

Nature Study

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Teaching Ecological Concepts

The American Nature Study Society

A DOZEN CONCEPTS . . . for Environmental Education

As you may have noticed, *NATURE STUDY* now is subtitled "A Journal for the Advancement of Environmental Education." It is our belief that environmental education should have certain concepts as its objectives. The following concepts should be considered as goals in the development of programs in indoor/outdoor education. No relative degree of importance is indicated by the order in which they are listed.

1. **Man is able to damage and destroy the environment and its ability to sustain life.** We possess enormous capacity for such destruction through machines and sources of energy only recently invented. We do not know the long-range impact of these activities on the natural environment—evidence indicates that many of our actions may have long-range bad effects.
2. **Man is a product of the natural world, and is adapted to it.** This adaptation is controlled and perpetuated by thousands of almost unchanging genes. This means that the world environment must be sustained essentially in its natural (i.e., precivilization) state or we, along with most other creatures, will succumb.
3. **Man depends on the biological organisms with which he shares this planet for his own health and well-being.**
4. **Man is himself a biological organism, and his basic bodily needs are the same as for most other creatures.**
5. **The natural world is extremely complex.** Like any complex organism or machine, there are many interacting parts and all parts are interdependent. All parts of the system must function properly or the whole system suffers. (The analogy with the human body, or with our community social structure, works well here.)
6. **The proper functioning of one's body, or of the natural world (the ecosystem), depends on the fitness of the structures which make them up.** This is easily seen in our own bodies, but may be hard to see in the ecosystem, where the functional parts are difficult to define and harder to analyze.
7. **All things in nature must be cycled, so that they can be used over and over again.** Some elements are cycled rapidly—carbon, water, oxygen, nitrogen. Others more slowly, through geologic processes—minerals deposited, uplifted, eroded. The materials of the earth are in limited quantities, and must be used again and again. Wastes of human activities must be salvaged and reused if future generations are to have the necessities of life.
8. **Diversity is a necessity in the living world.** The survival of any species will be in part dependent on the variations which it contains within itself. Man, in his ignorance or for selfish reasons, tends to simplify the world in which he lives, through monoculture of plants and animals, extinction of whole species, and destruction of specialized habitats (such as wetlands).
9. **All living things have a right to exist in suitable habitats.** Mankind's ability to change the face of the earth must be carefully exercised. Too drastic change is not only detrimental biologically, but may be indefensible morally.
10. **Natural environments have important therapeutic effects on urbanized man, as witnessed in literature, art, music, recreation, wilderness, etc.**
11. **We must have within ourselves a sense of awe and wonder, a humility with regard to ourselves in relation with the natural world.** Many of our problems of environmental deterioration are due to man's egotistical "above nature" attitudes.
12. **We must translate ideas into feelings.** People usually do what they feel like doing, not necessarily what they know they should do. The teacher must keep this fact ever in mind, so as to take advantage of those opportunities whereby students may develop attitudes friendly to nature and natural phenomena.

J.A.G.

Nature Interpretation and the Machine Age¹

BEN D. MAHAFFEY*

The title, "Nature Interpretation and the Machine Age" is poor — even though I chose it. The title associates a natural and important learning opportunity to an innovative period of time. The title may be attempting to place a veneer of acceptance for machines or non-personal, non-natural processes. Often, the appreciation of our environment and natural surroundings is not compatible with machines.

Actually, we are not living in the machine age; that period of time passed many years ago. The electronic age replaced the machine age, but it, too, is gone and we have slipped through the atomic age into the space age. The tools of the space age may not be any more compatible with natural surroundings than the more simple machines.

Society often considers new technology and mechanical advancement as basic improvements in all activities, but this may not be true, especially when we consider man's natural environment. I believe our environment and surroundings can be understood effectively with a minimum amount of automation and machinery.

William Wordsworth phrased my feelings in 1798 when he wrote *The Tables Turned*.

... Come forth into the light of things,
Let nature be your teacher.
She has a world of ready wealth,
Our minds and hearts to bless —
Spontaneous wisdom breathed by
health,
Truth breathed by cheerfulness.
One impulse from a vernal wood
May teach you more of man,
Of moral evil and of good,
Than all the sages can . . .²

My statements should not make you think that I am a person out of tune with reality. It is important that we develop new technology and machines. The question seems to be whether we want *all* areas of educational opportunities invaded and changed by various types of machinery.

Enos Mills, an early self-made naturalist and outdoorsman from Kansas became known as a guide, hunter and author. During his lifetime he traveled to every state existing at that time. He claimed "intense and happy days I have had with only bark, berries and mushrooms to eat . . . but what did eating matter! I felt the occult eloquence of

the tongueless scenes; the world was young. Life with nature is always real and sometimes, with storm or snow slide, it is deadly earnest."³ This man had sensually interpreted his environment. Mills also went on to say: "Nature supplies materials for thought and pleasantly compels thinking." I am not sure that nature will "compel" thinking in all people; hopefully nature will encourage thought, if the learning opportunity is accepted by the individual.

Effective interpretation is a key to becoming acquainted with our environment. Freeman Tilden tells us interpretation is "An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information."⁴

This definition may appear rather academic to some but we can use it for a base to develop a clearer understanding.

Margaret Farrand vividly explained the role of an interpreter when she wrote *The Seeing Eye*:

A curve in the road and the hillside
Clear cut against the sky.
A tall tree tossed by the autumn
wind
And a white cloud drifting by.
Ten men went along that road
And all but one passed by.
He saw the hill and the tree and
the cloud
With an artist's mind and eye.
And he put it down on canvas
For the other nine men to buy.

The primary objective of interpretation is to create a sensual and personal AWARENESS! To be aware it is necessary to develop a personal perspective with the environment. Awareness must start with a knowledge of the environment. This is where interpretation *begins*. We often fail in our interpretive efforts . . . the mere knowledge, the facts, the dimensions, the colors, the definitions — each topic taken individually or collectively does not necessarily create this awareness. We have to feel the presence of the environment.

I am concerned about the need for personal feelings and personal involvement, especially for our young people. Will they have the opportunity to taste, to see, to feel, to sense, to understand their environment? Or will these opportunities have to come vicariously — through artificial methods?

Have you asked yourself what "the

environment" is? Most of us, with all our various backgrounds, have a responsibility or opportunity to work in some *part* of our surroundings. But what about the total environment? This appears to be a topic for concern these days.

Throughout most of the country people are engrossed with *part of the environment*. With which aspects are *you* concerned? Local and national organizations are providing excellent leadership in instilling an awareness of the various specialized aspects of our surroundings. We have groups working with our natural environment, the endangered species, pollution problems, timber waste, wilderness preservation, etc. We have other organizations attempting to preserve our historic remains. This is also important. We as a nation must not neglect our cultural heritage any more than we should allow our natural resources to be squandered.

Where does our environment really *begin*? Can we separate our social environment from our physical environment? I personally think that an awareness and appreciation for one's social environment will enhance the same awareness and appreciation for the natural environment.

My personal experience and religious philosophy have led me to believe that our personal perspective of social and natural environments should be initiated in the home, by a unified family, with the father providing the leadership and discipline; with the mother at home, giving her attention to the children. The mother's role should be directed toward setting the spiritual tone for the physical and social surroundings. Therefore I also believe that this type of personal attention will bring security, love, and discipline which hopefully will spawn recognition. This initial social contact can successfully develop an awareness for each succeeding phase of the social and natural environment. As a parent, I also believe that no outside success can compensate for failure in the home. Social scientists have shown that other social structures may be equally effective; perhaps some of you may have experience in this area. I would like to discuss these possibilities with you.

Cliff Emmanuelson, of the Gifford Pinchot Institute, tells of ghetto children in New York City who have lived their lives within 12 blocks of the Hudson

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River and have never visited it. I witnessed a three-day outing by a group of Job Corps youngsters in the Southwest one summer. They arrived on a bus and were so frightened of the sounds and sights of the outdoors that they would sit by the hour, inside the bus. It took their counselor most of the allotted camping period to barely introduce their senses to the potential of learning to enjoy the outdoors. Think of the opportunities and experiences lost to children every day across our land!

Emmanuelson also tells the story of adults wanting to know what goes on throughout the city at night—so a series of "nocturnal field trips" were planned. On these trips the participants visited skid row, the hospitals, the law enforcement agencies and entertainment centers. The heartbeat of the city was exposed and felt—this awareness may not always be pleasant but it is necessary for understanding and recognition.

How does an appreciation for environment develop? Where does appreciation begin? Although I have not attempted to verify this scientifically, I personally believe it should begin in the home with both parents personally teaching and interpreting to their children. However, we often find that parents completely ignore these opportunities. The responsibility is then passed to the primary and secondary schools or to the church. Dedicated teachers have great influence with the children but often have little time to personally motivate the youngsters. The responsibility is then passed to the colleges and universities. Teaching appreciation at the college level can be very difficult.

What does this part of our conversation have to do with machines? Television and the automat are replacing mother and dad; the church is assuming a lesser role in the training of youth; automated devices are filling our classrooms. Universities are developing and using new types of self-learning equipment. In some institutions the sight of a real live professor is a rare and unexpected experience.

A similar automation is occurring in our recreational atmosphere. The National Park Service has been the pioneer in the interpretation of our natural and historic environment. The agency started in the early 1920s with individual and dedicated services available to most visitors. With increasing visitation much of this personal attention has been lost and we find that other methods are necessary to disseminate information and handle the crowds. We have more naturalists and rangers available now but they are able to contact only a small

proportion of the greatly increased visiting public. How much understanding do we lose by shifting from personal interpretation to message recorders, taped slide programs and the written word?

Economics and population growth have forced our nation to become self-service and device oriented. We may be sorry that this is happening in the field of interpretation. We can successfully provide information, facts and figures to millions of visitors yearly, but without a personal communication, interest and attention from capable interpreters, we may fail in touching the public with a sensual appreciation.

Perhaps I am wrong. Since the name of the game is impersonality, then the challenge appears to be to develop the equipment to induce a personal perspective. We know very little about the effect of machines in the recreational atmosphere. Scant research has been done in this area. We know practically nothing about the preference the public exhibits towards the machines and printed matter that are used all over the nation in recreational areas. This information could have high utility in the future development of recreation complexes.

An example of machine frustration might be the Texas Cultures Building at HemisFair this past year. The dome of the pavillion was designed to accommodate an intricate and sophisticated audio-visual display. The dome had 37 screen surfaces with batteries of slide projectors that are used with a series of movies. Sometimes as many as 17 separate images were shown at once! A few minutes of this performance left me addled and unappreciative of the story of the various Texas cultures. What a tremendous display of equipment! But what about my knowledge of the cultures of the state of Texas? *My interest* was lost somewhere in the marvel of electronics.

Computer systems could be used in areas needing extensive interpretation; they are already programmed for teaching. Audio-visual programs could be designed with automatic selection of slides, music and explanation. Interpretative programs could be supplied at the push of a button.

Emotional involvement can be encouraged with the new techniques being developed. The details of the geology of the Grand Canyon could be explained and graphically detailed without the use of personnel. However, I personally enjoy the opportunity of having contact with the geologist and the motivating knowledge that *he is interested in talking to me*.

Currently our Department of Recreation and Parks at Texas A&M University is finishing a study conducted this summer at Fort Parker State Historic Site. In this study we have investigated visitor preference for selected interpretive media and the relative effectiveness of the media. Hopefully, we can begin to answer some of the very basic questions that we have raised today. Perhaps automation can produce better results than personal contact, but I would like to see a temporary policy of "moderation with automation" until we have established the relative effectiveness of machines as compared with personnel.

We have discussed many questions and found few solutions. However, the beginning of the solutions could be the knowledge that the problems exist. What is our environment? Where does it begin? Should we be concerned for only a portion of it? How do we interpret it? Who should be responsible for understanding it? How do we encourage the experience of "the occult eloquence of the tongueless scenes"? Can environment be felt, taught, or sensed from a machine?

1. This paper was presented to the American Nature Study Society at Session I of the Annual Meeting of the American Association for the Advancement of Science, Dallas, Texas, December 27, 1968.
2. Wordsworth, William. 1904. *Complete Poetical Works of William Wordsworth*. Houghton-Mifflin Company, Boston, New York. Page 83.
3. Mills, Enos A. 1932. *Romance of Geology*. Houghton-Mifflin Company, Boston and New York. Page VII.
4. Tilden, Freeman. 1967. *Interpreting Our Heritage*. The University of North Carolina Press, Chapel Hill, North Carolina. Page 8.

To make campfires safe, remove all combustible material within three feet of the edge of your fire. And, when you extinguish that fire, remember—drown it, stir the ashes and drown it again.

The size of the average camping party at Public Campsites in New York State has increased to 4.26 persons.

Black bear cubs weighing only about one half pound each are born in mid-winter while their mother is in her winter sleep. Blind and nearly naked at birth, it is nearly 40 days until they open their eyes and about 70 days before they venture out of the den.

A recent U.S. Forest Service interim report of commercial growing stock timber volume in New York State shows an increase of 12 percent since 1950.

Training Interpreters at Mather Training Center

RAYMOND L. NELSON

For more than 1,000 years the "PRAYER OF THE WOODS" has been used in Portuguese forest reservations:

I am the heart of your hearth on cold winter nights,
The friendly shade screening you from summer suns,
And my fruits are refreshing draughts
Quenching your thirst as you journey on.
I am the beam that holds your house,
The board of your table,
The bed on which you lie,
And the timber that builds your boat.
I am the handle of your hoe,
The door of your homestead,
The wood of your cradle,
And the shell of your coffin.
I am the bread of kindness,
And the flower of beauty.
Ye who pass by listen to my prayer:
Harm me not.

That is one of the best examples of effective interpretation I have ever encountered. It motivates through the emotions, not the mind. It has feeling, not facts. It has a powerful message, completely free of the strangling fetters of dull education. The message?

Interrelationships, Interdependencies, Pure Ecology—with Man as a very dependent part of the whole. Simplicity gives it strength—words and phrases are short and beautifully descriptive. And its brevity taps the nail home without marring the surface.

The "Prayer of the Woods" is symbolic of the objectives of Mather Training Center. This is how we want National Park Service interpreters to Communicate. And one year ago a question was seriously asked: "Is Mather providing the training to do this?" The answer was: "No, it is not."

And why not? Perhaps it can best be summed up by simply saying that much of the training lacked the most important ingredient of interpretation itself—motivation.

Further evaluation indicated that all of the ingredients of effective interpretation are identical to the ingredients of effective interpretive training. In short, interpretive training is interpretation. So, out went the old, and in came the new, based entirely on the ingredients of effective interpretation.

When anyone seriously analyzes interpretation, he will inevitably come up with a definition. I am no exception. My definition is simply this: "Interpretation is feeling." Any communicator who causes others to think, has not inter-

preted. He has only informed, and, much to his surprise—maybe even chagrin—he has not even educated. Too many so-called interpreters have failed, and miserably so, because they have decided they were teachers.

For thousands of years true interpreters have realized that nothing can be taught. They know that knowledge is learned, not taught. The finest educators the world has ever known have striven for only this: The ability to Motivate. They have understood that others will learn only if they want to, only if they're "turned on." "Turning on" involves not the mind. It is an emotional thing. So, to set the stage for effective learning, it is *feelings* that are involved, not the mind. And this is the foundation of the new curriculum at Mather Training Center.

When the new courses were structured, the other aspects of interpretation became the guides—the framework—the walls of the various rooms. These walls are *Brevity, Simplicity, Theme or Message, and Relationship or Ecology, (which very much includes man)*.

Instead of one large, rambling course that attempted to "cover the waterfront," five separate courses were developed. These are based on the *why*, the *what*, and the *how* of interpretation. All courses are short, of one or two-week's duration, involving the principles of total immersion—the most effective method of adult education.

The Why of Interpretation

To us, the *why* course is the most important, and aspects of it are found in every interpretive course. We call the *why* course: "Interpretive Management: Goals", but it could have had any of many names. It is preceded by some 15 to 20 hours of required selected reading to acquaint trainees with the challenges that face man today in relation to the environment, including some of the reasons for the present situation. With this as a common background, 16 trainees gather for five days of intensive seminar. Attempts are made—with the trainees doing most of the talking—to determine what is the most effective role of National Park Service interpretation in relation to these challenges facing man. How can our interpretation help man become more aware of his environment? Do our present attempts meet this need? During this period of probing, much dirty laundry is aired, and souls are searched. The trademarks

of sensitivity training are the warp and woof of this experience. Outside discussion leaders take up nearly half of the time; leaders in various fields. Such people as Freeman Tilden, Sigurd Olson, Dr. Raymond Dasmann, Dr. Jack Knetsch, Orin Bullock, Mike Frome, and many others have helped hone our realization to a keener edge. No specific answers are given, or even attempted. This is the *why* course, a time of realization—realization of the stakes—*Survival!*

The What of Interpretation

The *what* course is: "Interpretive Management: Operations." One week in length, this course is attended by 30 interpreters responsible for program management. What constitutes a balanced interpretive program? What are the effective roles of personal services and self-guiding? What part do off-site services play? How do signs, exhibits, walks, talks, publications and all the other mediums of interpretation relate to each other? The foundation that supports an interpretive program is stressed—the understanding of true interpretation. And the wearing forces—the gritty sandpaper of money, man-power, policy, and human nature—all play a part in the selection of materials on which the program is built.

The How of Interpretation

Interpreters have but one tool with which they ply their art of communication. This single tool is the *word*. And they use the word in three different ways: They speak it, they write it, or they imply it. So, the *how* of interpretation is handled by three separate training courses: "Communications: Oral," "Communications: Writing," and "Communications: Visual Aids."

We devote two weeks to the oral course, equivalent to approximately two semesters of college public speaking. Each class of 30 trainees grapple with the basics of effective interpretive speech: organization of talks, choice of words, voice control, pitch, volume, articulation and pronunciation. Both theory and practice are stressed. We firmly believe all training, and especially skills training, must involve participation. And to help build oral strength, we find that videotape, showing each participant how he "comes across" to both the ear and the eye of the audience, is worth more than ten additional instructors.

The *writing* course involves AV script

Paper presented at Association of Interpretive Naturalists Annual Meeting at Gatlinburg, Tennessee on April 4, 1968.

writing, speech writing, information folders, self-guiding signs, newspaper and magazine writing, and exhibit labels. The thematic approach is stressed, and participation, followed by careful, individual evaluation by both peers and instructors adds to the effectiveness of the course. Outside successful writers and editors play a role. Thirty trainees leave after two weeks of hard work that involves them night and day, each one aware of some latent talents that must be developed, and a deep appreciation of interpretive writing.

The last *how* course, "Visual Aids," is not photographic training. It is a course stressing the effective *use* of visual aids, and is not involved with how to *secure* them. In addition to the display and projection of color, black and white, still and motion pictures, it includes the interpretive use of artifacts, and the storage and handling of visual aids. Outside photographers and editors become involved, and trainee participation is again stressed in this one-week course. Trainees end up with a better understanding of that old proverb: "One picture is worth a thousand words."

In addition to the above, another two-week course is offered specifically for park guides. In it the basic principles of effective interpretation are stressed, and oral communication—the spoken word—is the skill upon which we concentrate.

This, very briefly, is the new interpretive training being offered at Mather Training Center—offered not only to our own people, but to others, too. We know how valuable it is to have non-National Park Service interpreters in our classes, and we hope to have an average of 10% from outside the National Park Service in each group of trainees.

Has it been effective? We believe it has. Evaluation of the effectiveness of training is a sticky business at best, but it should be wrestled with. At Mather we wrestle. Organized, constant "feedback" is being analyzed continually, and the results are encouraging.

The rewards? These come in the form of letters from past trainees proudly sending us copies of something they have written and published, of some effective work they have accomplished with the spoken word, the changing of interpretive programs with the words: "It works!" And when interpreters say, orally and in writing, "I want to come to Mather even if I have to take annual leave and pay my own way," then we look at each other and say: "My God! Maybe we have—somehow—interpreted!"

Take a Boy Fishing

PAUL M. KELSEY

Time and again it has been demonstrated that boys who have cultivated an interest in such outdoor activities as camping, hiking or fishing are much less apt to become entangled with the law than are boys who have not had the opportunity to learn the fascinations of the great out-of-doors.

Introducing a youngster to the wonders of a fish pond can be a most satisfying experience. Father and son fishing expeditions offer an opportunity to do something together without the tension and competition of such father-son activities as Little League baseball.

Fishing has no age limits and even the youngest may participate. However, when a youngster is along, the fishing should be geared to his level; he shouldn't accompany you on your trip—you should accompany him on his trip. Bouncing lead for lakies may be your idea of the ultimate in recreation, but for a youngster it could be extremely dull.

A youngster's attention span is short. There should be some sort of activity going on most of the time. This means lots of small fish rather than pitting your wits against the evasive tacklebaster that has so far avoided you. It may sound dull, but to anyone who has seen the thrill on a young face as the lad battles a sunfish or bullhead, the satisfaction is greater than landing a lunker. You will soon find yourself putting your rod aside and carefully maneuvering the boat to points where your fisherman can fish choice spots.

Modern-day spinning equipment can make panfishing a very lively sport. While casting for perch and sunfish, a youngster will learn the principles of handling his tackle safely while actually catching fish.

It is amazing how uncooperative even panfish can be when you are really counting on them. This is the ideal time to show the boy that there is a lot more to fishing than catching fish. By opening his eyes to the many activities of the other inhabitants around the pond, you can show him how to bring home memories that will make it possible to come home empty-handed but refreshed.

The warm water ponds, where panfishing is best, are full of all types of interesting life that can open a youngster's eyes to the many varied wonders of nature. A small school of minnows drifting unconcernedly may not look dramatic, but in the shade of a floating leaf a few feet away lies a motionless little two-

inch pickerel. As the minnows drift by the leaf there is a flash and the predator is on its prey. A little shifting of the minnow and it is started headfirst down the pickerel's throat. The commotion lasts only a moment. The minnows again drift quietly near the pickerel which is resting calmly with the minnow's tail still protruding from its mouth.

Little incidents like this are going on around you all the time as you fish. Teach the boy how to see them, and these little dramas will often become more vivid memories than even the memories of a good day's catch.

Children are insatiably curious, as any parent who has lived with the unending "Why?" knows. While fishing is slack, point out the minute plant and animal forms that can just barely be seen in the water. Explain how these are important food for the minnow which just served as food for the little pickerel. You can point out that the pond is just like the farmer's pasture and will produce only so many pounds of fish. If too many little fish survived, there would not be enough food to go around. Instead of starving, the little fish just wouldn't grow into big fish.

Now that you have carefully explained why it is good conservation to keep all the little panfish rather than throw them back to compete for food, your youngster will land a nine-inch bass. Why does this bigger fish have to be thrown back? The answer to that one is easy compared with some you are sure to get.

For a change of pace and a gratifying experience, take a young boy fishing.



NATURE STUDY

Walt Whitman's Natural Resources

MAXWELL CORYDON WHEAT, JR.

*Having studied the mocking-bird's tones
and the flight of the mountain-hawk
And heard at dawn the unrivall'd one,
the hermit thrush from the swamp-cedars,
Solitary, singing in the West, I strike
up for a New World*

*Starting from Paumanok
Walt Whitman*

These are natural resources — the "delicious gurgles, crackles, screams, weeps,"¹ of the mockingbird, the swoop of the hawk and the "pure deliberate notes"² of the Hermit Thrush. In the "dust-bowl" era of text book conservation we learned about natural resources in terms of land being blown away in the wind out west or mining for coal and ores and harvesting crops and fish — all very important. But in our increasingly crowded and concreted civilization, there is a growing — perhaps desperate — awareness of the natural resources for the spiritual and artistic.

Indeed, all nature "Of earth, rocks, Fifth-month flowers experienced, stars, rain, snow,"³ are used by many poets for much of their imagery and expression.

"Solitary the thrush,
The hermit withdrawn to himself,
avoiding the settlements
Sings by himself a song.

Song of the bleeding throat,
Death's outlet song of life,⁴

Sing on there in the swamp,
O singer bashful and tender, I hear your notes,
I hear your call,
I hear, I come presently, I understand you,
But a moment I linger, for the lustrous
star has detain'd me,
The star my departing comrade
holds and detains me.

O how shall I warble myself for the
dead one there I loved?"⁵

The last line in *When Lilacs Last in the Dooryard Bloom'd* reflects Whitman's urgent search for the words to express the grief experienced for the assassination of Abraham Lincoln. For it is the poet's drive to discover the words, the metaphors, the images to somehow convey that which "I just can't find the words to tell you how I really feel."

What indeed are the words that can express overwhelming tides of joy and grief; or articulate the obscure, the ambiguous, the enigmatical that permeates feelings deeply psychological and spiritual? How does the artist translate subtlety, poignancy and ecstasy?

Haven't you read — or have even heard "live" through television or radio — the astronauts' attempts to express their wonder, "What a beautiful view!"⁶ exclaimed Commander Alan Shepard, America's first man in space. "Can see clear back to a big cloud pattern back across the Cape. Beautiful sight,"⁷ reported Colonel John Glenn. Hardly "language charged with meaning to the utmost possible degree,"⁸ Ezra Pound surely would agree.

I recall the television and radio news commentator Frank McGee saying a few years ago that someday a poet-astronaut should be hoisted off that launching pad in Cape Kennedy. For McGee was asserting that only a poet could find the words to describe the new combinations of view and emotion being experienced by our weight-less globe-circling men. (And now moon-circling). But the poet would probably have to utilize some more earth-orientated experiences of men to effect the fresh imagery and meaning.

T. S. Eliot suggests the formula when he asserts that no emotion can be expressed accurately in art without what he calls an "objective correlative . . . a set of objects, a situation, a chain of events which shall be the formula of that particular emotion; such that, when the external facts, which must terminate in sensory experience, are given, the emotion is immediately evoked."

Nature is a natural resource for the objective correlative. A hermit thrush singing in the white cedar swamps in the pine barren region of Long Island was Whitman's objective correlative for his expression of grief for Lincoln.

"Sing on, sing on you gray-brown bird,
Sing from the swamps, the recesses, pour
your chant from the bushes,
Limitless out of the dusk, out of the cedars
and pines.

Sing on dearest brother, warble your reedy
song
Loud human song, with voice of uttermost
woe."¹⁰

One's mood response to the sounds and sights of nature perhaps depends on the person's psychological orienta-

tion at the time. Yet, it is phenomenal how often the Hermit Thrush song is reported in terms of loneliness, plain-tiveness — "the cool, lonely meditation of the hermit thrush in the depths of the woods"¹¹ says drama critic Brooks Atkinson in *Once Around the Sun*. John Burroughs suggests even a sacredness to the song — "a serene religious beauty as no other sound in nature."¹²

Possibly the circumstances are enhancing to these moods — the seclusion of the haunts — also, the fact that this drabish brown bird with the fox-red tail is hard to see so the effect of its varied, flutelike and yet mellowed sweet tones is to rise from the shady green environs disembodied. It's — and there's a temptation to think this — that nature has its own "set of objects, a situation, a chain of events" . . . its own objective correlative.

It was perfectly appropriate for Whitman to use this objective correlative for the expression of his unspeakable grief. But it also was appropriate for the more subtle feeling of resignation — or more intellectually, for the sense of reconciliation. One is stirred to find meaning and comfort in the delicate, pure tones emanating from the more recessed regions of nature. Did this lead Whitman to a reconciliation — an acceptance of the realities of life, an acknowledgment of the tragic vision?

"And the singer so shy to the rest receiv'd
me,

Come lovely and soothing death,
Undulate round the world, serenely arriv-
ing, arriving,
In the day, in the night, to all, to each,
Sooner or later delicate death."¹³

Because of his known walks and enjoyment of Long Island nature we can feel fairly certain that he was well aware of the Hermit Thrush in the Island's pine barrens and cedar swamps — that perhaps he had actually heard it there. It would fit into the context of his overall interest and awareness of nature. This context explains many of his uses — of the Yellow-crowned Heron which would probably go unnoticed by the casual sojourner in the coastal wetlands. In *Song of Myself* he refers to

"Where the yellow-crown'd heron comes to
the edge of the marsh at night and
feeds upon small crabs."¹⁴

How many of my neighbors have failed to notice the chip notes and calls actually so common on a spring or fall night during the migration. But Whitman writes in his prose *Specimen Days*:

"Did you ever chance to hear the midnight flight of birds passing through the air and darkness overhead, in countless armies, changing their early or late summer habitat? It is something not to be forgotten. A

friend called me up just after 12 last night to mark the peculiar noise of unusually immense flocks migrating north (rather late this year.) In the silence, shadow and delicious odor of the hour, (the natural perfume belonging to the night alone,) I thought it rare music. You could hear the characteristic motion — once or twice 'the rush of mighty wings,' but oftener a velvety rustle, long drawn out — sometimes quite near — with continual calls and chirps, and some songnotes. It all lasted from 12 till after 2. Once in a while the species was plainly distinguishable; I could make out the bobolink, tanager, Wilson's thrush, white-crown'd sparrow, and occasionally from high in the air came the notes of the plover."¹⁵

From Whitman's own admissions, one can perhaps sometimes question his identifications. But it's the observations — of behavior, for example — that count. He "had studied the mocking-bird's tones."

I was suddenly and excitedly aware of this at about one o'clock on a spring morning when a couple of Mocking-birds were singing across some backyards in the suburbs of Baltimore, Maryland where I was visiting relatives. Between the sounds of cardinals, caged canaries and spring peepers, plus a variety of generous chirps and workman-like calls, it occurred to me that these birds seemed to be answering each other across the space of these few backyards. Although there was some overlapping, one would usually hold forth alone — with the other, when it commenced, picking up some of the final notes of its colleague. Then spontaneously there occurred to me a line from *Out of the Cradle Endlessly Rocking* that I had wondered about but never could adequately explain — "musical shuttle."

"Out of the cradle endlessly rocking
Out of the mocking-bird's throat, the
musical shuttle."

It was an uncanny feeling to believe that I was hearing essentially the same kind of performance that Whitman might once have listened to very closely — just as I was that night — and which might have inspired this brief, but accurate description.

I can imagine Whitman identifying with the Mocking-bird — the strength of his empathy is so powerful.

"My two kingfishers still haunt the pond . . . as they fly and sport athwart the water, so close, almost touching its surface. Indeed there seem to be three of us. For nearly an hour I indolently look and join them while they dart and turn and take their airy gambols . . ."¹⁶

This, from *Specimen Days*, shows the tendency of Whitman's empathy towards a single entity — a metamorphosis of human emotion and natural resource, one into the other. In the grief and reconciliation for the Lincoln tragedy,

the Hermit Thrush is singing man's woe. And the man, Whitman, is in a sense the Hermit Thrush — *warble* being the key word for this deep and still necessarily ambiguous translation.

"O how shall I warble myself for the
dead one there I loved?"¹⁷

Today, one excitedly senses the primitiveness of this juxtapositioning of the natural and the human — for we are in the age when the arts of the primitive are being, in effect, transferred from the museums of natural history to the museums of art (witness the much heralded exhibit of ancient African, Indian and Pacific works in the New York Metropolitan of Art Oceania exhibit.)

Here the public can experience — and the artist in the tradition of Picasso, Braque, Modigliani, Miro (he painted the *Head of a Woman* with arms uplifted like a crab's claws) can imitate — the sophistication and force of the earlier art, especially those pieces reflecting the ancient's knowing combination of the natural resource with the human. For example, the Mayan sculpture combining the forms of a human baby and a jaguar. This is charged with meaning.

I would suggest that today's artist looking ahead to the 21st Century ponder Whitman and what he means about a "New World." Is it one of a reaffirmation of each man — feeling to the full his humanity and freedom and creativity and also his naturalness with all the terror and ecstasy this can involve? For a painting or a sculpture charged with meaning I could suggest that the artist juxtapose in a single form a free-flying predator and the features of man — and doing this by using as his 'natural resource' these words of Walt Whitman:

"The spotted hawk swoops by and accuses me, he complains of my gab and my loitering.

I too am not a bit tamed, I too am untranslatable,

I sound my barbaric yawp over the roofs of the world."¹⁸

1. Song of Myself, Section 33
2. When Lilacs Last in the Dooryard Bloom'd, Section 15
3. Starting from Paumanok, Section 1
4. When Lilacs Last in the Dooryard Bloom'd, Section 4
5. When Lilacs Last in the Dooryard Bloom'd, Section 9
6. Shelton, William Roy, American Space Exploration. Little, Brown & Co., Boston, Mass. 1967. Page 149
7. Ibid., Page 200
8. Pound, Ezra, ABC of Reading, New Directions Books, New York, 1960. Page 36
9. Rosenthal, M. L. The Modern Poet, Oxford University Press, New York, 1960. Page 81

10. When Lilacs Last in the Dooryard Bloom'd, Section 13
11. Atkinson, Brooks. Once Around the Sun, Harcourt, Brace & Co., New York, 1951. Page 179
12. Pearson, T. Gilbert, editor. Birds of America, Garden City Publishing Co., Garden City, N. Y., 1936. Part III, Page 235
13. When Lilacs Last in the Dooryard Bloom'd, Section 14
14. Song of Myself, Section 33
15. Whitman, Walt. The Poetry and Prose of Walt Whitman, Louis Untermeyer, editor, Simon and Schuster, New York, 1949. Page 673
16. Ibid., Page 705
17. When Lilacs Last in the Dooryard Bloom'd, Section 10
18. Song of Myself, Section 52

Note: All poetic quotes of Whitman taken from The Poetry and Prose of Walt Whitman edited by Louis Untermeyer and published by Simon and Schuster, New York, 1949.

Welcome New Members

T. L. Aydlott, Elizabeth City, N. J.
Mrs. Carolyn Benne, Sioux City, Iowa
Dr. A. L. Borgatti, Salem, Mass.
Valoria Bovee, Clayton, N. Y.
Cincinnati Nature Center, Milford, Ohio
Elizabeth Darrah, Little York, N. Y.
Mary DeFrancisco, Oak Forest, Ill.
Maureen Fitchette, LaFargeville, N. Y.
James Fravil, Raynesford, Mont.
Ellen Grossman, Bronx, N. Y.
R. S. Hale Camping Reservation,
Westwood, Mass.
Gwendolyn Hanna, Winston-Salem,
North Carolina
James S. Herzman, Pitman, N. J.
Thomas Keefe, Buffalo, N. Y.
Jessie Kitching, New York, N. Y.
Donald Lambert, Westfield, Mass.
Herbert Lang & Co., Bern, Switzerland
Dr. Malcolm McDonald, Brigham City,
Utah
Tim McDonnell, Syracuse, N. Y.
Meryl Meloy, North Weymouth, Mass.
National Park Service, Richmond, Va.
Gwendolyn Pearson, Lewiston, N. Y.
Mrs. John H. Probasco, Coronado, Calif.
Laura Purnell, Queens, N. Y.
Edward Rayburn, Scio, N. Y.
Roger E. Reinke, Santa Ana, Calif.
Recreation Department, Glastonbury,
Connecticut
Carolyn Schutz, Ithaca, N. Y.
Barbara Seaver, Glenfield, N. Y.
Jonathan H. Smith, Watertown, N. Y.
Charles Srnka, Ithaca, N. Y.
Joanne Srnka, Ithaca, N. Y.
Debby Stevens, Dryden, N. Y.
Dr. Arthur D. Strickland, Statesboro, Ga.
University of Wisconsin Library,
Milwaukee, Wisconsin
Utley Jr. High Library, Flint, Mich.
Miss Alison Werme, Oxford, Mass.
Judy Winter, Brooklyn, N.Y.

PUFFBALL

(Lycoperdon pyriforme)

This is the Pear-shaped Puffball, a common species growing out of rotting wood in damp, shady northern forests. Puffballs are fungi, in the Class Basidiomycetes—the same class to which most conspicuous mushrooms belong. They are edible when not too ripe—before the spores turn color. One must be careful not to confuse them with mushrooms which are just emerging, and which may be poisonous. Puffballs usually occur in large groups together, on a thoroughly rotted log. Some species grow as large as basketballs—the Giant Puffball has been found up to 5 feet high and 4 feet wide. They are all saprophytes, meaning they live on dead remains of other organisms. When ripe, the spores are “puffed” out of a pore or slit in the top.

Photo by

Richard Albright

Provided by the Audio-Visual Committee

American Nature Study Society

No. 31

(May be removed for display)



Photo by Richard Albright



Photo by Richard Albright

BEAR'S HEAD FUNGUS

(Heridium (Hydnum) caput-ursi)

This fungus, in the Class Basidiomycetes, is found in cool, damp woods, usually growing on dead hardwood trees (but occasionally on live ones). It is edible, as is its close relative, the Coral Hydnum. A single clump of the branches and teeth may weigh over a pound.

Late summer and early fall are excellent times to explore woodlands for fungi of all sorts. They are especially abundant after a period of damp weather. The parts that you see are the fruiting structures, producing large quantities of spores, the reproductive cells of the plant. Beneath the surface of the object to which they are attached is a vast network of living threads which are actively digesting away the wood or other organic matter on which the fungus feeds.

Fungi are extremely important in the process of re-cycling essential elements in nature. Without them organic matter would not decay, the earth would be littered with dead remains and waste products, and nitrogen, carbon, and other elements would be in short supply.

Photo by
Richard Albright

Provided by the Audio-Visual Committee
American Nature Study Society

No. 32

(May be removed for display)

Nature Study TIPS

Seeing Nature in Action

BOB AND SONIA VOGL

As part of broadening a child's understanding of the world around him, the concept of the changing of the earth's surface is included in his studies. An important aspect of developing this concept should include a trip to a site where the earth's surface is undergoing natural changes.

Regardless of where you live, some area illustrating the earth's changing surface should be close enough so that your class can travel to the site and spend a day, or part of a day, exploring evidences of this change. Use the services of the enlarging corps of interpretive naturalists, park administrators, personnel of the state geological society, and others interested in natural areas to help locate a place of study. Ask them for material which you can read to build your own understanding of the natural processes affecting the earth's surface.

One process which we have studied extensively with children has been the effects of flowing water on the earth's surface. By reading about the geologic history of the site of exploration (in our case, a forest preserve in Cook County, Illinois), then condensing the information to a level appropriate to the upper elementary classes with whom we were working, we were able to lead children on a two hour exploration hike of the drainage of the forest preserve.

Our hike started at the highest spot in the preserve. At this point, we observed the lay of the land and hypothesized the route of travel of a drop of runoff rain water. We then determined the slope of the land, surveying it with the children's "own built-in measuring devices." The children paced off ten feet and placed one child at either end as markers. By having a third child squat down at the lower position until his line of sight was even with the ground on which the higher child was standing, then use his hand-span to measure the distance from his eyes to the ground, the number of inches of drop in land elevation in ten feet was determined. By multiplying the change by ten to determine the drop in one hundred feet, then changing the inches to feet, the percentage of slope was determined. This conveys the concept of changes in land elevation, which allows the children to compare various slopes. (See Illustration 1.)



(No. 40 in the series)

Illustration 1

We then continued down the hillside, following what seemed to be the path which the water would follow, always moving from higher to lower elevations, noting the changes in the slope of the land, and estimating the effects which this would have on the speed at which the water would flow. On a steeper slope, children enjoy the increased speed at which they find themselves traveling.

Eventually, since we were in an area illustrating the common dendritic pattern of drainage, other channels of drainage joined the one which we were following. Such places offer good opportunities to discuss terms and expressions such as "converge" and "confluence." As secondary drainage patterns converged into major patterns, the children soon recognized that they were walking along the side of (or right in) a stream bed. This point in the exploration presents a good opportunity for a follow-up activity. Children invariably have difficulty recognizing what to call this drainage channel: a stream, a creek, a river — what do these different terms signify, and which one of them applies to this waterway? (See Illustration 2.)

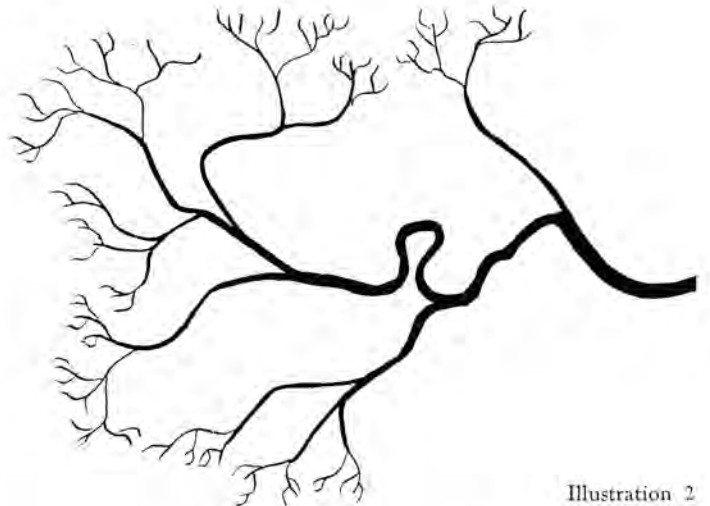


Illustration 2

Children enjoyed picking up pieces of rocks, noting their sizes, feeling the comparative weights of two different rocks of the same size, cracking some open with rock hammers to examine their structure and the component minerals more carefully, testing with dilute hydrochloric acid to discover whether limestone is present, and recording the relationship of speed of stream flow and the sizes of the stones present. In regard to this last point, our particular exploration started in a steep, V-shaped valley, where the stones were generally fist sized. Farther downstream, where the valley broadened and flattened out into a U-shape, the stones could easily be held between two fingers. The children were then able to recognize the comparative speeds of flow of water in a steep or flat valley.

When collecting is permitted, as it was in our location, a class collection rather than individual ones is advisable, es-

pecially if the area is one of heavy use. Various kinds of rocks, as well as rocks of different sizes from different locations in the stream, make interesting collections. However, if pocket guides to rocks and minerals (such as the Zim book) are brought along, the children may find answers to many of their questions while on the trip.

We then continued downstream, looking for former beds of the stream, as well as theorizing possible future routes. If possible, we tried to identify the largest tree growing on a former bed, measure its circumference—again using body measurements—then determine its diameter. If the tree was one whose average rate of growth was known at the time, and the class was especially eager mathematically, we arrived at a rough estimate of its age on the spot. If not, later, back at class, the children could hunt to find a table of average rates of tree growth, generally given in terms of inches in diameter per year, and by estimating the age of the tree, determine the minimum number of years ago that the stream stopped flowing through that particular channel.

When other secondary channels flowing into the main stream were discovered, the children enjoyed traveling up them to discover their points of origin, as well as note the changes in their structure as they worked back up the hillside. The high rate of speed at which the children generally made the return trip down the hillsides demonstrated vividly for them the speed which water may attain when flowing down a bare hillside.

This understanding then was related to the soil borings which were taken on eroded channels and compared to those taken on grassy areas. Farther downstream, we looked for changes in land elevation. As the area surrounding the stream became lower and the stream speed decreased, we looked for smaller rocks in the stream bed. By using leading questions, the children were guided into making three observations, and stated the principle regarding the relationships of slope, stream speed, and rock sizes in a stream bed.

We then continued our way downstream, making observations of the stream bed, the surrounding land, and general plant characteristics. Occasionally, we stopped for a few

moments, and allowed the children to make observations on anything which may have caught their interest. It is surprising how frequently a child may notice something of significance which even a well trained teacher may miss.

Finally, the stream story ended in a pond. At this point additional observations were made regarding slope of land, stream speed, and rock particle sizes. Fine sand, silt, and even clay were found just before the stream fed into the basin. An abundance of plants which grow with "their feet in the water" were found. We noted the differences between these plants and any which may have been found in the more swiftly flowing water, clinging tenaciously to the rocks in the stream bed. Which are more highly developed? Why? Would quiet water give upright plants with roots a better chance to establish themselves than flowing water? We also noted which plants are firmer—those growing in the water or those growing beside the water. Why? Would water lend support to the plants in it, while those standing alone may need woody tissue to support themselves? The children tried crushing a piece of cattail. What was the sound which was heard? As the students dissected it, they noticed that it was the sound of air cells being broken, and the air leaving them.

This particular exploration may end here, but many questions raised by the hike will be possible sources of follow-up back at school. The concept of watershed, the tracing of the drainage of one's particular area, and the value of natural areas for study by students are a number of avenues worth pursuing with children.

Although the lesson started with the concept of the changing of the earth's surface, many other concepts became an integral part of the experience. Changes in land elevation and the effect on the speed of water flow, and finding the age of former stream beds by identifying trees and determining their rate of growth are some of the concepts which grew out of the direct experience. This might well be the major advantage of "seeing nature in action," i. e., the natural world is complex and many factors affect it. Should not children be exposed to the complexity of our world in addition to comprehending facts and concepts in isolation?

Are Changes Needed?

The educational scheme must help children to meet the changes being forced upon people resulting from the rapid technological advances in many factors of living. Mrs. Martha Mullens of Borger, Texas presents some viewpoints in the following:

"Most teachers have traditionally emphasized the product rather than the process of science. Probably, this has been done because teachers have not had a good understanding of the philosophical bases and processes of science. Too often, science is presented on the elementary, secondary and college levels in completely authoritarian fashion. Students are expected to memorize information as it is presented whether or not of doubtful validity. Teachers and textbook writers strive to make their presentations in so logical a fashion that debate is difficult. Laboratory work consists of verification exercises designed to "prove" that statements of teacher and text are true. The grading system re-

wards the unprotesting students and penalizes the original thinkers. In consequence, students come to feel secure only in the presence of dogma; they are ill at ease when faced with the uncertain and the unknown. This approach is used in other areas besides science with the same results, but I do not know so much about other fields except through the ineptness of my students to do original thinking.

"Strict authoritarianism is the enemy of skepticism and therefore of progress. Individuals trained from early childhood to accept blindly and unquestioningly rarely develop the habit of skepticism. Their minds are so firmly imprinted with fixed ideas that: 1) alternative ideas do not occur to them; and 2) if alternatives are pointed out, objective evaluation is difficult. Skepticism is an essential ingredient in a scientist or any thinking and productive member of a changing society.

"A teacher's role is, or should be, to insure that learning is efficient and effective so students can discover their edu-

cational potential. To accomplish this the modern trends in secondary school sciences are for students to have an opportunity for increased laboratory work and application of inquiry methods of learning. They are directed to better understanding of how scientists work and how knowledge is obtained. More attention is being given to the processes of science. New apparatus and facilities promote investigations of natural phenomena, while the teacher becomes more a director of research rather than a dispenser of knowledge. These are modern curriculum changes in science with those of other areas employing the same techniques.

"The impact of modern curriculum changes will be felt for many years. It is doubtful whether as stable a pattern of science offerings as that characteristic of the first half of the twentieth century will again be achieved. Science of the future will need to be dynamic and changeable in order to meet the demands of a rapidly accelerating scientific age.

CONTRIBUTION OF C. J. MAYNARD TO NATURE STUDY

RALPH W. DEXTER

*Historian, American Nature Study Society
Kent State University, Kent, Ohio*

Charles J. Maynard was well known both as a professional zoologist and a leader in the nature study movement. He published research on mollusks and birds particularly, but in educational circles he was noted for his promotion of nature study in the public schools.

He organized a serial publication entitled *Nature Study* to be issued monthly beginning with February of 1899. Only a single volume was produced consisting of 12 issues, the last two being combined numbers. These have been bound into a single volume entitled "Nature Study in Schools." This volume contains 70 pages of text, 140 figures, and 10 color plates. Many of the articles were written by Maynard himself, but some contributions were made by Austin Clark, M. Eva Warren, Lillian A. Young, Harry H. Whall, William D. Mac Pherson, John O. Godfrey, and Harriet B. Spooner. Occasional articles or reports were written by students, and some student drawings were reproduced.

Many of the feature articles were devoted to birds, a subject in which Maynard was particularly interested. Other subjects of note were insects, marine invertebrates, trees, and geology. One feature was a periodical account of Experimental Lessons. These were reports by teachers and students who described classroom exercises in *Nature Study*. Every issue also contained book reviews, nature notes, and news.

Maynard organized his serial publication because "There has been up to the present time, no periodical which has been devoted exclusively to this objective," and with the "rapidly growing interest in nature study, and the necessity of its introduction as a fundamental branch of education in our schools, a want has been felt by teachers and others interested in educational matters for such a guide to the practical teaching of nature study." Maynard prepared a series of articles on systematic zoology as one of the features, but he did not get beyond the protozoans, sponges, and coelenterates before suspending publication.

The periodical sold at 10 cents a copy or \$1 for a year's subscription. Special club rates were also available. Apparently Maynard had his own printing press according to the title page of the bound volume.

Occasionally nature verses were published, some of which had been composed by Maynard. A few ads were published, particularly for Maynard's Zoological Synoptical School Collection which was offered for sale to schools and colleges. The periodical also served as a forum for its subscribers. They were invited to submit questions to the editor and, whenever possible, answers would be sent to them or published in the pages of *Nature Study*.

In one of his comments published in *Nature Study* (page 84), Maynard pointed out that "It is gratifying to note that most, if not all, of our State Normal Schools regard nature study as a fundamental branch of education. This will have a vital influence upon the introduction of nature study into schools throughout the State where it is not now taught, for the pupils who graduate from the Normal Schools in the future will feel the necessity of teaching nature study."

Maynard had a nature laboratory in his home, 447 Crafts Street, W. Newton, Massachusetts, where he conducted nature classes, especially for bird study. His home was a center for naturalists in the Boston area. In addition to his publication and home laboratory, Maynard organized the Maynard Chapter of the Newton Natural History Society with 16 charter members. Maynard served as president and was the guiding light of the society. Some of the reports of the society's activities were published in *Nature Study*. The main accomplishment of the society was the establishment of a museum from which specimens were made available to public school teachers and students in Newton as well as to the members of the society. Many of the specimens had been accumulated by Maynard over a period of some 20 years of collecting.

Maynard was an all-round naturalist who had a wide knowledge of the whole scope of natural history. His most important contributions to science were in the fields of malacology and ornithology. He published many papers on mollusks. One of his notable contributions to ornithology was a volume on the *Eggs of North American Birds*, published in 1890. In the field of nature education his major contribution was the publication of *Nature Study* and promoting its activities.

Teaching or Telling

Most students are used to the telling method of education, and think that education consists of a teacher standing and handing out information, and this is all the pupil need retain—little bits of information. Probably typical of this is the phenomenon of the teachers' notes passing from his paper by his voice to the student, with the student causing the same to appear in his notebook. From there it passes during exams to a paper without the information having passed through the active minds of either the teller or the listener.

Too often what is told during the telling or lecture process is a regurgitated mass of material in a textbook for which the student is responsible. Textbooks have their place, but much fine education went on long before there was printing, and when textbooks were unknown. Of course for the teacher the textbook is an excellent outline of a course on which he can lecture. The textbook is a safe harbor to stay in when the route is not very clear, and there is fear that outside the harbor may be too many shallow and unknown fields.

The college degree is often a rudderless ship to pilot through the maze of questions which a student might raise. It is a ship which will need a great amount of calking with reading at every opportunity to deepen the shoals of knowledge in his field of teaching. Personal investigation into biological phenomenon will enrich rapidly. Sometimes, and that too often, an instructor lectures biology year after year without ever personally performing a biological experiment, or making an inquiry by personally investigating a biological phenomenon which comes under his observation. After several years of complete slavery to the printed page, teachers lose skill at seeing much biological significance in the world about them. Where will you fit into this picture?

New York State waters have produced some big trout over the years. State records for these popular fish are as follows: Brook trout, 8 lbs. 8 oz. (1908); Brown trout, 21 lbs. 5 oz. (1954); Rainbow trout, 21 lbs. (1946); Lake trout, 31 lbs. (1922).

Hiking shoes with leather soles have no place on wilderness trails. Rubber or composition soles prevent falls and possible serious injury.

Attendance at Palisades Interstate Park has increased more than five million since 1945.

GOOD READING

A Naturalist In Trinidad, by C. Brooke Worth. Illustrated by Don R. Eckelberry. 291 pp. Lippencott. \$7.95

The author is a medical parasitologist, who for numerous years has been associated with the Trinidad Regional Virus Laboratory which is supported by the Rockefeller Foundation. His appointment as a field naturalist on an arbovirus team entailed the studying of the habits of the wildlife of Trinidad and the obtaining of blood samples from them. He says, "any field naturalist who confines himself to the assigned aspects of an arbovirology program is not only a fool but also a detriment to the lab because of his serendipity. I have neglected to remark that the natural history of not a single virus is fully known. Consequently many of the things I observed and enjoyed as side lines in Trinidad could have been important to some one else." It is the fully absorbing sidelines which were not tied up with the formal program that he writes about in the book.

The first four chapters are concerned with the work of the virology laboratory and the establishment of the field station on "Bush-Bush Island." Each of the remaining twenty chapters is a fascinating essay on some aspect of the natural history of the island which excited his interest.

He shares with you his sense of wonder, delight, admiration and excitement in the Trinidadian scene. As a result, one is made to feel the real Trinidad which, as he points out, "existed even before Columbus first sighted the Trinity Hills on the southern coast, when the only indigenous primates were the howler and cebus monkeys and a few savage hominids. Though not much of this remains, the fragments are there to delight perceptive eyes and souls." This is nature writing at its best.

The beautiful illustrations by Don Eckelberry add to the pleasure in the book and the enjoyment of the text.

— E. Curry

The Bug Club Book by Gladys Conklin. Holiday House, New York, \$2.95

This book might annoy some readers by the repeated switching from the term insect to bug and back to insect. This would be parallel to hearing a person who professed to know about water birds to call them all ducks. However, some good activities are suggested, and the book would prove useful if one can excuse this scientific inaccuracy.

The Lovely and The Wild, by Louise de Kirline Lawrence. McGraw Hill Book Co., 330 West 42nd St., New York, N. Y. 10036. 228 pp. \$6.95. 1968

This book is beautifully written by Mrs. Lawrence after 30 years of study of the feeding habits, flight, nesting and migration habits of the birds of the black spruce forests of Ontario's Pimisi Bay Region.

* * *

Garden of God's

Perhaps no city park in America has become as well known as the 830 acre Garden of the Gods in Colorado Springs. Paul W. Nesbit has titled a beautifully illustrated booklet *Garden of God's* as a way of giving credit to the Creator whose "garden" it most truly is.

Mr. Nesbit is well known to many ANSS members and particularly to those who were led by him on the field trip during the Denver meeting several years ago. His skill in "reading the landscape" showed him well qualified to see the ruggedness and beauty of the Garden of the Gods on whose south border he lives. Through the years he has seen more and more of that unique park, and, unlike many who think they have seen it in an hour's drive through it, he tells of the many things they have missed in their haste.

Those who took such a hasty trip Nesbit likens to those who when driving past a theater would think they had seen the show. One gains little of the real show offered by the Garden of the Gods in such hasty visits, and Nesbit's *Garden of God's* makes an effort through text and black and white and colored photographs to bring out the real story. This 48 page pamphlet (\$2.00) and two inch color transparencies and many others are available from Paul W. Nesbit, 711 Columbus Road, Colorado Springs, Colo. 80904.

* * *

Watching For The Wind—The seen and unseen influences on local weather, by James G. Edinger, Anchor Books, Doubleday & Co., Garden City, N. Y. \$1.25

To be in tune with Nature—or even to perpetrate a temporary dissonance, which nature will in time resolve—we should be sensitive to that grand collection of events which we call climate. Here we perch on a planet hung between the sun and interstellar space, heated and cooled just enough to make our lives possible. Great!

How many young people these days know the satisfaction of facing into a strong breeze until the sound is exactly the same in each ear, the pressure precisely the same on both cheeks? How many retract the steps of primitive man, walking upwind to follow their noses to the source of an intriguing smell? How many run from bed to window of a morning to read the signs which tell the weather? Few!

Dr. Edinger's book can bring new awareness to teenagers and their elders who are ready for aeolian adventure. He has been a youngster and, more notably, has not forgotten long hours outdoors after school and on holidays when there were still unbeculverted brooks in which to play. Now as an imaginative research scientist and communicative teacher he explains in simple language how we too can vibrate to the strum of the air around us in our daily microclimates. Through this understanding, we come to see our little niche as a burble in the planet's boiling atmosphere. ANSS members should get this book into every school library, give a few away for Christmas, and keep one at home to lend to alert young people and to older people too, perhaps to the old man on the bench in front of that sunny wall which is setting up a convection current.

— J. Brainerd

"Of all aspects of the natural world, weather is outstanding in its beauty, its majesty, its terrors, and its continual direct effect on us all."

— Lehr, Burdett and Zim in "Weather"

Teaching and Social Responsibility

Since starting to teach school in 1922, I have observed many kinds of teachers. Most lived with a fine moral conscience and a rather narrow code of ethics which bordered on the Puritanical. In numerous contacts with a variety of these teachers, there seemed an absence among many of a social conscience which would stress attention to community political and social realities and ideas which might be more or less disturbing. There was found a dearth of attention to the problems humans have in the community, and a preoccupation with ideal situations presented on the printed page of texts.

It seemed that the educational scheme required safety to be established for the good of the order by leaving pressing social, political and economic problems alone. School administrators did not care to have teachers rock the boat of security; so the path of mediocrity was

Continued on page 12

NEWS and NOTES

New York Rural School Teachers

Would the New York Rural School Teachers who used the Cornell Rural School Leaflets published under the editorship of Dr. E. Laurence Palmer (Cornell U. 1919-1952) be so kind as to contact Mr. Joseph Bellisario, Hunt Club Lane, Chester Springs, Pa. 19425? Mr. Bellisario is evaluating the impact Dr. Palmer's publications may have had on New York rural school teachers.

Cornell Science Leaflet Ceases Publication

Word has been received from Dr. Verne Rockcastle, former president of ANSS and long-time editor of the *Cornell Science Leaflet*, that the current volume will be the last. These Leaflets began around 1900, when Cornell began to issue the *Cornell Rural School Leaflets*. For many years they were written and edited by Dr. E. Lawrence Palmer, and later by Dr. Eva L. Gordon, both active in ANSS.

ANSS members who receive the *Cornell Science Leaflet* as a part of their membership subscription will continue to receive them for the remainder of the current membership year. Arrangements for the future will be made at the annual meetings in December.

Red River Saved

"Dams are proposed and dams are built. Some that are proposed are not built, but seldom has an authorized dam been cancelled or relocated because of ecological and aesthetic reasons, because of floristic and faunal values. An exception is the proposed Red River dam in eastern Kentucky. After much controversy, it now appears that the Red River Gorge will be at least partly saved from inundation because of its geological and biological uniqueness."

These words, written by Dr. Mary E. Wharton, Professor of Biology at Georgetown, Kentucky, appear in a special report on the Red River Dam Controversy, published in the AAAS Bulletin of June 1969. ANSS members will remember that the Board of Directors of the Society gave special encouragement and took action to help Dr. Wharton in her battle to save the Red River dam valley from inundation. It appears that our efforts have paid off. There is a new era of ecological and environmental awareness beginning in our public agencies.

Ruth Scott Appointed to Pennsylvania Commission

Mrs. Ruth Scott, the President-Elect of the American Nature Study Society, has been appointed by Governor Raymond P. Shafer to the Air Pollution Commission of the Commonwealth of Pennsylvania. Ruth sets us all a good example by being "involved" where the action is.

Paul Fluck Leaves Washington Crossing Park

Dr. Paul H. Fluck, for over seventeen years director of the Nature Education Center at Washington Crossing State Park in Washington Crossing, Pennsylvania, has resigned that position and gone to assume a post of Director-Naturalist at the James Rand Memorial Park in Freeport, Grand Bahama Island. The James Rand Park is the first interpretive nature center in the Bahamas, and Dr. Fluck hopes to provide an educational program which will create interest in conservation throughout the West Indies.

During Dr. Fluck's work at the Washington Crossing Park, he carried out weekly bird banding demonstrations which were viewed by tens of thousands of children and adults who came from many miles in all kinds of weather. We wish Dr. Fluck good luck in his new venture.

House Conservation Subcommittee Plans Broad-Gauge Ecological Investigation

The House Conservation Subcommittee plans to conduct a broad-gauge investigation of the country's ecological heritage of land, water, and air, and their relationship with living things, according to Chairman Henry S. Reuss.

Among the matters which the Subcommittee will investigate in the near future are:

- Why do some federal agencies support the dredging of wetlands, such as the Corps of Engineers and the Department of Agriculture, while other agencies endeavor to preserve wetlands?
- What is the status of federal programs for expanding migratory wildlife refuges?
- Does the Federal Highway Construction Program adversely effect parks, historical sites, recreation areas, and the quality of water and air?
- What is the Federal government doing to reduce air pollution by automobiles, buses, airplanes, steam power

plants and municipal trash incineration, as well as from its own installations?

- What is the Federal government doing to improve the reclamation and reuse of water to increase the nation's usable water supply?
- What are the current practices of the Corps of Engineers in dumping dredged materials from harbors and river channels into the Great Lakes and other bodies of water?
- Does the Corps of Engineers obtain reimbursement for the excess costs the Corps incurs in removing the wastes which the industries dump into navigable waterways?
- What is the status of the Federal government's program for cleaning up the Potomac River?
- To what extent are phosphates in detergents responsible for overfertilization (eutrophication) of lakes and streams throughout the country?
- To what extent will the rivers and harbors of the country become degraded from waste heat emitted by some 250 giant steam electric plants which are expected to be built in the next two decades?
- What are the dangers of the increasing use of pesticides, herbicides and fungicides for wildlife, fish, domestic animals and people?

The Conservation and Natural Resources Subcommittee is part of the Full Committee on Government Operations which is chaired by Honorable William L. Dawson (D-Ill.). Other members of the Subcommittee are Congressmen Jim Wright (D-Tex.); Floyd V. Hicks (D-Wash.); John E. Moss (D-Calif.); Guy Vander Jagt (R-Mich.); Gilbert Gude (R-Md.); and Paul N. McCloskey, Jr. (R-Calif.).

New York State Interpretive Programs

The New York State Conservation Department has set up for the second year a series of campsite programs interpreting the natural history of each area. These were begun in 1968, and were very popular. Eight public campsites in the State, mainly in the Adirondack area, had an average attendance of over two hundred at each of these illustrated lectures. The record attendance at a single lecture was seven hundred last year.

Charles E. Mohr, president of ANSS, 1946, is now executive director of the Delaware Nature Education Center where he administers a unique arrangement in conservation education programs. In only two years time Mr. Mohr has developed his program in cooperation with the Wilmington Dela-

ware schools to encourage teachers to make nature education an integral part of their teaching.

The DNEC uses facilities provided by the State of Delaware in the Brandywine Creek State Park. ANSS members are urged when touring in the vicinity to drop in to see the facilities and to get a sense of the fine work Mr. Mohr is doing.

Sacramento

Governor Ronald Reagan has signed into law, a bill by Assemblyman John Stull (R-Leucadia) creating underwater marine parks in California.

The plan has been hailed by conservationist organizations as landmark legislation to aid in preserving outstanding aquatic areas in California for future generations.

Stull said the responsibility of locating marine preserves would be assigned to the California Park Commission and areas would be developed based on their scenic, ecological, geological and natural scientific values.

Stull said certain areas would be preserved in their natural state while other areas would be developed for recreational use.

The three areas now under consideration for development as underwater parks are Penasquitos Lagoon-Submarine Canyon sector along the San Diego coastline, Julia Pfeiffer Burns State Park off the Monterey coast and Salt Point north of San Francisco in Marin County.

Memo

- A new Forest Service Conservation program called "OUTDOOR PATTERNS FOR PEOPLE" was unveiled at the new Massanutten Information Station, George Washington National Forest, Virginia. John A. Baker, Assistant Secretary of Agriculture, said the project "is to provide additional opportunities for a variety of outdoor experiences to groups of people who might not otherwise encounter them, by providing information interpretation and leadership that will lead to more enjoyment and understanding of the natural environment." It is hoped schools, colleges and universities in the area will take an active part in developing program ideas. The Massanutten Station, close to Washington, D. C. will serve as a model for similar installations in other areas.

- In Washington, D. C., the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, sponsored a symposium to explore the provocative topic "MAN AND NATURE IN THE CITY." Bureau Director John S. Gottschalk and scientists and university professors dealt with questions such as: What are the

antagonisms between the urban environment and wildlife? How important is the presence of wildlife to the mental health and well-being of city inhabitants? How much are city dwellers interested in the environment? Answers to these questions should help to lay a philosophical foundation for the kind of program the Bureau of Sport Fisheries and Wildlife will be initiating in the future.

An ad hoc COMMITTEE ON THE ENVIRONMENT has been formed by a bipartisan group of 90 Senators and Representatives to aid Congress in evaluating the impact of federal programs and policies on natural resources and the environment. Senator Clifford P. Hansen of Wyoming was one of the founders of the new committee which is to be headed by Richard L. Ottinger of New York. The committee will be aided in its efforts by a special advisory board made up of 97 leading scientists and businessmen. The board will review and comment on environmental issues before Congress.

—Mid Continent MEMO: BOR.
Feb. 1, 1969

Conservation Notes

The Monterey Peninsula Herald is not the only sheet to present the conservation picture. I recently received a "Fresno Bee" dated February 23, 1969, and found a veritable gold mine of material. I learned that the so-called "pasture mosquito" — *Aedes nigromaculis* — now is known to be resistant to every known larvicide, including some which have not yet been marketed. This little mosquito, while relatively harmless, except for the nuisance of its sting, can drive laborers from their work and drastically reduce milk production in cattle. Progressively heavier doses of DDT and other insecticides have only built up more resistant strains of mosquitoes. Other mosquitoes are found in the San Joaquin Valley, some potential disease carriers such as *Culex tarsalis*, which would spread encephalitis among humans unless chemical controls were used. The *Anopheles freeborni*, which may carry malaria, is also present, waiting for someone to come along with a malaria-laden bloodstream. Nobody knows for sure whether or not these mosquitoes will develop immunities, or super-resistances, to control agents such as the chlorinated hydrocarbons of the DDT family and others. From the same paper we read the warning of Dr. H. T. Reynolds of the University of California at Riverside: "The almost complete reliance on pesticides to control pink bollworm in the Imperial Valley has virtually wiped out insect parasites and pred-

tors of crop pests where chemicals have been applied." These predators, insect parasites, would normally take care of some 80% of the cotton leaf perforators, an insect which can be many times more devastating to cotton than the pink bollworm which the pesticide was aimed at! It is significant that 15 years ago the cotton leaf perforator developed a resistance to chlorinated hydrocarbon compounds, or could until about the middle of last season, when some indication of tolerance or immunity began to be noticed. An article in the *Bee* by Wayne Cox tells of the increasing difficulty in controlling the destructive lygus bug, which also is a pest of the cotton fields. This bug has been showing a resistance to both chlorinated hydrocarbons and the organo-phosphates. Stop-gap controls have been devised by planting alfalfa between rows, or adjacent to cotton plantings — the lygus bug having a preference for alfalfa — but then the alfalfa has to be treated to kill the lygus, and this in turn kills beneficial insects, so we're back at the beginning of our troubled cycle again.

—E. B. Hurlbert, Conservation Chairman
The Sanderling, April, 1969, Bulletin of
Monterey Peninsula Audubon Society

Teaching and Social Responsibility

Continued from page 10

chosen. This was a middle of the road path that was a dead end which led to little understanding of the nature of the community.

Occasionally a bold, moral and conscientious teacher, seeing community problems, tried to bring the problem into perspective for his students. However, cries from those who were dragging their feet in the solution of these problems, that the schools were dabbling in politics, caused superintendents and principals to issue directives to offending teachers that they desist. Rocking the boat disturbed the serenity of city hall or similar entrenched bureaucracy. In like manner, industries which may have been involved in creating unfavorable impacts on the human environment by air or water pollution by industrial byproducts, insecticides or other negative practices are quick to object to schools involving these in classroom situations.

The recent reawakening of interest by school people in the environment in which even Congress has taken an interest, is a healthy sign. Much good will come from this if educators become knowledgeable of everyday environmental problems rather than vague generalized academic considerations of the environment. There are challenges ahead for all teachers. Will they be accepted?

S.B.M.

Nature Study

The journal of the American Nature Study Society

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I Walked in God's Garden

by Neil B. Stevens

I walked in God's garden the other day,
The flutters and whispers there seemed to say
Walk quietly, reverently as you pass.

The way was all lined with Violets and Rue.
A creek bubbled merrily through and through
Lending music, a background of tinkling sound.

Small shapes flit and scurry, and suddenly pause,
Eyes peer and ears listen intently because
Someone passes, with soft, easy tread.

I slowed to pay heed to the wonders surrounding
The Gardener here shows his great love abounding
And endless, for those who would see.

I walked in God's garden the other day,
His presence there in the glade seemed to say,
"Stop—look at me and know."