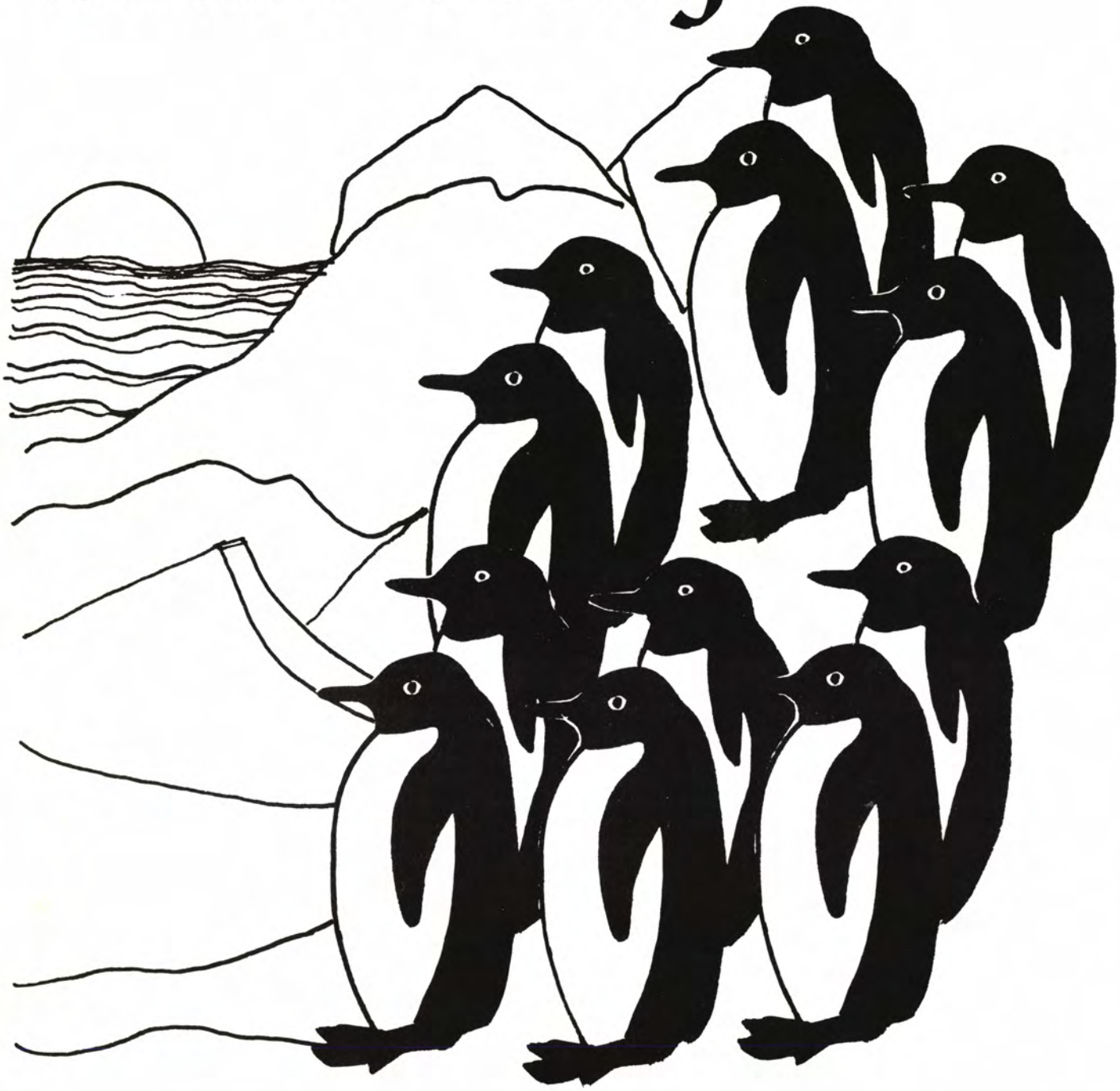
Nature Study



"Sharing"

Volume 38, Numbers 2 & 3

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A JOURNAL OF ENVIRONMENTAL EDUCATION AND INTERPRETATION

Fran Ludwig and "Native" Earth Club Members.
Note face paint made from local rocks containing red ochre pigment.

NOTE: In this Journal authors share activities, techniques, materials. Some include addresses for follow-up. Even without addresses, queries sent to the authors care of the editor will be forwarded.

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"Sharing"

(MEMBERS SHARING IDEAS)

Editor: Helen Ross Russell
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Hop, Skip, and Jump

Mary Lou Ferbert and
Anne Springman

MOVIN' ALONG

Use an open space about ten yards wide. The object of the game is to move across the space in as many different ways as possible.

Have the children line up along one side of the space, shoulder to shoulder. One at a time, each person traverses the ten yards using a different method of locomotion (example: skipping, hopping, rolling, or walking backwards). Continue the game until all methods have been exhausted or until you are tired!

Immediately after the game, have the children analyze what parts of their bodies they used.

CHARADES

Have everyone choose an animal Pal from the school yard or any outdoor study site. They will be responsible for discovering all about how, where, why, and when Pal moves so in order to imitate Pal in a game of Charades. A discussion of the following points will give them some clues as to what to look for.

1. What body parts are used? (legs, wings, body segments that contract)
   a. Legs
      How many legs does your Pal have?
      Do they move together, alternately, or independently?
      Does the pattern of leg movement change with increased speed?
   b. Wings
      How many wings does your Pal have?
      When flying, does your Pal glide, flap, or dart?
      Where are the wings when resting?
2. Where does your Pal move? (air, vegetation, above ground, underground, water)
3. Why does it move? (hunger, protection, comfort, shelter)
4. When does it move? (day/night, summer/fall/winter/spring)

Make or section off a simple runway. Have the children move down the runway imitating the way their Pal moves and at the end of the runway, stop and imitate the way the animal looks when it is not moving. Have them guess who Pal is in twenty questions or less. The performer is allowed to answer only "yes" or "no" questions.

ADDITIONAL ACTIVITIES

An adaptation of Movin' Along is to have the participants work in pairs and/or groups to create a means of traversing the ten yards.

The discussion of Movin' Along is a good lead-in to the adaptations that follow a physical disability such as a loss of limb.

An adaptation of Charades is to have the participants work in pairs or groups to create an animal of their choice.

CONCLUSION

There are several million different kinds of animals on earth and each one has a nearly unique way of moving. That's Incredible! □

Mary Lou Ferbert is Coordinator of the Environmental Service of the Cleveland Museum of Natural History. This activity is from The Natural World Around Me, *a badge/patch program that was a joint venture of the Cleveland Museum of Natural History and the Lake Erie Girl Scout Council. Anne Springman is the Program Specialist at the Lake Erie Girl Scout Council.*

The Natural World Around Me *was a spin-off of the Museum program,* Nature in the City, *a science program for upper elementary level.*

Meaty Principles for Environmental Educators

V. N. Rockcastle

While I was a participant in an environmental education conference two years ago, it occurred to me that real life for most environmental conference participants relates to driving in a car (and thus closing car doors frequently), and living and working in buildings with piped-in and fossil-fuel-heated water. They return to daily lives of learning more about motorcycles, jet planes, autos, telephones, and TV sets than about birds and insects. If all this be so, then what kind of conceptual meat *should* there be in an environmental education conference?

First of all, I suggest that there *is* a body of knowledge — of general utility and understanding — to which the educated person should be exposed, should internalize, and should call upon frequently. This body of conceptual knowledge includes some basic principles of both biological and physical science. Some examples from physical science are:

1. F=Ma, or the force needed to accelerate an object is proportional to the mass of the object, and to its acceleration. This is true both in a positive and in a negative sense (both in speeding and in slowing).

Imagine two cars at a stoplight. One is an American-made mid-size car weighing about 3000 pounds. The other is a compact, weighing about 1500 pounds. The light changes, and both cars accelerate at the same rate, only to find themselves stopped by another light down the street. The force that the twice-as-massive car needs to accelerate is *twice* that of the smaller car, and this results in *twice* the gasoline consumption during the acceleration. It takes *twice* the fuel to move the twice-as-massive car uphill, *twice* the energy to stop it. No matter how you slice it, *F=Ma!* If we really concentrated on that concept while we have our fun and games, our environmental education programs might make more of a mark on modern society.

Or consider something as mundane as a congregation sitting down on the pews after a hymn. The pews are unpadded, and so each parishioner comes to rest on a polished oak seat. He or she is cushioned, and thus decelerated, only by his or her gluteus. So the bodies (each with an average weight of about 125 pounds) must decelerate from a downward speed of perhaps 1 foot per second to zero in the distance of about an inch. Decelerating that massive a set of bodies in a distance of one inch puts a tremendous force on the seats, and hence on the beams of the floor.

Now consider padding the seats with, say, the equivalent of two inches of foam that compresses to less than half an inch when the congregation is seated. Now the deceleration takes place through 2½ inches instead of one inch. Less force is required, and the stress on the floor timbers is less as a result. A simple relationship of *F=Ma* being brought home through applied understanding!

Or consider the water in the pipes that supply your rooms. Water is for all practical purposes incompressible. That means when you turn on the water, a column of water from the faucet all the way back to the source moves. The mass of this column is considerable. A faucet turned on all the way permits fairly high speed for this water. Now think what happens when the faucet is turned off suddenly — instantaneously, for example. In an instant, that entire column of water is brought to a grinding halt. And being incompressible, there is no springiness or "take-up"; the pressure *zooms* for a split second. Perhaps enough to split the pipe, or at least find the weakest spot, and squirt out!

On the other hand, picture the faucet being turned off in something *more* than a split second — a half-second, perhaps. The water is brought to a halt more gently. The force within the pipe rises only slightly higher than normal, and no leaks occur. A knowledge of *F=Ma*, and some conceptual understanding of compressibility and of force and pressure, combine to put less stress on the system, make it last longer, and thus do less environmental detriment.

2. Force = pressure x area, or the force on a surface equals the pressure times the area on which that pressure is applied.

Some students — unknowledgeable or unthinking, or both — were bicycling around the university track, which has been newly resurfaced. When told that they should not be biking there, that their tires would do considerable damage to the track, they became insolent. People ran on the track. Why should bicycles do any more damage than running shoes?

3. v=fa or the velocity of a wave equals the frequency of the wave or vibration times its wavelength.

There are many environmental phenomena involving sound and light which this relationship helps to explain. One simple example might be the hum of a mosquito or a gnat. Imagine that you are disturbed in your sleep by one of these critters, keep slapping and fanning to no avail, and then remember that you might as well do a simple investigation, since you are now wide awake. You hum the note of the insect, and go to the nearest piano. There, you explore for the key that is nearest the note you are humming, and finding it, use the numbers below to determine the oscillation rate of the insect's wings.

Approximate vibrations per second:

Middle	C = 262
	D = 294
	E = 330
	F = 349
	G = 392
	A = 440
	B = 494

Every higher octave is double the same note below it. If you found C above middle C, for example, the wings would be beating an incredible 524 times per second!

And since the insect just might have followed you out of the bedroom to the room with the piano, you now beat a hasty retreat back to bed, relaxed and happy in the knowledge that the insect is no longer your roommate, and that you have found its wing-beat.

Or consider the colors one often sees in soap bubbles, oil films on a wet

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road, and the clear wings of some Hymenoptera and Diptera. When the upper and lower surfaces of a membrane (or a thin sheet of oil) are not the same distance apart (as when the oil is spreading from a slightly thicker center toward the thin edges), there is an interference of light that reflects from the upper surface, and that which reflects from the lower surface and passes up through the material. This results in effectively cancelling out certain wave-lengths of light, while permitting others to pass through. As the thickness of the membrane or film changes, different wave-lengths are interfered with, until the film or membrane is of absolutely uniform thickness. Then it becomes one color, since the interference no longer changes. Seeing this, and understanding why it happens must be more pleasing and satisfying than not seeing it at all, or seeing and not knowing. Utility? Not much, perhaps. But what is the *utility* of knowing the difference between water of guttation and dew? Yet that *knowledge* makes my environment a better place to live.

There are so many other things associated with a basic *knowledge* of waves and wave generation, from the energy required of a firefly to the resonance needed to tune TV or radio, of FM and AM, simple and mundane occurrences such as squeaks, the apparent out-of-tune effect two sections of a band marching in opposite directions produces, and the apparent drop in pitch of a passing car horn.

There *is* a need for sympathy, for sensitivity, and for understanding in environmental education. But that need can best be met through a concerted effort to build a solid conceptual base. When affective elements are solidly rooted in conceptual meat, they have a much better chance of resulting in behavioral change.

How, precisely, would one go about implementing a teaching strategy that invólves both conceptual meat and environmental sensitivity? Let's look at a lesson on animal tracks that has built into it conceptual meat on force and pressure. To involve children at the outset, they are asked to trace their feet on squared paper, and find the area of both feet. Then they step on a scales and find their weight. They write their weight *over* their feet (force over area) because their weight *rests* on their feet. This is reduced to a simple decimal or fraction.

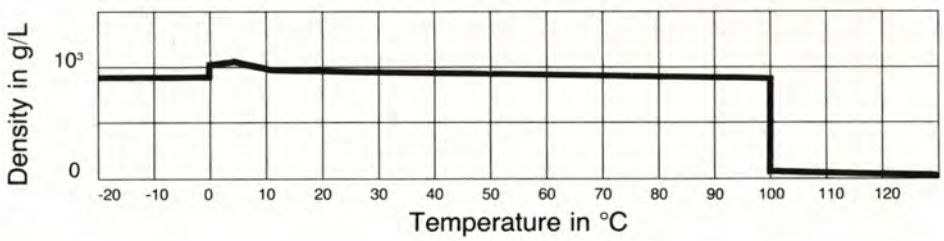
Then they find the area of an animal track such as a deer, using the same units of area. The weight usually has to be given — about 175 pounds or 80 kilograms. When reduced to a simple decimal or fraction, a deer's *sink-in-the-snow coefficient* is found to be several times that of a human. And a deer *does* sink in the snow several times as far as a person.

Next, children can apply this to the track of a snowshoe hare, whose feet are huge compared to its weight. Its *sink-in-the-snow coefficient* may be only 1/10th that of a human, and 1/50th that of a deer. Extending this concept still further, one might measure the area of a car tire when it presses against the pavement, then take the pressure with a tire gauge. Multiplying one tire's press-against-the-pavement coefficient (tire pressure) by the area on which that coefficient (pressure) works, one finds the force or weight on that tire. Doing this for each wheel, in turn, and adding them up will give the total weight of the car. Finding the weight of a vehicle by means of a ruler and a tire gauge is simply applying the relationship between force, pressure, and area. It is also seeing in that relationship that the larger the area, the greater the force; or the greater the pressure, the greater the force; or that if the area is big enough (such as the wall of a building), even a modest pressure (as in a wind-storm) could exert a tremendous force (enough to topple the wall!).

Now back to the fun-and-games aspect of an earlier environmental conference. Crossing the dangerous swamp on a plank could have had a two-fold reward: (1) socializing and developing group awareness, and (2) learning some conceptual meat about force and pressure. The plank we stood on was about 1 foot by 8 feet. There were ten of us trying to crowd onto that one plank. If each of us weighed 150 pounds, we would have totalled 1500 pounds. We would have been crowded onto an area of 8 square feet, making 187½ pounds per square foot. We didn't take the time to find the area of our feet, but I think that on the plank, massive as our load appeared, we exerted less pressure on the ground than we did by simply standing. With a scale and some squared paper, we could have found out. At least, we could have learned about force and pressure, and perhaps even about snowshoes and rug coasters.

4. The density of water depends upon its temperature (and for some temperatures, its pressure), and the temperature/density curve shows why water is so environmentally important a substance.

There is much to study about water in environmental education, from its physical properties to its biological necessity to its erosive power to its causing weather. Besides of its high specific heat (of which little is made in most environmental programs), water is unique in its temperature/density relationship. Its temperature/density curve looks something like this:



These are but a few of the many ways in which conceptual meat can be infused into environmental expeiences. None of them involves complex relationships. All of them help to explain common environmental occurrences or phenomena. None of them detracts from the fun of studying nature naturally. And all of them must necessarily increase understanding that, in turn, must affect attitudes and eventually behaviors. When we marshall our forces to affect behaviors, our environment will be the benefactor. Conceptual meat helps translate affective concern into behavioral muscle! □

Outdoor Education and Recreation Must Not Neglect the Sixty-Plus Crowd

Judith A. Kennison

The majority of retired Americans are unprepared for this period of their lives. There is a need for stimulating and challenging experiences to be offered to senior citizens. After their basic needs of shelter, food, and clothing have been met, they need to be offered continued educational experiences and opportunities to enhance the quality of their lives.

There are, in fact, few activities of any type that are unsuitable for older adults. The only legitimate limits to activity involve the economic condition, local opportunity, and health of each individual. And these limits apply to any age group.

Studies indicate that an individual's choice of leisure activities in childhood is a useful indicator of adult recreation patterns (Hendee, Cullom, Marlo and Brockman, 1968; Bevins, Corcoran, McIntosh, and McNeil, 1968; Burch, 1969; Sefranko and Nolans, 1972; Yoesting and Burkhead, 1973). At other stages, leisure activities are modified, but the pattern remains the same. For example, substitution for outdoor recreation that has become too physically demanding is made, but the desire for the pursuit of outdoor activities remains constant.

Outdoor education and recreation have seriously neglected this segment of the population. There is a need for the development of programs that provide opportunities to revive former skills and interests and to learn new ones. Few quality opportunities are now offered to the elderly.

They need to be provided with opportunities to learn beginning skills; many may be hesitant to attend programs of this nature because much programming is geared toward young children. This is one aspect where segregation might be beneficial, so that seniors need not feel uncomfortable or that they are compromising their dignity. Beginning recreational activities specifically for seniors could be offered and used as a drawing card to get seniors to a facility initially or to try a specific activity. These activities could easily be offered during the day, when the heaviest users, children, are in school and younger adults are working.

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The Purpose of Programs for the Aged

The primary purpose of any recreation services should be to provide opportunities which make it possible for people, particularly seniors, to become self-sustaining in their leisure. This can be done through outdoor education by offering programs and providing facilities. Goals of such a program could include:

1) improving the quality of life of seniors through constructive and creative use of leisure;

2) combating loneliness by providing for meaningful social interaction;

3) providing an opportunity to be and feel useful through volunteer services;

4) challenging some of the negative concepts of retirement and aging through integration of various age groups;

5) promoting the social and emotional well-being of older persons.

Creative Use of Leisure

Meaningful programs for seniors might include astronomy, apple-pressing, picnics, and fishing. Practical skills such as home repairs, gardening, canning, and bee-keeping could be emphasized. The current popularity of bicycling, hiking, running, cross-country skiing, along with a new emphasis in physical fitness, is of interest to the old as well as the young. Active participation in these activities should be encouraged.

A look at campgrounds during the week indicates that older adults are interested in this activity. Many probably camped when they were younger. If so, they will probably need to be educated in environmentally sound practices. An attitude of "man against nature" is more likely to have prevailed when they were young and resources were viewed as limitless.

One potential problem in staffing such a program is that a young professional who is "gung-ho" in camping may not be able to accept the possibility that some people prefer the comfort of a camper over a sleeping bag on the ground. It should be kept in mind that the participant can have a good social and educational experience without necessarily becoming a wilderness fanatic. Yet, even this opportunity may be desired by some and should be available.

Meaningful Social Interaction

Many individuals are able to cope with retirement by pursuing some hobby or interest developed before retirement, but many have a desire for social interaction.

Informal groups could be organized for trips, one-day outings, and volunteer services. Vacations are just as important for the retired as for the working individual. Low cost is essential and could be maintained by providing group tours to national parks and historic sites.

Flexibility is needed and it is important that the basic planning include particpant in-put in order to develop the potential for self-planning for leisure activities. Participation in the planning process by people being served is an important growth process. The professional's responsibility for programming should be gradually lessened as the group grows and is able to assume more responsibilty.

An emphasis should be placed on serving people through an educational process rather than program planning. Programs should be a means rather than an end. Social interaction should be an integral part of any program.

Volunteer Services

Many older persons feel that they are no longer valuable members of society because they are not given the opportunity to contribute their knowledge and skills. Many would be capable of leading activities as well as participating in them. Our senior citizens represent our best reservoir of talent and energy; society desperately needs the services which the old are better qualified than the young to provide.

Volunteer programs such as Foster

Grandparents and Retired Senior Volunteer Program (RSVP) illustrate that seniors are willing to work unpaid for non-profit organizations, especially part-time, and perhaps, at a reduced pace, if necessary.

Recreation facilitis can utilize their skills and talents in several ways. One is to match volunteer opportunities to the person's background and previous experience. Who could be better qualified to assist with the financial aspects of an agency than a retired banker? Retired educators would be invaluable in training outdoor educators or junior naturalists and actually working with people in an informal educational setting.

Secondly, seniors should not be locked into a role based on previous experience. There may be a need to do something entirely different from one's career. The retired can be just as easily retrained as any other age group.

Integration of Age Groups

One of the most effective ways to combat negative stereotypes is to provide for integration of various age groups. Young people need to be convinced that aging need not be a negative experience. Rather, it should be looked on as a period of life in which one is entitled to pursue enjoyable activities. Interaction with all age groups is important in changing attitudes and removing unwarranted fears.

Promoting Social and Emotional Well-being

According to the Institute of Scientific and Social Research, the suicide rate for persons 65 and older is higher than for any other age group. Also, according to the same source, there is a positive relationship between mental state and social activity. The opportunities for meaningful activity, social interaction, and volunteering could greatly enhance the self-image of this much-neglected age group.

Implication for the Future

People from early middle-age and on should be encouraged to prepare for the second half of their life as they did for the first. Preparation for extended periods of leisure should begin prior to retirement. Perhaps some form of educational leave several years prior to retirement, to explore leisure activities, would help ease the transition from total employment to total leisure.

It should be possible to live a life that is different from our working life, but just as, or more, satisfying. As a society which places much emphasis on youth, we need to re-evaluate our attitudes and values to ensure a higher quality of life for seniors.

Ideally, recreation professionals should be working toward putting themselves out of business, or at least drastically changing their focus. If leisure-centered living were to become a reality, individuals would have the self-motivation and knowledge to make creative use of their time. Only facilities and other resources would be necessary for their self-directed use.

Unfortunately, this is not likely to happen in the near future. Hopefully, as people have more leisure due to shorter work days and weeks and longer vacations, the transition to retirement will be easier because they will have already developed leisure interests and activities.

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Land Use Planning

Some Simulations

Martha E. Munzer

When first actively involved in the field of conservation, I had the good fortune to become a member of the staff of the Conservation Foundation. That was in 1954. The organization's seal contained the words *Soil, Water, Forests, Wildlife.*

What a long way we've come from that early concept of the scope of conservation! Thirty years have added such concerns as air, human resources and the multiple problems of the urban environment. In cities, where most of us now live, soil is covered with asphalt, water comes from a tap, forests may be represented by the proverbial tree that grows in Brooklyn, and wildlife — depending on where one lives — may well consist of domestic pets, pigeons, rats and roaches.

As conservation's horizons broadened from a rural to a rural-plus-urban landscape, educators became interested in developing techniques to add to their kits of environmental materials. Although I was no longer a classroom teacher, I was still in close touch with groups of young people and with colleagues in the teaching profession.

The research and writing that were now my tasks led me to the conclusion that wise planning was the key to the

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solution of many of our environmental problems. How the ideas of planning could be presented in such a way as to elicit an interested and active response, led to the thought of games as ice-breakers.

The first was represented in *Nature News Notes* of the Utah Nature Study Society with an urban setting. It was designed to involve, in a lively way, everyone in the audience, from upper elementary classes through high school to teacher groups. The problem presented was this: "What is to happen to the empty lot on our block?"

What's To Become Of That Vacant Lot?

To introduce concepts and problems of planning in a community to a group of any age, you might find this SIMULATION GAME effective.

With a large piece of wrapping paper and a magic marker, make a map of a city or suburban block that contains a vacant lot. A school class could explore its neighborhood and make its own map. Now suppose your class or other group belongs to a Block Association, and a meeting has been called to see how the neighbors feel the vacant lot should be used. The roles to be played might consist of: a child, teenager, working mother, father, grandparent, apartment owner, unemployed worker, store owner, real estate agent, school principal, librarian, social worker, planning board member, and others depending upon the size of class or group.

Some might be apartment dwellers who need a parking lot for their cars. Others might want a new apartment house because decent housing is so scarce; or a supermarket for cheaper shopping; or a playground, because the area at the school is much too small; or a vest-pocket park for sitting and sunning; or a community center; or a new branch library. Other suggestions for use of the vacant lot may come out in the meeting which are not included here.

How will your Association make up its mind as to what is the *best use* for this small bit of vacant land?

Won't you have to survey the blocks around you to see how near you are to a park, a playground, a supermarket? And won't you have to decide which is the most urgent need for your block?

And you'll quickly need to find out who owns the land — a private person, a corporation or the city itself. Once you know about the ownership, there are still other questions: what would be the environmental impacts of particular uses of the lot? Are there laws or zoning ordinances that prohibit certain uses of the land on your block?

Who has the final say as to how the land is to be used? If the answer is a Planning Board, are there public hearings which you can attend to express your views? And after a decision has been reached by the responsible agency, what happens next? And next after that?

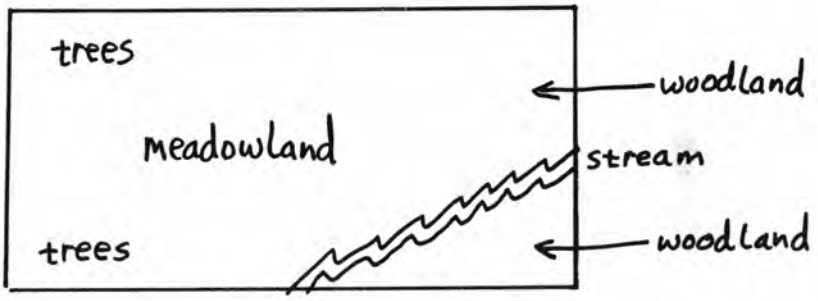
Rebuilding a city or town to make it a better place in which to live is a job in which we all need to take a part. We can begin right now. The first step is to become informed about the planning process and how decisions are reached. This game should provide an introduction.

I've yet to meet with a single assemblage that did not respond with excitement and even some heat to this role-playing introduction to important questions such as planning and decision making in the area of land use.

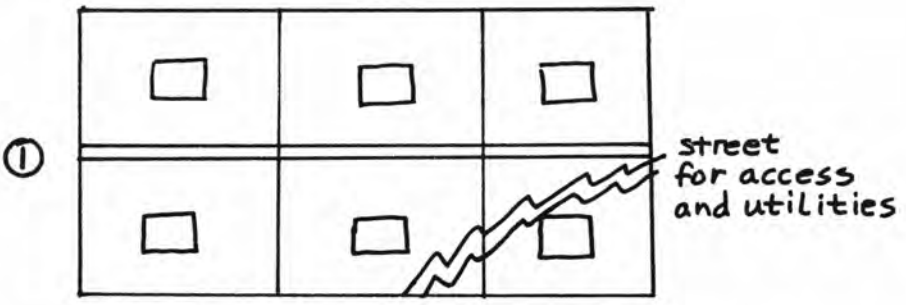
The second simulation, set in the fringes of a city or in a suburb, introduces the idea of cluster development as an alternative to the conventional gridiron pattern of development. Pros and cons of each type of growth are explored in the process of the exercise.

Cluster Development

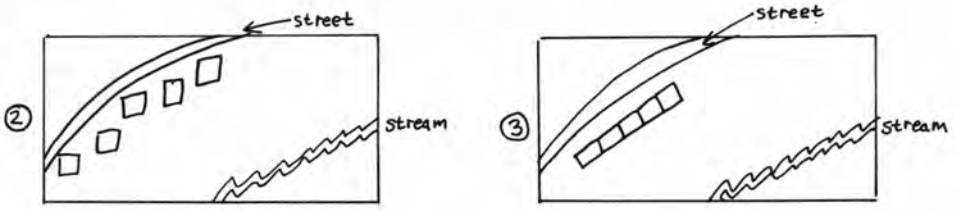
A developer owns a lot that is zoned for 6 single family residences. The lot looks like this:



The usual way to build would be to divide the property into 6 equal sized lots, thus:



He might, however, build in a different way, if zoning ordinances permit:



This is called cluster development.

If type 1 development is chosen:

1. Which will be the most valuable lot?
2. Who will have access to the stream and wooded area?
3. What are the chief advantages of this type of development? Disadvantages?

If type 2 development is chosen:

1. Are home sites of about equal value?
2. Since all homeowners have access to the stream and wooded area, who would be responsible for its care?
3. Where are the chief advantages of this type of development? Disadvantages?

If type 3 development is chosen (town house or garden apt.)

1. Are all apartments of equal value?
2. What advantage is this type of construction as to energy consumption? Explain.
3. How about building higher on less ground?

Other factors to consider:

1. Which type of development would be cheapest to build and service with utilities? Why?
2. As land and open space become scarcer and more expensive, which type of development is to be preferred? Explain.
3. Would the life styles of residents be affected by the type of development chosen? Explain.
4. Which type would *you* prefer? Why?

Suggestion:

Five members of the class might act as a Planning Board. The rest of the group would then be divided into three, representing proposals for plans 1, 2 and 3 respectively. After the presentations, the Planning Board would discuss the pros and cons of each proposal and then come to a decision.

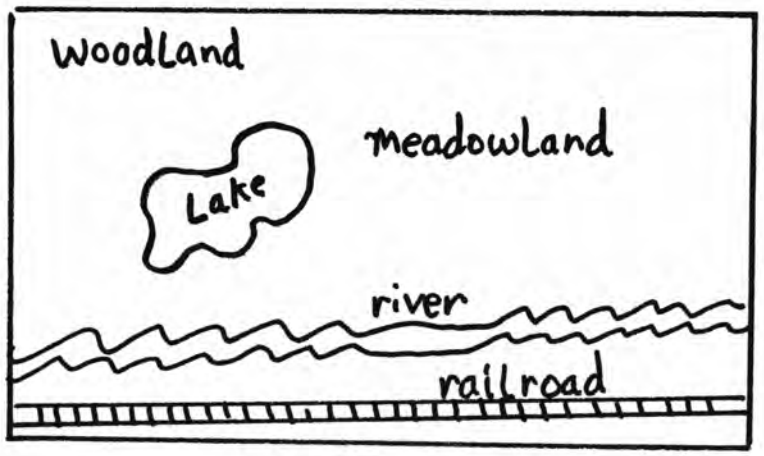
Planning a Town is a longer experience for a class. Were I a classroom teacher I would provide enough preliminary sketches of the land on which the town is to be erected so that groups of about eight students could work together, over an extended period, on a single model.

Planning a Town

A town is to be built from scratch. It is to be a *complete* town containing residences for people of various ages, races, income levels; commercial facilities; light industries that will supply job opportunities; schools, churches, municipal facilities as well as cultural and recreational ones.

You are asked to contribute your ideas to the planning process which is still in a fluid stage.

Here is a map of the land that has been acquired for the building of the new town. How would *you* propose to design it?



Answers to the following questions might help you in making your plans:

1. What are the essentials for industrial development? Where then would you locate your industries?
2. Should the lakeside be developed for the more expensive residences or should it be set aside as a municipal park? What about the riverside — residences? municipal building? park? or?
3. What types of residences would you choose to meet the needs of people of various income levels? Single family homes? 2 or 3 family homes? Town houses? Garden apartments? An apartment tower?
4. How will you group the housing? The "gridiron" city pattern of streets and avenues? Cluster development? Or?
5. Where would you place schools in relation to homes? The commercial area or areas? The municipal facilities, the cultual ones?
6. What provision will you make for open space and recreation? What types of recreation should be provided?
7. How will people get around? How safe can you make your traffic and transportation system?
8. Look over your plan. Have you created a place in which you yourself would like to live?

Once I presented the idea for the game at a teachers' workshop and apologized to the early childhood group for wasting their time on an idea unsuited to very young children. My apology was needless. The very next week a Kindergarten teacher had made a three dimensional movable model of buildings, trees, etc. which she planned to use immediately with her young ones!

So, I present these games or simulations or whatever you may call them, with the assurance that the creative teacher will see new ways of introducing a few of the vital ideas that are today a significant part of environmental education. □

Attention!

The editors of *NATURE STUDY* invite our readers to submit articles for the next two issues, which deal with the following themes:

INSECTS AND OTHER INVERTEBRATES
INTERNATIONAL NATURE EDUCATION

Articles may be of any length up to about 2000 words. Illustrations in black-and-white are preferred. Send to:

Dr. Helen Ross Russell, Editor
44 College Drive
Jersey City, NJ 07305

ELF Opens the Door

Jenepher R. Lingelbach

Slightly stooped, neck and head protruding awkwardly forward, the second-grader tiptoes across the floor in front of his attentive classmates. Suddenly he stops, cocks his head, and stretches his chin out, then rapidly tucks it in, sticks it out, and tucks it in again. A few more steps, pause, chin out, in, out, in. "A woodpecker," someone calls out, "a woodpecker pounding on hard bark trying to get insects in the tree."

This classroom is engrossed in a pantomime game from an ELF workshop entitled "Thorns and Threats." What is ELF? It is a basic natural science/environmental education program for elementary aged children. Designed by the Vermont Institute of Natural Science in Woodstock, Vermont, the goal of ELF is to give children experiences from which they can gain an appreciation and understanding of the way the natural world functions. Appreciation leads to caring. Understanding engenders a sense of responsibility for the environment. ELF is Environmental Learning for the Future.

Awareness, discovery and excitement are precursors of a scientifically curious mind. ELF takes advantage of children's natural curiosity and concern about the plants and animals around them. Using a workshop format with sequential activities, the children are led from initial introduction to knowledge and hands-on experience with the subject. There are over 50 workshops which are divided into concept groupings: Adaptations, Cycles, Designs of Nature, Forces of Nature, and Habitats.

In the aforementioned Thorns and Threats workshop (concept: Adaptations), the children watch slides showing defenses common to plants and animals: hard coats for turtles and trees, prickers for porcupines and rose bushes, etc. Then they play a concentration game with one team trying to match specific defenses with appropriate animals, while the other matches the same defenses with the correcct plants. On to the pantomime game where each child in turn acts out a situation in which he either uses defenses or tries to overcome them. "Pretend you are catching a slippery fish." "Play possum." "Pretend you're picking blackberries in a prickly patch." The children throw themselves into the acting with great energy and imaginaton; their classmates are quick to guess the scene. Outdoors, they look for plants with "don't eat me" defenses and finish the session back indoors by drawing a "monster mouthful" — an imaginary plant/animal which has such pefect defenses that no one can eat it.

What did these children learn? That plants and animals need defenses to keep from being eaten. That nature seeks deterrent methods to avoid wasting energy in battles or injury. That totally unrelated organisms may use similar strategies because those strategies work. These could be difficult concepts to explain to second graders.

In order to provide a setting in which children can absorb information and begin to understand concepts, ELF workshops try to create an enjoyable, focussed, learning world for children, where they feel good about themselves, each other, and their surroundings. These positive feeling translate readily into positive attitudes.

The first activity is important to set this tone, and to introduce the workshop. Puppet shows work well. Before the show even starts, good feelings grow as children snuggle next to each other on the rug, facing an empty puppet stage (often an overturned table), excited and expectant. In a spring workshop on Bird Songs (concept: Cycles) Rocky Raccoon appears yawning and grumpy, complaining that Mr. Bird has kept him awake for days with his constant singing. Mr. Bird explains that his song is necessary to find a Mrs. Bird. As the show unfolds and Rocky can't persuade Mr. Bird to stop the incessant singing ("Have you considered No Trespassing signs?") the children learn why birds sing and that bird songs convey a number of messages depending on the situation. The ensuing activities all reinforce this theme.

Once the children are in a frame of mind to learn and have become acquainted with the topic, the second activity gets them up and actively involved, often with a new version of a familiar game. Knowing why birds sing, children in the Bird Song workshop experience the importance of being able to distinguish sounds by playing a blindfold search game. Half are Mr.

Puppet shows entertain and educate indoors or out!

JENEPHER LINGELBACH is director of education at the Vermont Institute of Natural Science at Woodstock, VT.

Birds, each singing his own particular song ("chickadeedee," "potato chip" for the goldfinch, "pleased, pleased to meet you" for the chestnut-sided warbler, etc.) and half are blindfolded Mrs. Birds who must find their partners by recognizing the correct song.

Two "chickadees" find each other — one sang, the other responded!

Different kinds of activities are included in each workshop so that all children experience some success; it is heartening to hear how many of the academically unsuccessful children shine during ELF. A creative child may make a beautiful snow bouquet out of dried weeds and white play dough in the Winter Weeds workshop (concept: Cycles) or weave a colorful, textured grass mat in Grasses (concept: Designs of Nature). The child who does not do well in a highly structured situation may get the most out of a stream exploration or a stonewall investigation.

One of the most difficult challenges for natural science teachers is figuring out how to be a good catalyst for learning while not robbing students of their own discoveries. ELF tries to ensure that all children make their own findings, if possible outdoors. Scavenger hunts, disguised under many pseudonyms such as Forest Foray (workshop: Forest Floor; concept: Habitats), give children items to look for without restricting their individual initiative. Shape, color, texture, size, life stages, whereabouts, patterns of moving, are among the many variables which can be listed for plants and/or animals. No specific identifications are requested nor need they be made by the children. It is not important that the children find everything on the list, but that, with focussed looking, they see and observe. Most findings will relate to the topic, some won't. But a child who has discovered something for the first time, or who has seen a familiar object in a new light, is excited. Excitement leads to learning.

The ELF workshops have been used successfully with children by hundreds of school teachers and outdoor eductaors over the past twelve years. In Vermont, the ELF program has also been brought into dozens of elementary schools throughout the state by community volunteers. Four Vermont Institute of Natural Science staff teach monthly ELF workshops to approximatley four hundred volunteers in some thirty towns. These trained volunteers, (parents, retired people, high school students, environmentally concerned citizens) in turn teach close to 4,000 children in their classrooms and on the school grounds. With no previous science knowledge, these adults can

ELF volunteers in Vermont carry the nutrients from roots to leaves in a "variations on a leaf" relay race.

ELF volunteers cheer on their teammates, who are racing to carry food from leaves to roots in a "variations on a leaf" training workshop.

bring natural science into elementary schools in a new and stimulating way and thus provide one very good answer to the nationwide cry for more science and increased parental involvement in our elementary schools.

It is hard to evaluate exactly what children have learned in ELF. Questionnaires to teachers and parents come back citing positive gains in knowledge and environmental attitudes. Children's compositions about what they learned and what they like give additional feedback. A sixth grader in the small town of Worcester, Vermont, wrote, "ELF has showed me that there is more to something than there appears to be unless you look closely. It has made me realize for instance that when I throw away a can, it doesn't just disappear, and this has made me conscious of how much I waste. ELF has taught me that though a lawn may look dead, it is really alive with bugs and growth. Most of all it's been fun."

An ELF child looks for life in the bottom of a pond.

Children find that an old tree stump is a haven for small plants and animals. ELF is a catalyst for discovery.

Casual stories also reveal what ELF has meant to the children. A parent described a winter dinner suddenly interrupted by his first grader dashing outside to catch newly falling snowflakes to look closely at their different designs. A grandmother told us about her third grade granddaughter discussing insect metamorphosis with her as they walked in a September field.

One Vermont elementary school principal put it this way, "We don't have objective measures of student gains in natural science knowledge or changes in environmental attitudes. But I hear students asking informed questions about natural science and talking about the information presented during ELF. I also hear students asking 'What is it?' or saying 'Be careful' and 'Let me see.' The other day after a snow storm, several students asked 'When do we have ELF? We missed it yesterday.' That type of question is a good evaluation of the program in itself however, because no one mentioned missing gym or art or music or reading or recess."

ELF workshops have opened the door to natural science/environmental education for thousands of Vermont children. Perhaps it could do the same for children in your community.

Note: the ELF Workshops are scheduled to be published in book form by the Vermont Institute of Natural Science in September, 1985. Write VINS, Woodstock, VT 05091 for more information. □

BOTTLE GENTIAN

Pollen bottled
kept under blue wraps
never to propogate
unless a venturesome
Bumble bee bores into
the blue cervical opening
to free captive pollen
spawning another
bottle gentian

Vern J. Wolf

Secrets of the Marsh

A Book by 276 Children

Aline Euler

"From the highway APEC doesn't look like much, but once you're on the path, it's beautiful. We saw tall stalks, trees and grass," wrote Tania Turcinovic from P.S. 131 Q. Christopher Pan of P.S. 221 Q. described a weeping willow:

"A waterfall of branches
Falling into the lake,
A sad head with hair hanging down.
The letter N with the trunk in the middle and the branches hanging down.
A weeping willow."

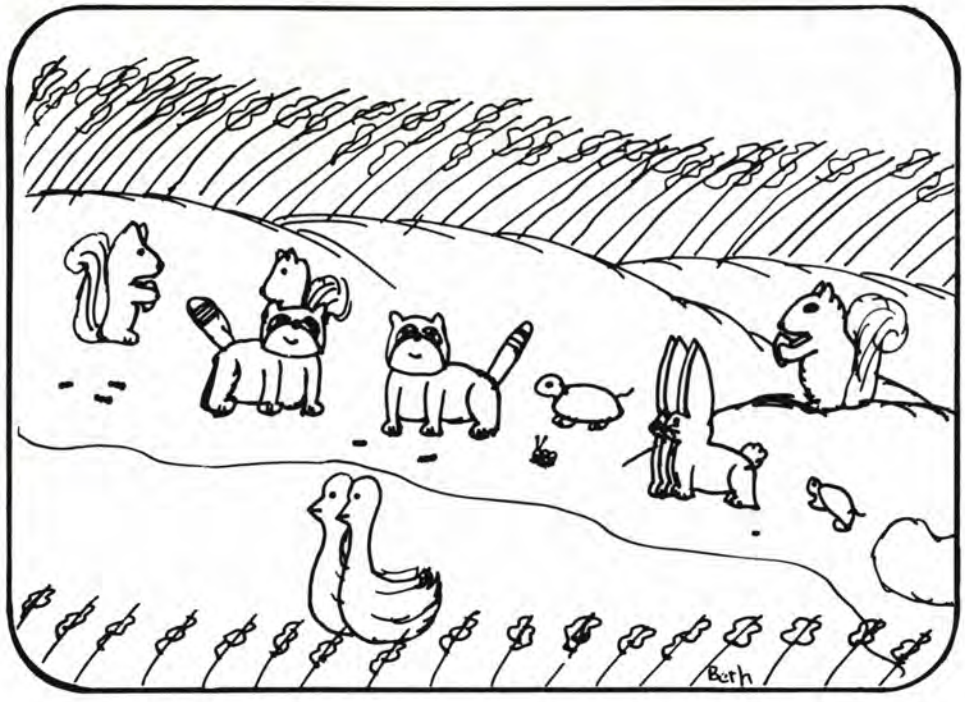
These writing examples were from two of the 276 student participants who created *Secrets of the Marsh*, a 62-page activity-resource book for children.

The story of how their project developed is a useful model for others to follow or draw from for ideas.

Alley Pond Environmental Center (APEC), located in Douglaston, Queens, New York, is an urban environmental education center serving thousands of school children each year from the metropolitan New York area. Headquartered within the confines of Alley Pond Park, APEC was incorporated in 1976 with the help of many local community people. In November 1976, the APEC organization took lease of a New York City Department of Parks building, and began a prodigious task. It set its goal to be . . . "to encourage environmental awareness, understanding, appreciation, and responsibility in the urban person through education." APEC was declared a National Environmental Study Area by the National Park Service in 1979. The concept of environmental education in city parks evolved through the dreams and aspirations of a dedicated group of New York City school teachers led by Joan and Hy Rosner.

Faced with concrete, cars, and cacophony, could the urban youngster still be concerned about the little remaining natural areas and their inhabitants found in our city parks? After conducting many urban school classes of all age and academic levels at APEC, it is clear that city children do appreciate and love their green park spaces. With this in mind, the education staff began to think of ways to reach out to more children and teachers to encourage and reinforce an understanding of our urban parks and their value. Since our class appointments fill up so quickly and many classes are closed out of a trip, this further validated the need to search for an appropriate outreach to provide park information.

Concurrently, other positive factors supporting an outreach project were emerging. First, APEC was the recipient of a matching grant from the New York City Youth Bureau, a project-funding governmental agency. This money was intended for tuition-free educational programs for gifted classes, among others. Second, there were various inquiries from teachers of gifted classes for information about the possibility of providing some special program for these youngsters. Knowing that we had a potentially interested group of teachers and their gifted students, and some money to begin to fund the project, the idea of a program to develop a publication was conceived. It would incorporate a collection of works by these children about Alley Pond Park. Gifted children can use higher levels of thinking — analysis, synthesis and evaluation; therefore, it was thought that with their creative abilities and problem-solving skills, they could produce an imaginative publication for other children. To encourage their nat-



Aline Euler is Education Director at Alley Pond Environmental Center in Queens, NY.

ural curiosity, fluent and elaborative thinking, and ability to create unique alternatives, was an exciting prospect for those concerned with this idea.

A teacher workshop was scheduled at APEC for those teachers who expressed an interest in participating with their gifted classes. Twelve teachers representing all the Queens school districts attended and signed up to participate. Grade levels ranged from kindegarten to junior high. Would this wide spread of ages present an eventual problem for our publication venture? We discussed this problem at the workshop, and it was felt that an age spread would give our publication wider appeal, and problems could be resolved duing the actual visits. Program content, topics, and structure were established. The content would focus on life in Alley Pond Park Marsh, and visits would concentrate on a teacher-class selected topic which included plants, trees, insects, reptiles, birds, and mammals. The format for each two-hour visit would include a discussion-orientation period on the topic, a field walk through the marsh, and a hands-on activity, for example, a marsh collage using natural materials or sampling techniques. In addition, an explanation of the class's responsibility for its part in the production of the publication would be given. The education department began to develop a plan for each class topic. For example, the mammal program agenda included types of mammals found, characteristics, adaptations, requirements for survival, and life cycle.

After a visit, each class did research at school and summarized the focus of their class topic on two pages (four sides, 8½ x 11) using a black marking pen or black type to ensure clear reproduction. These pages could contain handwritten or typed information, activities, games, puzzles, illustrations — anything that students thought other children might like to read about Alley Pond Park Marsh and its inhabitants. The enthusiasm and interest expressed by these students and their teachers on the class visit was incredible. Their questions, reactions and motivation during each part of the visit evidenced time and again.

The publication pages from the classes began to arrive at APEC, and each envelope's contents seemed to top the previous arrival. The activities created and information written by these youngsters surpassed our expectations. Children drew the illustrations for the cover and title page. As it was sent to us, we assembled the copy into topic groups and found to our delight that we had produced an impressive 62-page resource-activity book which we named *Secrets of the Marsh.*

Unfortunately, we also learned that the New York City Youth Bureau funds did not cover the printing costs. How could we publish our special project and realize this dream? A teacher involved in the project answered our prayers: A child's father in her class was a printer. He was able to obtain the plates, paper, printing, and binding as a donation. A guardian angel had smiled upon the project. Five hundred free copies rolled off the press — *Secrets of the Mash* became a reality, and everyone rejoiced. The 276 student authors would each have a copy, as well as the teachers, principals, and the New York City Youth Bureau. A special publication ceremony was held at APEC and was attended by class representatives, parents, teachers, school and political officials, governmental agencies, and our printing benefactors. It

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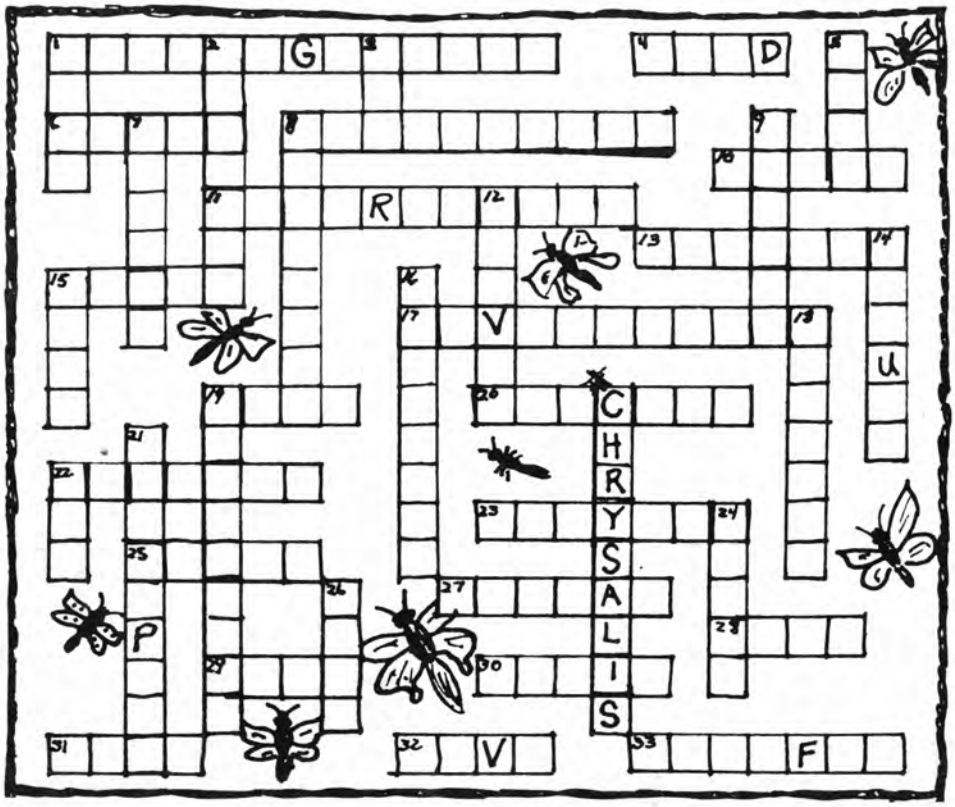
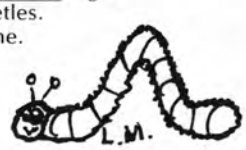


ACROSS
1 It eats other insects
4 Breeding place of mosquitoes.
6 Flies are insect _____.
8 Animal phylum of insects.
10 Insects hide under _____.
11 The larva of a moth.
13 Third part of insect's body.
15 Some insects have two pair.
17 Surroundings.
19 Produces wax and honey.
20 Attached to twig by female.
22 Protection from the weather.
23 Type of beetle.
25 Home for many animals.
27 Middle part of insect's body.
28 Outer covering of trees.
29 All insects have six.
30 Insects are link in food _____.
31 Insects have compound _____.
32 Bees' home.
33 Many insects are _____ to man.

DOWN
1 Stage between larva and adult.
2 Small six-legged animals.
3 Uninvited guest at picnic.
5 Hike.
7 Season of awakening life.
8 Feelers.
9 Pupa of a moth.
12 Caterpillars.
14 Plants and animals are part of _____.
15 Parasite of many insects.
16 Marshes preserved for wildlife.
18 An insect that eats wood.
19 A monarch _____ eats milkweed.
21 Too many legs to be an insect.
22 Insects have _____ legs.
24 Larvae of beetles.
26 Animal's home.



Stony Acres:
An Opportunity For Outdoor Awareness & Self-Awareness

S. Elaine Rogers and Deborah D. Repsher

Stony Acres, an outdoor education and recreation area for East Stroudsburg University, is the only facility of its kind in the United States. To the best of our knowledge it is the only outdoor education and outdoor recreation area which has been acquired through the initiative and efforts of the college students themselves. Generally university facilities of this type have been acquired through state funds, foundation grants, or community donations.

The 119-acre property, which is located in northeastern Pennsylvania near the town of Marshall's Creek, was purchased by the college's Women's Recreation Association (WRA) in 1962. Under the leadership of Professor Helen G. Brown, the women raised $2,000 themselves and borrowed $13,000 from the student senate. In 1964, the WRA turned the property over to the student body as a whole and the student senate relieved the organization of its remaining debt.

The original property contained unmanaged forests, overgrown fields, a run-down house and several outbuildings. The students, under Miss Brown's supervision, had much work to do to turn the buildings and grounds into an education and recreation facility. They cleared brush to make recreation playing fields, renovated the house and constructed nature trails through the woods. A one and one half acre lake was built by an outside contractor and stocked with fish. Canoes were purchased and a dock was built on the lake.

In the early years, the property was known as "Stony Acres Camp." Miss Brown's classes were focused on learning outdoor education and outdoor recreation skills, and the administration of a camp facility. Students were learning by doing.

Stony Acres Lodge

In 1964, when the Women's Recreation Association donated the property to the student body, it was incorporated and a board of directors was established to direct planning, management and operations. The composition of this board has remained unchanged from then until now: 6 students and 6 administrators and faculty, all having an equal vote.

In the years from 1965 until Miss Brown's retirement in 1975, the Board of Directors, under her continuing leadership, made many improvements to the operations and development of Stony Acres. The income to operate the property initially came from profits from the student snack bar, the washers and dryers in the dorms and food and beverage vending machines across campus, all of which Stony Acres, Inc. was allowed to manage.

Improvements to the property itself continued. Two wells were dug, ten platforms were replaced by winterized cabins and a primitive shower house and a chapel were built — most of the work was done by students themselves with help from interested faculty.

It was not until 1980 that the first written master plan was developed and adopted by the Board of Directors. Dr. S. Elaine Rogers, Property Development Coordinator for Stony Acres, Inc. wrote the master plan with assistance from technical advisors from local, state and federal resource management agencies.

Among the recommendations of the master plan was the development of specific resource management plans to address soil and water conservation, woodland management and wildlilfe habitat improvement. These plans have been written and are presently being implemented to improve both educational and recreational opportunities for users of the property.

The master plan also called for the development of a system of hiking/nature trails. Students from classes in the Department of Recreation and Leisure Services Management constructed the

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Deborah Repsher is a graduate of the Recreation and Leisure Services Management Department at East Stroudsburg University. She served as President of the Board of Directors for Stony Acres, Inc. during her senior year.

three mile trail system over a 2½ year period.

Future classes will continue the maintenance on the trails.

Once the trail was completed, interpretive services class students developed a trail map brochure, which includes information on interesting natural and historical features along the trails.

Most important among the recommendations of the master plan was the construction of a multi-purpose lodge facility to better serve student groups and organizations from off-campus, who may wish to use Stony Acres for workshops, meetings, field campus courses, youth camps, etc.

The Lodge was completed in the spring of 1984 and was dedicated to Helen Brown. The $310,000 building contains a large kitchen and dining room — to accommodate up to 125 people, two classrooms/break-down rooms, an office and modern restrooms, including showers, with facilities for the handicapped. With the construction of this building, the master plan was considered to have been completed — a five year plan was completed in four years.

Today the area is used by students, alumni, university faculty and staff, and non-ESU organizations from the local community and regional area. Other colleges and universities frequently use Stony Acres as a workshop site or study area on a lease basis. Visitors to the property may pursue the following types of outdoor recreation activities: camping, hiking, nature study, wildlife observation and photography, horseshoes, ice skating, volleyball, picnicking, canoeing, archery, fishing, cross country skiing and snowshoeing. Equipment for most of these activities is checked out free of charge to students.

Certain activities are not allowed: hunting, snowmobiling, trail biking, horseback riding or swimming. Alcoholic beaverages are not allowed, except by special permit for adult groups.

Stony Acres is available for educational use by all academic departments on campus, but is most frequently used by the Departments of Recreation and Leisure Services Managment, Basic and Professional Physical Education, and Biology.

Outdoor Education students become very familiar with Stony Acres through exploratory hikes, awareness activities, solo time, and the design and construction of outdoor education projects, such as bird feeders, nesting boxes, and educational exhibits. Prospective camp counselors learn basic camping skills through hands-on experiences at the site. Physical education students are taken to the Acres for classes such as canoeing and sport orienteering. Biology classes such as Aquatic Ecology and Ornithology visit the property to learn first-hand about the flora and fauna of the Pocono Mountains.

An additional educational facility at Stony Acres is a Project Adventure ropes course — a system of problem-solving, task-oriented physical elements, which the participants must negotiate, sometimes as a group and sometimes individually. The objectives of the ropes course are:

1. To provide first-hand experience in a challenging adventure.
2. To develop a sense of cooperation and a feeling of support among members of a group.
3. To build self-confidence.

The course, which was constructed in April of 1982, has been used by classes, student organizations and off-campus groups. A fee is charged to off-campus groups for the use of the course, and equipment and also for instruction.

The Project Adventure ropes course provides challenging experiences for classes and outdoor organizations.
Photo by Maureen Thomas

In the 23 years since its founding, Stony Acres has served many thousands who have visited the property for many reasons. Some have come seeking a quiet place to relax with friends. Others wish to learn the natural history of the Poconos through studying a carefully preserved sample of the region. But all most certainly have come to understand themselves better, especially the students who have worked so hard to improve the property and take advantage of educational opportunities available there.

Stony Acres has been, and continues to be, an opportunity for outdoor awareness and self-awareness. This idea can best be summed up with this thought from a paper, written by Miss Brown in 1967, in which she described the "Stony Acres Camp" project:

> "Experiences gained from the planning, supervision and operation of this project could never be gained in the classroom, nor could its true value be estimated in dollars and cents. The true value of such adventure can only be seen in our graduates of tomorrow."

For further information on visiting or leasing the facilities at Stony Acres, please contact Mr. Fred Moses, General Manager for Stony Acres, at (717) 424-3291 or College Center, East Stroudsburg University, East Stroudsburg, PA 18301. □

Networking is Working for TVA

B. Shaw Blankenship and Terry Wilson

Environmental education is evolving. In the past decade we have witnesed the development of a wealth of programs designed to help produce a population that is more aware of the interrelationships of human and natural systems and motivated to act in responsible ways to improve the quality of life. Organizations and individuals across the Nation have produced a profusion of instructional and informational materials, together with new approaches to teaching and strategies for integrating environmental concepts into the Nation's classroom curricula.

With its birthright founded in a strong concern for the environment and the relation of humankind to and in that environment, and with its multipurpose structure and focus on a major region of the Nation, the Tennessee Valley Authority (TVA) has identified the need for a broad-based, regional educational effort to support and promote these ideals. Environmental education has thus evolved as a major program and new frontier for TVA. In facing the challenge of environmental education for those involved in schools and other formal education systems, TVA identified several factors influencing current efforts in environmental education.

1. It is recognized that although a wealth of resource materials exist, relatively few are actually reaching the classroom.

2. In order for environmental education materials to become "a part" of classroom curricula, teachers must be impacted through in-service and preservice training.

3. In every part of the Tennessee Valley, universities represent a key change agent.

Therefore, the TVA formal environmental education effort has focused largely on the creation and support of a "network" of university-based centers for environmental and energy education that can be used by educators as well as the general public. For this unique cooperative effort of TVA and universities, the network is largely a "delivery system" designed to provide a multiplier effect by which TVA staff, as well as other organizations and groups, can impact a large number of classrooms through credible, professional environmental educators associated with regional universities.

The network had its beginnings in 1975 at Murray State University in western Kentucky when TVA, Murray State, and local schools pooled existing resources to create the Center for Environmental Education. With a strong initial thrust in teacher training programs, the center soon became a key mechanism for a diversity of program efforts aimed at a variety of audiences. With initial operational funding from both the university and TVA, the expanding set of center projects attracted additional support.

As designed in 1980, the contract between Murray State and TVA ended, and the center became a self-sufficient entity operating fully as a university program, with supplemental projects contributed to by various agencies and organizations. This transition in fiscal support, along with the positive response of its program efforts, provided TVA with a model for the initiation of similar programs in other universities in the Tennessee Valley. Collectivly, this network represents a unique system of cooperatives that share the common goals of teacher training, program development, regional services, and research.

Each of the six centers currently operating has placed a strong emphasis on teacher training, particularly at the in-service level. The center at Memphis State University, for example, has focused on the human and environmental relationships in its large urban area as it works with teachers in one of the largest school districts in the Midsouth.

In contrast, the center at Western Carolina University has developed a strong community-based emphasis, focusing on the natural and cultural resources of the rural mountain environment, while providing a connection with global trends through an exchange program in public schools in Canada and Jamaica.

With a strong in-service program underway, Murray State is now pioneering one of the first preservice efforts, with all undergraduate teacher trainees receiving firsthand training in environmental teaching approaches.

Regional services are also very diverse within all six centers. The University of Tennessee at Chattanooga quickly developed an excellent resource collection of materials and an efficient system for matching specific program needs with available resources.

Another level of service is demonstrated within the North Mississippi Environmental Education Consortium, a cooperative effort between TVA and four institutions of higher learning. The Consortium staff serve as coordinators of several environmental education projects of Northeast Mississippi Junior College, Itawamba Junior College, the University of Mississippi, and Mississippi State University. Still another type of service is represented by the TVA-sponsored environmental van that visits schools through a project of the center at Murray State University.

Program development efforts in the university-based centers are constantly expanding, ranging from Middle Tennessee University's focus on the historical and cultural aspects of environmental education to the efforts of the Memphis State Center staff in coordinating energy curriculum development with citizen groups and local electrical power distibutors.

Reseach is an important function of all colleges and universities, and the centers for environmental/energy education recognize the need for research in their programs. For example, the center at the University of Tenneseee at Chattanooga is involved in research in energy and alternative transportation, with its current developmental project in the area of human-powered vehicles.

Western Carolina's center has been

(continued on page 25)

B. Shaw Blankenship is project leader of the Environmental/Energy Education Program of the TVA at Norris, TN. Terry Wilson is director of the Center for Environmental Education at Murray State University, Murray, KY.

A Volcanic Terror and Wonder

Joseph James Shomon

When the Dozing Maiden With a White Bonnet Suddenly Awakened, the Entire World Would Know It – and Gain a New Appreciation of the Destructive as Well as Re-creative Powers of Mother Nature.

All above me the sky is clear revealing a blueness such as only western skies can claim. The hour of my arduous climb is around noon. An autumnal sun is pouring out its welcome warmth as if trying to soothe and heal the devastated landscape. I am climbing a steep hillock beside Windy Ridge, one of many promontories not far from the tattered walls of the crater.

Driving my boots sidewards into the loose ash to gain a firmer foothold, I peer upward toward the summit some 500 feet away. The incline is a sharp 50 percent slope, and the stress makes my head ache. I climb over huge logs half-entombed in ashen sand and pumice. Only the barkless trunks remain, all prostrate now, limbs long burned away and bark sandblasted down to dry sapwood. Here and there I meet chunks of broken basalt, some so large I must crawl around them. As I slide on the volcanic gravel, I am reminded of the slopes of Mount Kilimanjaro which, too, once suffered a major eruption and is now the beauteous queen of African mountains. For twenty-five more minutes I dig into the slope and finally reach the summit. On all sides I see only a desolate, lifeless, moonscape that was and still is a hell on earth. Mount St. Helens, once at 9,677 feet, had decapitated herself down to 8,400 feet.

I have seen Kilimanjaro many times and when it reveals its massive snow-covered dome, it is beautiful. So was Mount St. Helens once. Less than half the size of the African mountain, I saw her from the air many times flying north along the Cascade Range from California to British Columbia. "Off to our right," the pilot would announce over the intercom, "are three snow-covered volcanic peaks. The closest is Mount St. Helens. Just east of her is Mount Adams. And the big mountain just beyond, of course, is Mount Rainier."

I finally stroll north a hundred yards to a shattered precipice and then look down on Spirit Lake, once the sparkling gem of the Cascades in Washington State. Now it is broken into two parts, a monstrous landslide and mud flow creating an isthmus across its center. All around the lake, on all sides, in all cardinal directions, my mind's eye sees only stark devastation. The crater, surrounded by jagged torn walls, partly covered by ice and snow (now a dirty gray-brown), is only three miles away and is still puffing out plumes of steam. I get an eerie feeling but United States Geologic Survey experts and state geologists say the Windy Ridge area is reasonably safe.

Earlier in the day as part of our Tacoma Chapter of The Mountaineers, we stopped at another ridge and got our first glimpse of the St. Helens area. The spot has become historic for this was the campsite of David Johnson, 30, a young U.S.G.S. volcanologist who was sent to monitor the rumblings of Mount St. Helens when she first erupted on March 27, 1980. The initial volcanic activity was minor and consisted of emissions of steam and ash. Similar eruptions preceded by earthquakes continued until April 7. On May 7 eruptions of steam and ash were resumed and continued until May 14. On the morning of May 18, 1980, Johnson was on a ridge near his campsite studying the suspicious cone of St. Helens where dark cracks in the snow and ice had appeared and ash and steam were escaping. He was reporting the events by radio to his U.S. Geologic Survey station in Vancouver, Washington, At 8:32 a.m. he saw the mountain lifting off and yelled: "Vancouver, Vancouver. This is it!" He was never heard from again. Within seconds a monstrous firestorm with poisonous gases blew him from the ridge, cremating him alive.

The recounting of this dramatic episode made our tour group pause briefly in silence. I said a prayer for young Dr. Johnson and the 60 other persons who perished in this most cataclysmic volcanic eruption on the North American continent in recent times.

I personally recall the moment well. I was shaving in our upstairs tri-level home in Oakbrook, near Tacoma, some 60 airline miles away. My wife Vera was downstairs in the kitchen starting our Sunday breakfast. We heard a blast like that of a 240 howitzer going off, and it shook the house. I thought it would be at Fort Lewis, 10 miles away, or perhaps a fighter aircraft speeding over nearby McCord Air Force Base. Soon the radio was making the dramatic announcement.

Unless one is somewhere near the blast area and feels its effects and then actually is a witness to the gigantic fire ball itself – which we saw almost immediately – and later sees the devastation itself, it is hard to put into words just what it is like. It is a little easier to describe what is *still* happening. Let us briefly review the past and present events as they occurred and are still occurring based partly upon my own knowledge and partly on factual data I have been able to assemble.

The May 18, 1980 Eruption

The Mount St. Helens eruption blasted into the atmosphere what amounted to a whole cubic mile of rock, pumice, and ash, spewing a mushroom-like cloud 70,000 feet into the sky and raining havoc and devastation over 250 square miles of prime forest and wilderness land. The gigantic blast had the force of 8.2 atomic megatons of energy or roughly the equivalent of 500 Hiroshima-type atomic bombs. The 400 m.p.h. lateral fire storm flattened trees and other vegetation in a fan shaped area 8 miles long and 15 miles wide to the north side of the mountain. In addition to the blowdown area to the north, there was extensive damage and mud flow to the east. The actual damaged area covered an irregular fan measuring 18 by 27 miles. Millions of trees, chiefly Douglas fir, sitka spruce, red cedar, western hemlock, western white pine, red alder, big leaf maple, and black cottonwood, were so laterally flattened that it would appear some gargantuan King Kong had laid them low like matchsticks and then ignited them. On the periphery of the blast zone standing trees were scorched to death by heat and fire. Others were toppled by

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A Volcanic Terror and Wonder

Gifford Pinchot NF. A June 1980 calendar produced by Photo Art Studios showing Mt. St. Helens before eruption, and in March, April and May 1980. Photos by Denny Miles, Gary Jenkins, and Tom Atiyeh of Photo Art Studios, and Jim Hughes of USDA Forest Service.

Gifford Pinchot NF. Trees knocked down by blast from Mt. St. Helens volcano, rocky outcrop in picture. June 10, 1980.

A small lake near Mt. St. Helens after the eruption of May 18, 1980. USDA Forest Service Collection (PIC)

Gifford Pinchot NF. Plume of steam escaping from top of Mt. St. Helens before eruption. Mount Rainier visible on horizon. USGS aerial oblique. May 18, 1980.

Photograph by John Keith

mud flows or killed by hot ash. The outflow of Spirit Lake was choked with volcanic debris and the lake level raised more than a hundred feet. The north fork of the Toutle River, fed by Spirit Lake, was devastated by debris and mud flow. The south fork of the Toutle also received huge mud flows. On May 18th ash drift flowed northeast; on May 25th it drifted northwest; on June 12th to the southwest; and on July 12th again to the northeast. Most of Washington got ash fall, as did the upper half of Idaho, all of Montana, and the upper ⅔ of Wyoming. In a few days ash reached the Atlantic coast and in a week it spread around the earth. Like Krakatoa, in Indonesia in 1883, Mount St. Helens made herself known around the world.

Assessment of Death and Damage

The Mount St. Helens eruption claimed the lives of 61 people, including crusty 84 year-old Harry Truman and his 16 cats. Also lost or destroyed were 2300 big game animals, much small game, countless birds and fish and untold numbers of invertebrate life. In addition, lost were 61,200 acres of prime national forest, plus 89,400 acres of forest owned by the State of Washington, private companies, and individals. National Forest resources destroyed or damaged include 1,600,000,000 board feet of timber, 100 miles of streams, 197 miles of trails, 27 recreation sites, 63 miles of roads, 13 bridges, and 15 U.S. Forest Service buildings. The estimated resource loss on national forest land alone has been put at $137,087,000.

The damage was the result of four major forces: the physical force of the blast hurling away rock and debris from the erupted mountainside, the swift fire-storm itself that scorched everything in its path and reached nearly 500 m.p.h., the toxic gases and fumes, and, finally, the physical entombment of flattened objects, plus damage from mud, mud flows, landslides, and floods. Hundreds of homes and other buildings were demolished, washed away by floods or otherwise damaged. Rivers were silted, included heavy deposits in the Columbia River below Portland, Ore., which had to be re-channeled by the Corps of Engineers. It is said that when the salmon met the blocked silt barriers on the Columbia, they began leaping out of the river in crazy fashion. So the re-awakened young gal in the Cascades had made her mark.

Volcanoes, Earthquakes and Vulcanism

The matter of volcanic activity and associated geologic dynamism is a complex and involved subject, all much too deep to go into here. In a brief way we can only say that volcanoes, earthquakes and crustal movements go together and all date back as far as 2 to 3 billion years ago when the earth was lifeless and young. Back then massive pyrotechnic eruptions occurred all over the earth, finally settling down along repaired great fissures and cracks in the earth's crust. The cooling of the earth's shell and shifting crustal plates, however, continued to provide weaknesses in the earth's surface. Earthquakes continued along the earthen plates, even after life began, as volcanic activity produce large areas of mountains, cinder cones, and lava flows.

The Cascades are an earthquake belt and form a part of the Ring of Fire around the world where volcanoes are active. The ring stretches all the way along the Pacific rim in South America, through Central America, the U.S., British Columbia, Alaska, the Aleutian chain, across Japan and down into Indo-Malaysia, Indonesia and Australia. Other volatile areas include Iceland, the Mediterranean, Turkey, Middle East, the Great Rift Valley of Africa, and certain islands in the Pacific Ocean. The highest peaks in South America, Central America, Mexico and the U.S. are volcanic. Some volcanoes rose from the bottom of the ocean to great heights above sea level and so are the largest land forms on earth. Some volcanoes spew only steam, rock, and ash. Others emit molten rock from deep within the earth's interior. The Hawaiian volcanoes are of this type; so are those of Iceland whose lava flows eventually form caves and volcanic tubes. I explored some of these underground volcanic caverns in Iceland and they are awesome. In tropical areas some of these caves become the favorite haunts of bats, including the vampire type.

The St. Helens volcano is of the "Strata" type and also is characterized by caves, tubes, and branching volcanic conduits. A cross section of the mountain would show first a solid basalt layer in the lower earth's region followed sequentially and vertically by a strata of igneous and metamorphic rock. This is followed by a layer of sedimentary rock which, in turn, is topped by a cone of lava, pumice, and ash. A break in the first three layers, often prompted by an earthquake, sends magma up the break and begins to form a mount of ash and volcanic debris. Periods of magma flows and blastings through holes in the mantle finally may build up a sizable volcanic cone.

St. Helens was a very young mountain as mountains go. She had a major blow in 1857 and scientists believe she showed variable activity between 37,000 and 2,500 years ago. Her nearest sisters are Mt. Adams, a similar size dormant volcanic peak, and huge Mount Rainier. Both could blow anytime. Volcanologists also believe that Mount Hood and Three Sisters in Oregon and Mount Shasta and Lassen Peak in California are prime candidates for a volcanic outburst. Rainier is only a short distance from my home, and if this granddaddy (14,430 ft.) decides to blow, I hope I'll be far away, like hiking the rain forest slopes of Mt. Kenya or savoring the game-filled plains of the Serengeti 11,000 miles away. You see, I'm a bit of a coward.

Ecosystem Recovery

Within weeks of the big blow the process of natural restoration had begun. Since then, man has come in to salvage most of the downed timber and start artificial reseeding and planting. Even though the mountain is still active and new coverings of ash have appeared periodically, the forces of ecological revegetation are hard at work. Already patches of green are showing where spring water seeps out of the mountainsides. Phytoplankton and zooplankton are seen at Spirit Lake. Frogs and salamanders are coming back, as well as elk, deer, rabbits, and coyotes along the periphery of the denuded area.

Steelhead and salmon are again coming up the Toutle. On my descent down the hillock to Windy Ridge a raven rode a thermal overhead and loudly croaked.

Unless repeated new devastations occur, the area should recover rather quickly. Abundant rainfall of 35-70 inches a year is the key. In ten years time much of the devastated area will be clothed with grass, fireweed, salal, blueberry, and young trees. Then it no longer will be what it is today. Thus one must hurry to see the raw signs of unbridled nature once at work. Nature surely destroys but its power to rebuild, to reclothe even the most hideous of earthen wounds, is great and ever persistent. In 500 years Mount St.

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A Chronology of Environmental Education

Please Throw Stones at This Author

Craig C. Chase

Author's Note: People trying to learn about environmental education may not be familiar with the components of the history of the field. Some articles in the public media have detailed portions of this history. There is a need for a comprehensive picture of the field so that future environmental educators will learn from mistakes of the past, thereby enhancing the world of the future.

This article is limited by the experiences and biases of one writer. It is hoped that readers will "throw stones at the article" to aid in molding a correct and inclusive history of the field.

Many consider environmental education to be the process leading to the development of a citizenry aware of and concerned with the relationships of the living and non-living components of their environment. Using this definition, one might visualize environmental education as a large umbrella with spokes representing academic areas such as: biological science, psychology, conservation, outdoor education, physics, nature study, chemistry, humanism, history, language, mathematics and sociology, as well as others.

The beginnings of environmental education may be said to be rooted in the period 1861-1880. It was during these years that recreational camping for the public appeared. In 1861, Frederick Gunn founded and headed the Gunnery School for Boys. This first school camp attempted to move the organized school pursuits to an outdoor setting.

Dr. Joseph Rothrock (1876) established a School of Physical Culture which combined his knowledge of forestry with a desire to aid frail boys. This first private camp closed within a few years because of a lack of funds.

The first church camp was established by the Reverend George Hinckley in 1880. As a youth leader, he saw camping as an opportunity to know his boys better and to have a lasting influence on them.

The beginning of the Nature Study movement is usually attributed to the publishing of a book by Wilbur Jackman entitled *Nature Study in the Common Schools* in 1891. Shortly after this, in 1896, Cornell University's College of Agriculture began publishing a series of leaflets designed to encourage nature study in rural schools. These continued until 1969.

The first camp for girls was established by Laura Mattoon in New Hampshire in 1902.

The American Nature Study Society was established in 1908 with Liberty Hyde Bailey as its first president. Helen Ross Russell has noted in an article in the July, 1983 *ANSS Journal*, "At this time, science materials for teachers were practically non-existent, and the few science books for children were commonly anthropomorphic, sentimental or moralistic. To change these conditions, some educators were borrowing high school equipment and watering down content meant for the older students so they could present it to elementary school children." The ANSS members united behind a belief that direct experiences with the environment and its interrelationships provided an ideal laboratory for learning.

In 1906, two years before the founding of ANSS, Maurice Bigelow, a Columbia University biology professor and an early officer of the Society, had founded a monthly journal entitled *Nature Study Review*. This eventually became ANSS's quarterly magazine, *Na-*

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ture Study. It is interesting to note that the complete title today is *Nature Study - A Journal of Environmental Education and Interpretation.*

Anna Botsford Comstock, the first woman faculty member at Cornell, became the American Nature Study Society's fifth president. Her book, *Handbook of Nature Study,* published in 1911, is still a valuable teacher resource.

Ernest Thompson Seton, Dan Beard and Lieutenant General R.S.S. Baden-Powell were active in originating the Boy Scout movement. In 1910, the first Boy Scout camps with professional leadership were established in the U.S. By 1911, an official Boy Scout Handbook had been prepared. It states that the aim of the Boy Scouts is to supplement the various existing educational agencies, and to promote the ability in boys to do things for themselves and others.

Juliette Low, recognized as a founder of the Girl Scouts, established a Girl Scout camp in Savannah, Georgia, during the summer of 1912. This was the first of today's nationwide network of GSA camps. During this same year, Mrs. Luther H. Gulick established the program of work and ideals that, with some modifications, became the national organization known as Campfire Girls. The first camps for Campfire Girls were conducted in 1914.

In 1918, the first Master's Degree in outdoor education was given by the University of Southern California. Why is this worth noting in a history of the development of environmental education? Because it signifies the acceptance of the field by educators. This acceptance was also evidenced by articles in professional journals of the time, and the fact that there was, by now, a market for the services of outdoor educators. Agencies, educational institutions and private employers recognized the values of employing a person with a specialized training in the field of outdoor education.

In 1925, Lloyd B. Sharp took over the Fresh Air Farm sponsored by the old *Life* magazine. He was principally responsible for the reorganization that became Life Camps in the 1930's. His philosophy was "that which can be best taught and can best be learned indoors should be taught and learned indoors. He also asked that those subjects, topics and courses that can best be taught and learned in the out-of-doors should be taught in the out-of-doors." This philosophy may explain to the reader Sharp's success in the training of staff that became famous in the field and the eventual (1940) establishment of the National Camp for Leadership Training. Along the way, L. B. acquired the first Ph.D. in Outdoor Education from Columbia University.

By 1930, eight cities in the United States had school camps for teaching and learning. Los Angeles, Chicago, and Dallas, as well as Jersey City, New Jersey, and LaCrosse, Oshkosh and West Allis of Wisconsin, had school camps sponsored by their Boards of Education. Environmental learning in the outdoor laboratory was beginning to be utilized by progressive educators. In the early thirties, Michigan schools in growing numbers were carrying out camp education programs. Notable programs in progress at that time were the Ann Arbor, Dearborn and Cadillac public school camps.

Phi Delta Kappan devoted its entire December 1938 issue to Camping Education. The significance would seem to be that this prestigious education magazine deemed the topic of interest to its educator members across the United States. That same year, Atlanta, Georgia joined the growing list of major school systems with resident programs.

By 1940, the W. K. Kellogg Foundation established an experimental resident school camp at Clear Lake, just outside of Battle Creek, Michigan. During the 1940's school camping continued to expand. In 1945, the San Diego and Long Beach public schools in California set up resident programs. Tyler, Texas, began a similar program in the late 1940's. The New Jersey State School of Conservation was established and began offering courses in outdoor education at that time, too.

The New York City camping education experiment, carried on in 1947, is significant in the history of environmental education. Fifth and seventh grade classes provided experimental groups which went to a school camp and were compared to a matched control group that remained in the traditional classroom. A summary of test results designed, administered and evaluated by a psychological team employed for the project indicated a general "superiority of the experimental group, with many of the differences, being statistically significant."

E. Laurence Palmer's book, *Fieldbook of Natural History,* was published in 1949. The revised edition is still a popular seller. Aldo Leopold's *A Sand County Almanac* also appeared in 1949.

A social force that aided in the development of the concept of environmental education began in 1954. It was the *Outdoor Project* of the American Association of Health, Physical Education and Recreation under the guidance of Dr. Julian Smith who, from 1940 until his death in 1975, was probably best known as a public relations expert in the field of outdoor education. He had been a teacher, principal, program administrator, college professor and director of the *Outdoor Education Project* for the American Association of Health, Physical Education and Recreation. Smith's thesis was that "the outdoors belongs to everyone, consequently, education in the outdoors should cut across subject matter and departmental lines," including recreation. His work as Director of the Outdoor Project encouraged the training of leaders in the outdoor environmental setting.

Rachael Carson's *Silent Spring,* published in 1962, became a best seller as the general public began to be caught up in the scientist's concern for the environment.

In 1965, the politician Adlai Stevenson, his sensitivity heightened by constituents' concern for their environment, made his "Spaceship Earth" speech before the United Nations. That metaphor, emphasized by the first photograph of the earth from the moon (1969), impinged itself upon the common man's consciousness, creating an awareness of the finite planet earth and its limited resources.

The political voice of the United States now began to be heard. President Nixon established the Environmental Quality Council. This act also established the Environmental Protection Agency and required the submission and review of Environmental Impact Statements before approval could be given to major actions likely to significantly affect environmental quality. Senator Gaylord Nelson of Wisconsin conceived the idea of an "Earth Day" and scheduled this event for April 22, 1970. It was expected to be a day of significance on campuses of higher education aound the country. However, the aforementioned people and events had been raising the concern of the majority of citizens for their "Spaceship Earth," and this concern was evidenced in the communities and

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Photo Tips

Frank Knight

Most of us SLR (single lens reflex) camera owners have an electronic flash unit for use indoors to capture the memories of family activities or the excitement of parties, but seldom do we consider that there are as many outdoor as indoor flash photo opportunities.

Before taking your flash outdoors, take it off the camera. Although the camera's hot shoe is a convenient place to hold the flash unit, it is the least appropriate place for quality flash photography. It results in monotonous, flat, full-frontal lighting with no opportunity to use light and shadow to sculpt your subject. Another disadvantage is that it often gives your subjects "red eye" as the light reflects straight off the retina onto your film. If your flash unit has a swivel head permitting your aiming it at the ceiling you can get very softly lighted, shadow-free lighting so flattering to your human subjects. Just be sure the flash is in the manual mode and open your lens 2 to 3 f-stops more than the flash guide indicates to compensate for the further distance the light must travel to your subject. Take the same shot, first with direct and then bounce light to see which result you prefer, and while you're experimenting try the same shot hot shoe-mounted and hand held above and to the left or right. You will need to buy a 5 foot PC cord to connect your flash unit to the camera's flash terminal. Since some economy cameras lack a flash terminal, it may be necessary to get an adapter that connects to the hot shoe.

NOW TAKE THE FLASH OUTDOORS

Now that you have your flash off the camera and the flash unit set to the "manual" mode, the most obvious first flash use outside is as a fill-in light for people pictures. It eliminates those harsh shadows in eye sockets and under nose and chin, and even better lets you position your subjects with their back to the sun for squint-free photos. Fill in also gives life-giving catch lights in your subjects' eyes and flattering sun highlights to the hair. Simply expose your picture normally so the background will be properly illuminated. Be sure the shutter speed is right for flash synchrony (usually 1/60 sec.). If you are shooting from 2 people to a small group you will be at the right distance for a well filled-in shot. With a head and shoulders portrait of one person, a single thickness of a white handkerchief over the flash unit will cut the light sufficiently to prevent wash-out.

PLAY GOD WITH YOUR "SUN"

Turning to nature photography, you can have the most fun and success with your flash. It helps to have a close-up lens to enable you to move in close to your subject. If you plan on doing a lot of close-up work, you will eventually want to invest in a macro lens (about $200-$250) that will enable you to focus from infinity down to a few inches where a penny would be penny-sized on the film. In the meantime, you can begin mastering the techniques involved with a less expensive ($20-$30) close-up filter set which screws onto your existing lens.

Now you have total control of the lighting. You can put the sun where you want it. Actually, the versatility of putting the light anywhere you want is a secondary benefit. The main reason for using flash and setting the lens at f16 or f22 is to provide maximum depth of field for your close-up shots. Using available light results in shots with a paper thin field of focus like the first coral fungus photo illustrating this article.

Front lighting? Easy. After composing and focusing, set your lens aperture at the largest f-stop number, f22 or f16 on most cameras. The mathematically proficient will want to use the following Calhoun formula to determine how close to hold the flash to the subject:

Electronic Flash Nature Guide Number (Calhoun Formula)

$$\frac{\text{Focal Length of Lens}}{\text{Smallest f stop}} \times \frac{\text{Normal Flash Guide No.}}{3} = \text{Nature Guide Number}$$

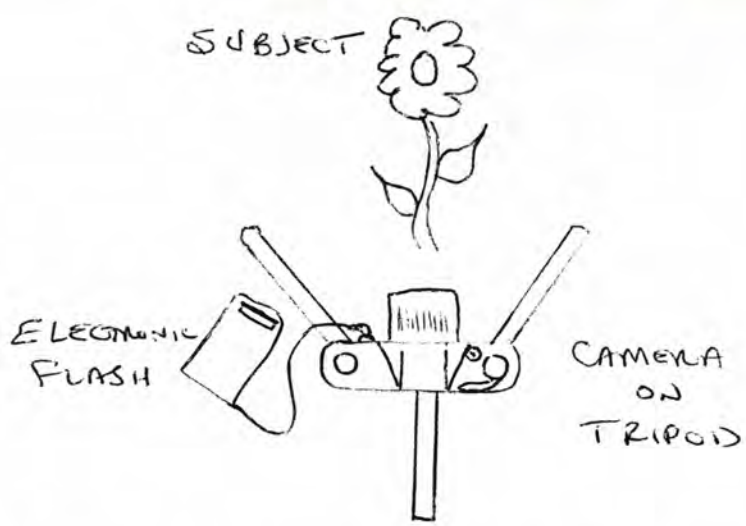
e.g. $\frac{55}{22} \times \frac{65}{3} = 49 = \text{N. G. N.}$

Now, measure the lens extension (distance from rear of camera to the lens diaphragm) in inches and divide this into the Nature Guide Number:

$\frac{49}{5} = 10$ **inches.**

Place the light 10 inches from subject for front lighting; ¾ths of front distance for back lighting. Make up a chart by ½ inch increments and calculate light distances to save time in field.

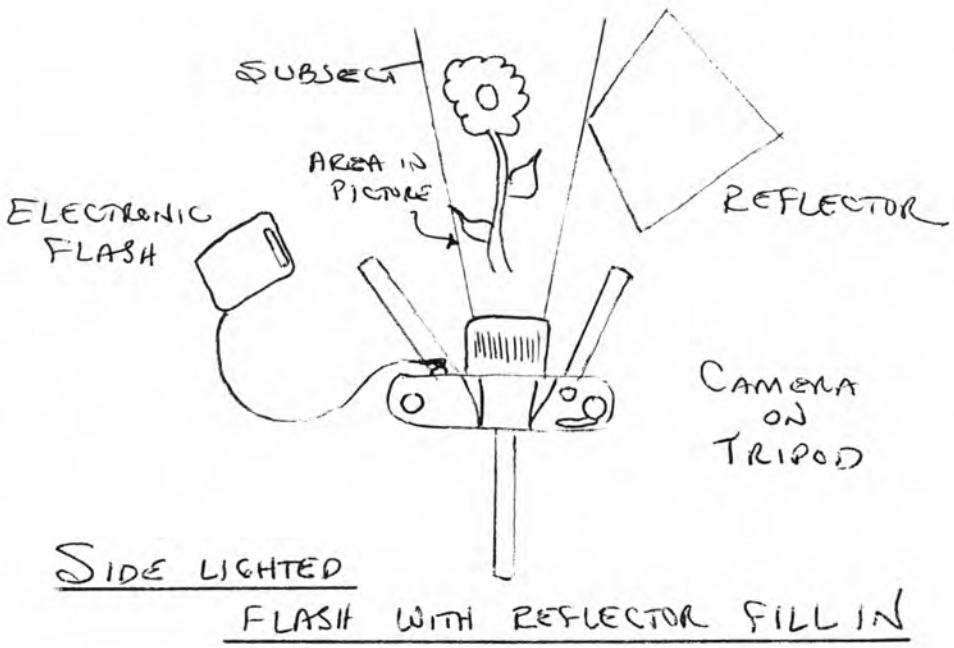
Math air-heads like me will probably do better by trial and error. Try 11 inches for ASA 64 film and 16 inches for ASA 100 film. (I recommend these lower ASA films for minimum graininess and maximum color fidelity.)



FRONT LIGHTED FLASH SET UP

Frank Knight is director of Stony Kill Farm Environmental Education Center at Wappinger Falls, NY.

How about dramatic side lighting? Try one shot with the light coming in from the left and a second with the light from the right. Then use a reflector to fill in a little light from the opposite side. A rigid aluminum cookie sheet has served me well for many years. I hold it as close to the subject as I can just outside camera range and aimed directly back – 90° – to my flash. If I'm holding both a flash and a reflector, who is holding my camera? I use a tripod for all my close-up work. I've adapted it with a clamp on the leg so I can get my camera down to ground level when necessary. The tripod enables me to carefully and patiently find the best camera angle and then hold it while I can try different angles with the flash and fill in. Were I hand holding the camera, my creativity would be inhibited by my wanting to more quickly resume a more comfortable position.



Taken with available light in the shade in the rain, only the edge of the plant is in focus.

With front flash, the coral fungus is well lighted and in sharp focus from front to rear.

Illuminated from behind, the translucent plant glows like a Tiffany lampshade.

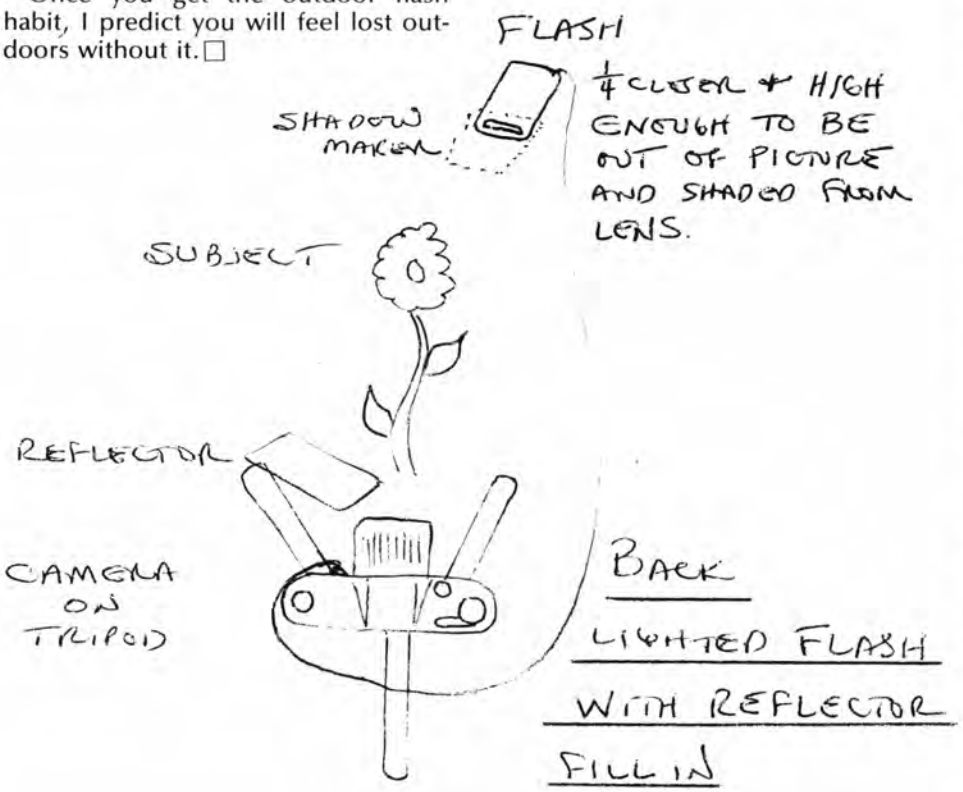
For the most dramatic back-lit shots, move your flash around behind the subject but ¼ closer to it than normal. With the light slightly to the left or right and just out of the picture at the top, your reflector can be in the foreground just outside camera range for front fill-in. I use my hat brim or hand to block the light from shining directly into my camera lens where it could produce an unwanted flare. Back-lighting is best for translucent petals and leaves, giving a "Tiffany lamshade" effect.

Since electronic flash units produce a cool bluish white light, you may want to warm your shots up a bit with an 81A filter. Since it cuts down the light a bit you will want to hold the flash unit a little closer to the subject.

Once you have mastered these techniques to your satisfaction, try moving the light back a bit with your aperture open to f11 or f16 to achieve a lighter, more natural background for

your pictures.

Once you get the outdoor flash habit, I predict you will feel lost outdoors without it. □



NETWORKING is Working for TVA

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instrumental in the development of a computer network that links high school students to university faculty for student research projects.

The efforts of TVA in creating university-based centers for environmental/energy education is an excellent example of the "domino" principle. By working with a university-based center, TVA can make input into a much larger number of classrooms than would otherwise be possible through working with an individual teacher or individual school system. With this in mind, TVA's overall strategy is to facilitate the development of a network of 17 centers that would span the Valley so that any Valley citizen will be within 50 miles of center services. (On October 1, 1984, centers for environmental and energy education were established at Tennessee Technological University and Jackson State University [Mississippi].)

This model of networking university-based centers for environmental/energy is becoming nationally recognized as an example of how a Federal agency can utilize the agency's resources in a highly efficient manner while maintaining a high level of local involvement and control. In fact, the model has already been duplicated in universities outside the Tennessee Valley.

The TVA model is a diverse, yet cohesive, program with roots in a deep commitment to furthering understanding of the inseparable relationship between humankind and Earth. □

A Chronology of Environmental Education

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public schools of the nation, as well. Citizens literally joined hands to tell political forces in the United States that they feared for the environmental quality of their habitat.

Earth Day was followed by the passage of the Environmental Education Act (Public Law 91-516). This act authorized funding of elementary and secondary school programs in environmental education, also pre-service and in-service training for teachers and the development of environmental education materials for use by the mass media.

Laws were passed, but it has taken time for changes in attitudes and life styles to become effective. The controversies of the 1970's centered around fuel supply and use, nuclear power, federal land use and environmental education. More recently, acid rain, waste disposal, energy use and multiple use for land areas are the principal environmental concerns of the 1980's.

Many packaged environmental education curricula have appeared as schools, teachers and youth leaders responded to the zenith of public feeling expressed on Earth Day. Popular ones have been *Acclimatizing* and *Acclimatization,* USFS-*Process Approach, Outdoor Biological Instructional Strategies* (OBIS), the *Green Box, Project Learning Tree* (PLT), NPS-*NEED program,* (BFW) - Environmental Learning on Wildlife Refuges.

One of the new, exciting environmental education programs is *Project Wild.* This was developed by the people behind *Project Learning Tree,* along with a number of co-sponsors, and aims at teaching about conservation and wildlife in the schools. *Habitat* is another that explores the needs of humans and their environment. *Sunship Earth* has been endorsed by many, too.

More and more school districts across the nation are expecting all their youth leaders to teach environmental education. As the demand for citizens aware of and concerned with the relationships of their surroundings increases, indications are that the schools are taking constant steps to do a better job of educating their children — the citizens and voters of tomorrow! □

A Volcanic Terror and Wonder

(continued from page 20)

Helens may again have giant Douglas fir trees four feet in diameter. It will be a different kind of an area, of course, but if the present and future generations work with the natural forces, Mount St. Helens could once again become a beautiful place.

The big lesson to be learned from the St. Helens scenario is this: Nature, not humans, rules the roost. Nature surely destroys, but the power of ecological reconstruction is equally great. Humans on the other hand, have had a history of too much ecological destruction. Only nature can really rebuild, really repair. The hour has come for us to assume a partnership and stewardship role with nature, or we will be a short-lived species on earth. □

Teacher Aids for Using a Discovery Trail

Paul T. Zeph

Virtually every nature center has a "discovery trail" — a trail of numbered stations with a corresponding paragraph or two in a booklet interpreting an item of interest at that station. This is a popular and useful method for the general public to obtain an informative, interpretive walk without a naturalist-guide. For a school group of thirty students, however, this discovery trail booklet is all but useless. The information is interesting, but the teacher must read everything to the students, the pictures are too small to hold up for everyone to see at once, and there is often nothing the student can do except stand quietly and listen. What could potentially be an exciting outdoor experience becomes a struggle between the students' boredom and the teacher's patience.

At Aullwood Audubon Center and Farm, we've taken a typical discovery trail and added a unique set of materials and equipment for teachers to use; transforming an ordinary self-guided visit into an exciting adventure, involving discovery, student participation, group dynamics, and creativity. This self-guided package is borrowed by the teacher for the visit, and includes three components: 1) a booklet of trail activities; 2) a backpack of simple field discovery equipment; and 3) a set of laminated visual aids.

The booklet of trail activities is the most important part of these materials. It provides the teacher with information about the trail and with group-oriented activities, allowing a teacher with no prior experience with our trails, or knowledge about the natural world, to lead an excellent interpretive walk. At each station the same topic is addressed as in the general public discovery trail booklet, but the approach is different. An activity is presented at most stations that requires the students to get involved with the natural world they are in: at the marsh, they will explore for aquatic organisms; in the woods they turn over logs and seek out woodland creatures; elsewhere they divide into teams and search for plant shapes and colors; along one trail they do creative movement and move as their favorite animal would; and at another station they fantasize as poetry is read to them.

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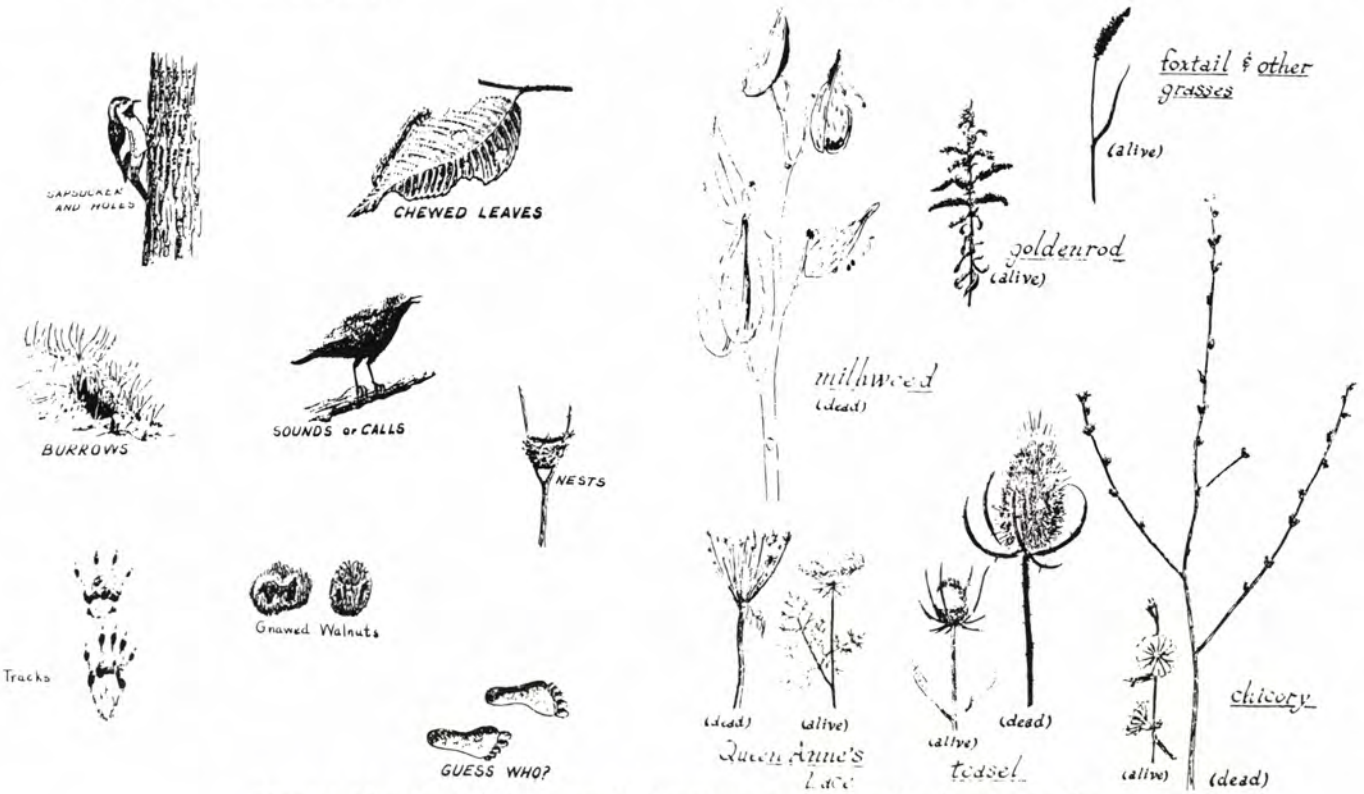
Map of trail and booklet that is given to teachers ahead of time to read through to pick out most appropriate activities for visit.

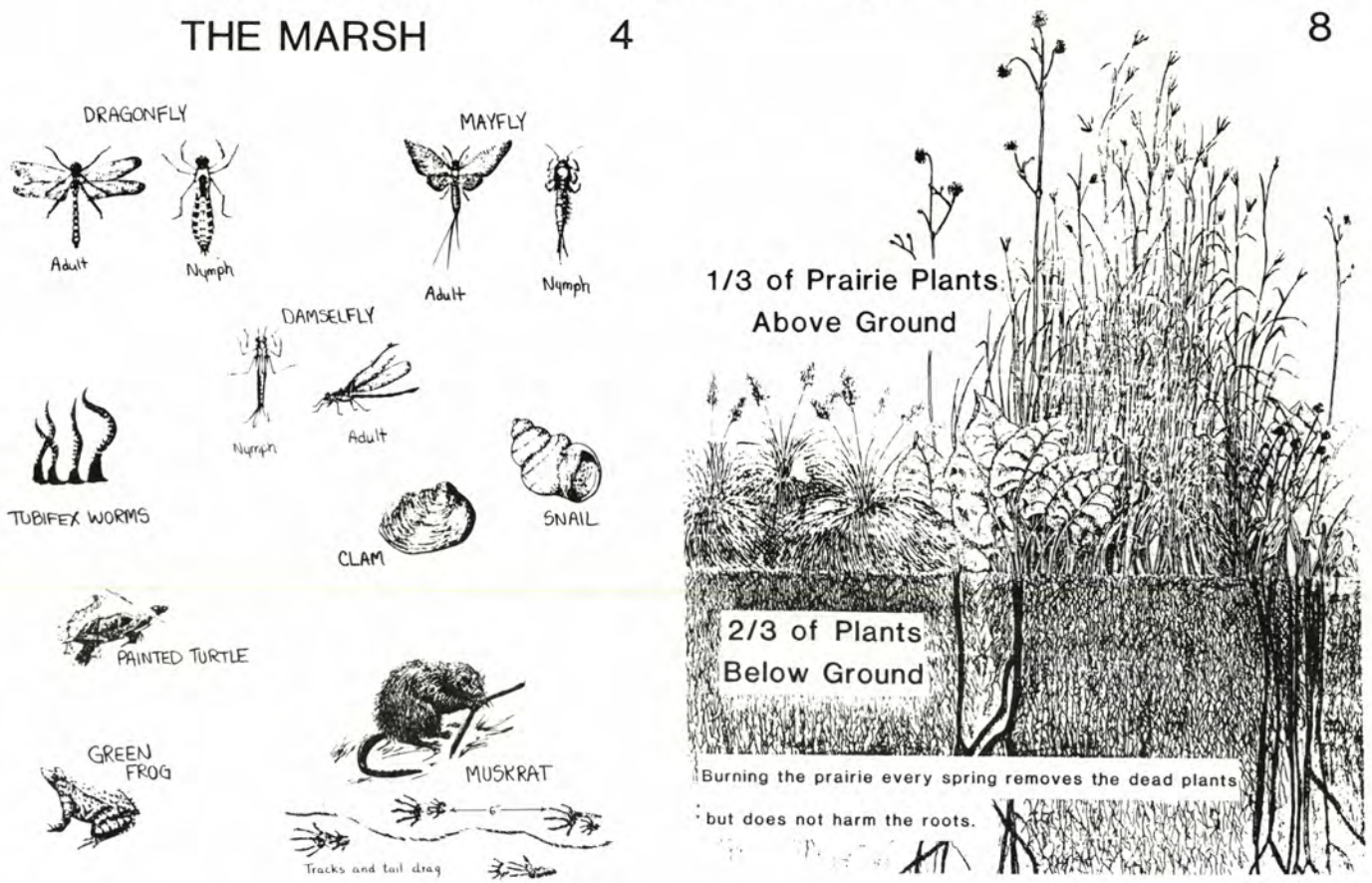
For each activitiy, the booklet details procedural steps, gives the teacher instructions to read to the students, and suggests questions to ask students to facilitate a good questioning process. We have found that most teachers are reluctant to lead a group of children on a nature walk because they don't know what they'll see, or feel they won't know what to do or say while on the trail. Materials such as these alleviate much of their fears and also promote a good questioning process, group problem solving, and outdoor learning.

The second component, a backpack of field equipment, adds immeasurably to the students' trail adventure. Each backpack contains plastic hand magnifiers on a neck rope (one for each child), aquatic discovery equipment (a shallow pan to hold organisms and small metal strainers), and assorted vials and plastic boxes to contain small creatures for examination. The magnifiers encourage children to get very close to things they would otherwise overlook, such as flower parts, insects, or fungi. The aquatic equipment enables students to become actively involved with aquatic life for they can scoop up a water strider, diving beetle, or dragonfly nymph to observe in a pan, instead of standing along the shore listening to the teacher lecture on the life in a pond or stream.

The final component, a set of laminated visual aids, is also carried in the backpack. These are simply-labelled pictures on 8½" x 11" cards that correspond to various stations along the trail. The pictures are big enough for a group



Copies of a few of the laminated cards contained in the backpacks for teachers, to show at various points along the trail — aids greatly in helping the younger children understand concepts — makes concepts more concrete.



Children using strainers to collect aquatic organisms.

Children using hand lenses which forces them to get close to nature and interact.

of children to see when huddled around a leader; and are laminated to make them last a few years (clear contact paper is an inexpensive substitute for lamination). These pictures are extremely important for elementary students, as the children require concrete visual images to truly comprehend and understand certain abstract concepts. Some examples are: animal signs to look for, the life cycle of a tree, decomposer organisms, prairie plant roots, or the travels of the water in our brook after it leaves our property.

Each of these three components by themselves — the booklet of activities, the backpack of equipment, and the visual aids — are tried and true interpretive tools used widely by many educators in the field. The combination of these components, however, is an exciting, new approach for self-guided groups; and provides a richer, more meaningful experience for both student and teacher.

Note: A copy of Aullwood's self-guided trail booklet and visual aids is available by sending $2.00 to cover printing and mailing to: Aullwood Audubon Center and Farm, 1000 Aullwood Road, Dayton, Ohio 45414.□

Toward a Better Environment and Education in America:

A Call for Coalition

Jack Padalino

Background

The National Congress for Environmental Education Futures: Policies and Practices August 1983 was preceded by none other than eight national policy conferences that had been convened since 1970. These national convocations served as a valuable prelude to a call for a coalition to address EE policies and practices in America for the next decade.

The Alliance for Environmental Education (AEE), the coordinating organization for the EE Congress, has been nurturing the growth and influence of environmental educators in America longer than a decade. The AEE was founded during the early 70's by professional organizations with support from the Johnson Foundation. AEE affiliates now number 30 and represent diverse interests of youth, physical fitness enthusiasts, naturalists, educators, business and industry, labor unions, and research institutes. AEE extends an invitation to provincial, regional, and state organizations, their education officers, and their equivalents, to affiliate.

Coordinating this congress was AEE's most recent contribution. The meeting became a forum for over 400 concerned professionals from some 21 environmental organizations, listening, discussing, and drafting ideas for a coalition of environmental organizations to improve the quality of environment and education throughout America.

Prior to the congress, those people who registered for its policy track received a copy of *From Ought to Action in Environmental Education* that provided a common base from which to begin discussion in working interest groups. The six interest groups working at the Congress were: citizen's organizations, elementary/secondary education, government organizations, higher education, and industry/business. Each group attempted to achieve a consensus on recommendations that dealt in some measure with resolutions, action plans, and strategies important to the viability of EE. Recommendations from the groups are being synthesized into a working document that Congress coalition participants will review, study, and act upon.

Jack Padalino is President of the Alliance for Environmental Education

AIMS

I propose as groundwork to a coalition for environment and education the recommendation that our major priorities be teachers, students, American citizens, and the American political process.

Coalition members must help upgrade the competence and status of environmental educators – by providing opportunities for their self-improvement; providing professional backup to help teachers in the substance of their teaching; and by recognizing exemplary teachers and programs.

Coalition members must help improve the EE experiences of students – through joint efforts with formal and non-formal educational organizations to provide: thinking skills, laboratory and field experiences, computer literacy, social issues, and career information.

Coalition members must help increase the literacy of citizens in, for, and about environment – by involving diverse publics in professional environmental organization meetings; working with the mass media; and encouraging popular expositions focused on environmental quality.

Coalition members must help inform the political system as it formulates policies that affect education in, for, and about environment in America – by working at local, state, national, and international levels; by providing information and technical expertise; by working collectively with other groups and organizations with kindred interest to better schooling and education in America.

PRIORITIES

Educational opinion making and decision making in America has been characterized as diffuse and fragmented. Hence it is recommended that participants in the coalition work together to analyze the decision/policy making process, monitor it, and provide coalition members with information as needed.

The coalition should focus special attention and efforts at state and local levels – by analyzing the policy making process in each state; involving AEE affiliates, coalition members, and additional organizations with kindred interests; coordinating information on global and national issues with grass roots efforts; ensuring that current EE practices are not further eroded; and providing advice.

The coalition should identify key opinion makers and policy makers – through individuals, AEE affiliates, coalition members, and members of the congress' six interest groups.

The coalition should work jointly with groups whose interests include a strong program for pre-college education in America – by exploring shared concerns with trade associations, business, labor, foundations, and industrial groups; by exchanging information on local, state, and national legislation; by promoting a better understanding of the link between an environmentally literate citizenry, the economy, and the democratic process.

The coalition should establish a process for keeping informed on national developments in EE – by making use of information from AEE affiliates, coalition members, and other groups who monitor national policy making and legislation; by providing status reports on relevant legislation.

The coalition should provide a means of sharing information among AEE affiliates, member groups and others – by sharing testimony that has been prepared for Congress and/or State Legislatures; monitoring select publications, newspapers, TV, radio; identifying a coalition newsletter; preparing guides for state and local coalition members, AEE affiliates, and others; convening congresses, conferences, and workshops; publicizing

and reporting on meetings of AEE affiliates, coalition members, national commissions, and other groups.

The coalition should establish teams to work on especially important EE issues – such as the erosion of education about environment in school curriculums.

NEEDS

In order for this EE coalition to be effective it needs information about:

the current status of EE at the precollege level – including statistical and descriptive information; latest policy, program, and legislative developments at local, state, and national levels; lists of available EE speakers and audio-visual materials.

member organizations – lists of their EE activities, programs, and resources; summaries of their policy oriented activities, experiences, and resources; school materials available for teachers.

Possible means for exchanging information include:

directories – for stable information and data;

a regular and timely newsletter – for keeping up to date with new developments in EE;

instant exchanges – to inform coalition members of important news of immediate interest.

An important role for AEE in the coalition should be to coordinate the exchange of the above types of information. AEE affiliate and coalition members roles should include distributing relevant information from AEE to their members plus providing AEE with information of importance to the coalition. AEE and coalition members should share the responsibility of communication with the EE community and with the general public.

It is proposed that the coalition be a loose-knit oversight group with AEE functioning in the role of secretariate. The coalition would be driven by issues, and proceed on the ground rules of advice and consent.

Current key issues such as formation of EE centers, EE literacy, EE networking, and EE support resulted from a synthesis of recommendations made by Congress interest groups. These together with more that 50 presenters at the Congress iterated and reiterated the scope and complexity of America's problems in environment and education. Furthermore, the national EE leaders at the Congress clearly underlined the fact that there are no simple solutions to the problems they presented.

In a context of the Congress's thorough review of EE policies and practices, coalition members are turning full attention to what private and professional organizations including Alliance for Environmental Education affiliates working collectively might do to counteract America's current situation in EE. □

Good Reading

BOOK REVIEW . . . by Mary D. Houts

A Teachers' Guide to the Conservation of *People and Their Environment,* by Matthew J. Brennan. Port Washington, NY. Bayberry Press, 1983. Two Vols: Grades 1-2-3 and Grades 4-5-6. A Conservation Project of National Council of State Garden Clubs.

No one in this high technology and nuclear era can question the fact that the present generation and those to follow have a crucial lesson to learn from the earliest possible age. The lesson is that life on earth has a basis in certain biological truths, and that the human race must work within these and endure, or ignore them and perish. This puts a double burden on teachers. First, they have a responsibility to see that students understand this message even as they continue to teach the separate academic disciplines spelled out in their curricula. Second, it must be presented in such a way that the young will not be driven to despair by the degree to which mankind has ignored these truths already, but will feel that they can learn to be effective agents of positive change.

The two volumes of *People and Their Environment* will help teachers to lighten this burden. They provide means of integrating the message of biological responsibility, or what the author refers to as a "conservation ethic," into everyday teaching, and they do it with a positive approach.

The basis for the 15 teaching units provided on each grade level is three "conceptual schemes":

1) Living things or populations of living things are the product of their heredity and their environment.

2) Living things are interdependent with one another and their environment.

3) Living things and environments are in constant change.

The relationship of each unit to each concept is clearly explained under the heading "Unit Concept." Many suggested activities are provided under three further headings — "Introducing the Unit," "Developing the Unit," and "Extending the Unit." Teachers will find the quality of the teaching ideas uneven. Some of the units are especially unique, and have excellent ideas for activities. The Grade 4 unit on "What it is to be 'human'" is one of these, as is the Grade 5 unit on "People Change Environments." But teachers of the primary grades in particular will find some of the ideas overly abstract and some of the activities too difficult for their students' capacities. However, these are volumes that teachers will want to browse through to see where the ideas and activities fit into what they are already teaching, and to get new ideas. The *People and Their Environment* teachers' guides are worth looking into by every teacher concerned about preparing their students to become responsible citizens of the future. □

Meet a Member

Lena Linnaea Veta Feighner

Lena Feighner's story is a tale of an almost-ninety-year love affair with nature, with learning, and with teaching. It is also the saga of an indomitable woman who has refused to be beaten by tragedy.

Birth – Pony Corner, Fontana, Kansas, December 3, 1895. Moved to top of hill – in a prairie cabin beautiful flowers by hill roadside, forest, prairie. Brother Walter, 14 months younger, tagged along with me.

My dad said that I was the meanest kid on earth, they wished I had not been born. I figure I was too smart to stay in a cabin with such beautiful landscape about me.

My dad was a great hunter. He knew homes of wild turkeys, swans, ducks, other water birds, geese, woodpeckers and all birds and animals. I grew up with animals on porch and the kitchen floor. So it was my father's fault that I grew up to love wild things.

I walked the roadside for flowers common to hillsides and roads. My Aunt Rose taught me their names and habitats.

One day mother and father went to the garden at the foot of the hill and left me to care for baby Gladys in the road. I stayed there as long as possible, then waded barefooted in tall giant ragweed. A great yell, my feet were tangled in snakes. Dad came running, too many coppers and rattlers there, but it was only one garter snake that had half swallowed another. Once I took Gladys to the spring and saw a strange animal in a tree. I was half scared to death – I had seen one of those animals once when I was picking flowers along the river bank. I couldn't get through the fence fast enough and tore my lovely blue Easter dress with white dots. I still cannot appreciate raccoons as much as other people do.

Mother always took us walking along road when she went to gather hops to make her new starter for her wonderful bread. A trip to town or to church in our wagon was great. Grandfather Feighner was a missionary pastor to a congregation that met in the new school house. He was a minister for Campbell's group. His wife's ancestors, Campbells, came from Scotland and Ireland in the early 1770's and landed in Kentucky and established a church and college.

I went to the lovely country school, 85 pupils, for one week and no more schooling for a year and a half. School was the greatest event of my life – all teachers from first to college graduate were my greatest friends.

I had a wonderful inheritance. My mother received the genes from her mother's French Huguenots ancestry that made her a great musician. She never refused to play the piano or organ for any group she attended. She told me she had only 6 lessons on the organ, but she was tops. She was organist for Grandfather's church. Her mother's uncle, John Sallee of Kentucky, had many slaves. But he enjoyed his slaves chorus most of all. When the civil war freed them, he did not lose his chorus. He provided land and cabins for them if they wanted to stay in the area. His brother took up a government claim near Newton, Kansas. That musical gene was handed down to many Sallees, even to Feighners today. Three of my mother's grandchildren are college grads in music.

I had a wonderful education with the best teachers! I led the botany class in classification in graduate school at Kansas University because of my high school teacher. I received my A.B. at Parks College and M.A. at University of Kansas.

I went with a group of nine K.U. graduate students to Friday Harbor, Washington. We joined University of Illinois class at Minneapolis and had classes under Dr. Victor E. Shelford in animal ecology, my great love forever. We studied all mountains and woods across Canada for a week before we landed at Friday Harbor, a great new study area and marvelous student body. At Glacier, Canada, we walked up the mountain punching holes with our sticks for glacial cracks. I came out on one side of a glacial stream with the class on the other. Nothing to do but walk down alone. We had seen bears among the trees going up. When the class arrived at our hotel and I was missing, the town fathers were disturbed, but I saw my classmate, Stanley Brooks, from Kansas University coming back up the hill. "Everyone is disturbed with you out there among the bears," he told us. Since then students have been killed by bears in that same area.

My class in Marine Ecology introduced a new world to me.

Dr. Shelford took classes for four years, over 28,000 miles of land in North America, from Churchill, Maine, tundra to tropical Mexican forest at Tamazunchalan. I joined all of them.

I own 160 acres of woodland prairie in E. Kansas which I call Shelford Wild Life Sanctuary and have given it to Burroughs-Audubon Association of greater Kansas City for a nature preserve, especially for bobwhite, quails, doves and birds – but no poisonous snakes or extra black snakes, coyotes to chase my deer through the tangled woods or bobcats to get ground nesting birds. It is a beautiful area where my missionary grandfather served the people.

I went for a bird study around the world and our class was sent to the Black Sea in Russia. Dr. Shelford was interested in great ecological study areas there, established around 1887. It is an area similar to my neighbor's prairie. When I stopped at the Science Department in Moscow University and introduced myself as Dr. Victor Shelford's student, teachers were very happy. They called me "Victor's student."

White Sands study at desert was great until the government took it over.

I went somewhere to study every summer. Once to Michigan Biological Laboratory at Douglas Lake. There we had to study some bird's life history. After squirrels destroyed my original I had to take robin study. Later, my high school students, after a successful science fair, decided to study robins. Bent's history told of a student who studied food; 3.2 lbs. to raise a group of nestling robins for 14 days. We worked daily, at school and home. One boy said he didn't know parents had to work so hard to grow their babies. So did his parents.

We used book, Insects of Kansas, cut insects from colored paper. I watched one of my boys work for days to make his polyphemos moth for another problem. Giant boys cut and pasted little paper wasps. I told them with such fingers they should be surgeons or mechanics. We won top prize in the science fair for both projects. Pupils drew and cut their own patterns and models of insects. I took their projects to science conventions – Christmas

time to St. Louis, Washington, D.C., Carmel, Indianapolis, Chicago, Champlain, Urbana, Omaha, Nebraska.

I studied ornithology at Cornell after Dr. Blanchard's death at Michigan. I had to carry home bobwhite eggs due to hatch. They hatched in the dining cafeteria. Such wonderful creatures – God's most beautiful and greatest work on earth, I think. Dr. Allen wrote me a letter and called me The Johnny Appleseed Missionary for bobwhites. I went back to Cornell for 13th International Ornithological Congress in the sixties. It was all great.

I took hatching bobwhites to Canada to visit Dionne Quintuplets. I had studied genetics and was thrilled at their birth. White throat sparrows sang there. I wrote a 50th birthday letter to 3 surviving quints in May 1984 and prize my thank you in return.

I prized my visits with E. Laurence Palmer at Cornell even to his death. He gave me a copy of papers on fossils, written by David Starr Jordan, first President of Leland Stanford University. My pupils copied pictures etc. to illustrate fossils found in his stories because of fossil brought to a class room. I think it has not been published. But since my house was robbed and burned July 25, 1980, and I came home from travel to red hot ashes, I don't know where much I saved is located.

I spent the summer of 1925 at Cold Spring Harbor, Long Island, NY, where I started my thesis in genetics. Students and classes were great. The professor took us to N.Y.C. for 3 days of study, including fossil eggs of Dinosaurs brought back from Mongolia, one with embryo showing, a great event for me.

I taught General Science at Central Junior High, Kansas City, the first junior high school built west of the Mississippi. For 42½ years we studied God's rules for his world. One class was like no other in the world. I am sure my pupils were as interested as I. I started biology but inherited general science classes. I would do it again. Of course, I had pupils who were upside down and still are. A member of the first class I ever taught was buried at Ft. Levenworth, Nov. 16, 1984. One of my girls, helping to clean the lab, one night said, "Miss Feighner, you should not be paid for teaching science." "WHY, Lucille?" "You have too much fun."

In 1934 someone presented me with bobwhite eggs that came from a nest destroyed by a mower. I hatched them with a Bantam hen and took them to school.

I was teaching 10 hours of science a day. Our high school had burned. I taught biology in a.m. 7:30 until noon then General Science until 5:30 p.m., about 500 pupils each day for many days.

My biology classes came in – I brought you some chicks today. What kind? I let each pupil hold one. I raised quail each year, 1934 until I retired in 1965. Football boys put babies in shirts to keep them warm. We loved them.

After the war one of my students met a supervisor. "Is the teacher still there who had bobwhites?" "Yes." "While I was hiding from the Japs in the jungle, I thought of baby bobs I used to put in my shirt to keep warm." At a later time I met a large man waiting for my bus. "Miss Feighner, you do not remember me, but you saved my life during the war. You had been around the world and around Africa and you told us what natives ate in jungles. While I was hiding from the Japs, I ate everything, snakes, frogs, snails, lizards, birds, etc. I was skin and bones when they found me, but I am alive."

Dead 13 foot 8 inch python abandoned in Kansas City, May 11, 1984.

If all my teaching years were worth nothing but those two reports, it was worthwhile.

I am a great traveler. I have had 4 study trips around the world. I had 4 studies in Africa, a week in Ethiopia where famine is killing thousands, lovely country in 1957. I bought an African python skin in Leopoldville. My pupils liked it. This summer I had an opportunity to save a large Burmese python and skin, body and organs. I will probably send it to my alma mater, Kansas University, Lawrence, Kansas. There are only two kinds of pythons and I am happy to be lucky to own one of each. That is my last *big* project.

Lena Feighner rescued the python from incineration, and spent more than two days skinning it, preparing the organs and the skeleton for display.

After the robbery and burning of my home in the summer of 1980 former students presented me with a trailer. Six months later thugs broke in my trailer Jan. 1981 and left my naked, injured body to die; they kicked out my teeth and pulled right arm out of shoulder, it is still out. The pupils of my school gave picture shows, etc. and presented me with money to help pay

my medical bills. I pinched pennies and gave Park College $1,740.00 to buy books for any students that want to work their way through college. I will help them through Jr. College also. One of our colored girls who wants to be a doctor helped me. She has been waiting for an organ transplant in Pittsburgh. I am helping her.

How good and how crooked can people be? I enjoyed conventions of ANSS through the years. I am homeless and bedless now except I go out of town. I give my regards to all my Shelford classmates and my students and teachers who read this.

I like nature, music, art, china dolls, students, all work in Presbyterian church (all my active life), ecology, classmates, great teachers, traveling, you name it.

Best wishes to all nature lovers, ecologists and to those who love bobwhites, doves, robins, blue birds and other birds I have rescued and raised and released. To all teachers of Gen. Science, greetings, but do not follow the plans given by your supervisors – use your own ideas! □

Secrets of the Marsh

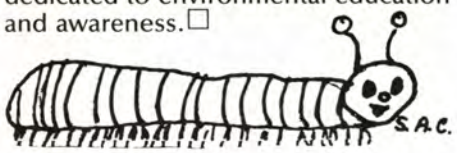
(continued from page 13)

was a story-book ending for a project conceived with commitment, cooperation, and caring.

Recently, *Secrets of the Marsh* was highlighted in two education journals, *Instructor* and *Humane Education*. Orders for our *Secrets* have come in from all over the country and Canada. Our initial 500 copies have long since left the shelves so that others far and wide will appreciate the secrets of Alley Pond Park Marsh, and see it in a new way — through the eyes of our gifted urban children.

It is hoped that a new "land ethic" optimism and feeling will reach each human being, and touch them to love and cherish the living creatures and plants of our city parks as it did our gifted student authors.

Secrets of the Marsh, an activity resource book for and by children, published in June of 1982 is available for $4.00 plus $1.50 postage and handling from APEC, a non-profit organization dedicated to environmental education and awareness. □



Details of the Trumansburg Pumpkin Plan for Halloween Week for 5th Grade

Monday

Show the class a sphere without polar or equatorial markings of any kind. (A styrofoam ball, billiard ball, or even baseball will do.) Mark a point somewhere on the ball. Then ask,

Suppose that you wanted to describe the position of this point on the ball to someone else. How would you do it? Remember that the ball might be in any position, but the mark on it would not change!

On a ball with no fixed reference points, it cannot be done. But let some discussion about this take place, and see if you can bring the class to such a conclusion without *telling* them. *Conviction* is important here.

Would it be any easier to locate such a point on a rectangular plane? How about a circular plane? A plane without any boundaries at all?

(Discussion)

Now, suppose that the ball is spinning in space . . . like a spherical top. What characteistic or quality of the spinning ball might make it easier to describe the location of that point on the ball?

Can the exact point be described? Or only a "slice" or circle on which the point is located?

(Discussion)

How would you describe for someone else which circle (or "slice") the point is on?

(Discussion)

Could you describe the circle in terms of how far above or below the "equator" the point is? What else would you need to have on the ball to describe exactly where the point is located?

Here, discuss with the class the importance of some "frame of reference" for describing location. On a spinning ball, the poles or the places where the axis of spin intersects the surface of the ball, are part of the frame of reference. If we distinguish between the poles as X and Y, or as N and S, then we can describe many circles or "slices" of the sphere as being so many *degrees* away from the N and S points, *or* if we describe the fattest circle or "slice" as the *equator,* we can describe all other circles or slices in terms of how far N (north) or S (south) they are from the equator.

What happens to the diameter of the circles (or "slices") as we go either N (north) or S (south) from the equator on a spinning ball?

Now, suppose we *designate* a line between the N and the S poles as another part of our *frame of reference.* (This is an *arbitrary* line. Explain the meaning of arbitrary, that by some kind of agreement, one is simply picked. But it *could* have been somewhere else; there is nothing sacred in the manner in which that line was designated.)

Then we can refer to the originally designated *point* on the sphere as *both:*

- N(orth) or S(outh) of the equator (and how *far* N or S)
- W (left) or E (right) of the N-S line, and how *far* W or E

Ahah! We finally have a frame of reference to help us locate a point on a sphere — a rotating sphere! The point can be so many degrees N or S of the equator, and so many degrees (like thin, orange slices) W or E of the designated N-S line.

(Discussion of the Greenwich prime meridian)

At this point, review the number of degrees in a circle, the meaning of *degree,* and the number of degrees in a quarter-circle and a half-circle. From the equator to either pole represents a quarter-circle, or 90 degrees. From the designated N-S line to another line half-way around the sphere is a half-circle, or 180 degrees. One could describe the distance around the equator from the designated N-S line up to 360 degrees either W or E. But it is customary to use the W only up to 180° left around the equator, and the E only up to 180° right around the equator, from the designated N-S line. (From here on, refer to the "designated N-S line" as a *prime meridian.* That's how it will be described on Earth.)

Now, if there is time, pass out a spherical apple and a toothpick to each student. Have each student score an equator on the apple (half-way between the stem and the remains of the calyx). Then have each score a prime meridian (straight down from stem to

remains of calyx).

Next, have each student prick another meridian 180° from the prime meridian. Then, in order, have each one lightly prick the following lines:

- parallels (like "slice lines") every 15° N and S of the equator
- meridians every 15° W and E of the prime meridian

(Here, check to see that each student has the concept of parallels and meridians, and is marking his apple correctly.)

Give the latitude and longitude of Trumansburg, then have each student put his toothpick into the apple at that point. Let students compare apples to see if each has done it correctly. Also, put out a topographic map of the Trumansburg area, and let some of the students check the exact latitude and longitude of the spot where they live.

(Discussion of terms latitude and longitude, and where Trumansburg is located on a globe)

Finally, introduce the concept of time zones — twenty-four zones or sections of earth's surface that are each about 15° of longitude, but are *centered* on each 15° longitude line. That is, the eastern time zone is 15° wide, but it is centered on the meridian that is 75°W of the prime meridian.

Have the students locate and mark the eastern time zone on their apple. Then let each one cut out this slice and eat it.

(Remember to pass out paring knives only when they are ready for this step, and to collect the knives when the apples are all eaten. There will be more cutting, so don't collect the knives yet.)

At the same time, demonstrate, if you can, where the eastern time zone is on a classroom globe.

Next, have the students locate, mark, then cut out and eat the following time zones (centered on the meridians shown):

- central (90°W)
- mountain (105°W)
- Pacific (120°W)
- Yukon (135°W)
- Alaska-Hawaii (150°W)
- Bering (165°W)

Now, let the students finish their apples . . .

Collect all paring knives, wash them, and have them ready for the session with pumpkins on Thursday.

Note: Any suggestions you want to make for outside reading, looking up things, etc.?

Some hints: World almanac for time zones, latitude and longitude of major world cities

World Book Encyclopedia

Latitude and longitude of Greenwich, England; Asimov, Isaac, *The Clock We Live On,* Abelard-Schuman, New York, 1965. chapters 2, 3, pgs. 30-57.

Tuesday

(Continue with the schedule for Monday if not all was done that was suggested.)

Divide the class into groups of about four students each. For each group select a chairman who should be responsible for:

- getting pumpkin, nails, string, pencil or pen
- seeing to it that all cooperate in the activity
- returning all material after the completion of the activity

Provide a nearly spherical pumpkin to each group, along with 5 meters or more of string, two nails, and a pencil or felt pen with which to mark the pumpkin.

Review the meaning of pole, equator, meridian, parallel, and the division of a circle.

Then have each group mark *lightly* on its pumpkin the following lines:

- equator
- parallels of 15°N, 30°N, 45°N, 60°N, and 75°N, as well as corresponding parallels in the "southern hemisphere."

Next, ask each group to insert a nail at the "S pole" of its pumpkin, and with another at the "N pole" or just use the stem as a large nail. With the string, tie a loop around the "N pole" and then pass the string down and around the "S pole," north again to make a 15-degree section, around the "N pole," down to the "S pole" to make a 15-degree section, and so on . . . until the entire pumpkin has been outlined with strings to show 15-degree meridians around the entire sphere.

One of the meridians should be designated as the prime meridian, and another as the "international date line" (180° meridian).

With these two meridians so marked, ask each group to locate "Trumansburg" on its pumpkin. Also, ask each group to locate and mark (with a dot) Greenwich, England (51° 30′ N, 00°). Set the pumpkins where they will not be disturbed.

Wednesday

Have each group use the pumpkins from the preceding day, and mark on them the following points, outlining each group of points *after* all points have been marked:

45°N, 15°W; 45°N, 45°W; 30°N, 30°W
45°N, 75°W; 45°N, 105°W; 30°N, 90°W
30°N, 60°W; 15°N, 75°W; 15°N, 45°W
15°S, 30°W; 15°S, 90°W; 23½°S, 60°W

Thursday

(You will need paring knives, paper plates, and paper towels)

Let each group use paring knives to cut out the outlined portions. They should also cut around the parallel that is 75°N. This will make a jack-o-lantern with a removable lid. Be sure that one member from each group cleans up any mess of cut-out pumpkin parts, seeds, and soggy paper towels.

Review the concept of meridians and parallels. Also take another look at a topographic map showing Trumansburg, to find the latitude and longitude of Trumansburg.

If you wanted to find a point as small as your house or farm on a topographic map, locating it to within a degree might not be exact enough. (A degree of latitude spans about 70 miles! A degree of longitude at the latitude of Trumansburg spans something less — about 50 miles!)

What is the next smaller unit of measurement on the spherical frame of reference on Earth? About how large an area would such a unit cover?

What is the next unit smaller than that? How large an area does it cover?

Friday

HALLOWE'EN PARTY!□

Ethics and the Prairie Movement

(continued from page 35)

Ave., Winter Park, FL 32789. Publishes *The Palmetto* (a quarterly, now in its fourth year). California and Florida both have rich floras, but the threats are immense and joining groups such as FNPS or CNPS are very worthwhile, even if you live outside either state. Many other states have native plant societies.

The Nature Conservancy, esp. Midwest Office, or state Chapter Offices.

The National Wildflower Research Center, 2600 F. M. 973 North, Austin, TX 78725.

Plant Conservation Project, Natural Resources Defense Council, 917 15th Street, N.W., Washington, D.C. 20005.

Natural Areas Association, 320 S. Third St., Rockford, IL 61108 (memberships).□

Ethics and the Prairie Movement

Douglas E. Wade

Prairie management, reconstruction, and restoration has been invaded by promoters and users of alien plants, geographically out-of-place North American natives, named cultivars derived largely from native species (western states), and strange, bizarre mixtures, some even retailed in cans. Because of all of this, including false advertising by operators, (sadly with three in Illinois), I started to examine nursery catalogs and write to the owners about what seemed to be questionable practices. Not exactly a small task. One listing (1982 ed.), *Sources of Native Seeds and Plants,* issued by the Soil Conservation Society of America, shows, out of 272 companies listed, 160 deal with wildflower seeds and native plants or native grass seed. This might be just the tip of the iceberg.

Then, in 1981, I started to help in distributing a Purple Loosestrife Alert *(Lythrum salicaria)* prepared by Dr. Dan Thompson, U.S. Fish & Wildlife Service, Fort Collins, Colorado. With Dr. Thompson's help, I prepared a purple loosestrife exhibit, with premier showings at the 5th Northern Illinois Prairie Workshop and the 8th North American Prairie Conference. I became more strongly aware than ever, that certain obnoxious aliens, like purple loosestrife, were in the nursery and landscape trade. The prairie, wildflower, and natural landscaping movements were in a rampant growth and some practices were threatening to the genetic and ecologic integrity of natural systems and areas. A prairie ethics (guidelines) seemed to be missing.

Therefrom, I had become involved in a war of values (ethics). I prepared written materials which aroused some feedback. Copies of the notes were useful in writing to seed and plant companies, as well as to supporters of my views.

Mr. Wade, former ANSS President, is currently serving as president of the Prairie Preservation Society of Ogle County, and along with Dorothy R. Wade, co-owner of Windrift Prairie Shop and Nursery. He is presently engaged in an "Alien Plants Research Project."

Quite lively interchanges have occurred with nursery companies, although a few have not so far responded. Some who have carried purple loosestrife or have questionable mixtures have said they would remove offensive species. Whether or not these promises are kept is another point. There is need for watchdog groups or a network of informed persons, especially those who can work within pertinent organizations such as nurserymen's associations, state or national garden club groups, and native plant societies, or within the stewardship programs of The Nature Conservancy. And, what a super day it would be if all state and federal agencies, making large use of plant materials, were to stop using aliens, cultivars, and species out-of-whack-geographically!

Actually, concern for genetic and ecologic quality or integrity of native, indigenous prairie remnants should underpin every session at all prairie meetings. A wet prairie, a native fen, or a woodland bottoms invaded by purple loosestrife is a degraded habitat. A so-called prairie reconstruction planted with western cultivars, aliens, or bizarre mixes is a despicable lie; a product of greed.

Stating an ethic is easy; the tough part starts when one tries to live by an ethic, which in this case would be designed to enhance the integrity of native prairie remnants. The ethic must also be applied to efforts in prairie restorations of all kinds. Over the long run, prairie remnants may increasingly become degraded; meanwhile more of us should study and try to understand the processes that diminish quality. Out of such knowledge should come revelations about human beings and the workings of natural areas. Having an ethic gives hope to the prairie movement and fortifies and smooths the way for stewardship.

SOME HELPFUL REFERENCES AND ORGANIZATIONS

Anglemyer, Mary *et al.* 1980. *A Search for Environmental Ethics: An Initial Bibliography.* Smithsonian Institution Press, Washington, D.C. 446 entries, 119 pages. An extremely stimulating reference.

Barnett, Mary. "Invasion of the Alien Weeds." *San Francisco Sunday Examiner & Chronicle,* Feb. 26, 1984, pp. 10, 12-14, and 17. An excellent example of how to tell the general public some of the problems associated with alien plants and how the California Native Plant Society is striking back at some of the aliens.

Brown, Lauren. "Wildflowers for Sale." *Horticulture,* Vol. LIX (5), May 1981, pp. 38-40. Describes how the North Carolina Botanical Garden in Chapel Hill and several organizations in Northeastern states are building programs to offset butchery of native plants by unethical nurseries.

Koopowitz, Harold & Hilary Kaye. 1983. *Plant Extinction: A Global Crisis.* Stone Press, Washington, D.C. 239 pp. Valuable references, including organizations, "Red Data" lists of some threatened plants, worldwide, selection of readings and periodicals. Gene banks are suggested, but what will be saved depends on you and me and how soon we begin to act.

Leopold, Aldo. 1970. "The Land Ethic." (pp. 237-264) in *A Sand County Almanac, with Essays on Conservation from Round River.* 295 pp. Ballantine Books, New York City, NY. Re-reading of this famous essay is always worthwhile and stimulationg to one's thoughts about how an ethic is shaped.

Vale, Thomas R. 1982. *Plants and People: Vegetation Changes in North America.* Association of American Geographers, Washington, D.C., 88 pp., extensive bibliography.

Elton, Charles. 1958. *The Ecology of Invasions by Plants and Animals.* Methuen, London, England. All too often overlooked, but a straightforward exposition that can be helpful in developing ethical approaches.

Restoration and Management Notes, 1207 Seminole Hwy., Madison, WI 53711. Issued twice a yr.; very useful. Subscription, $10/yr.

The California Native Plant Society (especially: Dr. Elizabeth McClintock, Chairman of the Escaped Exotics Committee, 1335 Union st., San Francisco, CA 94109), or main mailing address: 2380 Ellsworth, Suite D, Berkeley, CA 94704. Write for list of publications; a very active organization.

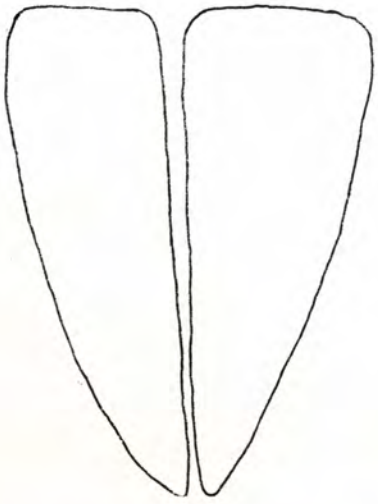
Florida Native Plant Society, 1203 Orange

(continued on page 34)

Finding a Sink-in-the-Snow Coefficient

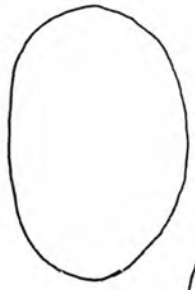
Verne N. Rockcastle

1. Place one foot on paper marked off in square centimeters. Trace around one foot with a pencil or crayon. Then count the number of squares inside the outline. Besides all the complete squares, count all squares that have more than half their area inside the outline. Do not count any squares that have less than half their area inside the outline.
   Write this number here: _____ cm^2 (square centimeters)
   Now double that number (because you have two feet).
   Write the number here: _____ cm^2
2. Find your weight from the metric bathroom scales. Write it here: _____ kg
3. Since, when you stand in snow, your weight is *on* your feet, write your weight above the area of your feet:
   your weight in kilograms / the area of your feet = **?**
4. What is the *ratio*? It is your "sink-in-the-snow coefficient." Write it in the blank here: _____
   (My "sink-in-the-snow coefficient")
5. Now do the same with a deer track, assuming one foot to have a track this size:

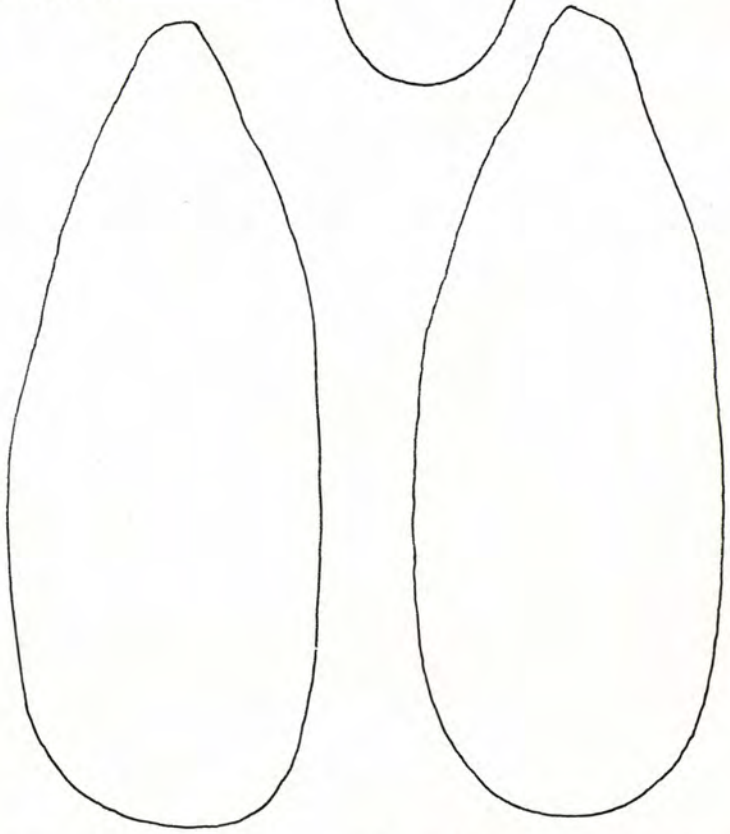


   Assume the weight of an average deer to be 80 kilograms.
   a deer's weight in kilograms / the area of a deer's footprints = **?**
   What is a deer's "sink-in-the-snow coefficient"? Write it here: _____

6. Do the same with the track of a snowshoe hare, assuming it to look like this:



   The weight of a snowshoe hare would be about 1½ kilograms.
   weight of a snowshoe hare / area of snowshoe hare's feet = **?**
   The "sink-in-the-snow coefficient" for a showshoe hare is _____



7. Now consider yourself standing, not on your two feet, but on snowshoes. Find the area of a snowshoe, then double it, and write the fraction (ratio) of your weight-to-area when wearing snowshoes.
   Hint: Since the area of one snowshoe may be too large for easy tracing and counting of squares, you can find it by tracing the outline on a cardboard, cutting out the cardboard, and weighting it. Then cut out a smaller square of, say, 100 cm^2. Weigh this smaller piece. Then find how many times larger the snowshoe outline is than the smaller square. That will tell you the area of the outline.
   your own weight / the area of the snowshoes = **?**
   What is your "sink-in-the-snow coefficient" with snowshoes on?

   _____

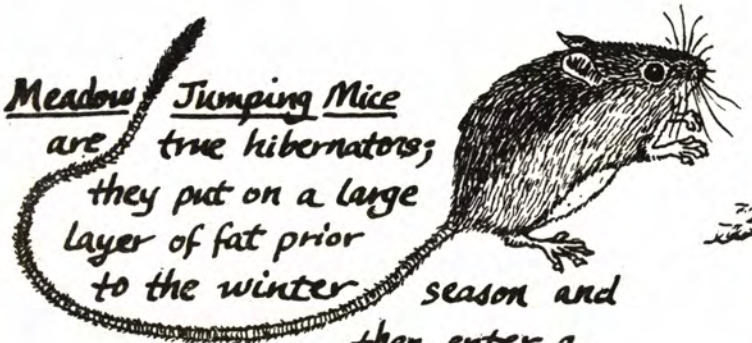
   □

Naturalist's Sketchbook
Winter 1984-1985

★ Small mammals respond to the cold of winter in a variety of ways, ranging from true hibernation to intense activity all winter —

Eastern Flying Squirrels remain active in winter, but only at night. Small groups often congregate in tree-hollows during the coldest periods, presumably for added warmth.

In the Autumn, Eastern Chipmunks can be observed gathering seeds and nuts into their cheek-pouches and depositing load after load into their underground burrows. During winter, they stay in their burrows and subsist on their food hoards.



Meadow Jumping Mice are true hibernators; they put on a large layer of fat prior to the winter season and then enter a sleep-like state of lowered metabolic activity, living off the stored fat until the arrival of spring.

hibernating posture

Our northern Bats hibernate during the winter, living off a layer of fat and lowering their metabolism like Jumping Mice. Some migrate long distances to hibernate; others find protected spots (usually caves) nearby.

Deer Mice remain active all winter, mainly at night. After light snowfalls, their tracks on the snow betray their presence. They're a favorite prey of resident owls.

Pine Vole

Shrews & Voles stay active day and night all winter, traveling and feeding along tunnel-like runways and in shallow burrows. Their runways are easy to find in wet, grassy areas after snowmelt in the spring.

Short-tailed Shrew

The American **NATURE STUDY** *Society*
John A. Gustafson, Treasurer
5881 Cold Brook Rd.
Homer, New York 13077

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AN APOLOGY FOR DANDELIONS

My lawn is full of yellow spots
Which I fondly call my dandelion dots;
While my neighbors pull up all of theirs
And fix on mine such frightful stares.

Sirs, say I, across the fence,
I must rise to the dandelion's defense;
In parts of the world there are
dandelion lovers
Who grow them by acres for
synthetic rubbers.

And in years gone by, I tell them next,
Medical doctors filled their texts
With potions made from dandelions—
Not to mention dandelion wines.

And though you may think it
quite incredible,
The dandelion is perfectly edible;
In fact, they were imported here
precisely
To grow them to eat, for which they
do nicely.

You can boil the greens or
fry the petals,
You can cook up the roots
in big kitchen kettles;
So all in all, there's little need
To call this noble plant a weed.

The neighbors, of course,
were unconvinced
At my dandelion defense;
They'd rather have unbroken grass
Than dandelions *en masse.*

Yet I perceived they glared less hard
At the yellow intruders in my yard;
And even though what one hates,
another savors,
Perhaps there's room for some of
that in neighbors.

– Judy Ethridge

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