

Nature Study



THE *Write* STUFF

Volume 41, Numbers 3 & 4

March 1988

A JOURNAL OF ENVIRONMENTAL EDUCATION AND INTERPRETATION

THE EVA L. GORDON AWARD

1963-1988

Excerpted and updated from Helen Ross Russell's description
in the 75th anniversary edition of *Nature Study*, 1983

by President Frank Night



A long-time member of the American Nature Study Society, Eva L. Gordon was honored a year following her death in 1962 by the establishment of the Eva L. Gordon Award for Children's Science Literature by the ANSS Board of Directors.

Eva Gordon was a pioneer in writing children's science literature, having co-authored two primary grade textbooks of nature stories long before science books for little children existed. These books were based on her first hand knowledge of the outdoors and her experience in teaching first and second graders in the public schools of Milwaukee. These two modest books entitled *Fall* and *Autumn* beautifully demonstrated the twin requirements for good authorship: knowledge of the topic and the reader.

It was following these early achievements that Eva Gordon entered Cornell University as an undergraduate where she stayed on after the completion of her master's degree to influence several generations of future teachers and writers. As one of two women on the College of Agriculture Faculty, she became so involved with her classes and students that she had little time for writing herself. Some of her creative energy went into reviewing books and she guided her students in judging, selecting and using books. To the budding writers among them, she taught skills and techniques.

Eva L. Gordon was a caring human being and a great teacher. Among her greatest satisfactions was seeing some of her students carry forward the torch which she lit. It seemed most appropriate to honor her by honoring excellence in writing for children. Some of the recipients were Eva's students and some were friends through ANSS membership. All recipients have met her high standards as expressed in the following criteria for the award: Does the book open doors to new adventures? Does it develop good attitudes? Does it help build understanding of interrelationships? Does it encourage children to make their own scientific observations? Is it accurate? Is it readable? Has it a quality of joyousness? Does it relate to many kinds of 20th century situations?

The Eva L. Gordon Award for Children's Science Literature has been given to the following persons:

1964 Millicent Selsam	1979 Ross Hutchins
1965 Edwin Way Teale	1980 Glenn O. Blough
1966 Robert M. McClung	1981 Herbert Zim
1970 Jean Craighead George	1982 Peter Parnall
1971 Verne Rockcastle	1983 Laurence Pringle
1974 Phyllis Busch	1984 Seymour Simon
1975 Jeanne Bendick	1985 Vicki Cobb
1976 Helen Ross Russell	1986 Dorothy H. Patent
1977 Herman & Nina Schneider	1987 Patricia G. Lauber
1978 George F. Mason & Dorothy Shuttlesworth	

A program like the one at Delaware Valley can be put in place in virtually any school. The luxury of a beautiful site is nice to have but not necessary to create an effective program. We often make the mistaken assumption that we must go outside the district for special expertise in order to provide an environmental education experience of this nature. The resources within a school district are tremendous and are frequently overlooked. When they are combined with talents available in the local community, the results can be spectacular. We have presented this model to many teachers and administrators across the country and many have become excited about the possibility of starting such a program in their school districts. They have represented rural schools, city schools, suburban schools, schools with great financial



resources and schools with little or no money available for new projects. We have yet to come across a school where this model could not be utilized in some form. All it takes is at least one interested person to get it started. □

SUSAN B. SEWALL is a sixth grade teacher at Delaware Valley Middle School in Milford, PA, and **SCOTT D. PALERMO** was the school guidance counselor until this year when he became school psychologist at Port Jervis, NY.



Earthball-playing (kids bought it by recycling aluminum cans.)

ERIC Clearing House Contract

Dr. Robert W. Howe, Director of the ERIC Clearinghouse for Science, Mathematics and Environmental Education, announced on February 15, 1988 that The Ohio State University had been awarded a renewal on its contract for ERIC/SMEAC for a five-year period, 1988-1992. The agency will continue to process materials for Resources in Education (RIE) and Current Index to Journals in Education (CIJE), as well as monthly digests, monographs, and other helps to finding information. A free annual bulletin may be obtained by writing ERIC/SMEAC, 1200 Chambers Rd., #310, Columbus OH 43212

for consideration for the Eva L. Gordon Award and that the Museum of Science and Industry classifies as AA is extremely important in helping young people develop creativity, imagination and social concern and, with adult support, healthy egos.

As Jodi Hunken says to parents and teachers in her article on "Plant Activities for the Pre-literate Child (see p.33)." go to children's books to fill your gaps in knowledge. A good child's book is a better source of beginning information than a college text or an encyclopedia. And, as Eva Gordon repeatedly told would-be writers and reviewers, "If a book turns adults off by its style it is not a good book for children either."

And finally, as Hilda Parfey, Librarian, in Sandburg Elementary School in Madison wrote for an article in the Wisconsin Department of Natural Resources' *EE News*, February 1988

One of the most effective ways to use science books is to read them aloud. Why read aloud? Jim Trelease answers this question in *The Read-Aloud Handbook*: "... for the same reasons you talk to a child: to reassure, to entertain, to inform or explain, to arouse curiosity, and to inspire — and to do it all personally, not by machine." Reading aloud can spark appetites for reading itself.

Display appealing books on a classroom table. Allow time for students to explore the books on their own. Informal time with books encourages learning and development of interests. You might also gain helpful insights about your students by noting which books they choose.

If you are beginning a unit, consider finding a good science book to introduce it or to serve as its focus. For example, if you're going to study volcanoes, obtain a copy of *Volcano*, an extraordinarily informative and attractive book by Patricia Lauber (Bradbury Press). Read from it, and leave it where students can browse through it on their own.

If you're teaching reading/language arts, use books on science topics as part of your program. In this way, you are infusing science or environmental topics into your curriculum.

Unquestionably, the right books rightly used, are tremendously important to our children and to our future.

HELEN ROSS RUSSELL has been teaching children and teachers of children for more than a half century.

Nature Study



inside cover

Patterns of Winter

John Brainerd

What is winter? Does a scientist know? Or does a poet know better?

1 Editorial The Write Stuff

Helen Ross Russell

The importance of good science books used in the right way cannot be over-estimated.

4 Some Visual Aspects of Writing

John W. Brainerd

Not only what we write but how we write it can be important.

5 Writing and Illustrating: A Team Effort

Dorothy Hinshaw Patent

How do two people successfully collaborate on producing a book?

6 The Author As Illustrator

Robert McClung

An author who knows illustrations from the angle of both writer and illustrator provides information on producing a unified whole.

7 Authorship the Easy Way

Edith A. Sisson

The author's personal reflections on melding teaching into writing provide useful insights for any teacher who would be a writer.

10 When You Want To Get The Point Across To Your Students . . . Send Them To The Principle

Richard J. Baldauf

Several examples of the WRITE STUFF conference to show how environmental issues may be told in story form to hold the attention of an audience.

11 Using Nature Poetry

John A. Gustafson

Facts and feelings blended are necessary to make us good citizens of what is, and always will be, a world which is basically natural.

12 Early examples of Scientific Nature Writing For Children

Liberty Hyde Bailey

Anna Botsford Comstock

Liberty Hyde Bailey and Anna Botsford Comstock made scientific ideas come alive for our grandparents.

14 Nature Writing Through John Burrough's Eyes

John Lutz

1987 was the centennial of John Burrough's birth. His books are still a rich source for nature literature because their content came from a lifetime of outdoor involvement, and their clarity came from hard work.

15 On Keeping a Journal

William J. Hamilton, Jr.

What should you record? "Anything and everything", according to Bill Hamilton.

FIVE EXCITING, ENRICHING OUTDOOR STUDY DAYS

In the Life of Delaware Valley Middle School Sixth Graders

Scott D. Palermo and Susan B. Sewall

Photographs courtesy of the Delaware Valley Middle School Files.



Looking the other way at the sunrise session.

The first light of day bursts over the edge of the mountain dissolving the gray of dawn into a myriad of colors and simultaneously lighting up the eyes of a huddle of sixth graders, their parents, and their teachers, awaiting the sunrise on the banks of the Delaware River. As they watch in silence, except for murmurs of appreciation, Vivaldi's "Four Seasons" begins to be heard in the background, and a flock of Canada Geese choose that moment to put on a show above the water ending in a flurry of splash landings. The time has come to try to capture the moment. The students go off in different directions to express what they have witnessed in song, poetry, or water colors.

Such is the beginning of the Environmental Ed. Days program for those sixth graders who can convince their parents to bring them to school in the darkness for "Sunrise Session". Almost half do just that, and many of their parents stay, often experiencing their own first sunrise! The rest of the sixth graders arrive on the busses as usual and join the early risers for sessions on environmental topics, taught by their regular teachers, teachers from other parts of the district, community resource people, and volunteers from all over the east coast.

There are five such Environmental Ed. Days during the school year and they are the high points of the multidisciplinary environmental education curriculum that is taught throughout the year. The Environmental Ed. Days program costs but \$25.00 a year (for bailing twine and hot chocolate) and has the support of the faculty, the administration, the community, and of course the students.

Each day consists of three sessions, each two hours long. Sessions that have been offered have included: Spiders (a session that leaves human size, student created, spider webs in the woods), Wild Foods, Solar Cookers, Snow Shoe Making, Black Bags (a sensory activity), Wild Flowers, Survival, Snow Sculpture, Raptors and Rodents (a simulation), Writing, Stream Investigation, Bubbles (a study of their characteristics), and many, many more!

The one exception to the three session format is the Fall Day. Since at that time the sixth graders don't know each other very well having come to our school from four different elementary schools, the first session is replaced with Action Socialization Experiences (ASE's). ASE's are group problem-solving activities which physically involve the students in their sol-

ution. For example, a group of students (usually 8 to 10) may be asked to get each of its members over an electrified fence (a string) before the Snuggly Ug-lies get them. The ASE course is set up in such a way that each group is allowed to spend as much time as they need to solve each problem. The group must solve the problem before they may try another one and every member must be a part of the solution. The emphasis is on cooperating in order to complete the task at hand, not on how many problems each group can solve. The ASE's forge the sixth graders into a unit which has an identity that sets the tone not only for the environmental education program but also for the year in general.

How did all of this come about? It didn't happen all at once, it evolved over a period of nine years. The precursor to Environmental Ed. Days was an Earth Day program. The students and the faculty enjoyed it so much that it was decided to look into a residential environmental education experience at a local environmental center for the sixth graders. Funds were promised and, as often happens in education, were lost due to a change of administration. The Environmental Ed. Days program was born when it was realized that we had the ability to create a quality environmental education experience on the school grounds. Three days in the spring were chosen, in-depth sessions were added, and the program became a reality. The following year it was decided to spread out the days during the school year, one in the fall, one in the winter, and one in the spring. The next year two more days were added in the spring to bring the total number up to the current five. Recently the arrangement was changed to two in the fall, one in the winter, and two in the spring. The point is that the program is flexible and can be adjusted as needed.

Administrative support was gained by insuring that what was done, however small, was done well; and that all who were involved, including administrators, were given credit in all media coverage. The media coverage



SOME VISUAL ASPECTS OF WRITING

John W. Brainerd

Why write? We may feel the need to make visible our thoughts, to record facts, and often to communicate these to others. Our efforts range from doodles and squiggles to computer printouts. Marks of an endless variety, cuneiform, arabic, roman, dot matrix, and laser-printed have helped people communicate. Part of my joy in writing is seeing letters of the alphabet form words, phrases, sentences, paragraphs, essays—or even just a plant label.

Not being Chinese, I almost always see the characters take their positions in horizontal lines, although occasionally a few may

plunge when describing a waterfall or like a milkweed seed. That can be somewhat disconcerting for a reader but may catch an extra bit of attention.

During many years of so-called teaching (=trying to help students learn), I've often felt that young people have not given enough attention to the characters which play such an important part in their efforts to communicate with words. What a pity that term papers should have to be typed or specimens labeled with a LeRoy lettering set or other means of stenciling so that uniformity gives clarity. Only rarely have students turned in to me what I considered beautiful papers, not typed but handwritten with clearly formed characters which are conventional yet with personalized grace, a joy to read.

Can we set children higher standards of care in lettering without being tyrannical? Can we give them freedom in shaping letters while making them aware of their responsibilities to those who have to decipher their words, reach for their thoughts, or evaluate their data? Can we? Surely we can.

Consider the Leaky O Syndrome. The O is full of gas which bursts out the top leaving a U behind. The dotted e following an undotted i is a heinous tripperupper (what a beautiful word!). The crossed l before or after an uncrossed t is an atrocious slower-downer (not so beautiful a word but I like the repetitive ow-ow and er-er).

Who cares? Just fuddyduddies like me? I hope not. I was fortunate to have a cartography teacher who made beautiful maps, Dr. Erwin Raisz. Many times I've driven across the United States with his physiographic maps beside me to show me the landscape. It was like having an expert geologist to communicate the drama of the earth. He

taught his students to letter names of cities and towns whenever possible to the right of the symbols for their location; thus the front end of the name would have a comfortable space next to the symbol and avoid having the back end cramp up against it. He emphasized that each letter should stand up vertical, except in hydrography, continued on p.9

LETTERING - Not fancy, just neat, to be legible and communicative.

Separated letters are more readable than *cursive* and with practice as rapid to make. Fundamentals:

Diagram showing letter parts: stem, lobe, ascender, descender, tails, K, R.

Diagram showing letter parts: enclosed space, admitted space, h with serifs, h sans serif.

PROPORTIONS: TOO THICK TOO THIN
stems too tall - stems just right?
too wide - too narrow?

SPACING: JAMMED CLOSE - DISTANT
IRREGULAR UGH!
Some words too close for comfort

Straight-sided letters should be farther apart than rounded or open ones: "Do tell the cook, Art."

STYLE: Don't drive in my ruts.

Have fun but stay sensibly legible - or create all sorts of confuisionary tangles!

JWB



Photo by Ray Pfortner

few years. How do I know? I heard a U. S. Senator's staff person mention radon recently (and express surprise that a job applicant was not informed); radon was on a short list of items for study by the House of Representatives Subcommittee on Environment and Natural Resources in 1987; recent conversations with a physical scientist suggested that the problem is far more widespread than was previously thought. Chlordane leaking from treated construction wood will also become an issue soon. How do I know? I heard of the problem second-hand from a toxicologist associated with the Environmental Protection Agency. And it appears intractable, risky, expensive, controversial, likely to affect many people.

We can identify important incipient issues in many ways. Among them are these:

ply).

Most U. S. environmentalists' lists of top ten environmental issues, global-to-regional (mainly U. S.), middle-term time scale, would probably look something like this:

1. air quality (including global warming, stratospheric ozone depletion, acid rain, asbestos-like particles and other toxics in building interiors)
2. water quality and supply (including contamination of ground water)
3. toxic waste cleanup (including Superfund sites, abandoned industrial sites, illegal dumps, military and other government areas)
4. waste disposal (including landfills, recycling, export of wastes, incineration, ocean dumping, hazardous and radioactive waste storage)
5. land use controls (including public and private land)
6. biological diversity (including endangered species, genetic "storehouses," rare breeds of domestic animals and crops)
7. resource allocation (including management of hunted animals and of sport and commercial fish, recreational vs. commercial uses

of public lands)

8. energy issues (including allocation of costs, policy regarding alternative sources, conservation measures)
9. habitat destruction (including loss of tropical forest, loss of endangered species' habitats, wetlands)
10. plants and animals in their roles as pests, diseases, carriers of diseases, competitors, predators.

On a global basis, and expanding our list to include environmental problems which are not issues, and critical issues which may be only secondarily environmental in their nature, we should add these: loss of soil, desertification, human population increases and changing demographics, urban concentration of people, overconsumption of resources, poverty, increasing disparity between rich and poor, unemployment, malnutrition and starvation, military pre-emption of resources, illiteracy (including environmental "illiteracy"), esthetic insensitivity, inadequate moral basis for relations with nature, support for environmental institutions.

How Can We Discover Incipient Issues?

Radon gas in our basements will be an issue in the U. S. during the next

1. We can project trends from available data. We know that human numbers will continue to increase for some time, that average ages are increasing; this implies demand for certain amounts of certain resources. If we combine these trends with those indicating increased rates of consumption, e.g. of electricity, and showing increased disparity between rich and poor, we can draw conclusions regarding consumption of resources, political power, social unrest, etc.
2. We can listen to leaders. There are experts. And though they may be narrow in their areas of expertise, we can use a home-made version of a tool called the Delphi technique to carry ideas between areas of expertise. We can ask the electric power utility executive what would happen to rates if nuclear power plants were required to shut down. We can ask economists and sociologists how people will behave if electricity costs multiply. We can ask foresters and wildlife biologists what will happen if vast numbers of people turn to fuel wood for cooking and heating. We can analyze, combine, and adjust the experts' opinions and projections or predictions. A return trip to each expert, and reporting of the views of the others, may produce mod-

photos varies from book to book. Should we discuss each book individually and try to work out an arrangement for each? We quickly came to the conclusion that each and every book was an inseparable combination of his work and mine, whether it had more words or more photos. We agreed that for each and every book we would split the royalties 50/50. That way, we both acknowledged our debt to one another and we avoided a potential source of contention between us. An additional sign of trust is that we have no written agreement whatsoever, and neither of us has ever proposed to the other that we have one. I have read articles about collaboration that advise NEVER to collaborate without putting the terms in writing, but for us, that has not been necessary.

How does our partnership work? Each of us focuses on his or her own role in producing a book but also helps the other out. Sometimes I make most of the contacts for a project, other times he takes on that role. For example, he did the legwork for *Wheat—The Golden Harvest*. He has a friend who is a wheat farmer, and he has neighbors who raise small quantities of wheat. He even did the interviewing for me, finding out vital facts about wheat farming today. I was so busy with other projects at that time that he knew I'd have trouble making time for the wheat book without extra help from him. On the other hand, I helped him out on *The Way of the Grizzly*. We were in Alaska working on the book, and I went to McNeil River



Photo by William Muñoz

A Grizzly cub scratching itself on a post in Denali National Park (illustrations from "*Way of the Grizzly*").

to see and photograph the bears there; quite a few of the photos I took at McNeil are in the book.

Once the book begins to take shape, we make sure that he has all the photo needs covered before it is too late to fill them. When I get my first rough draft written, he reads through it and comments on it. I decide what specific photos I may want to use, often going through hundreds of slides to choose 50 for one book. When I have any doubts, I leave a choice so he can select the photo he prefers for that illustration. He reads through the final draft with photos in hand so we know we both agree on the complete package. Now and then, a situation arises in which one of us must add something at the end so the

other one doesn't get to see it; that is okay, too.

The details of a working relationship between partners will always be unique, depending on the kind of collaboration and on the personalities of the partners. But certain qualities are, I believe, vital to success. A shared vision is very important—what do each of you want to get out of your work? If one is trying to communicate important information to children while the other has his or her eye mainly on the royalty check, the partnership won't work. A smooth routine for coordinating your efforts is necessary, too, so that neither of you is left not knowing what is expected when. An ability to communicate honestly so that the partner isn't left guessing about what is in the other's mind is also vital. The most critical requirement, however, is mutual respect; respect for one another's work and respect for each other as persons with needs that may conflict at times with a perfect partnership. That means flexibility on the part of both partners and a willingness to tolerate imperfection in one another. With respect, flexibility, shared vision, and a smooth working relationship, two people can make a team that produces more and better material than either could do alone. Besides, having a partner helps relieve the loneliness of writing, sometimes called the loneliest profession. □

DOROTHY HINSHAW PATENT was the 1986 Eva L. Gordon Award recipient.



THE AUTHOR AS ILLUSTRATOR

(See inside back cover)

Robert M. McClung

My first book, *Wings in the Woods*, was published 40 years ago, while I was at Cornell working toward my master's degree in zoology. That book, in slightly fictionalized form told the story of my boyhood summers on my grandfather's farm and my growing interest in butterflies and moths. I did the illustrations for that first book, as well as for about half of all the others I have written since that time.

For all those books which I both wrote and illustrated, the principal team effort was between myself and my editor, but the art director and the book designer for the publishing firm

also played important roles. Once the manuscript of a short book was finished, I prepared a dummy showing the text allotted to each page and quick pencil sketches of the proposed illustrations. This rough layout was often changed to include suggestions from the editor, art director, and book designer. Once everyone was satisfied, the designer then supplied page sizes, margins, and all the other specifications that would influence the rendering of the final illustrations. Since I had never taken formal art training and many techniques were a mystery to me, the art director on

more than one occasion guided me through the intricacies of how to make color separations, how to get some special effect I wanted, or what kind of art paper and supplies to use.

Through the years I have filled a series of sketchbooks with notes and quick pencil drawings of animals or plants I have observed. These pertained not only to whatever I was working on at the moment, but also to anything of special interest that I might observe from day to day. My first sketchbook includes many drawings of orphaned baby chipmunks which my wife and I raised at home; tiger

beauty. The flower stalk will grow out first, producing extravagantly large lily-like blossoms. (The 3 sepals that serve as bud covers color up to match the 3 petals.) The parts involved in seed production, female pistil and male stamens, are easily distinguished. The pollen on the stamen will ripen and then shrivel before the tip of the pistil shows its maturity by splitting open at its tip end—the stigma. If younger blossoms have opened by then and their pollen is fresh, transfer some pollen onto the open stigma to pollinate (self-fertilize) the ovules within the pistil. Leave the seed pod on the plant until the seeds within turn brown. If you plant the seeds, new amaryllis will grow. Possible new words: petals, sepals, stamens, anthers, pollen, pistils, stigma, pollination, ovules, ripen.



Photo by Jori Hunken

EXTENDING: By giving a child the chance to express what he or she has seen, the child's role changes from witness to teacher. Consider some of the following activities as opportunities to add new dimensions to plant experiences.

—Act out, with hands or whole body movements, the gestures of sprouting, growing, blooming, and scatter-

ing seed.

—Imagine that you are a seed or bud and describe your feelings as you open from dark to light and begin to grow.

—Make drawings into stick puppets and act out the lives of the plants. Include the characters of insects that eat leaves, insects that pollinate, the rain,

cold, and sun.

—Draw a picture of yourself as a plant. Include in the picture the things that you need for growth. □

JORI HUNKEN a former teacher, is a mother, an author and volunteer guide-trainer at Garden in the Woods, Framingham, MA.

Graduate Program Moves

Steve Van Matre announces that his graduate program in environmental education and interpretation has moved to Aurora University in Aurora, Illinois.

Formerly located at George Williams College in metropolitan Chicago (and originally designed for the National Park Service) this innovative, project-oriented, twelve month masters degree has evolved into a program that is unique in its field.

Here's what participants gain through courses specifically designed for environmental education and interpretation:

- **Practice** in using newly developed tools for crafting effective communication and education experiences
- **Ability** in breathing freshness and vitality into people's appreciation and understanding of the world around them
- **Experience** in analyzing and re-designing a variety of programs and facilities (visiting centers and sites in several midwestern states)
- **Skill** in building complete educational programs and interpretive experiences (as opposed to the usual collection of supplemental activities and techniques)
- **Contacts** for internships throughout the U.S. (including Alaska), plus Canada, Britain, France, and Australia.

AND a new vision of what the professional fields of environmental education and interpretation could become.

For more information, contact:

LERA Division
Aurora University
Aurora, IL 60506

PROFESSOR VAN MATRE is the author of the acclimatization materials (*Acclimatization, Acclimatizing, Sunship Earth, Earthkeepers, The Earth Speaks*), chairman of the international educational organization, The Institute for Earth Education (with branches in the United States, Canada, Britain, France, and Australia) and president of Sycamore Associates (a new interpretive design and planning firm.)

writing was mainly expository, and the book was in some ways akin to a cookbook. Like recipes, the many activities included first a list of materials, then an explanation of the procedure, a format which set creative limits. I found enough latitude, however, in describing procedure and in explaining natural history phenomena to bring in my own experiences and to put much of myself into it. Here again is why I suggest that writing can be easy—you have only to follow your inner self. The goal of the book, to promote curiosity, care and concern about the natural world, was identical with the underlying motives of my teaching.

I had started teaching when my youngest child entered first grade. By that time I had brought so many different creatures into my children's classes I thought it time to capitalize on my volunteer efforts, and I began work as a leader of school field trips at a demonstration farm. My first trip with a group was memorable. Words stuck in my throat, and I mumbled and stumbled along, until finally in the barn where a small calf lay in a stall, I loosened up to give a glowing description of her future as a giver of milk that we associate more with the supermarket than with an animal. My praise completed, the dear creature stood up to reveal, unmistakably, that he was a bull. As I fell through the barn floor in my mind, I concluded teaching was not for me. Forget it. Yet, I tried leading another group. And another. And slowly discovered the pleasure of sharing the farm and the outdoor world with kids.

My motivation grew—but how to make up for my lack of training for my work? Continued experience, several extension courses, and books. To how many natural history authors I am indebted for educating me in my teaching career I cannot say, but I sit now in a room with ten shelves of nature books, and down the road is the library whose adult and children's natural history sections I know well. Whether or not authorship was easy for the multitude of writers whose books I have used, I do not know, but I do know how helpful their writings have been for me.

Often the children's books prove to be the most informative. Here's an example, that stems from the part of my present work that involves rehabilitation of native animals. Our or-



Photo by Joan O'Rourke

phaned skunk had dug herself a fine hole as her winter quarters outside in our old aviary. The library had a paucity of books on skunks, but the children's room had a fictional narrative for young children, which proved to be helpful. The story told about an abandoned skunk litter, cared for by a farmer, who, when winter came, put hay by the skunks' dwelling in his barn for the youngsters to use. Would our skunk take hay into her new whole? With some doubts, I put a pile of hay by the entrance to her hole one late afternoon, and was surprised to find only a few wisps left the next morning. During winter's cold we could imagine a cozy skunk down under, thanks to the children's skunk story book in the library.

The skunk and other orphaned or injured visitors, as well as the wide variety of domestic animals that lived with our family over the years, produced the motivation for my second try at authorship. I bring animals frequently to my classes (indoors as well as out, and with students of all ages and stages), or often I tell stories about our creatures to make an educational point. Could I make a book about our animals? I went off alone for several days in the country to face the issue, as well remember the excitement I felt, when after only about an hour's work by the light of the kerosene lantern on the porch, I had a crude outline for a book and even a title, *My Father Goose*—a tribute to a particu-

larly strong character who dominates our yard. It took that summer and one more to create the two chapters, the outline and the general proposal. Yet, after this work, once again the opportunity for authorship came easily. In a surprisingly short time after sending the material into the publisher, I answered a telephone call and heard my editor's familiar voice, saying "Good news . . ."

This time around I was wiser. I knew I was in for work, a great deal of it, although typically I underestimated how much. I realized my need to learn more about writing to carry through an anecdotal style, and used two books: *The Elements of Style* by William Strunk, Jr. and E. B. White and *On Writing Well* by William Zinsser. I would read White, then the Zinsser, then back to White, then Zinsser again, and so forth, with occasional time-outs. I can't quote the books, but they have become familiar indeed, and I'd be glad to share with you the main message of both in one word, which is—SIMPLIFY.

Also I realized I should enter the modern age and use a word processor. I scarcely knew hard from soft ware, and my children echoed one another with "Mum, the only computer you'll be able to use is a user-friendly one." After I made the momentous purchase, the next two weeks were terrible. I sat with three manuals: one for the computer, one for the word processing system, and one for the writer.

accept a great variety of answers. I propose the criterion of diversity; does a proposed development increase or decrease the variety of habitats available to humans, habitats which they might value for whatever reason?

Even if the first film is not obtained, the second and third can be joined in an effective lesson.

The third film is *Lake Powell, Jewel of the Colorado*. Like the others, it is a quality color film, thirty minutes long, produced in the early to mid 1960's. It is the Bureau of Reclamation's direct response to the Sierra Club film, and in it the Bureau tries to duel the Sierra Club on its own ground, that of outdoor esthetics. We see people fishing, motorboating, and swimming in the new reservoir behind Glen Canyon Dam, and especially we follow a family as they explore the side canyons looking for Anasazi cliff houses and other human artifacts, and as they wade a stream and splash about in a plunge pool. We also see them, and many others, taking their boats almost to the foot of Rainbow Bridge to see that great and previously inaccessible wonder. *Jewel of the Colorado* can be borrowed free of charge from the Bureau of Reclamation, Attention Code D-822-A, P.O. Box 25007, Denver, CO 80225; (303) 236-6741.

After this film I distribute another set of questions for the students' written responses. Again, I vary the *modus operandi* and the number to which they are to respond, from time to time. The questions are flagrantly loaded and biased, a fact for which I make absolutely no apology:

(1) Often, in these battles, both sides will present the facts as they perceive them, leaving others wondering just where the truth lies. The conservation groups may exaggerate the potential bad effects of a proposed project. The developer may omit or ignore real dangers and relevant facts. In the film you just saw, in which you were shown the beauty that still remains in the side canyons, there was an omission. The lake hadn't yet been filled; it still had approximately 200 vertical feet to go. Remember the scenes of Rainbow Bridge National Monument, with no lake in sight. The waters of the filled lake are 47 feet deep at the foot of the bridge. Obviously, that changes some of the scenes you saw. Any comments?

(2) In his book *Desert Solitaire*, Edward Abbey has a beautiful, exciting chapter entitled "Down the River," in which he describes a float trip down Glen Canyon, made by himself and a friend, before the completion of Glen Canyon Dam. Abbey makes the then-six-mile hike from the river up to Rainbow Bridge, and has this to say of the Bridge:

I climb to the foot of the east buttress and sign for Ralph and myself in the visitor's register. He is the 14,467th and I the next to enter our names in this book since the first white men came to Rainbow Bridge in 1909. Not many, for a period of more than half a century, in the age above all of publicity. But then it's never been an easy journey. Until now.

The new dam, of course, will improve things. If ever filled it will back water to within sight of the Bridge, transforming what was formerly an adventure into a routine motorboat excursion. Those who see it then will not understand that half the beauty of Rainbow Bridge lay in its remoteness, its relative difficulty of access, and in the wilderness surrounding it, of which it was an integral part. When these aspects are removed the Bridge will be no more than an isolated geological oddity, an extension of that museum-like diorama to which industrial tourism tends to reduce the natural world.

All things excellent are as difficult as they are rare, said a wise man. If so, what happens to excellence when we eliminate the difficulty and the rarity?

From *Desert Solitaire*, by Edward Abbey. Copyright 1968 by Edward Abbey. Used with permission of McGraw-Hill Book Company.

Discuss the above passage from Abbey. With Lake Powell filled, will Rainbow Bridge be worth as much as when he saw it? To those who go there? To those who cannot go there, but can imagine it? (Note: whereas approximately 15,000 persons had signed in at Rainbow Bridge in the 60 years beginning in 1909, it is estimated that in 1972 alone, 72,000 visitors boated up Forbidding Canyon, on an arm of water now extending to the Bridge.)

(3) The Sierra Club film showed people in Glen Canyon with rubber boats. The second Bureau of Reclamation film showed a family on Lake Powell with a motorboat. Did the people in the two films probably have very different types of experience? Discuss.

(4) Those who wish to develop wilderness for some commercial venture have often charged that those who wish to preserve the wilderness are selfish; that they are the rich who alone can afford the cost of a "wilderness experience." Discuss. (In which film had the people spent more on their boating equipment?)

(5) Some defenders of wilderness have said, "I know that I will never have the chance to get there, but I'll be happy just knowing it's there, unspoiled." Discuss. What would the human spirit be without a vision of wild places?

(6) People have long recognized the idea of good taste — in art, music, books. Is there such a thing as good taste in environment, or in outdoor recreation? If so, in which film(s) was good taste best represented?

I believe that each of these questions is important, dealing with concepts that go to the heart of environmental esthetics. My students never cease to surprise me with the good job they do on them. The reader is invited to use them.

Here, I have described only a fraction of the case study of Glen Canyon Dam as I teach it. I also use other films, and books by Edward Abbey. I explain the political history of the dam, and its ecological and economic impacts. I lead the students to question whether the dam ever should have been built, and share with them what I believe to be the big ideas from the case study. I try to update the study every year or two. Anyone wishing more information should write to me at 143 Bessey Hall, ISU, Ames, Iowa 50011.

I am teaching this Glen Canyon unit right now, for about the 16th year (with constant updating). In a few hours I'm going into class and add a new twist: an offer to lead them on an expedition into the Glen Canyon — canyonlands country during spring break. I hope a few will take me up on it. □

DR. TANNER was a high school teacher in Oregon, Montana, and Uganda. He is now a professor of secondary education and environmental studies at Iowa State University. In addition to publishing many articles, he wrote *Ecology, Environment, and Education* (1974) and edited *Aldo Leopold: The Man and His Legacy* (1987).

WHEN YOU WANT TO GET THE POINT ACROSS TO YOUR STUDENTS. . . SEND THEM TO THE PRINCIPLE

Richard J. Baldauf

Excuse the pun in the title. Puns are regarded as the worst form of humor . . . by those who can't use them. And principles are considered too sophisticated . . . too academic . . . to be used in communicating with the lay person. But that's not true! Further, it is easy but wrong to fall into the habit of communicating principles without a backdrop of current thought and action.

Example! It was once sufficient to use the primer with the story of Dick and Jane and Spot the dog having fun running and playing on the sidewalk. And we learned to read. However, if you're writing that story today, Spot should be on a leash . . . and neutered!

Looking at the act of communicating from a different angle reveals that many elementary school children go skipping out of school every day singing the 20-second TV commercial they heard the night before. They don't always whistle the message just received in the classroom. Now why is that! I regret to say that we have some of the most creative minds in this country making TV commercials. Schools of Education need a few more required subjects, such as TV Commercial Script Writing; War and Peace Jingles; The Use of Life Savers in Photographing Blood Cells; How To Use 1987 Stock Market Graphs Sideways; and much more.

We must look at environmental issues in the same way. How can we catch the eye and ear (and the brain?) of our audience. Waste is a terrible thing to Mind. And still we do waste our natural resources . . . we do not use our brains to the full. The human brain! Our best computer yet! Only slightly larger than two human fists . . . weighs less than two pounds . . . it's portable. Unfortunately, our discs are too floppy!

Well, then, we can examine some environmental issues by presenting the principles on which they are based. But we can also inject some common sense as well as a gimmick to catch the fancy of the audience.

I have the advantage in making this presentation in person—something a writer doesn't usually have. And my

interest in environmental issues is a long-standing one. I've talked to thousands of audiences. I've been the culprit that started action that resulted in stopping two dam projects of the Corps (and you can spell that anyway you wish). During all of this action and interest, which started long before Earth Day I, I notice that I can get away with more, and people are more apt to believe me, when I wear a dark blue suit . . . as I get more gray.

Let's look at some of the environmental issues and consider how some of the stories might be told.

The American Dream—having a green lawn around your house, all nicely manicured, always. But you must remember that nature doesn't make lawns. The closest natural thing to a lawn is a prairie. Consider the energy and water used in maintaining a lawn of grass. Consider your harrassment! No one will argue that your neighbors want YOU to have a nice lawn. How can you do that? Well, the first advice one usually receives is to buy grass seed from a local nursery . . . because that seed has been genetically engineered to grow where you live. That's right! Somebody spent a lot of time in the laboratory splicing genes; agricultural businesses and institutions spent much time, money, and space in growing various kinds of seeds in various parts of the country to determine the commercial feasibility of new strains. (Although all of this DID offer financial support for graduate students.)

But let's assume the work has been done, the correct genetic combination for your part of the country has been decided, and

you can now buy it at your local nursery.

Read the package carefully. It will tell you what kind and how much fertilizer to use at what time of the year. Forget that most of the nitrogen-rich fertilizers are made from natural gas. (Could it be that someday we'll have to choose between keeping warm and having a green lawn? Believe me, your neighbors want you to have a green lawn.)

A rule of thumb indicates that the average 10,000 square foot lawn in the United States requires between five and ten 50-pound sacks of fertilizer. Don't cheat and use less. The research and that graduate student was paid to determine how much fertilizer your lawn will need.

One 50-pound sack of nitrogen-rich fertilizer equals about 162,000 BTUs. The British Thermal Unit is not necessarily the best unit of measure for energy. But we got used to BTUs by way of window air conditioner units at least 25 years ago. It's not a good way to measure energy, but let's continue. 162,000 BTUs.

Why do we put this fertilizer on the lawn? To make the grass grow! But let's not have it grow too much. Remember, your neighbors want you to have a nicely manicured lawn. And so the crop grows and we reap the crop. Each week we see the need to CUT THE GRASS. This is when you renew your religious interest and reflect on St. Matthew 9:37, where we are told that "The harvest truly IS plenteous, but the labourers are few."

In any case, you've got to cut it off before the bugs get it! (Although the seed package also tells you what kind of insecticide to use. You see, you can spend money to purchase a product

that took much energy to make, in



Sample daily Observation Record Form:

You can write a descriptive record of what you observe and your interpretations of what you see, or you might consider keeping a record as follows:

date _____ observer _____ place _____ time _____

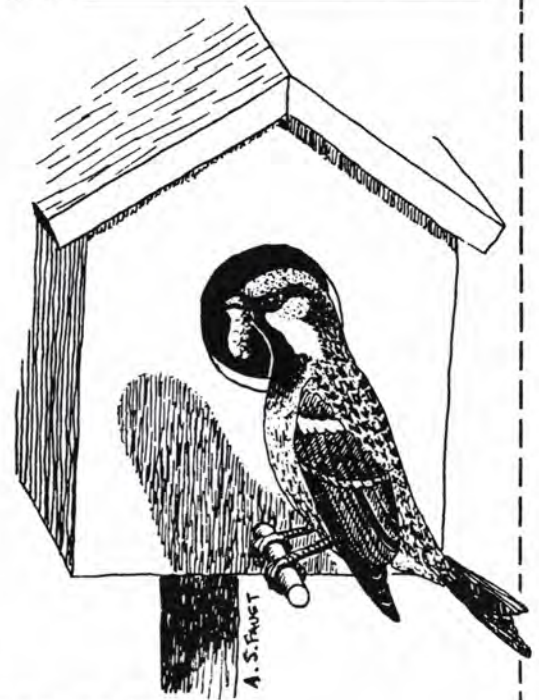
temperature _____ precipitation _____ cloud cover _____

estimated wind speed _____ wind direction _____

Birds	Location	Notes
1. chickadee	maple tree	F, C
2. house sparrow (male)	nest box in backyard	F, feeding young
3.		
4.		

Mammals	Location	Notes
1. gray squirrel	telephone wire	T
2.		
3.		

Insects	Location	Notes
1. bumble bee	yard	flew by without stopping
2. ants	sidewalk	active around hole between sidewalk cracks
3.		



Activity Code: F = feeding, H = playing, M = maintenance (preening, cleaning fur), X = mating, T = travelling (flying, running), C = calling, P = playing, O = other (give details). (Feel free to make your own coding system for observing and cataloging animal behaviors.)

Plants	Location	Notes
1. maple tree	backyard	flowering; flowers in clusters; red and sticky; insects flying around them; looks like squirrels are eating them; some flower clusters falling to ground
2. dandelions	sunny frontyard	about 10 plants, averaging 3 flowers each; flowers close at night, open the next morning
3.		
4.		

Other observations and thoughts: _____



EARLY EXAMPLES OF SCIENTIFIC NATURE WRITING FOR CHILDREN

Reprinted below are two nature-writing gems from the turn of the century, written by the two most influential persons in the formative years of the American Nature Study Society. Bailey was our first president; Comstock the fifth. Bailey authored books which, when stacked on the floor, reached higher than he (as shown in a famous photo in Life magazine when Bailey was ninety). Comstock's "Handbook of Nature Study" remained in print for over fifty years, and is still a useful compendium of helps for elementary teachers. In their writings, they gave powerful expressions to the basic philosophy of the nature-study idea: nature writing must be exciting, emotionally satisfying, and scientifically accurate. They continue to be models for us today.

TEACHER'S LEAFLETS

No. 1.

FOR USE IN THE RURAL SCHOOLS.

DEC. 1, 1896.

PREPARED BY

THE AGRICULTURAL EXPERIMENT STATION OF CORNELL UNIVERSITY,

ITHACA, N. Y.

Issued under the auspices
of the Experiment Station
Extension, or Nixon Law.
BY L. H. BAILEY.

HOW A SQUASH PLANT GETS OUT OF THE SEED

L. H. Bailey

If one were to plant seeds of a Hubbard or Boston Marrow squash in loose warm earth in a pan or box, and were then to leave the parcel for a week or ten days, he would find, upon his return, a colony of plants like that shown in Figure 1. If he had not planted the seeds himself or had not seen such plants before, he would not believe that these curious plants would ever grow into squash vines, so different are they from the vines which we know in the garden. This, itself, is a most curious fact — this wonderful difference between the first and the later stages of nearly all plants, and it is only because we know it so well that we do not wonder at it.

It may happen, however — as it did in a pan of seed which I sowed a few days ago — that one or two of the plants may look like that shown in Figure 2. Here the seed seems to have come up on top of the plant; and one is reminded of the curious way in which beans come up on the stalk of the young plant. If we were to study the matter, however — as we may do at a future time — we should find a great difference in the ways in which the squashes and the beans raise their

seeds out of the ground. It is not our purpose to compare the squash and the bean at this time, but we are curious to know why one of these squash plants brings its seed up out of the ground whilst all the others do not. In order to find out why it is, we must ask the plant, and this asking is what we call an experiment. We may first pull up the two plants. The first one (Figure 1) will be seen to have the seed-coats still attached to the very lowest part of the stalk below the soil, but the other plant has no seed at that point. We will now plant more seeds, a dozen or more of them, so that we shall have enough to examine two or three times a day for several days. A day or two after the seeds are planted, we shall find a little point or rootlike part breaking out of the sharp end of the seed, as shown in Figure 3. A day later this root part has grown to be as long as the seed itself (Figure 4), and it has turned directly downwards into the soil. But there is another most interesting thing about this germinating seed. Just where the root is breaking out of the seed (shown at a in Figure 4), there is a little peg or projection. In Figure 5, about a day later, the root

has grown still longer, and this peg seems to be forcing the seed apart. In Figure 6, however, it will be seen that the seed is really being forced apart by the stem or stalk above the peg for this stem is now growing longer. The lower lobe of the seed has attached to the peg (seen at a, Figure 6), and the seed-leaves seem to be cracking out of the seed. Figure 7 shows the seed a day later. The root has now produced many branches and has thoroughly established itself in the soil. The top is also growing rapidly and is still backing out of the seed, and the seed-coats are still firmly held by the obstinate peg.

Whilst we have been seeing all these peculiar things in the seeds which we have dug up, the plantlets which we have not disturbed have been coming through the soil. If we were to see the plant in Figure 7, as it was "coming up," it would look like Figure 8. It is tugging away in getting its head out of the bonnet which is pegged down underneath the soil, and it has "got its back up" in the operation. In Figure 9, it has escaped from its trap . . . It must now straighten itself up, as it is doing in Figure 10, and it is soon standing proud and straight, as in Figure 1. We now see that the reason why the "seed" came up on the plant in Figure 2, is that in some way the peg did not hold the seed-coats down (see Figure 13), and the expanding leaves, being pinched together must get themselves loose as best they can.

There is another thing about this interesting squash plant which we must not fail to notice, and this is the fact that these first two leaves of the plantlet came out of the seed and did not grow out of the plant itself. We must notice, too, that these leaves are much smaller when they are first drawn out of the seed-coat than they are when the plantlet has straightened itself up. That is, these leaves increase very much in size after they reach the light and air. The roots of the plantlet are now established in the soil and are taking in food which enables the plant to grow. The next leaves which appear will be very different from these first or seed leaves.

These later ones are called the true leaves. They grow right out of the little plant itself. Figure 11 shows these true leaves as they appear on a young Crookneck squash plant, and the plant now begins to look much like a

explain structure, function, practically anything in nature, in terms of purpose, is a common fault of children's books. I usually question those in which such expressions as "so that" or "because" appear commonly to explain structures or acts of living things. And sentimentality or prejudice such as the common attitude toward predatory animals should be largely absent from good books.

My next two criteria are matters largely of philosophy. If one believes that the nature and science experiences of young children should begin—and be largely concerned with—situations in which they can use evidence collected by their own senses as a basis of simple generalizations, good books should be closely related to the background and experience of the child by whom they are to be used. They should draw from common experiences of children data related to the concepts they present; and they should interpret truly everyday phenomena in terms their readers can understand. In addition, a good book, I believe, should stimulate its reader to further observation, to some worthwhile activity, or to continued reading.

The presence or absence of indexes, bibliographies and glossaries, and qualities such as timeliness, uptodate-ness, use to which adapted, grade or age suitability, geographic appropriateness, and format, need, I believe, no elaboration. Instead, I shall spend the rest of my time discussing those ideas about books and book production I mentioned at the beginning.

My first, and perhaps chief, suggestion is for more careful checking of content and illustration before publication, by qualified persons, to eliminate weaknesses and to emphasize desirable features. Many publishers evidently give much attention to this checking, but so many books could easily have been so much better. Whether this checking is done through the author or through the publisher is immaterial, but it would seem highly desirable that more and more books meet the three standards of scientific acceptability, educational worth, and excellence as children's literature. Such checking would seem especially desirable for books written by persons without extensive scientific training in the field concerned, in books of broad scope, and in books

dealing with complex subjects such as conservation of natural resources. I realize the idealism of such a suggestion, but I believe I am not alone in feeling the desirability of such procedure.

Excellent as are the illustrations in most modern books for children, I believe that higher standards could be set in books in nature study and science for accuracy, realism and general informational value. And attention to building more definite size concepts is especially desirable. Better conformity between quality of text and quality of illustration would be possible in many cases.



That brings me to grade placement. Publishers are giving increasing attention to suggesting grade or age ranges for which particular books have been planned. Such suggestions are valuable both to reviewers and to users. Most of us recognize the impossibility of setting up narrow or definite limits in this matter, but some qualification of the wide ranges frequently stated probably is needed. Perhaps this qualification could best be provided by re-

viewers, taking into account not only reading difficulty, but such considerations as the concentration of ideas and the type and extent of background required for understanding.

AUTHORSHIP

As to authorship, I am unable to conclude that scientific training is in itself a guarantee of value. Authors with extensive scientific training and authors apparently without such background have written good nature books for children. The converse is also true. It seems however, that possession of training in science favors accuracy and sometimes clarity, attention to concepts and possibly to scientific attitudes, and care to stimulate observation and further activity. But training or experience closely related to the interests and reactions of children are also important factors in successful writing in those fields.

Several years ago Dr. Carroll Lane Fenton, an author of a number of books of nature study and science for children, and a frequent critic of such books, suggested a possibility worth considering. His idea was that a board of cooperating scientists, authors, illustrators, editors, educators and others interested in the production of nature and science books for children be set up. Here books could be cooperatively examined before they were published, persons who were preparing or wished to prepare books could receive suggestions, helpful reviews and publicity measures could be sponsored, and perhaps other activities carried on that would help to improve the quality of books in the field and the possibility of the right book reaching the right child at the right time. Responsibility for improvement in quality and construction rests largely with authors and publishers. But responsibility for better choice and use of books rests chiefly with booksellers, reviewers, parents, teachers, librarians and others who guide children's reading, and, perhaps to some extent, with the children themselves. But between these two groups, the producers and the consumers, are the reviewers and selectors, whose responsibility is to work in both directions. And so, in the memorable words of one of our graduate students, "I am right back to the conclusion I started with." □

to active delight. Thus it is that in all the lands of snowy winters the chickadee is a loved comrade of the country way-farer; that happy song, "chick-a-dee-dee," finds its way to the dullest consciousness and the most callous heart.

One day in February we were, with much enjoyment, wading through a drifted highway that skirted a forest, the least twig of which bore a burden of soft snow. Over all hung that silence of winter which is the most "silent silence" that rests upon the earth anywhere outside the desert. No breeze swayed a creaking branch or shook from it the snow in soft thud to the white carpet below. Even the song of the brook was smothered beneath coverlets of ice and pillows of drift. We stood fast, awed by the stillness, when suddenly it was broken by the thrilling notes of the chickadees. We could hardly credit our senses, for it seemed as if the woods was a hopeless place for any living creature that morning. But there before our eyes was a flock of these courageous birds hunting for food on the leeward sides of boles and branches left bare and black in the recent storm. Their tiny weights sent the snow in showers from the

terminals twigs, which phenomenon was greeted with triumphant song while the cheerful midgets hunted the relieved branches topside and bottomside for any lurking tidbit. As we watched them, Emerson's poem came to mind:

"Piped a tiny voice near by,
Gay and polite, a cheerful cry—
Chick-chickadeedee! saucy note
Out of sound heart and merry
throat,
As if it said, 'Good-day, Good Sir!
Fine afternoon, old passenger!
Happy to meet you in these places
Where January brings few faces.'"

No wonder that the great American philosopher was attracted by this other American philosopher who sings when he is cold and hungry.

Besides its usual song the chickadee has a song that says "phoebe" much more distinctly than does the song of the phoebe itself. Few people recognize this, and often in February or early March it is announced in the local newspaper, "The phoebe-birds were heard to-day" though it may be weeks yet before these birds arrive. The two songs may be easily distinguished by even the ear untrained to music. In the phoebe song of the chic-

kadee, the last syllable is at least one note lower than the first and has a falling inflection; while the last syllable of the phoebe bird's song is at least a half note higher than the first and has a rising inflection.

Not long since I visited the deserted nest of a devoted pair of chickadees. It was cuddled down in the bottom of a hole that opened on the very top of a fence post, and, one would imagine, must have been wet more than once when inhabited. However, a large family was raised there during the past season and much enjoyment was derived from watching the many fussy birdlings that found home and comfort in that unattractive retreat. I looked upon them with special interest, for I was sure they would visit the suet on my trees this winter and thus become friendly neighbors.

As soon as the trees are bare, nail or tie bits of suet to branches which may be observed from your windows. I know of no investment which pays such enormous dividends both to pleasure and pocket as do suet restaurants in orchards patronized by chickadees. Every child, at home or school, will be attracted by this experiment. □



NATURE WRITING THROUGH JOHN BURROUGH'S EYES

John E. Lutz

Good writing says something. And it represents hours of practice. These claims have literary merit for nature writers.

The content of good writing says something meaningful to its reader. That paperback novel you can't put down puts you in the position of the hero or heroine. The popular do-it-yourself article points to the same problem you'd like to solve in your own home apartment. Interesting nature stories take you to the wild with descriptions of scenery or animal attributes you'd love to see.

The substance of writing that brings greatest meaning to the reader has many sources. And it's the variety of sources and breadth of experiences that develop a depth to one's writing. For example, some writers are inspired by other writers. Reading broadly about a topic expands a writer's background and generates a vari-

ety of new ideas or different combinations of existing ideas. To illustrate — after reading a series of articles on rhododendrons, one can develop a broad knowledge of these leathery evergreen shrubs. New propagation or planting tips for first-time gardeners could result. The broad information base gained from reading can spawn useful supplements or additions to the original knowledge.

Another example of broadening experiences, however, and one most often serving to inspire our most widely read nature writers, is direct participation in the natural world. To see, to smell, to feel, to taste, to listen — this is where the grist of popular outdoor writing develops. To slosh through a muddy thaw to smell the offensive odor of the juices of the early spring skunk cabbage yields a whole different perspective on its scent than can be possible by only reading about

it. Being stimulated by nature firsthand allows you to collect the ingredients necessary for stimulating others who read your words. When you live your words, writing them is more likely to convey life to the reading mind.

The second claim says writing develops writing. To be a good writer, you must practice. Although some would say there's a natural talent requirement, that's not entirely true. Just as the athlete improves with practice, a writer can become better by preparing drafts and revising them. And as the shortstop sharpens his fielding skills through coaching, the writer can be advised by an editor, a reviewer, or another seasoned writer.

The idea is to practice writing. Few people consider the hundreds of hours spent to perfect a faultless golf swing. Why, then, should several hours not be expected for one to be-

dry that no amount of mental chocolate milk will ever wash it down, then accuracy is no panacea. Thirdly, good format. I look for a book with a nice balance of white space, a pleasing type face, and crisp, clear photographs, drawings or diagrams; a book that "feels" good to the hand and engages the eye. An attractive cover is a pleasing bonus.

Besides the quality control of accuracy, decent writing and good organization, there is one more aspect to the text that may be even more important (though not so easily recognized.) It is a combination between the author's interest and/or enthusiasm for the subject and his/her ability to transmit this feeling into the text (without being obtrusive) so as to arouse interest, enthusiasm and even awe and wonder in the reader. Not many authors have that capacity, nor do many books have that quality. A lot are quite readable, useful and informative books that are welcome additions to any collection of natural history works, but just don't have the special magic in them that ignites a spark in the young reader (or the older one, for that matter.)

Even picture books have to be considered in this way, for such books may open windows for the very young, showing them landscapes they had not even known were there. Picture books can be rich sources of knowledge of the natural world, and such knowledge is usually presented in a comfortable, non-intimidating manner. Seasonal changes, the infinite variety of animals and plants, animal behavior, and ecology — even the process of metamorphosis — can be and are encompassed between the covers of amusing, entertaining, and enlightening picture books for preschoolers and "older" young children.

Books are important. They can, quite simply, affect us for our entire lifetime. And if children can come to realize the beauty, the wonder, and the delight of the infinite variety of the natural world about them, and of humankind's need for this world both for aesthetic pleasure and for simple survival, through the pages of a book, the world will be the better for it. □

PATRICIA MANNING is Children's Librarian at Eastchester Public Library, 11 Oak Ridge Place, Eastchester, New York.

REVIEWING AND SELECTING NATURE BOOKS FOR CHILDREN



Eva L. Gordon

It is forty years since the American Nature Study Society held its first program on science books for children at the Annual Conference of the American Association for the Advancement of Science in Washington, D.C. This program consisted of a panel with Eva Gordon representing reviewing, Edith Patch an early author of children's science books, Glenn O. Blough, a teacher with wide experience in elementary education and Mrs. Hamilton, an editor of children's books for William Morrow.

Eva L. Gordon's remarks on that occasion were originally published in School Science and Mathematics, in November 1949. For many years reprints of it were used in her course and other courses in children's literature. The article, excerpted below, is timeless, and if we substitute environmental education for nature study, it is dateless.

As I thought about this program, it seemed to me that my place in it was that of a "middleman" between the producers of children's nature books, as represented by Miss Patch and Mrs. Hamilton, and the consumers, whose problem was presented by Mr. Blough. Just as the job of any middleman reaches toward both the producer and the consumer, so, it seems to me, the reviewer and selector of nature books—or of any books, for that matter—could and should contribute in both directions.

Let's take first some of the qualities that have seemed particularly significant in evaluating nature and science books for children. Although these criteria were developed chiefly from examination of non-textbooks, it is believed that the same general considerations would apply to textbooks. Such qualities may be grouped in at least three classes: those concerned with the books themselves, qualities of content and format which can be judged by examination of individual books; those concerned with the preparation and production of books, such as author's purpose and background, the illustrator, the publisher and his policies, and cost; and those concerned with the reviewer or selector, the purpose, background and personal preferences.

CONTENT

Content is obviously the most important of the factors concerned with the books themselves. The subject-matter field and the scope of content are first considerations of the re-

viewer: with what materials a given book deals and the breadth, or detail, or emphasis with which its subject is treated. Children's nature books vary as widely in scope as in subject-matter, from a tiny book that deals with so simple a subject as the seasonal growth of an apple tree to one that attempts to survey the entire plant and animal kingdoms. What a book does and does not do determine to a large extent its usefulness to any given prospective reader, and the reviewer who fails to give an adequate description of content is limiting the value of his contribution. The highly generalized descriptions which frequently appear in brief annotations often fail in this respect, and give little information beyond that implied in the title.

ACCURACY

Most persons asked to suggest the most important quality of children's books in nature and science, probably would name accuracy. As I have worked with these books I have come to feel that accuracy, whether of text or of illustration, is not simply a matter of correct factual detail, although I cannot emphasize enough my belief that books should be as free from misstatement and incorrect illustration as is humanly possible. It seems to me that there is no reasonable excuse for a statement such as the following—and I quote: "The pistil is the organ bearing the ovule, which is the bud inside it. The part of the plant which contains the pollen is called the anther, part of the pistil," which appeared in a comparatively recent, widely publicized



ON KEEPING A JOURNAL

William J. Hamilton, Jr.

I shall never forget my tenth birthday. My mother had placed beside my dinner plate a little pocket book replete with colored pictures of our common land birds. It was Chester Reed's guide, measuring little more than 3 by 5 inches and slipping handily into one's pocket. Throughout the winter and approaching spring I filled in the margins with notes of each new bird. When the year ended, 70 species had been listed. During the next few years, I added additional guides and any book on natural history that I thought might be useful. Always I made copious marginal notes and inserted slips of information that I came upon in my reading. Mind you, this was 20 years before the Peterson field guides.

The page margins soon became inadequate for my notes. Before long, sundry notebooks were being filled with observations made around my home. While my boyhood was spent on Long Island, but ten miles from Manhattan, there were plenty of wild areas for a youngster interested in nature. I recall watching night herons dropping on the mud flats of Flushing Bay, that now supports La Guardia Airport. My field companion and I collected butterflies and moths, beetles, fish, salamanders and snakes. Frequently we visited the great American Museum of Natural History, where kindly curators made time to answer

our questions and show us specimens "behind the scenes." The information thus gained went into our field notes.

Finally, I went off to college, to meet professional biologists who kept detailed notes of their observations. I bought my first diary in 1923, a substantial reminder that measured 5 by 8 inches. This first one cost 45 cents, the current one was \$11. In these and other larger journals faithful records have been kept over the years. One might well ask "What does one record?" Anything and everything, just to keep the habit of faithful recording of one's observations from one day to the next. One never knows of what use your recordings may be.

One of America's great naturalists, Elliott Coues, in his *Key to North American Birds*, wrote more than a hundred years ago, in this fashion:

"Let us look at the day's work. You have shot and skinned so many birds and laid them away labelled. You have made observations about them before shooting and have observed a number of birds that you did not shoot. You have items on haunts and habits, abundance or scarcity, or manouvers and actions under special circumstances, as of courtship, nesting, etc. Various notes of birds are still ringing in your ears and finally you may have noted the absence of species you saw awhile be-

fore. Meteorological items, especially while travelling, are often of great assistance in explaining the occurrence and action of birds. Now you know these things but very likely no one else does, and you know them at the time but you will not recall a tithe of them in a few weeks or months, to say nothing of years.

"Don't trust your memory—it will trip you up. What is now clear will grow obscure, what is found will be lost. Write down everything while it is fresh in your mind. Write it out in full; time so spent now will be time saved in the end, when you offer your research to the discriminating public. Don't be satisfied with a dry as dust item. Clothe a skeletal fact and breath life into it with thoughts that glow, let the paper smell of the woods. Place a pulse in a raw fact, catch the rhythm before it dies. Keep off the quicksand of mere memorandum that means something to be remembered, that is just what you cannot afford to do. Shun abbreviations; such keys rust with disuse, and may fail in after times to unlock the secret that should have been laid bare in the beginning. Use no signs intelligible only to yourself. Your notebooks may come to be overhauled by others whom you would not wish to disappoint. Be sparing of sentiment, a delicate thing easily degraded to drivel. Beware of literary infelicities, the written word remains. Write as if a stranger were looking over your shoulder." □

DR. HAMILTON, Professor Emeritus of Mammology at Cornell University introduced his students to the importance of keeping written records.



HOW TO SELL YOUR ARTICLE

Betty Blair

Every writer should approach an article with some assumptions about the reading audience. I've made a few assumptions of my own:

- You're creative and resourceful and eager to publish
- You know how to write for kids, or you're learning fast
- You're serious about breaking into the children's magazine market or increasing your sales there

As you may know, writing is an art, but selling your writing is a business. As a business person, you're going to have to make a hard-headed search of the children's magazine market for a

suitable outlet for your product. And that's not easy to do — unless you're deeply into writing about health or God. I did a quick survey of *Writer's Market* yesterday, and of the 36 children's magazines listed, 7 deal primarily with health and nutrition and 20 deal with biblical or religious themes. That leaves only 9 with more general interests, and some of these buy very few freelance pieces, whether they be fiction or non-fiction.

There's a bright spot in all of this, however: it's always easier to sell a manuscript to a magazine than to a book publisher. A book is a major com-

mitment for a publisher. You've got to convince an editor to invest many thousands of dollars in you with no guarantee of profit. On the other hand, a magazine editor makes a commitment of only a few hundred dollars and thus is much more willing to take a chance.

So how, then, do you break into this limited but interesting and potentially profitable market? Or how do you increase your sales if you're already in? Well, it very often begins with salesmanship — how well you can sell your ideas and your ability to write . . . through a "query" letter.



A BOOK ABOUT BOOKS

THE MUSEUM OF SCIENCE AND INDUSTRY BASIC LIST OF CHILDREN'S SCIENCE BOOKS, 1987, compiled by Bernice Richter and Duane Wenzel, 1987, American Library Association, 72 pp. Author and Title indexes. \$8.95 plus \$1.50 shipping cost (50¢ for each additional book). Order from Museum of Science and Industry, 57th Street and Lake Shore Drive, Chicago, IL 60637.

This 8½ x 11 book containing information on approximately 500 currently in-print children's science books that have been published between 1983 and 1986 should be a part of every school and library. The book is organized into 17 alphabetized main subject divisions e.g. animals, astronomy, environment/conservation, math/computers, et al. Books are arranged alphabetically by title in each division. Information on each book includes author, illustrator, publisher, publication date, and cost, followed by a short summary of contents, and a list of major reviewers. Marginal Keys provide instant grade level information and a rating of the book's quality.

These 5 ratings, ranging from AA strongly recommended, A recommended, B good, C acceptable quality to D not recommended, provide additional information on the books. The ratings are based on 8 factors: accuracy, currency, author's qualifications, organization and format, illustrative matter, literary qualities, balance and objectivity and promotion of scientific attitudes and skills. It is not surprising to find a large number of Eva L. Gordon Award winners' books, including ones by this year's Patricia Lauber with double A ratings.

Appendixes include: a list of 38 source books for adults following the same useful format as the children's books, a list of science magazines for children providing name, address, price, age level, and number of issues per year, a similar list of review and science education journals for adults and a directory of more than 200 publishers whose books appear in this listing.

Two earlier books are still available: the 1973-84 Basic List for \$9.75

and the 1986 Basic List Supplement for \$6.95.

Helen Ross Russell □

MARSHES OF THE OCEAN SHORE: DEVELOPMENT OF AN ECOLOGICAL ETHIC by Joseph V. Siry. (College Station, Tex.: Texas A. and M. University Press, 1984. 216 pp. Illustrations, notes, and index).

Siry's book traces the history of usage and management of salt marshes from early colonial times to the present, with a brief review of modern ecological research on tidal marshes. For a long period of time they were mismanaged (drainage, ditching, dredging, filling). The goal was reclamation for land use and needs of navigation rather than conservation of a natural resource for maintaining the water cycle, purification of water, habitats for wildlife, providing nutrients for ocean life and for aesthetic values. Few people appreciated the ecologic, economic and recreational importance of tidal wet lands. John and William Bartram were

among the first naturalists to do so; Samuel L. Mitchell was an early supporter for protection of marshes. Writers such as Alexander Wilson, Audubon, and Thoreau made the public aware of the natural beauty of marshlands. The early conservation proposals of such men as George Perkins Marsh and John Wesley Powell are reviewed.

Not only salt marshes are considered, but also their relation to freshwater marshes of the estuaries, upland forest and farmland, and adjacent life of the ocean. Pioneers like George Perkins Marsh "grasped the entire dynamism of living systems and their dependence on an undisturbed environment" (p. 78). His work "became the foundation of the subsequent drive to protect the country's natural resources" (p. 79); "the perceptions held by Marsh, Ruffin, Olmsted, and Ellet formed the core of an organic ideology" (p. 81.) which eventually led to government policies. The controversy between land reclamation and development on one hand and management of a natural resource by ecological principles on the other hand is traced historically. Marshlands were usually regarded by the political and economic sector of society as wastelands. Aldo Leopold developed a land ethic for conservation based on ecological cycles and the interrelatedness of all living things and their environment. The central theme of the book is "an inherent conflict between ecology and economics" (p. 132). The role of Rachel Carson in popularizing the need for preserving and maintaining marine communities is brought forth. Modern studies on marshes and their productivity by such ecologists as E. P. Odum and his associates are outlined and applied to problems of management. Federal, regional, state, and local efforts to manage marshes, not always for the common good, are traced historically. Gradually it is becoming apparent that "estuaries are integral parts of the earth's ecology" (p. 188) and as a result of the efforts of many naturalists, conservationists, and public-spirited politicians, natural resources such as wet lands are looked upon with an "ecological view of mankind's place in nature" (p. 189).

Ralph W. Dexter
Emeritus Professor of
Biological Sciences
Kent State University □



readability formulas and word lists. It's ok to use these to edit your work, I guess, but don't let them stifle your writing. We believe that formulas don't measure readability anyway, because they don't take into account sentence structure and writing style. Harriet Bernstein, who headed a project investigating the use of formulas in textbooks, says:

"Engaging and colorful writing has the power to carry even unskilled readers over difficulties, while stilted or boring writing causes problems for even capable readers."

And you often produce stilted and boring copy when you're a slave to readability formulas.

Kids have a great sense of wonder and enthusiasm. They live in the present and enjoy the urgent quality of something happening now. To write a successful piece for *Ranger Rick* you have to find those feelings in yourself. Kids have a need for adventure and discovery, so you must rekindle those needs in yourself and have them spill over into your work.

An article in a magazine — *your* article — must pass the ultimate test — a test most classroom materials would fail miserably. Your piece has got to be so interesting that it's read *voluntarily*. Your challenge is that while kids may be just learning to read, they very well may just be learning to dislike reading. To turn this thinking around — to get kids to pick up your material and read it voluntarily — you've got to meet the reader's need to have fun as well as find out.

IS IT FUN TO READ?

Reading that's fun begins with your own enthusiasm and love of the subject. You must really care about the subject or the reader won't care at all. Your passion will awake the passion in others. So write from your heart as well as from your head. Avoid a patronizing, condescending tone and write like a creative peer telling a story, not a teacher giving a lesson. Remember that you are first an entertainer, that the piece you're writing is a performance, and that you don't have a captive audience.

As I mentioned earlier, essential to an article's success in *Ranger Rick* is a tantalizing lead. After luring the readers in with the lead, you have to keep them interested. Here's where all your diligent research comes in. Your copy

should be packed with what we call "Gee-whiz" facts. You should combine your interesting facts with a playful style. You've got to be playful with words, not pedantic.

Fun also can come from the use of unexpected images and clever twists. Always try to appeal to the senses by using graphic, sensual images. Kids, far more than adults, live and learn through smells, sounds, sights, and textures.

Important to the success of any piece, important to making your copy fun, is saving something good for last. We never let a piece go to print in *Ranger Rick* unless it has a good strong ending.

Following my own advice, I've saved something "good for last." It's in the form of a word of encouragement. In a day when many magazines for children are little more than television in print, we at *Ranger Rick* still believe that good writers are essential to a good magazine. We have what we think are high standards, and we desperately need writers who can meet or exceed those standards. There's a lot to learn about "making it in magazines," but above all is the fact that we couldn't "make it" without you. □

ELIZABETH BLAIR is a Senior Editor of *Ranger Rick* magazine.

WITCH OF THE WOODS BLOSSOMS FORTH IN FALL

Phyllis K. Busch

Special to The Lakeville Journal ®



WITCH-HAZEL

Spring brings wildflowers to mind, a pageant of blossoms whose flowering was assured by last year's buds. To behold wildflowers in full bloom in October and November takes one by surprise. At a time when things seem to be falling down, winding up, tucked away for winter, witch hazel, the "witch of the woods" turns things upside down by sending forth a burst of yellow blossoms.

The witch hazel, a native of eastern North America, is a small tree or tall shrub, seldom exceeding 15 feet. The wavy-edged leaves are roughly diamond shaped, uneven at the base, and grow alternately along the stems. Small bluish lichens decorate even the smallest twigs. The leaves turn yellow or tan at this time of year and may fall before the tree is in blossom, although sometimes the leaves may hang on until spring.

The little round buds and the blooms which burst forth from them appear in clusters along the ends of branches. The flowers have four petals resembling narrow yellow streamers

and exude a sweetish perfume. A cold snap causes the petals to curl up but the return of bright sunshine encourages a renewed display. After pollination the petals dry up and usually fall off. Some of the petals hang on with the rest of the flower which remains dormant until the following spring at which time its fruit is developed.

The fruit, a capsule or pod, can be found in clusters among this year's blossoms. The closed pods suggest little monkey faces. As the pods dry they open, revealing two shiny black seeds. As drying continues the opening widens, causing pressure on the seeds which ultimately becomes so great that the seeds are forcibly ejected. The process may be compared to shooting wet watermelon seeds by pressing them between thumb and forefinger.

Witch hazel can provide some spooky indoor sport. Cut a branch with unopened or partially opened pods and place in a jar on the mantel. As the pods dry the expelled seeds will rattle around the room hitting ceiling, walls, and people with harmless impact. In early days when the dispersal of these almost invisible seeds fell among the dry woodland leaves creating a rattle, the gullible readily believed the sounds to be those of muttering wicthes. In fact many believed that the witches inhabited the witch hazel.

AMERICAN ENVIRONMENTALISM: OUR LITERARY AND ARTISTIC HERITAGE

Charles H. Yapple

With the colonization of the "New World" by European powers in the late 1600's, European settlers brought culturally influenced attitudes which generally caused them to view wilderness as an obstacle to civilization and human survival itself. Notions of "conservation" of natural resources were practically non-existent given the situation facing pioneers in what often was a hostile environment. Indeed, progress was measured in the number of acres of cleared land one could bring to pass.

Despite the pressures of survival, a fairly significant number of influential Americans held ambiguous attitudes towards nature. While viewing a pristine natural landscape, no less a wilderness conqueror than Daniel Boone once remarked:

No populous city . . . with all the varieties of commerce and stately structures could afford so much pleasure to my mind as the beauties of nature I found here.

Other Americans, including Thomas Jefferson, actually boasted about the beauty and uniqueness of the land. Jefferson argued that the trip across the Atlantic was worthwhile if the visitor came only to view the American countryside.

Two cultural forces of the times, "Nationalism" and "Romanticism", fueled the ambivalence expressed by Boone and others. Struggling for acceptance in the world of nations, many American leaders in art, literature and politics found themselves expressing pride in the young country's wilderness. Taking quickly to the romanticists' enthusiasm for the remote, solitary and mysterious, American artists and writers began to produce works proclaiming the virtue of wild land. In a relatively short span of time a number of individuals including William Cullen Bryant, James Fenimore Cooper, Ralph Waldo Emerson, Henry David Thoreau and others utilized their talent with the written word to both promote the values of nature and bemoan the rapid negative impact that advancing civilization was causing. Their efforts were supported by the artistic endeavors of wildlife painter John James Audubon and the

landscape masterpieces of Thomas Cole, Asher Durand, Frederick Church, Albert Bierstadt, Thomas Moran and others.

As the young nation emerged from the Civil War other literary figures joined their predecessors in raising public consciousness about the value of nature and played important roles leading to the establishment of the National Park System. The ideas of George Catlin, George Perkins Marsh, Frederick Law Olmstead and others set the stage for rapid designation of numerous national parks in the late 1800's and early 1900's.

The dynamic personalities, and writings, of John Muir and Theodore Roosevelt were also instrumental in making preservation/conservation sympathies into law. Influenced by Muir and first Chief United States Forester, Gifford Pinchot, Roosevelt's presidency embraced the establishment of many national forests, parks and wildlife refuges. Indeed, it was during Roosevelt's administration that the very term "conservation" was coined.

A growing nature study movement, initiated by the writing and teaching of Louis Agassiz, Aldo Leopold and others began to mature into the science of ecology during the first half of the twentieth century as concepts concerning the interrelatedness of life were popularized. In a span of some thirty years Leopold laid the groundwork for turning wildlife management into a legitimate science, served prominently in several conservation organizations and helped found the Wilderness Society.

Taking a cue from John Muir's ability to influence a President, Jay "Ding" Darling utilized his pen to coax Franklin Delano Roosevelt into supporting wildlife legislation. An editorial cartoonist and Pulitzer Prize winner, Darling used his syndicated newspaper connections to generate public support for wildlife related laws including the Duck Stamp Act of 1934. Working with the newly created American Wildlife Institute, the Izaak Walton League, the Audubon Society and others, Darling's efforts, by 1940, had helped double the acreage held by the federal wildlife refuge system.

The end of World War II and Linnie Marsh Wolfe's winning of the Pulitzer Prize for her biography of John Muir, launched a revival of interest in conservation issues. A succession of artists and writers including Ansel Adams, Aldo Leopold, Joseph Wood Krutch, Edwin Teale, William O. Douglas, Bernard DeVoto, Eliot Porter, Roger Tory Peterson and many others made significant contributions that led to the environmental decade of the 1970's. The writing of DeVoto and Krutch along with the art of Adams and Porter became regular fare for Sierra Club publications and adorned the coffee tables of many influential Americans.

Seldom does one book launch an immediate movement of world significance. Yet, that is exactly what author Rachel Carson accomplished. Published in 1962, *Silent Spring* became the "Uncle Tom's Cabin of modern environmentalism" by directly tying human survival to the ecological viewpoint. Within a decade millions of people would label themselves "environmentalists" and through some 3,000 organizations produce an avalanche of activism, literature and legislation causing the 1970's to be called the "era of Environmentalism." Writers such as Paul Erhlich, Barry Commoner, and Barbara Ward became famous as they documented the numerous environmental dangers facing humankind.

Much progress has been made since Carson wrote *Silent Spring* but many environmental dangers still exist. Every minute acres of tropical rain forest disappear, hundreds, perhaps thousands, of toxic waste dumps threatened the health of present and future generations and acid rain falls from our skies. Many battles to protect our natural heritage have been won but the struggle lingers on to preserve the Earth.

May the work and inspiration of the great writers and artists of the past motivate and energize those who would continue their efforts to preserve the earth and all its creatures. □

This narrative is a summary of a slide/tape presentation which traces the history of American environmentalism in terms of contributions made by American writers and artists.

DR. CHARLES H. YAPPLE is a Professor of Recreation at SUNY College at Cortland.

RIGHT BEFORE YOUR EYES

JOHN WIESSINGER

Worst of Times

Spring. An exhilarating time for most of us. But not for many animals. Food supplies are at the lowest point of the year. Fat reserves are exhausted. Chilling rains are common. The leaf litter and snow that sheltered small animals from weather and predators are gone — matted, melted, wet.



White-footed Mouse

By late spring, temperatures have risen and new plant life provides food and cover for the survivors. But early spring, for all its promise of renewed life, can be the worst of times.

© 1984 John Wiessinger

8458

RIGHT BEFORE YOUR EYES- Worst of Times

In general, we think of winter, with its cold temperatures and snows, as the worst time of the year for animals. Many animals are able to migrate or hibernate to avoid the onslaught of winter but those which do not are well adapted to survive. Nevertheless, winter does take its toll. Spring, however, does not herald "easy living" and may prove to be the "straw that breaks the camel's back".

In areas where snow lies upon the ground for long periods, the lower layers are full of tunnels. These tunnels are "home" for many small mammals which forage in safety and relative warmth under the snow. In areas where the snow falls unpredictably, it may still afford some temporary cover. By spring however, not only is the snow cover eliminated, but the wet, matted ground-cover has been stripped of much of its bounty. Food is scarce and shelter is harder to find. Early spring means that there is still time before the landscape will again provide food for the winter's survivors; weakened animals are still in jeopardy. Spring's fickle weather may dump sudden cold rain, sleet, or hail to soak and chill; heavy, wet snow may make foraging for what little food is left almost impossible.

Sudden spring storms may dump huge quantities of rain, sleet or hail adding an additional burden to the large, as well as, small terrestrial animals. Broad areas may be too muddy to navigate. Even deer may find it difficult to get around and are occasionally mired, unable to free themselves. They either die of starvation or succumb to predators.

Although we regularly speak of snow, rain, sleet and hail as a part of our weather, are we always sure of what initiates them? Here are some brief definitions of these four common phenomena.

SNOW- begins as a nucleus of dust or salt in the air which attracts molecules of water from cloud droplets. As the water molecules accumulate on the nucleus, they form ice crystals, which become larger as more water molecules are added, then fall to earth as snow.

RAIN- begins when the microscopic droplets in clouds become so concentrated that they join together into larger droplets. When they become heavy enough, they fall to earth.

SLEET- begins as rain which falls through a very cold layer of air on its way to earth.

The droplets freeze into solid icy raindrops as they continue falling to the ground.

HAIL- begins as sleet but is thrown back into the raincloud by thunderstorm updrafts. Back in the raincloud, the droplets pick up another layer of water and fall again. This continues until the updrafts are unable to keep the increasingly heavier drops airborne. Hailstones are known to reach 3" in diameter; the largest precipitate to fall from the skies!

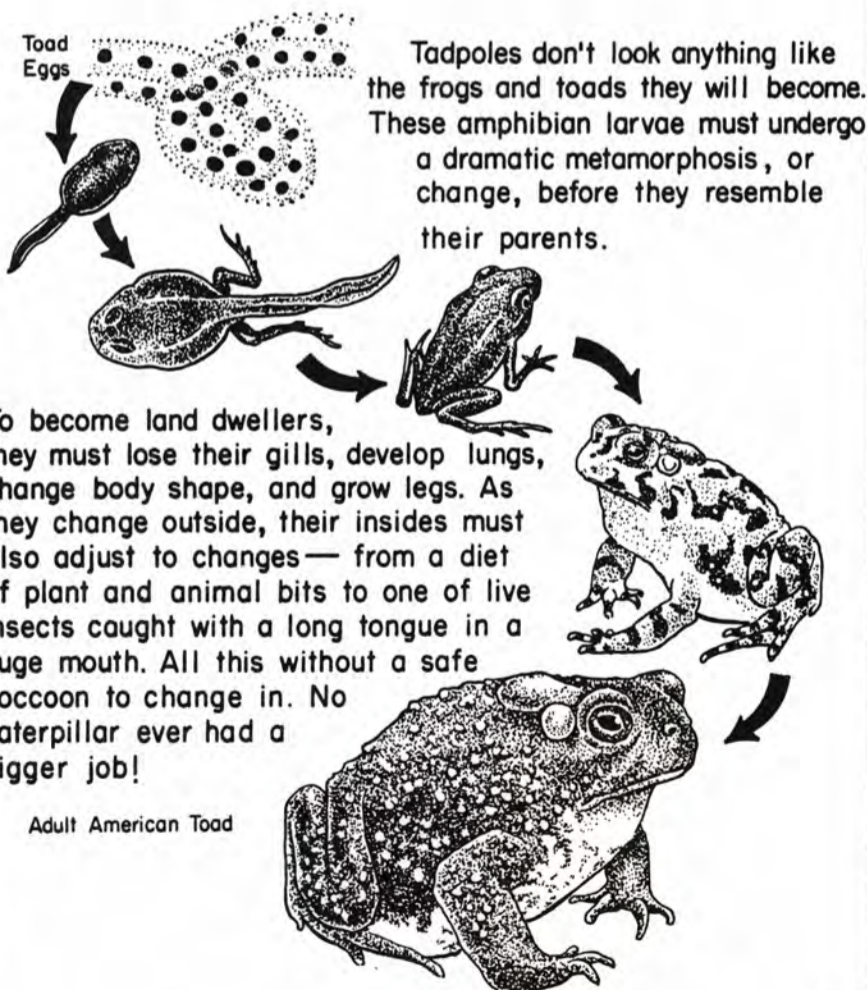
Knauth, P. 1972. *The North Woods Time*-Life Books, NY.

Stokes, D. 1976. *A Guide to Nature in Winter*, Little, Brown and Co., Boston.

© 1984 John Wiessinger

8458

Major Overhaul



Tadpoles don't look anything like the frogs and toads they will become. These amphibian larvae must undergo a dramatic metamorphosis, or change, before they resemble their parents.

To become land dwellers, they must lose their gills, develop lungs, change body shape, and grow legs. As they change outside, their insides must also adjust to changes — from a diet of plant and animal bits to one of live insects caught with a long tongue in a huge mouth. All this without a safe cocoon to change in. No caterpillar ever had a bigger job!

Adult American Toad

© 1986 John Wiessinger R.B.Y.E. Box 453 Etna, NY 13062

8613

RIGHT BEFORE YOUR EYES - Major Overhaul

The word "tadpole", comes from medieval English, *tadd* or *tade* meaning "load", and *poll* meaning "head". The term tadpole "larva" may sound inappropriate. We normally reserve this term for immature insects, but a larva can refer to any animal whose immature stage differs radically from the adult. Tadpoles certainly fit this definition! While many insects metamorphose out of sight within a cocoon, tadpoles can be watched daily as they change from an aquatic to a terrestrial world. This transformation, called metamorphosis, may take anywhere from a few weeks to several years (the Bullfrog takes 2 to 3 years), depending upon the species and water temperature.

When tadpoles hatch, they do not move about much at first but use a tiny pair of adhesive discs to cling to objects while they absorb the remains of their yolk sac. Initially, each tadpole has external gills, but these are replaced by internal ones within a few days. Once the gills are internal, water enters the mouth, passes over the gills through the gill chamber to provide the necessary oxygen, and exits through a small spout, called a spiracle, on the left side of the head. A tadpole's narrow mouth is equipped with cutting jaws and small rasping teeth for feeding upon a wide variety of plant and animal material. If you quietly approach a pond containing tadpoles, you can watch them nibbling along the bottom or on plants and debris in the water as they feed.

As the tadpole grows, hind legs appear while front legs develop beneath the skin. As the time for emergence from the water nears, the tadpole stops eating, receiving all of its nourishment from its ever-shrinking tail. The head takes shape, the mouth broadens, and the eyes develop lids and begin to protrude. Internally, gills disappear as lungs take over the job of respiration. Because the digestion of animal matter is not as complex as the digestion of plant material, the intestines shorten as the diet changes from omnivorous (both plant and animal) to entirely carnivorous. The tail is the last vestige of its larval life to disappear, continuing to nourish the animal until it is completely transformed.

Most young frogs and toads leave the water in early summer, but the timetable may vary considerably. Emergence is probably the most critical stage in their lives. They are a choice target for predators and their thin skin makes them very susceptible to dehydration. Within a short time, their numbers will be drastically reduced. It's no wonder so many eggs are needed to ensure that enough survive each year to carry on the species.

Can tadpoles be kept in an aquarium? Yes. They make interesting "pets" and their progress is fun to follow. They should have plenty of space and plenty of water surface area so that the water will contain enough oxygen. They can be fed commercial fish food. Keep the tank away from direct sun. Bottom debris from a pond helps provide more natural food. Once they have well-formed legs they should have a way of leaving the water.

Logier, E. 1952. *The Frogs, Toads and Salamanders of Eastern Canada*. Clarke, Irwin & Co. Limited., Canada.

Porter, G. 1967. *The World of the Frog and the Toad*. J.B. Lippincott Co. NY.

Zim, H. & Smith, H. *Reptiles and Amphibians*. Western Pub. Co., Inc., Racine, WI.

© 1986 John Wiessinger R.B.Y.E. Box 453 Etna, NY 13062

8613

John Wiessinger is a free-lance illustrator and author. Address inquiries to Box 453, Etna, NY 13062

AMERICAN ENVIRONMENTALISM: OUR LITERARY AND ARTISTIC HERITAGE

Charles H. Yaple

With the colonization of the "New World" by European powers in the late 1600's, European settlers brought culturally influenced attitudes which generally caused them to view wilderness as an obstacle to civilization and human survival itself. Notions of "conservation" of natural resources were practically non-existent given the situation facing pioneers in what often was a hostile environment. Indeed, progress was measured in the number of acres of cleared land one could bring to pass.

Despite the pressures of survival, a fairly significant number of influential Americans held ambiguous attitudes towards nature. While viewing a pristine natural landscape, no less a wilderness conqueror than Daniel Boone once remarked:

No populous city . . . with all the varieties of commerce and stately structures could afford so much pleasure to my mind as the beauties of nature I found here.

Other Americans, including Thomas Jefferson, actually boasted about the beauty and uniqueness of the land. Jefferson argued that the trip across the Atlantic was worthwhile if the visitor came only to view the American countryside.

Two cultural forces of the times, "Nationalism" and "Romanticism", fueled the ambivalence expressed by Boone and others. Struggling for acceptance in the world of nations, many American leaders in art, literature and politics found themselves expressing pride in the young country's wilderness. Taking quickly to the romanticists' enthusiasm for the remote, solitary and mysterious, American artists and writers began to produce works proclaiming the virtue of wild land. In a relatively short span of time a number of individuals including William Cullen Bryant, James Fenimore Cooper, Ralph Waldo Emerson, Henry David Thoreau and others utilized their talent with the written word to both promote the values of nature and bemoan the rapid negative impact that advancing civilization was causing. Their efforts were supported by the artistic endeavors of wildlife painter John James Audubon and the

landscape masterpieces of Thomas Cole, Asher Durand, Frederick Church, Albert Bierstadt, Thomas Moran and others.

As the young nation emerged from the Civil War other literary figures joined their predecessors in raising public consciousness about the value of nature and played important roles leading to the establishment of the National Park System. The ideas of George Catlin, George Perkins Marsh, Frederick Law Olmstead and others set the stage for rapid designation of numerous national parks in the late 1800's and early 1900's.

The dynamic personalities, and writings, of John Muir and Theodore Roosevelt were also instrumental in making preservation/conservation sympathies into law. Influenced by Muir and first Chief United States Forester, Gifford Pinchot, Roosevelt's presidency embraced the establishment of many national forests, parks and wildlife refuges. Indeed, it was during Roosevelt's administration that the very term "conservation" was coined.

A growing nature study movement, initiated by the writing and teaching of Louis Agassiz, Aldo Leopold and others began to mature into the science of ecology during the first half of the twentieth century as concepts concerning the interrelatedness of life were popularized. In a span of some thirty years Leopold laid the groundwork for turning wildlife management into a legitimate science, served prominently in several conservation organizations and helped found the Wilderness Society.

Taking a cue from John Muir's ability to influence a President, Jay "Ding" Darling utilized his pen to coax Franklin Delano Roosevelt into supporting wildlife legislation. An editorial cartoonist and Pulitzer Prize winner, Darling used his syndicated newspaper connections to generate public support for wildlife related laws including the Duck Stamp Act of 1934. Working with the newly created American Wildlife Institute, the Izaak Walton League, the Audubon Society and others, Darling's efforts, by 1940, had helped double the acreage held by the federal wildlife refuge system.

The end of World War II and Linnie Marsh Wolfe's winning of the Pulitzer Prize for her biography of John Muir, launched a revival of interest in conservation issues. A succession of artists and writers including Ansel Adams, Aldo Leopold, Joseph Wood Krutch, Edwin Teale, William O. Douglas, Bernard DeVoto, Eliot Porter, Roger Tory Peterson and many others made significant contributions that led to the environmental decade of the 1970's. The writing of DeVoto and Krutch along with the art of Adams and Porter became regular fare for Sierra Club publications and adorned the coffee tables of many influential Americans.

Seldom does one book launch an immediate movement of world significance. Yet, that is exactly what author Rachel Carson accomplished. Published in 1962, *Silent Spring* became the "Uncle Tom's Cabin of modern environmentalism" by directly tying human survival to the ecological viewpoint. Within a decade millions of people would label themselves "environmentalists" and through some 3,000 organizations produce an avalanche of activism, literature and legislation causing the 1970's to be called the "era of Environmentalism." Writers such as Paul Erlich, Barry Commoner, and Barbara Ward became famous as they documented the numerous environmental dangers facing humankind.

Much progress has been made since Carson wrote *Silent Spring* but many environmental dangers still exist. Every minute acres of tropical rain forest disappear, hundreds, perhaps thousands, of toxic waste dumps threatened the health of present and future generations and acid rain falls from our skies. Many battles to protect our natural heritage have been won but the struggle lingers on to preserve the Earth.

May the work and inspiration of the great writers and artists of the past motivate and energize those who would continue their efforts to preserve the earth and all its creatures. □

This narrative is a summary of a slide/tape presentation which traces the history of American environmentalism in terms of contributions made by American writers and artists.

DR. CHARLES H. YAPLE is a Professor of Recreation at SUNY College at Cortland.

(American Environmentalism: Our Literary Heritage – Yapple)

Selected Bibliography

Entries without publisher names indicate that the book is out of print. When two dates are entered the original publication date is enclosed in parentheses.

- Abbey, Edward. *Desert Solitaire*. Old Saybrook, Connecticut: Peregrin Press, 1982. (1968)
The Monkey Wrench Gang. New York: Lippincott Company, 1975.
- Agassiz, Louis. *Methods of Study in Natural History*. Salem, New Hampshire: Ayer Company Publishers, 1970. (1863)
- Austin, Mary. *The Land of Little Rain*. Magnolia, Massachusetts: Peter Smith Company, 1973. (1903)
Earth Horizon. (1932)
- Bailey, Liberty Hyde. *The Holy Earth*. Ithaca, New York: New York State College of Agriculture at Cornell, 1980. (1915)
How Plants Get Their Names. Ithaca, New York: New York State College of Agriculture at Cornell, 1975. (1933)
- Barbour, Thomas. *Naturalist at Large*. 1943.
- Beebe, William. *Nature's Year*. Norwood, Pennsylvania: Telegraph Books, 1982. (1906)
Edge of the Jungle. Mattituck, New York: Amereon Limited, 1986. (1921)
- Berry, Wendell. *The Gift of Good Land: Further Essays Cultural and Agricultural*. San Francisco: North Point Press, 1981.
A Place on Earth. San Francisco: North Point Press, 1983.
- Beston, Henry. *The Outermost House*. New York: Random House, 1976. (1928)
- Blanchan, Neltje. *Birds That Hunt and Are Hunted*. 1898.
- Bolles, Frank. *Land of the Lingerin' Snow*. 1891.
- Brewster, William. *October Farm*. 1936.
Concord River. 1937.
- Brooks, Paul. *Speaking for Nature: How Our Literary Naturalists Have Shaped America*. Boston: Houghton/Mifflin, 1980.
- Bryant, William Cullen. (1794-1878) Poet, Naturalist, Man of Letters.
- Burgess, Thornton. *Old Mother West Wind Stories*. Mattituck, New York: Amereon Limited, 1986. (1910-1951)
- Burroughs, John. *Camping and Tramping With Roosevelt*. Salem, New Hampshire: Ayer Company Publishers, 1970. (1906)
Wake-Robin. (1871)
Winter Sunshine. (1875)
Locusts and Wild Honey. (1879)
- Carson, Rachel. *Silent Spring*. Boston: Houghton/Mifflin, 1962.
The Edge of the Sea. Boston: Houghton/Mifflin, 1979. (1955)
The Sea Around Us. New York: Oxford University Press, 1961. (1951)
- Chapman, Frank M. *Autobiography of a Bird-Lover*. 1933.
- Commoner, Barry. *The Closing Circle*. New York: Alfred Knopf Company, 1971.
- Comstock, Anna Botsford. *Handbook of Nature Study*. Ithaca, New York: Comstock Press, 1986. (1911)
- Coues, Elliot. *Key to North American Birds*. Salem, New Hampshire: Ayer Company Publishers, 1974. (1872)
- DeVoto, Bernard. *The Easy Chair*. Salem, New Hampshire: Ayer Company Publishers, 1985. (1955)
- Dillard, Annie. *Pilgrim at Tinker Creek*. New York: Harper and Row, 1985.
- Dubos, Rene. *Celebrations of Life*. New York: McGraw-Hill, 1981.
The Wooing of Earth. New York: Scribner Company, 1980.
- Ehrlich, Paul. *The Population Bomb*. New York: Random House, 1976. (1968)
- Eiseley, Loren. *The Immense Journey*. New York: Random House, 1985. (1957)
- Emerson, Ralph Waldo. *Collected Works of Ralph Waldo Emerson: Nature, Addresses and Lectures*. Cambridge, Massachusetts: Harvard University Press, 1979. (1836-1882)
- Fairchild, David. *The World Was My Garden*. 1941.
- Flagg, Wilson. *Studies in the Field and Forest*. 1857.
The Birds and Seasons of New England. 1875.
- Forbush, Edward Howe. *Birds of Massachusetts and Other New England States*. Salem, New Hampshire: Ayer Company Publishers, 1985. (1925-29)
- Fox, Stephen. *John Muir and His Legacy*. Boston: Houghton/Mifflin, 1984.
- Grinnell, George Bird. *American Big Game and Its Haunts*. 1904.
- Grinnell, George B. and Sheldon, Charles (eds.) *Hunting and Conservation*. Salem, New Hampshire: Ayer Company Publishers, 1970. (1925)
- Higginson, Thomas Wentworth. *Outdoor Papers*. 1863.
Army Life in a Black Regiment. New York: Norton Company, 1984. (1870)
- Hornaday, William Temple. *Our Vanishing Wildlife: Its Extermination and Preservation*. Salem, New Hampshire: Ayer Company Publishers, 1970. (1913)
- King, Clarence. *Mountaineering in the Sierra Nevada*. Lincoln, Nebraska: University of Nebraska Press, 1970. (1872)
- King, Thomas Starr. *The White Hills*. 1860.
- Krutch, Joseph Wood. *The Desert Year*. Tucson, Arizona: University of Arizona Press, 1985. (1952)
The Voice of the Desert: A Naturalist's Interpretation. New York: Morrow Company, 1971. (1954)
- Lanier, Sidney. *Florida: Its Scenery, Climate and History*. Gainesville, Florida: University of Florida Press, 1973. (1875)
The Marshes of Glynn. 1875.
- Leopold, Aldo. *A Sand County Almanac*. New York: Oxford University Press, 1949.
- Lord, Russell. *Behold Our Land*. New York: Da Capo Printing, 1974. (1938)
- Marsh, George Perkins. *Man and Nature*. Cambridge, Massachusetts: Harvard University Press, 1986. (1864)
- Marshall, Robert. *Alaska Wilderness: Exploring the Central Brooks Range*. Berkeley, California: University of California Press, 1970.
Arctic Village. 1933.
- McHenry, Robert and VanDoren, Charles (eds.) *A Documentary History of Conservation in America*. New York: Praeger Publishers, 1972.
- Miller, Olive Thorne. *Bird Lover in the West*. Salem, New Hampshire: Ayer Company Publishers, 1970. (1900)
With the Birds in Maine. 1904.
- Mills, Enos. *In Beaver World*. 1913.
The Story of a Thousand-Year Pine. 1914.
- Muir, John. *My First Summer in the Sierra*. Boston: Houghton/Mifflin, 1979. (1911)
The Story of My Boyhood and Youth. Madison, Wisconsin: University of Wisconsin Press, 1965. (1913)
Travels in Alaska. Boston: Houghton/Mifflin, 1979. (1915)
A Thousand-Mile Walk to the Gulf. Boston: Houghton/Mifflin, 1981. (1916)
- Murphy, Robert Cushman. *Bird Islands of Peru*. 1925.
Logbook for Grace. 1947.
- Nash, Roderick. *Wilderness and The American Mind*. New Haven, Connecticut: Yale University Press, 1967.
- Olmstead, Frederick Law. *Journey in the Back Country*. New York: Lenox Hill Publishers, 1970. (1860)
- Olson, Sigurd. *The Singing Wilderness*. New York: Knopf Company, 1956.
The Lonely Land. New York: Knopf Company, 1961.
Open Horizons. New York: Knopf Company, 1969.
Wilderness Days. New York: Knopf Company, 1972.
Reflections from the North Country. New York: Knopf Company, 1976.
- Osborn, Henry Fairfield. *Impressions of Great Naturalists*. 1928.
- Osborn, Fairfield. *Our Plundered Planet*. 1948.
Limits of the Earth. Westport, Connecticut: Greenwood Publishing, 1971. (1953)
- Parkman, Francis. *The Oregon Trail: Sketches of Prairie and Rocky Mountain Life*. Williamstown, Massachusetts: Corner House, 1980. (1849)
- Pamer, E. Laurence. *Fieldbook of Natural History*. New York: McGraw-Hill, 1975.
- Peattie, Donald Culross. *An Almanac for Moderns*. Boston: Houghton/Mifflin, 1986. (1934)
- Pinchot, Gifford. *Adirondack Spruce. A Study of the Forest in Ne-Ha-Sa-Ne Park*. Salem, New Hampshire: Ayer Company Publishers, 1971. (1907)
- Powell, John Wesley. *Report on the Exploration of the Colorado River of the West*. 1875.
- Roosevelt, Theodore. *Ranch Life and the Hunting Trail*. New York: St. Martin's Press, 1985. (1888)
The Wilderness Hunter: An Account of the Big Game of the US and Its Chase with Horse, Hound and Rifle. New York: Irvington Publications, 1986. (1900)
- Sears, Paul B. *Deserts on the March*. Norman, Oklahoma: University of Oklahoma Press, 1980. (1935)
- Seton, Ernest Thompson. *Wild Animals I Have Known*. 1898.
Trail of an Artist-Naturalist. Salem, New Hampshire: Ayer Company Publishers, 1978. (1940)
- Sharp, Dallas Lore. *The Face of the Fields*. Salem, New Hampshire: Ayer Company Publishers, 1986. (1911)
- Stegner, Wallace. *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West*. Lincoln, Nebraska: University of Nebraska, 1982. (1954)
- Stratton-Porter, Gene. *The Song of the Cardinal*. Folcroft, Pennsylvania: Folcroft Publications, 1977. (1903)
- Teale, Edwin Way. *The Wilderness World of John Muir*. Boston: Houghton/Mifflin, 1954.
The American Season. New York: Dodd, Mead and Company, 1981. (1951 +)
- Thoreau, Henry David. *Walden*. White Plains, New York: Pauper, Peter Press, 1966. (1854)
The Natural History Essays. Salt Lake City: Peregrine Smith Books, 1984. (1842 +)
- Torrey, Bradford. *Birds in the Bush*. 1885.
A Rambler's Lease. 1889.
- Vogt, William. *Road to Survival*. 1948.
- Wallace, David Rains. *The Klamath Knot*. San Francisco: Sierra Club Books, 1983.
The Turquoise Dragon. San Francisco: Sierra Club Books, 1985.
- Ward, Barbara Jackson. *Spaceship Earth*. New York: Columbia University Press, 1966.
- Wolfe, Linnie Marsh. *Son of the Wilderness*. New York: Alfred Knopf Company, 1945.
- Wright, Mabel Osgood. *The Friendship of Nature*. 1894.
Birdcraft. 1895.

GOOD READING



A BOOK ABOUT BOOKS

THE MUSEUM OF SCIENCE AND INDUSTRY BASIC LIST OF CHILDREN'S SCIENCE BOOKS, 1987, compiled by

Bernice Richter and Duane Wenzel, 1987, American Library Association, 72 pp. Author and Title indexes. \$8.95 plus \$1.50 shipping cost (50¢ for each additional book). Order from Museum of Science and Industry, 57th Street and Lake Shore Drive, Chicago, IL 60637.

This 8½ x 11 book containing information on approximately 500 currently in-print children's science books that have been published between 1983 and 1986 should be a part of every school and library. The book is organized into 17 alphabetized main subject divisions e.g. animals, astronomy, environment/conservation, math/computers, et al. Books are arranged alphabetically by title in each division. Information on each book includes author, illustrator, publisher, publication date, and cost, followed by a short summary of contents, and a list of major reviewers. Marginal Keys provide instant grade level information and a rating of the book's quality.

These 5 ratings, ranging from AA strongly recommended, A recommended, B good, C acceptable quality to D not recommended, provide additional information on the books. The ratings are based on 8 factors: accuracy, currency, author's qualifications, organization and format, illustrative matter, literary qualities, balance and objectivity and promotion of scientific attitudes and skills. It is not surprising to find a large number of Eva L. Gordon Award winners' books, including ones by this year's Patricia Lauber with double A ratings.

Appendixes include: a list of 38 source books for adults following the same useful format as the children's books, a list of science magazines for children providing name, address, price, age level, and number of issues per year, a similar list of review and science education journals for adults and a directory of more than 200 publishers whose books appear in this listing.

Two earlier books are still available: the 1973-84 Basic List for \$9.75

and the 1986 Basic List Supplement for \$6.95.

Helen Ross Russell □

MARSHES OF THE OCEAN SHORE: DEVELOPMENT OF AN ECOLOGICAL ETHIC by Joseph V. Siry. (College Station, Tex.: Texas A. and M. University Press, 1984. 216 pp. Illustrations, notes, and index).

Siry's book traces the history of usage and management of salt marshes from early colonial times to the present, with a brief review of modern ecological research on tidal marshes. For a long period of time they were mismanaged (drainage, ditching, dredging, filling). The goal was reclamation for land use and needs of navigation rather than conservation of a natural resource for maintaining the water cycle, purification of water, habitats for wildlife, providing nutrients for ocean life and for aesthetic values. Few people appreciated the ecologic, economic and recreational importance of tidal wet lands. John and William Bartram were



among the first naturalists to do so; Samuel L. Mitchell was an early supporter for protection of marshes. Writers such as Alexander Wilson, Audubon, and Thoreau made the public aware of the natural beauty of marshlands. The early conservation proposals of such men as George Perkins Marsh and John Wesley Powell are reviewed.

Not only salt marshes are considered, but also their relation to freshwater marshes of the estuaries, upland forest and farmland, and adjacent life of the ocean. Pioneers like George Perkins Marsh "grasped the entire dynamism of living systems and their dependence on an undisturbed environment" (p. 78). His work "became the foundation of the subsequent drive to protect the country's natural resources" (p. 79); "the perceptions held by Marsh, Ruffin, Olmsted, and Ellet formed the core of an organic ideology" (p. 81.) which eventually led to government policies. The controversy between land reclamation and development on one hand and management of a natural resource by ecological principles on the other hand is traced historically. Marshlands were usually regarded by the political and economic sector of society as wastelands. Aldo Leopold developed a land ethic for conservation based on ecological cycles and the interrelatedness of all living things and their environment. The central theme of the book is "an inherent conflict between ecology and economics" (p. 132). The role of Rachel Carson in popularizing the need for preserving and maintaining marine communities is brought forth. Modern studies on marshes and their productivity by such ecologists as E. P. Odum and his associates are outlined and applied to problems of management. Federal, regional, state, and local efforts to manage marshes, not always for the common good, are traced historically. Gradually it is becoming apparent that "estuaries are integral parts of the earth's ecology" (p. 188) and as a result of the efforts of many naturalists, conservationists, and public-spirited politicians, natural resources such as wet lands are looked upon with an "ecological view of mankind's place in nature" (p. 189).

Ralph W. Dexter
Emeritus Professor of
Biological Sciences
Kent State University □

CHOOSING THE RIGHT BOOK: A LIBRARIAN'S VIEW

Patricia Manning



Books are important. Books can, and do, change people's lives. Good books on natural history can help children to begin to understand, or at least recognize, the natural world around them. The best books (of any sort) enable children to begin to understand themselves, to discover who they are and what they are, and where their particular niche in the world may be. Once this is accomplished, those good books help you grow. Good books give you information, but they give it in such a way as to send you into the backyard at night, imagining stars being born, and growing old. They let you look at the fossilized bones in a museum exhibit and see the long-dead animal fleshed and muscled and striding across a prehistoric landscape. They let you feel the inexorable pressures below the surface of the earth slowly turning long-buried forests into coal. They let you see the barbed intricacies of a flight feather, the geometric patterns of snowflakes, and allow you to wonder how a butterfly can even begin to know how (and where) to migrate. They give you a glimpse of the world as an entity of complex, intertwined and interdependent systems upon whose correct balances all life on earth depends.

This may seem like a lot to expect from books, but the good books, the best books, are certainly able to meet, and even excel, these high expectations.

Such quality informational books for children were not easily come by when I was growing up, and as an adult I have made it a small crusade to make sure the better books being written now for children on a wide range of nonfiction topics are there on the shelves in the children's room for our young patrons' pleasure and enlightenment. My own early interest in dinosaurs was frustrated by the dearth of information about them in our local library, so it may come as no surprise in these more halcyon days that the Eastchester Public Library has two fat shelves full of good, up-to-date, well written and nicely illustrated books on these prehistoric critters,



Photo Archives of Manhattan Country School

and the other wildlife that shared early earth with them! (Dinosaurs, by the bye, never go out of style, being beloved by children in each generation, fascinated by these safe monsters that will never lurk under a bed at night. Extinction has its blessings when you're in the dark, alone!)

I have been reviewing and selecting books for almost 18 years now, and know what I am looking for in a book of natural history, and also how to look for natural history in books where it might not be expected. As a librarian, I can also select a "special" book which may have limited appeal but be a good, well-written, informative work. Communities are usually large enough to produce more than one child with the same particular or "special" interest, and as new children grow into the children's room each year (as their predecessors grow out of it) there are always new readers coming along to justify expenditure on those "special" titles. I find comfort too in thinking that some of these more demanding, more specific books may be the nucleus of a life-

long interest in natural history (or any other field), an interest which may even develop into a fulfilling, challenging career.

Well, what do I, as reviewer, librarian, and sometime naturalist/scientist look for in a book on natural history? Some things are quite basic, and hold true with any nonfiction work I might evaluate.

Accuracy is first. Children believe that anything they see in print is true, particularly if the spine of the book is graced with a Dewey Decimal Number. Just because a book is classified as nonfiction doesn't mean it is accurate, not these days. There are too many careless writers and too many uninformed editors about to accept a book at face value when it comes to accuracy. Even picture books, easy readers, and works of fiction (such as animal "biographies") need some scrutiny if they are being considered for their "scientific" content. Second, after accuracy, is approachability. If a reader can't get into a book because of poor writing or sloppy organization, or if the whole thing is so sandstorm

dry that no amount of mental chocolate milk will ever wash it down, then accuracy is no panacea. Thirdly, good format. I look for a book with a nice balance of white space, a pleasing type face, and crisp, clear photographs, drawings or diagrams; a book that "feels" good to the hand and engages the eye. An attractive cover is a pleasing bonus.

Besides the quality control of accuracy, decent writing and good organization, there is one more aspect to the text that may be even more important (though not so easily recognized.) It is a combination between the author's interest and/or enthusiasm for the subject and his/her ability to transmit this feeling into the text (without being obtrusive) so as to arouse interest, enthusiasm and even awe and wonder in the reader. Not many authors have that capacity, nor do many books have that quality. A lot are quite readable, useful and informative books that are welcome additions to any collection of natural history works, but just don't have the special magic in them that ignites a spark in the young reader (or the older one, for that matter.)

Even picture books have to be considered in this way, for such books may open windows for the very young, showing them landscapes they had not even known were there. Picture books can be rich sources of knowledge of the natural world, and such knowledge is usually presented in a comfortable, non-intimidating manner. Seasonal changes, the infinite variety of animals and plants, animal behavior, and ecology — even the process of metamorphosis — can be and are encompassed between the covers of amusing, entertaining, and enlightening picture books for preschoolers and "older" young children.

Books are important. They can, quite simply, affect us for our entire lifetime. And if children can come to realize the beauty, the wonder, and the delight of the infinite variety of the natural world about them, and of humankind's need for this world both for aesthetic pleasure and for simple survival, through the pages of a book, the world will be the better for it. □

PATRICIA MANNING is Children's Librarian at Eastchester Public Library, 11 Oak Ridge Place, Eastchester, New York.

REVIEWING AND SELECTING NATURE BOOKS FOR CHILDREN



Eva L. Gordon

It is forty years since the American Nature Study Society held its first program on science books for children at the Annual Conference of the American Association for the Advancement of Science in Washington, D.C. This program consisted of a panel with Eva Gordon representing reviewing, Edith Patch an early author of children's science books, Glenn O. Blough, a teacher with wide experience in elementary education and Mrs. Hamilton, an editor of children's books for William Morrow.

Eva L. Gordon's remarks on that occasion were originally published in School Science and Mathematics, in November 1949. For many years reprints of it were used in her course and other courses in children's literature. The article, excerpted below, is timeless, and if we substitute environmental education for nature study, it is dateless.

As I thought about this program, it seemed to me that my place in it was that of a "middleman" between the producers of children's nature books, as represented by Miss Patch and Mrs. Hamilton, and the consumers, whose problem was presented by Mr. Blough. Just as the job of any middleman reaches toward both the producer and the consumer, so, it seems to me, the reviewer and selector of nature books—or of any books, for that matter—could and should contribute in both directions.

Let's take first some of the qualities that have seemed particularly significant in evaluating nature and science books for children. Although these criteria were developed chiefly from examination of non-textbooks, it is believed that the same general considerations would apply to textbooks. Such qualities may be grouped in at least three classes: those concerned with the books themselves, qualities of content and format which can be judged by examination of individual books; those concerned with the preparation and production of books, such as author's purpose and background, the illustrator, the publisher and his policies, and cost; and those concerned with the reviewer or selector, the purpose, background and personal preferences.

CONTENT

Content is obviously the most important of the factors concerned with the books themselves. The subject-matter field and the scope of content are first considerations of the re-

viewer: with what materials a given book deals and the breadth, or detail, or emphasis with which its subject is treated. Children's nature books vary as widely in scope as in subject-matter, from a tiny book that deals with so simple a subject as the seasonal growth of an apple tree to one that attempts to survey the entire plant and animal kingdoms. What a book does and does not do determine to a large extent its usefulness to any given prospective reader, and the reviewer who fails to give an adequate description of content is limiting the value of his contribution. The highly generalized descriptions which frequently appear in brief annotations often fail in this respect, and give little information beyond that implied in the title.

ACCURACY

Most persons asked to suggest the most important quality of children's books in nature and science, probably would name accuracy. As I have worked with these books I have come to feel that accuracy, whether of text or of illustration, is not simply a matter of correct factual detail, although I cannot emphasize enough my belief that books should be as free from misstatement and incorrect illustration as is humanly possible. It seems to me that there is no reasonable excuse for a statement such as the following—and I quote: "The pistil is the organ bearing the ovule, which is the bud inside it. The part of the plant which contains the pollen is called the anther, part of the pistil," which appeared in a comparatively recent, widely publicized

book. Of course, such statements can be put to use by one who recognizes them as inaccuracies to develop in children the habit of evaluating sources of information, but that possibility does not seem sufficient justification for failing to insure that, factually, material is in accord with the knowledge of recognized specialists. It is satisfying to note that careful attention to this factor is increasingly evident.

Accuracy, however, seems a much more complex matter than avoidance of vagueness or misstatement. It implies, for one thing, discrimination between proved or demonstrable truth and theory or hypothesis. An explanation of the origin of the universe or a description of the habits and appearance of prehistoric animals may be stated not as what we believe to be possible on the basis of evidence we have, but in terms as positive as might be used to tell how one made his garden or to describe the appearance and behavior of a pet cat. Accuracy means also, a willingness to say "I don't know," and in general, avoidance of sweeping statements and sparing use of such words as "all," "every," and "always." It means, too, careful expression in terms not necessarily technical, but at least not in conflict with scientific language that will come into the child's later experience. One "horrible example" in this respect concerns a frog, who, telling the story of his life, described the appearance of his legs and the disappearance of his tail, and finished by saying, "the very day that my tail disappeared I found that I could jump out of the water, I was no longer a fish. I was an animal—an animal—animal." Good performance in this matter of careful expression, always practiced by some authors, seems to be shown increasingly in the newer books, sometimes in judicious use of scientific names, and frequently in the use of well-defined, carefully explained terms instead of awkward, written-down expressions. More and more authors seem to recognize that a child able to talk about accelerators and ailerons and chrysanthemums and such does not need to have nectar called "the sweet juice of flowers" and can comprehend the distinction between "animal" and "mammal," or "bug" and "insect."

TYPE OF PRESENTATION

Accuracy is closely related, too, to

type of presentation, a much discussed question among producers and users of children's nature books, and one which evidently has no answer, judging from the variety of methods and devices used to sugar-coat or otherwise prepare the facts of nature for consumption by young readers. There is, first and foremost, what might be called direct presentation written in expository, narrative, or essay style, aimed simply to give information. Personally I prefer this type of presentation, especially when carefully prepared material is well written in simple, dignified style, and gives the same satisfying kind of information that informed parents frequently give orally in answer to their children's questions. Books of this type, designed for children of many ages, are appearing with growing frequency. Perhaps authors are trusting increasingly in the inherent interest of their subject as sufficient motivation for child readers. Besides these "direct" books, there are nature stories of many kinds, good, bad and indifferent. There are a few experiment books and books that direct various activities. A few books are presented in rhyme; and one or two in comic-strip fashion. Several more or less artificial devices of presentation are employed, examples of which appear in all types of books. It came to be a game to fit these into categories. There were, for instance, the autobiographies, in which creatures or inanimate objects told their own stories; the biographies, chiefly about animals, in which the life history, habits and sometimes ecological relationships of a species are presented through the life of a single animal, usually a young male, the boldest and most active of a family. Such stories vary from the strongly humanized type in which the animals are thinly disguised human beings to truly presented, accurate stories in which the characters behave naturally. There was the conversational presentation, in which information was conveyed through conversations among characters, human or otherwise. Among these conversational types were the "wise adult" stories and discussions in which information was given to one or more children usually by one particularly well-informed adult, sometimes a natural, everyday person, sometimes a stilted walking encyc-

lopedia who knew all the answers. Then there were the fanciful presentations: the Alice-in-Wonderland type, where observers, changed to unnatural size and usually in charge of some supernatural character, learned about natural phenomena by imaginary observation; or where museum animals or gold nuggets or other things "came alive" and related their stories; or where a boy or a girl was transported through the power of imagination into a different time or into a different space relationship than his own. And there were what might be christened the Hip-hip-hooray type, written in the over-chatty, over sprightly style that sensationalizes the things discussed. Such devices of presentation seem to have been used more frequently and in more extreme form in older books than in the more recent ones, but in any case their importance in determining the worth of a book seems to lie primarily in the degree to which they interfere with the accuracy and realism of the situation presented.

While I prefer the direct presentation of nature material, I concede that variety in presentation has some advantage. I repeat that the method of presentation employed seems to be important only insofar as it affects the realism of the material—the quality of being essentially true to actual facts or conditions.

Choice and use of incident also affect realism and accuracy: the appropriateness and probability, the number, sequence, and relation to each other. Some stories made up of largely acceptable factual material have been so breath-takingly crowded with exciting incidents that they seemed unreal.

USEFULNESS

From the standpoint of usefulness to the science teacher, choice of facts and the manner of their use are undoubtedly of prime importance. Accuracy of the most painstaking sort is of small worth unless it contributes to worthy understandings, appreciations, attitudes or skills. Thus, I came to ask: What does a given book contribute to the building of science concepts? How does it help to develop desirable scientific attitudes? I am not going to elaborate these points. An illustration or two will suffice. For example, teleology, the tendency to

explain structure, function, practically anything in nature, in terms of purpose, is a common fault of children's books. I usually question those in which such expressions as "so that" or "because" appear commonly to explain structures or acts of living things. And sentimentality or prejudice such as the common attitude toward predatory animals should be largely absent from good books.

My next two criteria are matters largely of philosophy. If one believes that the nature and science experiences of young children should begin—and be largely concerned with—situations in which they can use evidence collected by their own senses as a basis of simple generalizations, good books should be closely related to the background and experience of the child by whom they are to be used. They should draw from common experiences of children data related to the concepts they present; and they should interpret truly everyday phenomena in terms their readers can understand. In addition, a good book, I believe, should stimulate its reader to further observation, to some worthwhile activity, or to continued reading.

The presence or absence of indexes, bibliographies and glossaries, and qualities such as timeliness, uptodate-ness, use to which adapted, grade or age suitability, geographic appropriateness, and format, need, I believe, no elaboration. Instead, I shall spend the rest of my time discussing those ideas about books and book production I mentioned at the beginning.

My first, and perhaps chief, suggestion is for more careful checking of content and illustration before publication, by qualified persons, to eliminate weaknesses and to emphasize desirable features. Many publishers evidently give much attention to this checking, but so many books could easily have been so much better. Whether this checking is done through the author or through the publisher is immaterial, but it would seem highly desirable that more and more books meet the three standards of scientific acceptability, educational worth, and excellence as children's literature. Such checking would seem especially desirable for books written by persons without extensive scientific training in the field concerned, in books of broad scope, and in books

dealing with complex subjects such as conservation of natural resources. I realize the idealism of such a suggestion, but I believe I am not alone in feeling the desirability of such procedure.

Excellent as are the illustrations in most modern books for children, I believe that higher standards could be set in books in nature study and science for accuracy, realism and general informational value. And attention to building more definite size concepts is especially desirable. Better conformity between quality of text and quality of illustration would be possible in many cases.



That brings me to grade placement. Publishers are giving increasing attention to suggesting grade or age ranges for which particular books have been planned. Such suggestions are valuable both to reviewers and to users. Most of us recognize the impossibility of setting up narrow or definite limits in this matter, but some qualification of the wide ranges frequently stated probably is needed. Perhaps this qualification could best be provided by re-

viewers, taking into account not only reading difficulty, but such considerations as the concentration of ideas and the type and extent of background required for understanding.

AUTHORSHIP

As to authorship, I am unable to conclude that scientific training is in itself a guarantee of value. Authors with extensive scientific training and authors apparently without such background have written good nature books for children. The converse is also true. It seems however, that possession of training in science favors accuracy and sometimes clarity, attention to concepts and possibly to scientific attitudes, and care to stimulate observation and further activity. But training or experience closely related to the interests and reactions of children are also important factors in successful writing in those fields.

Several years ago Dr. Carroll Lane Fenton, an author of a number of books of nature study and science for children, and a frequent critic of such books, suggested a possibility worth considering. His idea was that a board of cooperating scientists, authors, illustrators, editors, educators and others interested in the production of nature and science books for children be set up. Here books could be cooperatively examined before they were published, persons who were preparing or wished to prepare books could receive suggestions, helpful reviews and publicity measures could be sponsored, and perhaps other activities carried on that would help to improve the quality of books in the field and the possibility of the right book reaching the right child at the right time. Responsibility for improvement in quality and construction rests largely with authors and publishers. But responsibility for better choice and use of books rests chiefly with booksellers, reviewers, parents, teachers, librarians and others who guide children's reading, and, perhaps to some extent, with the children themselves. But between these two groups, the producers and the consumers, are the reviewers and selectors, whose responsibility is to work in both directions. And so, in the memorable words of one of our graduate students, "I am right back to the conclusion I started with." □

TIPS FOR ENVIRONMENTAL EDUCATION

ACTIVITY: YOUR COUNTY ALMANAC

Stephan P. Carlson



Goal: To observe and record the natural events that are happening in your area.

Subjects: Science, social studies, English.

Grade Level: 5-12

Materials: — Field guides for birds, insects, mammals, flowers, weeds, grasses, reptiles, amphibians, etc.

— *A Sand County Almanac*, by Aldo Leopold.

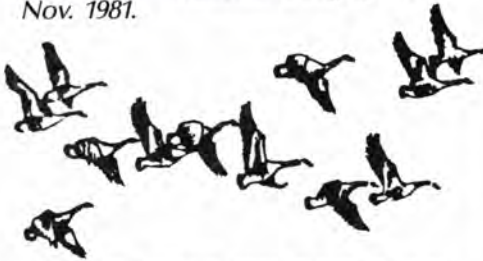
— Map of your local region.

— Calendar.

— Thermometer.

— Watch.

Background: "With his mother's opera glasses and a canister for collecting plants, Aldo would ride the streetcar to the end of the line and disappear into the woods. Often as not he carried his shotgun and a notebook, the beginnings of his prolific and literate journals." — *National Geographic*, Nov. 1981.



Leopold was a keen observer and wrote extensively about his observations and thoughts. He kept detailed journals, and asked his students to do so. Clay Schoenfeld, a well-known Wisconsin journalist, was a Wisconsin high school student in 1934 when he volunteered for a conservation club project led by Leopold. He kept a journal that summer, and over 30 years later wrote about the encouragement to "perceive" that he received from Leopold. "We weren't simply to be field hands; we were to observe, to ask questions, to try to put things together; in short, to 'perceive' as he later called it. We were to begin to practice 'deep digging' for facts, yet we were not to be blind to natural beauty."

Leopold's *A Sand County Almanac* was to become his most famous collection of natural history observations and thoughts.

Procedure: 1. Ask students: What is an almanac?

2. Read all or part of *A Sand County Almanac*, by Aldo Leopold. Why do you think Aldo Leopold called his book *A Sand County Almanac*?

3. Leopold was an expert in phenology and spent many hours pursuing this study. What is phenology? What does a phenologist do?

4. You, too, can be a phenologist. Create your own almanac! On a daily basis, observe and record the natural

and the return of a migratory songbird. (See p.28)

5. Share results of your phenological study with other interested individuals and organizations. Much useful and important information can be obtained from such records. Leopold greatly admired the contributions to the field of ornithology made by a woman who studied song sparrows in her neighborhood. Ask your local nature center, National Audubon Society Chapter, university natural resources

EDITOR'S NOTE:

(Aldo Leopold's *A Sand County Almanac* is frequently credited with launching the conservation ethic. Even with modern means of communication like television and computers nothing spans the years or has the potential for influencing thinking for illimitable time as does a well-written book combining what John Gustafson calls facts and feelings.

Leopold's *Almanac* started as a *Journal*, a day-by-day recording of small events, "grass drawing circles on the sand" to giant concepts, "importance of wild areas as norms for land science." I suspect that the journal initially was a project devised wholly for Leopold's enjoyment and for use in making comparisons in developing his concept of phenology or as a reference for future writing or teaching, because, as Dr. Hamilton points out in his article *Keeping a Journal*, no matter how keen our memories are, we do forget.

There is another aspect of journal keeping: it serves as a discipline, not just because it forces us to set time aside to write but also because it increases our sensitivity and intensifies our observation. When I was teaching college I required students to keep nature journals. One girl wrote at length about the beauty of the wisteria vine blooming over the

porch across the street from the dormitory. Two weeks later she went home, 100 miles to the north, and returned in a state of shock; the porch next to her parents' home was festooned with wisteria. She had lived there for eighteen springs but had never seen it.

As part of the Leopold centennial the Wisconsin Department of Natural Resources devoted their February 1987 *EE Newsletter* to the recognition of Leopold's contributions while providing activities that teachers could use to foster his philosophy and goals. The article which follows was prepared to help teachers structure a journal writing project. The work sheet provides guidance for beginners. With time, journal keepers will devise their own form of record keeping, or they may use work sheets like these as a basis for essays or poems.

"Journals" may include sketches with dated drawings (see Bob McClung's back cover). They may be kept on file cards as E.L. Palmer required his students at Cornell to do so that they could be filed alphabetically and repeated dated entries made. And, of course, in this day of the computer they may be put on floppy discs. No matter what the form, the observation and note taking comes first.

— Helen Ross Russell)

events that are happening in your yard, park, community, or county. Take note of both obvious and subtle changes that occur throughout the year. For example, note the first sign of autumn color on a familiar tree, the first snowfall of the season, the day the ice breaks upon a local pond, the blooming of a dandelion in the spring,

researchers, Department of Natural Resources biologist, or county Extension personnel for recommendations about how you can make your information useful to research projects.

STEPHAN P. CARLSON is director of Maywood Environmental Park, Sheboygan, WI.

Sample daily Observation Record Form:

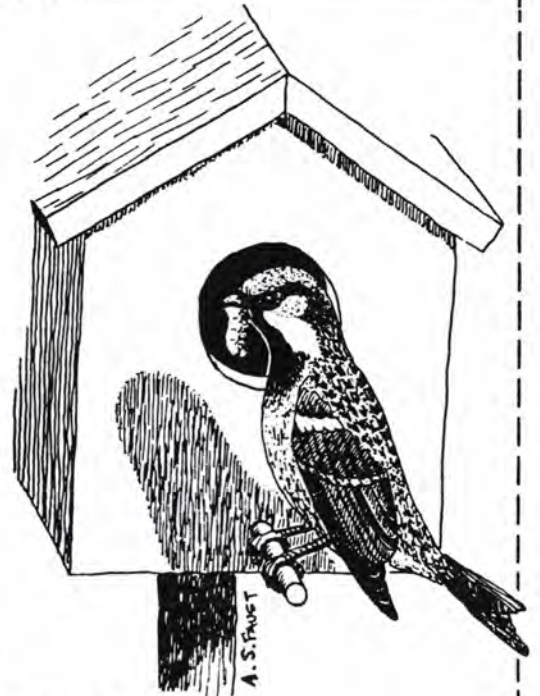
You can write a descriptive record of what you observe and your interpretations of what you see, or you might consider keeping a record as follows:

date _____ observer _____ place _____ time _____

temperature _____ precipitation _____ cloud cover _____

estimated wind speed _____ wind direction _____

Birds	Location	Notes
1. chickadee	maple tree	F, C
2. house sparrow (male)	nest box in backyard	F, feeding young
3.		
4.		



Mammals	Location	Notes
1. gray squirrel	telephone wire	T
2.		
3.		

Insects	Location	Notes
1. bumble bee	yard	flew by without stopping
2. ants	sidewalk	active around hole between sidewalk cracks
3.		

Activity Code: F = feeding, H = playing, M = maintenance (preening, cleaning fur), X = mating, T = travelling (flying, running), C = calling, P = playing, O = other (give details). (Feel free to make your own coding system for observing and cataloging animal behaviors.)

Plants	Location	Notes
1. maple tree	backyard	flowering; flowers in clusters; red and sticky; insects flying around them; looks like squirrels are eating them; some flower clusters falling to ground
2. dandelions	sunny frontyard	about 10 plants, averaging 3 flowers each; flowers close at night, open the next morning
3.		
4.		

Other observations and thoughts: _____

CONSIDERING THE PRISTINE

Thomas Tanner



I use three films and two sets of questions to try to raise my students' sensitivities toward the natural and pristine.

My students, ranging from freshmen to seniors, represent a variety of majors at a state land grant university. However, I believe these methods and materials could be used successfully with somewhat younger students of various populations.

The films are all set in the dramatic red canyonlands of southeast Utah. The first is *Operation Glen Canyon*, produced by the U.S. Bureau of Reclamation way back in the early 1960's. Today, prints may be purchased from Western Cine, 312 South Pearl, Denver CO 80209; (303) 744-1017. *Operation* shows the building of Glen Canyon Dam on the Colorado River, a job begun in 1956 and concluded in 1963. The film is of particular interest today because it is a product of another era, when "progress" and "growth" were unquestioned. Certainly they aren't questioned in this film. The second film is *Glen Canyon*, produced by the Sierra Club. It *does* do some questioning, as the reader might suppose. It shows the remarkable beauty of the slot canyons which were drowned forever by the dam. These canyons were in many places hundreds of feet deep and only a few feet across, from top to bottom. In places the slots were not vertical, so that one canyon wall overhung the canyon floor by scores of feet. The film makes the point that such beauty was lost because not enough people even knew it was there, to defend it. The few who did reach it did so by a long raft journey, though — as the film shows — the journey could be made by anyone, for technical skill was unnecessary. *Glen Canyon* can still be rented from the Film Library, University of South Florida, 4202 Fowler Avenue, Tampa, FL 33602; (813) 974-2874. The charge is \$9.50 plus round-trip shipping charges for three days, including the days of receipt and return.

Prior to showing these first two films I give my students some questions for their later consideration: (1) Do the films represent two different value systems, or ways of viewing the world?

Watch for specific clues in the narrators' words. The background music, the lighting. (2) If so, will these two value systems come into conflict more often or less often in the future? (3) Is such conflict limited to dams? and (4) A difficult question: What sort of standard, or criterion, should be used to settle such conflict?

The students write short essays for each of these, after seeing both films. I have handled this in various ways. Sometimes they work in small discussion groups, sometimes alone. Sometimes I obtain responses to all four questions, sometimes just one or two. Summaries of some reasonable re-

sponses follow.

(1) Utilitarian, subdue-the-earth, master over nature vs. esthetic, leave-some-beauty-untrammelled. Lusty narration, martial music, bright colors vs. quiet voice, quiet music, subdued tones.

(2) These two mindsets may come into conflict more often as pristine places become fewer and thus more precious to the growing number of people who care about them.

(3) No, the conflict occurs over high-ways, power plants, urban sprawl, and all sorts of development.

(4) This is a tough question, and I



accept a great variety of answers. I propose the criterion of diversity; does a proposed development increase or decrease the variety of habitats available to humans, habitats which they might value for whatever reason?

Even if the first film is not obtained, the second and third can be joined in an effective lesson.

The third film is *Lake Powell, Jewel of the Colorado*. Like the others, it is a quality color film, thirty minutes long, produced in the early to mid 1960's. It is the Bureau of Reclamation's direct response to the Sierra Club film, and in it the Bureau tries to duel the Sierra Club on its own ground, that of outdoor esthetics. We see people fishing, motorboating, and swimming in the new reservoir behind Glen Canyon Dam, and especially we follow a family as they explore the side canyons looking for Anasazi cliff houses and other human artifacts, and as they wade a stream and splash about in a plunge pool. We also see them, and many others, taking their boats almost to the foot of Rainbow Bridge to see that great and previously inaccessible wonder. *Jewel of the Colorado* can be borrowed free of charge from the Bureau of Reclamation, Attention Code D-822-A, P.O. Box 25007, Denver, CO 80225; (303) 236-6741.

After this film I distribute another set of questions for the students' written responses. Again, I vary the *modus operandi* and the number to which they are to respond, from time to time. The questions are flagrantly loaded and biased, a fact for which I make absolutely no apology:

(1) Often, in these battles, both sides will present the facts as they perceive them, leaving others wondering just where the truth lies. The conservation groups may exaggerate the potential bad effects of a proposed project. The developer may omit or ignore real dangers and relevant facts. In the film you just saw, in which you were shown the beauty that still remains in the side canyons, there was an omission. The lake hadn't yet been filled; it still had approximately 200 vertical feet to go. Remember the scenes of Rainbow Bridge National Monument, with no lake in sight. The waters of the filled lake are 47 feet deep at the foot of the bridge. Obviously, that changes some of the scenes you saw. Any comments?

(2) In his book *Desert Solitaire*, Edward Abbey has a beautiful, exciting chapter entitled "Down the River," in which he describes a float trip down Glen Canyon, made by himself and a friend, before the completion of Glen Canyon Dam. Abbey makes the then-six-mile hike from the river up to Rainbow Bridge, and has this to say of the Bridge:

I climb to the foot of the east buttress and sign for Ralph and myself in the visitor's register. He is the 14,467th and I the next to enter our names in this book since the first white men came to Rainbow Bridge in 1909. Not many, for a period of more than half a century, in the age above all of publicity. But then it's never been an easy journey. Until now.

The new dam, of course, will improve things. If ever filled it will back water to within sight of the Bridge, transforming what was formerly an adventure into a routine motorboat excursion. Those who see it then will not understand that half the beauty of Rainbow Bridge lay in its remoteness, its relative difficulty of access, and in the wilderness surrounding it, of which it was an integral part. When these aspects are removed the Bridge will be no more than an isolated geological oddity, an extension of that museum-like diorama to which industrial tourism tends to reduce the natural world.

All things excellent are as difficult as they are rare, said a wise man. If so, what happens to excellence when we eliminate the difficulty and the rarity?

From *Desert Solitaire*, by Edward Abbey. Copyright 1968 by Edward Abbey. Used with permission of McGraw-Hill Book Company.

Discuss the above passage from Abbey. With Lake Powell filled, will Rainbow Bridge be worth as much as when he saw it? To those who go there? To those who cannot go there, but can imagine it? (Note: whereas approximately 15,000 persons had signed in at Rainbow Bridge in the 60 years beginning in 1909, it is estimated that in 1972 alone, 72,000 visitors boated up Forbidding Canyon, on an arm of water now extending to the Bridge.)

(3) The Sierra Club film showed people in Glen Canyon with rubber boats. The second Bureau of Reclamation film showed a family on Lake Powell with a motorboat. Did the people in the two films probably have very different types of experience? Discuss.

(4) Those who wish to develop wilderness for some commercial venture have often charged that those who wish to preserve the wilderness are selfish; that they are the rich who alone can afford the cost of a "wilderness experience." Discuss. (In which film had the people spent more on their boating equipment?)

(5) Some defenders of wilderness have said, "I know that I will never have the chance to get there, but I'll be happy just knowing it's there, unspoiled." Discuss. What would the human spirit be without a vision of wild places?

(6) People have long recognized the idea of good taste — in art, music, books. Is there such a thing as good taste in environment, or in outdoor recreation? If so, in which film(s) was good taste best represented?

I believe that each of these questions is important, dealing with concepts that go to the heart of environmental esthetics. My students never cease to surprise me with the good job they do on them. The reader is invited to use them.

Here, I have described only a fraction of the case study of Glen Canyon Dam as I teach it. I also use other films, and books by Edward Abbey. I explain the political history of the dam, and its ecological and economic impacts. I lead the students to question whether the dam ever should have been built, and share with them what I believe to be the big ideas from the case study. I try to update the study every year or two. Anyone wishing more information should write to me at 143 Bessey Hall, ISU, Ames, Iowa 50011.

I am teaching this Glen Canyon unit right now, for about the 16th year (with constant updating). In a few hours I'm going into class and add a new twist: an offer to lead them on an expedition into the Glen Canyon — canyonlands country during spring break. I hope a few will take me up on it. □

DR. TANNER was a high school teacher in Oregon, Montana, and Uganda. He is now a professor of secondary education and environmental studies at Iowa State University. In addition to publishing many articles, he wrote *Ecology, Environment, and Education* (1974) and edited *Aldo Leopold: The Man and His Legacy* (1987).

PLANT ACTIVITIES FOR THE PRE-LITERATE CHILD

Jori Hunken

Teaching about plants is one way of enriching the life of the child with the lives of real things. With the young child, especially, it is a matter of creating pleasant memories, not inoculating with data. The distinction rests on the feelings involved—a cherished memory is multidimensional, including sensory perceptions and emotions. Include in each activity

—a sense of discovery which has elements of surprise,

—a sense of success in which the child has taken responsibility,

—a sense of sharing when the child's feelings are validated by your approval,

—a sense of mastery so that the child can describe what occurred and/or can make it happen again.

Notice that in none of the above is it necessary for you to play a central role as instructor. Nor do you need a thorough knowledge of botany to achieve these goals. Books on plants in the children's section of the library will give you all the vocabulary you need (and many good ideas for projects.)

Your attitude and actions are essential for setting the tone. When you find plants you like, touch the leaves or bark, smell the flowers. If the child sees that you are genuinely pleased to be with certain trees and flowers, you will have made a lasting impression about the pleasures of knowing about plants. When you don't know the answer to a question, it's ok to say "I don't know, I've wondered about that, too; what do you think?" If you do know, frame your answer so that the child understands that the information came from somewhere and you are passing it on, just as he or she might do. ("I read in a book. . .").

When can you start to teach kids about plants? Non-walkers in strollers and back frames are ready to touch leaves, bark, and flowers. Just make sure that nothing goes in the mouths. The rule of one-finger touching may limit some of the damage, and toddlers and plants should always be supervised. Since plants cannot hold a young child's attention for more than a minute or so, use plants as a variety of sensory experiences. Introduce the



Photo by Jori Hunken
Learning to dig and transplant.

plants or parts if you know the names, but keep the tone casual.

At what age will children learn to appreciate sprouting or flowering? Since most of the adults I know, including myself, are still trying to understand those amazing events, perhaps you should just start early and watch sprouting and flowering as often as possible. As with the other activities, it will be your enthusiasm and involvement that make the greatest impression, so choose projects that interest you. The following is a partial list of plant projects appropriate for you and children two-years and up.

NARCISSUS BULBS: All the "paper-white" varieties are easy. In its simplest form—set a bulb on a bed of small gravel in a cereal bowl. Keep the water level up to the bottom of the bulb. As the roots and leaves grow, the bulb can be picked up for inspection and replaced. Just keep the water over the roots. If inspections are so frequent that they prevent the roots from holding onto the stones, you'll need to support the lengthening leaves and flower stalks by providing a fence made of string and sticks stuck firmly into the gravel. The flowers may come as a sur-

prise, as the growing stalk looks something like a leaf. Enjoy the smell and the tiny flower parts. If your onion bulbs start to grow, they can be treated in a similar fashion; large onion bulbs may even flower. Possible new terms: bulb, roots, stalks, buds, leaves.

BIRDSEED GARDENS: If your child has been helping to put out seed for the wild birds, it may seem wonderful to find out that the seeds will grow into plants. A wide flower pot, filled to within one inch of the top with soil will be an adequate garden. In lieu of a flower pot, use an aluminum cake tin or a milk carton with one side cut away. Put pencil-sized holes in the bottom for drainage. Moisten the soil *before* putting the seeds in, then sprinkle the seeds over the surface. If you put plastic wrap over the top, moisture will be retained and you can see the seeds sprouting. Otherwise, put a 1/8 to 1/4 inch layer of soil over the seeds to keep them moist. Don't let the soil dry out. Warmth will hasten the sprouting. If using a seed mixture—try to keep track of the way each kind of seed is growing. Other pot-gardens with fewer or with more seeds can be tried to see the effects of crowding, or try growing several just-alike gardens in different places: sunny, shady, warm, cold, etc. What will be the effect of each habitat? After watching the leaves grow, turn the plants out of their pots an look at the ways the roots grew. Also try to sprout and grow dry soup beans, seeds from fruit, or from spice boxes. Possible new words: seed coat, cotyledons (the "pads" on the stems of sunflowers and beans), leaves, roots.

AMARYLLIS—A TREMENDOUS FLOWER:

One bulb may cost around six dollars, but the dramatic quality of the flower is worth the expense. Usually, the bulb comes as a "kit" with pot and soil supplied. If you have only the bulb, plant it in a pot which allows one inch between bulb and pot at the surface of the soil. Then place only the lower third of the bulb into the soil. The bulb will probably look too big for the pot. Let the surface of the soil get dry between waterings, and get ready for

beauty. The flower stalk will grow out first, producing extravagantly large lily-like blossoms. (The 3 sepals that serve as bud covers color up to match the 3 petals.) The parts involved in seed production, female pistil and male stamens, are easily distinguished. The pollen on the stamen will ripen and then shrivel before the tip of the pistil shows its maturity by splitting open at its tip end—the stigma. If younger blossoms have opened by then and their pollen is fresh, transfer some pollen onto the open stigma to pollinate (self-fertilize) the ovules within the pistil. Leave the seed pod on the plant until the seeds within turn brown. If you plant the seeds, new amaryllis will grow. Possible new words: petals, sepals, stamens, anthers, pollen, pistils, stigma, pollination, ovules, ripen.

EXTENDING: By giving a child the chance to express what he or she has seen, the child's role changes from witness to teacher. Consider some of the following activities as opportunities to add new dimensions to plant experiences.

—Act out, with hands or whole body movements, the gestures of sprouting, growing, blooming, and scatter-



Photo by Jori Hunken

ing seed.

—Imagine that you are a seed or bud and describe your feelings as you open from dark to light and begin to grow.

—Make drawings into stick puppets and act out the lives of the plants. Include the characters of insects that eat leaves, insects that pollinate, the rain,

cold, and sun.

—Draw a picture of yourself as a plant. Include in the picture the things that you need for growth. □

JORI HUNKEN a former teacher, is a mother, an author and volunteer guide-trainer at Garden in the Woods, Framingham, MA.

Graduate Program Moves

Steve Van Matre announces that his graduate program in environmental education and interpretation has moved to Aurora University in Aurora, Illinois.

Formerly located at George Williams College in metropolitan Chicago (and originally designed for the National Park Service) this innovative, project-oriented, twelve month masters degree has evolved into a program that is unique in its field.

Here's what participants gain through courses specifically designed for environmental education and interpretation:

- **Practice** in using newly developed tools for crafting effective communication and education experiences
- **Ability** in breathing freshness and vitality into people's appreciation and understanding of the world around them
- **Experience** in analyzing and re-designing a variety of programs and facilities (visiting centers and sites in several midwestern states)
- **Skill** in building complete educational programs and interpretive experiences (as opposed to the usual collection of supplemental activities and techniques)
- **Contacts** for internships throughout the U.S. (including Alaska), plus Canada, Britain, France, and Australia.

AND a new vision of what the professional fields of environmental education and interpretation could become.

For more information, contact:
 LERA Division
 Aurora University
 Aurora, IL 60506

PROFESSOR VAN MATRE is the author of the acclimatization materials (*Acclimatization, Acclimatizing, Sunship Earth, Earthkeepers, The Earth Speaks*), chairman of the international educational organization, The Institute for Earth Education (with branches in the United States, Canada, Britain, France, and Australia) and president of Sycamore Associates (a new interpretive design and planning firm.)

INFORMATION SOURCES FOR ENVIRONMENTAL ISSUES



What Are the Issues?

Science and nature writers create environmental issues. Problems (human needs for which relief is sought and possible) do not become issues (controversial problems with public followings) until people become informed and interested. Although it may sound a little perverse, it is the job of nature communicators—writers, photographers, teachers, etc.—to create environmental issues. We have lived with radon in our homes for many years, but until the condition was recognized and iden-

Richard J. McNeil

tified as undesirable and we found we could do something about it, radon exposure was not a problem. And until numbers of people learn more about it and organize around it, radon will not be an issue.

Of course, an almost infinite list of environmental problems or issues could be created, depending primarily on the specificity of the items included. We can look at issues broadly (loss of biological diversity) or narrowly and specifically (the Eastern

woodrat is endangered in New York State). Similarly, some issues are universal (decreased stratospheric ozone may be increasing human skin cancer rates); others are local (a proposed new shopping center may disrupt water flow to a salamander breeding pond). On still another dimension, some issues are of long-term concern (we need to find waste disposal sites for radioactive materials which will be secure for perhaps a quarter-of-a-million years); others are of immediate importance (an abandoned industrial waste dump may be leaking toxic chemicals into my drinking water sup-

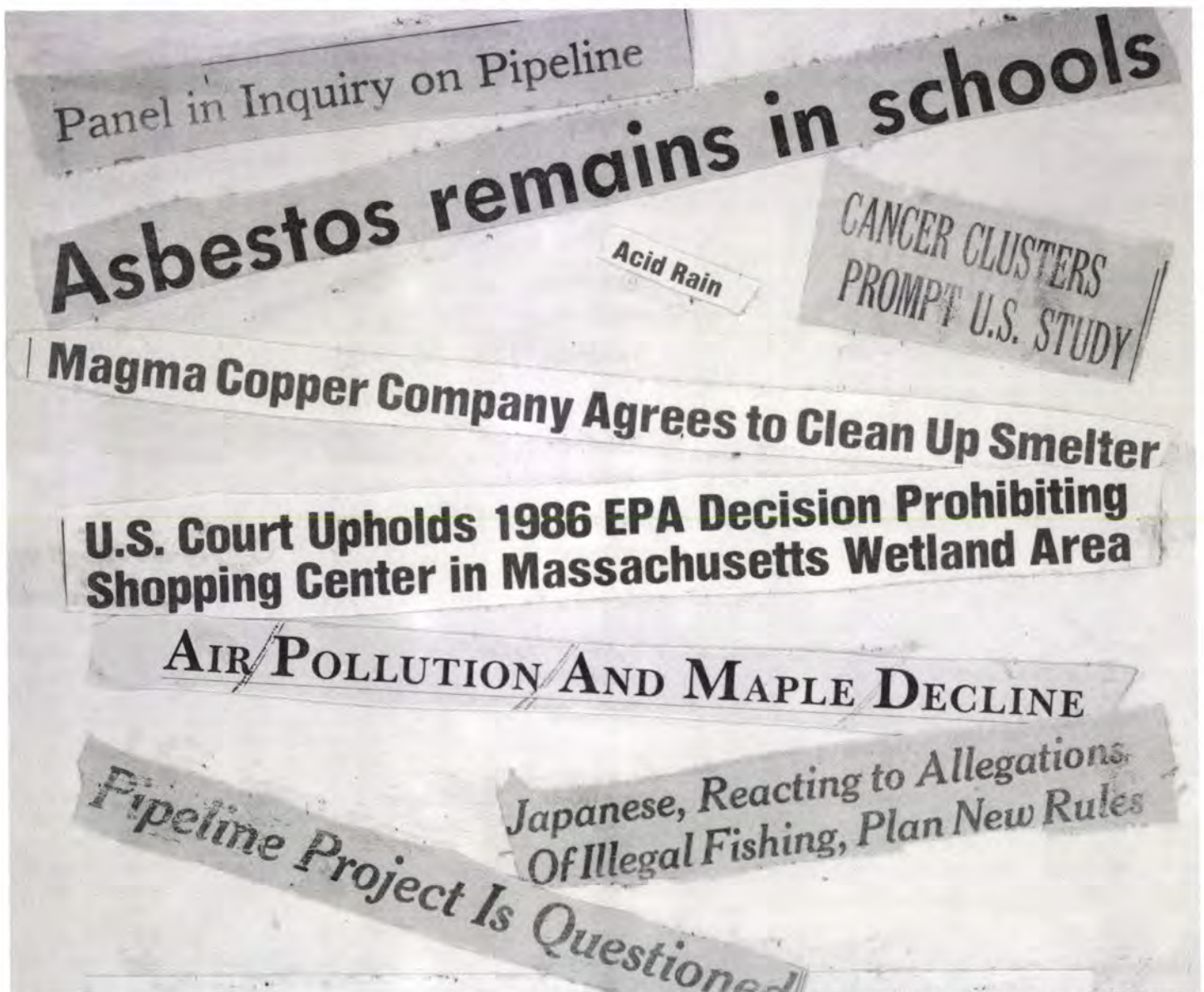


Illustration by Richard McNeils



Photo by Ray Pfortner

ply).

Most U. S. environmentalists' lists of top ten environmental issues, global-to-regional (mainly U. S.), middle-term time scale, would probably look something like this:

1. air quality (including global warming, stratospheric ozone depletion, acid rain, asbestos-like particles and other toxics in building interiors)
2. water quality and supply (including contamination of ground water)
3. toxic waste cleanup (including Superfund sites, abandoned industrial sites, illegal dumps, military and other government areas)
4. waste disposal (including landfills, recycling, export of wastes, incineration, ocean dumping, hazardous and radioactive waste storage)
5. land use controls (including public and private land)
6. biological diversity (including endangered species, genetic "storehouses," rare breeds of domestic animals and crops)
7. resource allocation (including management of hunted animals and of sport and commercial fish, recreational vs. commercial uses

of public lands)

8. energy issues (including allocation of costs, policy regarding alternative sources, conservation measures)
9. habitat destruction (including loss of tropical forest, loss of endangered species' habitats, wetlands)
10. plants and animals in their roles as pests, diseases, carriers of diseases, competitors, predators.

On a global basis, and expanding our list to include environmental problems which are not issues, and critical issues which may be only secondarily environmental in their nature, we should add these: loss of soil, desertification, human population increases and changing demographics, urban concentration of people, overconsumption of resources, poverty, increasing disparity between rich and poor, unemployment, malnutrition and starvation, military pre-emption of resources, illiteracy (including environmental "illiteracy"), esthetic insensitivity, inadequate moral basis for relations with nature, support for environmental institutions.

How Can We Discover Incipient Issues?

Radon gas in our basements will be an issue in the U. S. during the next

few years. How do I know? I heard a U. S. Senator's staff person mention radon recently (and express surprise that a job applicant was not informed); radon was on a short list of items for study by the House of Representatives Subcommittee on Environment and Natural Resources in 1987; recent conversations with a physical scientist suggested that the problem is far more widespread than was previously thought. Chlordane leaking from treated construction wood will also become an issue soon. How do I know? I heard of the problem second-hand from a toxicologist associated with the Environmental Protection Agency. And it appears intractable, risky, expensive, controversial, likely to affect many people.

We can identify important incipient issues in many ways. Among them are these:

1. We can project trends from available data. We know that human numbers will continue to increase for some time, that average ages are increasing; this implies demand for certain amounts of certain resources. If we combine these trends with those indicating increased rates of consumption, e.g. of electricity, and showing increased disparity between rich and poor, we can draw conclusions regarding consumption of resources, political power, social unrest, etc.
2. We can listen to leaders. There are experts. And though they may be narrow in their areas of expertise, we can use a home-made version of a tool called the Delphi technique to carry ideas between areas of expertise. We can ask the electric power utility executive what would happen to rates if nuclear power plants were required to shut down. We can ask economists and sociologists how people will behave if electricity costs multiply. We can ask foresters and wildlife biologists what will happen if vast numbers of people turn to fuel wood for cooking and heating. We can analyze, combine, and adjust the experts' opinions and projections or predictions. A return trip to each expert, and reporting of the views of the others, may produce mod-

ifications of the first-round statements.

3. We can be alert to indicators. Rising prices and people waiting in lines indicate scarcities. Many diseases of human beings and other species can be indicators. Poverty, waste, noise, and ugliness are signals of environmental problems.
4. Models sometimes allow us to try several possible scenarios. Science fiction especially provides a way to preview various possible futures.
5. History can provide us with parallel situations and experiences. Lowdermilk, in his USDA Bulletin, *Conquest of the Land Through 7,000 Years*, demonstrates many of the problems which inevitably follow or accompany large-scale irrigation. We are beginning to see in our Southwest and in other parts of the world the waterlogging, salinization, sedimentation and related problems which caused the destruction of past civilizations. We can see how Japan deals with energy shortages, how Britain and the Netherlands use land in their much more densely populated situations. We can observe how Sweden and Finland provide for the needs of older populations.
6. We can use common sense and logic together with our knowledge of ecology and the behavior of animals in nature. We know that all plant and animal populations "overproduce", that many individuals must therefore die, that organisms' numbers are controlled by some limiting factor or another, that individuals attempt to capture resources and to control environmental conditions. So we realize that some resource will always be scarce. We know that natural evolution and adaptation cannot keep up with technological change. So we can predict that new poisons will be invented, that new pressures will be placed on resources, that technical solutions will be found for some of our problems, and that those solutions will be accompanied by unpredicted "side effects."

How Can We Create Issues?

It is not my place to describe methods, but it is important to remind ourselves that solutions to most major environmental problems require political action. Interested people need to coalesce into influential groups which then lobby for legislative or bureaucratic action. The creation of interested and informed activist groups is largely the job of environmental communicators, both professionals and amateurs.

It also seems to me that our role is not only to arouse and inform. We can also provide a central role in moving people to action. Letters to the editor, TV panel discussions, public assemblies and discussions, and countless related activities can provide for a participatory educational process. Tools, techniques, a forum, leadership skills can help many beginners who have limited access, fewer resources, or little experience, to begin to play active roles in alleviating environmental problems.

Where and How Can We Find Information Sources?

By the time we tend to hear or read about environmental issues, a genuine expertise has invariably developed somewhere. Even though scientists are always inclined to be uncertain, needing more study, more conclusive results or accumulated evidence, deep and serious work is almost always available to us. Those with the greatest talent and most experience in any area of the natural and social sciences and humanities are, however, frequently unavailable to us or unable to describe easily what we need to read or hear.

Therefore, it is often an excellent strategy instead to try to locate the information brokers. These are the people in direct contact with the narrow subject-matter specialist. The brokers need the information to do their jobs, to serve their employers or their clientele. Who are the information brokers? They include staff members of Congressional committees (and similar state and local functions), staffs of individual legislators, information officers in bureaucracies, and lobbyists for private corporations and public interest groups. They include thousands of county staff people in the federal Extension Service and

many people who work in the broadcast and print media, librarians, and information officers in educational institutions.

Almost all of us have easy contact with a staff member working for our Congressman and another for a state legislator, with a librarian, with a county Extension Agent, and with a college or university office. These contacts are usually not the people we ultimately want to interview, but they have information about the information brokers. They are the brokers' brokers. Their networks are complex, up-to-date, and incomplete. They may know only the person who knows the next person. Individual pieces are incomplete but the network is usually unbroken. A series of three or four brief phone calls will usually put you in touch with a very small group of information brokers who are knowledgeable on your subject. Then some suggestions for reading, an appointment for an interview, a sackful of literature to carry away, and some suggestions of further readings or other people will send you further into your subject.

Multiple sources will usually be necessary to do research on any major subject. Each has part of the picture, a unique perspective, additional detail. The same is true if you are searching for an interesting subject or trying to keep up-to-date on environmental issues. Many environmental organizations produce popular journals (e.g. *Audubon*, *Sierra*, *Greenpeace*) which include brief notes about current events. Some are in a newspaper format (e.g. Friends of the Earth's *Not Man Apart*) and consist almost entirely of news and current topics in nature and environmental conservation. These are usually available at newsstands and by subscription. Daily reading of a good newspaper such as the *New York Times*, *Christian Science Monitor*, or *Washington Post* is invaluable.

As you develop your skills in information gathering and in using the networks, don't be surprised that you have become a valued information broker, and that others are coming to you as a source of that highly critical resource, information. □

RICHARD McNEIL is Associate Professor of Natural Resources at Cornell University.

FIVE EXCITING, ENRICHING OUTDOOR STUDY DAYS

In the Life of Delaware Valley Middle School Sixth Graders

Scott D. Palermo and Susan B. Sewall

Photographs courtesy of the Delaware Valley Middle School Files.



Looking the other way at the sunrise session.

The first light of day bursts over the edge of the mountain dissolving the gray of dawn into a myriad of colors and simultaneously lighting up the eyes of a huddle of sixth graders, their parents, and their teachers, awaiting the sunrise on the banks of the Delaware River. As they watch in silence, except for murmurs of appreciation, Vivaldi's "Four Seasons" begins to be heard in the background, and a flock of Canada Geese choose that moment to put on a show above the water ending in a flurry of splash landings. The time has come to try to capture the moment. The students go off in different directions to express what they have witnessed in song, poetry, or water colors.

Such is the beginning of the Environmental Ed. Days program for those sixth graders who can convince their parents to bring them to school in the darkness for "Sunrise Session". Almost half do just that, and many of their parents stay, often experiencing their own first sunrise! The rest of the sixth graders arrive on the busses as usual and join the early risers for sessions on environmental topics, taught by their regular teachers, teachers from other parts of the district, community resource people, and volunteers from all over the east coast.

There are five such Environmental Ed. Days during the school year and they are the high points of the multidisciplinary environmental education curriculum that is taught throughout the year. The Environmental Ed. Days program costs but \$25.00 a year (for bailing twine and hot chocolate) and has the support of the faculty, the administration, the community, and of course the students.

Each day consists of three sessions, each two hours long. Sessions that have been offered have included: Spiders (a session that leaves human size, student created, spider webs in the woods), Wild Foods, Solar Cookers, Snow Shoe Making, Black Bags (a sensory activity), Wild Flowers, Survival, Snow Sculpture, Raptors and Rodents (a simulation), Writing, Stream Investigation, Bubbles (a study of their characteristics), and many, many more!

The one exception to the three session format is the Fall Day. Since at that time the sixth graders don't know each other very well having come to our school from four different elementary schools, the first session is replaced with Action Socialization Experiences (ASE's). ASE's are group problem-solving activities which physically involve the students in their sol-

ution. For example, a group of students (usually 8 to 10) may be asked to get each of its members over an electrified fence (a string) before the Snuggly Uglies get them. The ASE course is set up in such a way that each group is allowed to spend as much time as they need to solve each problem. The group must solve the problem before they may try another one and every member must be a part of the solution. The emphasis is on cooperating in order to complete the task at hand, not on how many problems each group can solve. The ASE's forge the sixth graders into a unit which has an identity that sets the tone not only for the environmental education program but also for the year in general.

How did all of this come about? It didn't happen all at once, it evolved over a period of nine years. The precursor to Environmental Ed. Days was an Earth Day program. The students and the faculty enjoyed it so much that it was decided to look into a residential environmental education experience at a local environmental center for the sixth graders. Funds were promised and, as often happens in education, were lost due to a change of administration. The Environmental Ed. Days program was born when it was realized that we had the ability to create a quality environmental education experience on the school grounds. Three days in the spring were chosen, in-depth sessions were added, and the program became a reality. The following year it was decided to spread out the days during the school year, one in the fall, one in the winter, and one in the spring. The next year two more days were added in the spring to bring the total number up to the current five. Recently the arrangement was changed to two in the fall, one in the winter, and two in the spring. The point is that the program is flexible and can be adjusted as needed.

Administrative support was gained by insuring that what was done, however small, was done well; and that all who were involved, including administrators, were given credit in all media coverage. The media coverage

was important! If the local paper or radio station did not cover one of our programs, we wrote our own articles, took our own pictures, and sent the information to them. Administrators, custodians, cafeteria workers, and secretaries were given tangible thank-yous in the form of student-made plaques, letters, or signed posters.

The program could not have evolved as it did without the help and commitment of the Delaware Valley Middle School Staff, most of whom did not consider themselves well versed in environmental education at the outset. The pool of interested faculty members grew as result of cooperation within the school. Lesson plans were written for those who wished to be involved but did not know what to do, resources for ready made lesson plans such as *Project Wild*, *Project Learning Tree*, and Joseph Cornell's *Sharing Nature with Children*, were made available. When a lesson was successful it was written up and placed in a central file for others to use in the future. The number of people involved began to increase as more and more people became comfortable with teaching in and about the outdoors. Eventually the interest spread to teachers in other buildings in the district and permission was gained to have them released from their usual duties to join in. As a result of this cooperation within the



district there are now similar programs operating at the elementary level!

Although the interest and expertise in-house was growing there was a recognition that outside help was also valuable. People in the community were invited to present sessions. Such resource people included representatives from the local conservation district, teachers from other school districts, naturalists from the National Park Service, staff members from local environmental centers, in short, anyone we came across that we thought might add to the program. All of these people gave their time without cost, and many of them have returned for repeat performances!

Another way we use local resources is to fill equipment needs. Shop teachers and Vo-Tech instructors are often on the lookout for new projects and willing to help for the good of the program (don't forget the tangible thank-yous). We needed under water viewing boxes so we visited the Vo-Tech and for the cost of a sheet of plywood, some plexiglass, and some paint, we had them in short order. Materials may often be constructed from things just lying around for the taking (we're talking recycling here). For instance seining nets cost a fortune but an old pair of sheer curtains stretched between two old broom handles works very well. Two liter soda bottles with tops cut off have many uses such as under water viewing boxes, collection containers etc., and old refrigerator drawers make great collection bins. In other words if you can't afford to buy one, make one.

Although the program was run on site for the first few years, in recent years on one or more of the Spring days we have taken the students on the road to local waterfalls, parks, and environmental centers. The sessions are run by the faculty and resource people as usual but the new setting adds a nice dimension to the program as well as exposing the students to places of interest in their own community that in most cases they have never visited before. This part of the program is obviously not within the \$25.00 budget quoted above because of the bussing costs but it is only possible because of the support that has been developed as the program has evolved.

Beyond the economic advantages of running an environmental education program on your school site, there are several other reasons why the idea has merit. First of all there is ownership. Students have something that they can be proud of and that pride increases the chances that the material presented in the program will be remembered. Second, by utilizing the existing faculty members, you are teaching by example. Therefore environmental education is presented as something that significant role models in the students' lives truly believe in as a way of life. Third, when environmental education is presented on site, conservation, recycling, and other environmental concepts are reinforced as being part of real life because they are taught within the context of the school day which is a large part of reality for most school students.



Sunrise session.

A program like the one at Delaware Valley can be put in place in virtually any school. The luxury of a beautiful site is nice to have but not necessary to create an effective program. We often make the mistaken assumption that we must go outside the district for special expertise in order to provide an environmental education experience of this nature. The resources within a school district are tremendous and are frequently overlooked. When they are combined with talents available in the local community, the results can be spectacular. We have presented this model to many teachers and administrators across the country and many have become excited about the possibility of starting such a program in their school districts. They have represented rural schools, city schools, suburban schools, schools with great financial



resources and schools with little or no money available for new projects. We have yet to come across a school where this model could not be utilized in some form. All it takes is at least one interested person to get it started. □

SUSAN B. SEWALL is a sixth grade teacher at Delaware Valley Middle School in Milford, PA, and **SCOTT D. PALERMO** was the school guidance counselor until this year when he became school psychologist at Port Jervis, NY.



Earthball-playing (kids bought it by recycling aluminum cans.)

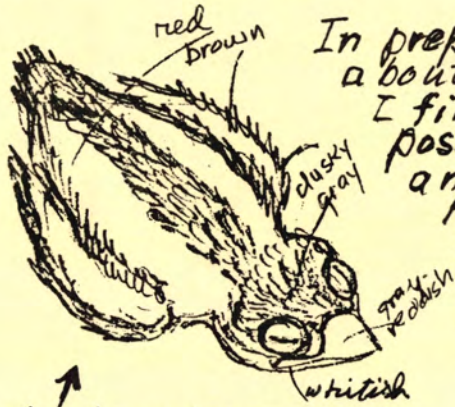
ERIC Clearing House Contract

Dr. Robert W. Howe, Director of the ERIC Clearinghouse for Science, Mathematics and Environmental Education, announced on February 15, 1988 that The Ohio State University had been awarded a renewal on its contract for ERIC/SMEAC for a five-year period, 1988-1992. The agency will continue to process materials for Resources in Education (RIE) and Current Index to Journals in Education (CIJE), as well as monthly digests, monographs, and other helps to finding information. A free annual bulletin may be obtained by writing ERIC/SMEAC, 1200 Chambers Rd., #310, Columbus OH 43212

Naturalist's Notebook

First Steps in writing and Illustrating a Nature Book

In preparation for a life-cycle book about a common native animal, I fill many pages, whenever possible, with field notes and quick sketches. Here are a few xeroxed samples of sketches and excerpts from notes taken for a book about cardinals.



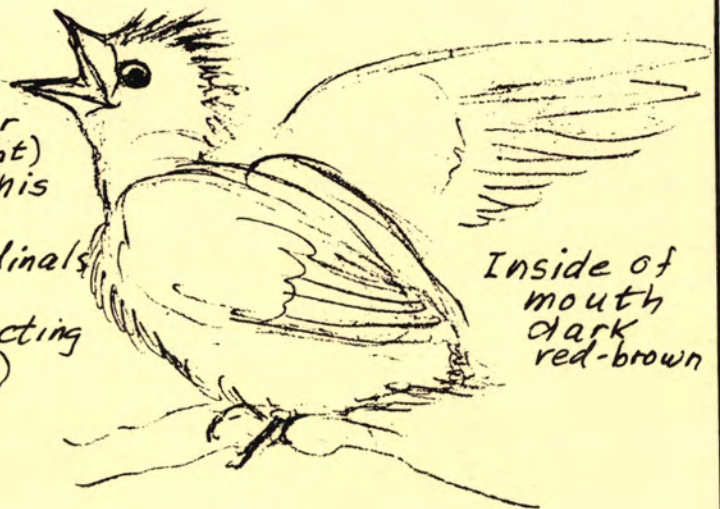
6/3 - Lanphear nest. Young several days old. Skin red brown. Feather tracts dusky gray.



6/6 - Lanphear nest. Young alert. ♂ and ♀ in close attendance. Young checked with mirror on pole.



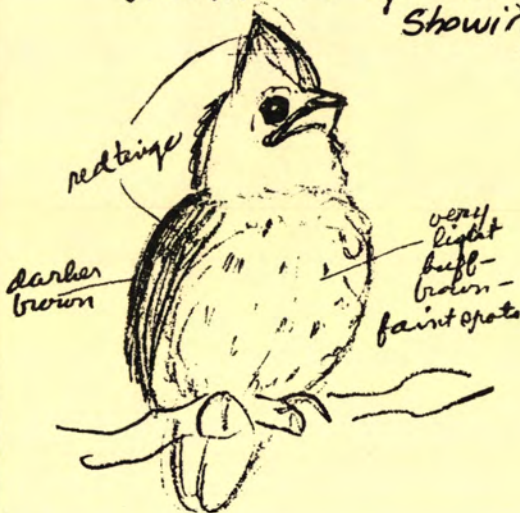
6/7 Lanphear young (right) left nest this morning. Adult cardinals chase a bluejay (acting together)



Inside of mouth dark red-brown

6/9 Hewlitt young (above) just out of nest.

6/15 Hewlitt young (below). Can fly well... tail 1" long. Rich brown above - breast gray-brown with streaks or spotting. Faint red showing on shoulders.



6/7 Lanphear Cardinals. When ♂ feeds young, he tilts his head sideways. Have not seen ♀ feed young today



The American **NATURE STUDY Society**

John A. Gustafson, Treasurer
5881 Cold Brook Road
Homer, New York 13077

Non-Profit Organization
U.S. POSTAGE
PAID
HOMER, N.Y.
PERMIT NO. 21

ADDRESS CORRECTION REQUESTED



Request for Articles

The journal NATURE STUDY belongs to the members — we need your input in the form of comments, articles, suggestions, questions, evaluation. The next issue will be devoted to Women in Environmental Studies. If you have any names of women who should be included, or articles you would like to submit, please contact editor Helen Ross Russell. DEADLINE FOR ARTICLES IS JUNE 1, 1988.

Themes for later issues will be:
Weather
Non-flowering Plants

— — What would YOU like to see as a theme?

OFFICERS

President: Frank Knight 9 Willowbrook Lane, Cohoes, NY 12047
Past President: Kathleen Blanchard Atlantic Center for the Environment, 39 South Main Street, Ipswich, MA 01938
First Vice President: Paul C. Spector Holden Arboretum, 9500 Sperry Rd., Mentor, OH 44060
Recording Secretary: Joy Finlay Box 8644 Station "L", Edmonton, Alberta, Canada T6C 4J4
Corresponding Secretary: Mary D. Houts 70 Hillymede Rd., Hummelstown, PA 17036
Treasurer: John Gustafson 5881 Cold Brook Rd., Homer, NY 13077
Nature Study Editor: Helen Ross Russell 44 College Dr., Jersey City, NJ 07305
Associate Editor: John Lubbe
Contributing Editors: Mary Houts, Robert S. Russell

DIRECTORS

Class of 1988 Peter Corcoran, Anne C. Hallowell, John W. Kominski, Laura Lee Lienk, Darrell D. Young
Class of 1989 Michael J. Caduto, John Disinger, Tracy R. Kay, Hank Tyler, Diane Wiessinger

NATURE STUDY is published quarterly by the AMERICAN NATURE STUDY SOCIETY, and is sent to all members and subscribers. Concerning subscriptions, change of address, and membership: address the treasurer. Concerning requests for back issues, TIPS, and other information: address the secretary. Concerning manuscripts, notes, letters for publication, and membership news: address the editor. Reprints of articles may be obtained within six weeks after publication by placing orders with the editor. Cost of reprints is \$10.00 per page for 100 copies and \$4.50 per page for each additional hundred copies. Printed by American Printing & Typesetting, Cortland, NY 13045.

The opinions expressed in this publication are those of the authors. Articles may be reprinted provided credit is given.

ISSN0028-0860