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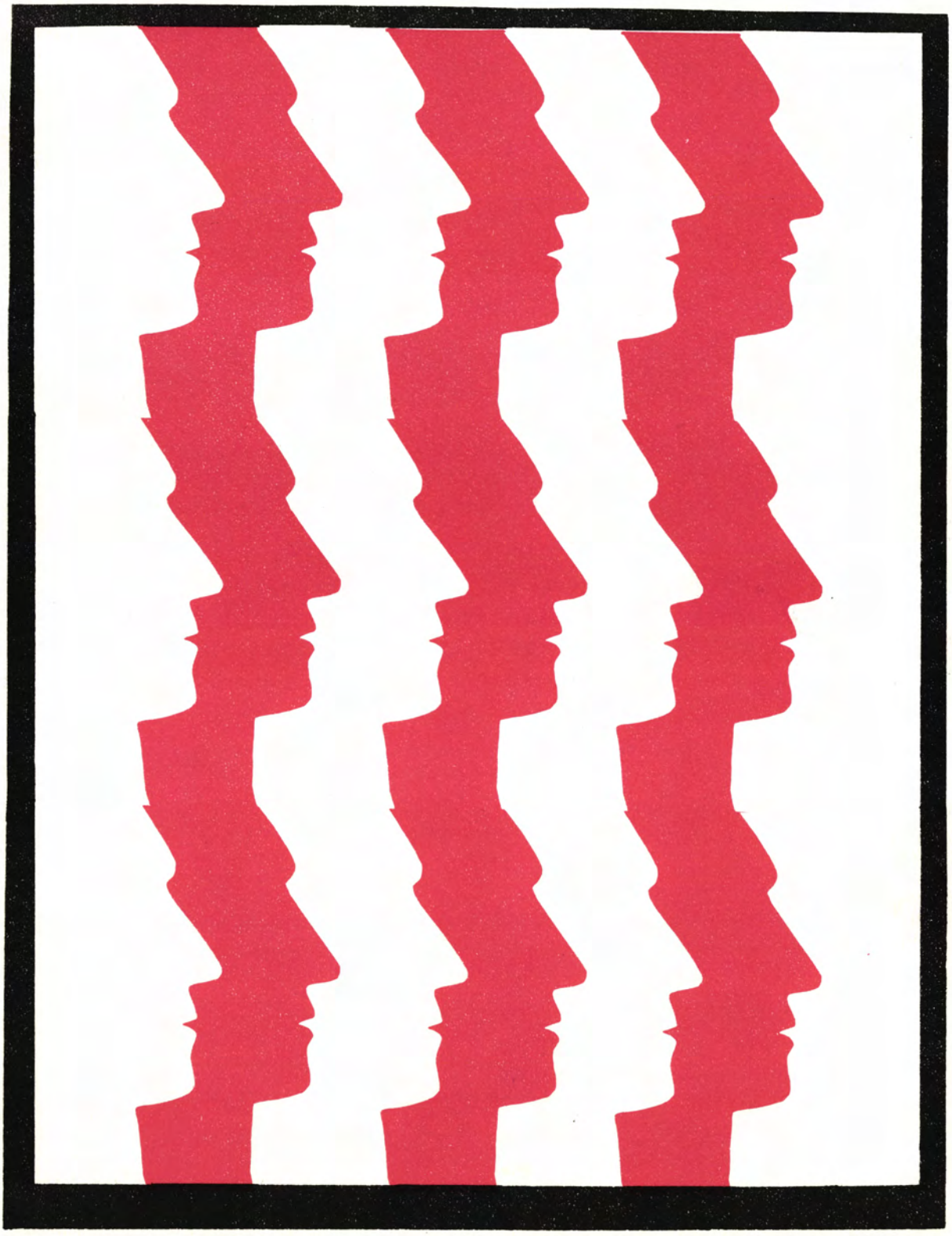

Volume 35, Numbers 1 & 2

MEMBERS ISSUE

ANSS President Talbert Spence (l.) takes the gavel and scroll from retiring president Jack Padalino in ceremonies in October, 1981.

TALBERT B. SPENCE

Tal Spence became president of the American Nature Study Society in the fall of 1981, assuming leadership at the end of Jack Padalino's two year term. Tal worked for several years as environmental education specialist at the American Museum of Natural History in New York City, where he developed programs in urban nature study. Currently he is environmental educator at Wave Hill Center for Environmental Studies in the Bronx, NY. At Wave Hill he continues his important work among urban children and adults, an emphasis which ANSS has long endorsed because of our early efforts associated with the city meetings of the American Association for the Advancement of Science.

Over the years since our founding in 1908, great nature study leaders such as Cap'n Bill Vinal, Eph Palmer, Helen Russell, and Chuck Mohr (whose 75th birthday was recently a cause for celebration in the state of Delaware) have given special attention to nature study in urban settings. In a nation where urbanites make up the vast majority, nature education in cities is particularly important. President Spence will continue to give dynamic attention to this tradition.

APRIL, 1982

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Nature Study

A JOURNAL OF ENVIRONMENTAL EDUCATION AND INTERPRETATION

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ENERGY OPTIONS FOR YOU!

by Shirley A. Crawford

INTRODUCTION

We have all been inundated with information about the "energy crisis." We know it began in earnest in 1973 with the oil embargo and we realize it is still with us by the drain of money from our personal accounts to pay for our energy needs. Traditionally the use of the term "crisis" denoted a short-term situation which required prompt action for a solution to an immediate "win or lose" event. Most of us by now realize that the term "crisis" really doesn't fit the energy problem at all; it has been, and will be, with us too long for that term to be applicable. It is very likely that the "energy problem" will be with our children in an even more serious form than it is with us today.

Historians will some day look back upon the Fossil Fuel Age as a short-lived term in the history of man. If the history of man were graphed over the span of several thousand years, the Fossil Fuel Age would appear as follows:

On a worldwide basis, it is estimated that oil and natural gas production will peak around the year 2000, and will be *gone* for all practical purposes around the year 2100. In the United States, our oil and gas peaked near 1970 and production has been declining, in spite of increased exploration efforts and enhanced production techniques, ever since. Coal, because it has not been exploited as much as the other fossil fuels, is still in plentiful supply in several countries; world coal production is expected to peak around the year 2100. To the ordinary citizen this means a personal search must be started in order to find alternatives to the fossil fuels. Certainly we can't be too effective in deciding if the government will back nuclear, oil shale, fusion or coal conversion techniques to fuel the nation, but there are things each of us can do to ease the burden of the energy problem on ourselves and our families.

DR. CRAWFORD is on the faculty of SUNY at Morrisville, where she coordinates an interdisciplinary course in Environmental Education and does research in Aquatic Ecology. She is chairperson of two Madison County citizens' committees on environmental affairs.

CONSERVATION

It is possible in the United States for us to use 30% less energy without sacrificing our standard of living through the implementation of conservation techniques. Sweden, Switzerland, Australia, and New Zealand all possess similar standards of living to ours, but use one-third to one-half the energy which we do. Even in the United States, the city of Portland, Oregon, has successfully shown what conservation can do to lower energy usage. This city has, over the past 15 years, decreased its fossil fuel consumption by 34% by instituting conservation requirements and by promoting the increased use of solar energy. In many aspects of our lives, we need to personally begin to believe that "small is beautiful" and cease the needless, extravagant use of energy we take for granted. Instead of our viewing energy resources with a "frontier civilization" frame of mind, we must develop an approach to energy resources and all resources which might be described as an "earthmanship civilization" thought pattern. To see how far down the road in energy usage we've come, it might be well to consider that early man, as a gatherer and hunter, needed about 100 watts of energy/day to fulfill his needs; modern man requires each day approximately 10,000 watts of energy. To meet our energy needs in the future, many energy sources will be needed. What works for one locality may be quite ineffective for another region. This is why *each* of us must look at our own, personal situation to try to find ways to decrease dependence on the fossil fuels which work for *us*. Your neighbor might have an ideal site for a wind-generator while your home is perfectly situated to exploit the use of passive solar energy. Each of us must analyze our own situation and go with it!

The first thing that all of us should begin to do is to initiate changes in our life styles. We need to begin to take for granted lower thermostat settings, warmer clothing, a toleration of temperature fluctuations between 60^{o} F. and 90^{o} F., and smaller cars. Besides being less wasteful and more watchful of our energy consumption, we are going to have to be willing to spend more time monitoring daily weather conditions and adjusting our home heating/cooling devices to take full advantage of the situation provided by *each* day. We will have to set our home system for daily conditions just as a sailor sets a sail for a particular wind.

RATING YOUR HOUSE— THE ENERGY INDEX

The first thing each of us should assess in regards to our own home is how well it is doing as far as heat retention is concerned. This is done through a measurement known as the "Energy Index." The Energy Index is computed by the following means:

$$\text{Energy Index} = \frac{\text{? BTU's Consumed}}{\text{? sq. ft. heated x ? Area's Degree Days}}$$

Each of us can measure easily the number of square feet of living space which we are heating. Your area's "Degree Days" figure can be obtained from most texts on energy or from your nearby weather station. This is a tally of how many days in a typical heating season are involved in heating a home and to what

extent heat must be provided in that area. For example, the Syracuse, NY area has an overall "Degree Days" heating requirement of 6678. The third factor in the Energy Index for your home involves the number of BTU's of heat your home used during a heating season. This is computed from the kind and amount of fuel which you burn. For example, 1 gallon of fuel oil burned at 70% efficiency will yield 100,000 BTU's of heat energy, while one pound of Western coal or one pound of wood will yield approximately 8,000 BTU's. One cubic foot of natural gas furnishes 1030 BTU's. Once you have calculated your square footage and BTU usage and have discovered your area's Degree Days measurement, you are ready to plug these values into the equation to determine the Energy Index for your home. Once this is done, the following chart will give you an idea of how well your home is doing:

BTU/DD/Sq. Ft.	
0- 2	Excellent
3- 5	Very Good
6- 8	Good
9-11	Average
12-15	Poor
Over 15	Sell It!

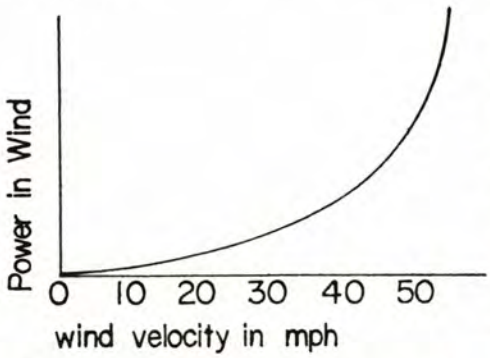
QUESTIONABLE ALTERNATIVES

The energy problem has spawned numerous alternatives which we each must evaluate as we search for increased energy independence from traditional fuels. One alternative advocated today is to convert your oil-burning furnace to natural gas, in any region where this is possible. Caution must be observed in choosing this option; price controls come off natural gas in 1982 and the economic benefit of natural gas over oil is likely to be short lived.

In the 1930's wind-generators dotted the rural landscape and furnished the electrical needs of most farms. On the average, these "windmills" provided 3000 watts of power/residence on a daily basis. However, this was before our use of electrical power skyrocketed. Today, a home which is *not* using electrical resistance heating, still requires 400 to 600 KWH/month. A typical wind-generator supplies 60% of this energy, but may cost as much as $10,000 if purchased and installed by a commercial dealer. Over the 20 year life span of the machine, that makes the cost of wind-generated electricity come to approximately $.15 to $.20/KWH – much higher than most electric utilities charge. Obviously, the initial cost of these machines must be brought down before the average homeowner can afford this source of electric power generation. However, the news is not all bad as far as wind-generated electricity is concerned. This form of electric power may be feasible for you right now—if you have a windy site. This is because the power in the wind is calculated by this equation:

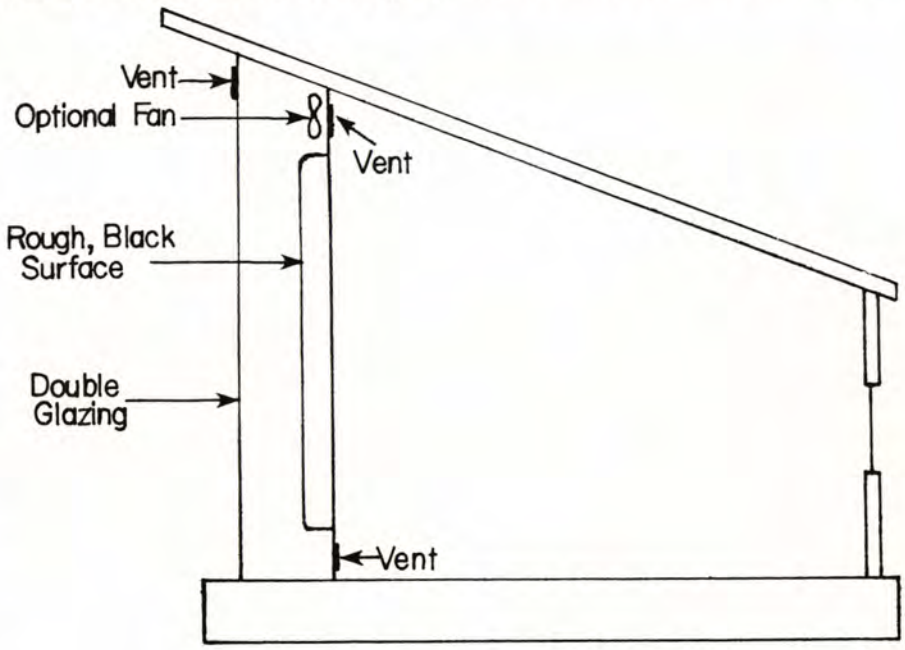
$$\text{Power in Wind} = K \times A \times V^3$$

where K is a constant, A is the area swept by the blades, and V is the velocity of the wind. Because the power in the wind increases with the *cube* of the velocity, windy sites and gusts of wind produce surprisingly increased amounts of power. The following graph shows the relationship between the wind's velocity and the potential power in the wind. What this means to the homeowner on a windy site is that a 20 mph wind will give him *8* times the power which his neighbor might be getting with a 10 mph wind on a less windy site.



The rest of the good news concerning wind generators is that they are considered a source of solar energy, and rightly so, and thus qualify for a tax *credit* of 40% of a maximum of $10,000 spent on such devices. This means that if you spend $10,000 getting your wind generator purchased and installed, you can deduct $4000 from your tax *bill*.

Another alternative for you to consider is the installation of what is known as a Trombe wall. Basically this is some sort of thermal mass—concrete, water barrels, etc.—which can soak up the heat of the sun during the day and slowly give it off during the night. Such thermal masses have been used by Adobe Indians for centuries to make desert living possible; they are also responsible for the more even temperatures of cities versus the surrounding countryside. Trombe walls in homes still work best where they were "invented" by the Adobe Indians—in climates where there is a big difference in day/night temperatures. It is questionable whether they are economical in the Northeast while they remain excellent alternative heating devices for the Southwest. The following is a sketch of how a home designed with Trombe wall heating might look. Daytime heating occurs as the sunlight passes through the double-glazed window and heats the thermal mass of the Trombe wall. The inside vents are both open; the top vent allows the warm air to rise and pass into the interior of the house while the bottom vent feeds cool air from the house into the Trombe wall area. Night-time heating occurs with both interior vents closed and the thermal mass of the Trombe wall radiating its stored heat into the interior of the house. Ideally, the heat loss through the double-glazed window will be minimized at night by the use of thermal shutters or curtains



over this area. Daytime cooling can be accomplished by opening the rear windows of the house and both the interior upper vent and the exterior upper vent. The rising warm air will be siphoned out of the exterior vent and draw cool air from the rear of the house through the dwelling. Trombe walls can be as simple as stacked, blackened water barrels or can be as exotic as black, plastic tubes filled with eutectic salts that liquify and solidify at temperatures experienced by the Trombe wall, providing additional heat storage and release through phase change energy gains and losses. A common eutectic salt used in such tubes in a Trombe wall is sodium sulfate decahydrate. It usually comes with a ten year warranty by the manufacturer of such Trombe walls. After ten years of phase changes, the salt loses some of its capability to be liquified and solidified completely and may need to be replaced.

There is both good and bad news for homeowners contemplating installing an active solar *hot water* system. The good news is that 70% of your hot water needs/year can be achieved by such a system. The bad news is that you will need between fifteen and twenty square feet of collector area/inhabitant and if this is done commercially, it may cost you around $2500. An active solar *space heating* system will necessitate the construction of one square foot of collector for every three or four square feet of living area; in addition you will need 1.5 to 2 gallons of water storage or one cubic foot of rock storage per square foot of collector. Needless to say such a system is expensive to install and is most economical in cold, sunny climates where the need for such systems is apparent and the sunny days are available to provide the necessary insolation. Homeowners in much of the cloudy Northeast and the sunny, but warm, Southeast have trouble justifying the expense of active solar space heating systems albeit for different reasons.

A limited alternative which really hasn't "gotten off the ground" is underground houses. Many owners of such homes have experienced ventilation and moisture problems and it is hard to find a real advantage to such homes over well-insulated aboveground homes.

Heat pumps are a popular alternative. They do cost more than oil or gas heat and they tend to ice-up in very cold climates. Then they must be defrosted before they will work. For homeowners who heat by electrical resistance heating, however, a heat pump may be an economical alternative today.

REASONABLE ALTERNATIVES EVERYONE SHOULD CONSIDER

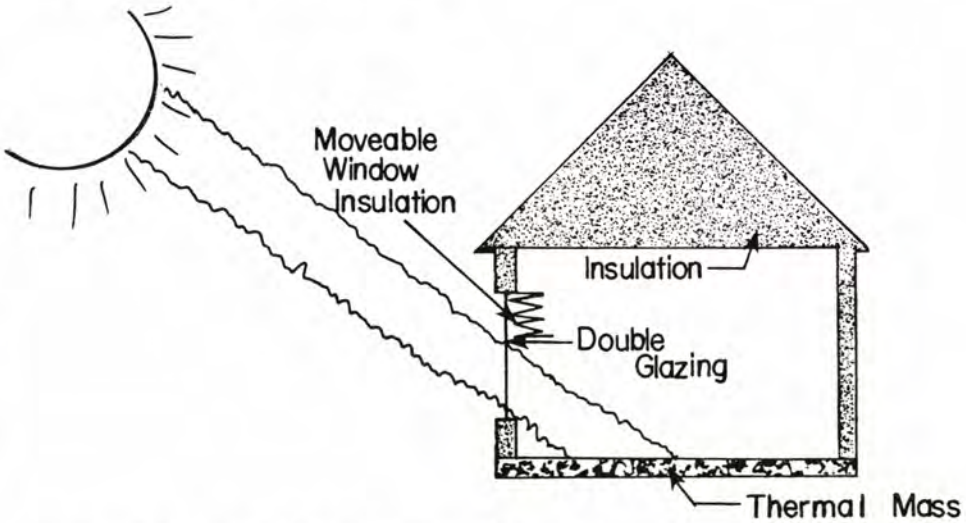
First, employ an energy auditor for your home. Your electric utility can furnish information on obtaining a competent person to do an energy audit for you. Such an audit may cost you around $10 (or it might be free) but it's worth at least $100 when the energy auditor's time and computer services are figured in. The audit will tell you what steps you can take in your home to increase the energy efficiency of the dwelling, along with the pay-back period involved with each option. The energy audit is a very necessary first step to improving your home's Energy Index!

Second, vow now to stop all infiltration of cold air into your home. To detect such spots, hang thin plastic strips on a coat hanger and *slowly* walk through your house. The waving strips will indicate all the places guilty of allowing cold air infiltration. Then it's out with the caulking gun, weather stripping, etc. until your house is tightened up for the winter.

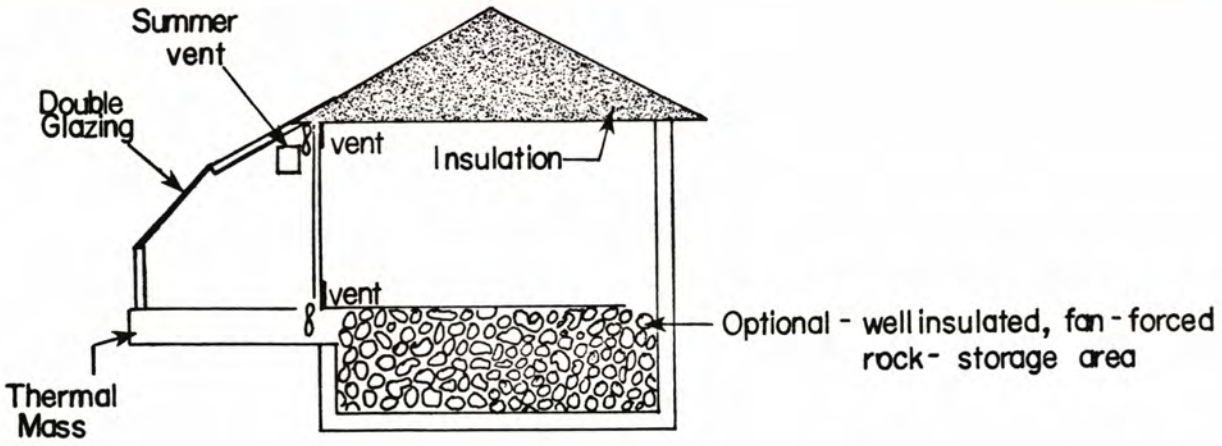
The next step involves a check of your home's insulation. If infiltration is halted, adequate insulation can bring the cost of heating your home for an entire season to approximately $200. This requires insulation adequate to provide 30-60 R in the ceiling, and 20-40 R in the walls of the dwelling. Windows must be double or triple glazed and the use of moveable insulating shutters or curtains must be provided. However, the reward is mind-boggling! Imagine heating your home for an entire winter for approximately $200.

The final alternative to which everyone should give serious thought is the use of some kind of passive solar device. Passive solar can furnish 30-40% of the cost of heating your home for a season. If you combine passive solar options with adequate insulation, you can get your heating costs/winter *below* $200.

The simplest passive solar option involves the use of south facing windows equipped with thermal window quilts. An ideal setup for this option is shown below. The moveable thermal window insulation is raised to permit insolation into the room and lowered to prevent heat loss at night or when insolation is not desired. Although active solar space heating has proven disappointing for many homeowners in the Northeast, passive solar space heating has many fans, even in this cold climate.

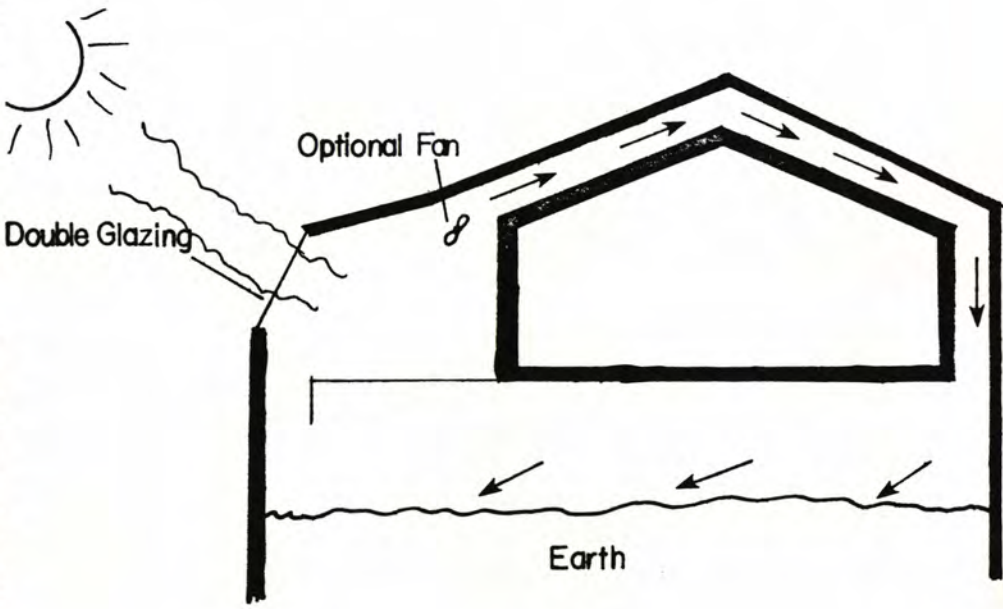


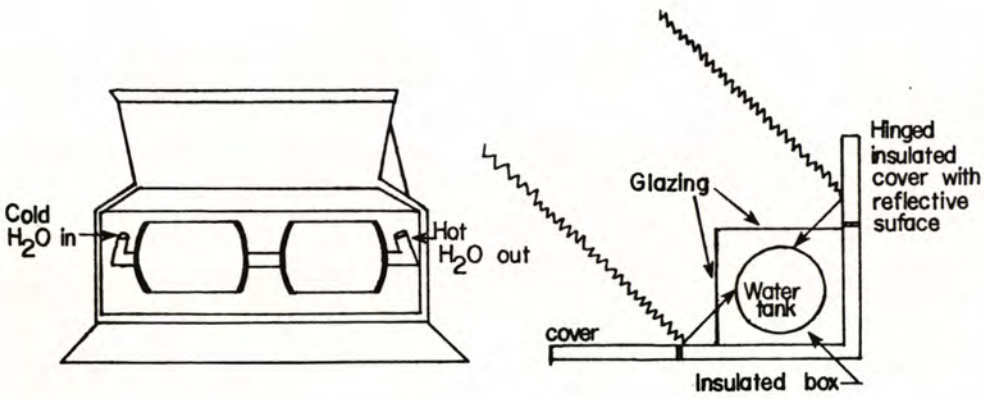
A second effective passive solar heating option is the solar greenhouse. When combined with adequate insulation and a fan-forced rock storage area, as shown below, the solar greenhouse uses only one-third to one-half the auxiliary heating fuel of the third passive solar option, the envelope house. However, remember the solar greenhouse must be constructed properly with double glazing tipped at the best angle for the winter sun (latitude $+15^{o}$), well-insulated walls or doors with moveable insulation (shutters or curtains) between the solar greenhouse and the house itself, and adequate thermal mass. The owner of a solar greenhouse must be willing to provide more attention to this system than is required by any other solar option. There are doors, vents, fans, awnings, shutters, curtains, etc. which must be "set" for the daily conditions. Regardless, owners of solar greenhouses seem to enjoy their duties and frequently reap the side benefit of pleasant hours in the greenhouse among the flowers and vegetables which can be grown.



The envelope house appears at first glance to be a house within a house. However, the outer shell of the envelope house is considered by the homeowner to be actually "outside" the house. The envelope house uses the entire roof and north wall as a *duct* from the solarium to the geothermal mass in the basement below the house. In the daytime, heat flows to the geothermal mass and at night the flow reverses.

Owners of envelope houses occasionally complain about insufficient heat storage in the earth-containing basement as the warm air tends to rise and stratify under the basement floor. Others have experienced moisture problems in the form of condensation on windows and high humidity resulting from moist earth in the basement. Nevertheless, the envelope house remains an interesting passive solar option that is worth your consideration.





For those desiring to heat their water with a passive solar device, the simplest is most likely the Breadbox Solar Hot Water Heater, so-called because it looks like water tanks placed in a breadbox. All this device requires is some blackened water tanks to absorb the sun's energy, some reflective surfaces to increase the insolation onto the tanks, and someone to open and close the "breadbox" as weather conditions demand. Pre-heating your water by use of a Breadbox Solar Hot Water Heater will lessen the demand on your regular water heater, providing you with an inexpensive source of hot water throughout much of the year.

(continued on page 21)

Whatever Happens To Old Naturalists?

by Glidden Baldwin

You have heard that old saying, that an old soldier never dies; he just fades away. That can't be true of a naturalist, as he or she is too well grounded. I have worked at it and learned a lot from my associations with my naturalist friends. My only paid claim to being one, however, was when I worked as a Ranger-Naturalist under the guidance of the Chief Naturalist, Mr. Arthur Stupka, in the Great Smoky Mountains National Park. I had the lowly rating of SP 5. This was in the late 1940's.

I don't think you can change a naturalist from his wonderment and observations of nature by retiring him, at least not me. I have gone on pursuing the same natural history interests since retiring from the practice of medicine twelve years ago. Soon after retiring, my wife and I decided to move to our cabin in the foothills of Tennessee overlooking the Great Smoky Mountains. At our former home in Illinois, we had doctored and raised many injured and baby native animals, that were constantly being brought to us, many we had kept because they couldn't have made it if released. When we moved we gave most of them to the zoos, but a Red Fox we had raised since she was a baby orphan was too precious to give away, so we brought our 13-year old Honey with us to Tennessee.

Our cabin was remodelled and made snug for winter, but it proved inadequate to keep the white-footed Deer Mice from coming in to live with us when winter of '69 came. We bought a Havahart trap, caught and released them at what we thought was a safe distance to prevent their return. It wasn't long, however, until Mrs. Baldwin was sure they were returning. I decided I would investigate, so I started to mark their different toes with fingernail polish of different colors and I also made records of the various distances and direction from our cabin where I released them. We live near the top of a hill in a woods, with no close-by houses. Our entrance road winds through the forest gaining altitude for over a half-mile.

I carried the mice away in paper sacks, both down our road and through the woods in different directions. The mice which returned to our house had to avoid owls and foxes if they came by night (they are nocturnal) and hawks by daytime.

Most of them continued to return until I carried them a distance of two and one-half miles away from our cabin. After I had recorded a total of thirty return visits during a period of six weeks and had finally stymied them, I knew that I could prove that Deer Mice have a remarkable HOMING INSTINCT, a fact that I never had seen recorded before. There was one barrier that did stop them, a small stream they never crossed. I was so taken with their exploits that I threatened to reward them and let a pair live with us. But my wife put her foot down on this idea.

We still feed all the birds and animals that visit our feeders. Mrs. Baldwin cuts up carrots daily for the rabbits. We have gray foxes that come almost every night, to get their fresh chicken necks and backs. After several months of patient effort I have been able to hand feed two gray foxes.

About three years ago my wife saw a small half-grown skinny and disheveled gray squirrel being chased away from our feeders by the other squirrels. Upon more careful observation we found that this little fellow was deformed, missing a right ear and his lower jaw was twisted in such a manner that his lower incisors grew outside his mouth like tusks (see picture). She took pity on him and made up small balls of peanut butter, cornmeal, ground-up sunflower seeds and bread crumbs. He soon learned to come to a window sill where we could put the peanut butter balls out for him. His physical condition improved very quickly and he regained his self confidence but he never became

GLIDDEN BALDWIN was president of ANSS in 1962.

tame. However, he did know who fed him. When he saw us near the window he would run to get on the window sill just out of our reach and seeing him we would again put his meal out. His teeth (lower two incisors) grew very fast and soon were over an inch long and began to make a sore on his nose and one actually grew into his upper eyelid. Something would have to be done.

We bought a larger size Havahart trap and soon trapped Toothie. We took him to a Veterinarian and we put Toothie to sleep. We cut off the lower tusk-like incisors and found that the upper incisors had curved around in his mouth and penetrated the roof of his mouth. These also were removed. As you know rodents' incisors never stop growing so every three or four months Toothie has to be caught in our trap and taken to the Vet. We keep him in the house overnight following his surgery and when he is wide awake the next morning let him go. He has been to the Vet eight times now and is about ready to go again. I presume that Toothie would be quite fond of Naturalists by this time and would like to send his regards to all of you, but for fear I would be called an anthropomorphist, I deny saying what is printed above.

I was asked to tell how I became a Life Member and former President in 1962 of the American Nature Study Society.

Trees have been my particular hobby in nature, and in the 1940's I was trying to find the biggest native trees of their kind in the Eastern half of the United States. In so doing I would check the list of the Social Register of Big Trees kept by the American Forestry Association and published in their magazine, *American Forests*. Doing this endeavor I wrote several articles about these same trees for publication in the magazine. During this time the American Nature Study Society was associated with the magazine called *Nature Magazine* and edited by Richard W. Westwood, an excellent Naturalist. He noticed my articles and asked me to contribute to his magazine and join the A.N.S.S. which I did, as I was always searching for more natural history information. At one time while working for Mr. Stupka in the G.S.M.N.P. between us we located 19 of the biggest trees of their kind in the Great Smokies N.P. It has been a wonderful experience being associated with such outstanding naturalist members of A.N.S.S. I recall so many people whom I learned from and treasure their friendship. My list would include many, but the ones I now recall include Charles E. Mohr, Edwin Way Teale, Ellsworth Jaeger, Roger Tory Peterson, Ruth E. Hopson, Malvina Trussell, Richard L. Weaver, Stan and Dorothy Mulaik, Emory Will, John A. Gustafson, Dr. Lawrence Palmer, John W. Brainerd, Howard E. Weaver, Verne N. Rockcastle, Elizabeth Blair, Ralph Dexter, Paul Webster, Helen Ross Russell and many more. □

Glidden and Mary Baldwin measure a giant tulip tree with a 23+ foot circumference 4.5 feet above the ground in Great Smoky Mountain National Park.

1953 Annual Meeting – Left to right: Mary Baldwin, Edna Banta, Professor Howard Michaud of Purdue, Richard Westwood, editor of Nature Magazine, *Richard Weaver (back row between Michaud and Westwood).*
Photo by: S. Glidden Baldwin

To End The Journey

Where It Began

by Walter Linck

(Illustrations © Robin Marsiglia)

We were a group of twelve, already a number of days into a canoe trip that was to last for another couple weeks. They would be miserable weeks, if the weather didn't clear up. It had been raining or threatening to rain since before we'd even finished unloading the truck, all of us anxious to be off and away from the muddy road. Our attempts to stay dry and comfortable, at the outset so careful, had jokingly been abandoned.

I slept each night in a tent with an old woodsman. In his earlier days I knew him to have led many canoe trips, but not in this area. The lands he had then favored were to our west—lands of brighter waters, and rocks, with exciting bass fishing and campsites that were high off the shoreline. I remembered them too. My first adventure of this kind had been with him there, when I wasn't yet old enough to help.

I had since grown taller, and more mature, but as I did so a sad change was witnessed in that country. Logging roads had torn deeper into his wilderness with the arrival of each summer's work season, and crowds of people had traveled northward along them. It was now just another vacationland. The adventurous few were forced to turn their backs on the lakes they had long known, to search elsewhere for solitude and rugged experience.

And so he reluctantly joined me here this summer, in a region with which I was now familiar. It was a wilder, less frequented region. The landscape was flat and swampy, with few rocky areas. There was little chance for any cliff-diving along the way. The rivers were murky and deep, and filled with voracious pike. There weren't any bass to be caught.

Though the campsites here were undoubtedly less attractive, they'd been especially sloppy in rainy weather. If I could find a scrap of a beach and some level ground that wasn't too wet, I was happy. Little help, the newcomer refused to consider it anything but an exasperating choice between muck or bothersome sand. In the evenings he grumbled that he didn't like this country. I laughed at his complaints, but they stirred my own memories of better days.

Sheltered within a canvas tent, judging a new morning's daylight was proving to be more and more frustrating. My conceptions of brighter dawns were crushed as I crawled out for breakfast, there greeted by the same, drizzly and damp clouds hanging low to the water. They'd settled in as darkness early overcame us the night before—restless, yet unmoved. Capable of bursting open in silence they waited, promising to drench us repeatedly as we canoed through the day ahead. Morning meals were huddled, and quiet.

The trip was taking us from one lake to another, often down connecting streams and rivers, and frequently forcing us to portage around dangerous rapids or waterfalls. It was all in the worst of weather. Cutting thick poles to lay along the boat bottoms had become a standard loading procedure, to keep our gear from the rain that would soon collect. In heavy downpours we sometimes quit canoeing briefly to pass around tin cans as bailing cups.

Many in the group were still tiring easily on the portages, and giving up on their loads along the trail. With more than two week's food left in the wanagans I had anticipated some troubles, but not quite to this degree. The old man and I were upset to find ourselves burdened with three or four extra trips over each land-jump. It meant carrying the canoes and the heaviest of the wanagans, battling swarms of mosquitoes, and passing through cold and wet bushes. It didn't matter if it had temporarily stopped raining. We were still soaked from the waist down, shivering, and exhausted.

The ambition to get up in the morning, to face another day, was in danger of becoming extinct. I didn't much care if we broke camp by nine. Nobody did. It remained only to shield my conscience from the guilt that might come later, when the trip had finally ended.

Time dragged, and senses dulled. The world around me seemed little more than an ugly smear of dark gray and muddy green. The water, the woods, canoes, canvas tents, the clouds, everything—all were reduced to two depressing shades of drizzly dreariness.

The afternoon of the fifth day found us paddling slowly, winding down the stream's final, swampy meanders. High overhead the clouds were in a strange turmoil, but we had agreed to pay them little notice. It was a trick, designed to raise our enthusiasm and render it foolish again.

The current was sluggish, the stream widening as we continued. It was choked with lilies, and grasses. The edge of the woods fell away behind us, and there lay the lake.

I'd not caught a glimpse of the sky, but everything appeared just a little brighter than before. The lake was relatively calm. Someone in another canoe gathered the courage to say something hopeful as we paddled out into the openness of the bay.

I barely had time to find out who he was, and to mark him disgustingly in my mind as a fool. At that moment, in total surprise, not only did the sun burst through to shine upon us, but the entire ceiling of clouds ripped apart. Broken into awkward pieces they were floating away to nothingness in the distance. There might not be one left in the whole expanse of blue sky!

The grin that rippled over my face felt like it would split it open, it had been crusty and tight for so long. The rest of the group began yipping and hollering as

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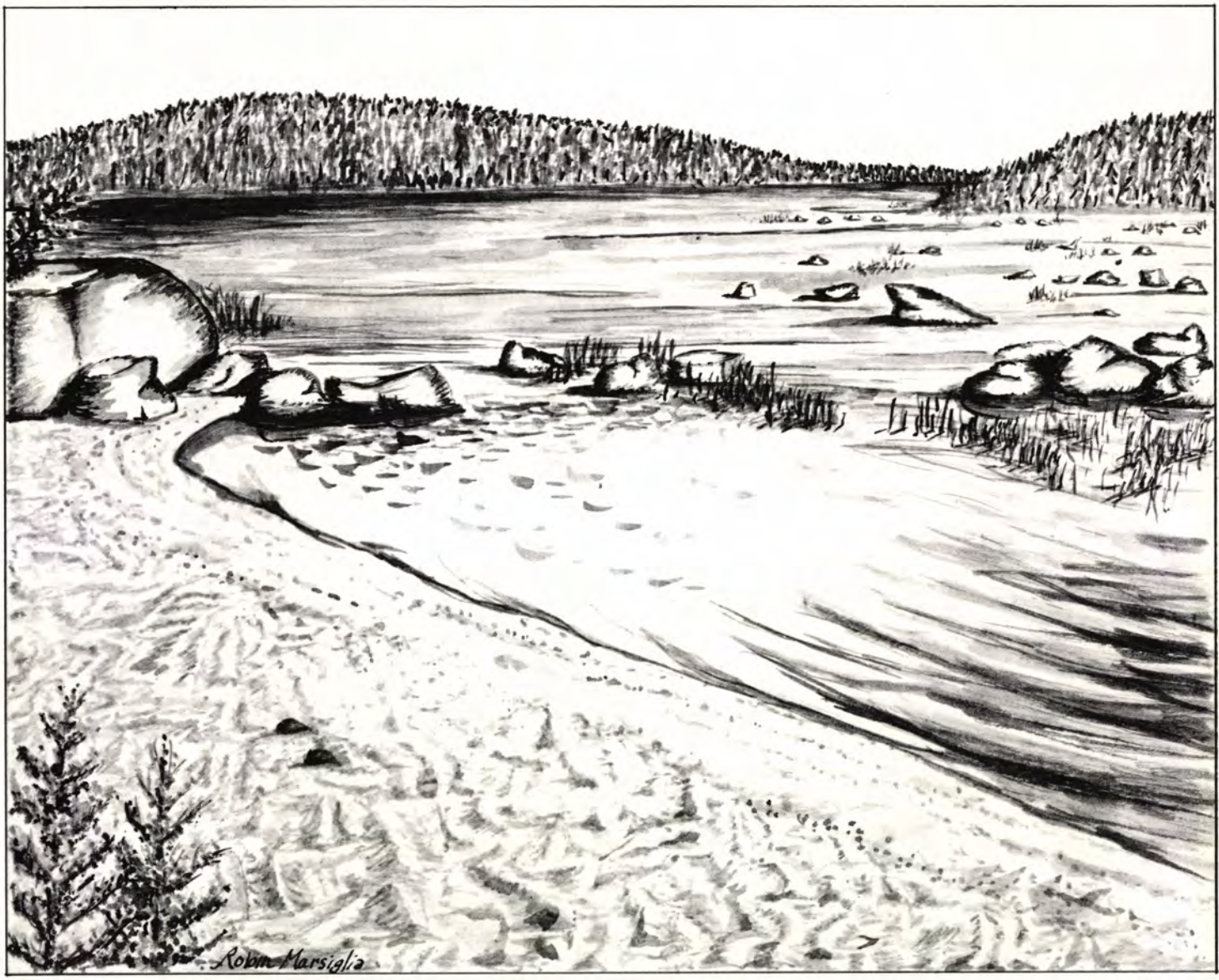
WALTER LINCK is a former student of John Gustafson's, and is now a graduate student in forestry at the State University of New York in Syracuse.



if they'd lost some sense, and were wildly digging hard for the campsite I pointed out to them across the next large bay.

In a few seconds I joined the race.

From past experience I knew that the long, narrow sandy beach ahead of us was the only decent campsite on the upper half of the lake. On the westward facing shore of a large point of land, it had room for four, maybe five, tents—some off from the sand, in the spruce and jackpine, and some on the sand.

The most unusual thing about this spot though, was its long string of boulders. From where the beach and the scrubby trees and bushes of the point ended, they stretched out across the lake in a scattered procession of sizes, uninterrupted from one shore all the way over to the other. The bay was shallow and sandy, and the boulders were perfect for washing clothes, sunning, or losing time on in child-like abandon.

Enticed by the warmth of the sun on my shirted and damp shoulders, I decided to escape for some quiet time to myself as soon as I could. The others would have to choose their tent sites, gather firewood, and set about the typical immediate chores. There was at least an hour or two left to the afternoon, and very little for me to do before preparing another meal. It was my partner's day to pitch our tent.

Catching and passing the others, my bowman and I were the first to slide onto the sand. Together we lifted the wanagan out of the boat and carried it up towards the woods. While I patiently worked off its leather tumps, he dragged our duffles over to do the same with them. When I'd finished, my duffle left leaning upright against a tree, I was ready to leave.

I pulled off my mildewy clothes, and threw them in a tangle across the bushes bordering the beach. They'd dry there, without me. One last look around, and I unobtrusively left the activity of the camp to begin wandering slowly down the beach, dragging my toes in the sand, my eyes half-closed. A bothered sandpiper kept erratic pace ahead of me, then took to the air and landed behind, resuming its search. Near the end of the point I waded out into the shallow water.

From high above me, as I headed for one of the more distant rocks, the sun baked my tired, naked body. I relaxed, and became content, hearing only the sounds of my own wading and the occasional cry of a soaring gull.

Not in my life had I felt so distinctly fresh and clean inside. It caused me to laugh to myself, for it was a sensation I

owed undeniably to the misery of the recent past. In ten short minutes I'd been struck with appreciation for those days. Only yesterday I had bitterly determined not to let it happen, to remember them forever as terrible.

I glanced downward. And it was at that instant, still near the shore, that I stopped, held by what my half-closed eyes had as yet neglected. The sparkling, golden sand below my feet lay patterned in endless arrays of tiny ripples. They were miniature sand dunes, thousands of miles long—blowing and drifting in a timeless, weaving dance with crystal water winds. From the sands, sharp green reeds poked up here and there in scattered oases, the lake's subdued, gentle waves rolling softly through them as if they didn't exist. It fascinated me.

How long had each watery, shifting moment here been exactly like the last? Each brief moment . . . indistinguishable from the one just before it, no different from the one before and the one before, reaching ever further back into the depths of time on the planet. And yet, I knew that in a collection of these moments this lake had appeared, and had flourished. Through these identical moments in time to come, this lake would slowly die away, and be replaced by some other landform.

In this simple but dynamic process was more beauty than I had ever noticed in something before. No sunset I had seen, nor artist's work, nor wild animal had affected me as completely as this did. Unable to pull my eyes away from it I experienced an exhilarating, fast-growing joy until, in curious confusion, I found myself trapped.

The beauty shimmered, very faintly at first. An essence it now seemed to be—an essence in surreal flow, pervading, and existing within things otherwise empty shells. It blessed them with its presence. It was here, unveiled in front of me! I could feel it, as it was rapidly beginning to expand.

A light, tingling sensation took hold within my brain, then swept through my entire body. I remained held loosely, and as if by a strange chance opened to it, was filling, and filling! Before I knew it I was higher than the gulls careening overhead, and more excited than I had ever thought possible.

Finished then with what lay below, my eyes began a burning search of their own path as I straightened, and looked up. More than eyes, they seemed. With them I did more than see. They enabled me to fill even further, in gathering intensity and wonder, with each object I touched. I scanned across the water to the rocks, and to the far shore, and then to the sky, and the gulls, and the clouds! What colors!

It was as startling as if I had been blind from birth, and instantly had received sight. Basking in the life-light of the sun were green reeds, and golden sands, and the clear, cool waters of the shallows. The boulders strung out jaggedly to my left were mottled grays and browns, the lake a glittering blue, and the trees along the far shore a deep dark green. The light billowy clouds were a perfect white, set against an azure sky.

Heading towards the rocks again, I realized that these many different aspects of the scenery were no longer separable. As though fused into a great, swirling mass as I absorbed them, they were one! I stretched out my arms, reeling with the power that encircled me.

It struck me then that I could just as easily be a moose, or any other wild creature emerging from the forest. The differences had vanished. Had mankind existed on another world, in another universe, and had a moose wandered out into these very same shallows, so I now wandered. I thought of an artist, painting a picture of this moment, and how he would

accurately portray me I simply could not imagine. For the effect of my presence would have to be painted no different than that of one flickering ray of sunlight, or one gull, or one tree amongst the thousands. I could be the focus for no one's thoughts. I was changed, and could not imagine a shape that reflected what I had become.

The feeling strengthened, but took a new form. I felt that I belonged to the lake's scenery, as though it was very much intended I be there then. I was as primitive, and natural in recent origin as the ancient rock down to my right, warming in the sun, and the trees crowded closely to one another along the shore, and the grains of sand beneath my feet! I was there—just as hidden, but as alive as they were!

I felt the closeness of these things. If I moved, I was immediately conscious that I could create no disturbance. My motion, and even my substance had become integrated with everything around me that I touched. The understanding then quickly came that I had, without ever once considering the chance of it, been wholely accepted! This was home . . . my planet!

I stood as the wild and native human being of the Earth—no longer the insulated intruder, here to tread the retreating edges of an abandoned world. For an instant in time I had faded in to become part of that world. Behind me, I dimly

sensed the presence of the camp down the shoreline, and the people in it, and could feel the intrusion. I could feel it as if metamorphosed through the thousands of years that separated them from their surroundings. They were strangely out of place here.

They were alien.

I seemed diffused, flowing through the other things of the Earth near to me. There were no barriers. I could see a small stone beneath the water, and suddenly I felt I was the stone! The breeze cooled my skin, and for a lost heartbeat I became the breeze. I was totally immersed in the flickering passage of milliseconds, and so entered upon the timelessness, and mystery of eternity.

It is said
that love is eternal.

It is said
as only love will carry our minds
to such fantastic limits.
Only love involves us
so intensely and ecstatically
in the present
that the mystery is felt.

Beauty shall forever remain
the rouser of love.
Love will be
only as eternal
as beauty is.

I cry to the world
that our single great beauty,
the Earth,
is dying.

On a chilly autumn morning, singing a song as the sun rises to burn the mist from the lake, I am infused with the aura of the human potential. Such power there is in the spirit of song! I look down at my hands, for a moment in disbelief. I cannot believe it has finally come to this.

As I sit, I reach back in my mind to when I was a boy. I remember the excitement of crayfish beneath these rocks, and the challenge of trying to catch them. I remember raccoon prints in the sand, next to mine. I remember how thrilling and full the air was of life beyond me, and I begin to shake with a sadness so fierce it has torn my soul.

For I am young, yet know that my children will never experience the wonderful things that I have. I know that their lives will be dirtier, and more hectic, and that their existence will be blessed with none of the beauty that I have seen vanish. I know that for their children, there may not be life at all.

Here by the water's edge, where alone used not to be lonely, I embrace the force of my life. The Earth is dying, and its pain is my pain.

Seasons slowly pass, almost as they always have, but the pain tears at me with growing violence. I have lived five years since those moments by the boulders, and months since returning to this lake in the mountains. I came to think, and to write, and to find strength to face the hard times ahead. I have scribbled volumes on the plight of the Human Being.

They are ashes in the stove—burned to ignite my morning's fire. I cast away all arguments for those who cannot feel. It is mid-winter now, and a stormy mood grips me in the same silence as the snowfall does these woods.

I have stumbled upon the ethereal stream, which runs far from the conceits of this sickened world. It has left me as a man without a people, with no way of life to call my own and be proud of. I have had no grandfather to teach me with his eyes what pretentious books will never hold. I have had no companions to share adventures with, from the morning I first peered at the brightness of the sun, to that aged evening I last see a purple sunset. With such a part of my spirit captured in the mysterious flow, I will not be snared by an existence so distant and mindless as that which I have inherited. I spurn it.

Yet a vision haunts me, deep in my awareness. I see the light of my spirit, immersed in the flow that continues ever, and it is never dimming, but never joined. I see it trailing through time—a thin ray of light, the very last, absorbed in the gathered brilliance of what has been the Human Being.

It is a vision, but I collapse to my knees in the heavy snow that swirls around me. I cannot endure this image of my descendants, so shut from ever entering upon the stream. I cannot forsake them. I cannot run blindly from these people. For beneath this cold and frozen blanket there still huddles the warmth of life, just as in each of them there lies smothered a great beauty, awaiting the fresh breezes of a new Spring.

I pick myself up, and know that I am ready. I am at last ready to surrender to the power whose seed was planted in my heart. Though it carries a great sadness, it is also a profound joy, for to deny its incarnation would be as to kill myself, to deny all that I have ever loved, and lived. The time has finally come to give of what I am.

From this day forth, I live for one purpose. I live for the awakening that will free us from the decay of a misdirected world. I live for the day when a person can step from his or her home, to feel the same kind of exhilaration and oneness with the life of the Earth as I have, in lands far from here. It is time for the spiritual transcendence of our unnatural and destructive separation.

There is a cabin now,
on the point.

I have seen it.

It is built of spruce and jackpine,
felled hastily with a chainsaw.

Piles of broken bottles,
and rusting cans,
and garbage lie scattered all around it.

The sandpiper flutters up the lake,
but the boulders reach,

and go nowhere.

SUMMER JOB OPPORTUNITIES

Two openings are available at the Caratunk Wildlife Refuge in Seekonk, Massachusetts for Director and Assistant Director of the nature day camp. The day camp teaches natural history, outdoor skills, and crafts to children in grades K-6 from the Providence, Rhode Island, area. The jobs run June 9 - August 25, 1982 and include salaries of $1300-$1500 for Director and $1100-$1300 for Assistant Director. To apply, send a resume and letter to Suzanne Williams, Director, Caratunk Wildlife Refuge, Brown Avenue, Seekonk, MA 02771 (telephone: 617–761-8230.)

The Audubon Society of Rhode Island is seeking two summer refuge naturalists to run the nature day camps and other nature programs at two of their wildlife refuges. The programs will include one-week half-day sessions for children in grades K-6, plus adult and family programs. Salaries for the seven-week jobs are $1000-$1500, depending on qualifications. For information, write Hobson Calhoun, Assistant Director, The Audubon Society of Rhode Island, 40 Bowen St., Providence, R.I. 02903 (telephone: 401–521-1670).

PÈRE DAVID'S DEER:

An Exercise in Planned Preservation

by Janet Newlan Bower

David's deer enter the winter in excellent condition. In August they usually acquire their iron gray winter coats.

For three millennia the once abundant herd of *Ssu-pu-hsiang,* or Père David's deer, has lingered but a breath's length from extinction. At the turn of this century, after 3000 years of existence in the Imperial Hunting Park, the eighteen remaining head of David's deer seemed doomed. Today, thanks to careful planning, there are close to 900 David's deer in more than eighty collections worldwide.

No written record of this deer's existence in the wild has ever been made, so far in the past lies this animal's freedom. Yet it survives, an attribute to man's awareness and planning today for the shortages and shrinkage of tomorrow's world.

Modern man first learned of this large primitive deer from a French naturalist and missionary, Armand David, while visiting China in 1865. Although a few of these deer were sent to European zoos over the next thirty-five years, the Emperor's herd of some one hundred plus animals were the only such deer in existance. The remainder had apparently been shoved into extinction by encroaching Chinese farmers in need of more land some 3000 to 4000 years before.

While the Père David's deer, or milu, was admired for its unique physical attributes and romantic history, there was little concern for breeding the deer in Europe. The Chinese herd was an excellent source for more specimens should the need arise. But two events occurred in China in the 1890's which shocked lovers of wildlife out of such a complacent attitude. In 1894 the Hun-Lo River flooded, destroying parts of the forty-mile wall surrounding the Imperial Hunting Park

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JANET NEWLAN BOWER is a freelance writer with a special interest in environmental problems.

and permitting the escape of many of its inhabitants, including most of the David's deer. Famine-starved peasants soon devoured any and all escapees.

Then the Boxer Rebellion in 1900 saw Allied troops enter the Imperial Hunting Park and slaughter the remainder of the animals there, including the last of the Père David's deer.

One pair of these deer remained in a decrepit zoo in Peking until they died in 1921 of apparent neglect. With them would have died a species unique in the animal world but for events which were occurring in Great Britain.

The 11th Duke of Bedford, and his wife, were most interested wildlife fanciers. Upon hearing of the potential demise of such a rare deer at the turn of the century, the Duke procured as many of these deer from European collectors as possible. To their original pair with a male offspring, they added fifteen other head. Some were old, some were barren, but on the spacious Woburn estate, the herd reproduced. The actual number of deer representing the parentage of the David's deer in the world today is unknown, but estimates are usually around fifteen. At one point the Duke estimated that only one stag sired all the off-spring of those first pairings.[1]

The return to numerical security for the David's deer was not an easy one. World War I saw the herd lose half its individuals when the government forced Woburn to open its gates to cattle and sheep without adequate food supplies. Starvation in the field was rampant during those years. Although the herd regained its strength during the years between, World War II threatened to repeat the deadly food shortages. Fortunately the 12th Duke of Bedford convinced the government of the wisdom of providing enough hay for the animals this time. Starvation was not as severe as it might have been.

It was at that point that the Duke decided it was far better to disperse the herd of David's rather than chance losing the entire herd which was located on one small plot of ground. Beginning with the shipment of seven calves to Whipsnade Park in 1946, these deer were sent around the world.

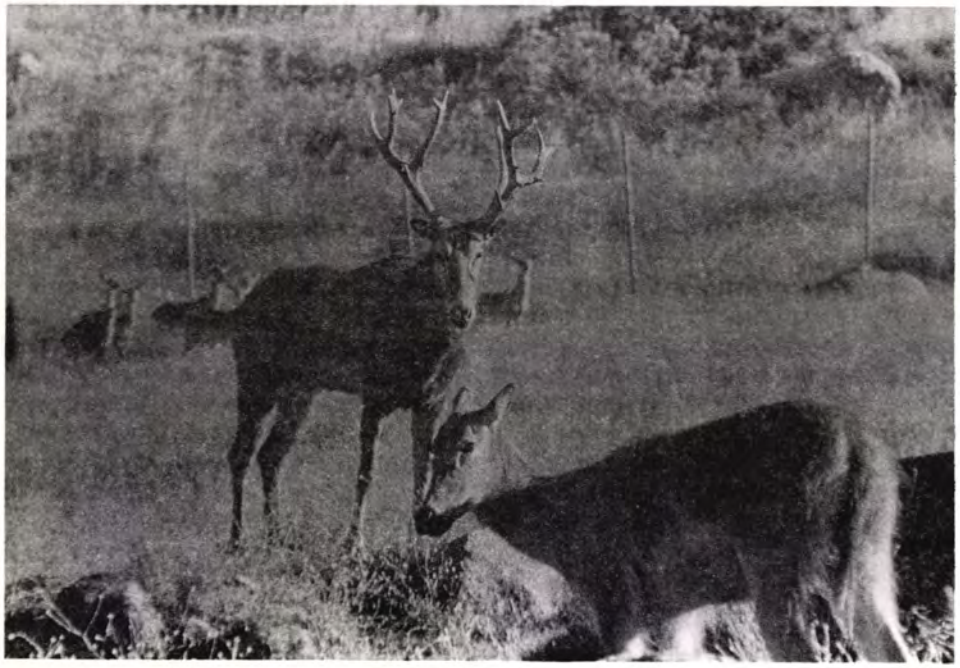
What is involved in maintaining a herd of Père David's deer? For an answer to that question I went to the San Diego Wild Animal Park and talked to James Dolan, General Curator, and Larry Killmar, Lead Keeper in charge of the David's deer. The Wild Animal Park is an excellent example of the achievements of the goals of collections around the world which exhibit Père David's deer. Its primary purpose is the protection and propagation of endangered species. It is currently home for the world's largest collection of ungulates, including a herd of David's deer.

"Easy keepers" was the term used in describing the deer. The David's were acquired for exhibit because of their unique history as well as a need to increase their number. Dolan also liked their educational aspect. The species is an excellent example of "what can be done in conservation."[2]

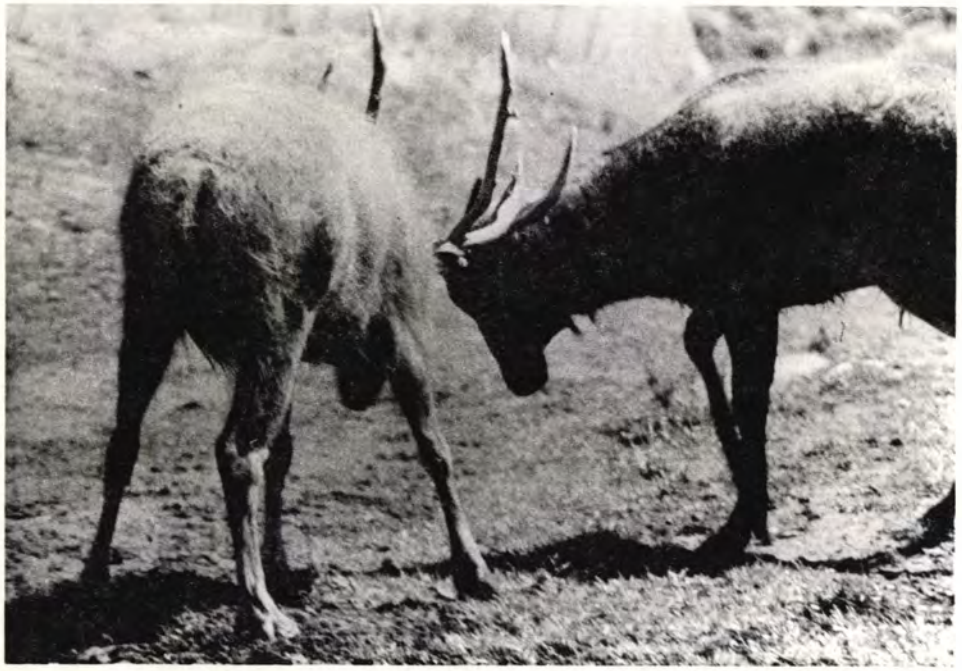
The most important factors in selecting the animals for exhibit and breeding are soundness and good conformation. Probably the most desireable characteristic is being female (something women have known for a long time!). It is much easier for most collections to keep a number of females and one or two males. The herd numbers are certain to increase and the vicious David's fighting during the rut can be kept to a minimum. As a result, females are difficult to acquire.

Space is probably the most vital element in their ability to reproduce. Bedford warned of insufficient range and the need for change of pasture. Such deficiencies could result in a deteriorating or sterile herd after a few generations.[3]

The Père David's rut occurs in June and July.



A stag stands with his favorite hind. Behind them is a herd of rare Eld's deer at the Wild Animal Park.



This stag and his son are involved in mock sparring. When it came time for serious combat, the old stag lost an eye in the fighting.

The thirty-five acres of enclosure at the Wild Animal Park provides the David's room for diversion and exploration.

As a result, successful reproduction has kept the herd increasing most satisfactorily. Birthing has not proved to be a problem in the past primarily due to the old adage, "Give her an apple and she'll follow you anywhere." Although the tendency has been stopped, the original hind became quite friendly with the keepers some time ago. Policy now discourages this relationship between keeper and animal in an attempt to maintain as much natural disposition as possible in the wildlife. However, the hind's love for apples made it an easy task to lure her into the *boma* (an African term for holding pen) prior to her delivery. Those first offspring of the herd could then be observed for several weeks before being released with the rest of the deer. The younger females have delivered without problem or benefit of apples.

In general, reproduction should be no problem in a healthy herd. G. Kenneth Whitehead wrote, "Père David deer are good breeders; at present at Woburn with a herd numbering over 300 we regularly get 100 calves." [4]

The herd's good health has been attested to by the growing of a second set of antlers by the senior stag during the year. The species is the only deer to grow two sets in a year. The Duke of Bedford noted this characteristic in his herd prior to WW I. Since the males stopped this second growth after their health declined in the war years, he concluded that the second sets were only acquired with outstanding good health and excellent feeding.[5]

Another important factor in successful health care and breeding programs is water. The David's deer is a marsh animal as evidenced by its physical characteristics and traits. In China the deer was called *Ssu-pu-hsiang* (Four characters which do not fit together.) It stands four feet at the shoulder with the thick curved neck of a camel, antlers which curve toward the back and seem to point the wrong way, hoofed feet like a cow, and the tufted tail of a donkey. Père David wrote of the original herd, "What characterizes the animals I saw was the length of the tail which was proportionately as long as a donkey's—a characteristic which fits none of the *Cervidae* I know." [6]

It is the wide cloved hoof and the love of mud that cause zoologists to believe this deer originally lived among marshy reeds. In addition to wallowing, wading, and standing around in mud and water, the David's use ponds as a safety-valve when feeling pressed during the fighting of the rut.

If any real threat exists to the Père David's today it is that of genetic degeneration, with the resultant destruction of the species.

Of the major sources of genetic degeneration, inbreeding, particularly in view of the limited number of the modern David's founders and the very nature of most zoological exhibits, as already discussed,

poses the greatest problem for the world herd.

Experts disagree on the potential threat that inbreeding and related genetic problems may exert on the David's. According to Kurt Benirschke, Research Director for the Zoological Society of San Diego, the Père David's deer have "passed through the bottleneck of inbreeding problems." He feels that any severe threat to the propagation of the David's deer was probably experienced by the Chinese thousands of years ago.[7]

Katherine Ralls, research zoologist at the National Zoo, Washington, D.C., supports Dr. Benirschke's views. In reference to her study on the effects of inbreeding on juvenile members of a species (a common indicator of inbreeding problems) she stated, "I did not find any increased juvenile mortality in the more inbred members of our herd [of Père David's deer] here at the National Zoo."[8]

Tom Foose, Curator of Ungulates at the Oklahoma City Zoo has done extensive work on the demographic and genetic status of the David's deer. He disagrees with those who argue the deer's genetic security. "I do not believe that this species definitely represents one of those few cases where a population has been highly but viably inbred so that genetic management is now unnecessary." [9]

To date, the inbreeding problems found in David's deer have been minor in scope. A hind and female offspring have developed antler buds. Several cases of albinoism have occurred. "Parrot mouth," where severe overhang makes eating difficult or impossible, has been observed. But major problems of early death or inability to reproduce have not proved a serious concern.

One way to prevent these potential genetic problems is the creation of a detailed studbook. Unlike most which includes the parentage of zoo animals, the Père David's studbook gives only births, deaths, and transfers of individuals by collection. Often when a collection sends a pair to another collection, it is a brother/sister pair, but the receiving collector may not be given that information.[10] Without an accurate studbook, such information may never be learned.

Have the Père David's deer, after years of tottering on the edge of extinction, now found a permanent place on man's mantlepiece of preservation?

Although it may seem so, that is not actually the case. According to Dolan, "They are not engendering the same concern as other endangered animals because there are so many of them."[12] But he warned that number may only be a temporary one. The herd was once thought secure behind the walls of the Imperial Hunting Park. Then sanctuary was sought at Woburn Abbey, only to find England engulfed in two world wars within twenty-five years.

As late as 1959 another potential disaster struck the species. Shortly after the David's deer were divided into two separate herds at Whipsnade malignant catarrh swept through and destroyed one of the herds. The infectious disease did not spread beyond the one paddock and the second herd as well as all other deer escaped infection. But the potential threat of another outbreak of malignant catarrh among the highly susceptible David's deer is always present. If it were to strike at the Woburn herd, which includes half the world's total number of these deer and provides the majority of the United States' David's imports, the species' security could be obliterated within days.

What lies in store for the Père David's deer of the future? To Christen Wemmer, Curator-in-Charge, Conservation and Research Center at Front Royal, Virginia, the David's deer is no longer technically endangered. "The object now is to maintain a genetically healthy population through national and international cooperation between zoos."[13] He suggests that for the David's best interest "recruitment and dispersal of animals be in the biological interest of the captive population rather than solely the political or economic interest of the zoo."[14]

Such action requiring a breeding consortium is supported by Foose.

> . . . we really don't know enough to state that inbreeding is benign in this species. In my opinion, demographic and genetic security for Père David's deer is assured only if the species is managed scientifically, which will require much more information about individuals in the population than is now available and much more coordination among the institutions involved than is now occurring.[15]

Unfortunately, those animals which are most rare and bring the most financial return whether by gate receipts or by sale of progeny, are the very animals the collections would be asked to voluntarily give up. An unlikely action by any exhibitor who needs money to pay for operations.

To Dolan, the David's future should include a return to its homeland. "I would really like to see the Chinese start a herd in their natural environment."[16] That is the goal of conservation and captive species reproduction programs—the return of a species to its natural environment.

In 1956 two pair of David's deer were sent to Peking. In 1957 the first calf in more than fifty years was born in China.

(continued on page 28)

Standing in water and relaxing in mud are the David's favorite pastimes.

Who Gives A Dam?

by Michael Cohen

6:15 a.m. The universe has pulled the bay waters to the seaweed line that marks yesterday's high tide. I push the canoe northward and let it gently glide with the outgoing tide. This is the last such ride from this part of the bay.

I am carried like a corpuscle in a giant artery from the heart of the earth. My futile salty tears are a fitting eulogy for the saline plasma of seawater that now retreats ten feet per minute from the shore. Who recognizes the bay waters as lifeblood, a reverent mixture of food, air and minerals stirred by wind, waves and the timeless flushing of the one-mile tide four times each day? Who cares?

I am engulfed by fish, marshgrass, microorganisms, shellfish, squid, and seaweeds. Representatives of every pulsing, wriggling, flowering life form have gathered here to suckle the lifestream. They are sustained by it, as am I. It is no wonder that so many of us choose this place to live, for here we don't buy energy. Nature freely shares it with us, and all that it asks of us is that we return it when we no longer need it.

6:57 a.m. The sun breaks through the fog. Why do we deny and discourage life? What is so hateful about this place that we are driven to kill it? I am looking into cold, clear water. I dip my hand into a pleasant forest of rockweed, snails and periwinkles. The wind whispers, a gull floats by. A seal curiously follows the canoe, submerges and appears again. A loon calls as small waves and dancing sunlight glance from my paddle. What is so boring about the here and now? I float. I am being drawn out to sea by the powers that created me while others are destroying these very powers, and enslaving them to run their television sets instead of the planet.

7:35 a.m. The far-flung intertidal ring of grassland, mudflats and seaweed-painted boulders grows larger as the receding sea gives its intertidal sustenance to the fish, mammals, and fishermen offshore. I watch as billions of life forms drown in the air, just as I would drown if I was submerged in water. They wait expectantly for the tide to return as it has for millennia. They don't know: they will learn that the sea has made its last journey the hard way, by the slow, deliberate stress of suffocation and thirst as desert dryness and summer heat leisurely broil the flats.

Have I gone mad? Am I the only one who recognizes that human consciousness is shared, at some level, by the community from which we gained all life processes? Does my obviously mutated lack of conceit deceive me into believing that the turmoiled intertidal multiplicity is conscious? How convenient it is for us to conceive mud, water and stones as dead, and for other life forms to have no consciousness, pain or equality! What an incredible alibi we have created to soothe our guilt of killing for a profit, and of brainwashing our neighbors into believing that they are *nothing* unless they brush their teeth electrically. Isn't it the economics of an imbecile to trade away a life system for an electric can opener?

8:45 a.m. The tide has retreated to the highest point it will ever reach in this finger of Cobscook Bay. Hundreds of acres lie exposed to an environment as hostile to them as that of the moon is to us. The inconceivable trade-off begins as the minutes tick by. Where are the friends of the earth who say they care? Are they watching television and dreaming of further riches to be gained from tidal power while part of the bay dies?

The tide retreats from its new high water mark as if disgusted by the nightmare, but as the Maine State Legislative bills LD 628 and LD 1603 prove, it is no dream. One wonders when we will outgrow our childhood. One wonders if our immorality begins at the interface of nature's far reaching shoreline. □

MIKE COHEN'S 31 year career in environmental and outdoor education originated in the progressive camping movement and the Guidance Department of Columbia University Teachers College. Dr. Cohen is a former director of the American Youth Hostels MNYC. He has founded several outdoor education programs and with his wife, Diana, presently co-directs the National Audubon Society Expedition Institute.

ENERGY OPTIONS FOR YOU!

(continued from page 6)

For those of you who are building a home, another option you can incorporate into your house is that of geothermal heating. Using this option does not require that your building site is located on top of a dry steam geyser. Every home, if constructed properly, can take advantage of geothermal heating. Even in the cold Northeast, the geothermal heat of the earth will provide an even temperature of 46^{o}-47^{o} F. if the outside walls are insulated with 4" of styrofoam at least 4 feet into the ground.

Many builders are also using staggered, double-wall framing in their construction. Wall studs made of "two by fours" are used to build two walls, two inches apart. The "two by fours" are staggered so that heat loss cannot "bleed" through to the outside. Both walls are finished with wallboard and insulation is added. The resulting R value is an amazing 32!

Admittedly, the energy problem has caused us all to seek out and examine a multitude of alternatives which we personally can employ. We all need to be careful and ask to what extent each option has been tested and scientifically monitored before we adopt it for our own homes. It seems fairly safe, however, to emphasize that right now it is doubtful that you could go wrong if you do three things: stop infiltration, provide adequate insulation, and adopt some sort of passive solar option. These three steps will give you a big boost towards your goal of freeing yourself from the fossil fuel bind! □

FUTURE ISSUES

The next Journal topics 1982-1983 will be :

Culture and the Environment
In Praise of Mountains
Urban Environmental Education
Native Americans
Diamond Jubilee Issue.

Please send any suggestions or articles for consideration to the editor, 44 College Drive, Jersey City, NJ 07305.

DISABLED HIGH SCHOOL STUDENTS IN MARINE SCIENCE

by E. C. Keller, Jr.

Watching David explore the bay water with his hand was as memorable for me as the experience was for him. As he lay on the deck of our 40 ft. barge, modified for student use, his hand felt, ploughed, and altered the water's path as we "steamed" to our next survey station. Then he sat up and exclaimed "moving through the water is like the air guided past a fast moving car, I've felt that with my hand, too." He continued to describe the tactile sensations which for him were very exciting. David was blind. He was having his first experience on a boat, and he was loving every minute of it. A vast new marine world of science and salt spray was opening up for this determined young man from Medford, Massachusetts.

He is one of 117 outstanding high school students from California to Nova Scotia from Washington to Florida who have proved that wheelchairs can navigate aboard boats and on beaches and that blind and deaf students can indeed study first-hand the natural habitats of fiddler crabs and sea hawks.

David was a participant in an innovative program held each summer since 1977 at the Marine Science Consortium's Wallops Island Station near Chincoteague, Virginia, and the Assateague Island National Seashore Park in Virginia.

Visualize twenty-five physically disabled high school students with assorted physical handicaps in the field studying marsh ecology or on a boat gathering physical oceanographic data. This is the first time that some of these students have been to the coast. And for some, the first time away from their home environment. The first experience of this heterogenous group is a trip to the beach to seine and become familiar with the environments (Marine forest, dunes, salt water marsh, bay, etc.) that they will study over the five weeks of the program. All the students are excitedly engaged in the task at hand: a deaf student, holding a crab, signs tactilely to a blind student; the blind student fingerspells a response; orthopedically disabled students, meanwhile, are helped to maneuver their wheelchairs to a better vantage point near or in the surf. Some are already out of their wheelchairs on the beach near the seine net, which has just been "pulled up" on the beach by some of their peers.

It's tough for a kid on crutches to take a field trip, for a wheelchair-bound student to roll across beach sand, or for a deaf person to understand some of the instructors. The blind kids also have problems to overcome. But we've done it—or rather, the kids have done it—and we've all learned together how to overcome the difficulties.

Five years ago, I proposed a new idea to the National Science Foundation: Why not try a science program for the physically handicapped, using marine science as the subject? Since marine science is a broad multi-disciplinary area, if we could be successful in teaching marine science to the disabled, then there should be little problem in doing the same thing for

Program Director Dr. Edward Keller showing three totally blind participants Flounders in a bucket.

E. C. KELLER, JR. is a professor in the Department of Biology at West Virginia University and Director of this program.

other areas of science. The Foundation agreed, and we received funds to begin the nation's first field science program designed exclusively for teaching high school students with a variety of physical handicaps.

We had 23 students the first summer, fifteen were deaf in varying degrees, five were totally or partially blind, and three were mobility-impaired. One boy had a double handicap. He was both blind and orthopedically disabled. They were all young, bright, and eager to learn.

The program was founded in 1977 and has been funded each summer by National Science Foundation (NSF) grants up through 1981. Partial tuition fees from some of the participants were also used to defray expenses. The program is operated as part of the Marine Science Consortium, Inc., which includes 15 colleges and universities from West Virginia, Pennsylvania, Maryland, and Washington, D.C.

Student participants may be partially or totally blind, partially or profoundly deaf, or orthopedically disabled/motor impaired. Yet, the goals of the program are the same for all:

1) to put physically disabled students in direct contact with college instructors and disabled role models.

2) to present a broad academic course in Marine Science, and

3) to provide experiential education and activities for future career decisions.

From the point of view of the staff, additionals goals are to test techniques, materials, and strategies for training the combination of handicapped students in laboratory, lecture, research, and field educational experiences.

Over half of the participants have come from special schools of the deaf and blind or from schools for the orthopedically disabled/motor impaired, and most of the rest have come from public schools. Over fifty percent of the students have had hearing disabilities, about 30 percent have been visually impaired, and the remainder orthopedically or motor disabled. Recruitment is done primarily through high school science teachers, with student selection based on a good academic record, expressed interest, and the recommendation of the student's teacher and school.

The location of the program, on the eastern part of the Delmarva Peninsula, is an ideal one. The area has an abundance of beach, ocean, wilderness, marshes, and marine animals and plants. The Marine Science Center itself is a complex of World War II married officers' barracks, now converted into classrooms, laboratories, and dormitories. A library and museum are also on campus. For short-range field trips, the National Aeronautics and Space Administration's (NASA) Wallops Island Space Flight Center (launch site of many satellites and weather balloons) and a National Oceanographic and Atmospheric Administration (NOAA) weather complex are only a short distance away. The most valuable outdoor resources are the nearby Chincoteague Bay, Chincoteague National Wildlife Refuge, and the limited access northern portion of Wallops Island. This latter island is as close to a wilderness island as possible but still it has easy access.

Staff instructor Mary Ellsworth signing instructions to deaf students during a rainy day expedition on the RV Chesapeake Bay. Photo by: E. C. Keller, Jr.

Instructors for the five-week program include content specialists in marine science (two of whom are physically disabled), sign-language interpreters, reverse interpreters (who "translate" the students' signs back to the instructor), sighted, braille readers, lifeguards, counselors, rehabilitation specialists, emergency medical technicians, and a nurse. Invited guest experts, from NOAA, NASA, or from faculties of participating colleges or universities, speak on specific marine science subjects. For example, on a field trip to the ocean, Mary Ellsworth, a teacher at the Gallaudet College Model Secondary School for the Deaf (MSSD), in Washington, D.C., teamed up a deaf student with a blind student to handle one side of the net. With the other team of deaf students, they brought to shore a net full of sea lettuce, jellyfish, anchovies, and a horseshoe crab. Mary and my wife, Helen Keller (academic coordinator and nurse for the program) lifted each item and passed it around explaining each one in spoken as well as in sign language.

Ernie Starcher, science teacher at the West Virginia School for the Blind (and the program coordinator for the blind) helped the blind students touch the jellyfish and other specimens from the ocean. Dr. Austin, retired director of EDIS in NOAA, the oceanography instructor and himself a paraplegic, lectured to the students from his wheelchair, pointing out various scientific tasks they can perform in spite of their various handicaps. Paul Cunningham signed for Dr. Austin as he does for the other instructors who have not been trained to sign. Paul is also a science teacher at MSSD at Gallaudet College. He is also an instructor as well as a signer on certain topics in the program.

The instructional program has the philosophy that virtually any student can learn and achieve in science, no matter what or how severe the physical handicap. The

program offers as wide a variety of instructional techniques and learning settings in science as possible. The academic program is structured so that students spend about 30 percent of their time in each of three instructional settings—in the field, in laboratory work, and in the classroom (lecture/demonstrations)—and 10 percent of the time working on individual research projects. The research projects are completed by the students during the program and are "fit" between the regular academic, enrichment, and recreational aspects of the program over a four week period. All students write, type, or braille a final project report, and at the end of the program present an oral, or signed, seminar about their findings.

A typical day in the program schedule might involve a lecture on navigational procedures and uses, including a tactile navigation chart and a captioned film, followed by field practice sessions on land in an area near the classroom. After lunch, several hours would be spent on board our old oyster barge, R. V. Chesapeake Bay, in Chincoteague Bay with the students practicing on-board navigation, while also measuring the direction and velocity of the wind and currents and sampling the bottom of the bay, for examination back at the laboratory. After the evening meal, a lecture/demonstration on scuba diving techniques and underwater safety might be given.

For much of the laboratory and field work, self-pacing has been found to be both necessary and beneficial; necessary, because many physically disabled students have varying work rates and require different media, and beneficial because of its usefulness in the students' preparation for college study. Learning to self-pace is one of the greatest benefits of the program, according to the reports of our previous students. Special media include braille/tactile materials, use of sign language, and texts recorded on tape cassettes.

Flotable tripod all-terrain wheelchair. Orthopedic student being pushed by blind student on beach. *Photo by: E. C. Keller, Jr.*

The lecture, laboratories, and field trips cover the scientific method, experimental design, elementary statistics, marine life, ocean physics and chemistry, meteorology (including weather balloons and rocket launches), and navigation.

Teaching such technical subjects to three major types of handicapped students in one classroom, even in a lecture format, demands a lot of flexibility. However, the true "test" of instructional ingenuity comes with the laboratory and field work, where the need to be constantly aware of the students' unique communication needs becomes even more acute than in the lecture situation. For example, if a profoundly deaf student turns away from you while you are conducting an outdoor laboratory, you lose visual contact, and therefore lose all communication with him. Blind students, meanwhile, can hear you, but how do you assure that they are not left out when reading a "visual" pH meter or by their inability to appreciate the color or the intricate design of a shellfish? And orthopedically disabled or motor impaired students have a definite mobility problem; wheelchairs and crutches perform poorly in sand, in the marsh, and on wet boat decks.

Another aspect of the program has been to help evaluate equipment modified for use in outdoor programs. For example, in conjunction with the Rehabilitation Engineering Unit of the University of Virginia, an all-terrain tripod/balloon tire/flotable wheelchair has been used and evaluated for the past two years. It is excellent for use in the program, but needs some further minor modification for optimum use in a program such as this one. Other personal care and mobility devices have also been evaluated.

In regard to the students' academic performance we have found that visually impaired students have generally performed best. In rank order from highest to lowest, the partially sighted were the best academic performers followed by: the totally blind, the motor impaired/orthopedically impaired, the partial hearing, and the profoundly deaf.

Despite the fact that the high school rankings and grade point levels of students in all groups appear to be similar, our findings suggest that the profoundly deaf students appear to have a far greater academic communication problem in science than the totally or partially blind. Also, we have observed that both the totally and partially blind students generally entered our program better prepared academically, even though their high school courses and grades were comparable to the students in the other disability groups. In addition, visually impaired students seemed to be more inquisitive.

Our experiences also underscore the importance of attitudes. Student attitude is important in any instructional program, but it is inestimably so in teaching handicapped students. Often, physically

handicapped people have a "second" handicap, that of diminished self-confidence. Among the various disability groups, we found the partially sighted students to have the most positive self-image, to be the most resourceful, the most helpful, the most motivated, and the most self-disciplined. Conversely, the totally blind students ranked lowest in these same categories. However, recall that the totally blind ranked second in academic performance.

We have shown that most types of physically disabled students can complete the academic (including laboratory and field requirements) demands in this introductory course in the Marine Sciences. Problems do remain however. To optimize courses there is a need for special hardware and materials, (not necessarily expensive) such as: audible meters, audible color indicators, tactile graphics, highly graphic methodology, and so on. However, one of the biggest teaching obstacles remaining—whether in teaching groups of handicapped students or in mainstreaming them in the regular classroom—is how to simultaneously lecture or conduct a laboratory or field experience in sign language for the profoundly deaf while also providing appropriate tactile assistance for the blind without disrupting the rest of the students.

It is possible that the optimum teaching strategy for many students (including those who are handicapped) is some form of non-traditional education. If all other factors were equal, our experience indicates that our program is close to its optimum with the partially sighted, totally blind, partially hearing, and orthopedically disabled/motor impaired individuals, but clearly not so for the profoundly deaf. We have tried many alternative methodologies, such as conducting tests in sign language, for conveying and receiving information to and from the deaf, but as yet, none of our adaptations has shown significant advantages over what we usually do.

A further obstacle exists for our participants in their high school teacher and counselor attitudes. Several of our students have reported "turn-offs" in some high school courses (and in career counseling) due to stereotypical attitudes about the ability of handicapped students. Certain courses, like chemistry, have at times been put off limits, usually because of "safety" concerns for certain students (usually for blind and the motor impaired/orthopedically disabled students).

Without encouragement, support, and guidance into other fields the disabled person begins to believe that his or her capabilities are indeed finite. This is an absolute myth. More and more disabled individuals are entering (and succeeding at) non-typical careers, such as science. There are physically handicapped role models in virtually every area of science, hence we need to help dispel the myth and make science a viable educational and career objective for the physically disabled. □

Ernest Starcher assisting a blind student with a tactile navigation board on the ship in the rain. *Photo by: E. C. Keller, Jr.*

TULLY PENNINGTON

To ANSS members who knew Tully Pennington his death on February 21, 1982 is a real loss. Bob McClung summarized Tully's life with a simple statement, "He was a great guy and a good friend."

A good friend to members of the Society who knew him personally; always ready to lead a field trip to a favorite haunt, to take off for the Okeefenokee Swamp, to introduce some less fortunate mortal, born in a cold climate, to the beauties of the Georgia ecosystem. A good friend to 100's of Boy Scouts and 1000's of students at Georgia State College who were touched by Tully's enthusiasm for life: for people as individuals and for the natural world.

He built his home next door to the Black Church in defiance of local social customs. His front yard was a yellow pine woods; his back yard a camellia garden. He was president of the Statesboro Garden Club and a charter member of the Ogeechee Camellia Society. It was from his outstanding collection that Tully provided camellias for all participants in the 50th anniversary celebration of ANSS at Atlanta, Georgia.

For many summers he was director of the pioneering training program for nature counsellors for summer camps held at Mary Gwynn's Camp at Brevard, NC.

A graduate of Cornell University and Florida State University, Dr. Pennington was active in numerous scientific and professional societies. He was listed in Who's Who in American Education and American Men and Women of Science.

H.R.R.

MEET TWO MEMBERS

JOHN A. GUSTAFSON

It's been twenty years since I was president-elect (and then president) of ANSS—and I've been continuously involved with the Society since. I had joined a few years before, while a graduate student of E. Laurence Palmer and Eva Gordon at Cornell, and had attended several of the ANSS/AAAS meetings with them and fellow students (Howdy Weaver, Helen Russell, Dick Wason, Becky Sharp New, Helen Illick, Ted Eckert, Ray Fisk and others). Those were marvelous times!! My service for ANSS since then has been mainly as treasurer and editor. In 1969 the Society honored me with its Distinguished Service Award.

As with John Brainerd, about whom you read last issue, I've now retired from teaching at the State University of New York at Cortland, after twenty-seven years. My solid example for early retirement was the first president of ANSS, Liberty Hyde Bailey, who decided early in life that he would spend one third of it in preparation, one third working, and one third "doing what he pleased." So here I am, taking my pension at 56. But "retirement" is hardly the proper word for my present state. I'm overwhelmed by volunteer work in environmental, educational, and church activities. Having bought the old Slingerland-Comstock Publishing Company a few years back, I'm dabbling in books. An insurance broker's license helps bridge the gap between income and outgo. A Christian camp in New Hampshire uses me for part-time field director. There's some travel and visiting to do. Then there's the gathering of wood for our wood stove, keeping up with five active kids and their families (but only one grandchild so far), and gardening to give plenty of physical exercise. Last year a new cross-country ski outfit has put a new and more favorable look on our long central New York winters. There's plenty to do—no time to let senility set in—and that's the way it ought to be.

It is my strong conviction that ANSS holds a unique place among the plethora of "environmental education" and "conservation education" groups that have sprung up in recent years. Not only are we the oldest of these groups (we celebrate our 75th anniversary in 1983), but our roots go deep into what Bailey called "the nature-study idea," which provides a philosophical foundation very much akin to that of Leopold. Bailey defined nature study as much more than knowledge *about* nature, a kind of science education. To him it embodied a distinctive attempt to move beyond knowledge to "spirit"; to put into every person a "feeling" for the natural world which would motivate us to treat it with what Leopold called "love and respect." Nature study must be experiental and appeal to the emotions as well as to the intellect. It fails if it does not result in changed behavior.

In an attempt to develop techniques to accomplish these aims, I once put together a slide show using some of Robert Frost's poetry and passages from the Bible, and have adapted the same material for field trip use. Out of it came a special issue of *Nature Study* devoted to Frost, in 1974. The impact of this format—infusing nature study with a strong emotional appeal—has been amazing.

The beautiful thing about being in the "people business" is that the work is never done. Each succeeding generation needs to hear the "old, old story," which is always fresh and new, filled with the wonder and excitement of discovery.

Now, if only I can learn to separate the urgent from the important in my life!!

Thanks for sharing a few moments with me. God bless you all!

— John A. Gustafson

HERBERT S. ZIM

The selection of Herbert S. Zim as the recipient of the Eva L. Gordon Award seemed joyfully appropriate for he has been a long-time member of the ANSS and his many books have reached children as well as non-science oriented adults here and abroad. Then when word arrived that the Zims would be returning from Europe in December in time to attend the ANSS Winter Workshop at the Pocono Environmental Center, everyone was delighted.

Herbert Zim began his remarks by telling his audience how happy he was to receive the award, while he stated that he had good news and bad news to tell us. The bad news was that he did not deserve the award since many of his books were a result of team effort and half of them carry his name as editor rather than author. The good news is that he does deserve it for in all books he has set the tone and maintained standards of quality while he wrote for adult non-science audiences as well as children of various ages. A book translated into Arabic that month brought the number of different languages that his books appear in to eighteen.

All ANSS members are familiar with some of the approximately 200 books that bear Herbert Zim's name but many do not know of his involvement with the Society. We therefore invited him to tell his own story in the Meet a Member column. We think you will enjoy it while you envy us who had the privilege of hearing him tell this tale at PEEC.

Carbon dating may be needed to determine when I first joined the American Nature Study Society. It was back in the early 1930's—possibly the late 1920's. In those days I was actively leading nature groups on hikes, running nature programs in New York settlement houses and doing some teaching of science on the elementary and junior high school level.

By 1934, when I began my doctoral study on the science interests and activities of adolescents, under the General Education Board, I had already attended a number of annual meetings of ANSS and was familiar with its journal and with the educational and research reports in it. At this time I presented several phases of my own research at the annual ANSS meetings and wrote several articles for the journal. During these years I had happy contacts with Eva L. Gordon and Anna Botsford Comstock.

While all this is long past, I still have a clear recollection of them and of other members of ANSS who gave me advice and suggestions for my work and listened sympathetically to my reports. These contacts were kept up as I continued my teaching and went on into university work in the field of science education, urging my graduate students into ANSS membership. Though my work was in science, those aspects of natural science which also played a rich role in nature study remained at the core of my interest. I'm very happy that the educational cycle has turned completely and that an essential viewpoint in education which had been neglected for several decades is now revised and reapplied in environmental education.

It was the same interest in "nature study" that got me started in writing. This was an emphasis on the personal and emotional facets of learning and on the satisfaction growing from first hand discovery in the field. My first book, in 1942, was *Mice, Men and Elephants,* a survey of the animal kingdom. My last was *Quartz* (a review of that common and important mineral) in 1981. In between a hundred or more books appeared of which I've been author or co-author and perhaps an equal number which I've edited. These include a series for Harcourt Brace, a larger one for William Morrow and a still larger one — the Golden Guides and Field Guides — for Western Publishing. Besides, I developed and edited two multi-volume encyclopedias for young readers and participated in several other series.

More impressive than large number of titles are the sales of individual volumes. Over fifteen — and all in the natural sciences — have passed the million mark — two of these are over five million. The total number is hard to calculate since we get incomplete data on books published abroad. However it is quite possible that the total printings of guides and related books have passed the two hundred million mark.

I lack modesty in mentioning these statistics because, in the first place, these books were a team effort in which many people participated. More important, a large number of these books are used in schools — both in classes and in school libraries. An even larger number have been purchased by people who use them alone in the field or with their families and friends. The educational impact of the guides has been tremendous because of our effort to make clear, efficient low-cost books. But of even greater importance is the fact that millions of people with all kinds of educational, social and economic backgrounds use the books because they are interested in the natural world, in the identification, understanding and enjoyment of plants, animals and their total environment. It is with these people and these closely knit aspects of our planet that the American Nature Study Society is still diligently concerned. For their help and support I am thankful and am more than happy to raise my voice in praise of their continuing achievements. □

EMPLOYMENT OPPORTUNITIES

Position: Instructor, Intern (12 month position)

Location: Keystone Junior College, Pocono Environmental Education Center, Dingmans Ferry, Pennsylvania 18328.

Pocono Environmental Education Center (PEEC) is located within the National Park Service's Delaware Water Gap National Recreation Area. As a year-round residential field center, PEEC provides experiences in natural history, outdoor pursuits, arts, and humanities. In addition to college and nonprofit groups, PEEC services elementary, middle, and secondary schools.

Intern duties include: Providing instruction for formal and non-formal education groups, assisting with physical plant upkeep and maintenance, participating in staff development, and program implementation.

Candidates should have the following qualifications: BA or upper division student; demonstrated paid or volunteer experience working with groups; interest in working in a residential setting; competency in one or more outdoor/science specialties.

Remuneration: $200.00 monthly, plus room, board, and vacation days.

Forward cover letter and resume to:

Leslie B. Gamble, Jr., Associate Director
Pocono Environmental Education Center
R. D. 1, Box 268
Dingmans Ferry, Pennsylvania 18328

GOOD READING

BOOK REVIEW –

The Sourcebook–Learning by Design

Environmental educators are always seeking new and enticing packages for the concepts they strive to convey. What will ignite the imagination and stir the potential insights of a group of students? What kind of activities will suit a community, a given set of resources or constraints? These questions lead us all to pouring over materials produced in a variety of settings for different audiences.

The Sourcebook–Learning by Design, recently produced by the American Institute of Architects, is a new resource for educators who wish to explore some of the excellent programs and materials that have been developed in different parts of the United States. Although there is an emphasis on programs related to the built environment, more general approaches, such as "Investigate Your Environment," (U.S. Forest Service) are part of the lineup. Programs and materials range from those that have been adopted by the National Diffusion Network, to those that are about a specific community, their inclusion depending on their proven success or their usefulness as a model. The selection represents round one; the *Sourcebook* will be supplemented each year on a subscription basis.

After a brief section giving the AIA's rationale for producing a resource in this area, there is a section called "Models," which describes seven programs in some detail. The reader learns how the program was developed, what its basic features are and how it has been adapted to a situation different from the original one. A final abstract outlines the grade level, topics, products and where to go for more information.

The next chapter, "Resources," requires a paper and pencil because it is the "catalogue" section and appeals to curricular consumers. Close to thirty books, guides, activity packets are described, including a sample activity and selection of graphics from each book. Testimonials from users are given as well as the source and price of the materials.

The "Bibliography" is called an "admittedly arbitrary harvest . . . (which) illustrates the richness and breadth of commentary about the natural and human designed environment." Selections go beyond strictly educational materials and range from Aldo Leopold's *Sand County Almanac,* to Public Law 91-516, the Environmental Education Act of the 91st Congress. It includes popular economic, design, ecology and philosophy books. Each entry is annotated and gives a quotation from the piece. This section of the *Sourcebook* will be useful to a wide audience, as it is intended to represent background reading and succeeds in giving a broad and appealing selection.

The AIA did a survey over a two year period of resource people and organizations and the results of this survey make up the final "Network" section. Although people and organizations are often the most valuable resource, they are difficult to document because staffs and programs continually change. Although this section will continue to be updated with the rest of the guide, it seems that it has a weaker start than some of the other portions of the book; some of the listings are already out of date. Judging on the basis of the section on New York, it seems that research was limited, because so little of what is currently happening was represented.

The *Sourcebook* will be of great interest to many educators in a number of related fields. The fact that it will continue to grow is an essential part of its value and reflects an appropriate approach to the subject. Environmental education is process not product oriented, and although this resource manual has a polished, finished look, it is, in fact, process oriented. This is reflected in both the organization of the material and the plan to enlarge upon it each year. The *Sourcebook* is, among other things, a tribute to the work that is being done by a wide variety of environmental educators, and should serve to promote communication within the educational community. The editors of the *Sourcebook* have solicited suggestions for contributions for next year's edition from readers and have included mail-in forms to facilitate this process. It will be a valuable addition to resource libraries.

The *Sourcebook* is available for $25.00 from The American Institute of Architects, 1735 New York Ave. NW, Washington, DC 20006, (tel. 202–626-7573) and the subscription rate for yearly supplements will be $10.00.

Review submitted by CARA LEE, Environmental Action Coalition, 417 Lafayette St., New York, NY 10003.

Guidelines and Techniques for Environmental Interpretation by Klaus Berkmüller is a paper-back manual designed for the low-budget, do-it-yourself interpretive program. Well written in straightforward language and amply illustrated with drawings and photos, it is a useful source of ideas and techniques for developing both simple and more extensive nature interpretation programs. Mr. Berkmüller approaches the development of nature centers from perhaps the most appropriate basic philosophy—conservation of nature and functioning ecosystems will only be accomplished when people deeply appreciate the nature around them through first-hand beneficial experiences. It is an approach long espoused by ANSS, and familiar to most American nature interpreters. The fact that Berkmüller's illustrations are largely derived from his experience in Nepal adds a sense of universality to what he describes. The techniques are eminently adequate anywhere.

Particularly helpful is the chapter on theoretical considerations – preparing background, identifying target groups, finding sources of information. The advice given will help make each center match the local situation and meet local needs. Other chapters deal with developing nature trails, outdoor signs, displays, and structures. There is a helpful section on the business of raising funds, and one dealing with live exhibits. The appendices cover sources of information and provide samples of hand-outs and guides.

Copies of this helpful manual may be obtained for $5.00 (plus $1.00 for postage) from Mr. Berkmüller, c/o Behavior and Environment Program, School of Natural Resources, Dana Bldg., U. of Michigan, Ann Arbor, MI 48109.

– John Gustafson

Yarrow, Ruth. *No One Sees the Stems.* 1981. Battle Ground, Indiana, HIGH/COO, 12 leaves. Available from HIGH/COO, Route 1, Battle Ground, Indiana 47920.

Ruth Yarrow is acutely aware of her environment. Her ecology background and field experience as a naturalist play an important role in this work of 18 haiku. A mother of young children, she has taken inspiration from that demanding physical and emotional experience. While she is involved in the care and nurturing of her babies, she observes as closely the phenomena of the natural world even to the tiniest detail. Although bound by demands and limitations, her mind soars free to create strikingly beautiful poems descriptive of that special (soon gone!) niche of young mother bond. This mini-chap book is number 14 in a haiku series available from HIGH/COO.

– Marie F. Long

CALLING ALL AUTHORS

The ANSS book exhibit is taking shape. If you are an author and have not already contacted your publisher to send your two most recent or two best books, please do so immediately. Address to: ANSS MEMBER AUTHOR book exhibit, c/o T. Spence, Wave Hill Center for Environmental Studies, 675 W. 252nd Street, Bronx, N.Y.C. 10471.

Warning! Do Not Taste

by Helen Ross Russell

We have a battery of sensors grouped under five headings that inform us about the world around us. Three of these, sight, hearing and smell, gather information about the environment at varying distances from our bodies but touch and taste require actual physical contact. Using either of these to identify unknowns can be extremely dangerous.

Just before Euell Gibbons died he did a series of television advertisements on cereals. On one program he asked, "Have you ever eaten a wild pine tree?" Some people were amused, others were extremely annoyed when the FTC cancelled the program on the grounds that it could be dangerous to children. The question was "perfectly innocuous" they said. But was it really? How many persons, adults as well as children, identify all needle bearing conifers as "pines." The inner bark of pines was used as a survival food by the native Americans and by Europeans. The inner bark of yew is deadly. The young needles of pines make a beverage high in vitamins. So do the needles of spruce and hemlock. The needles of Arbor vitae cause digestive upsets. The needles of yew are toxic.

Two and a half ounces of yew needles are sufficient to kill a 150 pound person. There are about 1,100 needles in one ounce. They fill two-thirds of a cup.

It is hard to imagine adults eating enough raw needles to kill or even make them sick; but small children playing games could eat fatal amounts. Furthermore, it is simple to brew a deadly tea from yew needles, a tea that could easily be consumed in quantity since unlike pine, spruce, hemlock and cedar, yew does not have a strong distinctive flavor.

The red aril surrounding the seed of yew is edible if you like cloyingly sweet gelatinous substances but the seed is laden with the toxic alkaloid and even a small number chewed and swallowed can be fatal.

Yew is not alone in being a deadly front yard or back yard plant. Rhubarb, potatoes, golden chain, wisteria, dogbane, oleander, lantana, lupine, privet, Carolina jessmine are just a few of the common plants that have been fatal to humans.

Children and adults are generally taught never to eat an unidentified mushroom. This is a good rule but it does not go far enough. Children should be taught NEVER TO TASTE any substance not used as food by their parents or other adults whom they trust. Adults should follow the same rule.

Questions and Answers

Elizabeth Blair, now retired to Highlands, N.C., near to Malvina Trussell, has suggested a question and answer column for the Journal. To kick it off she sent us the following questions asked by persons in her field trip groups.

Do turkeys have combs?

No; turkeys are bare headed with neither feathers nor comb but the fleshy fold of skin called a wattle which falls over their beak is conspicuous.

What is the difference between a shamrock and Oxalis?

Although the name shamrock is sometimes locally applied to both the 3-parted leaves of clover and of Oxalis, the shamrock of Ireland is a clover *(Trifolium procumbens)* according to the 16th century herbalist Gerard, and the 20th century botanist, Liberty Hyde Bailey.

Does the human body at the moment of death discharge a small charge of electricity?

Recent studies have revealed the presence of electrical fields and charges in all humans. We still know relatively little about these though we record them with delicate instruments. When the individual dies the electrical charges cease, like a light that goes out when the switch is flicked.

Do bears spend the winter in tree tops? Do they dig holes?

U.S. bears are divided into two large groups. According to the National Geographic Book of Mammals 1981, brown bears dig holes in hillsides. Black bears find shelter in caves, under fallen trees, even holes in hollow trees as high as 60 feet above the ground. All of these holes are lined with grasses, leaves and other nesting material.

We will try to answer appropriate questions submitted to this column in future issues.

Let Your Fingers Do The Walking

by Sandra Flynn Burns

Spring is an ideal time to encourage the development of your students' observation skills. Many people see, but most are not good observers. Observation involves more than the use of visual skills. A good observer uses not only the sense of sight but also the senses of touch, hearing, smell and taste.

Many people inspect the outdoors from an erect posture with hands in their pockets and downcast eyes. A teacher attuned to developing observational skills will encourage children to kneel down to touch the moss and smell the soil and to stretch up to finger the leaf and listen to the sounds it makes. The children will make comparisons, describe characteristics and share their findings with others.

These outdoor activities and follow-up classroom experiences are suggested to develop the observation skills of touch, hearing and smell with elementary age children.

TEXTURE HUNT:

Each child is given a bag containing several small pieces of materials of varying textures such as sandpaper, wax, velvet, etc. and is instructed to find some natural object in the selected area that matches the texture of the sample material. For example, velvet may be matched with the stem of a staghorn sumac. Depending on the nature of the area in which you are working, the group may either collect the specimens or match the sample to the object *in situ.* Have the class share their findings. This activity can have several variations. It can be modified to become a color hunt, a shape hunt or a fragrance hunt.

FEEL SOX:

A Feel Sox can be constructed by placing a can or small carton in a large stretch sock.

Construct several of these Feel Soxs and place a texturally distinctive natural object such as a rock in each one. Take the Feel Soxs outside where the objects may be found. Instruct the students to feel the object carefully and then to locate it in the designated area.

Variation: Divide the class into groups and give each group an empty Feel Sox. Each group finds a specimen to place in the Feel Sox and then challenges the other groups to touch the object in the Feel Sox and determine what it is.

TACTILE CARDS: (An index card with a textured surface—sandpaper, waxpaper, etc.)

Make Tactile Cards (two of each texture). Shuffle the cards and give them to blindfolded children to match by texture. After the children are adept at doing this, give them specimens collected during one of their outdoor activities. Have the children match the texture of the specimen with the appropriate Tactile Card.

SANDRA FLYNN BURNS is Associate Professor of Earth Sciences and Science Education at Central Connecticut State College, New Britain, Connecticut.

Illustrations by GEOFFREY FLYNN BURNS, a senior at the E. L. Smith High School of Central Connecticut State College.

RUBBINGS:

Give each child a piece of paper (manilla is preferred) and a crayon. Have the children put their names on one side of the paper. Have the class locate surfaces outside with interesting textures. Instruct the children to place the plain side of their paper on the textured surface and rub the crayon over the paper until the paper is covered with color. The children then exchange the texture rubbings with classmates to see if they can locate the surface that was used to make the rubbing.

SH-SH-SH!!

Select a suitable area and tell the children to close their eyes and listen for natural sounds. After the allotted time (1-2 minutes) ask the children to draw pictures of what they heard. Start a round robin discussion in which each child names the sound that he heard and then shows his picture. The pictures can be taken back to the classroom and mounted on a bulletin board entitled "Sounds of the Schoolyard."

JUST LISTENING:

This is a follow-up activity for SH-SH-SH!! Using index cards make pictures of some of the things which make sounds in the school yard. Give each child some cards and return to the area where the sounds were originally heard. Have the children sit in a circle and listen for sounds made by the things pictured on the cards. When the sound is heard, the class quietly holds up the card which represents the thing making the sound.

TO SMELL IS SWELL:

Instruct the children to smell as many flowers, plants, vines, leaves, bark, soil, water as they can in the time allotted. Give them a prepared ditto on which they can indicate the fragrances they liked, those they disliked and fragrances about which they had no positive or negative feelings. Encourage them to find descriptive words to characterize the odor. The class may share their fragrance preferences with each other.

Prior to beginning this investigation demonstrate the proper method of smelling a leaf. The child rubs the leaf with the thumb and forefinger to release the plant's fragrance and then bends down to smell the plant. Do Not break the plant and lift it to your nose!

THE SOUND MAKER:

Each child is given objects which make sounds. The objects could be a piece of ditto paper, popsicle sticks, tissue papers, pennies, etc. The children are encouraged to make sounds with these objects and then to locate things in the school yard which make similar sounds. Share and discuss your results.

SMELL BOX:

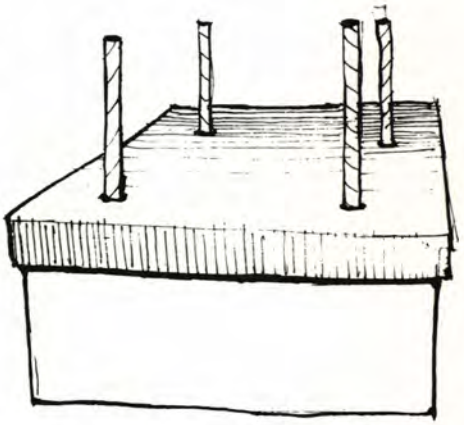
Fragrant objects discovered during a field experience can be brought back to the classroom so that the children have additional experiences developing sensory awareness. The Smell Box is an intriguing and versatile way to do this.

The Smell Box is made from a decorated shoe box. Four or more holes large enough to insert a straw through are cut in the lid. Straws are cut in two and small plastic bags each containing a fragrant specimen collected on a field trip are fastened to the straw by means of a twister seal. Each bag hangs loosely within the box. Each substance is given an identification number which is placed on the lid of the box to aid the children in their discussion about and identification of the odors. Another challenge can be provided by placing the actual specimens near the Smell Box and having the children compare and decide which specimen before them matches which item in the Smell Box.

These activities are simple techniques to develop the sensory awareness of your elementary age children as they explore the natural environment. They not only encourage growth in observation skills, they also enhance the development of the skills of communication and classification.

NOTE:

Instruct the children in all the dangers of the area (poison ivy, bee hives, poisonous plants) before you begin any outdoor exploration.



PÈRE DAVID'S DEER

(continued from page 16)

However, in the ensuing years of political turmoil, the West lost track of the milu and how they were doing numerically. Seven David's deer were recently seen in China. Whether there are more, and if so, where they are located, is unknown.

Whatever the David's destiny, it obviously lies in the hands of mankind. Indeed, as much may be said of the majority of wildlife. It has been estimated that over one-half of the extinctions since recorded history began have occurred in the present century.[17] Furthermore, about 20% of all living species are now threatened with extinction.[18]

Man's success will be found not in his complacency but in his concern. It is this which will determine whether his work with the Père David's deer, as well as with other world wildlife, will prove a successful exercise in planned, and permanent, preservation.

NOTES

[1] A. de C. Sowerby. "Notes on the original habitat of Father David's deer," *Notes de Mammalogie.* Musee Heude. p. 6.

[2] Interview with James Dolan, General Curator, San Diego Wild Animal Park.

[3] Hastings, 12th Duke of Bedford, "Père David's deer: the history of the Woburn herd," *Proceedings Zoological Society of London* 121 (1951): p. 333.

[4] Letter from G. Kenneth Whitehead, Lancashire, England.

[5] Hastings, 12th Duke of Bedford, "History of Woburn herd," p. 329.

[6] Jean Delacour, "Rarest deer in the world," *Animal Kingdom* 50 (1947): p. 3.

[7] Telephone interview with Kurt Benirschke, Research Director, Zoological Society of San Diego.

[8] Letter from Katherine Ralls, Research Zoologist, National Zoo, Washington, D.C.

[9] Letter from Thomas Foose, Curator of Ungulates, Oklahoma City Zoo, Oklahoma City, Oklahoma.

[10] Interview with Marvin Jones, Consultant, San Diego Zoo.

[11] Foose, *loc. cit.*

[12] Dolan, *loc. cit.*

[13] Letter from Christen Wemmer, Curator-in-Charge, Conservation and Research Center, Front Royal, Virginia.

[14] *Ibid.*

[15] Foose, *loc. cit.*

[16] Dolan, *loc. cit.*

[17] Sheldon Campbell, "Who needs wild animals?" *Zoonooz* LII (1979): p. 7.

[18] *Ibid.* □

NATURE PHOTOGRAPHY CONTEST ANNOUNCED

The Northeast Natural Science League, a nonprofit environmental organization, recently announced the sponsorship of its fourth annual natural science photographic competition. The deadline for entries is June 14, 1982.

Photographs must be taken anywhere in the thirteen state area of the Boston-Richmond megalopolis (Virginia to Maine), and may be of either nature subjects on earth or phenomena of the sky and space. In other words, subjects may range from bugs to black holes. Color slides, color prints, and black and white prints will be included. A total of five slides and/or prints may be entered by each participant.

The winners of the four major divisions – FAUNA, FLORA, ENVIRONMENT, and ATMOSPHERE & SPACE – will be awarded engraved plaques while those placing first, second, third and honorable mentions in the eight subdivisions will receive certificates of merit. A selection of the winning photographs will become the basis of an exhibit to be circulated to various institutions in the northeast.

The winners will be selected by a panel of judges at Princeton University during the week of June 20th. All photographers, young and old, amateur and professional, are welcome to enter. For entry forms and complete details send a stamped self-addressed envelope to the Northeast Natural Science League, P.O. Box 427, Peapack, New Jersey 07977.

Our Readers Write Us

I like what you are doing with *Nature Study*—a good appearance!

You might have Karen Nolan recheck her information on seasnakes (Vol. 34, 1, 2, p. 6). Their fangs are located in the front and not at the back. The main difference between the fang apparatus of the seasnakes and other proteroglyphs is that the former can raise (elevate) the fangs, whereas in the latter the fangs are permanently erect.

Dr. Richard Baldauf, Director
The Museum of Science & History, MacArthur Park,
Little Rock, AR 72202

We appreciate herpetologist Dick Baldauf's correction.

◆◆◆◆◆◆◆◆

Member Jean W. Scheel of Corvallis, Oregon, sent us this copy of a letter which she wrote to Porcupines Unlimited in response to an article in "News and Notes" telling of the founding of that organization:

Dear Sir:

I read with interest the article about your organization in the American Nature Study Society newsletter, May 1981. I appreciate the somewhat whimsical purpose of your organization but I was distressed by some errors of fact in the supporting statements. I have some personal experience with a tract of pine timber in eastern Oregon where porcupines are a problem and I can assure you that damage is more than occasional and that its consequences are costly. Porcupines girdle young pine trees near their growing tops and cause development of "schoolmarm" trees having two or more trunks. Such trees do not yield good quality logs and they consequently lower the harvest value of a tract. It is not a matter of an occasional tree of this type, but the fact that a high percentage of the trees in particular areas are thus damaged.

Porcupines in this part of the country appear to be in no danger of extinction. They are doing very well despite some sporadic control efforts by individual timber owners. We would rather the animals do not have your help here.

Very truly yours,
Jean W. Scheel

ATLANTIC CENTER FOR THE ENVIRONMENT: Internship Opportunities

The Atlantic Center is accepting applications for the following positions:

INTERNSHIPS

February - May 1982
NEXUS Ipswich, Massachusetts
Investigative reporting on Atlantic Regional issues, compiling and writing articles and editing of **NEXUS,** a semi-annual newsletter. 1 intern

NEWFOUNDLAND FORESTRY CURRICULUM PROJECT Newfoundland
Working with the Newfoundland and Labrador Department of Forest Resources and Lands, interns will assist in developing and testing an educational curriculum designed for forestry and wildlife management. 1 - 2 interns

May - August 1982
NORTHERN MAINE CANOE PROGRAM Aroostook County, Maine
Canoeing selected rivers and lakes, this team will instruct small groups of young people in natural history, ecology, outdoor skills and water safety. 2 interns

June - September 1982
NEXUS Ipswich, Massachusetts
See above description.

SUMMER PROGRAMS

June - August 1982
Teaching positions are available for the following programs:
LIVING RIVERS PROGRAM New Brunswick
Local and regional participants examine resource issues of Northern New England and Atlantic Canada. 5 staff positions
OCEAN HORIZONS Fogo Island, Newfoundland
Marine and coastal zone education for youths and adults in the province. 5 staff positions

photo by: Kris Bull

Ft. Kent intern working in local school.

MARINE BIRD CONSERVATION PROJECT Quebec
Participants examine the ecology and behavior of seabirds and the many threats to their survival. 3 staff positions

GENERAL INFORMATION

Candidates must be at least 20 years of age and should submit an Atlantic Center application, a resume and two letters of recommendation. Individuals will be notified by the Center when to schedule an interview. All applications must be postmarked no later than *20 JANUARY 1982* for internships beginning in February 1982. For spring/summer positions, all applications must be postmarked no later than *10 MARCH 1982.*
Interns receive a moderate stipend plus room, board and transportation expenses while at project site. Housing is available in Ipswich for a small weekly rate. Internships last approximately three months.

Write now for further information and an application to:
Internships
Atlantic Center for the Environment
QLF Program Headquarters
39 South Main Street
Ipswich, MA 01938
(617) 356-0038

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☐ Student or retired member	5.00
☐ Library subscription	10.00
☐ Life member	150.00

(All members receive *Nature Study* and the newsletter.)

Name _____

Address _____

_____

_____ Zip _____

(Membership in ANSS is tax deductible.)

Please make checks payable to the American Nature Study Society or just ANSS and send with this form to:
John A. Gustafson, Treasurer – R.D. 1, Homer, N.Y. 13077

THE AMERICAN NATURE
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John Gustafson, Treasurer
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20 years ago

. . . not many people were concerned about ecology, recycling, energy, endangered species, aquaculture, pollutants, red tides, acid rain, nitrogen cycles, habitat protection, environmental education, reforestation, pesticides, and the peregrine falcon.

But we were.

Through our publications program, field trips, workshops, and other activities, people began to see.