



Connecting With Nature

A NATURALIST'S PERSPECTIVE

Robert C. Stebbins

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National Science Teachers Association

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Nature's Gift to Children

Every child should have mud pies, grasshoppers, water bugs, tadpoles, frogs, mud turtles, elderberries, acorns, chestnuts, trees to climb, brooks to wade in, water lilies, woodchucks, bats, bees, butterflies, hay fields, pine cones, rocks to roll, sand, snakes, hackberries, and hornets, and any child who has been deprived of these has been deprived of the best part of his education.

—*Luther Burbank*

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Most of all is the debt I owe my parents. They were a remarkable pair. Dad (Cyril Stebbins, of English background)—the scientist, agriculturalist and teacher—emphasized self-discipline, civic values (“The Pillars of

Acknowledgments

Society are the home, the school, and the church”), and respect for others and nature. He believed in, and taught, the evolutionary origin of humans. He also sang in the church choir and fully supported the interdenominational church in our community, becoming a favorite of the pastor.

Mom, a Swiss immigrant (Louise Beck), was our loving caretaker who was devoted to her brood (We grew up seven—three boys, four girls, in that order, I the oldest). She taught us humility, caring for others, and “do unto others as you would have them do unto you.” She loved wild nature and believed it was God’s handiwork. My parents never disagreed on human origin. Evolution was evidently God’s way of creation.

Mom loved to tease us—one of her ways of showing affection. I was at her bedside at her death. She was 87 and dying of many small strokes, lucid at times then lapsing into a coma. On her last episode of consciousness she asked me to play my violin. I’m not that good, but I’m sure she wanted to hear it. I said, “I’m sorry, Momma, I didn’t bring my violin. I’ll whistle you a little tune,” whereupon I whistled “Yankee Doodle.” I have no idea why! When I stopped, there was a long silence. I thought she had left us. Then she said, always blunt and to the point, “I like the birds better.” I took it as a last affectionate goodbye.

This book and author had the indispensable help (both secretarial and intellectual) of five outstanding assistants: Daniel Mulcahy, Joyce Bautista, Raul Edwards Diaz Jr., Keishia Sheffield, and Debbie Lee, mostly supported by University of California, Berkeley Faculty Research Grants. My former graduate students Charles Brown and Sam McGinnis gave me professional help and support.

Introduction



Ecology—A Pathway to Connecting With Nature

The Importance of Ecological Literacy and the Whole Organism Approach to Biology

An ecological (whole organism) approach to biology tells us that, whatever else we may be, we are subject to the same laws of nature as are all other organisms; that we are related to everything that lives and are but a single, albeit remarkable, strand in the complex web of life; that our fate is inseparably tied to that of Earth's living community; and that human attributes and behavior have ancient roots extending back to the beginning of life on Earth. Every person alive today is a unique manifestation of this remarkable unbroken chain. A nature-centered world view contains the knowledge and ways of thinking that can help us deal objectively, yet compassionately, with our manifold social and environmental problems. Its ethics include and extend beyond our own species to the other life of the planet.

Ecology is the branch of biology that deals with the relationship of living things to their environment and to each other. It focuses on whole organisms (plants and animals) and their interaction in nature. Ecology and related disciplines such as natural history, botany, and zoology deal with biological subject matter with which people can make direct contact and form emotional ties. This can lead to respect for nature and planetary stewardship.

Unfortunately these participating disciplines, and especially natural history, have declined in popularity at many colleges and universities. They have been considered old-fashioned. Now the whole organism (organismal) approach to biology and its important role in connecting us to nature is needed more than ever before!

In many ways we may be drifting away from our biological roots and in the process, because of our numbers and demands, threatening ourselves and other life of the planet. The decline in teaching these subjects thus carries with it high physical and emotional costs. Prompt remedial action is called for.

Richard Louv, in his outstanding recent book, *Last Child in the Woods* (2005), extensively documents the importance of nature and outdoor play for the healthy development of children—to prevent what he calls “nature deficit disorder,” a malady associated with loss of connection with the natural world. However, he also tells of the efforts of the many individuals and groups working throughout the United States and abroad to establish nature in urban and suburban locations—and both the challenges and many successes they have experienced. The whole-organism ecological approach to nature education can encourage and greatly assist such efforts.

In what follows I offer activities and examples of things I have found effective in getting people interested in nature. Most can be applied wherever there is incentive to do so. I also discuss some major impediments to nature bonding that threaten our future worldwide—nature-dominating attitudes or indifference toward nature and our failure to adequately control our population growth. Some hopeful prospects for change are described, but far greater efforts are required, and urgently!

Finally, some educational recommendations are offered:

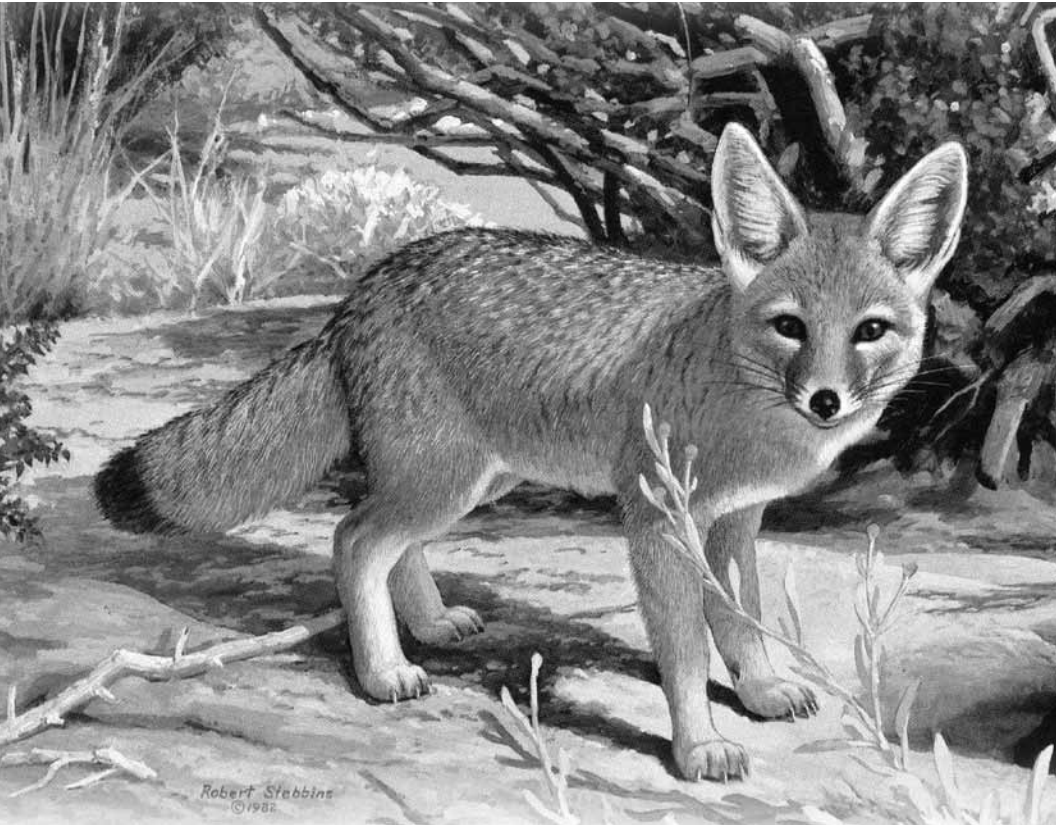
- Interdisciplinary cooperation by higher education to integrate fields of knowledge so that they are not taught completely in isolation;
- Devising and experimenting with methods to foster ecological literacy, environmental concerns, and nature bonding; and
- Finding ways to energize the educational community at all levels (beginning at home) to achieve these goals.

Part One

Connecting With Nature, an Ecological Approach—Goals.
Activities. Field Trips. Nature Stories. Nature's Driving Force for
Change.



Goals of an Ecological Approach



Living systems are complex, thus tampering with them calls for great care. The “first, do no harm” principle should be paramount. Through chain reactions and unexpected interactions, widespread and sometimes catastrophic effects can occur. Destruction of a species of ant reduced the productivity of European forests (see Text Box 2.1) and introduction of the European fox had far-reaching impacts on native marsupials in Australia. The spread of non-indigenous plants, animals, and microbes is a rapidly growing problem of global proportions—fueled by climatic change, commerce, and an expanding (and increasingly mobile) human population. It is considered by many biologists to be one of the greatest threats to biodiversity, planetary ecosystems, and public health.

TEXT BOX 2.1: THE ANT-FOREST CONNECTION

For about 1,000 years, people destroyed ants (pupae in particular) in the forests of Europe to get food for fish and birds, as well as to make a formic acid solution applied to the skin to treat rheumatism and arthritis. The ant fauna became greatly reduced and the health of the forests was threatened.

On August 6, 1958, near Würzburg, Germany, I visited a forest of mixed pines, firs, and beech under study to determine what is required to maintain a healthy productive forest. The forest ant (*Formica rufopratensis*) builds mound nests of forest litter, sometimes as much as 6 ft. high, and colonies can persist for decades. Because of the nitrogen content of the soil, fir trees growing near nests may be three times greater in diameter than those only 15–20 ft. away and have longer, darker needles and greater yearly twig growth, indicating a potent effect on tree health by the ant colony.

The ants milk aphids that feed on the forest trees. Those milked by ants are not considered harmful. The ants feed their broods with the excrement-rich iron. Aphids used by ants take little from trees but give a lot to ants that in turn benefit the trees. The ants, in tunneling beneath the nest mounds, bring soil particles to the surface and bury dead ants and other organic matter, enriching and aerating the soil.

The ants also help the forest by destroying the defoliating oak tree caterpillar (*Tortrix viridana*) during outbreaks and by aiding the seed dispersal of pines.

Since all dead trees are removed from managed forests—depriving insect controlling birds and bats of natural nesting and sheltering sites—bird and bat boxes are provided. At the time of my visit, 90 forests in Germany were carrying out the ant-bat-bird program. Also at the time, however, people oriented toward chemical control of forest pests tended to discount the effectiveness of the program. But chemicals destroy both useful and harmful insects. Those supporting the ecological approach noted that the interactions of the birds, bats, and ants resulted in good soil and healthy forests.

Although the basic principles of ecology upon which nature-centrism is based are readily comprehended (if taught), the organisms themselves and the interrelationships among them and their environments are not easily understood without careful, and sometimes prolonged, field training and study.

Consider the incredible interlocking hierarchy of increasing complexity and interaction of physical and chemical properties and environmental influences in going from DNA, chromosomes, cells, individual organisms, population, community, ecosystem, to the biosphere!

Field studies are absolutely essential to understanding nature and of increasing importance as human impacts escalate. Long-term studies are particularly useful in assessing ecological trends and problems (see Text Box 2.2). Often, combinations of field and laboratory studies are required to obtain satisfactory results.

Long-term goals can only be achieved with political, educational, and scientific communities—and a supportive public—that appreciate the importance of devoting the necessary time to obtaining ecological and environmental knowledge (See Chapter 9, *Roving Professional Naturalists*, p.158).

TEXT BOX 2.2: THE IMPORTANCE OF FIELD STUDIES

Field studies are crucial to stem the tide of declining biodiversity. There is an increasing need for dedicated and well-trained people to deal with our growing wildlife management problems, both plant and animal.

Top predators have often been targeted for extermination. Fortunately, we are beginning to understand their importance in the functioning of living systems and in the maintenance of biodiversity. With their loss or decline, a cascade of biological disruption can follow. The gray wolf (*Canis lupus*) was formerly widespread in North America. Yellowstone National Park lost the last of its wolves 80 years ago (at this writing), and they have been exterminated throughout most of the United States.

Studies in Yellowstone and surrounding areas where wolf populations have been introduced and still exist, or have been re-established, are revealing the importance of this top predator. In its absence, elk herds increased greatly, seriously damaging aspen and willow groves, thus impacting the needs of beavers for lodge, dam-building, and food, and certain birds requiring the groves for nesting. Coyotes held in check by wolves expanded greatly, presumably with adverse effects on red fox and midsize predators such as wolverines and fishers (a rare species of weasel), which are now expected to increase.

Why not have human hunters do the job of wolves? National Wildlife Federation Senior Scientist Steve Torbit answers: “People target healthy males, while top carnivores take old, young, and weakened animals, as well as females. It’s the females that control population growth. Even where elk are hunted, populations can continue to grow, and we are beginning to see a loss of healthy aspen grows outside of our national parks in the west. Wolves are the missing component” (Levy 2003).

The remarkable and fascinating story of Mark and Delia Owens’s (1984) fieldwork on lions, brown hyenas, wildebeests, and other animals in the Kalahari Desert in southern Africa is a classic example of the importance of long-term studies. Their findings and recommendations for wildlife management may be the best hope for the Kalahari Desert ecosystem and the future of human populations in Botswana.

Conveying Reverence Toward Nature

Nature-centered responses work best if they have emotional roots and grow from deep-seated feelings based upon understanding, respect, and reverence toward nature.

A powerful pro-environmental coalition is emerging. Religious people and institutions, scientists, and advocates of sustainable development are beginning to partner. They share an appreciation of nature that surpasses its economic value. A new ethic encompassing humans, the divine, and nature may be in the making (see Text Box 2.3).

Aldo Leopold warned against an arid conservation, “which...defines no right or wrong, assigns no obligation, calls for no sacrifice, implies no change in the philosophy of values” (See also Gorman, 2003).

Implementing a Nature-Centered Educational Program

The nature-centered educational program is partly an affirmation of the values of “nature study,” as pursued in the last century (see Comstock 1915), but it calls for some important modifications.

In the 1800s and, to some extent, into the early 1900s, “nature study” dominated elementary school science, but under the momentum of great technological advances, it gave way to a more technologically oriented science program. In reference to this shift, I remember well the remarks of a young science educator who spoke at a school science conference in the early 1960s. He said, “Soon we will be traveling thousands of miles per hour—thank goodness we have gotten away from the grasshoppers and butterflies in elementary school science.” If we have indeed left the grasshoppers and butterflies, we must now return to them, but with different eyes.

There was much of value in the old nature study program—with the direct observation of local plants and animals and their structure and manner of life—but it often lacked the unifying theme of evolution and was sometimes given to moralizing, excessive sentimentality, and interpretations based on the way humans think and behave (anthropomorphism).

How should today’s nature-centered studies differ from the old nature study programs?

1. They should emphasize ecological principles and the interrelationships of the organisms studied.
2. They should involve students and teachers in actual studies of living things in their natural habitats near school or home.
3. They should focus on learning the methods of science, emphasizing the “discovery” (hands-on) approach over the “telling” (lecture) approach.

TEXT BOX 2.3: ADDRESSING THE ISSUES ON A GLOBAL SCALE

There has been a sequence of gatherings of religious leaders, scientists, and legislators from many nations to try to deal with the rapidly worsening world environmental crisis.

Representatives of nearly 100 nations participated in the Global Forum of Spiritual and Parliamentary Leaders in Oxford, April 1988 and Moscow, January 1990. In Moscow, 1,300 delegates gathered in the Kremlin to hear an address by Mikhail Gorbachev. On the same day, the Grand Mufti of Syria stressed the importance in Islam of “birth control for the global welfare, without exploiting it at the expense of one nationality over another.”¹

The religious leaders overwhelmingly endorsed a statement titled, “Preserving and Cherishing the Earth: An Appeal for Joint Commitment in Science and Religion,” drawn up by scientists to summarize the environmental problems facing humanity. The meeting ended with a joint plan of action: “This gathering is not just an event but a step in an ongoing process in which we are irrevocably involved. So now we return home, pledged to act as devoted participants in this process, nothing less than emissaries for fundamental change in attitudes and practices that have pushed our world to a perilous brink.”

Since the Oxford and Moscow meetings, religious leaders in many nations have begun to act. *A Joint Appeal of Science and Religion for the Environment* was released, and at a meeting of scientists and leaders of the major religious denominations in New York in June 1991, a great deal of common ground was found. The religious leaders accepted “a prophetic responsibility” to make known the full dimensions of the environmental challenge and what is required to address it, “to the many millions we reach, teach, and council.” Among the steps required, it was recognized that there should be “concerted efforts to slow the dramatic and dangerous growth in world population.”

By 1993, the Joint Appeal had evolved into The National Religious Partnership for the Environment, a coalition of faiths. Thousands of clergy and lay leaders have participated in regional training, and thousands of congregational environmental initiatives have been documented.

In January 1996, a segment of the evangelical Christian community lobbied the U.S. Congress in support of the Endangered Species Act (which is itself endangered). Laws protecting endangered species were described as “the Noah’s Ark of our day.”

Now, more than ever before, the force of the Joint Appeal is needed.

¹All quotes from Sagan, C. 1997. *Billions and billions: Thoughts on life and death at the brink of the millennium*. New York: Ballantine.

4. They should give attention to human ecology—humanity’s place in the web of life—including the ecological impacts of human actions and our attitudes toward nature.

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Connecting With Nature

A NATURALIST'S PERSPECTIVE

One of my earliest memories is of a warm day, a field with many grasshoppers, a shallow creek with cold water, and the joy of a day in the hills with my parents. My dad had gone fishing and I was free to wander about nearby. It was summer in the Gray Pines foothills of the Sierra Nevada, near Chico, California, where I was born. Along the creek I found a turtle! I had hoped someday to have one as a pet. I ran with the wondrous creature cradled in my hands to show my mom. I was enthralled with its bright eyes, the feel of its claws, and its cold body as it struggled to free itself from my grasp. So began a lifetime of connecting with nature.

And so begins this amazing book—an irresistible story of how one child fell in love with nature and your students can, too. Taking what he calls “a nature-centered worldview,” author Robert Stebbins blends activities, examples, and stories with his perspectives on the importance of dealing objectively yet compassionately with social and environmental problems. As thought-provoking as it is charming, *Connecting With Nature* includes

discussions of “ecological illiteracy” and the impediments that keep people, young and old, from bonding with nature;

recommendations for establishing a nature-centered educational program and encouraging interest in nature at home;

advice on doing accurate observations and field reports and understanding natural selection; and

a captivating array of activities to pique the curiosity of students of all ages: imitating animal sounds, quieting lizards, tracking animals, photographing birds, and playing hide and seek with owl calls.

Even a quick glance through *Connecting With Nature* will make you wish you could give your students the joy of a day in the hills with the author. Failing that, you can use his book to instill a love of nature in your students—and rekindle it in yourself.

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