

AMERICAN NATURE STUDY SOCIETY

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Nature Study

The journal of the American Nature Study Society

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The American Nature Study Society

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Nature Study

A JOURNAL OF ENVIRONMENTAL EDUCATION AND INTERPRETATION

Spring, 1974



Volume 28, No. 1



Beauty —
In
Mind
and
Spirit

Yellowstone Falls, Wyoming.
Photo by N.P.S.

The American Nature Study Society

EROSION

There is little doubt that, given a state's natural resources and technological know-how, we could shape our physical environment into the epitome of beauty and harmony. The problem is not in the realm of resources or know-how; it is in the realm of the spirit and the mind of our citizens.

We, as a nation, have not been willing to commit ourselves honestly to the acceptance of the criterion of nature's laws. Yet to healthfully survive, our civilization demands that we operate within the understood rules of ecology and conservation.

The greatest problem we are faced with is that beauty must be real to the mind and spirit before it can exist on the land. We must face the failure of our public elementary and secondary schools to develop this aspect of good citizenship. Materialism has been the basic lesson plan for learning to live.

We suffer like no other nation from pollution of our natural environment and the erosion of man's spirit. Physically we enjoy the best of health, but mentally and spiritually we are victims of an eroded spirit and a desecrated land. Consider the statistics on consumption of barbiturates, tranquilizers, tobacco, alcohol, and narcotics. Consider the mounting cases of heart disease, ulcers, cancer and mental illness.

Man in America has played hookey from the school of the out-of-doors too long. Ever since formal learning became mandatory, we have increasingly lost direct sensory contact with the school that is nature.

In most cases the stepping-stones across this river of neglect have been inundated. Man cannot return to the proving ground where he was fashioned and lived successfully for a million years. Our society won't permit it!

Our teachers would be the first to admit that most of us live in a sterile world of ignorance of our environment. More and more we deal with the things and trappings of teaching: bells, books, models, graphs. We operate in climate-controlled cubicles with hordes of students. We know very little at first hand of community planning, ecosystems, radiation, pollution, urban renewal, aesthetic appreciation, or the results of 2,000 school children flushing toilets twice a day or 200,000,000 persons throughout the country doing the same thing. This ignorance is not bliss! We are poorly qualified to nurture and fashion the intellectual free inquiry of youth into their daily discovered outside environment.

S. B. M.

The Ecologue

1. Thou art one with the tissue of life
a seamless web that encircles the earth:
thou shalt repair a tear in it
wherever it occurs.
2. Thou art but the conscious dust, a shaper
but never the master of nature.
3. Thy creations also come from the dust:
unto dust shall they return,
for waste is just an unused stage
that thou must learn to use.
4. Thou shalt forever serve as
thy brother's systems keeper,
for man in the mass is but a part man.
5. Thou shalt forever remember
that earth is the oasis of life
in the desert of space:
thou must never turn earth to moon.
6. Thou shalt pay the tomorrow tithe
that thy children and thy children's children
may continue the privilege of living on earth.
7. Thou shalt fashion and use a timeglass
that measures decades,
centuries and millenia.
8. Thou shalt further remember:
the wants of man are infinite,
the resources of earth are not.
9. Thou shalt neither make nor disperse
the lifeless foes of life on earth.
10. Though the purpose of life may be mysterious,
thy very existence answers death
and the ending of all things.

Message From The President

THE AMERICAN NATURE STUDY SOCIETY

There comes a time in every organization and in everyone's life for taking stock. To ask "Who am I? What are my objectives? What is my potential? Am I achieving it?"

For an organization this answer can only come from its members, and undoubtedly the members will have varied reactions depending on their own background and relationship with the society.

My own relationship with A.N.S.S. is a long one starting in depression days when I kept a membership blank on hand for the day when I could afford to join this organization that would accept me without any college degree, that had no sex, age, or formal education requirements; that only asked that I be interested in the natural world and concerned about it. I found that mighty exciting—and still do.

American Nature Study Society has always had an impressive roster of leaders. A list of the presidents starting with Liberty Hyde Bailey and including people like Anna Botsford Comstock, William Gould Vinal, Bertha Chapman Cady, E. L. Palmer, Edith Patch, Edwin Way Teale, Ellsworth Jaeger, Roger Tory Peterson, and Richard Weaver reads like a Who's Who in the Nature movement; but it has welcomed the amateur, too; and we all benefit from this mix.

Annual conferences of ANSS are unique learning experiences. Sometimes the offerings are almost overpowering like the day we had to choose between birding with Roger Tory Peterson, following the interwoven web of nature with E. L. Palmer, or the trail of history—natural history—with Cap'n Bill. For most of us the questions were "When shall we go with each leader?" "How shall we budget our time?"

And what insights we gained on the Indiana dunes as we followed Edwin Way Teale over the land that he had known from childhood!

At another time whole new areas were opened by the field trip organized by Gerry Schneider in Washington, D. C., where we saw some of the things that could be and were being done to relate city dwellers to the natural world.

Undoubtedly the field trips of the ANSS conferences are one of our special teaching tools. Few members can attend the conference annually but many more could and would attend some sessions when the conference is in their part of the country.

Indoors, too, the conference is stimulating and offers opportunity to learn by sharing. I cannot remember a single session that hasn't involved audience participation and discussion. In recent years more time has been set aside for just this kind of learning. Thus

a highlight of the 1972 meetings was an evening session where 44 persons came to discuss approaches to environmental education. Of the 44, thirty-three actually participated. This three way process—listening, observing, and participating, can make a short conference more meaningful than a whole semester's course.

But what of people who can never get to conferences? From the early founding of the society there have always been published materials. In the beginning it was a newsletter. Then under the editorship of Malvina Trussel it grew into a quarterly journal. Malvina turned the job over to Stanley Mulaik in 1954 and in recent years Stan and John Gustafson have been sharing the editing.

Since Earth Day in 1970 there has been a rash of magazines concerned with ecology and the environment. Some have been short-lived in spite of the current interest in these topics. Some are obviously done by opportunists; some are done by persons genuinely interested with little knowledge and experience. Most of the worthwhile ones, like Nature Study, have been around a long time. Their contributors and editors are well versed in the basics and the interrelationships that must underlie all our decision making.

Nature Study is not a flashy magazine; but it is solid and dependable. It reflects the diversity of its membership. It belongs to all of us, both as readers and potential contributors. We can improve it by more member contributions.

By sharing ideas we contribute to each other and therefore to the effectiveness of the American Nature Study Society, for many of our members take responsibility and play leadership roles in their communities in the field of nature and environmental studies and each of us needs the stimulation and refueling that comes from shared experiences.

One section of special interest is the "Tips for Teachers" which was instituted more than twenty years ago by Dr. Richard B. Fischer of Cornell University. Many of these Tips have been reprinted and are available as sets or as individual sheets as an inexpensive teaching resource.

With this background where should we go? Two things under consideration are the publishing of more materials, and the operation of workshops that would reach persons who are unable to attend conferences, with a concentrated program on environmental education.

What suggestions have you for either of these activities? What else would you like to see ANSS do?

HELEN ROSS RUSSELL

NATURE STUDY

TIPS for Environmental Education and Interpretation . . .

Water Drop Studies

VERNE N. ROCKCASTLE

Water is one of the most common substances in a child's environment. Yet, as is often the case with the most common things, it may not be well known, especially with regard to its physical and chemical properties. Teachers and pupils can begin their study of water with an investigation of a small amount of it—a mere drop, or at most a few drops. Observations of a single drop may stimulate a class to learn more about water, without which life as we know it could not exist.

First, a teacher should give each pupil a sheet of waxed paper about six inches long, a paper cup half filled with water, and a toothpick or medicine dropper. Have each pupil dip a finger in his cup of water and transfer a drop of water to the waxed paper. What shape does the drop take on the waxed paper? Does a second drop assume the same shape? A third drop? A fourth drop? Something about this liquid keeps it nearly spherical when it rests on a surface such as the waxed paper.

Let each pupil put a few grains of table salt on his desk, and set the sheet of waxed paper over them. Have him transfer a drop of water to the waxed paper directly over the salt

grains, then examine the salt through the drop of water. How does the salt as seen through the drop compare with the salt that is not directly beneath a drop of water? Replace the salt crystals with some printed material and see if the letters are magnified under the drop. Replace the printed material with some pieces of graph paper, cheesecloth, window screen, or any other material that is marked off in tiny squares so that a magnified square can be compared with one that is not magnified. How much does the drop of water seem to increase the size of an object seen under it?

Ask each pupil to add a few more drops to the one, so that squares of the graph paper are observed beneath a small puddle instead of beneath a single drop. Does the larger diameter of the puddle increase the *magnifying power* of the water lens? Does it increase the *number of squares* that are visible at one time? Can magnifying power and field of view (number of squares) be increased at the same time?

Now ask the children to put a single drop of water on the waxed paper, and near, but not touching this one, put another drop. With a toothpick, let each pupil find out how close to one another the drops can be pushed without merging into one. Can two drops actually touch each other and still not merge or coalesce? What happens if a third is brought into contact with the first two? A fourth?

When a medicine dropper is filled with water, it becomes a cylindrical lens. If the pupils have medicine droppers to use, let them fill them as full as they can with water, then lay them down on a line of newsprint. Are the letters of the line made longer? Wider? Does the line under the water lens increase in two dimensions, or only one? How does this differ from what happened under a drop?

Sometimes a bubble will get into the water column in the medicine dropper. Let the children see what happens to things under the bubble as compared to things under the water. Do letters under the bubble appear larger or smaller? Is this the same as they appeared under a drop of water? (Compared to a drop of water surrounded by air, a bubble is a drop of air surrounded by water. Its optical effect is just the opposite of a drop.)

Reflections in drops of water are fully as interesting as the images seen by looking through a drop. Let the children put a small square of black construction paper on their desk, and over it put a waxed paper on which is placed a drop or two of water. What reflections can they identify in their drops of water? (A magnifying glass may help.)

Let them increase the size of the puddle of water and see what changes occur in the reflections. Are the reflections dis-



Photo by Rockcastle

These drops on a grass blade behave like ones on waxed paper, due to the waxy cuticle on the leaf surface.



Photo by Rockcastle

torted the same at both the top and sides of the puddle? Do two drops or puddles side by side show the same reflections?

Some water drops in nature occur as raindrops, some as spray from a stream or a falls, some as dew, and some as water of guttation, which is unevaporated water from inside the leaves of certain plants which escapes through small pores along the edge of the leaf. It is interesting to extend the study of water drops to these different sources. Dew and rain, for example, are distilled water. Water of guttation is not distilled, but probably has in it some dissolved chemicals. To test which is dew or rain, and which is water of guttation, put a drop on a clean glass such as a microscope slide, let the drop evaporate, and then see if a residue (spot) is left. The children in a class can compare drops of water from various sources — tap water, rain water, melted scrapings from a refrigerator, dew, melted snow, well water, and a teardrop — to see what kind of residue (spots) each leaves when the water has evaporated. In a rural area, each child might bring a sample of his well water, and each sample be tested for the amount of residue one drop will leave.

One simple way to measure the amount of water in a drop is to let it fall on a paper towel. When the water has been soaked up by the towel, mark the outline of the spot with a pencil. Then measure its diameter. Try another drop at a different spot on the paper towel. How does its diameter compare with the first? Now try two drops in one spot. Does the resultant spot have an area twice as big as the spot caused by one drop? (Remember that a spot whose area is twice as big

is not twice the diameter! A spot with twice the diameter as another would have an area four times as large.)

For a more complicated activity with drops of water, let a class try measuring the diameter of raindrops as follows. Cut a foot-square piece from a discarded nylon stocking that has not been washed since it was last worn. Stretch it tight in an embroidery hoop. Pour a little powdered sugar into a pie tin, spread it around, and dip the stretched stocking into the sugar until a thin coating of sugar covers the stocking. Then, during a rain shower, hold the powdered hoop horizontally in the rain for a few seconds. Bring it back indoors and examine the stocking for spots where the drops have fallen through the nylon, dissolving the sugar as they went. (It may help to hold a sheet of dark colored paper behind the hoop when examining it with a magnifier.)

Are all raindrops the same size? What is the biggest raindrop that can be found? The smallest? How does the size of the largest raindrop compare with that from a medicine dropper?

By studying drops, teachers and pupils will find water a fascinating substance. However, its characteristics in drop form are only a beginning. What it does when it patters on soil, enters the roots of plants, evaporates from leaves, condenses to form fog or clouds, becomes a stream or dashes against coastlines — all this is an extension of the study that might well begin with a single drop.



Photo by Rockcastle

These are drops of water on a spider web. Is the picture printed right side up or upside down? How can you tell? Set up an experiment to prove your point.

NATURE STUDY

AN EARLY ENVIRONMENTALIST (DEXTER)

(Continued from page 4)

hundreds of people panting for fresh air during the hot summer months are nevertheless forced to close their windows repeatedly." He described the North River as "a black and noisome stream rendered so by the sewerage and factories of a large and prosperous town above [i.e., Peabody]."

IV. Noise Pollution

In his journal for 4 July 1859, Morse complained of the noise created by celebrating the American Independence. He was very sensitive to all kinds of extraneous noise. He wrote a letter to the editor of the *Salem Gazette* 14 January 1870, condemning people for whispering and talking at concerts. His most intense dislike for noise was created by the constant screech of steam whistles on locomotive engines and at factories. For years he carried on a crusade against the steam whistle. In the *Salem Evening News* for 15 January 1900 he wrote that, "It is time that the citizen should insist upon that quiet in the city which he demands in his own home. He should insist upon the suppression of every unnecessary noise; in fact a number of our municipal ordinances, never enforced, provide for this relief."

A week later the *Boston Herald* carried an editorial comment on Morse's article praising him for his stand and adding that "The increasing sensitiveness of the public to the evil of the noises that afflict modern city life is a good sign of the times." Again in the *Salem News* Morse reminded his readers 6 September 1900, that city ordinances of Newcastle, Pa., Detroit, Mich., and Cleveland, Ohio illustrate what could be done to abate noise pollution from steam whistles. In the *Boston Herald* for 24 September 1903, Morse wrote, "Within a few years there had come in use on steam railways a series of whistle signals which, in some towns at least, have rendered life for many unendurable." At a meeting of the Massachusetts Association of Boards of Health held in Boston 27 January 1905, Morse told the audience that "— just in proportion as a family or community becomes civilized, just in proportion are unnecessary noises suppressed." He explained his contention that unnecessary noises were injurious to health and well-being, and damaging to property values. He continued his campaign, writing frequent letters to the newspapers of Salem and Boston. In the *Boston Sunday Globe* for 17 June 1906, he claimed "The brutality of a municipality which allows this scourge can hardly be conceived."

At the 9th International Otological Congress held in Boston 14 August 1912, Morse proclaimed that "— our people are the noisiest

civilized people on the face of the earth." While the railroad steam whistle is no longer a problem, excessive traffic noise from automobiles, trucks, and motorcycles has taken its place and we still have a serious problem of noise pollution.

V. General Destruction and Deterioration of the Environment

Morse early recognized the gradual deterioration of our environment. He was concerned over the removal of trees from our cities. He realized the need to provide open space and natural surroundings to counter-balance the growth of cities. At the Worcester Polytechnic Institute he presented a commencement address 11 June 1900, entitled "Can city life be made endurable?" He called attention to environmental degradation and pollution, the need to reduce such, and to improve and beautify our surroundings. He summarized that "The poor need just those comforts that the more favored possess in their country residences — playgrounds and parks, clean and quiet surroundings, a pure water supply and pure air, perfect hygienic conditions, and an orderly and temperate community."

Mulaik Retires As Editor

President Helen Russell announces that NATURE STUDY editor Dr. Stanley Mulaik has retired after serving in that capacity for the past nineteen years. During his tenure as editor the journal has changed in format from a four-to-eight page newsletter to a general journal with regular features such as *TIPS for Environmental Education and Good Reading*. It enjoys a nearly world-wide distribution and has attained an influence far greater than might be assumed from its modest circulation. We owe Stan a great deal for his leadership in ANSS, not only as editor but in many other capacities as well. He and his wife Dorothy have faithfully attended the annual meetings of the Society and have been members of the Board of Directors on several occasions. Stan served as president of ANSS in 1959. In addition, both the Mulaiks are founders and active supporters of the Utah Nature Study Society in their home state, as well as of the Western Section, which is affiliated with the Western division of the AAAS.

We wish Stan and Dodie well as they continue their many interests in retirement. We expect they will continue an active part in ANSS, and, like Cap'n Bill Vinal and others, will publish their thoughts in these pages from time to time.

Thoughts — and a Question —

While on Deer Watch

PAUL M. KELSEY

It was late the second morning of deer season and the warm sun had a relaxing effect as I still-hunted along the brow of a hill through a hardwood stand in which boys from McCormick Youth Camp had done some timber stand improvement about three years before. In response to release cutting, young maples had erupted and the brushy undergrowth was just the type deer can drift through unseen. The abundance of tracks in maple leaves under foot showed much travel along this brow where a deer could jump one way or the other and be out of sight. As I approached a blue line painted on trees, marking the end of the work area and the start of an old field now grown to 20-foot aspen, I took up a stand by a large maple and waited.

The noontide quiet was shattered by the sharp scolding of a goshawk farther down the ravine. My thoughts went back some 20 years when I first had heard that exciting call echo through the woods in New York's Chenango County, after I had flushed a female from her nest in a tall beech. Until that morning there had been a large gap in the known nesting range of the goshawk extending from the Adirondacks to the mountains of Pennsylvania.

Around the fringe of the Adirondacks, and across the southern-tier counties of New York, thousands of acres of land which had been under plow were then reverting to forest. As overgrown pastures became woodland, the more wooded habitat of the goshawk was developing. In following years other nesting goshawks were reported until now the goshawk is a regular part of the year-round fauna of these hills — not just an occasional winter visitor.

While the goshawk was increasing, its two closest relatives, the Cooper's hawk and sharp-shinned hawk were decreasing, until these last two are now seldom seen except during migration. Why is the goshawk succeeding where the other two have failed?

Two species of bark beetles carry the fungus disease responsible for the death of many stately elm trees.

Transpiration is the process whereby free water in a plant structure is released as vapor to the atmosphere through the leaves or bark.

Much human energy is spent in going to one extreme so as to counteract those who are going to some other extreme.

— Arthur E. Morgan

Interpretive Program

(Continued from page 13)

In addition to this program the undergraduate major in Natural Resources at Ball State also includes opportunities to elect Resource Geography, Fishery Resources, Communications, Water Quality, or a General option. To obtain information about the undergraduate or graduate major in Natural Resources contact:

Dr. Clyde W. Hibbs, Chairman
Department of Natural Resources
Ball State University
Muncie, Indiana 47306

E. E. in N. Y. C.

Armed with nets and seines, 650 New York City school children explored the waters of the Hudson River this fall in search of fish for their classroom aquaria. This was the first in a series of explorations sponsored by The Resource Center for Environmental Education (TREE) as part of a new educational program called "The City As Habitat."

The Program is sponsored jointly by the National Park Service of the U.S. Department of the Interior, the New York City Board of Education and Museums Collaborative, an organization which works to make the programs of the city's cultural institutions more relevant to school and neighborhood needs.

"We came back with all kinds of fish," said Joe Tobin of the Wave Hill Environmental Study Center, who led the expeditions. "Striped bass, eels, shrimp, sunfish — the Hudson River is still incredibly rich in its fish life, particularly at Haverstraw Bay and at the mouth of the Croton River where we gathered our specimens."

The children were taken outside the city to Croton-on-Hudson because that is the best collecting spot and also to show them the watershed which feeds New York its water. The program stresses the children's immediate neighborhood environment, but also emphasizes that this environment is effected by systems which extend far beyond it.

After they collected the fish, Tobin helped the children to set up the aquaria in the windows of their classrooms, using specially built cardboard hood to keep the tanks from becoming overheated. Classes continued their study of the New York waterways by visiting at Jamaica Bay Wildlife Refuge, by boarding the old ships at the South Street Seaport Museum and by getting an overview from the new World Trade Center, the world's tallest building complex.

After the water system, the children will study the plant-food-waste cycle in New York from the time of the Algonquin Indians, and the effects of man-made systems and technology on the

New York environment. The program will conclude with a study of the student's own neighborhoods. In all, each class will attend 20 workshops led by resource specialists during the course of the school year.

TREE Director Sandra Walter said that the program's chief aim is to develop methods by which all schools in New York City and elsewhere can make better use of the environment itself as a means to learning. "We think that children learn about the environment itself by working with it," she said. "Mapping it, measuring it, photographing it, testing it, building models of it, feeling it. I realize there is nothing new about taking trips outside the classroom, but what we are trying to do is to make such trips significant and regular parts of the school year, rather than isolated one-shot experience."

Many of our workshops are related to each other in showing different parts of our natural systems and interlocking man-made systems," she said. "We were also working to see how our workshops can be used to make the regular classroom work go better. We don't think of the workshops as ends in themselves, but as ways of stimulating the children to further reading, writing, art work, experiments and learning."

As preparation for the Hudson River expedition and other trips, two fifth grade classes from P.S. 122 in Queens studied food chains in special classes last week at the American Museum of Natural History. Other organizations which will provide resource people during the course of the school year include the South Street Seaport, the World Trade Center, the Queens Botanical Garden, Pratt Institute, CUNY School of Architecture, the Wave Hill Center for Environmental Studies, (classroom gardening as well as the Hudson River study), Arts Inc., Media for the Urban Environment, Federal Hall National Memorial, Hamilton Grange National Historic Site, the Environmental Action Coalition, Growth through Art and Media Experience, American Crafts Council and the Teachers and Writer Collaborative. To help prepare for and follow up on workshops, the program has loaned each class copies for supplementary materials called *Adventure in Environment*, published for the National Park Foundation by the Silver Burdett Division of General Learning Corporation.

TREE has also prepared charts showing how the program workshops can be related to the science and social studies curriculum guides prepared by the New York City Board of Education. It has books, films, testing kits and other materials which can be used for follow up activities and which are available on a limited basis to all schools in New York.

Gas For Travel

"Go where the gasoline is — to Alaska through western Canada over the Alaska Highway" — say the editors of the annually issued *Milepost Guide Book*, just off the press.

Editors report Canada in the west has "gasoline coming out of their ears," and in booming Alaska where work crews are gathering to begin the world's biggest pipeline construction project across the 49th state to tap the newly discovered rich oil fields of Prudhoe Bay in the Arctic, every indication is, that boosted allotments for Alaska will permit "plenty left over" for visiting motorists.

Interesting sidelight on one reason there is an oversupply of gasoline in Western Canada, *Milepost* editors tell us, is that some years back when oil and gas was struck in large quantities in the big central Canadian Edmonton oil basin, the rich eastern Canadians were encouraged to cooperate in building a 500-mile plus long pipeline eastward to Toronto, Ottawa and Montreal. They turned up their noses at the deal. They said such a pipeline would cost too much money — they could buy theirs cheaper from Venezuela — so today, western Canadians are laughing up their sleeves, shipping an occasional tanker through the Panama Canal to their eastern cousins when they can find an occasional tanker, and enjoying the look of wonder on the faces of just-arrived American motorists who can't believe their ears when the gas pump attendant inquires, "Fill her up?"

The 656 fact-loaded pages of *Milepost* tells about all you need to know about travel in Canada and Alaska and about its roads. Available from *Milepost*, Box 4-EEE, Anchorage, Alaska 99509. \$3.95.

Violence commonly is a parasite on social progress, not a cause. — Arthur E. Morgan

"You read a poem about green grass, trees, snow, salt spray blowing up against a beach. Hell, when we think of a beach we think of chicken bones, broken glass, beer cans."

"Each American accounts for more toxic wastes poured into rivers and oceans than 1,000 Asians."

"The new technological man carries strontium 90 in his bones, iodine 131 in his thyroid, DDT in his fat and asbestos in his lungs. There is now simply not enough air, water and soil on earth to absorb man-made poisons without effect. If we continue in our reckless way, this planet before long will become an unsuitable place for human habitation."

He maketh me to lie down in green pastures. He leadeth me beside the still waters. He restoreth my soul. —Psalms

A dissertation on the Inhumanity of Noise

The Value of Quiet

ALFRED G. ETTER

I speak for a little black girl who recently visited the Morton Arboretum, where I am the naturalist. On the floor of a woods she had discovered a small piece of a tree. Unable to recognize wood that never had been sawed or nailed, she asked what it was.

When she learned that it was a piece of a genuine tree, just the way God made it, she was so delighted that she embraced it like a doll and carried it home to the ghetto with her on the bus.

That is how ignorant of nature our people, specially our children, have become. For many of them, the unnatural has become the usual — so it has been with noise.

I think I speak not only for this little girl, but for people of every age who, because of rising levels of noise everywhere, are searching for something they feel they have lost.

Without knowing it, they need to walk and sit together in a quiet place and look at the earth, listen to how the birds sing and perhaps puzzle about how much growing and developing plants can accomplish without ever making a sound.

When I requested permission to testify at this hearing, I was asked whether I wanted to testify as an expert. How does one qualify as an expert on these matters? Must he have a Ph.D. to speak out against the inhumanity of man's noise? Isn't just being alive enough? Aren't ears sophisticated enough to tell the difference between what is strident and what is soothing? Aren't irritation and anger as good a measure as decibels?

If it helps to impress someone, then yes — I have a Ph.D. I have spent eight years in college and the rest of my life in studying the earth, and the life on it. I have made it my responsibility to understand how the world is put together — and not a little of this understanding has come from listening to the sounds of nature — the silent sounds of stars, the timeless flowing of rivers, the enthusiasm of wrens, the gnawing of squirrels as they husk walnuts in the fall.

In the past 15 years of my life I have traveled among the largest cities in the nation, and so I have become somewhat expert not only on sounds but on noise. I have heard most of the sounds of nature obliterated from the lives of people — worse than that, the sounds of the people have been obliterated too.

Now that I am living at the Morton

Arboretum in Lisle, Illinois, I am receiving an involuntary postdoctorate in suburban noise. Though people have a vision of the arboretum as a nice, quiet, green island somehow immune to progress, that vision is false. Hemmed in by ever-mounting traffic of every sort, it is already a victim of the noise that people and industry bring with them when they are fleeing the inhumane conditions they themselves have created in the deeper city.

Not long ago there was national concern about a silent spring. We have solved that threat with a greater one. Who knows whether the spring is silent or not amid the pandemonium of modern vehicles?

I recently spent a morning at the Ogden Avenue School in La Grange, Illinois, with a group of young people, trying to show them what there was of nature left on their own schoolyard. Amid the acceleration and deceleration of trucks and jet noise overhead, I could hardly make myself heard when I tried to communicate some of my excitement at finding a honeybee nest in an old maple tree.

For the sake of economy, several school buildings in the Chicago area are now being used 12 months of the year. Have you ever tried to teach, or learn, in a hot school with all the windows open and the noise of the traffic and road repairs boiling up from the streets?

What is gained by wasting a pupil's and teacher's time trying to fight the domination of today's traffic? How many of the other so-called fruits of civilization, the art museums, the peaceful parks, the opportunities for visits and strolls in the neighborhood, have succumbed to the omnipresence of noise?

I wonder how many others toss and turn, and grow angry along with me. Yet I am far more fortunate than most. What tortures of noise are inflicted upon those who are trapped in the breathless city, and forced to open their windows to the excretions of industry, the hot exhaust of vehicles, and the exhalations of countless office and apartment air conditioners that heat rather than cool the environment?*

Is it any wonder these people revolt, burn, vandalize, seek refuge on government property by Lake Michigan, as Mike Chosa and his Indian followers tried to do (in Chicago). The Indians still have enough instinct left to recognize the kind of environment a human being needs — what kills and what lifts the spirit.

At the arboretum on field trips I often try to tell children's groups how we

* For comments on this same problem made a century ago, see Ralph Dexter's article on E. S. Morse, p. 4.

Last fall I watched a string of sandhill cranes wending their way southward over their ancestral route, suburban Chicago, once a land of marshes and lakes and clean streams, now become a checkerboard of streets blanketed with polluted haze threaded with the webs of jets, helicopters and small planes. How much longer will the wild cries

of the adults keep the young of the flock on course until they find a sanctuary?

When animals are made to listen to noise, they grow sullen, unresponsive, erratic or violent. Is it any wonder we have violent, despondent, indifferent people when they cannot hear, in their neighborhood, the once familiar events by which they time their day? I suspect that a dissonant world has a way of producing dissident people.

Noise is the ultimate insult. It belittles us. It gives us nothing at which to strike back. It kills what is left of many things we have loved — music, beauty, friendship, hope, and excitement — and the reassurance of nature.

Traditionally noise is used to ridicule, embarrass, denigrate and curse — while silence is used for worship, respect, anticipation and love. Do we hate each other as much as our noise level indicates?

Collapsing Rome didn't give a damn how much noise it made, any more than we do. Read Juvenal:

"Insomnia causes more deaths amongst Roman invalids than any other factor . . . how much sleep, I ask you, can one get in lodgings here? Unbroken nights — and this is the root of the trouble — are a rich man's privilege. The wagons thundering past through the narrow, twisting streets, the oaths of draymen caught in a traffic jam — these alone, would suffice to jolt the doziest sea cow of an emperor into permanent wakefulness."

Will the noise of modern man jolt the doziest sea cow of all — the American city — where the sounds of ancient Rome have been magnified a hundredfold? Unless it does, I see no future for man.

Whom do I blame? I blame no one. I blame everyone. I blame all the people, including myself, who have . . . destroyed nature and created a tumult of noise born of their demands for every convenience and every novelty and every protection from exercise, from chance, from weather.

Like the little ghetto girl who had seen nothing but boards all her life, we have become so used to living in this noise-torn world that we accept the dissonant and the sonorous as part of our environment.

We no longer recognize quietness, nor know how to use it. But while I am aware that some can adapt to noise, as to other irritants, no adaptation is achieved without sacrifice.

I think that if people ever rediscover quietness again, they will embrace it, like the little girl embraced her piece of tree, and they will treasure it as something that is not sawed and nailed and misshapen by man, but which contains within it some of the secrets of life and some of the explanation of why we are here.

An Early Environmentalist . . .

E. S. Morse and His One-Man Campaign to Improve the Human Environment

RALPH W. DEXTER

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Today "Ecology" has become a household word and it has become popular to espouse the application of ecological principles to environmental problems. In the past decade, this movement has taken on a phenomenal development, and surely everyone is now aware of the major problems facing us as the balance of nature has been more and more disrupted and our environment has deteriorated. But this surge of interest and wide public acceptance is unique. Perhaps as some historians would say, "The time was ripe for such an event." Many of us teaching the natural sciences have advocated conservation and management measures based on sound ecological principles for many years without creating a ripple, and too often our words fell on deafened ears. At long last, circumstances have forced public attention to the necessity of revising our old ways of waste and pollution. While this public movement is very recent, I should like to outline here a campaign waged singlehandedly in the 19th Century by a foresighted naturalist — E. S. Morse, Director of the Peabody Academy of Science at Salem, Massachusetts. Acknowledgment is made to Dr. Ernest S. Dodge, Director of the Peabody Museum of Salem for aid in this study and permission to quote from the Morse papers at that institution.

I. Smoke

In the *Portland Transcript* for 28 May 1859, Morse published a diatribe on smokers and their filthy habits, pointing out they "— fill the room dense with smoke which they breathe in and out a thousand times. Is not this injurious to the system? It can not be otherwise." His New Year's resolution recorded in his diary for 1858 included, "to go through the year without smoking." On 18 July 1859, he wrote in his diary that he and a friend "broke their pipes and swore off smoking." On New Year's Day 1861, he recorded "my smoking habit I must curtail." It is ironic that Morse himself became an inveterate smoker in time. The fact that he became worse in his smoking habits rather than better does not negate his recognition of the smoking problem, both to the smoker and to those around him.

Another smoke nuisance he recognized

was the use of soft coal. In an article he published in the *Boston Herald*, 20 August 1894, he wrote, "— it would pay the city [Boston] to appropriate the difference in price between soft and hard coal, and to pay a bounty to every private householder to burn the non-smoking coal, rather than to suffer the financial loss [cleaning buildings, clothing, etc.] and discomfort which will surely follow the continuance of the smoke nuisance." In the *Salem News* of 8 December 1891, he wrote, "I insist for the benefit of the masses who are compelled to live in such regions [undesirable, industrial areas], that every odor that contaminates, every cloud of smoke that renders these houses less attractive should be suppressed."

II. Dirt and Littering

Morse recognized the truth in the old adage that everyone eats a peck of dirt before he dies. In the *Portland Transcript*, 9 June 1866, he wrote, "You are bound to eat your peck of dirt and you can not help it." While he felt this was beyond one's control, at least to a degree, he was concerned over the perpetual problem of littering and the accumulation of dirt. In many of his frequent letters to the newspapers, he kept reminding readers of the need to keep the streets and public places clean.

III. Water Pollution

On 8 July 1875, he published a notice in the *Salem Gazette* entitled "The Mill Pond Nuisance," in which he claimed, "The unendurable stench coming from this mass of putrescent vegetation daily produces nausea and sickness." A month later he wrote that an earthen dam preventing the flush of water with the tides, caused pollution in bodies of water above the Eastern Railroad embankment. A year later writing in the same paper on the "Condition of Mill Pond and North River — Salem" he pointed out that "The citizens of Salem are slowly but surely coming to realize that they are being subjected to an atmosphere which is not only oppressive, but dangerous." He described the Mill Pond as "semi-stagnant water covered with green ooze and sending up a disgusting and sickly odor, so offensive indeed, that

(Continued on page 15)

Roger Peterson Receives Award

The 1974 Golden Key Award, given by the American Association of School Administrators and six other national education organizations, has been awarded to Roger Tory Peterson, former ANSS president and one of the world's leading ornithologists. Author of the popular "Field Guide to the Birds," and many other books, Peterson's field identification system has been adapted to a full range of field guides published by Houghton-Mifflin Company. A recent article on Peterson in the *New York Times* indicated that, at the age of 65, he hopes to turn more of his attention to painting in order to finish some long-term projects which have been interrupted by the press of other duties. In the February 17, 1974 issue of *Parade Magazine*, Peterson's early career as a teacher was discussed by one of his most famous students, former Attorney-General Elliot Richardson.

We take pleasure in congratulating Mr. Peterson on this new award.

Mass. Audubon Collects "Gems"

David Miner, as co-director of conservation education for the Massachusetts Audubon Society, has put together a packet of 67 brief statements by leaders in environmental education. The statements are, in each case, a distillate of the experience and philosophy of the persons writing them. They were put together for use in a workshop for counselors in natural history and ecology. It is hoped that these "gems of wisdom" from leaders ranging from Marshall Case (one of the youngest) to Cap'n Bill Vinal (probably the oldest) will be helpful to those going into the field of nature interpretation and counseling. If any are available, copies of these "Gems" may be obtained by sending 25 cents to Wildwood Nature Center, Barre, Massachusetts 01005.

Baldauf Chairs State Committee

Governor Christopher S. Bond of Missouri has endorsed the development of a state plan for environmental education, and has assigned the responsibility to the State Departments of Education and Conservation. The two departments have appointed a Steering Committee and an Advisory Committee to develop the plan. On April 5 the Steering Committee organized in Jefferson City, and elected Dr. Richard J. Baldauf, First Vice-President of ANSS, to be chairman. The Steering Committee will develop the purpose, objectives, and guidelines of the state plan and will coordinate the work of the larger Advisory Committee. Deadline for the final report of the Committee is January 1, 1975.

Watt Urges Communication Between Recreationists

James Watt, director of the Department of the Interior Bureau of Outdoor Recreation, in speaking to the International Snowmobile Congress at Minneapolis in May, 1974, urged those who recreate by machine to enter into meaningful dialogue with those who might be termed recreation purists. He said that he hoped that controversies between those who favor off-road vehicles and those who oppose them will "cool down," now that the ground rules are clearer on which public lands are closed to motorized traffic and which are open.

It would seem that greater emphasis on nature study and appreciation of the natural environment would help to bridge the gap between these opposing points of view.

Program Grows at Squam Lakes Science Center

The young Squam Lakes Science Center experienced new growth in 1973, serving 308 school groups. The Center staff participated in outdoor education courses at the University of New Hampshire, and held a teachers' workshop in Wolfeboro. An all day energy crisis seminar was co-sponsored with the New Hampshire World Affairs Council. New exhibits on wood and alligators, and four new summer lectures were developed. The live animal facility was completely renovated, and new enlarged restroom facilities were constructed. The program was somewhat curtailed towards the end of the year due to the gasoline shortage and the reduction in the use of school buses.

Like many other non-profit centers of this kind, the current inflationary trend and energy crisis combine to present serious problems for the immediate future. Nature centers, with programs designed to educate the public with regard to energy and conservation, may feel the pinch more than other kinds of educational establishments. Only the contributions of interested individuals and corporations can avoid a decline in their activities.

Ocean Recreation Conference

An Ocean Recreation and Conservation Conference was held on June 15, 1974, in Los Angeles. Recognizing that the population of California has created a tremendous demand on the natural recreation resources of this state, and that private developers are reducing or eliminating public access to beach areas,

the Conference dealt with the need for preservation of our natural seashore resources, the need to assure and improve access to these areas, and means to support the inclusion of these needs in the state's master plan for the coastal zone. The large number of people who utilize the coast line, its ocean waves, underwater terrains and beaches, for low-cost, non-motorized recreational activities such as surfing, diving, swimming, and sightseeing, need to join together to effectively represent their interests in the light of plans for preservation and development of the coastal zone.

The Conference was jointly sponsored by the Western Surfing Association, the Sierra Club, and other environmental groups.

Interpretive Program at Ball State University

The Department of Natural Resources, Ball State University, Muncie, Indiana announces the establishment of an Interpretive program. The addition of this new option in Natural Resources Interpretation to the undergraduate major in Natural Resources is designed to train environmental interpreters for a wide range of interpretive assignments, including urban areas as well as traditional park, forest, and other natural settings. Ball State's program is initiated with the understanding that the effective interpreter needs as a foundation four basic competencies: (1) knowledge and understanding of the natural environment, (2) effective use of communication skills, (3) understandings related to people and societal relations with the total environment, and (4) a knowledge of effective program planning and administration.

Students desiring interpretive training will enroll for the undergraduate major in Natural Resources, complete the core requirements for the major plus those outlined for the interpretive option. Under the leadership of Professor Charles Mortensen, who will advise students enrolled for this program, two new courses have been developed: (1) Principles of Interpretation, and (2) Organization and Management of Interpretive Programs. Provision is made for elective courses to strengthen areas of special interest. Course work will include extended field experiences in established interpretive centers such as Land Between the Lakes, Kentucky, as a vital part of the student's training. Presently, reciprocal work experiences are currently being developed with a number of interpretive centers. Field areas and other facilities owned by the University are available for program use.

(Continued on page 14)

NEWS and NOTES for Environmental Education . . .

Phyllis Busch Receives Award

At the annual meetings in San Francisco, it was announced that the Eva L. Gordon Award for excellence in nature literature was given to Phyllis S. Busch. Dr. Busch, a former board member of ANSS, is the author of a number of books in the field of children's nature literature. A graduate of Cornell University, she personally studied under Dr. Eva Gordon, who inspired and directed her in her writing efforts. Dr. Busch has had long experience in nature education in urban settings. Her books, such as "Exploring as you Walk in the City," are valuable aids to urban outdoor education.

Madrona Marsh Needs Friends

Citizens of Southern California are campaigning to save the fifty-four acre Madrona Marsh in the center of the City of Torrance, in Los Angeles County. One of the few remaining freshwater marshes in Southern California, the city has prepared a feasibility study proposing that the marsh and surrounding grasslands be used as a wildlife park. The city council has endorsed the proposal, but outside help is needed to raise the funds to make it a reality. A small amount of oil drilling is already occurring in the site, and it is zoned for manufacturing uses. A developer has plans to build seventeen hundred condominiums, along with a fifty-acre commercial area and seventeen-acre industrial park.

Interested persons are urged to write their support and send contributions to Grace Lear, President, Friends of Madrona Marsh, Box 1472, Torrance, California 90505.

Baldauf Prepares Annual Meeting Program

First Vice-President Richard Baldauf has announced the preliminary program for the annual meeting of this Society scheduled for January 1975. Built around the general theme, "A Higher Quality of Life Through Environmental Education: an overview of state plans," the half-day symposium will review what has been done in the development of state environmental education plans, with a look at the prospects for a national environmental education effort.

There will be field trips and the popular "Lenses on Nature" program, as well as board meetings scheduled during the three or four-day conference. The meetings will take place in New York City.

Election Results Announced

Shortly before the annual meeting in San Francisco in March, Dr. Betty McKnight, Secretary of the Society, announced the results of the recent election. The new president of the Society, who served as President-Elect last year, is Dr. Helen R. Russell of New Jersey. Other officers are as follows:

President-Elect Ruth W. Melvin Carroll, Ohio

First Vice-President Richard Baldauf Kansas City, Mo.

Second Vice-President Richard James Philadelphia, Pa.

Treasurer John Gustafson Homer, N.Y.

Directors Marshall Case, Connecticut Millard David, New Jersey

Jean Milmine, Georgia

Christian Nelson, California

Catherine Pessino, New York

National Conference on The Urban Environment

An important, in-depth conference is being set up for March 1975. Responsible and interested persons from throughout the country are being sought to participate in the task forces, which will produce working papers addressing the contemporary urban environmental dilemmas such as air pollution, solid waste, water pollution, housing, land use, noise pollution, population, environmental health, recreation and open space, energy, and transportation. The conference will direct its concern toward a comprehensive outlook on the critical ecological problems facing us. The conference hopes to demonstrate that urban and non-urban problems are inextricably intertwined, and that answers must be sought which address themselves to both communities.

South Shore

Natural Science Center Dedicated

On June 2, 1974, the citizens of Norwell, Massachusetts, and their friends gathered to dedicate the new facilities of the South Shore Natural Science Center. Program activities of the center were begun in 1962, with the backing of the Natural Science for Youth Foundation and Cap'n Bill Vinal. ANSS member Elizabeth Lawrence has been involved in the teaching and interpreting programs. Beginning in 1966, a total of 21 acres of land has been given or leased to the

Center for its use. The new physical facilities are a symbol of the continuing program to bring awareness of our natural heritage to all the people of eastern Massachusetts.

Doug Wade Makes Tape On Leopold

At the request of the University of Wisconsin, former ANSS president Douglas E. Wade has prepared a one-hour tape on his reminiscences of the late Aldo Leopold, under whom Wade did graduate work in the late thirties. Tapes from twenty-eight persons will be edited into a national radio broadcast. Duplicates of the tapes will be housed in the University's Archives and the Wisconsin State Historical Library. Leopold's book, "A Sand County Almanac," continues to be a best seller and was recently accorded top place in a poll to indicate influential environmental publications.

Reprint Available

A most useful article entitled, "Invite Wildlife to Your Backyard," published in *National Wildlife* in the April-May 1974 issue, is available as a reprint from the National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036. This colorful twelve-page brochure gives plans and lists of suggested species to plant in the typical suburban backyard to encourage wildlife, particularly birds. Paintings in the brochure indicate the stages through which the planting will proceed through a period of thirty to forty years.

Many persons put off planting around their new suburban homes, thinking that it takes too long to achieve the desired results. However, this brochure indicates that within five to ten years a very suitable amount of cover and food can be provided to attract large numbers of wildlife species.

The National Wildlife Federation has launched a new program to establish a nation-wide network of mini-refuges in the backyards of Federation members. Associate members of the Federation are eligible to participate, and will receive a registration certificate and an award for backyard wildlife improvement upon proper application. Persons interested should write to the Backyard Wildlife Program, National Wildlife Federation, 1412 Sixteenth Street N.W., Washington, D.C. 20036. Copies of the brochure are available at 25 cents each.

Adirondack Aromas

HARLAN "GOLD" METCALF

benzoin) would have served her purpose just as well or better, although these plants are found more frequently in the southern foothills of the Adirondacks as well as in the Berkshires. The aroma of the spicebush makes it easy for the big beautiful night-flying moth, the Promethea, to locate and deposit its eggs on its leaves. The mature larvae, after anchoring the near end of the stem of the leaf to its twig securely with silk, rolls the leaf up vertically, spins its cocoon within it and hangs throughout the winter like one of several other dead, dry leaves.

One of the sweetest aromas of the Adirondacks is the pink azalea of the spring. It is often called "pinkster." Its fragrance is reminiscent of the flowers called "Pink" of early New England flower gardens.

In an Adirondack meadow on a sunny day while lying on a soft cushion of Princess-cap and Reindeer moss a soft breeze will waft the fragrances of sweet fern, and in season, the tantalizing smell of ripe wild strawberries.

On even a short stroll on the sphagnum bog on Raquette Lake looking for "sun dew," small cranberry plants and other interesting things, the air is permeated with the scent of Labrador tea which sways waist high in any direction one moves.

Wintergreen is without doubt one of the favorite flavors for gum and candy the world over. In the Adirondacks are found four different plants furnishing oil of wintergreen, the source of this heavenly odor and flavor. They are yellow birch, black birch (also called sweet birch and cherry birch), wintergreen berries and the dainty small round-leaved wintergreen or snowberry.

Walking through an Adirondack forest one frequently may come to a thicket of small one-inch diameter saplings with twin leaves alternately arranged up the branches. Tearing off a small live twig or two releases the undeniable aroma of wintergreen. The saplings are either yellow birch, or black birch; most likely the former as they are by far the most common in the Adirondacks. The outer bark of black birch is definitely darker and duller than that of the yellow birch, although there is actually more oil of wintergreen in the bark of black birch.

As a boy in summer in the Berkshires, I generally chewed the outer and inner bark from a small branch of black birch going to and from a swim in Hasting's Pond. When I was through with it the small branch looked like the winter work of a cottontail rabbit. Taste and smell are so closely related I was able to enjoy

for the "round trip" the delightful aroma of wintergreen.

Probably the most easily recognized contributor of the aroma and taste of wintergreen is the small evergreen plant, wintergreen berry, sometimes called "checkerberry." The berry is red outside with white flesh and small unobtrusive seeds. The flesh may be slightly mealy but sweet and with a delicious wintergreen flavor even in the green berries before they turn red ripe. The mature plants have about 4 or 5 leaves and are dark green and shiny, about one inch long and three-quarters of an inch wide, and they tend to lie fairly flat on top of the coniferous duff. The new leaves stand up vertically two by two and are shiny and waxy with a light pinkish tan color. Because of their youth and tenderness they are the most delicious part of the plant. We called them pippins.

Once years ago I aimlessly followed a deer trail through the middle of a thick, almost impenetrable blow-down bog area at the eastern base of Long Point. After slugging a quarter mile or so I tripped and fell into a bit of fairyland. I found myself lying on soft sphagnum moss which was most restful and comfortable. My surroundings were indescribably beautiful and there was a faint aroma of wintergreen in the air. Overhead were small patches of blue sky filtering through overhanging coniferous branches in unique disarray. The four side walls of the seven or eight foot enclosure were almost completely covered with a small dewy white flower, the "snowberry." Below the flowers and attached to them were long dainty green lines supporting miniature round leaves about 1/8" to 3/16" in diameter, and so close and evenly centered on the green lines as to simulate small green chains attached with fine rootlets to stones and ancient logs, the foundations of the walls. Tasting and chewing on a few of these small, round leaves yielded a mild but definite flavor of wintergreen. I rested in this fragrant and lovely bower for several minutes before leaving it for camp, and I could not help thinking that if I were a young Whitetail deer doe this secluded and beautiful haven would be the ideal one in which to drop my twin fawns.

It is impossible to do justice to the Adirondacks by trying to limit my description of it to aromas — but one of the human sense organs. The fact is that an Adirondack experience is rich in a total package of all the senses of ones being; and it spells INDESCRIBABLE BEAUTY.

The Ideal Classroom Situation?

WARREN APPLEGATE

The ideal classroom situation — senior high school ecology:

- two girls at the New York State Museum consulting a senior biologist about plants of the Hudson River tidal wetlands;
- one girl and one tape recorder interviewing the proprietor of a local health food store about the organic movement;
- two boys working in the school basement converting an old Corvair to propane fuel system;
- three boys riding a bus somewhere in Albany conducting interviews via a portable tape recorder with passengers about mass transport;
- three girls teaching third grade classes environmental awareness using sensory impression games;
- four students working on math homework so they will be free to address the garden club this evening on the preservation of local wetlands;
- three teachers working on a gigantic daily calendar attempting to plot the whereabouts of and the activities of these students for the next few days both in and out of the classroom.

Chaos? At times. Productive? Perhaps, but difficult to measure. Relevant? The kids are enjoying themselves. Their parents and the community are praiseful. The ideal classroom situation? If getting students into the field and out of the classroom and involving the community in environmental awareness is a worthwhile goal, then yes, ideal. Disjointed and frustrating? Well, a good teacher should be flexible.

A teacher in this particular teaching experiment — one attempted this past year at Maple Hill High School in Castleton-on-Hudson, New York — needed also to be willing to climb Mt. Jo (outside Lake Placid) at sunrise and throw in Mt. Marcy after breakfast. Also required: the staying power to coordinate five three-period classes a week, the energy for approximately two evening field trips a week, and the persistence to work about one weekend a month on community recycling or to lead a birdwalk at sunrise or to attend an area environmental conference. Not to mention a little extra for those three to five day field excursions from camping in the Adirondacks to slogging through salt marshes on Long Island. Ecology by its

Mr. Applegate is an instructor of English at Maple Hill High School, Castleton-on-Hudson, N. Y. and participated as a teacher in this experiment in environmental education.

very nature must be presented as an interdisciplinary study, (a glorified field biology course usually omits most of human ecology), and four teachers in this small district in upstate New York determined to present science, social studies, health, and English through this experimental program in environmental studies.

In the spring of 1972, the teachers' combined efforts at grantsmanship and the support of a sympathetic administration won for the district approximately \$2,000 from New York State and \$30,000 from the federal government (under the Environmental Education Act). Their avowed purpose: community awareness in environmental issues through an interdisciplinary environmental program. The ideal classroom: the community. The ultimate goal: students working within the system as effective environmental activists. The methodology: some (as little as possible) traditional classroom teaching and a great deal of individual and small group supervised projects outside the classroom and the school building. In other words, field study in the field. Of course this is where the going got sticky. It took the teachers more than one tense planning session and a number of poorly executed student projects to learn two basic principles.

The first: a working definition of the concept of interdisciplinary teaching. When each came to realize that he was first and foremost a teacher of ecology in this project and not necessarily of his certified and best loved academic domain, a good deal of bickering about just whose activity should be featured for the next extravaganza ended. After all, who can say whether sorting three hundred pounds of garbage at the landfill site is really a science project stressing weights and measures or an English activity formulated to enhance the appreciation and understanding of aesthetics?

The second lesson: how to provide students with the feeling of freedom, yet structure their activities. This will always provide the conscientious teacher with a challenging situation. But let's face it — few high school students actually can handle total freedom. One of the greatest disappointments encountered early in the year was the great number of ineffective and incomplete student projects. The students were as dismayed as the teachers at their inability to identify and organize projects. Failure definitely was not breeding success. So it was one step

backward to attain a vital step forward.

Instruction in identifying feasible projects, establishing objectives, organizing procedures, recording data and reporting conclusions was the first step in providing students with both security and methodology. Each Monday students were required to present a list of objectives and a schedule for meeting these goals to a faculty advisor. To provide a working illustration of project development, the students selected an activity which would involve the entire class — an information gathering and media preparation task to present the necessity for the preservation of a large tract of Hudson River wetlands near Castleton. The endeavor was more than successful in providing a workshop in the organization and culmination of a project.

The final product (a fifteen minute video-tape recording accompanied by slides, drawings, and a verbal presentation — a production which could run from a half hour to over two hours depending on the request of its audience) warranted local television coverage and more than a dozen community and governmental speaking engagements. Bolstered by a taste of success, students were then able to proceed on their own with more confidence. As should be expected in any project-oriented situation, unforeseeable and insurmountable snags were encountered in many individual efforts, and some projects were left unaccomplished.

The results: who can really measure such subjective goals to start with? Perhaps the most indicative measure of success would be a chronological listing of class activities through the year which led to such hectic project activity during some weeks that it was impossible for the teachers even to assemble the entire class together at one place at one time to discuss any one thing. "And just how do you propose that we get the kids together to hear Mr. J discuss the problems of solid waste in New York City?" The teachers got what they asked for — and were satisfied.

So what about curriculum? What did they learn? How did they do on tests? What did they read? Twenty-eight kids learned X different things. Some learned a lot. Some didn't learn much. Some kids learned how to use the phone. (Can most?) Some kids learned how to test water. Some read twenty books. Some learned there are places other than lavatories to sneak a smoke. Some students completed projects that would be accepted by most colleges for independent

In this book we see the hummingbird's nest fashioned of lichens, moss, and cobwebs; the thistledown nest of the gold finch; the Baltimore Oriole's hanging nest, sometimes fashioned of wool and yarn; the flimsy stick platform of the mourning dove; the hole in a tree trunk drilled by a flicker; and a cavity which a bank swallow hollows out in a creek bank or quarry site. The interest of the author, and his delight in his observations, are evident on every page.

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Collecting Cocoons, by Catherine Pession and Lois Hussey, N. Y., Thomas Y. Crowell Co., 1953. Elementary. 73 pp. Indexed.

Collecting is only one part of the story of this book which should be an excellent addition to every elementary school library and a wonderful gift for a child.

In addition to directions for preserving, identifying and labelling cocoons, instructions are included for care of live cocoons and moths and for the rearing of moths from eggs.

Identification and life history material is provided for Polyphemus, Cecropia, Promethia, Cynthia, Luna, Io, Goldenrod Gall Moth, Isabella. Grape leaf folder, tent caterpillar, bagworm, codling moth, bee moth, white mark tussock moth, European corn borer, fall cankerworms, webbing clothes moth, tomato sphinx and yucca moth.

This interesting variety of moths in terms of both habits and habitats almost guarantees that the readers will be able to locate some of the samples in their locality. It also affords the writers the opportunity to provide some feeling for the great variety of life patterns.

Decorative and helpful black and white drawings on every page by Isabel Darling frequently include larva and food plants as well as cocoon (or pupa) and moths.

H.R.R.
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What We Find When We Look Under Rocks by Frances Behnke, McGraw Hill 1971, Grades 2-4

Brief information on activities, biology, and interrelationships of some of the most common animals. Well illustrated. A good addition to any primary grade library, for if there aren't rocks on the school ground there certainly are some nearby in parks, vacant lots and waste areas. (The same animals will also be found under boards and trash.) H.R.R.

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Collecting Small Fossils by Catherine Pession and Lois Hussey, N. Y., Thomas Y. Crowell Co., 1970. Elementary. 58 pp. Indexed.

GOOD READING for Environmental Education and Interpretation

ROBERT M. MCCLUNG

Earth, The Great Recycler by Helen Ross Russell. Illustrated with photographs and with line drawings by Gene Garone. Thomas Nelson, Inc., New York, 1973. 160 pages. \$5.95.

This book is dedicated "In memory of E. Laurence Palmer, who was equally at home in the farms and woodlands of upstate New York, on the ranches of New Zealand, in the mountains of Mexico, in Europe and Africa, and in any other part of Earth's ecosystem because of his sensitivity to those universal interrelationships that constitute Earth's recycling mechanisms."

I believe that this is Helen Russell's best book so far — and I am confident that she will write even better ones in the future.

The Library of Congress "Cataloguing in Publication Data" in the front matter of the book, summarizes its contents as follows: "Describes the physical, chemical, and biological science concepts involved in cycling and recycling." How true. But that summary hardly describes all the things that the book covers, all the subjects it explains and clears up for the average intelligent reader — whether aged 10 or 15 or 90. One might describe the book as an elementary textbook in chemistry . . . or geology . . . or geography . . . or botany . . . or soils, or energy, or ecology. It is in truth each of these, and much more. It brings the whole spectrum of Earth's vital processes together in one unified, clear, and simple concept that should make it invaluable for concerned young people to read out of interest, for schools to use as a source book, for concerned adults to read and learn from, and finally, as guide book that tells what concerned citizens of any age can do about the whole mess which *Homo sapiens* is making of our planet Earth.

In this book, Helen Russell writes about the properties of elements, of how they join to form compounds; about the Earth's lithosphere, hydrosphere, and atmosphere; about water in all of its forms; about green plants and photosynthesis; about land and how it is formed, about crop rotation and composting; about the sun and about energy, about food chains and how we change the environment by pollution and poisons, and careless waste. Last, but not least, the book tells of many conservation organizations, and gives helpful pointers about what anyone can do to help preserve and improve the environment.

"Only as humankind joins together in

many different kinds of activities, all designed to use energy, as well as Earth's building blocks, knowledgeably and responsibly," says the author, "will we bring about the changes that are necessary to heal and protect the ecosphere so Earth's cycles can function successfully and all life can flourish on Earth, our home."

The book is attractively and informatively illustrated with many black and white illustrations, as well as with pen-and-ink illustrations and charts drawn by Gene Garone.

Must They Die? by Faith McNulty. Illustrated with photographs. Doubleday & Company, Inc., Garden City, New York 1971. 86 pages. \$4.95.

Subtitled, *The Strange Case of the Prairie Dog and the Black-footed Ferret*, this eloquent book, most of which originally appeared in "The New Yorker," tells in beautifully detailed prose, and in very moving fashion, the sad story of the ways by which the Division of Wildlife Services (formerly PARC — the Branch of Predator and Rodent Control of the Bureau of Sport Fisheries and Wildlife) has for many years waged relentless warfare against predators and rodents — using cyanide and the poison 1080 as their big guns. As a result, prairie dogs are vanishing everywhere, and the black-footed ferret — possibly our rarest mammal — is going along with them.

A state supervisor for wildlife in South Dakota is quoted by the author as follows: "It hasn't been proved to me that the ferret is endangered. If it is, I don't know whether it is worth saving at financial sacrifice to a landowner." Have we learned nothing in recent years? Must everything be weighed only as to whether it lines the pockets of one special group or another?

It almost seems that we haven't, when we consider that in January, 1974, a group of 21 western U.S. Senators are currently urging the Secretary of the Interior to lift current bans on poison so that cyanide and 1080 can be spread far and wide to kill coyotes and whatever other unlucky meat-eating mammals and birds that may happen to eat the poisoned bait. The long-range poisoning of dog towns continues — and the prairie dog and the black-footed ferret become ever more endangered.

Another good book to read on this subject is *Slaughter the Animals, Poison the Earth*, by Jack Olsen, published by Si-

mon and Schuster, Inc., New York, in 1971.

Nature Diary Through the Year by Mildred Little Rulison. Illustrated with line drawings by the author. Vantage Press, New York, 1971. 92 pages. \$3.50.

The author, a New Jerseyite with a degree from Newark State College, and graduate work at Columbia, has for years been a director and ardent worker for the Trailside Museum on the 2000-acre Watchung Reservation in Union County Park, one mile from Summit, New Jersey.

In these charming and informal nature essays, Mrs. Rulison discusses what she and her charges — often school classes or scout groups — discovered on many field trips in the reservation at every season of the year: their reactions to what they found, also, and what they learned from their experiences. The subjects of the essays range from insects to amphibians to birds and mammals, to leaves, buds, trees, and weather, to discussions on how to make an aquarium or terrarium. The reader gets a pleasant and vivid feeling for the natural areas covered in the Watchung Reservation.

"We believe," the author states at the end of her book, "that it is the business of schools, parks, civic organizations, and public institutions to prepare our young citizens for conservation. The first step toward conservation is nature study. The child must know and learn to appreciate nature before he becomes interested in conserving it. We can best prepare him for the informed, adult concept of conservation, with all its ramifications, by giving him facts and correct attitudes, and by instilling standards of behavior, so that he will understand his own relationships to nature and the responsibilities that it brings." Would that all teachers and others concerned with influencing the young have the same attitude!

Bird Nests I Have Found by John B. Behrends. Illustrated. Vantage Press, New York, 1972. 112 pages. \$3.95.

An enthusiastic and knowledgeable bird watcher, the author grew up in Illinois and graduated from Northwestern University. Here, in a series of 64 short but informative essays he discusses birds, their nests, their young, and their behavior, as he has observed them — mostly in the Midwest and in southern California, where he now lives.

study. Many students taught the class — when the class could be located. Some kids would have been pressed to work a great deal harder if they had taken English, social studies, science and health. Others did double the work. They all said they changed as people as a result of the experiment. A waste of time? Probably not, for change of attitude and behavior, a standard educational objective usually provided lip service but seldom served, was served.

The ideal classroom situation — high school ecology? Probably not. A bit too vague. A bit too informal. A bit too subjective. Plenty of room for improvement. Basic philosophy — interesting, potentially solid. And the flaws are not that glaring. A more solid course will be presented now that the instructors are aware of the weaknesses in the existing structure. The more freedom provided for students, the more invisible structure must be built in. More common readings are needed. Some basic and minimum requirements must be demanded of students. Those who go off never to return must be responsible for concrete presentations of work completed. Those who go off in twenty different directions must be narrowed, must see that one can not do everything. The basic premise of providing students with freedom and responsibility is a solid premise. Students must prove to themselves that they are able to meet their own demands. They must see themselves change. They must be given structured opportunity to build confidence and to experience success. And this approach to environmental education does provide this opportunity. It can change individuals and their values — or at least give them an opportunity to explore. To become educated.

"Something will have gone out of us as a people if we ever let the remaining wilderness be destroyed; if we permit the last virgin forests to be turned into comic books and plastic cigarette cases; if we drive the few remaining members of the wild species into zoos or to extinction; if we pollute the last clear air, dirty the last clean streams and push our paved roads through the last of the silence, so that never again will Americans be free in their own country from noise, the exhausts, the stinks of human and automotive waste.

And so that never again can we have the chance to see ourselves as single, separate, vertical and individual in the world, part of the environment of trees, and rocks and soil, brother to the other animals, part of the natural world and competent to belong in it."

— Wallace Stegner
Sierra Club Brochure

Energy Education

The following is a draft proposal for an "Energy Education" program. It is given for your review and comment.

Write: Nancy Ayers, 616 Pheasant Lane, Endwell, N.Y. 13760.

To achieve a sound national energy policy encompassing all aspects of energy production, transmission and use, it will be necessary to provide adequate, objective information to the public as well as elected officials, regulatory agencies and effected industries.

Together with escalated research and development, an education program is essential for citizens and public officials:

- 1 — to determine their true energy requirements and the related social costs,
- 2 — to understand how conservation affects increasing demand,
- 3 — to decide what energy sources are the most desirable; economically, environmentally, internationally,
- 4 — to analyze compatible siting of electrical generating facilities, transmission lines, deep-water ports for oil tankers, etc.,
- 5 — to develop related energy conservation regulations such as building code requirements for insulation, storm windows, maximum use of daylight and cross-ventilation,
- 6 — to evaluate the effect of and the need for advertising by energy industries and utilities, and
- 7 — to adopt interim measures including but not limited to conservation until more satisfactory and reliable sources can be brought on line.

Federal funding should be made available for energy education because of:

- 1 — the urgency of the problems of current supply and future development,
- 2 — the lack of a national energy policy guiding research and development,
- 3 — the need for unbiased objectivity in the decision-making processes, and
- 4 — the changes necessitated by administrative reorganization to deal with these issues cohesively in the proposed Department of Energy and Natural Resources must be predicated on environmental literacy and public awareness if the transition is to be effective.

Funds should be made available as non-renewable, small grants (\$100-10,000) to local and regional agencies for interdisciplinary, inter-organizational workshops, seminars, telecasts and dissemination of printed materials explaining and encouraging conservation of energy. Priority should be given to volunteer citizen groups and adult educa-

tion agencies to sponsor and coordinate local efforts.

Grant applications should require multiple sponsorship, industry participation and feedback to the administering Federal agency. That agency should be directed to report to the Congress with an evaluation of the projects funded, to disseminate a summary of all project activities to all participants and to publish a "Citizen's Guide To Conservation of Energy" based on the data collected.

Distribution of this information might be expedited through EPA's regional offices as they are already doing with other environmental information, since it may be quite some time before a new DENR could set up its own communications system. There is also the possibility of utilizing the channels established by the USOE office of Environmental Education on a contractual basis, but it is doubtful if the program should be assigned to USOE with its history of antagonism for categorical programs.

Environmental education in general is so broad that it is difficult for many educational needs for it. Issue-oriented education like "conservation of energy" is easier to grasp . . . at least the need for it is. It is particularly important for the Congress to provide a mechanism for prompt public involvement in the energy problems. It should also be recognized that one of the most compelling teaching tools available for this purpose is the Public Broadcasting Service. It would probably be advisable to separate the funding for National Educational Television programming from local educational activities. A minimum appropriation of \$10 million should be considered, with perhaps one-third designated for NET and two-thirds for local "seed" money to stimulate public attention and cators and officials to recognize the vital, participation.

To compensate for the inevitable time lag which results from organizing a program so diverse and widespread, it would seem advisable that the initial authorization should be no less than two years, and preferably three, subject to annual review by the Congress. A citizens advisory council could be a helpful adjunct to the administrative agency provided they have adequate staff support to function, that the chairman is either elected by the members or selected with the advice and consent of the appropriate Congressional Committees, and the appointees are adequately qualified by professional training or experience.

Behaviorial Revolution

AN OPEN LETTER TO KINGSLEY L. GREENE
PRESIDENT ANSS 1973-74

by OLD TIMER "CAP'N BILL" VINAL, PRESIDENT ANSS 1921-1923

First: May I congratulate you on being President of ANSS and on your essay "Another Look at the Horizon," NATURE STUDY (Winter 1973-74). I would be neglectful if I did not answer your questionnaire. Perhaps I should tell you that I was elected to the same position over 50 years ago. I am in my 93rd year and was born before electric lights, the telephone, motor boats, motor cars, and Boy Scouts. I drank out of a common dipper at District 3 School. All of us, including the teacher, had the measles at the same time (a great convenience if we had to have them). You intimate a long career in teacher education. Possibly you are a grandson of George Green, whom I knew in the same field at Penn State. Your career undoubtedly prompted your questions. I will answer your questions by statements (to save space); also due to career.

1. ANSS has always reached outward toward broadening goals.
2. ANSS, due to new members and officers, is continually changing and evolving.
3. ANSS should consider the changing environment (both good and evil).
4. ANSS should consider all areas and problems related to Nature.
5. ANSS should champion new ideas (keeping cool, calm, and collected).
6. ANSS philosophy and aims should appear in the publication NATURE STUDY.
7. ANSS should be active in all areas stated above, and new areas.
8. ANSS leaders might emphasize home gardens, animal pets, scenic roads, Nature Centers, Nature Study 1999. What can be seen and understood in the home area is a basis for future travel, such as National Parks, and other countries.
9. All, or any one, of problems above, should be considered pro or con.
10. The FOUNDERS of ANSS never hesitated to meet new horizons in leadership.

My answers may interest the readers of NATURE STUDY in a few biographical notes. In college I had "pickled Biology" but my first job (summer 1907) was the ecology of the scallop. Dr. David L. Belding and I studied its life history at Monomoy Point, Cape Cod. I continued work for 7 summers for the State Department of Fisheries and Game.

1911: Mrs. Vinal and I built a summer cottage at Wellfleet. Dr. John Alger, Principal of Rhode Island Normal, came walking up the railroad track. He caught me barefooted shucking clams. "Mother V," as she was fondly known, was sure that I would not get the job but I became Professor of Nature Education (1911-1925).

1914: "Mother V" and I, and Miss Alice Hamilton Belding, Professor at Randolph Macon Womans College, started Camp Chequesset, "a nautical camp for Knotty girls." In some ways this was unfortunate as World War I started too.

1918: *Nature Study Review* (As it was known then) in November (5th season of Chequesset) reported that 34 girls knitted 70 pairs of socks; collected sphagnum moss for Red Cross; sold \$300 worth of War Savings Stamps; earned \$162.90 to support a French war orphan by shouldering the

hoe, picking berries, and digging clams. Do you remember food stamps? (Of course you don't.) This was an *energy crisis*.

1918: *General Science Quarterly*, March 1918, pp. 399-401, gave an account of a Food Conservation Exhibit for Teachers at R. I. Normal as our part in winning the war. It was under auspices of R. I. Science Teachers Assoc., W.G.V. chairman. The preparation for this was hard-living on a farm rather than a college career.

1920: The National Association of the Directors of Girls Camps at their Boston meeting (at the invitation of WGV) voted to hold a Nature Lore School to train nature counselors at Camp Chequesset. On the Committee were Charlotte Gulick (wife of Dr. Luther Gulick, author of Gulick Hygiene Series), Director of Luther Gulick Camps; Miss Laura I. Mattoon, Director of Camp Kenhonka, and WGV, Chairman. It was held June 22-June 29. The second year it was held at Lake Morley, Fairlee, Vermont, WGV Director. Some of the staff were Dr. and Mrs. Alfred Kinsey, Indiana University; C. P. Sinnott, Bridgewater Normal; Anna Botsford Comstock, Cornell; WGV, Director. The 3rd, 4th and 5th sessions were back at Chequesset. Mrs. Comstock still on the staff. There was no hesitation on Mrs. Comstock's part to serve and her pay (financially) was very small. When Mrs. Comstock visited R. I. Normal early in 1920 I suggested the loose-leaf notebook whereby a camper could select pages according to his interest. The *Camp and Field Notebook* was 3 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ " so as to fit the pocket, 70 sheets, with hard covers for taking notes. There were a pamphlet on *Nature Games*, a Nature Guides Dictionary, a Bird Key and check list; outline drawings of birds and animals for coloring in; outline charts of birds and flowers for identification (by Louis Agassiz Fuertes). Mrs. Comstock thought well of the idea and decided to talk it over with Mr. Slingerland. It was published and copyrighted as a *Comstock-Vinal Notebook*. Imagine my surprise and pleasure to read in the last NATURE STUDY that it is still available through Mrs. Lempi Parsons.

1920: *Camp Leadership Course* of Teachers College, Columbia University. The course was at the University but there was a week of practical outdoor work at Palisades Interstate Park at Bear Mountain on the Hudson. Dr. Elbert K. Fretwell was Director and Ruby I. Jolliffe host. It was the greatest camping park in the world serving over 100 agencies. Dr. Palmer of Cornell and I were the naturalists. "Uncle Bennie" Hyde was the Nature Museum specialist. Dan Carter Beard added color.

1920: Mrs. Comstock invited me to be editor of the first Camp Number of NATURE STUDY REVIEW.

1921, 1922, 1923: I was elected president of ANSS in Toronto and re-elected in Boston.

1923: *Winter, The Woodcrafters of Quinsinet*, sponsored by Providence Lions Achievement Club, commenced November 8 and continued on Saturdays for 10 total trips. It was looked upon as a community service and the objective was to teach outdoor citizenship. Each leader entering the course was required to have a children's nature club. Most were school teachers. They still talk about melting snow to get water to boil potatoes. That you could boil an egg in a square bottom paper bag was another surprise.

1924: I was Ranger Naturalist in Yosemite National Park. Another summer in Glacier National Park and in Crater Lake (1933). I considered each new experience an investment in nature leadership. The same with Boy Scouts. I considered these experiences fundamental.

1927: A *Nature Almanac* for the year. It was a Community Nature Program suggesting recreation activities and was published by the Playground and Recreation Association of America (32 pp.) It is the beginning of a long story.

1926: *Nature Guiding*, 551 pp published by Comstock Company.

1935-1937: I had been writing and speaking at National Recreation Association conferences. The opportunity came to join the itinerant team which was serving major recreation departments of the country. Nature was to be on a par with drama, the dance, music, craft and social recreation. There were signs that the School of Education, of Western Reserve University, might crumble. Why should the city of Cleveland support a teacher training institution when the State was already doing it? We gave institutes in 24 major cities going west as far as Kansas City and St. Louis. I found the recreation leaders a great group and they readily saw the sense of nature being recreational. However, I missed the long-term training of students which the profession called for.

1937-1951: The opportunity came to organize a new department of Nature Recreation at the University of Massachusetts. The time seemed ripe for such a project. I must not draw this story out but will give one example of student training in field work. It was described in the June, 1939 Bulletin of Massachusetts Audubon. There was to be a traveling Conservation Education Van, on the side to be painted Massachusetts Conservation Council which was made up of 15 well-known, state-wide organizations. Frank W. Kingsbury and Bill Nutting, seniors, were to be in charge of the first expedition. It started from historic Boston Common with a handshake by Gov. Leverett Saltonstall. Operated by the oldest Audubon Society in the country, Russ Mason, Executive Director, it was to spend a day in each camp visited.

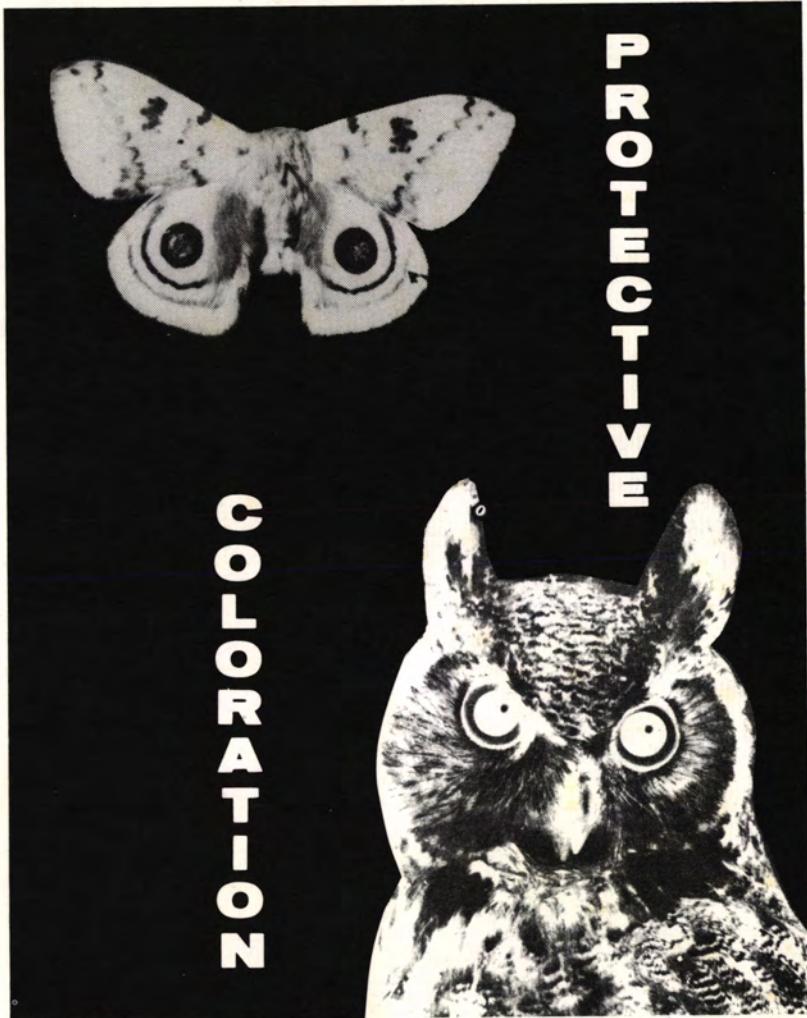
"Vineholler" is the title of an annual newsletter to past students. They get a copy if they write during the year. The thing that astonishes me is that supposedly they heard the same thing in the classroom, but what a difference in how they are applying it. I am sending President Greene a sample copy. Maybe he knows all this. "The same mold but a different product."

1974: TURNING BACK THE TIDES OF DEFLATION. It is evident that I am skipping a whole lot to make my point. This brings me to my grandson-in-law Dr. Murray Mackay, Head of the Accident Research Dept. at Birmingham University, England — a section of *Environmental Planning*. There are 14 on his staff and at an auto accident they rush to the scene. Each specialist makes notes of his unit, such as windshield, harnesses, parts injured, the peculiarity of environment. "Bumper heights are just right to break shins which are easier to mend than knees." He has had 10 years of research. He concludes "One of the faults of British Universities is that they do excellent work on things that no one is interested in." "Accidents seem to be the last bastion of irrational thought for people who are essentially rational. The word accident was not mentioned in a recent textbook on health." Murray gets his fare paid to Japan, Yugoslavia, and U.S. as a technician. He can even take his family along. I have 7 great grandchildren but must not get going on what I believe should be their education in Nature Study (1974).

I trust that you, KINGSLEY L. GREENE, the "new" President, realize that I am not making fun of YOU or of your "LOOK AT THE HORIZON." You have made a wonderful start and have my best wishes. It will be adventuresome.

Welcome New Members

- Fred C. Arnold, Eggertsville, N. Y.
Australian Conservation Foundation, East Melbourne, Australia
Brad Balsis, Elgin, Ill.
Harry T. Barnes, Turbotville, Pa.
Clyde D. Beaty, Hollis, Maine
Nancy Bill, Wayland, N. Y.
Dorothy Blanchard, Ann Arbor, Mich.
Helen L. Boecker, Kingston, Ohio
Bureau of Land Management, Fairbanks, Alaska
Central School Library, Milton-Freewater, Oregon
Paul A. Coley, Tallahassee, Fla.
Columbia High School, Maplewood, N. J.
Lucille T. Coppola, Roseland, N. J.
Les Corey, New Haven, Conn.
Samuel Demas, West Topsham, Vt.
Art Dorval, Cottonwood, Idaho
The Dunbars, Milford, N. H.
East Central State College, Ada, Okla.
Robert Edwards, New York, N. Y.
Hollis Fishelson, Ithaca, N. Y.
Michael J. Flitter, West Bend, Wis.
Leah T. Foerster, Bountiful, Utah
Sandra H. Foster, Austin, Texas
Jackie Gilmore, Walnut Creek, Calif.
Girl Scouts of U.S.A., Program Dept., New York, N. Y.
Mary Lee Grabowske, Corpus Christi, Tex.
Mr. and Mrs. Roger Greene, Little Compton, R. I.
Bob Hansen, Livermore, Calif.
Alvin C. Harding, Jr., Lancaster, Pa.
Mrs. Frank Jackson, Elba, N. Y.
Mrs. Kenneth Joslin, Minburn, Iowa
Frank Kapp, Boynton Beach, Fla.
Elaine C. Kibbe, Newfield, N. Y.
Donald R. Kirk, Palo Cedro, Calif.
Pam Konieczny, Warren, Mich.
Mike Koryak, Neville Is., Pa.
Lancaster County Park Board, Lancaster, Pa.
Library, Boston State College, Boston, Mass.
Library, Univ. of North Colorado, Greeley, Colo.
Library, Maryland-National Capital Park and Planning Commission, Silver Spring, Md.
Robert Lumsden, Orlando, Fla.
Robert A. Manus, St. Hilaire, Quebec
Mayfield City Schools, Cleveland, Ohio
Mrs. Clyde Meade, Bettendorf, Iowa
Mary H. Minasian, Danbury, Conn.
Mrs. Janice R. Mitchell, Castro Valley, Cal.
Muskegon Area Learning Program, Muskegon, Mich.
National Library of Australia, Canberra, Australia
National Library of Canada, Ottawa, Canada
Nature Centers Planning Div., National Audubon Society, New York, N. Y.
Peter Negri, Unadilla, N. Y.
Rudy Niermeier, Bailey, Colo.
Oakwoods Nature Center, Belleville, Mich.
Jim Phillips, Perry, Fla.
John Pichotta, Isabella, Minn.
Dr. R. E. Quinn, Bryan, Texas.
Mrs. Dorothy Redwine, Redondo Beach, Calif.
Edward R. Ricciuti, Killingworth, Conn.
Robert E. Rutkowski, Stratford, Conn.
Martin E. Seybold, Ft. Collins, Colo.
Lynne A. Sprague, New Canaan, Conn.
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The Trading Post, Isabella, Minn.
Virginia L. Woods, Princeton, N. J.
Steve Woolard, Brandon, Fla.
Zentralna Technitcheska Biblioteka, Sofia, Bulgaria



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PROTECTIVE COLORATION

Dr. Harold L. Willis

One of the most fascinating aspects about animals is that some of them are so hard to see, while others are so easy to see. Are there reasons for the colors or patterns that animals have? Most definitely! In the natural world, most animal species are preyed upon by other species, and some of these "potential prey" are themselves predators on other species. Most predators rely greatly on vision to find their prey (exceptions include nocturnal predators, such as scorpions, which rely on the tactile sense, or sense of touch; pit vipers (rattlesnakes, copperheads, etc.), which possess heat-sensitive organs to detect warm-blooded prey; and bats, which use echo location, or "sonar"). Between these predators with good vision and their prey, there is a life and death game of hide and seek. The predator must be well adapted with sense organs and structures for prey capture (claws, fangs, etc.) in order to catch enough food to survive (while at the same time escaping its own enemies). The potential prey obviously must be adapted to frequently escape being eaten in order to survive as a species. Among various methods of escape

(including running, flying, armor, spines, noxious chemicals, bluffing and playing dead) are several types of protective coloration, sometimes used in combination or with other methods besides color. In this issue we will examine the most common and interesting types, especially those found in midwestern species.

CONCEALMENT

Types of protective coloration can be divided into two main categories, (1) concealment, where the animal's color makes it difficult to see, and (2) conspicuous coloration. Concealment, which is sometimes called camouflage or cryptic coloration, usually involves an animal that tends to match its background or substrate, or resembles some object in its environment that a predator would not want to eat, such as a twig. Many species of insects, reptiles, and amphibians have a general color resemblance to their usual background, but no other special color adaptations. Green aphids, leafhoppers, caterpillars, tree frogs, and tree snakes are all found on vegetation. Brown moths (Fig. 1), beetles, lizards, snakes, toads, and mammals are found on either tree trunks or the ground. Most of these brown animals have a mottled or irregular pattern of darker and lighter shades of brown to resemble bark or soil. Ambush bugs, soldier

This issue of *The Kansas School Naturalist* was written by Dr. Harold Willis, of the Biology Department of Wisconsin State University at Platteville. He is a graduate of KSTC. Cover is by Dr. Robert Boles, KSTC Biology Department. Dr. Willis did the drawings. Photographs are by Dr. Willis and Dr. Boles.

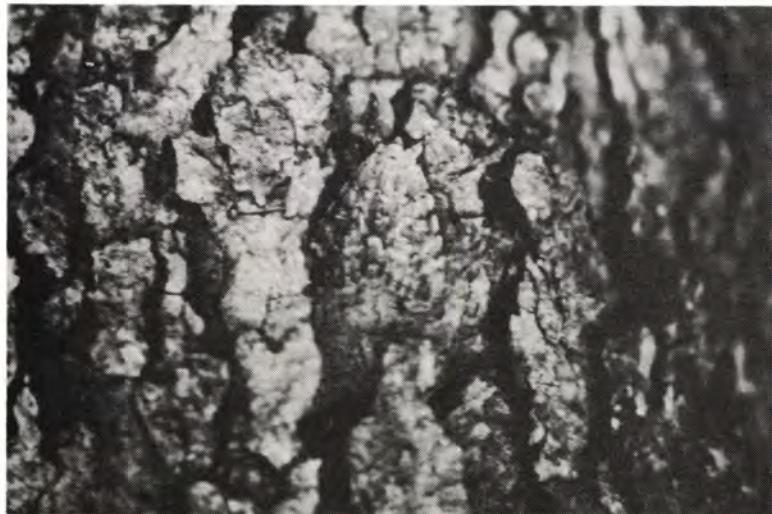


Fig. 1. Underwing moth (*Catocala*) resting on tree trunk, with front wings camouflaged.

beetles, and crab spiders sit in flowers (such as goldenrod and other yellow composites) and are yellowish in color. There are some tropical butterflies with transparent wings which can thus "match" any background color. Most fascinating are such animals as the chameleons and ocean flat fishes (flounder, sole) which can change their color at will to match their background, and can even become spotted, striped, or uniformly colored.

Besides general color resemblance, some animals have special color patterns or body structures that help conceal their body contour, outline, or even their shadow, which may be more conspicuous than the animal itself! The bodies of most animals are more or less cylindrical in shape, or

at least round or oval in cross section. If such an animal has a uniform color and if the sun shines on it from above, the bottom side of the animal will be in shadow and appear darker, while the top side will appear lighter, with the rounded sides intergrading between (Fig. 2A). This would make the rounded body contour conspicuous. To counteract this, some animals (many fishes, birds, mammals, reptiles, and insects) have their bodies colored so that the top is darker, the bottom lighter, and the sides gradually intermediate (Fig. 2B). This is called countershading. When light strikes the animal from above, the shadow is counterbalanced by the darker top side, and the cylindrical body appears flat (Fig. 2C). Besides concealing the shadow

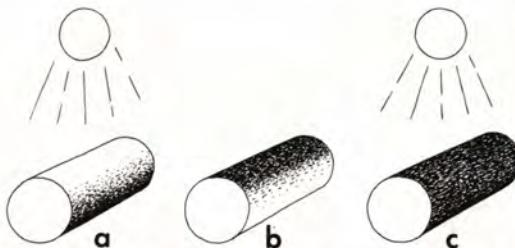


Fig. 2. Effect of countershading:
 (a) uniformly colored cylinder with
 shadow, (b) counter-shaded cylinder
 without overhead lighting, (c)
 counter-shaded cylinder that hides
 the shape.

on the rounded body, the shadow **under** the body (on the substrate) can be reduced or eliminated by the animal (a) having a flattened body (or flat flaps projecting out of the body) and clinging close to the substrate, or (b) having a fringe of small projections along where the body meets the substrate. A few tropical insects and lizards have these adaptations especially well developed (Fig. 3).

Most animals have bodies with fairly straight (or smoothly rounded outlines, which make them easier to spot in an environment made up of many small or irregular structures (jagged tree bark, rocks, vegetation, etc.). Some species have the usual body outlines, but have disruptive coloration, a color pattern that **visually** tends to break up or conceal the body outlines or shape. Generally, disruptive coloration involves light and dark colors that sharply contrast where they meet and form a bold pattern of stripes or shapes (often

running in a different direction than the body parts). This bold pattern actually may be conspicuous when seen up close or against a uniform background, but when seen from a distance or against an irregular background, they make the body shape very difficult to discern and provide an excellent camouflage. Some disruptively colored animals have a stripe running across their eye, serving to disguise this conspicuous round organ (Fig. 11). Examples of disruptive coloration include many moths and butterflies, frogs, marine fishes, and some mammals, including the zebra (Figs. 4-5). It is interesting to note how man has copied disruptive coloration (and sometimes countershading) to help camouflage war planes, ships, tanks, and soldiers. Another way of solving the problem of hiding the body outline is found in animals that have very irregular or ragged body outlines, such as a number of butterflies and moths with irregular wing edges (Fig. 9).

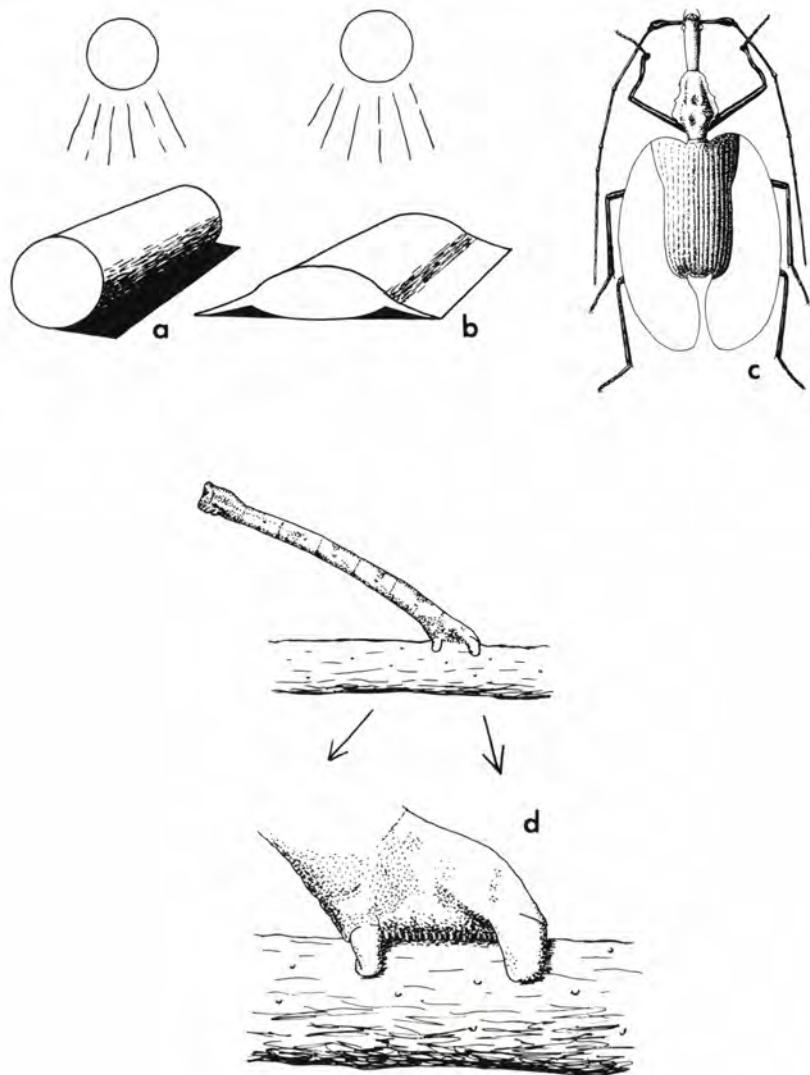


Fig. 3. Effect of shadow-reducing structures: (a) cylinder with shadow, (b) flattened cylinder with flaps, (c) Malaysian ground beetle (*Mormolyce*) with flaps on wing covers, (d) inchworm caterpillar with fringe at base.

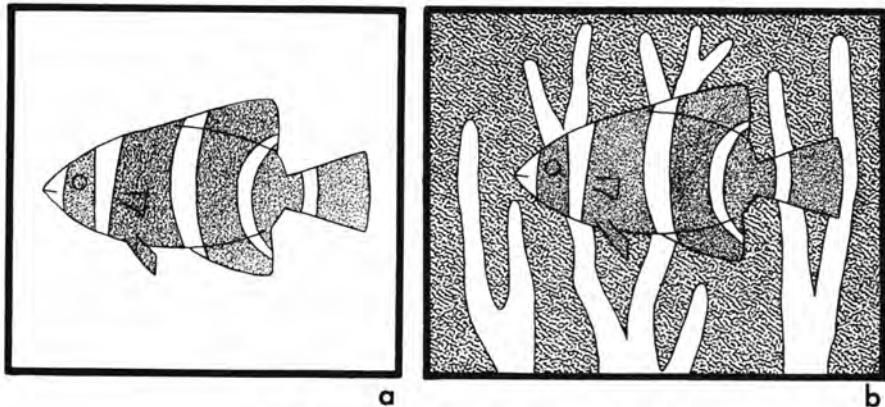


Fig. 4. Effect of disruptive coloration: (a) disruptively-colored fish against uniform background, (b) same fish against natural background.

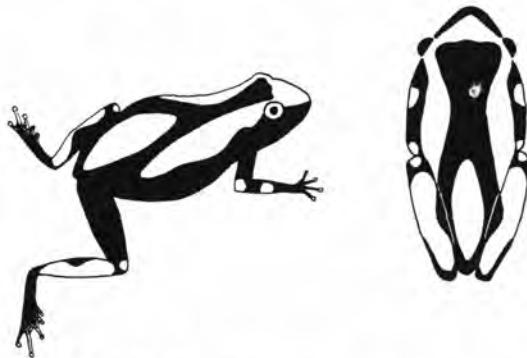


Fig. 5. South American tree frog (*Hyla leucophyllata*) with disruptive coloration.



Fig. 6. Two examples of tree hoppers.



Fig. 7. Walking stick in natural habitat.

Another general type of concealment is called special resemblance, in which not only the color but also the **shape** of the animal resembles some inedible object in its environment, often to an amazing degree. Common examples found in Kansas include walking sticks (Fig. 7), praying mantids, and inchworm caterpillars, which resemble twigs; katydids which resemble living leaves (Fig. 8) and butterflies in which the bottom surface of the wings resembles a dead leaf; and treehoppers which resemble thorns or jagged bits of debris (Fig. 6). Some tropical insects even resemble flowers or old moldy leaves with



Fig. 8. Green-colored katydid (*Microcentrum*) whose color and flattened shape resembles a leaf.

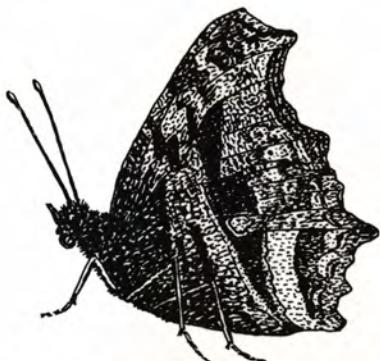


Fig. 9. Butterfly with irregular wing edges (hop merchant, *Polygonia comma*).

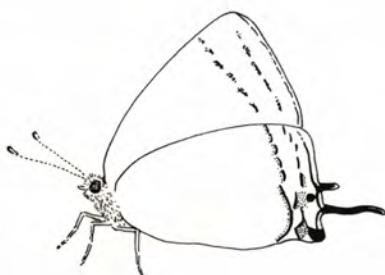


Fig. 10. Gray hairstreak butterfly (*Strymon melinus*) with false head at posterior end of hind wings.

holes chewed by insects.

A final type of concealment is unusual because only part of the body is concealed, the head region, while the opposite end of the body is conspicuous, having a color pattern resembling a false eye or head. These are called deflective or directive markings, since they presumably direct the attack of a predator away from the vital head region toward less vulnerable regions of the body. A common example in Kansas is the small gray hairstreak butterfly, which has its real antennae made inconspicuous by white stripes, but at the rear edge of its hind wings has false antennae and a bright orange area and black eye-like spot (Fig. 10). If a bird should peck away part of the edge of the butterfly's hind wing, it would not be killed and could probably fly away before the bird could catch it. Some marine fish have

the real eye hidden by disruptive coloration, but have a conspicuous false eye on their tail (Sig. 11).

CONSPICUOUS COLORATION

In the other main type of protective coloration, the animal usually has highly visible colors (red, orange, yellow) and a bold pattern of stripes or spots. Although such coloration would seem to invite predators to attack, the potential prey is protected in often surprising ways (literally!).

There are several types of conspicuous coloration. One involves animals which are primarily camouflaged by any of the methods described above, but also have hidden bright colors or false eye spots that they suddenly expose only when a predator approaches too closely. Thus they rely on surprising the enemy and may be able to escape when the

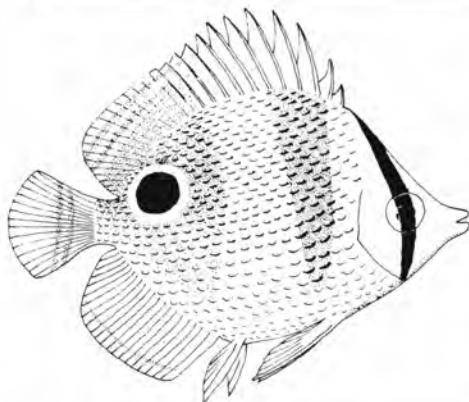


Fig. 11. Four-eye butterfly fish, with false eye spot and hidden real eye.



Fig. 12. Startle coloration in underwing moth (*Catocala*): (a) moth in resting position with front wings covering hind wings, (b) moth with front wings raised to show banded hind wings.

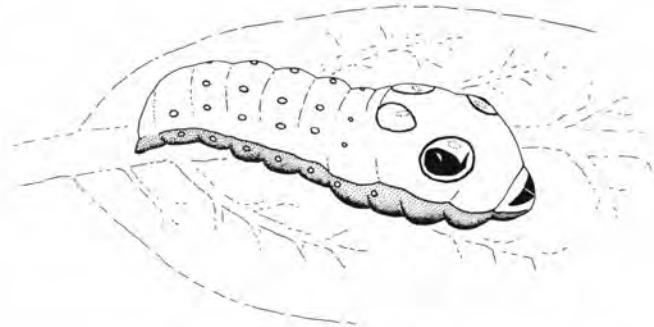


Fig. 13. Caterpillar of spicebush swallowtail butterfly (*Papilio troilus*) with false eyespots on thorax.

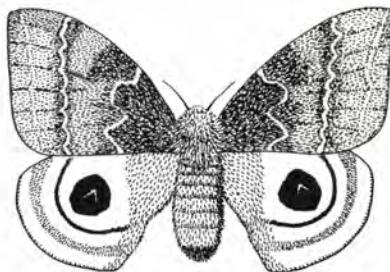


Fig. 14. Io moth (*Automeris io*) with eyespots on hind wings.



Fig. 15. American bittern (*Botarurus lentiginosus*) showing the striped color pattern and posture that camouflages the bird among aquatic plants.

predator hesitates or is frightened. This is called startle or flash coloration and is sometimes used along with sudden sounds or foul smelling chemicals, but usually the animal has no means of protection other than its coloration. False eye spots are an effective protection from predators such as birds, which think the "eyes" belong to a large predator such as a fox or hawk. Common examples in Kansas include the underwing moths, with camouflaged front wings and brightly striped hind wings (covered by the front wings

when the moth is at rest, but suddenly exposed when the moth is disturbed) (Figs. 1-12); b and-winged grasshoppers, which sit on the ground and are very well camouflaged, but suddenly fly up, exposing bright hind wings and making a crackling sound; several butterflies and moths which have eyespots on their wings (Fig. 14); and caterpillars with hidden bright colors or eyespots (Fig. 13).

A different sort of conspicuous coloration is called warning coloration. It is found on animals that can defend themselves (with stings, spines, poisons, or noxious chemicals), and involves conspicuous colors or patterns that are not hidden. According to theory, a predator may attack or even eat a few such animals, but will soon learn to avoid them on sight, thus the species as a whole is protected. Common examples include skunks, certain poisonous tropical frogs, certain caterpillars with stinging spines, bees and wasps, and such insects as ladybird beetles and the monarch butterfly (and its caterpillar), which contain distasteful chemicals (Fig. 19).

The protection gained from warning coloration is taken advantage of by certain species (called mimics) resembling other species (called models). This situation is called mimicry, and there are two main types. One, called Mullerian mimicry, involves two or more species of animals that can defend themselves, mimicing each other. Thus a predator only has to learn to avoid one color or pattern, not several different ones. Two

examples found in Kansas include (1) most of the species of stinging wasps and bees, which have yellow and black stripes, and (2) several distasteful insects that feed on milkweed, which are red and black or orange and black, including the monarch butterfly, a moth caterpillar, a long-horned beetle, and a leaf beetle.

The second type of mimicry, Batesian mimicry, involves a model that can defend itself and a mimic that cannot. Both usually have warning coloration, so the defenseless mimic is protected if the predators have learned to avoid the models. The resemblance of the mimic to the model is often amazingly close and has even fooled professional biologists! Many examples are found in Kansas; one is the viceroy butterfly, which looks very similar to the distasteful (to birds) monarch. The two species are not closely related, and the closest relative to the viceroy is the red-spotted purple, which is completely different looking and dark colored. Many other cases of mimicry among butterflies are found in the tropics. A surprising number of insect mimics have the yellow and black stripes (and often body shape and behavior) of stinging wasps or bees, including many syrphid flies, bee flies, a robber fly, wasp moths, clear-winged moths, a sphinx moth, some long-horned beetles, as well as others (Fig. 16). A few insects mimic ants, which do not have warning coloration, but do have a distinctive

shape to advertise their stinging capabilities.

ORIGIN OF PROTECTIVE COLORATION

Now that we have examined the most common types of protective coloration, we should consider how such unusual and often fantastic adaptation originated. The commonly accepted idea among biologists is that such adaptations (as well as most others) have been produced, or at least perfected by natural selection. In this process, any change in the color or shape of an animal (produced either from random gene combinations during the reproduction of each generation or by mutations, sudden changes in genes or chromosomes) may play a great role in determining whether it escapes its enemies and survives to reproduce. If a change occurs that better camouflages the species (or produces a more effective conspicuous coloration), those individuals that have the changed characteristic will most likely escape predators and pass on their genetic characteristics to the next generation (or in other words, the less well adapted individuals are eliminated by predators). Thus, over many generations the species can change or evolve to become better adapted, which may include protective coloration. We should not overlook the fact that in most cases, not only the color or shape of the animal is important in escaping its enemies, but also its behavior. Thus most camouflaged species tend to

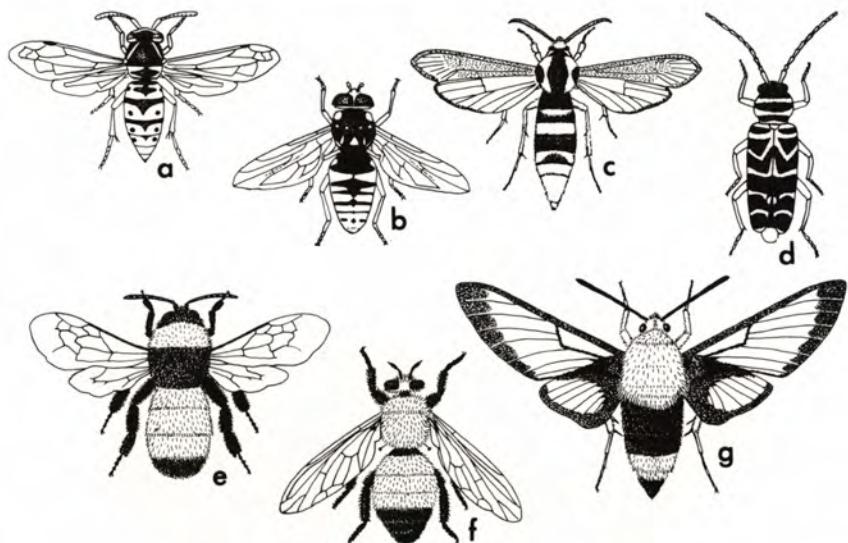


Fig. 16. Batesian mimicry: (a) a wasp, the model, (b) a flower fly; (c) a clear-wing moth; (d) a long-horned beetle; (e) a bumblebee, the model; (f) a robber fly; (g) a sphinx moth.

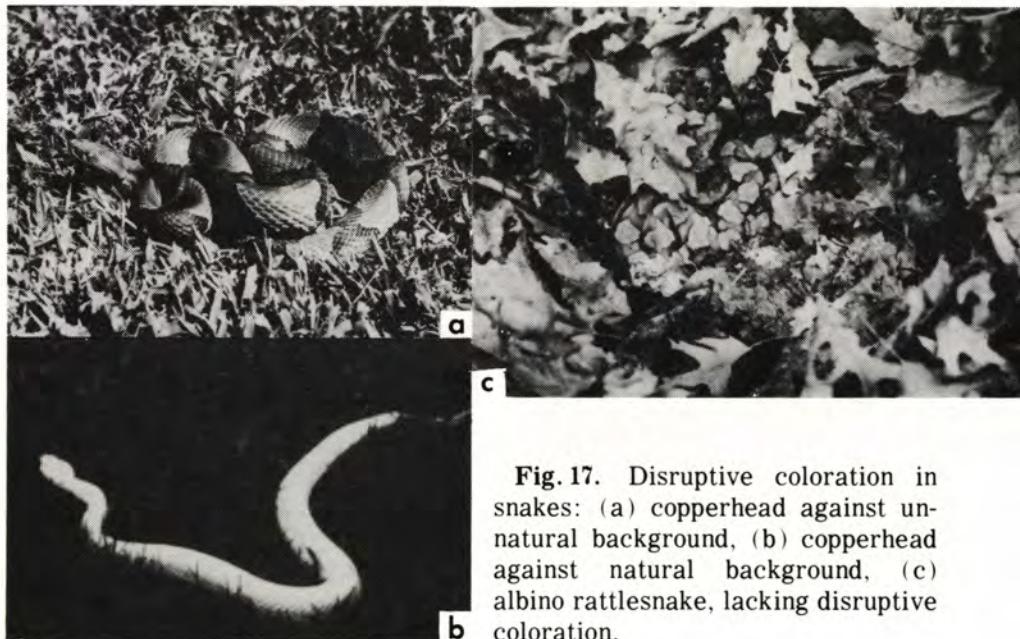


Fig. 17. Disruptive coloration in snakes: (a) copperhead against unnatural background, (b) copperhead against natural background, (c) albino rattlesnake, lacking disruptive coloration.

remain relatively motionless during the day. On the other hand, warningly colored species are quite active, and Batesian mimics imitate the behavior of their model. Species with startle coloration at first remain still, but when their camouflage fails, they exhibit their special coloration and attempt to escape. Behavior is also controlled by genes and can also evolve to better adapt the species for survival.

PROJECTS

It is fascinating to become familiar with the many examples of protective coloration which you can find around you. Simply walk around in various habitats and observe various species that are protectively colored (some will be very difficult to observe!). Record your observations in a notebook. If you have a camera, try to take pictures (especially in color) of the examples you find, and build up a picture collection. Or you may be able to collect and preserve the animals themselves, especially the insects. You can make an interesting display of protective coloration types, using pictures and specimens. For types of concealing coloration, you can glue dried specimens of insects to a natural background (a piece of bark, twigs, leaves, soil, etc.) to show how well camouflaged they are.

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Fig. 18. Horned lizard (**Phrynosoma cornutum**) with irregular body outline.



Fig. 19. Gila monster (**Heloderma suspectum**), with orange and black warning coloration.



A "CAMOUFLAGE" QUIZZ

The animals in these photographs rely upon their coloration and/or shapes to help them escape detection. See if you can locate and identify each of them.

(1) ptarmigan, (2) baby avocet, (3) pectoral sandpiper, (4) grasshopper, (5) wolf-spider, (6) praying mantis.

The Kansas School Naturalist
The Kansas State Teachers College
1200 Commercial Street
Emporia, Kansas 66801

CORRECTION!

The 1974 Wildgame Dinner, sponsored by the Biology Club, will be held on March 23, 1974, not November 23, as stated in the last issue of **The Kansas School Naturalist**. We will still be glad to receive any donations of wild game for the dinner. Proceeds go to the Frank Agrelius Scholarship Fund. If you have any wildgame you would be willing to contribute to the dinner, please call the Biology Department at 316-343-1200, extension 311.

THE AUDUBON SCREEN TOUR

You are invited to see the last Audubon Screen Tour film for this season.

March 20, 1974—Frank Heimans, "What Have You Done To My Country?"

For further information contact either Dr. Ransom, Biology Department, or Special Events, Kansas State Teachers College. The film will be shown in Albert Taylor Hall at 7:30 p.m.

WATCH FOR A FUTURE ANNOUNCEMENT

A field course in Kansas Ecology. June 3 through 21. Dr. Spencer and Dr. Prophet. Four hours of graduate or undergraduate credit.

EB 530. Workshop in Conservation. 3 hrs. credit. June 10-June 28. Seminars, lectures, discussions and field trips dealing with problems and status of natural resources. Especially desirable for teachers. Request information from Dr. Robert Parenti, Biology Department, KSTC.

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at Emporia, Kansas

1924: I was Ranger Naturalist in Yosemite National Park. Another summer in Glacier National Park and in Crater Lake (1933). I considered each new experience an investment in nature leadership. The same with Boy Scouts. I considered these experiences fundamental.

1927: A *Nature Almanac* for the year. It was a Community Nature Program suggesting recreation activities and was published by the Playground and Recreation Association of America (32 pp.) It is the beginning of a long story.

1926: *Nature Guiding*, 551 pp published by Comstock Company.

1935-1937: I had been writing and speaking at National Recreation Association conferences. The opportunity came to join the itinerant team which was serving major recreation departments of the country. Nature was to be on a par with drama, the dance, music, craft and social recreation. There were signs that the School of Education, of Western Reserve University, might crumble. Why should the city of Cleveland support a teacher training institution when the State was already doing it? We gave institutes in 24 major cities going west as far as Kansas City and St. Louis. I found the recreation leaders a great group and they readily saw the sense of nature being recreative. However, I missed the long-term training of students which the profession called for.

1937-1951: The opportunity came to organize a new department of Nature Recreation at the University of Massachusetts. The time seemed ripe for such a project. I must not draw this story out but will give one example of student training in field work. It was described in the June, 1939 Bulletin of Massachusetts Audubon. There was to be a traveling Conservation Education Van, on the side to be painted Massachusetts Conservation Council which was made up of 15 well-known, state-wide organizations. Frank W. Kingsbury and Bill Nutting, seniors, were to be in charge of the first expedition. It started from historic Boston Common with a handshake by Gov. Leverett Saltonstall. Operated by the oldest Audubon Society in the country, Russ Mason, Executive Director, it was to spend a day in each camp visited.

"Vineholler" is the title of an annual newsletter to past students. They get a copy if they write during the year. The thing that astonishes me is that supposedly they heard the same thing in the classroom, but what a difference in how they are applying it. I am sending President Greene a sample copy. Maybe he knows all this. "The same mold but a different product."

1974: TURNING BACK THE TIDES OF DEFLATION. It is evident that I am skipping a whole lot to make my point. This brings me to my grandson-in-law Dr. Murray Mackay, Head of the Accident Research Dept. at Birmingham University, England — a section of *Environmental Planning*. There are 14 on his staff and at an auto accident they rush to the scene. Each specialist makes notes of his unit, such as windshield, harnesses, parts injured, the peculiarity of environment. "Bumper heights are just right to break shins which are easier to mend than knees." He has had 10 years of research. He concludes "One of the faults of British Universities is that they do excellent work on things that no one is interested in." "Accidents seem to be the last bastion of irrational thought for people who are essentially rational. The word accident was not mentioned in a recent textbook on health." Murray gets his fare paid to Japan, Yugoslavia, and U.S. as a technician. He can even take his family along. I have 7 great grandchildren but must not get going on what I believe should be their education in Nature Study (1974).

I trust that you, KINGSLEY L. GREENE, the "new" President, realize that I am not making fun of YOU or of your "LOOK AT THE HORIZON." You have made a wonderful start and have my best wishes. It will be adventuresome.

Welcome New Members

- Fred C. Arnold, Eggertsville, N. Y.
Australian Conservation Foundation, East Melbourne, Australia
Brad Balsis, Elgin, Ill.
Harry T. Barnes, Turbotville, Pa.
Clyde D. Beaty, Hollis, Maine
Nancy Bill, Wayland, N. Y.
Dorothy Blanchard, Ann Arbor, Mich.
Helen L. Boecker, Kingston, Ohio
Bureau of Land Management, Fairbanks, Alaska
Central School Library, Milton-Freewater, Oregon
Paul A. Coley, Tallahassee, Fla.
Columbia High School, Maplewood, N. J.
Lucille T. Coppola, Roseland, N. J.
Les Corey, New Haven, Conn.
Samuel Demas, West Topsham, Vt.
Art Dorval, Cottonwood, Idaho
The Dunbars, Milford, N. H.
East Central State College, Ada, Okla.
Robert Edwards, New York, N. Y.
Hollis Fishelson, Ithaca, N. Y.
Michael J. Flitter, West Bend, Wis.
Leah T. Foerster, Bountiful, Utah
Sandra H. Foster, Austin, Texas
Jackie Gilmore, Walnut Creek, Calif.
Girl Scouts of U.S.A., Program Dept., New York, N. Y.
Mary Lee Grabowske, Corpus Christi, Tex.
Mr. and Mrs. Roger Greene, Little Compton, R. I.
Bob Hansen, Livermore, Calif.
Alvin C. Harding, Jr., Lancaster, Pa.
Mrs. Frank Jackson, Elba, N. Y.
Mrs. Kenneth Joslin, Minburn, Iowa
Frank Kapp, Boynton Beach, Fla.
Elaine C. Kibbe, Newfield, N. Y.
Donald R. Kirk, Palo Cedro, Calif.
Pam Konieczny, Warren, Mich.
Mike Koryak, Neville Is., Pa.
Lancaster County Park Board, Lancaster, Pa.
Library, Boston State College, Boston, Mass.
Library, Univ. of North Colorado, Greeley, Colo.
Library, Maryland-National Capital Park and Planning Commission, Silver Spring, Md.
Robert Lumsden, Orlando, Fla.
Robert A. Manus, St. Hilaire, Quebec
Mayfield City Schools, Cleveland, Ohio
Mrs. Clyde Meade, Bettendorf, Iowa
Mary H. Minasian, Danbury, Conn.
Mrs. Janice R. Mitchell, Castro Valley, Cal.
Muskegon Area Learning Program, Muskegon, Mich.
National Library of Australia, Canberra, Australia
National Library of Canada, Ottawa, Canada
Nature Centers Planning Div., National Audubon Society, New York, N. Y.
Peter Negri, Unadilla, N. Y.
Rudy Niermeier, Bailey, Colo.
Oakwoods Nature Center, Belleville, Mich.
Jim Phillips, Perry, Fla.
John Pichotta, Isabella, Minn.
Dr. R. E. Quinn, Bryan, Texas.
Mrs. Dorothy Redwine, Redondo Beach, Calif.
Edward R. Ricciuti, Killingworth, Conn.
Robert E. Rutkowski, Stratford, Conn.
Martin E. Seybold, Ft. Collins, Colo.
Lynne A. Sprague, New Canaan, Conn.
Linda Stafford, McKeesport, Pa.
James C. Stephen, Citrus, Calif.
Jodi Straight, Katonan, N. Y.
William A. Tedeschi, North Haven, Conn.
The Trading Post, Isabella, Minn.
Virginia L. Woods, Princeton, N. J.
Steve Woolard, Brandon, Fla.
Zentralna Technicheska Biblioteka, Sofia, Bulgaria

GOOD READING for Environmental Education and Interpretation

ROBERT M. MCCLUNG

Earth, The Great Recycler by Helen Ross Russell. Illustrated with photographs and with line drawings by Gene Garone. Thomas Nelson, Inc., New York, 1973. 160 pages. \$5.95.

This book is dedicated "In memory of E. Laurence Palmer, who was equally at home in the farms and woodlands of upstate New York, on the ranches of New Zealand, in the mountains of Mexico, in Europe and Africa, and in any other part of Earth's ecosystem because of his sensitivity to those universal interrelationships that constitute Earth's recycling mechanisms."

I believe that this is Helen Russell's best book so far — and I am confident that she will write even better ones in the future.

The Library of Congress "Cataloguing in Publication Data" in the front matter of the book, summarizes its contents as follows: "Describes the physical, chemical, and biological science concepts involved in cycling and recycling." How true. But that summary hardly describes all the things that the book covers, all the subjects it explains and clears up for the average intelligent reader — whether aged 10 or 15 or 90. One might describe the book as an elementary textbook in chemistry . . . or geology . . . or geography . . . or botany . . . or soils, or energy, or ecology. It is in truth each of these, and much more. It brings the whole spectrum of Earth's vital processes together in one unified, clear, and simple concept that should make it invaluable for concerned young people to read out of interest, for schools to use as a source book, for concerned adults to read and learn from, and finally, as guide book that tells what concerned citizens of any age can do about the whole mess which *Homo sapiens* is making of our planet Earth.

In this book, Helen Russell writes about the properties of elements, of how they join to form compounds; about the Earth's lithosphere, hydrosphere, and atmosphere; about water in all of its forms; about green plants and photosynthesis; about land and how it is formed, about crop rotation and composting; about the sun and about energy, about food chains and how we change the environment by pollution and poisons, and careless waste. Last, but not least, the book tells of many conservation organizations, and gives helpful pointers about what anyone can do to help preserve and improve the environment.

"Only as humankind joins together in

many different kinds of activities, all designed to use energy, as well as Earth's building blocks, knowledgeably and responsibly," says the author, "will we bring about the changes that are necessary to heal and protect the ecosphere so Earth's cycles can function successfully and all life can flourish on Earth, our home."

The book is attractively and informatively illustrated with many black and white illustrations, as well as with pen-and-ink illustrations and charts drawn by Gene Garone.

• • •
Must They Die? by Faith McNulty. Illustrated with photographs. Doubleday & Company, Inc., Garden City, New York 1971. 86 pages. \$4.95.

Subtitled, *The Strange Case of the Prairie Dog and the Black-footed Ferret*, this eloquent book, most of which originally appeared in "The New Yorker," tells in beautifully detailed prose, and in very moving fashion, the sad story of the ways by which the Division of Wildlife Services (formerly PARC — the Branch of Predator and Rodent Control of the Bureau of Sport Fisheries and Wildlife) has for many years waged relentless warfare against predators and rodents — using cyanide and the poison 1080 as their big guns. As a result, prairie dogs are vanishing everywhere, and the black-footed ferret — possibly our rarest mammal — is going along with them.

A state supervisor for wildlife in South Dakota is quoted by the author as follows: "It hasn't been proved to me that the ferret is endangered. If it is, I don't know whether it is worth saving at financial sacrifice to a landowner." Have we learned nothing in recent years? Must everything be weighed only as to whether it lines the pockets of one special group or another?

It almost seems that we haven't, when we consider that in January, 1974, a group of 21 western U.S. Senators are currently urging the Secretary of the Interior to lift current bans on poison so that cyanide and 1080 can be spread far and wide to kill coyotes and whatever other unlucky meat-eating mammals and birds that may happen to eat the poisoned bait. The long-range poisoning of dog towns continues — and the prairie dog and the black-footed ferret become ever more endangered.

Another good book to read on this subject is *Slaughter the Animals, Poison the Earth*, by Jack Olsen, published by Si-

mon and Schuster, Inc., New York, in 1971.
• • •

Nature Diary Through the Year by Mildred Little Rulison. Illustrated with line drawings by the author. Vantage Press, New York, 1971. 92 pages. \$3.50.

The author, a New Jerseyite with a degree from Newark State College, and graduate work at Columbia, has for years been a director and ardent worker for the Trailside Museum on the 2000-acre Watchung Reservation in Union County Park, one mile from Summit, New Jersey.

In these charming and informal nature essays, Mrs. Rulison discusses what she and her charges — often school classes or scout groups — discovered on many field trips in the reservation at every season of the year: their reactions to what they found, also, and what they learned from their experiences. The subjects of the essays range from insects to amphibians to birds and mammals, to leaves, buds, trees, and weather, to discussions on how to make an aquarium or terrarium. The reader gets a pleasant and vivid feeling for the natural areas covered in the Watchung Reservation.

"We believe," the author states at the end of her book, "that it is the business of schools, parks, civic organizations, and public institutions to prepare our young citizens for conservation. The first step toward conservation is nature study. The child must know and learn to appreciate nature before he becomes interested in conserving it. We can best prepare him for the informed, adult concept of conservation, with all its ramifications, by giving him facts and correct attitudes, and by instilling standards of behavior, so that he will understand his own relationships to nature and the responsibilities that it brings." Would that all teachers and others concerned with influencing the young have the same attitude!"
• • •

Bird Nests I Have Found by John B. Behrends. Illustrated. Vantage Press, New York, 1972. 112 pages. \$3.95.

An enthusiastic and knowledgeable bird watcher, the author grew up in Illinois and graduated from Northwestern University. Here, in a series of 64 short but informative essays he discusses birds, their nests, their young, and their behavior, as he has observed them — mostly in the Midwest and in southern California, where he now lives.

In this book we see the hummingbird's nest fashioned of lichens, moss, and cobwebs; the thistledown nest of the gold finch; the Baltimore Oriole's hanging nest, sometimes fashioned of wool and yarn; the flimsy stick platform of the mourning dove; the hole in a tree trunk drilled by a flicker; and a cavity which a bank swallow hollows out in a creek bank or quarry site. The interest of the author, and his delight in his observations, are evident on every page.

* * *

Collecting Cocoons, by Catherine Pession and Lois Hussey, N. Y., Thomas Y. Crowell Co., 1953. Elementary. 73 pp. Indexed.

Collecting is only one part of the story of this book which should be an excellent addition to every elementary school library and a wonderful gift for a child.

In addition to directions for preserving, identifying and labelling cocoons, instructions are included for care of live cocoons and moths and for the rearing of moths from eggs.

Identification and life history material is provided for Polyphemus, Cecropia, Promethia, Cynthia, Luna, Io, Goldenrod Gall Moth, Isabella. Grape leaf folder, tent caterpillar, bagworm, codling moth, bee moth, white mark tussock moth, European corn borer, fall cankerworms, webbing clothes moth, tomato sphinx and yucca moth.

This interesting variety of moths in terms of both habits and habitats almost guarantees that the readers will be able to locate some of the samples in their locality. It also affords the writers the opportunity to provide some feeling for the great variety of life patterns.

Decorative and helpful black and white drawings on every page by Isabel Darling frequently include larva and food plants as well as cocoon (or pupa) and moths.

H.R.R.

* * *

Collecting Small Fossils by Catherine Pession and Lois Hussey, N. Y., Thomas Y. Crowell Co., 1970. Elementary. 58 pp. Indexed.

This how-to book for young children provides instructions for approaching fossil collecting in an organized way. In addition to background information on the formation and age of fossils, the book provides specific information on collecting equipment, maps and procedure including recording in the field and good outdoor manners followed by techniques for display.

The last 15 pages contain drawings by Anne Marie Jauss to help with identification of 52 animal and plant fossils.

H.R.R.

* * *

Mice, Moose and Men, How Their Pop-

ulations Rise and Fall written and illustrated by Robert M. McClung, New York: William Morrow 1973. Age 10-14. 64 pp. Bibliography and Index.

The 10-11 year olds at Manhattan Country School had just returned from the farm next to John Burrough's Roxbury home and were full of talk about the deer they had seen, the things they had learned about the annual Catskill Mountain deer census by helicopter, and the pros and cons of hunting. It seemed like an ideal group to offer Robert McClung's new book to. And it was, except that I didn't see it again for weeks as one child finished reading it and passed it on to the next.

As Marco Polo Rodriguez wrote "This is a very good book for everyone who is interested in nature." What Marco Polo says is true; and the competition for the book among his classmates demonstrated the appropriateness of the material for this age and interest level.

But even without this experience *Mice, Moose and Men* should be available for all young people of the 10-14 year age group; to help them gain an understanding of the basic relationships of life on planet Earth and the problems that arise as humans alter patterns without regard to these relationships; as well as to increase their insight into the magnitude of the problems created by the human population explosion. For young people in this age range will be making decisions both at the polls and in their life styles in the next decade that will help determine the future of all kinds of life and to do this wisely and well they will need to build on the kind of knowledge and understanding presented in this book.

H.R.R.

* * *

What We Find When We Look Under Rocks by Frances Behnke, McGraw Hill 1971, Grades 2-4

Brief information on activities, biology, and interrelationships of some of the most common animals. Well illustrated. A good addition to any primary grade library, for if there aren't rocks on the school ground there certainly are some nearby in parks, vacant lots and waste areas. (The same animals will also be found under boards and trash.) H.R.R.

* * *

Block by Block by Martha E. Munzer and Helen W. Vogel, New York: Knopf, 1973. Jr. High and up, 165 pp., index, illustrated with black and white photos.

Whether you are a city dweller, a suburbanite, or live miles from the nearest town, *Block by Block* is an excellent book to read. Everyone knows of city problems. They should be equally in-

terested in some solutions to these problems.

Three city environments, Chelsea, Jamaica and Coney Island, have been selected for this story. Against a background of the history of these communities the variety of approaches reflect the differences in history, economics, community solidarity and geography that exist in even a small area. They also show that there is no single answer but that all successful answers must consider the well being of all the people of the community in a pluralistic society.

In each example different groups of people like: the young, the elderly, the poor, the middle income, business men, city governments, developers, and various ethnic groups began to listen to each other and band together to bring about changes not only in housing but in other vital areas like employment, health, safety, beauty, parks, education and public transportation.

None of these communities have solved all these problems but all three have done many things to make the city a good place to live and to make their blocks into small communities of concerned citizens.

H.R.R.

* * *

Using the School and Community, An Environmental Study Area. Teachers' Handbook by Lib Roller, Coordinator, Nashville Metro Schools, Environmental Education Dept.

This 192 page manual is an excellent compilation of possible activities designed to develop sensitivity in young people and get them involved in community activities.

The book has four major divisions. The first deals with selecting a site for environmental study starting with school grounds then moving beyond to other community areas.

The second and third are concerned with using the site first by building a trail, and also by non-trail studies and research.

The fourth section of the book deals with environmental problems: pollution, population, land use, special city problems.

There is a correlation of subject matter throughout with special activities for social science, science, art and music, language arts, and math; conversely single topics are developed using all these topics.

Activities range from simple experiences in testing five senses through things like mapping, community studies, using news items, doing bio-chemical studies of waterways. Throughout suggestions are backed up with concrete easily understood directions. In short, this would be a most useful addition to any teacher's library.

H.R.R.

NEWS and NOTES for Environmental Education . . .

Phyllis Busch Receives Award

At the annual meetings in San Francisco, it was announced that the Eva L. Gordon Award for excellence in nature literature was given to Phyllis S. Busch. Dr. Busch, a former board member of ANSS, is the author of a number of books in the field of children's nature literature. A graduate of Cornell University, she personally studied under Dr. Eva Gordon, who inspired and directed her in her writing efforts. Dr. Busch has had long experience in nature education in urban settings. Her books, such as "Exploring as you Walk in the City," are valuable aids to urban outdoor education.

Madrona Marsh Needs Friends

Citizens of Southern California are campaigning to save the fifty-four acre Madrona Marsh in the center of the City of Torrance, in Los Angeles County. One of the few remaining freshwater marshes in Southern California, the city has prepared a feasibility study proposing that the marsh and surrounding grasslands be used as a wildlife park. The city council has endorsed the proposal, but outside help is needed to raise the funds to make it a reality. A small amount of oil drilling is already occurring in the site, and it is zoned for manufacturing uses. A developer has plans to build seventeen hundred condominiums, along with a fifty-acre commercial area and seventeen-acre industrial park.

Interested persons are urged to write their support and send contributions to Grace Lear, President, Friends of Madrona Marsh, Box 1472, Torrance, California 90505.

Baldauf Prepares Annual Meeting Program

First Vice-President Richard Baldauf has announced the preliminary program for the annual meeting of this Society scheduled for January 1975. Built around the general theme, "A Higher Quality of Life Through Environmental Education: an overview of state plans," the half-day symposium will review what has been done in the development of state environmental education plans, with a look at the prospects for a national environmental education effort.

There will be field trips and the popular "Lenses on Nature" program, as well as board meetings scheduled during the three or four-day conference. The meetings will take place in New York City.

Election Results Announced

Shortly before the annual meeting in San Francisco in March, Dr. Betty McKnight, Secretary of the Society, announced the results of the recent election. The new president of the Society, who served as President-Elect last year, is Dr. Helen R. Russell of New Jersey. Other officers are as follows:

President-Elect Ruth W. Melvin
Carroll, Ohio
First Vice-President Richard Baldauf
Kansas City, Mo.
Second Vice-President Richard James
Philadelphia, Pa.
Treasurer John Gustafson
Homer, N.Y.
Directors Marshall Case, Connecticut
Millard David, New Jersey
Jean Milmine, Georgia
Christian Nelson, California
Catherine Pessino, New York

National Conference on The Urban Environment

An important, in-depth conference is being set up for March 1975. Responsible and interested persons from throughout the country are being sought to participate in the task forces, which will produce working papers addressing the contemporary urban environmental dilemmas such as air pollution, solid waste, water pollution, housing, land use, noise pollution, population, environmental health, recreation and open space, energy, and transportation. The conference will direct its concern toward a comprehensive outlook on the critical ecological problems facing us. The conference hopes to demonstrate that urban and non-urban problems are inextricably intertwined, and that answers must be sought which address themselves to both communities.

South Shore Natural Science Center Dedicated

On June 2, 1974, the citizens of Norwell, Massachusetts, and their friends gathered to dedicate the new facilities of the South Shore Natural Science Center. Program activities of the center were begun in 1962, with the backing of the Natural Science for Youth Foundation and Cap'n Bill Vinal. ANSS member Elizabeth Lawrence has been involved in the teaching and interpreting programs. Beginning in 1966, a total of 21 acres of land has been given or leased to the

Center for its use. The new physical facilities are a symbol of the continuing program to bring awareness of our natural heritage to all the people of eastern Massachusetts.

Doug Wade Makes Tape On Leopold

At the request of the University of Wisconsin, former ANSS president Douglas E. Wade has prepared a one-hour tape on his reminiscences of the late Aldo Leopold, under whom Wade did graduate work in the late thirties. Tapes from twenty-eight persons will be edited into a national radio broadcast. Duplicates of the tapes will be housed in the University's Archives and the Wisconsin State Historical Library. Leopold's book, "A Sand County Almanac," continues to be a best seller and was recently accorded top place in a poll to indicate influential environmental publications.

Reprint Available

A most useful article entitled, "Invite Wildlife to Your Backyard," published in *National Wildlife* in the April-May 1974 issue, is available as a reprint from the National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036. This colorful twelve-page brochure gives plans and lists of suggested species to plant in the typical suburban backyard to encourage wildlife, particularly birds. Paintings in the brochure indicate the stages through which the planting will proceed through a period of thirty to forty years.

Many persons put off planting around their new suburban homes, thinking that it takes too long to achieve the desired results. However, this brochure indicates that within five to ten years a very suitable amount of cover and food can be provided to attract large numbers of wildlife species.

The National Wildlife Federation has launched a new program to establish a nation-wide network of mini-refuges in the backyards of Federation members. Associate members of the Federation are eligible to participate, and will receive a registration certificate and an award for backyard wildlife improvement upon proper application. Persons interested should write to the Backyard Wildlife Program, National Wildlife Federation, 1412 Sixteenth Street N.W., Washington, D.C. 20036. Copies of the brochure are available at 25 cents each.

Roger Peterson Receives Award

The 1974 Golden Key Award, given by the American Association of School Administrators and six other national education organizations, has been awarded to Roger Tory Peterson, former ANSS president and one of the world's leading ornithologists. Author of the popular "Field Guide to the Birds," and many other books, Peterson's field identification system has been adapted to a full range of field guides published by Houghton-Mifflin Company. A recent article on Peterson in the *New York Times* indicated that, at the age of 65, he hopes to turn more of his attention to painting in order to finish some long-term projects which have been interrupted by the press of other duties. In the February 17, 1974 issue of *Parade Magazine*, Peterson's early career as a teacher was discussed by one of his most famous students, former Attorney-General Elliot Richardson.

We take pleasure in congratulating Mr. Peterson on this new award.

Mass. Audubon Collects "Gems"

David Minez, as co-director of conservation education for the Massachusetts Audubon Society, has put together a packet of 67 brief statements by leaders in environmental education. The statements are, in each case, a distillate of the experience and philosophy of the persons writing them. They were put together for use in a workshop for counselors in natural history and ecology. It is hoped that these "gems of wisdom" from leaders ranging from Marshall Case (one of the youngest) to Cap'n Bill Vinal (probably the oldest) will be helpful to those going into the field of nature interpretation and counselling. If any are available, copies of these "Gems" may be obtained by sending 25 cents to Wildwood Nature Center, Barre, Massachusetts 01005.

Baldauf Chairs State Committee

Governor Christopher S. Bond of Missouri has endorsed the development of a state plan for environmental education, and has assigned the responsibility to the State Departments of Education and Conservation. The two departments have appointed a Steering Committee and an Advisory Committee to develop the plan. On April 5 the Steering Committee organized in Jefferson City, and elected Dr. Richard J. Baldauf, First Vice-President of ANSS, to be chairman. The Steering Committee will develop the purpose, objectives, and guidelines of the state plan and will coordinate the work of the larger Advisory Committee. Deadline for the final report of the Committee is January 1, 1975.

SPRING, 1974

Watt Urges Communication Between Recreationists

James Watt, director of the Department of the Interior Bureau of Outdoor Recreation, in speaking to the International Snowmobile Congress at Minneapolis in May, 1974, urged those who recreate by machine to enter into meaningful dialogue with those who might be termed recreation purists. He said that he hoped that controversies between those who favor off-road vehicles and those who oppose them will "cool down," now that the ground rules are clearer on which public lands are closed to motorized traffic and which are open.

It would seem that greater emphasis on nature study and appreciation of the natural environment would help to bridge the gap between these opposing points of view.

Program Grows at Squam Lakes Science Center

The young Squam Lakes Science Center experienced new growth in 1973, serving 308 school groups. The Center staff participated in outdoor education courses at the University of New Hampshire, and held a teachers' workshop in Wolfeboro. An all day energy crisis seminar was co-sponsored with the New Hampshire World Affairs Council. New exhibits on wood and alligators, and four new summer lectures were developed. The live animal facility was completely renovated, and new enlarged restroom facilities were constructed. The program was somewhat curtailed towards the end of the year due to the gasoline shortage and the reduction in the use of school buses.

Like many other non-profit centers of this kind, the current inflationary trend and energy crisis combine to present serious problems for the immediate future. Nature centers, with programs designed to educate the public with regard to energy and conservation, may feel the pinch more than other kinds of educational establishments. Only the contributions of interested individuals and corporations can avoid a decline in their activities.

Ocean Recreation Conference

An Ocean Recreation and Conservation Conference was held on June 15, 1974, in Los Angeles. Recognizing that the population of California has created a tremendous demand on the natural recreation resources of this state, and that private developers are reducing or eliminating public access to beach areas,

the Conference dealt with the need for preservation of our natural seashore resources, the need to assure and improve access to these areas, and means to support the inclusion of these needs in the state's master plan for the coastal zone. The large number of people who utilize the coast line, its ocean waves, underwater terrains and beaches, for low-cost, non-motorized recreational activities such as surfing, diving, swimming, and sightseeing, need to join together to effectively represent their interests in the light of plans for preservation and development of the coastal zone.

The Conference was jointly sponsored by the Western Surfing Association, the Sierra Club, and other environmental groups.

Interpretive Program at Ball State University

The Department of Natural Resources, Ball State University, Muncie, Indiana announces the establishment of an Interpretive program. The addition of this new option in Natural Resources Interpretation to the undergraduate major in Natural Resources is designed to train environmental interpreters for a wide range of interpretive assignments, including urban areas as well as traditional park, forest, and other natural settings. Ball State's program is initiated with the understanding that the effective interpreter needs as a foundation four basic competencies: (1) knowledge and understanding of the natural environment, (2) effective use of communication skills, (3) understandings related to people and societal relations with the total environment, and (4) a knowledge of effective program planning and administration.

Students desiring interpretive training will enroll for the undergraduate major in Natural Resources, complete the core requirements for the major plus those outlined for the interpretive option. Under the leadership of Professor Charles Mortensen, who will advise students enrolled for this program, two new courses have been developed: (1) Principles of Interpretation, and (2) Organization and Management of Interpretive Programs. Provision is made for elective courses to strengthen areas of special interest. Course work will include extended field experiences in established interpretive centers such as Land Between the Lakes, Kentucky, as a vital part of the student's training. Presently, reciprocal work experiences are currently being developed with a number of interpretive centers. Field areas and other facilities owned by the University are available for program use.

(Continued on page 14)

Interpretive Program

(Continued from page 13)

In addition to this program the undergraduate major in Natural Resources at Ball State also includes opportunities to elect Resource Geography, Fishery Resources, Communications, Water Quality, or a General option. To obtain information about the undergraduate or graduate major in Natural Resources contact:

Dr. Clyde W. Hibbs, Chairman
Department of Natural Resources
Ball State University
Muncie, Indiana 47306

E. E. in N. Y. C.

Armed with nets and seines, 650 New York City school children explored the waters of the Hudson River this fall in search of fish for their classroom aquaria. This was the first in a series of explorations sponsored by The Resource Center for Environmental Education (TREE) as part of a new educational program called "The City As Habitat."

The Program is sponsored jointly by the National Park Service of the U.S. Department of the Interior, the New York City Board of Education and Museums Collaborative, an organization which works to make the programs of the city's cultural institutions more relevant to school and neighborhood needs.

"We came back with all kinds of fish," said Joe Tobin of the Wave Hill Environmental Study Center, who led the expeditions. "Striped bass, eels, shrimp, sunfish — the Hudson River is still incredibly rich in its fish life, particularly at Haverstraw Bay and at the mouth of the Croton River where we gathered our specimens."

The children were taken outside the city to Croton-on-Hudson because that is the best collecting spot and also to show them the watershed which feeds New York its water. The program stresses the children's immediate neighborhood environment, but also emphasizes that this environment is effected by systems which extend far beyond it.

After they collected the fish, Tobin helped the children to set up the aquaria in the windows of their classrooms, using specially built cardboard hood to keep the tanks from becoming overheated. Classes continued their study of the New York waterways by visiting at Jamaica Bay Wildlife Refuge, by boarding the old ships at the South Street Seaport Museum and by getting an overview from the new World Trade Center, the world's tallest building complex.

After the water system, the children will study the plant-food-waste cycle in New York from the time of the Algonquin Indians, and the effects of man-made systems and technology on the

New York environment. The program will conclude with a study of the student's own neighborhoods. In all, each class will attend 20 workshops led by resource specialists during the course of the school year.

TREE Director Sandra Walter said that the program's chief aim is to develop methods by which all schools in New York City and elsewhere can make better use of the environment itself as a means to learning. "We think that children learn about the environment itself by working with it," she said. "Mapping it, measuring it, photographing it, testing it, building models of it, feeling it. I realize there is nothing new about taking trips outside the classroom, but what we are trying to do is to make such trips significant and regular parts of the school year, rather than isolated one-shot experience."

"Many of our workshops are related to each other in showing different parts of our natural systems and interlocking man-made systems," she said. "We were also working to see how our workshops can be used to make the regular classroom work go better. We don't think of the workshops as ends in themselves, but as ways of stimulating the children to further reading, writing, art work, experiments and learning."

As preparation for the Hudson River expedition and other trips, two fifth grade classes from P.S. 122 in Queens studied food chains in special classes last week at the American Museum of Natural History. Other organizations which will provide resource people during the course of the school year include the South Street Seaport, the World Trade Center, the Queens Botanical Garden, Pratt Institute, CUNY School of Architecture, the Wave Hill Center for Environmental Studies, (classroom gardening as well as the Hudson River study), Arts Inc., Media for the Urban Environment, Federal Hall National Memorial, Hamilton Grange National Historic Site, the Environmental Action Coalition, Growth through Art and Media Experience, American Crafts Council and the Teachers and Writer Collaborative. To help prepare for and follow up on workshops, the program has loaned each class copies for supplementary materials called *Adventure in Environment*, published for the National Park Foundation by the Silver Burdett Division of General Learning Corporation.

TREE has also prepared charts showing how the program workshops can be related to the science and social studies curriculum guides prepared by the New York City Board of Education. It has books, films, testing kits and other materials which can be used for follow up activities and which are available on a limited basis to all schools in New York.

Gas For Travel

"Go where the gasoline is — to Alaska through western Canada over the Alaska Highway" — say the editors of the annually issued *Milepost Guide Book*, just off the press.

Editors report Canada in the west has "gasoline coming out of their ears," and in booming Alaska where work crews are gathering to begin the world's biggest pipeline construction project across the 49th state to tap the newly discovered rich oil fields of Prudhoe Bay in the Arctic, every indication is, that boosted allotments for Alaska will permit "plenty left over" for visiting motorists.

Interesting sidelight on one reason there is an oversupply of gasoline in Western Canada, *Milepost* editors tell us, is that some years back when oil and gas was struck in large quantities in the big central Canadian Edmonton oil basin, the rich eastern Canadians were encouraged to cooperate in building a 500-mile plus long pipeline eastward to Toronto, Ottawa and Montreal. They turned up their noses at the deal. They said such a pipeline would cost too much money — they could buy theirs cheaper from Venezuela — so today, western Canadians are laughing up their sleeves, shipping an occasional tanker through the Panama Canal to their eastern cousins when they can find an occasional tanker, and enjoying the look of wonder on the faces of just-arrived American motorists who can't believe their ears when the gas pump attendant inquires, "Fill her up?"

The 656 fact-loaded pages of *Milepost* tells about all you need to know about travel in Canada and Alaska and about its roads. Available from *Milepost*, Box 4-EEE, Anchorage, Alaska 99509. \$3.95.

Violence commonly is a parasite on social progress, not a cause. — Arthur E. Morgan

"You read a poem about green grass, trees, snow, salt spray blowing up against a beach. Hell, when we think of a beach we think of chicken bones, broken glass, beer cans."

"Each American accounts for more toxic wastes poured into rivers and oceans than 1,000 Asians."

"The new technological man carries strontium 90 in his bones, iodine 131 in his thyroid, DDT in his fat and asbestos in his lungs. There is now simply not enough air, water and soil on earth to absorb man-made poisons without effect. If we continue in our reckless way, this planet before long will become an unsuitable place for human habitation."

He maketh me to lie down in green pastures. He leadeth me beside the still waters. He restoreth my soul. —Psalms

AN EARLY ENVIRONMENTALIST (DEXTER)

(Continued from page 4)

hundreds of people panting for fresh air during the hot summer months are nevertheless forced to close their windows repeatedly." He described the North River as "a black and noisome stream rendered so by the sewerage and factories of a large and prosperous town above [i.e., Peabody]."

IV. Noise Pollution

In his journal for 4 July 1859, Morse complained of the noise created by celebrating the American Independence. He was very sensitive to all kinds of extraneous noise. He wrote a letter to the editor of the *Salem Gazette* 14 January 1870, condemning people for whispering and talking at concerts. His most intense dislike for noise was created by the constant screech of steam whistles on locomotive engines and at factories. For years he carried on a crusade against the steam whistle. In the *Salem Evening News* for 15 January 1900 he wrote that, "It is time that the citizen should insist upon that quiet in the city which he demands in his own home. He should insist upon the suppression of every unnecessary noise; in fact a number of our municipal ordinances, never enforced, provide for this relief." A week later the *Boston Herald* carried an editorial comment on Morse's article praising him for his stand and adding that "The increasing sensitiveness of the public to the evil of the noises that afflict modern city life is a good sign of the times." Again in the *Salem News* Morse reminded his readers 6 September 1900, that city ordinances of Newcastle, Pa., Detroit, Mich., and Cleveland, Ohio illustrate what could be done to abate noise pollution from steam whistles. In the *Boston Herald* for 24 September 1903, Morse wrote, "Within a few years there had come in use on steam railways a series of whistle signals which, in some towns at least, have rendered life for many unendurable." At a meeting of the Massachusetts Association of Boards of Health held in Boston 27 January 1905, Morse told the audience that "— just in proportion as a family or community becomes civilized, just in proportion are unnecessary noises suppressed." He explained his contention that unnecessary noises were injurious to health and well-being, and damaging to property values. He continued his campaign, writing frequent letters to the newspapers of Salem and Boston. In the *Boston Sunday Globe* for 17 June 1906, he claimed "The brutality of a municipality which allows this scourge can hardly be conceived." At the 9th International Otological Congress held in Boston 14 August 1912, Morse proclaimed that "— our people are the noisi-

est civilized people on the face of the earth." While the railroad steam whistle is no longer a problem, excessive traffic noise from automobiles, trucks, and motorcycles has taken its place and we still have a serious problem of noise pollution.

V. General Destruction and Deterioration of the Environment

Morse early recognized the gradual deterioration of our environment. He was concerned over the removal of trees from our cities. He realized the need to provide open space and natural surroundings to counter-balance the growth of cities. At the Worcester Polytechnic Institute he presented a commencement address 11 June 1900, entitled "Can city life be made durable?" He called attention to environmental degradation and pollution, the need to reduce such, and to improve and beautify our surroundings. He summarized that "The poor need just those comforts that the more favored possess in their country residences — playgrounds and parks, clean and quiet surroundings, a pure water supply and pure air, perfect hygienic conditions, and an orderly and temperate community."

Mulaik Retires As Editor

President Helen Russell announces that NATURE STUDY editor Dr. Stanley Mulaik has retired after serving in that capacity for the past nineteen years. During his tenure as editor the journal has changed in format from a four-to-eight page newsletter to a general journal with regular features such as *TIPS for Environmental Education and Good Reading*. It enjoys a nearly world-wide distribution and has attained an influence far greater than might be assumed from its modest circulation. We owe Stan a great deal for his leadership in ANSS, not only as editor but in many other capacities as well. He and his wife Dorothy have faithfully attended the annual meetings of the Society and have been members of the Board of Directors on several occasions. Stan served as president of ANSS in 1959. In addition, both the Mulaiks are founders and active supporters of the Utah Nature Study Society in their home state, as well as of the Western Section, which is affiliated with the Western division of the AAAS.

We wish Stan and Dodie well as they continue their many interests in retirement. We expect they will continue an active part in ANSS, and, like Cap'n Bill Vinal and others, will publish their thoughts in these pages from time to time.

Thoughts — and a Question —

While on Deer Watch

PAUL M. KELSEY

It was late the second morning of deer season and the warm sun had a relaxing effect as I still-hunted along the brow of a hill through a hardwood stand in which boys from McCormick Youth Camp had done some timber stand improvement about three years before. In response to release cutting, young maples had erupted and the brushy undergrowth was just the type deer can drift through unseen. The abundance of tracks in maple leaves under foot showed much travel along this brow where a deer could jump one way or the other and be out of sight. As I approached a blue line painted on trees, marking the end of the work area and the start of an old field now grown to 20-foot aspen, I took up a stand by a large maple and waited.

The noontide quiet was shattered by the sharp scolding of a goshawk farther down the ravine. My thoughts went back some 20 years when I first had heard that exciting call echo through the woods in New York's Chenango County, after I had flushed a female from her nest in a tall beech. Until that morning there had been a large gap in the known nesting range of the goshawk extending from the Adirondacks to the mountains of Pennsylvania.

Around the fringe of the Adirondacks, and across the southern-tier counties of New York, thousands of acres of land which had been under plow were then reverting to forest. As overgrown pastures became woodland, the more wooded habitat of the goshawk was developing. In following years other nesting goshawks were reported until now the goshawk is a regular part of the year-round fauna of these hills — not just an occasional winter visitor.

While the goshawk was increasing, its two closest relatives, the Cooper's hawk and sharp-shinned hawk were decreasing, until these last two are now seldom seen except during migration. Why is the goshawk succeeding where the other two have failed?

Two species of bark beetles carry the fungus disease responsible for the death of many stately elm trees.

Transpiration is the process whereby free water in a plant structure is released as vapor to the atmosphere through the leaves or bark.

Much human energy is spent in going to one extreme so as to counteract those who are going to some other extreme.

— Arthur E. Morgan

Message From The President

THE AMERICAN NATURE STUDY SOCIETY

There comes a time in every organization and in everyone's life for taking stock. To ask "Who am I? What are my objectives? What is my potential? Am I achieving it?"

For an organization this answer can only come from its members, and undoubtedly the members will have varied reactions depending on their own background and relationship with the society.

My own relationship with A.N.S.S. is a long one starting in depression days when I kept a membership blank on hand for the day when I could afford to join this organization that would accept me without any college degree, that had no sex, age, or formal education requirements; that only asked that I be interested in the natural world and concerned about it. I found that mighty exciting — and still do.

American Nature Study Society has always had an impressive roster of leaders. A list of the presidents starting with Liberty Hyde Bailey and including people like Anna Botsford Comstock, William Gould Vinal, Bertha Chapman Cady, E. L. Palmer, Edith Patch, Edwin Way Teale, Ellsworth Jaeger, Roger Tory Peterson, and Richard Weaver reads like a Who's Who in the Nature movement; but it has welcomed the amateur, too; and we all benefit from this mix.

Annual conferences of ANSS are unique learning experiences. Sometimes the offerings are almost overpowering like the day we had to choose between birding with Roger Tory Peterson, following the interwoven web of nature with E. L. Palmer, or the trail of history—natural history—with Cap'n Bill. For most of us the questions were "When shall we go with each leader?" "How shall we budget our time?"

And what insights we gained on the Indiana dunes as we followed Edwin Way Teale over the land that he had known from childhood!

At another time whole new areas were opened by the field trip organized by Gerry Schneider in Washington, D. C., where we saw some of the things that could be and were being done to relate city dwellers to the natural world.

Undoubtedly the field trips of the ANSS conferences are one of our special teaching tools. Few members can attend the conference annually but many more could and would attend some sessions when the conference is in their part of the country.

Indoors, too, the conference is stimulating and offers opportunity to learn by sharing. I cannot remember a single session that hasn't involved audience participation and discussion. In recent years more time has been set aside for just this kind of learning. Thus

a highlight of the 1972 meetings was an evening session where 44 persons came to discuss approaches to environmental education. Of the 44, thirty-three actually participated. This three way process — listening, observing, and participating, can make a short conference more meaningful than a whole semester's course.

But what of people who can never get to conferences? From the early founding of the society there have always been published materials. In the beginning it was a newsletter. Then under the editorship of Malvina Trussel it grew into a quarterly journal. Malvina turned the job over to Stanley Mulaik in 1954 and in recent years Stan and John Gustafson have been sharing the editing.

Since Earth Day in 1970 there has been a rash of magazines concerned with ecology and the environment. Some have been short-lived in spite of the current interest in these topics. Some are obviously done by opportunists; some are done by persons genuinely interested with little knowledge and experience. Most of the worthwhile ones, like Nature Study, have been around a long time. Their contributors and editors are well versed in the basics and the interrelationships that must underlie all our decision making.

Nature Study is not a flashy magazine; but it is solid and dependable. It reflects the diversity of its membership. It belongs to all of us, both as readers and potential contributors. We can improve it by more member contributions.

By sharing ideas we contribute to each other and therefore to the effectiveness of the American Nature Study Society, for many of our members take responsibility and play leadership roles in their communities in the field of nature and environmental studies and each of us needs the stimulation and refueling that comes from shared experiences.

One section of special interest is the "Tips for Teachers" which was instituted more than twenty years ago by Dr. Richard B. Fischer of Cornell University. Many of these Tips have been reprinted and are available as sets or as individual sheets as an inexpensive teaching resource.

With this background where should we go? Two things under consideration are the publishing of more materials, and the operation of workshops that would reach persons who are unable to attend conferences, with a concentrated program on environmental education.

What suggestions have you for either of these activities? What else would you like to see ANSS do?

HELEN ROSS RUSSELL

NATURE STUDY

The Ecologue

1. Thou art one with the tissue of life
a seamless web that encircles the earth:
thou shalt repair a tear in it
wherever it occurs.
2. Thou art but the conscious dust, a shaper
but never the master of nature.
3. Thy creations also come from the dust:
unto dust shall they return,
for waste is just an unused stage
that thou must learn to use.
4. Thou shalt forever serve as
thy brother's systems keeper,
for man in the mass is but a part man.
5. Thou shalt forever remember
that earth is the oasis of life
in the desert of space:
thou must never turn earth to moon.
6. Thou shalt pay the tomorrow tithe
that thy children and thy children's children
may continue the privilege of living on earth.
7. Thou shalt fashion and use a timeglass
that measures decades,
centuries and millenia.
8. Thou shalt further remember:
the wants of man are infinite,
the resources of earth are not.
9. Thou shalt neither make nor disperse
the lifeless foes of life on earth.
10. Though the purpose of life may be mysterious,
thy very existence answers death
and the ending of all things.

AMERICAN NATURE STUDY SOCIETY

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