questions were formulated:

What kind of life world (naive, spontaneous) concepts do children use to describe nature and their experiences with nature?

How do these concepts relate to the concepts taught in nature education classes in primary schools?

One can discover how children perceive and think about nature by sharing experiences with them. In this study, six primary schools were visited monthly in the course of a year, with the researcher taking part in the nature education classes. A group of 327 students and 13 teachers was studied. The six schools were selected according to religious denomination, size, location (both rural and urban schools were visited), nature environment, and cultural or ethnic diversity. These variations cannot be discussed in detail in the scope of this article. The results suggest, however, that religious denomination and size of the

school do not influence children's nature experiences while the other variations do.

During the visits to the schools, the classroom discussions were tape-recorded and transcribed later. Observations on the children's work were described in detail in a research journal. Because phenomenology and phenomenological field research are not quite accepted in the Netherlands, a judge (second reader) was introduced in this study to satisfy the Ministry and avoid being "too subjective." The problems with judges in phenomenological research are well known (see e.g., Giorgi, 1989). In this study, however, a fruitful and enjoyable cooperation developed. The second reader commented on all the transcriptions, and these comments gave depth to the interpretations.

Results

The exact sciences have had an enormous influence on general science education in primary and secondary schools and on the definition of environmental problems in general. For example:

> Holland is a highly polluted country. The river Rhine is like a sewer and our woodlands are dying. "Acid rain" is a well-known and often-used expression. One day, it is raining. I ask the children, "Is this acid rain coming down?" This amazes the children, "No, the rain doesn't taste sour. Acid rain is where trees die. The trees aren't dying here."

To understand the term acid rain, one must be familiar with the acid-base theory which is taught in high school. Many children do not get that far, or else they forget about the theory as it has no link with daily life. A scientific approach toward nature is characterized by an analytic, atomistic reduction of reality. For example:

> The children are doing a test to find out what kind of environment sow bugs prefer. They have two situations in which the sow bugs can choose between damp or dry, and between dark or light. When the children are asked, "Where did you find the sow bugs after a while?" they answer, "On top of each other." The sow bugs have crept on top of each other in a dark corner, but this point escapes the children's notice.

The children only remark on what they see. In daily life, climbing on top of each other is more remarkable to children than the other strange facts that ensue from the test. Outside this clinical, so-called scientific setting, children are aware of the conditions that sow bugs prefer. When you ask them where you can

find the bugs, they say, "Under stones," or "Under the dustbin"; these are dark and damp places.

One of the primary goals of nature education classes is to teach children a scientific attitude, that is, they learn how to perform proper experiments, how to make exact measurements, how to work with one or two independent variables, and how to draw logical conclusions.

One day, the children have a class about the muscles of the human body. Their first assignment is to determine the relationship between the length of the leg muscles and the height that a person can jump. First, they have to measure their total length, then their upper body length, and then they have to subtract one from the other to determine the length of their legs. The children don't really grasp this calculation. They become unsure and try to measure their legs from the ground to their hips instead. But how can you tell where your leg ends?

The following step is that they have to reach up against the wall as far as they can and mark this point. Then they have to jump up and make another mark. Then they must subtract one from the other to determine their jumping height.

I hope you can follow this method. To children, it is simply a mystery; they have no idea what the test is all about. The purpose of the test is to obtain mean scores which allow certain conclusions. But the children see it as a challenge. Even small children can make amazingly high jumps when they really try. Therefore, the mean scores of a class of children do not correspond with the mean scores for the general population. To try to draw conclusions in these lessons can be frustrating for teachers. Mean scores do not mean anything to children, and relating their scores to general mean scores does not make any sense to them.

Why do we want to make little scientists out of children when many of them will never actually become scientists, let alone work with scientific data? Is it justifiable to teach children of this age to develop an alienating scientific attitude? These questions are not rhetorical; they are fundamental, existential questions. It is my belief that in our Western culture the high status that has been attributed to science and technology, together with our lack of awareness of the symbiotic relationship between people and their environment, is at the core of the current environmental crisis.

After six months of research, we had more than enough information about the nature education classes, but we knew next to

nothing about the children's own nature experience. Accordingly, I started taking small groups of children outdoors to explore the school's surroundings. The results were so promising that we asked all the teachers to do a nature class about the school's natural surroundings.

The class started with a discussion about the question "What is nature?" "Trees" was almost always the first answer we got (see also Rejeski, 1982) followed by "plants," "flowers," "grass," "fish," "birds," "woods," and so forth. Note that, to children, plants, flowers, and grass are not synonymous, nor do they belong to the same category. The children's answers reflect culturally transmitted images and verbalisms about nature.

After this discussion, the children went outdoors to explore the natural surroundings in small groups. The children often did not know what to do or where to look during the first few minutes. The playground no longer seemed familiar to them. It was as if they had to take stock of the area all over again. They walked about like an incoherent flock of sheep, but as soon as the first discovery was made, for instance, a piece of wood or a small stone, they started exploring with increasing enthusiasm and attention. Each time it was amazing to see what the children could find, even in urban surroundings.

These outdoor explorations took about 20 minutes. Then the children went back to the classroom to report on their findings. Usually, they made a beautiful exhibition of the things they had found, grouping their findings in self-made categories such as "plants, insects and leaves," or "things that are either good or bad for nature." Or they arranged acorns in various stages of germination. The exhibitions showed that children organize spontaneously the facts and knowledge that they have discovered on their own.

When they reported on the outdoor explorations, the children hardly ever used adult terms or verbalisms. Instead, they always referred to concrete things or events and often used invented names or typical children's names for plants and animals.

On each of these explorations, I was not surprised to find that children approach nature with their entire body, with all their senses and potentialities. Not only does a tree entice them to start climbing and a ditch to start jumping, it is also as if they feel they have to conquer the thing that challenges them. Boys especially have a strong desire to experience adventures. And if there is no real adventure, they make one up.

On one occasion we are approaching a farm, and the boys say, "A large dog is living there." The boys enter the farmyard cautiously and go into the barn. There they run into the farmer's wife. At first, they are confused, but then they regain their composure, explain about their assignment, and ask for some fodder. They are given some and then they are allowed to play in the hay awhile. Later, back in the classroom, they describe the incident as if it were a terrific adventure.

I often asked children to show me nature around the school. Eventually, some of them wanted to show me their favorite spots or special places. A fishing hole is a good example of a favorite place.

Somewhat mysteriously, John asks me, "Shall I show you my fishing hole? Yesterday evening, I caught 16 perch and a carp there in one and a half hours' time. It's beautiful, I like sitting there." I realize that the invitation is quite an honor and agree to go along. The spot is nothing special, just a spot of downtrodden grass along the canal.

I think the place was so special to the boy because he had caught so many fish there. "I like sitting there" means sitting there peacefully, thinking things over, looking around, and being all by yourself. The literature (e.g., Hart, 1979) has shown that periods of rest and reflection are important to children. But also, boys like John know a lot about fish and water conditions. This is a kind of knowledge that they hardly ever can show off about in nature education classes.

In all these instances of outdoor exploration, I heard the children describing plants and small animals in their own words. Here we run into a translation problem with methodological implications that shows how culturally or linguistically embedded phenomenological field research is. The children used words and names that are meaningful in Dutch daily usage, but this meaning is not reflected in an English translation. More importantly, the children almost never used the official Dutch names for plants and small animals. Instead, they used names to indicate the resemblance to something else or functional names. For example, dairymaids dock (Rumex obtusifolius) has broad oval leaves. Dutch children call the leaves "dogs' tongues" because they do look a little bit like dogs' tongues. They believe that the leaves will soften the rash caused by nettle. There is some truth in this, for sorrel contains some acid. Their name for common sorrel (Rumex acetosa) is "rabbit leaves" because children feed it to their rabbits. Also, they know that Turkish people eat the leaves because they see them picking them.

The children taught me that nature has its own box of candy. For instance, I learned that the flowers of deadnettle have a sweet taste. We tasted many deadnettle flowers, and I had to admit that the white ones were sweeter than the blue ones, something that the children already knew. For my part, I was able to teach them that chickweed is called "birdweed" (Stellaria media) in Dutch because small birds are fond of this plant.

The children often warned me and one another about so-called poisonous plants. For instance, they believe that dandelions are highly poisonous. They showed me the milky liquid in the stem and told me to beware of the liquid, while for all I know it only stains your clothes. In the Netherlands, there are a lot of old wives' tales about dandelions. For instance, they say that dandelions on your bedside table make you wet your bed at night (dandelions do have a diuretic effect).

What we find in all these examples of children's experience of nature is a specific children's culture. After sharing these experiences with children, I started remembering similar stories from my own youth. Discussing the outcome of my research with others brought back their long-forgotten childhood memories. We used to tell each other stories like that about plants and animals when we were children. The stories are handed down from one childhood generation to another. They are a mixture of magic, fear, remedies, adventure, challenge, and folklore. I knew little about herbal remedies at first, nor did I know many folk tales about plants, but now, unexpectedly, my research made me study an entirely different kind of literature.

Conclusions

The official nature education program described at the beginning of this article and all other Dutch environmental programs claim to be adjusted to the child's life world and nature experience. My research results contradict this assumption. A true adjustment to the child's life world would mean taking children's nature experience seriously. The people who design the programs should be familiar with the myths and magic around plants and animals and start their lessons with these stories. I realize that this is a far cry from a so-called normal scientific attitude. But I believe that, if you start a lesson with a review of stories about dandelions, you can easily switch to the subject of nitrogen and its poisonous effect. It also gives you an opportunity to explain how strong dandelions are: They survive even when other wild flowers die from the high concentration of nitrogen in fertilizers. In the Netherlands, artificial fertilizer

and liquid manure play an important part in environmental pollution and acid rain.

Challenging nature the way children do can also be an excellent starting point for nature education.

One day, the children are jumping over ditches again. Suddenly, they find a bottle in the water. "Look," they say, "that's pollution." I look and discover snails' eggs on the bottle. The children are very happy about this discovery, and they start looking for other bottles and water plants to find more snails' eggs.

On this occasion, jumping over ditches turned into a lesson about water environment and breeding conditions for water creatures. Similarly, a group of girls who were climbing a tree discovered digger-wasps. At first they were frightened. Then I told them a little about digger-wasps, and they discovered more and more small insects in the tree. The incident could easily be extended to a lesson about a tree's microcosms.

In all these cases, learning by discovery starts with children's own nature experience in their immediate environment. This can be done in an urban environment as well; even though there is less vegetation in towns and cities, there are still all kinds of living creatures. The children themselves discover relations between things that are directly observable and understandable to them. Back in the classroom, they organize their findings and knowledge. They can be assisted to group their findings or to name a categorization. In this way, concept names (not necessarily the scientific ones) are learned inductively at the moment when the children really need the words (van Hiele, 1973).

Many school curricula use a deductive approach (Ausubel, 1968), introducing concepts to the children first, and afterwards, with considerable difficulty, translating these concepts into daily life experiences. Our scientific knowledge has a hierarchical structure. In an abstract logical way, it allows deductive conclusions. But we frequently overlook the fact that much scientific knowledge has been gained inductively. And, perhaps even more importantly, we forget that the logic of science is not the same as the logic of scientists. Once we accept that science is a human enterprise characterized by human error, we can see how relative the awesome status of science really is.

By using a more inductive approach and starting nature education by having the children explore their immediate environment, we avoid presenting them with an alienating scientific perspective on nature. Instead, we work with the natural world that they experience daily. By doing so, we teach children and

ourselves to reflect on our symbiotic relationship with the environment. Instead of maintaining a senseless dichotomy in our approach to nature, with esthetic nature appraisal on the one hand and scientific technological nature control on the other, we will learn how to regain an inhabitable world (Waldenfels, 1985, p. 136).

References

Ausubel, D.P. (1968). *Educational psychology: A cognitive view.* New York: Holt, Rinehart and Winston.

Giorgi, A. (1989). Some theoretical and practical issues regarding the psychological phenomenological method. *Saybrook Review, 7*(2), 71-85.

Hansen, W. (1965). *Die Entwicklung des kindlichen Weltbildes.* Munich: Kösel Verlag.

Hart, R. (1979). *Children's experience of place.* New York: Irvington.

Piaget, J. (1923). *Le language et la pensée chez l'enfant.* Neuchâtel-Paris: Delachaux et Niestlé.

Plötz, F. (1963). *Kind und lebendige Natur.* Munich: Kösel Verlag.

Rejeski, D.W. (1982). Children look at nature: Environmental perception and education. *Journal of Environmental Education, 13*(4), 27-40.

Stückrath, F. (1942). Die Tierbeobachtung des Kindes. *Zeitschrift für pädagogische Psychologie,* 117-152.

van Hiele, P.M. (1973). *Begrip en inzicht: Werkboek van de wiskundedidaktiek.* Purmerend: Muusses.

Waldenfels, B. (1985). *In den Netzen der Lebenswelt.* Frankfurt a. M: Suhrkamp.