EVERGLADES NATIONAL PARK

ROYAL PALM and LONG PINE KEY

a NESA GUIDE

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ENVIRONMENTAL EDUCATION SPECIALIST

"If people don't learn to learn as children, there is little chance that they will ever learn to learn at all."

Anon

"The goal of education is not to increase knowledge but to create possibilities for a child to invent and discover, to create men and women who are capable of doing new things."

Piaget

(Drawings by Denise Cooley and Amanda Muller)
(Maps by Amanda Muller)

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INTRODUCTION

Since 1971, schools in Dade, Broward, Monroe, and Collier Counties have been a part of the National Environmental Study Area (NESA) Program at Everglades National Park. Over 10,000 teachers and students come to the park yearly to participate in NESA.

Teacher commitment makes the program stronger than ever. By continuing this commitment , teachers truly do create possibilities for "invention and discovery," which will lead to adults who will "do new things."

This guide is meant to serve as a resource for helping that commitment. It too is intended to create possibilities for invention and discovery. Teachers who use it will hopefully be motivated to try new things with their students.

Students who first participated in this venture will soon be graduating from high school. They will be voting, entering the labor force, continuing their education, making social and environmental decisions. Will their participation years ago in a new environmental education program make a difference for the future? It is difficult to predict or measure.

But intangible forces like witnessing an everglades wilderness for a day has a way of burning an image in a young mind which just may result in a tangible action years from now. The faith in such a possibility keeps teachers, school systems, and the Park Service committed to a strong interaction between young students, the natural environment, the man-made environment, and ideas about how they affect one another.

If you are a veteran teacher in the program, we look forward to another meaningful year. If you are a new teacher, welcome - exciting prospects await you. In conjunction with your workshop, this guide should help you feel confident and willing to share the everglades environment with your students. If you have suggestions for improvement, let us know. We want your imput.

Michael D. Watson
Environmental Education Specialist
September, 1977

OVERVIEW OF NESA

Just what is a National Environmental Study Area (NESA)? At the beginning of the 1970's, a growing demand for Environmental Education (EE) programs surfaced in our nations schools. To help meet this need, the National Park Service helped develop EE materials called the National Environmental Education Development (NEED). Physical sites were designated for using the curriculum materials and philosophy of NEED. These sites are known as NESA'S.

Everglades National Park has several NESA'S. Two of them are Royal Palm and Long Pine Key, areas only a few miles apart in the southern section of the park. They are designated as NESA'S because of their excellent representation of everglades wildlife and plants, and the forces which govern them. In addition these areas allow easy comparsion and contrast with urban environments where most students live. The fact that most urban and agricultural areas in Southern Florida were once part of the everglades wilderness is an important relationship which can be explored by students as they travel from their homes to these NESA areas.

By agreeing to be in the NESA program at Everglades National Park, a teacher makes a commitment: he or she will attend a park-sponsored workshop at least once every two years. The Park Service in turn makes a commitment: it will do all it can to make the field trip meaningful by providing coordination, resource materials like this guide, and a naturalist to assist the group. Teachers must prepare their students before coming to the park, and conduct follow-up activities on their own. They must also help conduct the field trip while in the park.

Because a half million students attend schools in immediate areas around the park, some controlling factors had to be employed for the NESA Program. So, only sixth-grade teachers from Dade County can attend the NESA workshops at Royal Palm / Long Pine Key. A similar restriction is placed on the Shark Valley NESA in the northern section of the park - only fourth-grade teachers are permitted there. This gives all students a chance to be in the park program if their fourth and sixth-grade teachers will simply commit themselves to a workshop. Other teachers can bring their students to the NESA areas, but they do so completely on their own.

A NESA, then, is a physical site where environmental education programs take place. This guide explores the two NESA's at the Homestead entrance to the park, Royal Palm and Long Pine Key. The guide is primarily intended for sixth-grade teachers, but anyone who benefits from it is welcome to use it.

The NESA Program has an element of risk, of course. Complete control of a class is impossible in an outdoor classroom. An alligator is exciting to students and they just may feel like shouting their exuberance. A teacher has to be flexible - there is just no way to predict what will happen on a field trip. You might worry that you do not know the name of every animal

and plant. So what? Neither does anyone else, including park rangers. It is so much more important to make observations and share them than it is to know a name. Names are nice to know, but they are not necessary to appreciate what happens before your eyes.

Plan to take some risk, then, as you participate in NESA. Your students will perhaps view you in a new manner, and it is likely to be a positive one.

ENVIRONMENTAL EDUCATION AND THE EVERGLADES

Everglades National Park is the last remnant of a unique wilderness which once extended from Lake Okeechobee to Florida Bay. Probably no other resource area in the United States is more suited for environmental education experiences than the everglades. The environmental movement of the late 60's and early 70's practically launched itself by focusing on the jet port controversy. The proposal to create an enormous aviation complex in the heart of the everglades only a few miles from the park boundary stirred the consciousness of millions. The public outcry which resulted halted further development of the jet port and catalyzed public examination of countless other environmental issues, many of which still continue today.

In earlier times, the everglades had similar impact. At the turn of the century, Congress and the country could no longer ignore or condone the mass slaughter of wading birds in the everglades. The practice of attaching bird feathers to women's hats and clothing practically exterminated several bird species due to hunting pressures. The federal government eventually passed protective laws for the birds and created Everglades National Park in 1947. Today's Rare and Endangered Species Act is a direct result of this early environmental issue. Everglades National Park now harbors more rare and endangered animal species than any other area of the country.

Likewise, numerous other environmental issues of grave importance have occurred or are now occurring in the everglades. And all of them somehow involve the adverse effects that man causes when his actions change a delicate natural area. A decade ago, the pressures of reduced fresh water supply and illegal poaching nearly pushed the American alligator and crocodile to extinction. Channilization of Southern Florida for flood control has depressed the fresh water table several feet below historical levels and has consequently reduced everglades wildlife by as much as 95% compared to thirty years ago. The rapid urban development of Miami and Dade County is approaching the park boundary from several directions and will influence the character of the park immensely in the next twenty-five years, unless wise management is practiced. With these issues and others at stake, the everglades serves as an ideal laboratory for environmental education programs.

Keeping these ideas in mind, how do they mesh with the goals of environmental education? If the widely accepted goals of EE as outlined by William Stapp at the University of Michigan are accepted, they mesh perfectly. Stapp's goals of environmental education are to develop in individuals:

(a) An awareness, understanding, and concern for the environment with its associated problems, and:
(b) The knowledge, skill, motivation, and commitment to work towards solutions to these current and projected problems.

To achieve these two goals, Stapp says that the following structure and processes are needed to help individuals and groups:

(a) Obtain an understanding that human's are inseparable parts of an environmental system and that whatever they do alters their surroundings.
(b) Obtain a basic knowledge of how environmental problems can be solved, and recognize the responsibility of individuals and each segment of society to cooperate in their solution.
(c) And develop thinking and action skills for the prevention and correction of environmental abuses.

These are worthy goals. And there is no way that a teacher can expect to achieve them in one short trip to a park. But if they are constantly in mind and an effort is made to focus on them throughout the school year, then the NESA experience can play a vital role in an overall program.

If it is not yet obvious then it should be stated now that environmental education is not a subject: it is a process, a way of thinking. This process crosses many disciplines, involves people and the way they interact with various environments, and is problem-focused.

But how does one use all of these great ideas in a teaching situation? One way which came out of the development of the Park Service's EE Program is to use an underlying framework known as the SPICE Strands, described in the following section.

THE SPICE STRANDS

There are many productive ways in which to make use of the environment as an educational tool. One approach is strictly classification: everything has a name and a specific way of interacting with the universe. Scientists describing unique objects use this taxonomical method as a principal operational procedure in their investigations. This method, however, has a drawback for the teacher with a limited scientific background, who may not know the multitude of specific names and conditions with which to describe the environment scientifically.

Another way of approaching environmental study is through an investigative, completely open-ended method. The teacher guides students in their attempts to discover what is present in their surroundings and to place their discoveries into some kind of perspective. The advantage of this method is it provides the kind of study that activates sensory awareness and enables the student to develop creative problem-solving techniques. The difficulty rests with the development of research skills. Research skills are another tool of the scientific investigator, and although they would provide a good background in problem-solving for the student, it takes time to develop them.

The SPICE Strand approach draws upon the advantages of both of these methods while eliminating the disadvantages. It incorporates both the specific and the investigative approaches into a third approach with which both student and teacher can feel more comfortable. It requires identification and classification, but on a modified basis. It also requires open-ended investigation leading to problem-solving. Yet all of its requirements can be taught by a teacher and fulfilled by a student who has little of the rigorous scientific training demanded by the other approaches.

The Strand approach makes necessary a reorganization of thinking into unfamiliar patterns, which may at first be difficult. The valuable, unifying characteristic of the Strand approach, however, makes whatever initial effort may be necessary unquestionably worthwhile.

The Strand approach uses five broad, universal concepts as a way of drawing the environment under a total, integrated "umbrella". They are known as the SPICE Strands because the first letter of each concept makes up one of the letters of the word SPICE. These concepts or Strands are:

SIMILARITIES AND VARIETY: Many likenesses and differences occur among living and nonliving things. A variety of functions, sizes, and structures exist in plants and stars, rocks and animals, processes and people. Yet there are sufficient similarities to permit their classification into orderly patterns. These classifications increase one's understanding of this world.

PATTERNS: Organizational patterns are kinds of structures that may be found in rock formations as well as in social groups of

people and animals. Functional patterns include traffic movements and classroom schedules. Spatial arrangements are patterns that often please us. Such patterns occur both in nature and in artistic design.

INTERACTION AND INTERDEPENDENCE: Nothing exists in isolation. Each individual is constantly interacting with living and nonliving things: his family, his belongings, his friends, his world. These people and things also depend on the individual in order to function properly. The process is continuous (as part of the life cycle) even after death, for dead life-forms nourish the living.

CONTINUITY AND CHANGE: Both living and nonliving things are constantly changing--whether among galaxies and planets or within body cells and body systems. Some things remain the same in spite of change. Matter and energy may change in form, but they can never be created or destroyed.

EVOLUTION AND ADPTATION: Over centuries and centuries , living and nonliving things alter and develop in the process called evolution. Probably the greatest number of changes over the longest periods of time come about in order to enable an organism to adapt to the environment. Hereditary factors then preserve the continuing elements. The characteristics that enable the organism to adapt best (for example, the best food finder) are apt to be the traits passed on from generation to generation, thus ensuring survival of the species.

Similarities and variety means the simple recognition of each organic and inorganic thing. A classification is derived by noting similar characteristics in distinct objects. Once a classification is made, an object's Patterns can be identified. What is the nature of its design? Of its function (what does it do)? Of its organization? The functional pattern leads directly to Interaction and Interdependence. How does the specific variety interact with air, water, earth, (other) populations? As it Continues to Change, it is constantly undergoing Evolution and Adaptation, according to how it fits into the Pattern of existence. If a substance does not adapt in its present form, it Evolves, through Continuity and Change, into a new Variety, with a new Pattern of Interaction and Interdependence.

Using these large concepts, or Strands, teachers who have had no particular scientific or ecological training can instruct or guide students toward open-ended, purposeful activities. The scope of the Strands can be focused on the specific at almost any level of detail or sophistication. Within the Strands there is a synthesis of environmental relationships. This synthesis makes the Strands applicable to the wide range of disciplines within the school program, yet the Strands provide a tool for study that can be specifically related to the most widely differing ecological situations. For example, Patterns can be applied to the arrangements of beach fauna (biology), mountain ecology (natural history), or people living in an urban area (social sciences).

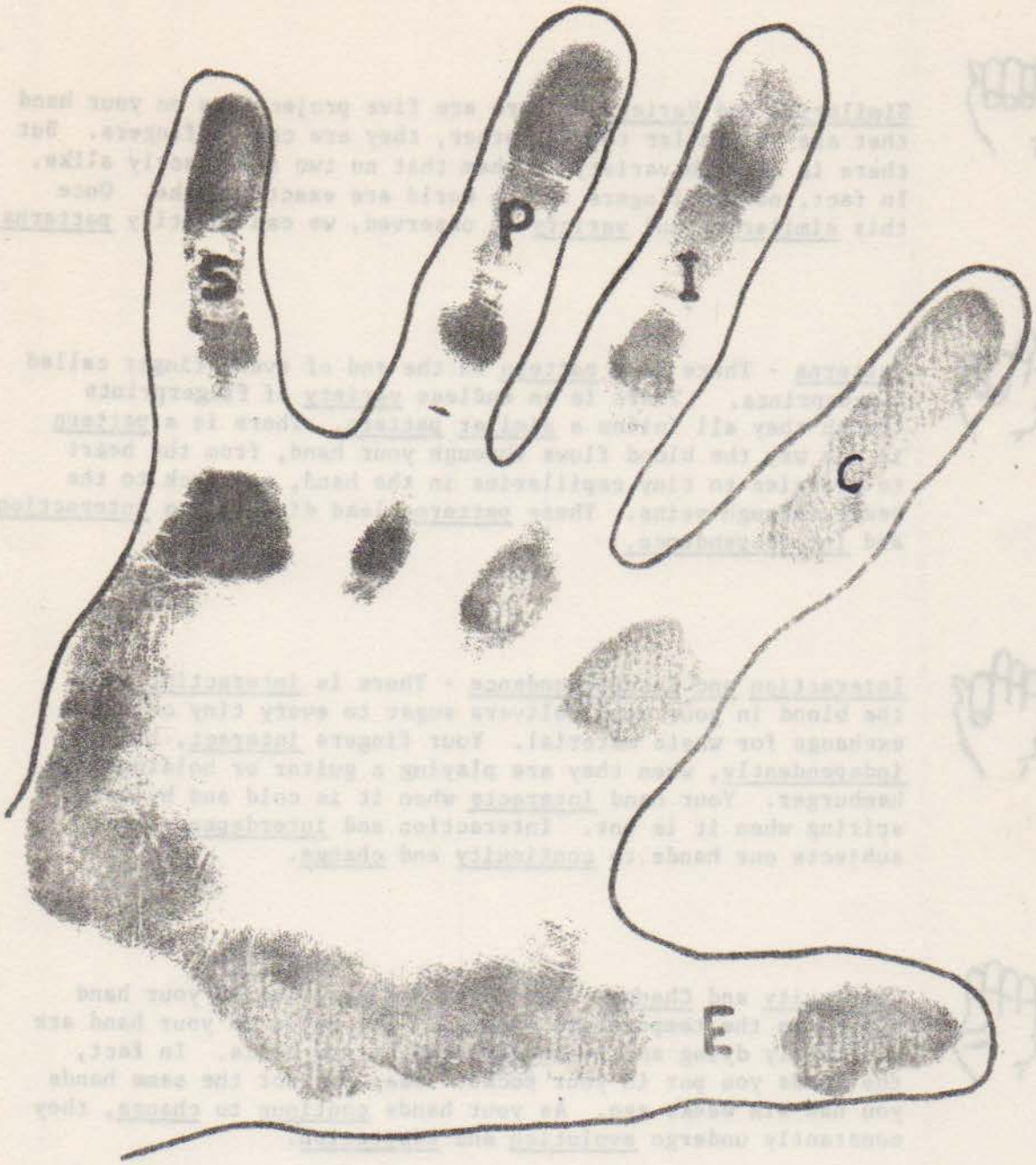
Teachers should think of themselves as catalysts--permitting the students to develop the answers themselves whenever possible, which will result in a greater retention of the basic understandings. Once the basic Strand understandings are established with the students, they will continue to seek new examples in new environments, leading to a keen awareness of man's ineractions with the world.

The Strands can be disastrously misused. The danger inherent with any methodology is that the methodology can be used as a thing in itself, for its own sake. There have been unfortunate examples where the Strands were taught as a subject, instead of used to integrate discipline or to understand processes. Other times, students were told to memorize and parrot them like multiplication tables. Avoid these dangers. The Strands are a framework. You may never have to mention them at all. Like the girders in a building, they are hidden from view, but keep everything from collapsing.

Perhaps the best thing about the Strands is that students can use them as a reference point to interrelate the things they know, see, and feel, in their own lives with all their future experience and education. It is fairly clear that the only way people achieve higher levels of understanding is by understanding new ideas in terms of old ones. Otherwise, people are reduced to learning information and facts without new awareness.

There is one thing about the Strands never to be forgotten: the Strands exist simultaneously in all things at all times. You will find that while using the Strands, one irresistably leads into the others. Often one becomes indistinguishable from another. The Strands always reinforce one another.

This is as it should be. In a world of process, it is inevitable that an honest framework is as dynamic as the world it views.



One easy way to remember the SPICE Strand framework is to examine the Strands Pocket Model. There are five fingers on your pocket model, one for each Strand:

Similarity and Variety - There are five projections on your hand that are so similar to each other, they are called fingers. But there is so much variety in them that no two are exactly alike. In fact, no two fingers in the world are exactly alike. Once this similarity and variety is observed, we can identify patterns.

Patterns - There is a pattern on the end of every finger called fingerprints. There is an endless variety of fingerprints though they all follow a similar pattern. There is a pattern in the way the blood flows through your hand, from the heart to arteries to tiny capillaries in the hand, and back to the heart through veins. These patterns lead directly to interaction and interdependence.

Interaction and Interdependence - There is interaction when the blood in your hand delivers sugar to every tiny cell in exchange for waste material. Your fingers interact, though independently, when they are playing a guitar or holding a hamburger. Your hand interacts when it is cold and by perspiring when it is hot. Interaction and interdependence subjects our hands to continuity and change.

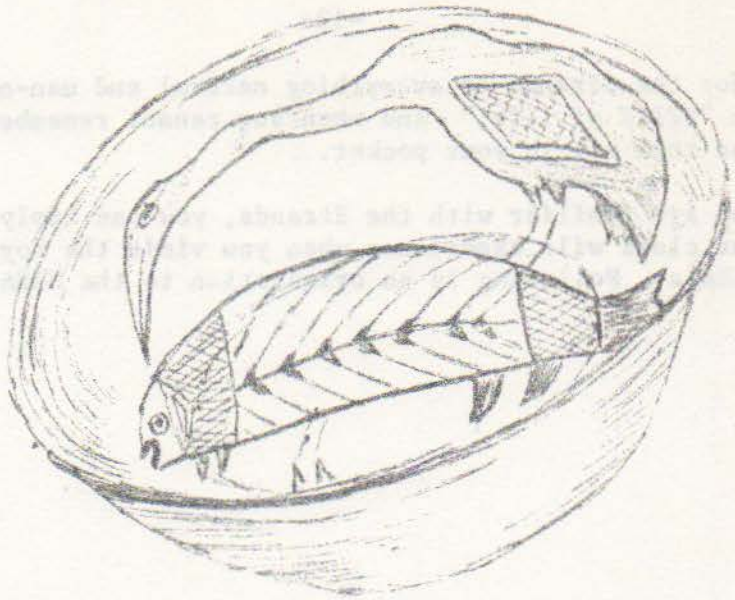
Continuity and Change - The veins and arteries in your hand change as the temperature changes. The cells in your hand are constantly dying and being replaced by new cells. In fact, the hands you put in your pocket today are not the same hands you had six weeks ago. As your hands continue to change, they constantly undergo evolution and adaptation.

Evolution and Adaptation - Over long periods of time, the human hand has adapted to new situations. The opposable thumb allows us to do marvelous things with our hands that most other animals cannot. Evolution is change over long periods of time. The hands of man a million years from today may look and function much different than these of today.

So, watch for the Strands in everything natural and man-made, and think of them as the "SPICE of life." And when you cannot remember what they are, you can find them all in your pocket.

Now that you are familiar with the Strands, you can apply them to everything you and your class will experience when you visit the Royal Palm and Long Pine Key NESA's. Following is an orientation to the NESA Trails in terms of SPICE.

ROYAL PALM NESA



Royal Palm is one of the most popular areas in Everglades National Park. It is not only popular for school groups like yours, but also for the general public. Over a million people a year visit the park, and a great portion of them visit Royal Palm.

Two trails at Royal Palm offer a diversity of experience. The elevated boardwalk of Anhinga Trail, named after a bird of the same name, winds through a wide water drainage known as Taylor Slough. Close views of alligators, turtles, fish, wading birds, snakes, and other wildlife are experienced on this trail.

The Gumbo Limbo Trail winds through a small portion of Royal Palm Hammock, one of the largest hammocks (subtropical tree island) in Everglades National Park. It affords a first-hand look at tropical hammock vegetation. The constrast between the adjoining areas of Anhinga and Gumbo Limbo Trails is remarkable and explains one reason why so many people find the area inviting.

Interest in the Royal Palm area dates back into the nineteenth century. Indians lived periodically in the Royal Palm Hammock in the 1800's. The first mention of the magnificant stand of native royal palm trees occurred in 1847 by a surveyor. In 1893, two botanists examined the area and marvelled at the royal palms. The photographs they took of the palms began the first movement to create a park there.

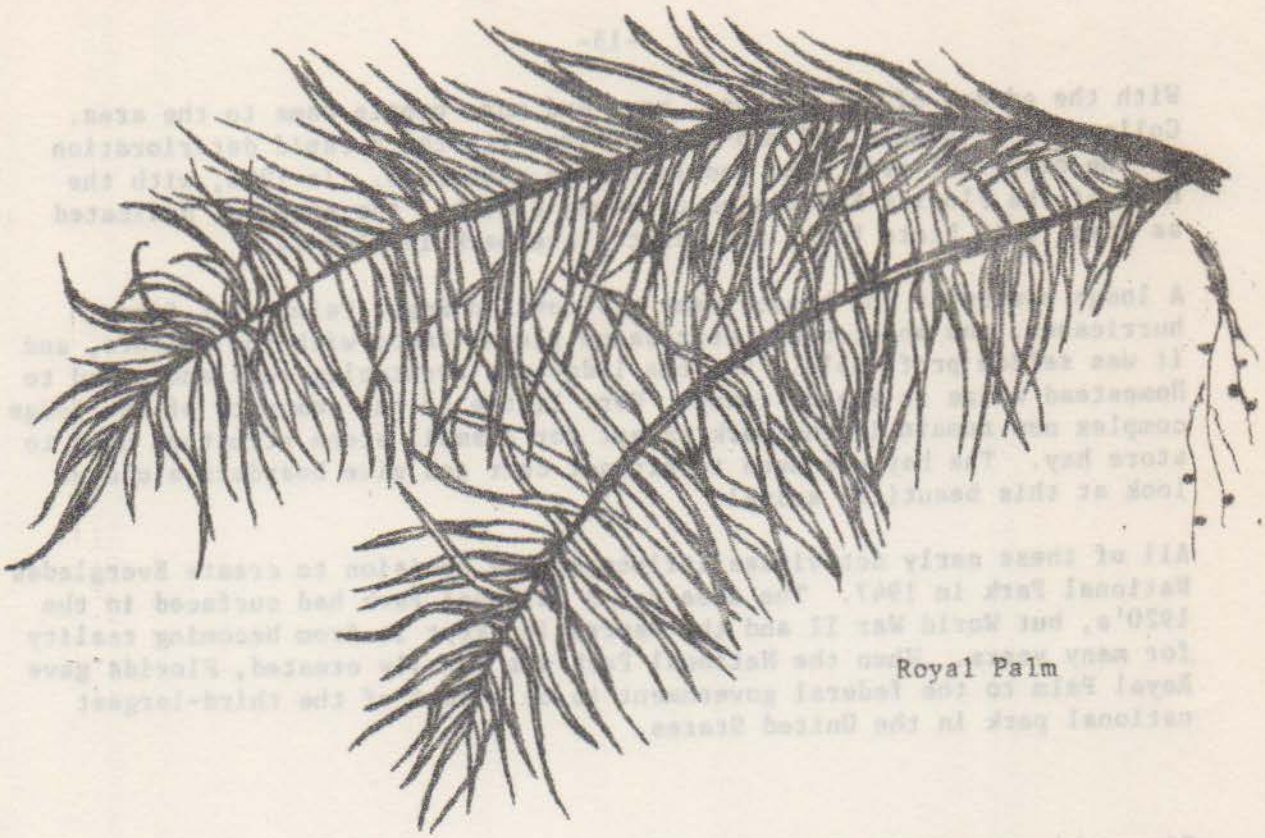
A highway was built to Flamingo around 1914 connecting Coconut Drive in Miami with Flamingo. The highway went through the Royal Palm Hammock and became known as the Ingraham Highway, named after the vice-president of the Florida East Coast Railroad which once owned part of Royal Palm and contributed it when the area became a park. Portions of today's modern road to Flamingo follows the same route as the original Ingraham Highway.

With the advent of the highway, more and more people came to the area. Collecting of plants and man-caused fires started a rapid deterioration of the beautiful area, and people became concerned. In 1916, with the help of the Florida Federation of Women's Clubs, the area was dedicated as Royal Palm State Park, the first state park in Florida.

A lodge was built and housed many visitors to Royal Palm. But fires, hurricanes, and an economic depression played havoc with the venture, and it was seldom profitable. So, the lodge was eventually sold and moved to Homestead where it stands today. Very little of the remnants of the lodge complex now remain in the park except for a small stone structure used to store hay. The hay was used to attract deer and give boarders a closer look at this beautiful animal.

All of these early activities influenced the decision to create Everglades National Park in 1947. The idea for a National Park had surfaced in the 1920's, but World War II and the Depression kept it from becoming reality for many years. When the National Park was finally created, Florida gave Royal Palm to the federal government to be a part of the third-largest national park in the United States.

Given this short historical sketch it is time to look closer at the two trails and what to expect there. Before doing so, however, ask yourself if the SPICE Strands apply to the history of Royal Palm. Think a moment before reading on.



Royal Palm

Certainly the SPICE Strands apply to the history of Royal Palm as well as to the natural history. Royal Palm Hammock was and is similar to other hammocks in Everglades National Park. But the variety of its magnificant Royal Palm Trees gave it fame, and singled it out as a treasure to preserve.

Patterns of palm trees on photos appealed to many who never actually visited there, and helped influence their minds as to what should be done with such a spectacular area.

The interaction of the area with people who visited there caused a rapid deterioration of the area. Man's influence was certainly felt. Man and nature became interdependent in the course of the history of Royal Palm. Only wise management and protection can allow people to visit a delicate area like Royal Palm. In turn, people gain great joy and insight about their environment by seeing a truly unique biological system.

Hurricanes, fire, and man continually change Royal Palm. However, minus the trails and buildings, the area maintains a continuity which makes it much the same today as it was a century ago.

The status of Royal Palm has evolved from no protection to maximum protection in the last 100 years. It has adapted itself and been altered by many new situations, both natural and man-caused.

The SPICE Strands are extremely versatile. They are the underlying framework in all we say and do. Following is a description of both trails at Royal Palm with thoughts about the Strands, and questions to ponder.

Anhinga Trail

During the winter, a multitude of wildlife can be closely observed from Anhinga Trail. Activity along this trail displays a perfect example of a food web in action. Keep the idea of a food web in mind as you travel along the trail - Ecologist Barry Commoner says that "everything is connected to everything else." See if you can support this statement as you explore Anhinga Trail. Which of the five Strands does Commoner's statement refer to?

Starting at the Visitor Center, let us take a typical winter-time (October - April) walk around Anhinga Trail. The numbers refer to points on the accompanying map.

(1) Look out across the pond for a few minutes and observe. Anything interesting? You bet.

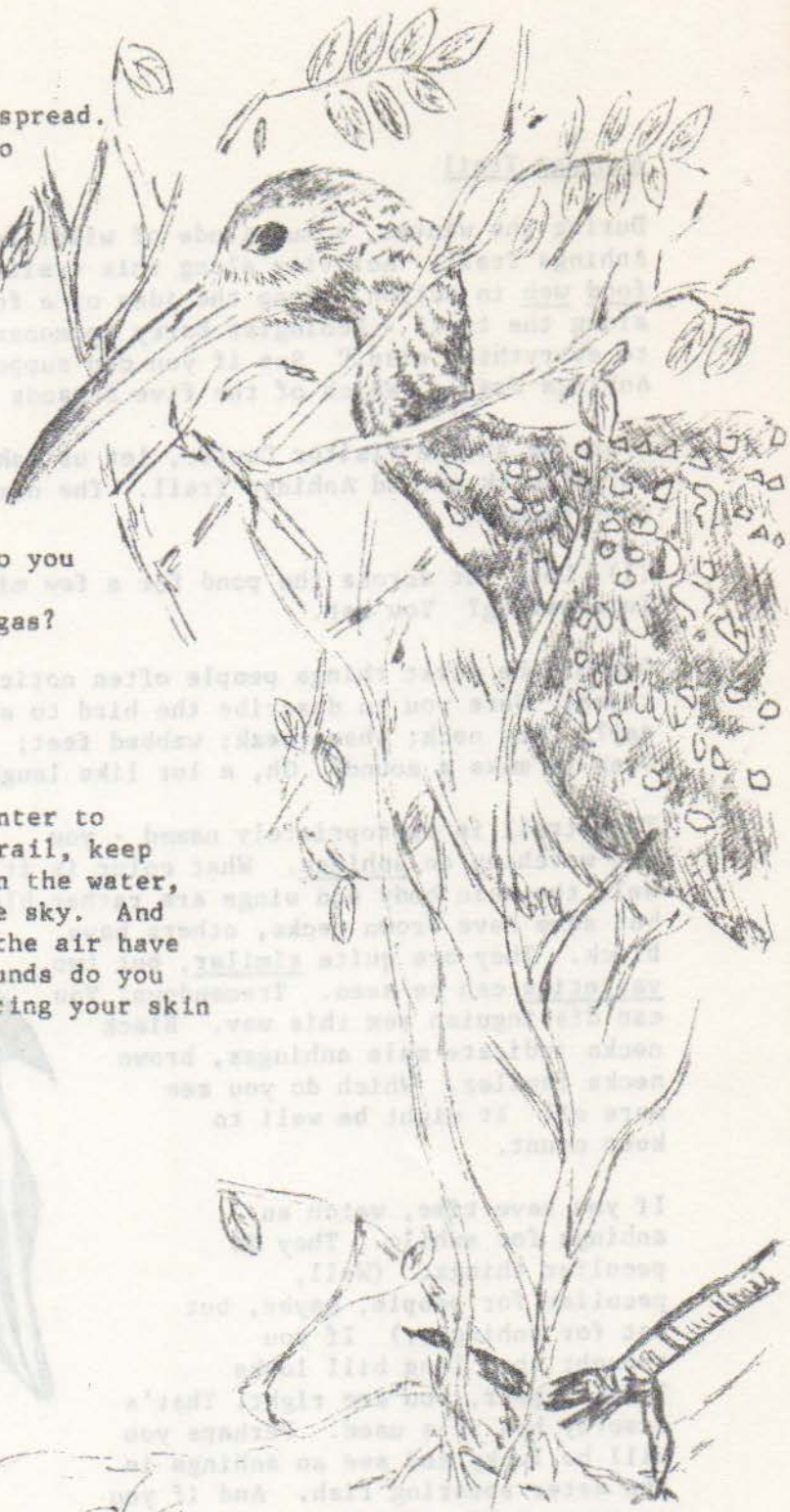
One of the first things people often notice here is a strange bird in the trees. Were you to describe the bird to a blind person, what whould you say? Long neck; sharp beak; webbed feet; fan-tail with long feathers. Does it make a sound? Oh, a lot like laughter, you think. Good observations!

This trail is appropriately named - you are watching an anhinga. What color is it? Well the main body and wings are rather black, but some have brown necks, others have black. They are quite similar, but two varieties can be seen. Tremendous! You can distinguish sex this way. Black necks indicate male anhingas, brown necks females. Which do you see more of? It might be well to keep count.

Anhinga

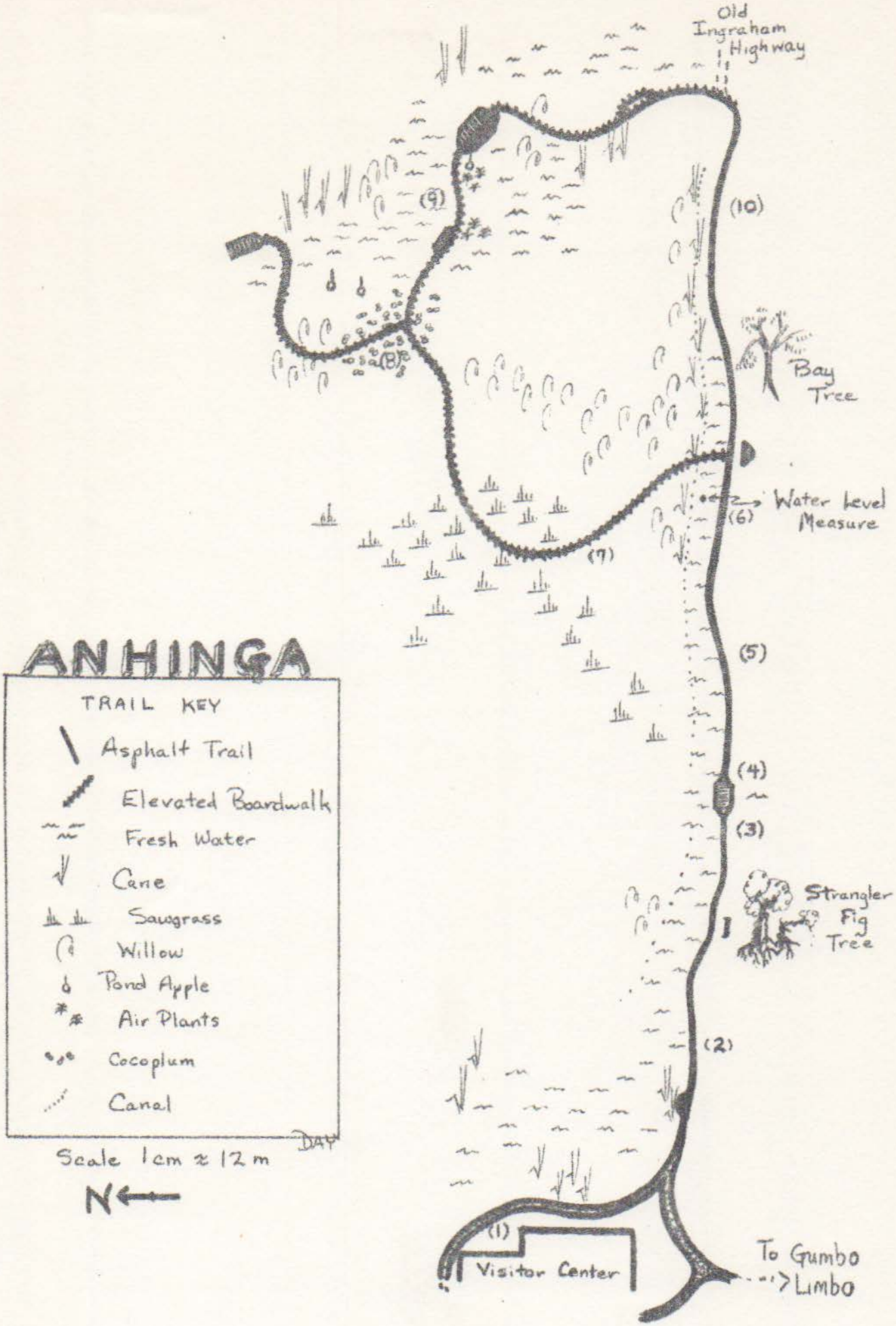
If you have time, watch an anhinga for awhile. They do peculiar things. (Well, peculiar for people, maybe, but not for anhingas.) If you thought that long bill looks like a spear, you are right. That's exactly how it's used. Perhaps you will be lucky and see an anhinga in the water spearing fish. And if you see one swallow the fish whole, your day will be complete already. Which way did it swallow the fish, incidentally: head-first or tail-first? Is there continuity in the way anhingas swallow fish?

Watch for an anhinga with its wings spread. Why is it doing this? People used to think that anhingas have no oil glands and will drown if they stay in the water without drying their wings. But we know now this is not the case - they have oil glands. However, they do get cold in the water. What better way is there to warm up after a swim then to use your wings like solar panels? Do you ever do this after a day at the beach? Do you display any similar patterns or behavior? Why do you suppose some people call them water turkeys or darters rather than anhingas?



(2) As you walk from the Visitor Center to the huge strangler fig tree up the trail, keep your eyes open. Lots can be found in the water, but do not neglect the bushes and the sky. And use more than just your eyes. Does the air have a particular smell? What unusual sounds do you hear? Have you felt a mosquito piercing your skin yet?

Limpkin


Old Ingraham Highway
(9)
(10)
(8)
Bay Tree
Water Level Measure
(6)
(7)
(5)
(4)
(3)
Strangler Fig Tree
(2)
(1)
Visitor Center
To Gumbo Limbo
ANHINGA
TRAIL KEY
Asphalt Trail
Elevated Boardwalk
Fresh Water
Cane
Sawgrass
Willow
Pond Apple
Air Plants
Cocoplum
Canal
DAY
Scale 1cm ≈ 12 m
N

Alligator Ancestor

Ha, look! An alligator on the other side of the water, resting on the bank. Just what you have been waiting for. Do you think you will see any more? Why is he (or is it she) so still? When will it move?

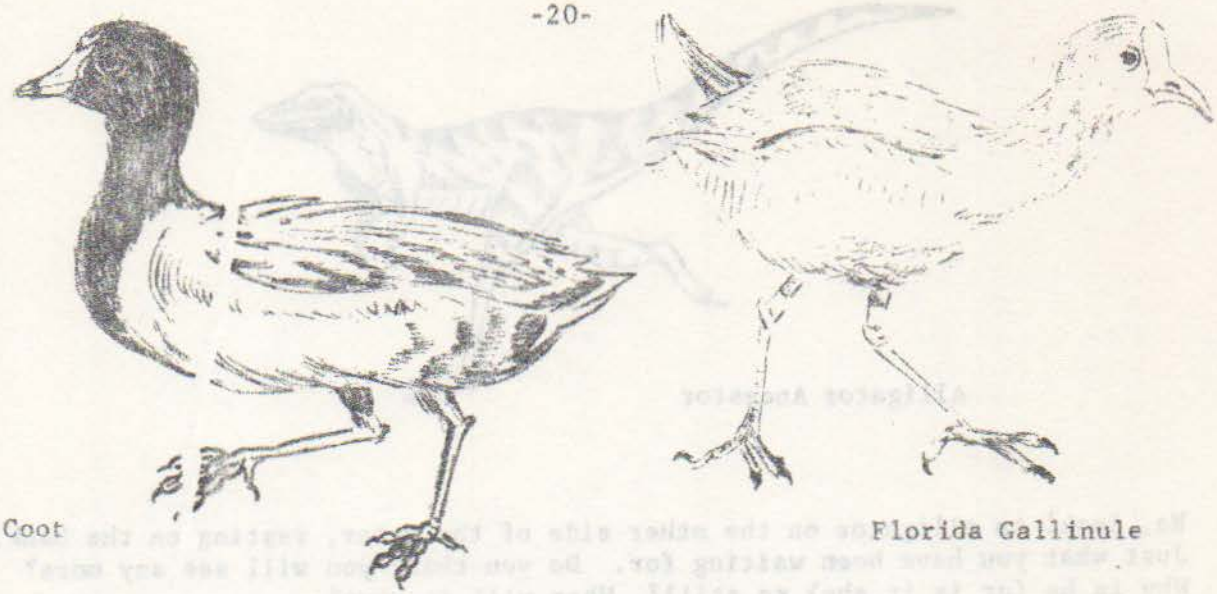
Alligators shared the earth with dinosaurs, and now they share it with us. And they are much the same as their ancestors a hundred million years ago (continuity?). They are well adapted for the everglades environment and can truly be called king and queen of the glades. What are some of these adaptations that helped the alligator evolve into such a mighty creature?

A thick tough hide. Powerful jaws. A dark back, a light stomach. An extra eyelid. A strong tail. Eyes, ears, and nose above the water when the rest of the body is below. Strong stomach acids. Ability to stay submerged for over thirty minutes. Could any of these observations help answer the question? What else?

How do you know it is not a crocodile? Taste the water. That's right, taste the water. Alligators are normally in fresh water, crocodiles in salt water. They look different too, but everything you see on Anhinga Trail is an alligator. Crocodiles are very rare and reside in Florida Bay and the western coast of the park.

How has man and the alligator interacted in the last hundred years? If the everglades had not been made a park, would the alligator be around today?

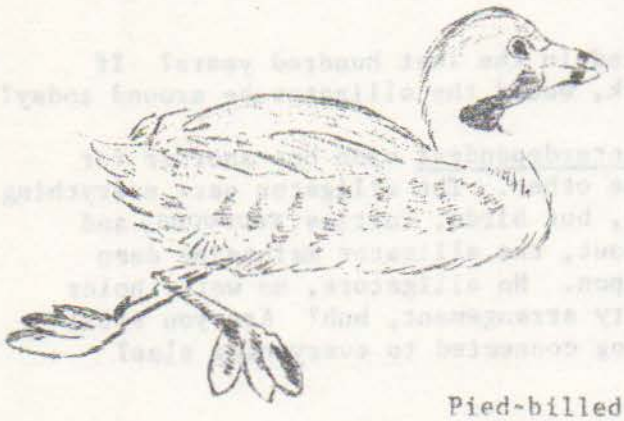
The alligator and other wildlife are interdependent upon one another for survival. One cannot exist without the other. The alligator eats everything it can get into its jaws - mostly fish, but birds, turtles, raccoons, and deer are fair game also. By moving about, the alligator maintains deep water holes for the animals it feeds upon. No alligators, no water holes in dry times, no wildlife. Pretty nifty arrangement, huh? Are you still thinking about food webs? Is everything connected to everything else?



Coot Florida Gallinule

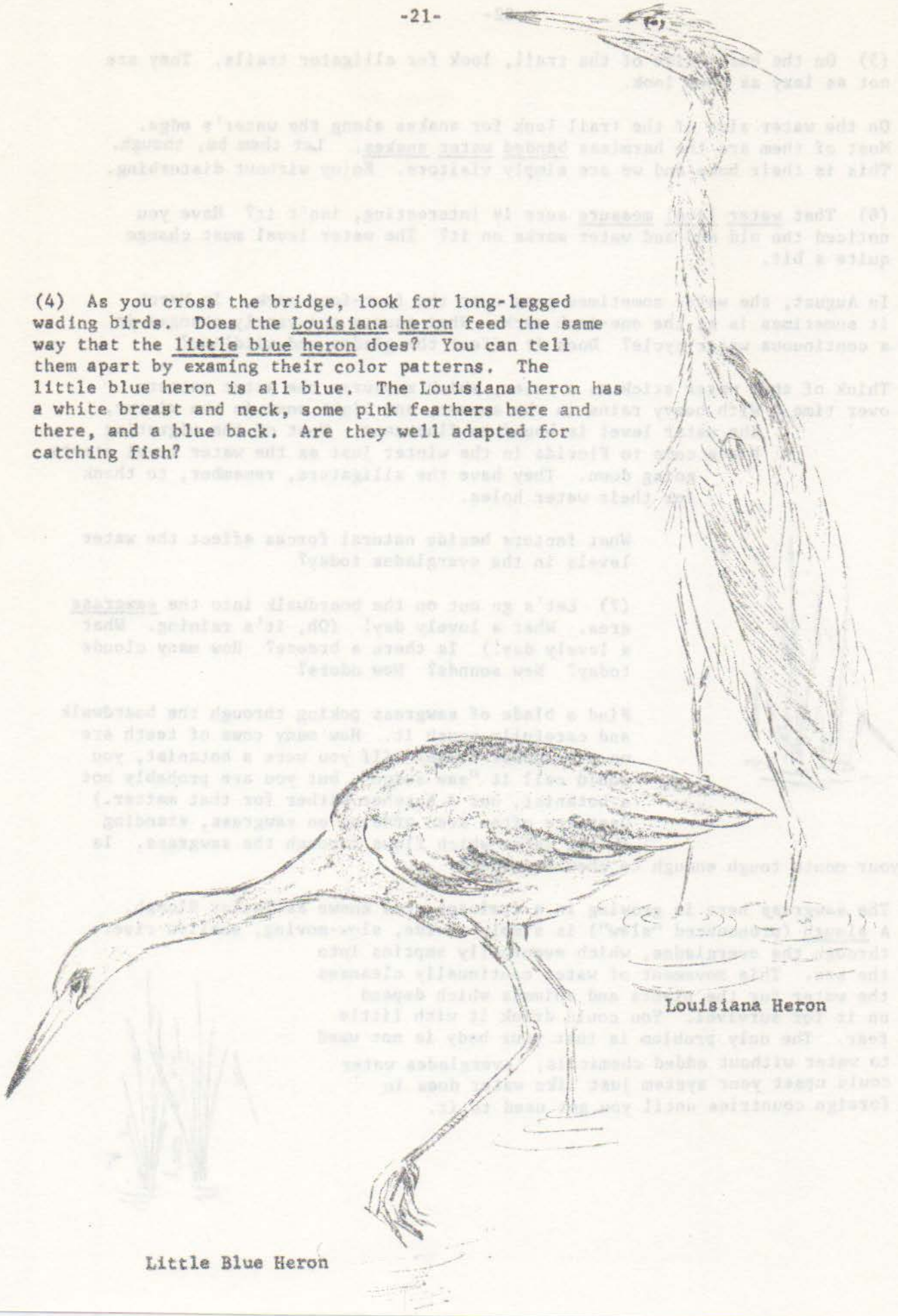
(3) Before you cross the bridge, look for some of the duck-like birds. White snoot means coot. Candy-corn snoot means the coot's cousin, the Florida gallinule. They are similar to ducks, but if you watch their feet, you will notice no webs. Coots and gallinules are a different variety of water birds from ducks.

Another common bird is the grebe, known in bird books as the pied-billed grebe. What is a pied-bill, anyway? The grebe has one if you look closely. But it is easier to look for a small brown bird that bobs on top of the water, and swims underneath. The grebe is a fish-eater while the coot and gallinule are plant-eaters. Watch for similarities and variety in their behavior for clues about their feeding habits.



Pied-billed Grebe

(4) As you cross the bridge, look for long-legged wading birds. Does the Louisiana heron feed the same way that the little blue heron does? You can tell them apart by examing their color patterns. The little blue heron is all blue. The Louisiana heron has a white breast and neck, some pink feathers here and there, and a blue back. Are they well adapted for catching fish?



Louisiana Heron

Little Blue Heron

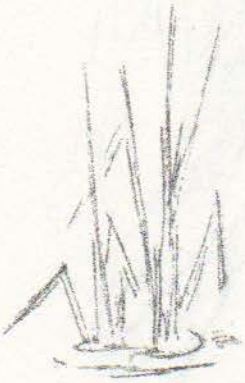
(5) On the bushy side of the trail, look for alligator trails. They are not as lazy as they look.

On the water side of the trail look for snakes along the water's edge. Most of them are the harmless banded water snakes. Let them be, though. This is their home and we are simply visitors. Enjoy without disturbing.

(6) That water level measure sure is interesting, isn't it? Have you noticed the old mud and water marks on it? The water level must change quite a bit.

In August, the water sometimes goes over the four-foot mark. In March it sometimes is at the one-inch mark. What causes the yearly changes in a continuous water cycle? Does it effect the glades and wildlife?

Think of that water stick as a ruler, which measures the water pattern over time. With heavy rains in the summer, and light ones in the winter, the water level is bound to fluctuate. Most of the migrating birds come to Florida in the winter just as the water level starts going down. They have the alligators, remember, to thank for their water holes.



What factors beside natural forces affect the water levels in the everglades today?

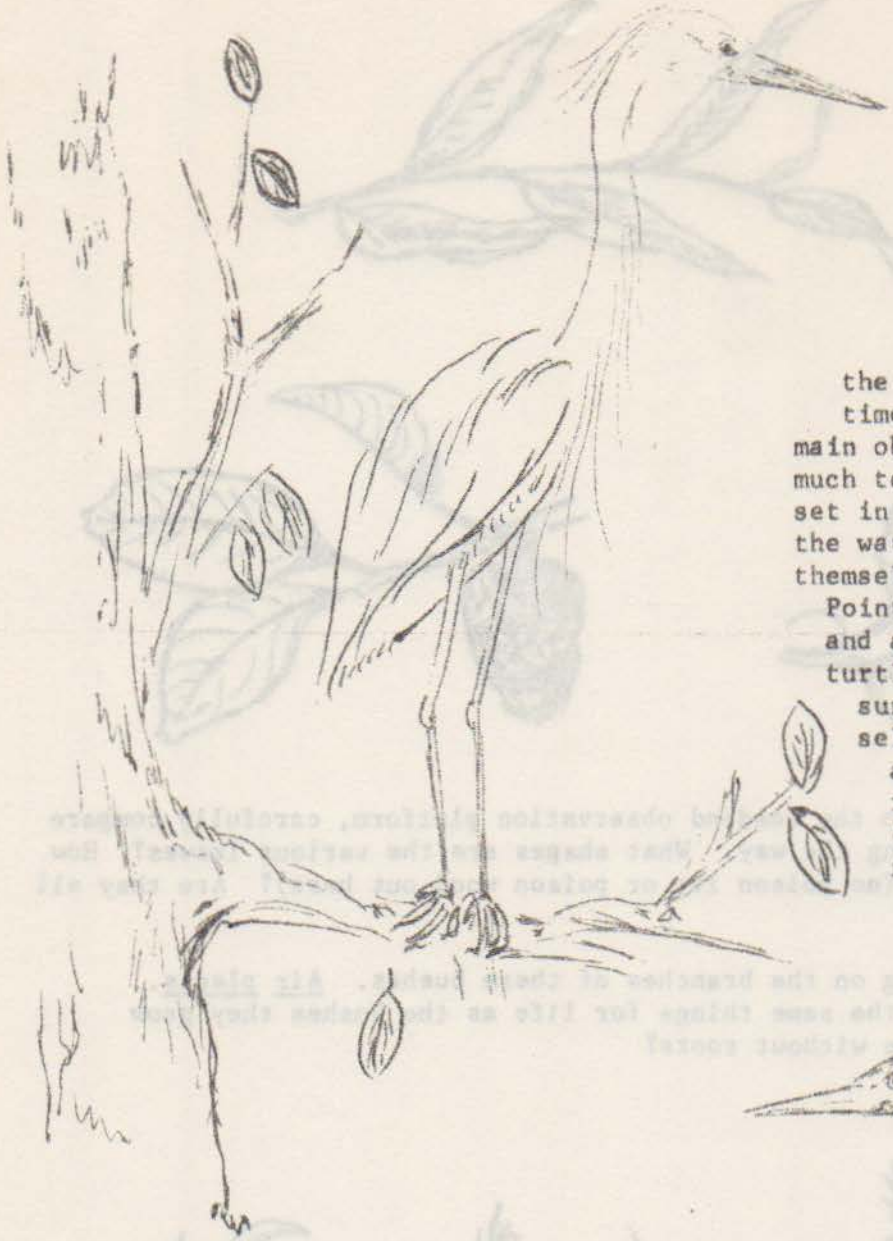
(7) Let's go out on the boardwalk into the sawgrass area. What a lovely day! (Oh, it's raining. What a lovely day!) Is there a breeze? How many clouds today? New sounds? New odors?

Find a blade of sawgrass poking through the boardwalk and carefully touch it. How many rows of teeth are on a sawgrass blade? (If you were a botanist, you would call it "saw sedge", but you are probably not a botanist, nor a butcher either for that matter.) Deer are often seen grazing on sawgrass, standing in the water which flows through the sawgrass. Is your mouth tough enough to chew sawgrass?

The sawgrass here is growing in a drainage area known as Taylor Slough. A slough (pronounced "slew") is simply a wide, slow-moving, shallow river through the everglades, which eventually empties into the sea. This movement of water continually cleanses the water for the plants and animals which depend on it for survival. You could drink it with little fear. The only problem is that your body is not used to water without added chemicals; everglades water could upset your system just like water does in foreign countries until you got used to it.

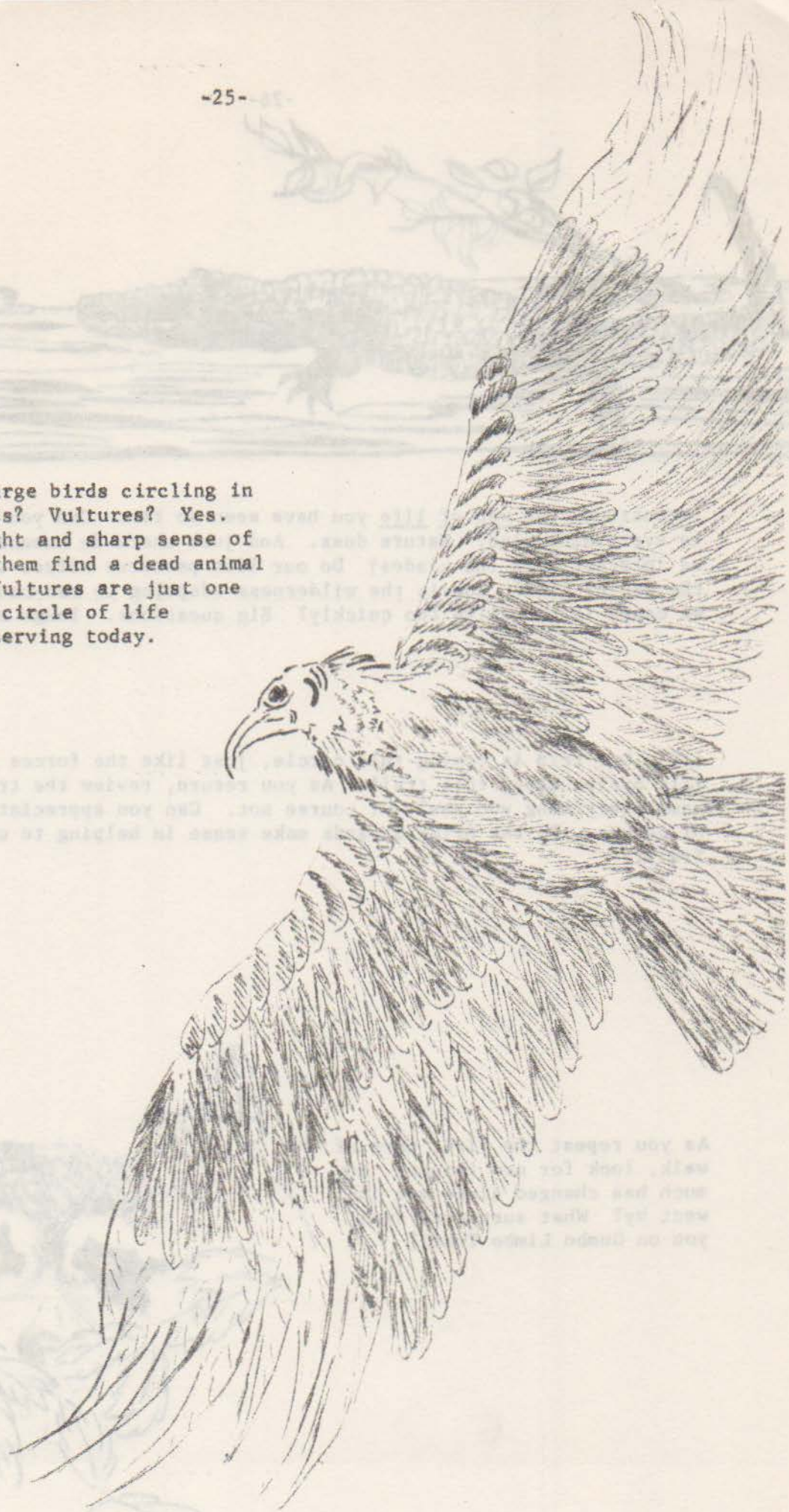
(8) As you walk out to the deadend observation platform, carefully compare some of the shrubs along the way. What shapes are the various leaves? How do they feel to touch (no poison ivy or poison wood out here)? Are they all the same color?

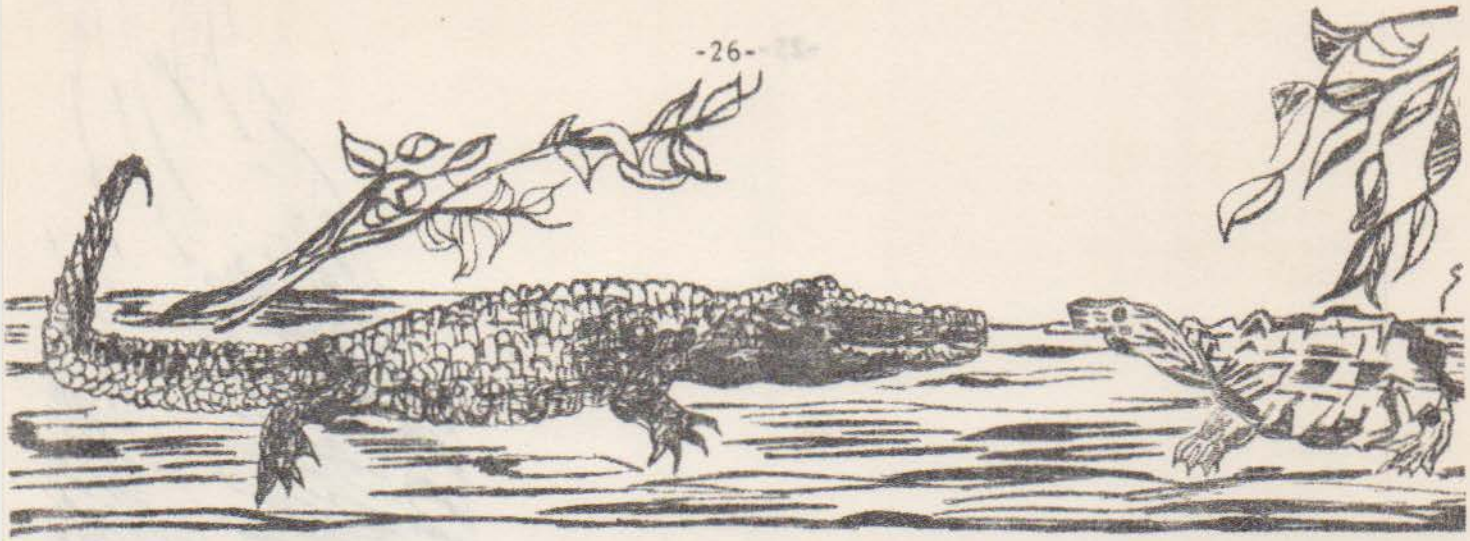
Watch for plants living on the branches of these bushes. Air plants. Do air plants require the same things for life as the bushes they grow upon? How do they live without roots?



(9) After you return to the main boardwalk, take your time as you travel through the main observation area. There is much to observe. Anhingas often set in the pond apple trees across the water. Alligators like to sun themselves along grassy edges. Pointy-nosed softshell turtles and algae-covered hardshell turtles often swim to the surface, or even sun themselves on land beside the alligators which eat them in the water. Gar fish (kids call the "cigar fish"), favorite food of the alligator, cruise along with their slim, spotted, foot-long bodies.

What are those large birds circling in the sky? Buzzards? Vultures? Yes. Their keen eyesight and sharp sense of smell will help them find a dead animal in the glades. Vultures are just one more link in the circle of life you have been observing today.





Reconstruct the web of life you have seen so far. Can you connect everything to everything else? Nature does. And just where do humans fit in? How do we interact with the glades? Do our life patterns affect the continuity of the web of life? How is the wilderness adapting to man-caused change? Will we cause it to evolve too quickly? Big questions. Tough answers.

(10) Our trip is coming full circle, just like the forces which govern the life cycles along this trail. As you return, review the trip. Can you name everything you saw? Of course not. Can you appreciate without names? Of course. Do the SPICE Strands make sense in helping to understand Anhinga Trail?

As you repeat the first part of the walk, look for new things. How much has changed since you just went by? What surprises await you on Gumbo Limbo Trail?

Gumbo Limbo Trail

Gumbo Limbo Trail winds through a portion of the Royal Palm Hammock. The word hammock comes from an Indian word meaning garden spot, or green paradise. It is certainly an appropriate word.

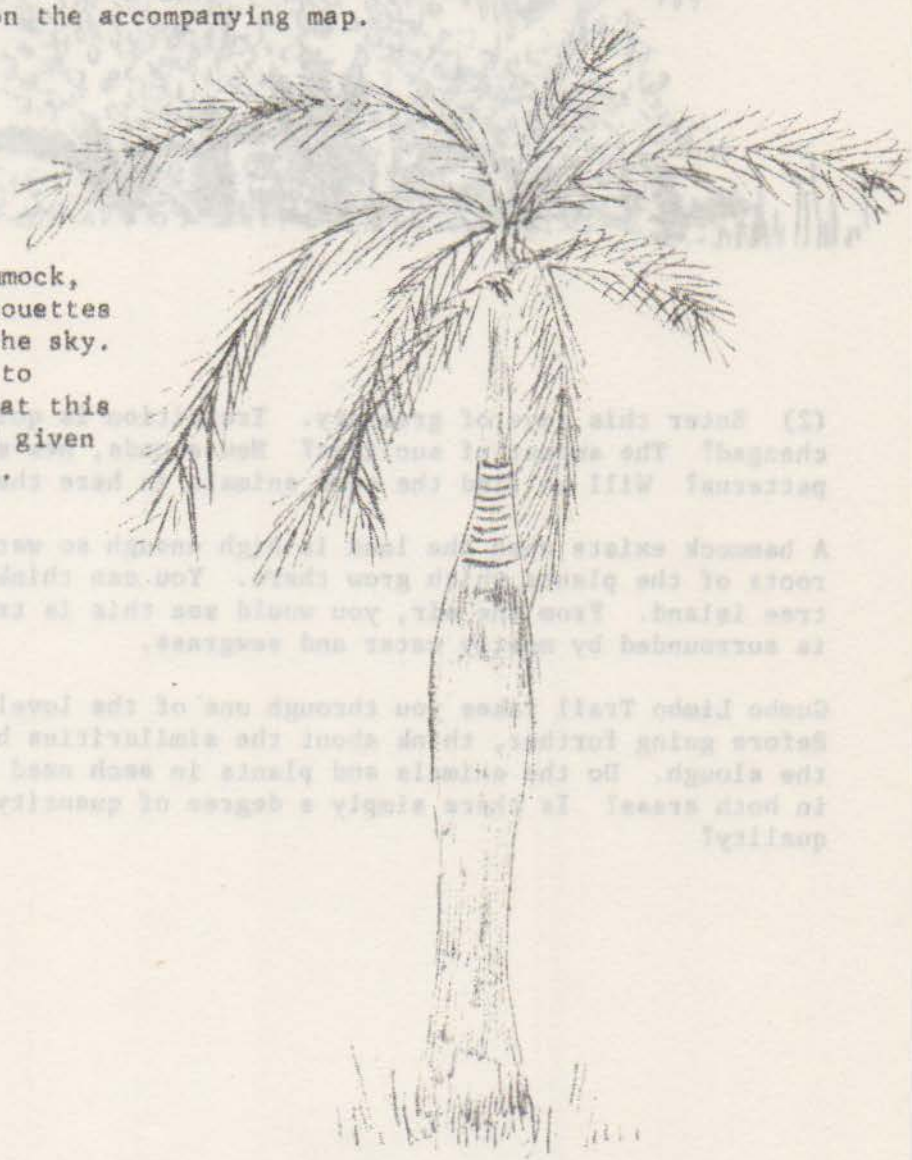
As you stroll around Gumbo Limbo Trail, use your imagination a bit. There is a sense of mystery inside a hammock, and if your mind is receptive to it, you can have lots of fun.

Another idea to keep in mind as you explore is the idea of competition. You will see many struggles in the hammock, some obvious, some subtle.

And don't forget to watch for examples of the SPICE Strands. They are as easy to find here as they were on Anhinga Trail.

So, lets walk around the trail, keeping our mind and senses alert. The numbers refer to locations on the accompanying map.

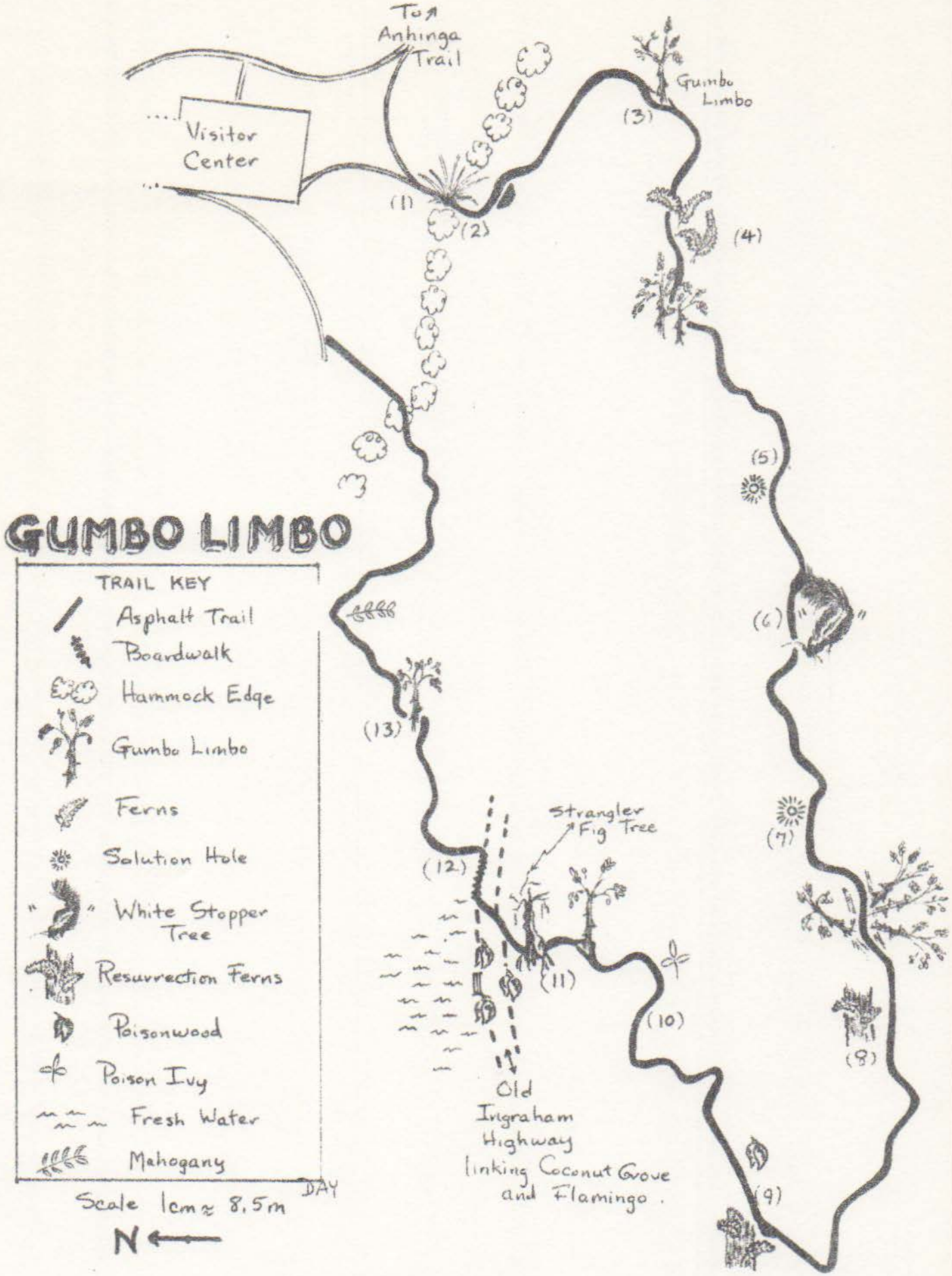
(1) Before entering the hammock, look up and examine the silhouettes of the Royal Palms against the sky. Would this have been enough to convince you 70 years ago that this area should be protected and given park status? Think about it.



(2) Enter this cave of greenery. Transition is quick. Has the temperature changed? The amount of sunlight? New sounds, new smells? What about color patterns? Will we find the same animals in here that we did on Anhinga?

A hammock exists when the land is high enough so water cannot cover the roots of the plants which grow there. You can think of this area as a tree island. From the air, you would see this is true - Royal Palm Hammock is surrounded by mostly water and sawgrass.

Gumbo Limbo Trail takes you through one of the loveliest hammocks in the park. Before going further, think about the similarities between the hammock and the slough. Do the animals and plants in each need the same things to survive in both areas? Is there simply a degree of quantity involved, or is it quality?


GUMBO LIMBO
TRAIL KEY
Asphalt Trail
Boardwalk
Hammock Edge
Gumbo Limbo
Ferns
Solution Hole
White Stopper Tree
Resurrection Ferns
Poisonwood
Poison Ivy
Fresh Water
Mahogany
Scale 1cm ≈ 8.5m
N
To Anhinga Trail
Visitor Center
Gumbo Limbo
Strangler Fig Tree
Old Ingraham Highway linking Coconut Grove and Flamingo.
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)

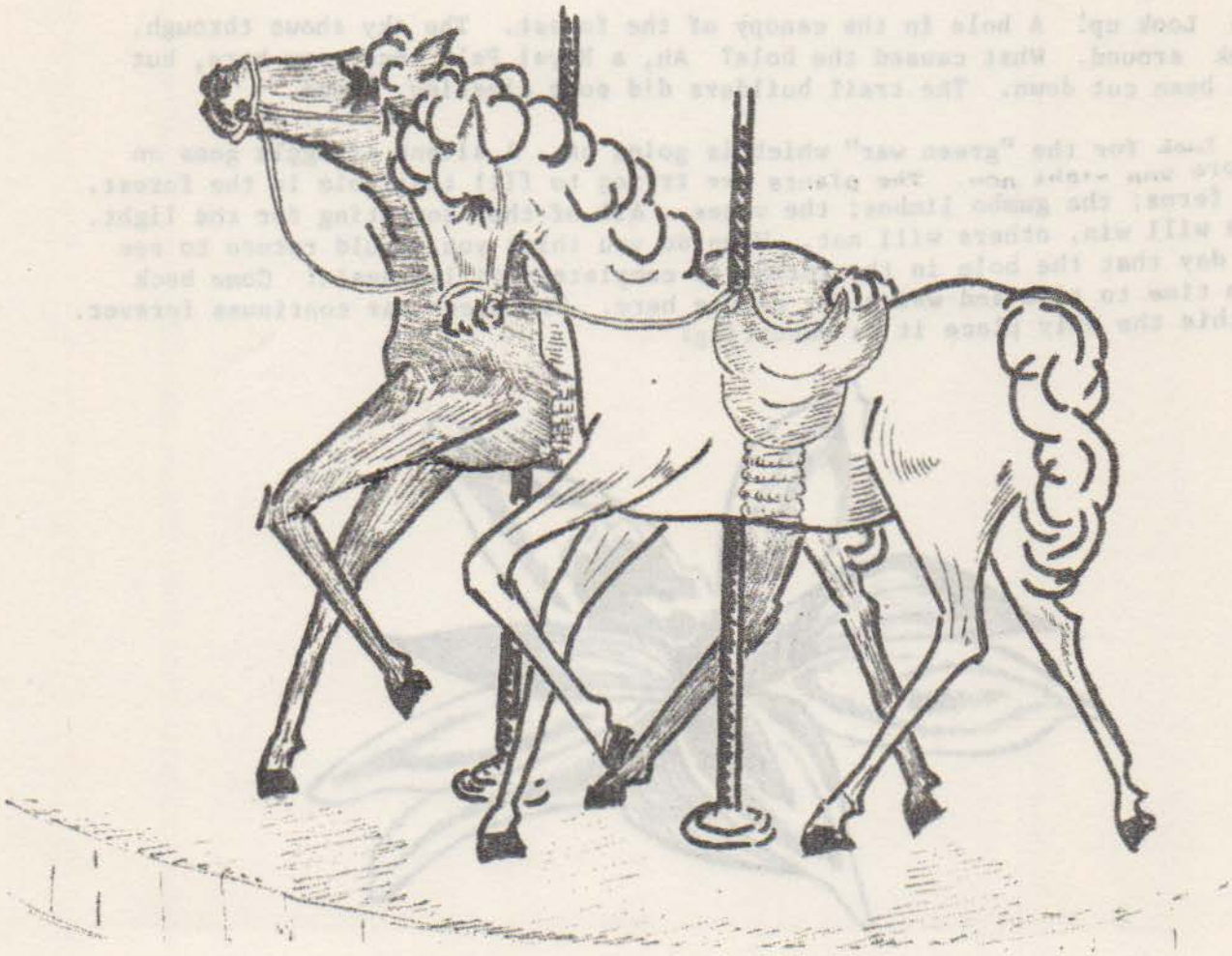
(3) Find a gumbo limbo tree. How? Look for a red tree, with the bark peeling off. Run your fingers up and down its trunk. Close your eyes and feel some more. Could you recognize this tree with just your fingers in another place and time?

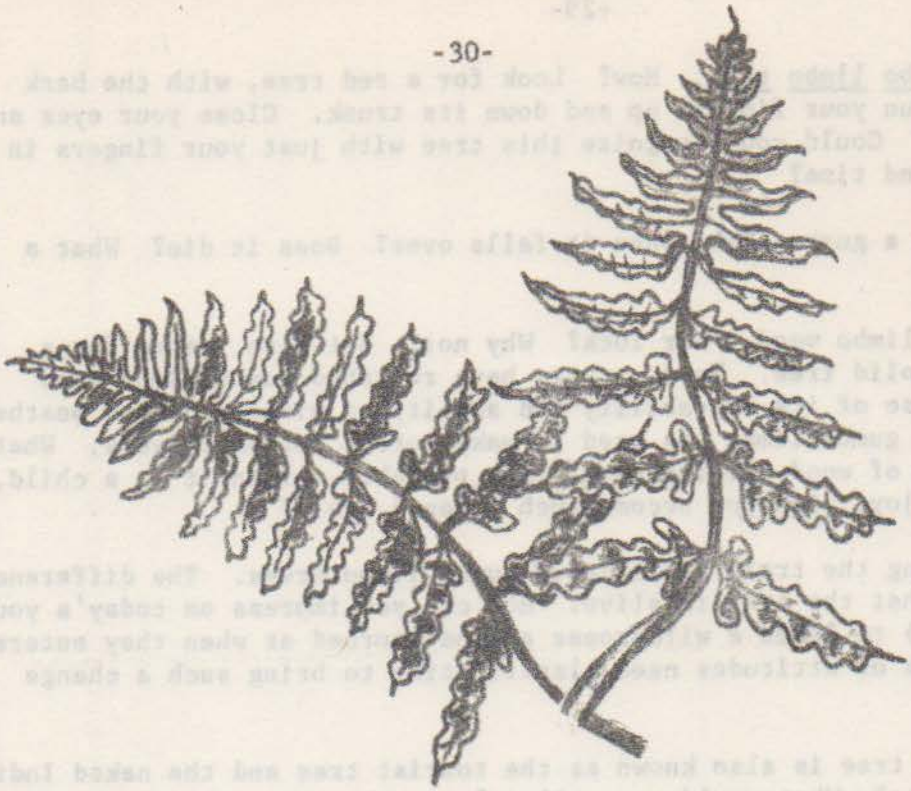
What happens to a gumbo limbo when it falls over? Does it die? What a marvelous tree!

Knock on gumbo limbo wood. For luck? Why not? But also listen for a hard knock, a solid tree. Wood carvers have relished gumbo limbo wood for years because of its carvability and ability to withstand hard weather. Before plastic, gumbo limbo was used to make horses for carrousels. What a friendly hunk of wood growing here! You probably sat on it as a child, squealing with joy. Can you become such friends again?

Some people along the trail still carve gumbo limbo trees. The differences is of course, that the tree is alive. How can you impress on today's youth (and adults too) to leave a wilderness as undisturbed as when they entered it? What values or attitudes need clarification to bring such a change about?

The gumbo limbo tree is also known as the tourist tree and the naked Indian tree. Good names? What would you call it?





(4) Look up! A hole in the canopy of the forest. The sky shows through. Look around. What caused the hole? Ah, a Royal Palm once grew here, but has been cut down. The trail builders did some clearing. Good.

Now look for the "green war" which is going on. A silent struggle goes on before you right now. The plants are trying to fill that hole in the forest. The ferns; the gumbo limbos; the vines. All of them competing for the light. Some will win, others will not. When do you think you should return to see the day that the hole in the forest is completely filled again? Come back from time to time and watch for change here. The green war continues forever. Is this the only place it is occurring?

(5) Ah, you've noticed the big hole in the ground. And you are wondering what caused it. Good! Let's explore a couple of possibilities.

Most people around here call them sink holes. Sink hole: not a bad name at first glance. But where did it sink to?

Look carefully at the limestone rock. Feel it. What do you notice about the rock surrounding the hole? And what would you think if you were told that this limestone is thousands of feet thick below your feet? Still think this hole went "plop" into the ground? Maybe. Maybe not.

What do you know about limestone? Right - it has calcium in it - just like your bones and teeth. And did you notice all the trees around the hole? What happens when all those leaves fall into the "sink hole" full of water. Partially right. Not only do they rot, but they form a mild acid solution. Acid solution? Right - just like you find in your tummy after you've eaten too much (acid - indigestion?).

So, what does acid, limestone, and this hole have to do with one another? A lot! Acid eats away limestone (calcium).

What is the answer here then? The choice is yours. Sink hole or solution hole? The answer is a very simple solution.

(6) Sniff the air for the next portion of the trail. Some days you will smell a skunk odor. But don't fret. No sensible skunk would hang around this trail with so many people around.

The white stopper tree (it looks like all the others here) gives off an odor that smells like a skunk. What kind of an adaptation is this? Would you use white stopper for a walking stick if it smelled like a skunk? Would you chew on it or a better smelling tree if you were a rodent?

(7) As you pass by the next solution hole, think of the mystery and intrigue once again that exists in a hammock. Have you seen many animals yet? Lizards, butterflies, fleeting birds, spiders. Good: any others?

If you came back at night (do it sometime), what might you hear? Bobcats, raccoons, opossums. Sure. Snakes? Once in awhile. Hammocks are alive. You must be patient, however, because the critters which live here are shy. Wander off the trail some day, sit down very still for an hour, and be amazed at what shows up.

Would you like to live here? Indians once did. They had gardens and open sided shelters called chickees. Could you live in a chickee without air conditioning, television or automobiles? How would you cope with mosquitoes (they are worse in the summer)?

Take a minute, and imagine yourself an Indian living here. Be careful, though. Imagine hard enough and you might just find things about such a life that are more attractive than today's hustle and bustle.

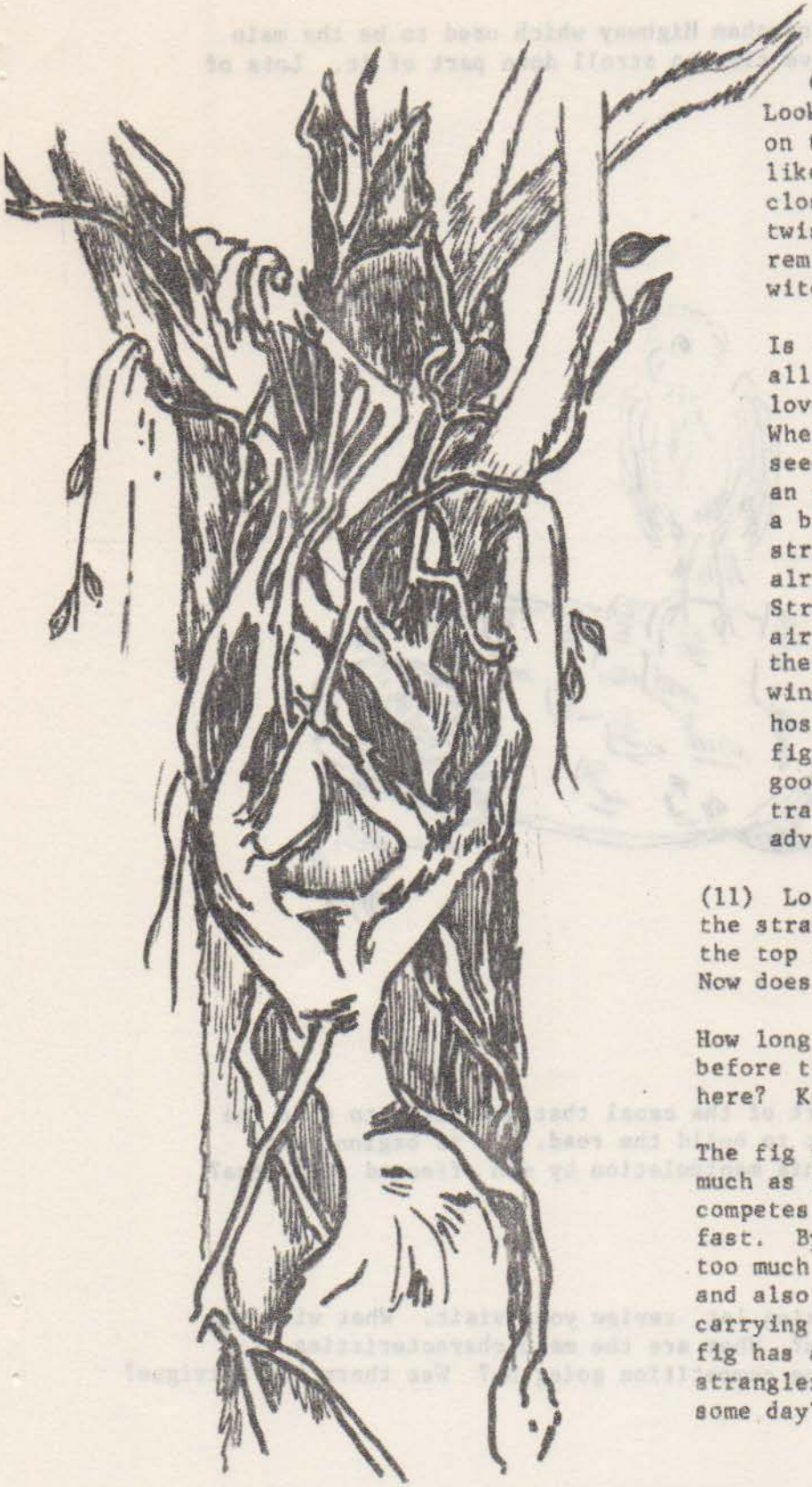
(8) You have undoubtedly noticed a multitude of different plants by now. And you feel a little uneasy about not knowing all their names. Don't. Instead, rely on the Strands for help. How are the plants similar, how are they different? What pattern of growth do they display. How do they interact with one another? How have old hurricanes changed them? What adaptations have they evolved to survive in such a crowded world?

If you look ahead, you will notice that huge live oak trees have suddenly appeared. Where were they on the first part of the trail?

Feel a live oak like you did the gumbo limbo. Is the bark the same? Live oaks have a tough time surviving fire. Several years ago, fire swept through this area, but more or less skipped the area ahead where the live oaks live. Could this account for their existence here?

(9) As you walk by the live oaks, look for the resurrection ferns, as well as other air plants, growing on live oak trunks. The resurrection fern is fascinating - it looks withered and dead during most of the dry winter, but is lush and green in the wet summer. Even in the winter, though, they will perk up after a nice rain. Such an adaptation to the changing weather is a miracle in its own right.

An abundance of air plants tells you something about the quality of the air. Such plants are extremely sensitive to air pollutants. The air must be pretty good here, don't you think? Are air plants growing on trees near your home or school? It might pay to find out.



(10) Wow, another war! Look at that strangler fig on the old tree. It looks like the fig won. Look closely at the gnarled and twisted wood. What does it remind you of - death, halloween, witches and goblins?

Is it possible a bird caused all of this? Absolutely! Birds love to eat strangler fig fruits. When they do, they swallow the seeds. Later on, they light in an oak tree or a palm and leave a bird dropping, complete with strangler fig seed inside. It's already fertilized! Amazing. Strangler figs usually start as air plants this way, sending their roots to the ground, winding their roots around their host tree. Some people call the fig a lover's tree. Is this a good name? Walk on down the trail to see a struggle not as advanced as this one.

(11) Look up and trace the pattern of the strangler fig from the ground to the top of the live oak it is attacking. Now does the bird story make sense?

How long do you suppose it will be before the fig takes over completely here? Keep returning to find out.

The fig really doesn't strangle as much as it just takes over. It outcompetes its host because it grows so fast. By blocking out the light, adding too much weight for the oak to support, and also pinching parts of the nutrient-carrying vessels under the bark, the fig has all the advantage. Will strangler figs take over completely some day? They haven't yet. Why?

(12) You just passed the old Ingraham Highway which used to be the main park road. Perhaps you will have time to stroll down part of it. Lots of neat surprises await.

The pond in front of you is part of the canal that was built to make the road. Material was scooped out to build the road. It is beginning to look natural again. How has this manipulation by man affected this area?

(13) As you return to the parking lot, review your visit. What will you remember most about Gumbo Limbo? What are the main characteristies of a hammock? Can you appreciate the competition going on? Was there any intrigue?

And these gumbo limbo trees. Are you old friends now? You think so. All right then, draw the shape of a gumbo limbo leaf without looking up. Right now.

Never take friends for granted. They always have something new to offer. Your interaction with this area will leave an impression which can grow. Protect that impression and keep it alive for future visits, always learning, never seeing it all.

LONG PINE KEY NESA

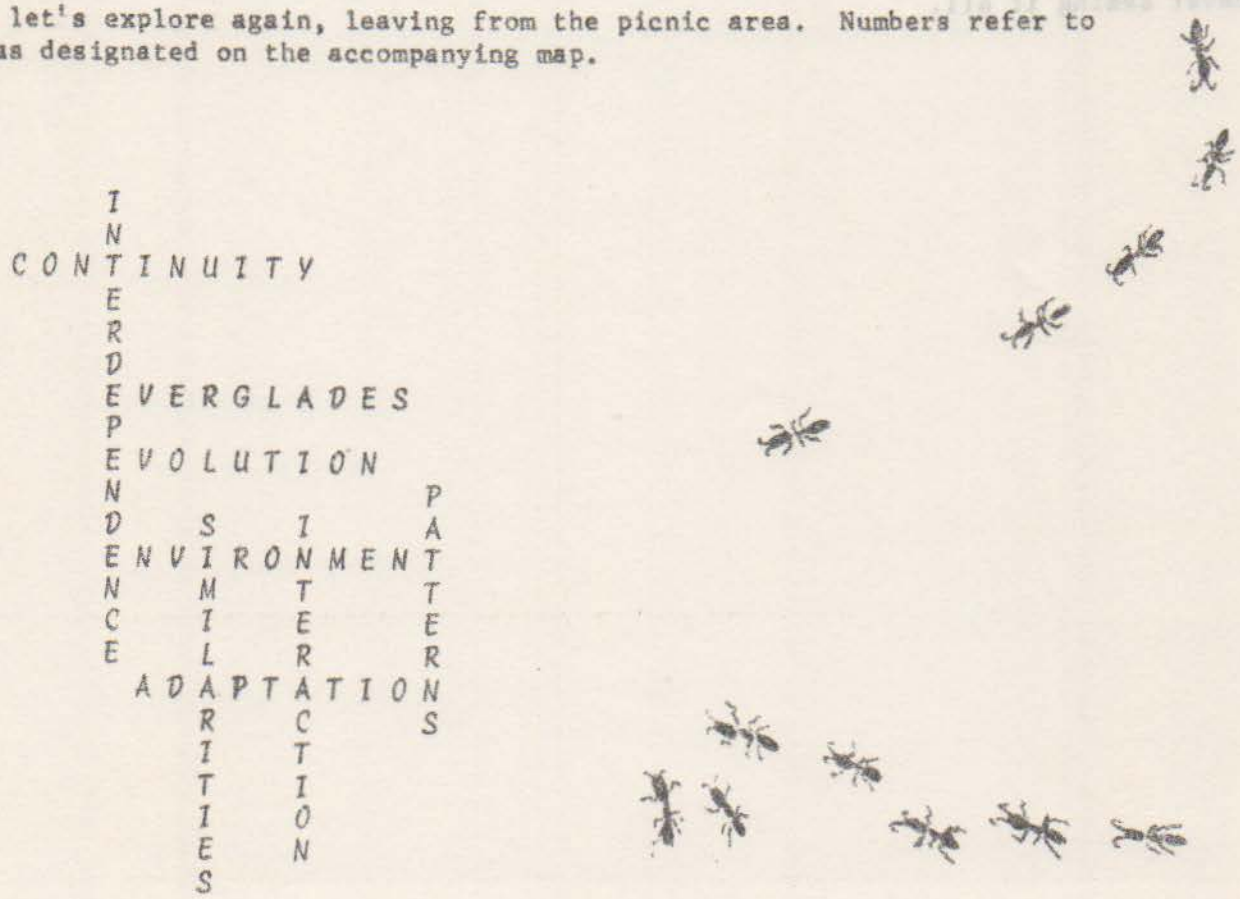
In some respects the Long Pine Key NESA trail is like the Royal Palm NESA. In others, it is not. Both areas have trails through hammocks. Each represents important segments of the everglades system. But Royal Palm has been an attraction for a long time, long before it received NESA status and school groups began visiting it. The NESA trail at Long Pine Key is designed especially for school groups, is only a few years old, and is seldom visited by the normal visitor. The area especially lends itself to examination and exploration via the SPICE Strands. It is also an excellent area to try some of the suggested sensitivity activities described in the nextsection.

Three major natural everglades systems come together along this trail-- pinelands, sawgrass prairie, and tropical hammock. Few other areas in the park offer such a wide diversity of systems in such a small area. In addition to the three natural systems, a man-made system is nearby as well: an organized campground and picnic area.

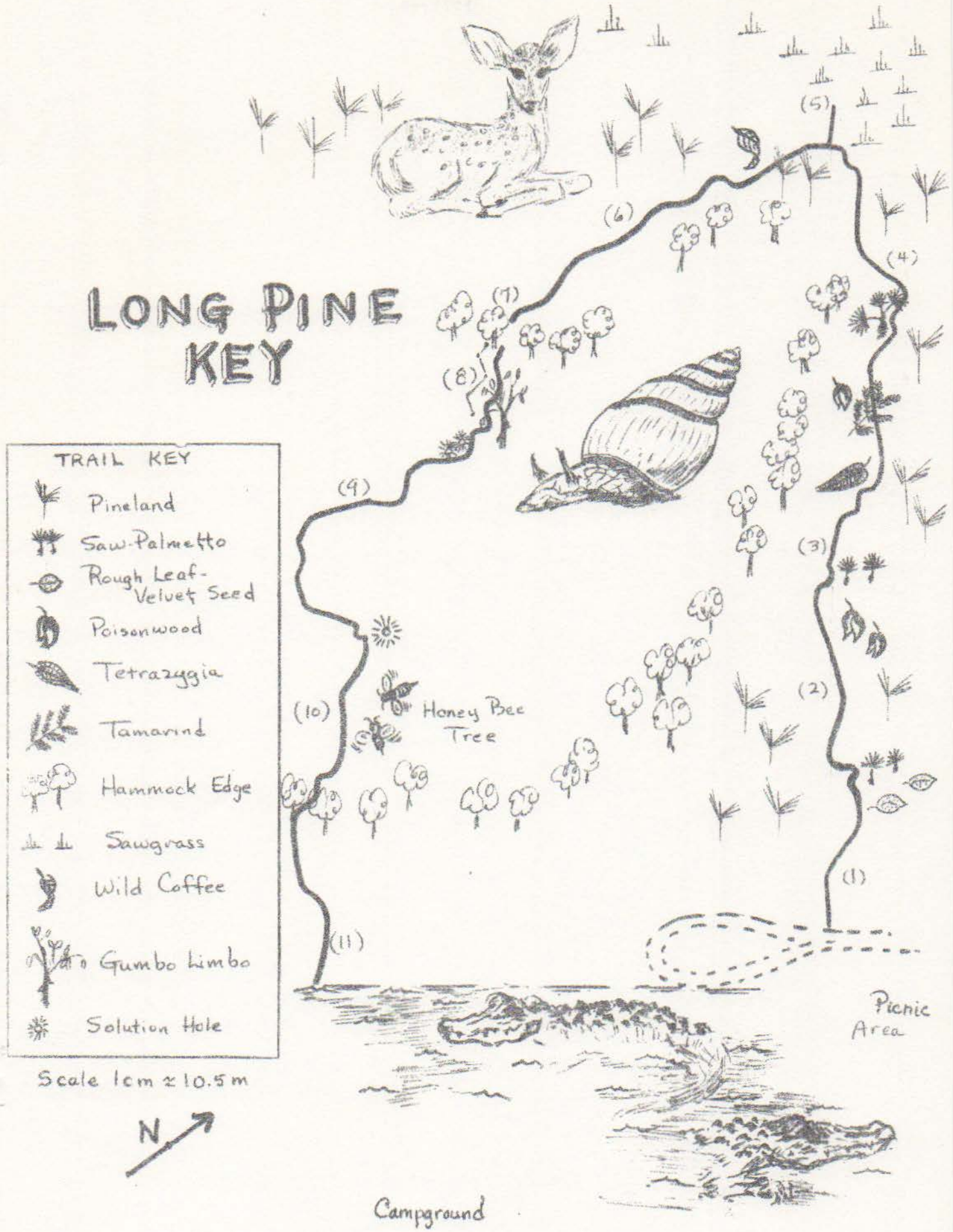
As you prepare to embark on this third NESA trail, review your experiences at Royal Palm. How will they apply here? What will be different? How can you apply the SPICE Strands now that they are such good friends?

Keep your mind open to transition. Where does the hammock start, the pinelands leave off? But don't neglect the small and minute--they deserve just as much attention as the big picture.

So, let's explore again, leaving from the picnic area. Numbers refer to areas designated on the accompanying map.



LONG PINE KEY



(1) Immediately we find ourselves in a pine forest. Look around. What new patterns do you instantly perceive? How is this area the same as Gumbo Limbo Trail? How is it different? New plants? Different sounds? Air plants? Rocky soil? More, or less open?

Look at each individual pine tree. Follow its trunk from the ground to the sky. What do you notice? Why are the base of the tree trunks all black? Fungus or fire?

Look at the needles of the southern slash pine. How long are they? How many needles per bunch? Are needles leaves? Certainly. They perform the same function as gumbo limbo leaves. Why are there so many different shaped leaves then? Adaptation? Evolution? Adaptation! Evolution!

As you stroll further, ask yourself why the pineland is here rather than a hammock. The ground seems high and dry enough.

(2) The next several hundred feet give you a good chance to become better friends with some of the plants here. Some are really neat to touch, but one is not. What are some of the interesting plants here?

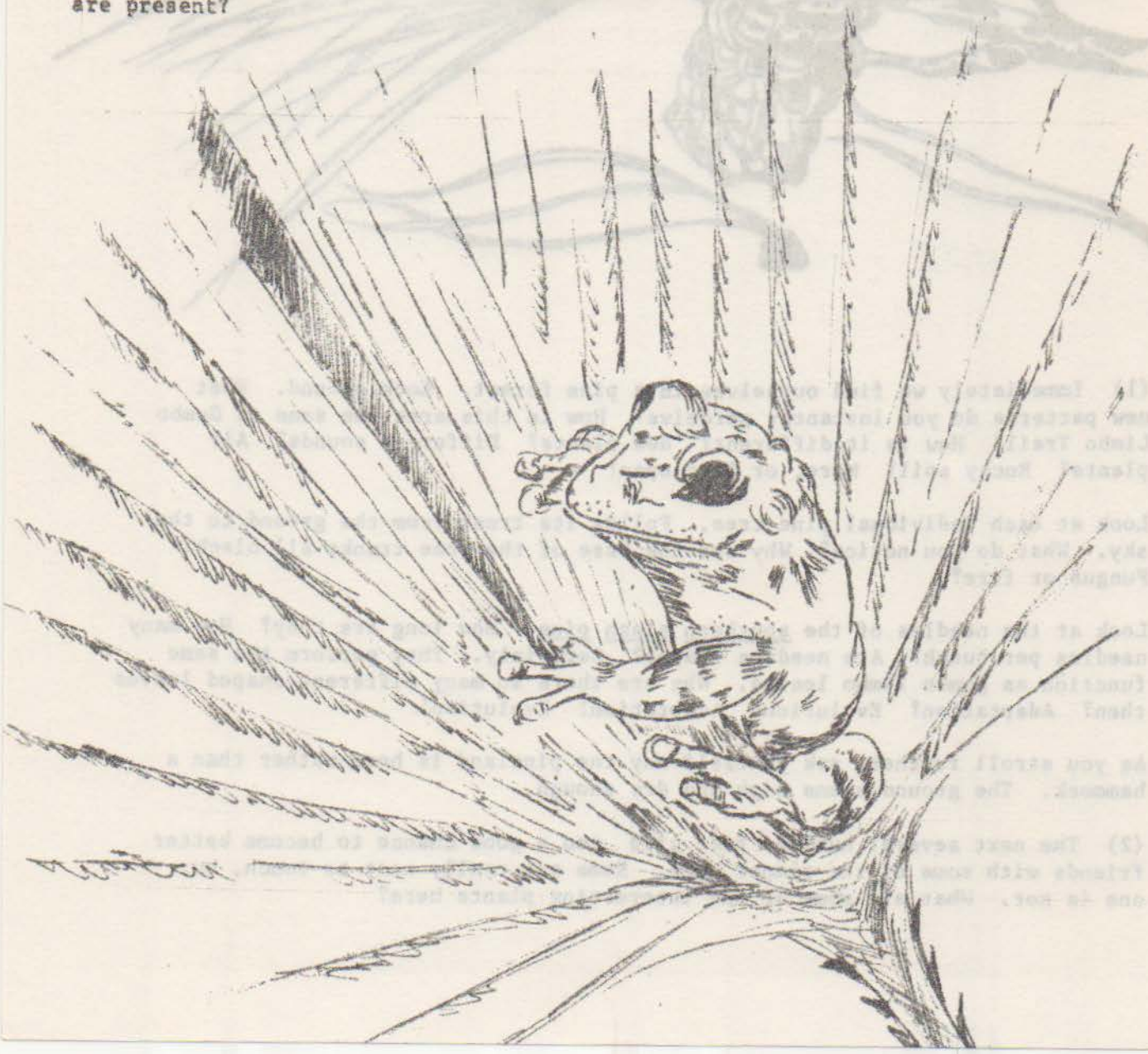
Let's start with the saw palmetto, easy to spot--palm leaves emerging from a thick, underground stem. Why "saw"? Well, carefully run your fingers along the leaf stem to discover why. Can it be a relative of the sawgrass? Not really, but it does have a similar adaptation. What kind of an adaptation is a thick, underground stem?

Another neat shrub is the rough-leaved velvetseed. Descriptive name. Does it fit? Well, the rough-leaved part sure does. Now, where is that velvetseed?

One leaf pattern which you need to know is that of poisonwood. You really don't want to touch it while looking for rough-leaved velvetseed! Brown-spotted, droopy leaves, 3-5-7 leaflets per leaf, are deadly giveaways.

Anyone can get poisonwood sometime in their life, so don't tempt a miserable rash. "Leaflets three (or 5, or 7, or 9), let it be."

Look at other plants along the way--how are they similar? How many varieties are present?



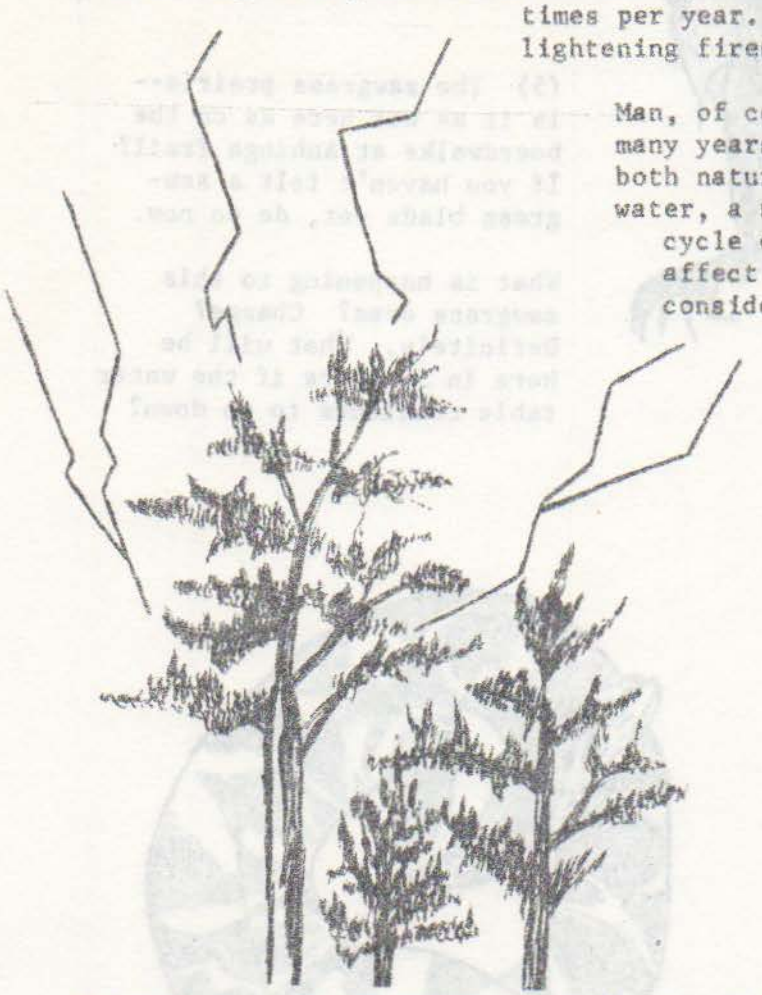
(3) Have you felt the bark of the slash pine yet? How would you describe it with your eyes closed? Crackly? Paper-like? Brittle? What else?

So, you've decided the blackness on each tree is from fire. Good. Fungus would probably not live on each tree, or grow to the same height on each trunk, anyway.

How long ago did this area burn? A few years ago? Close. Were the pine trees here before the fire? Sure. So, the fire didn't kill the trees, did it? Right. Could that bark have helped during the fire?

What about the shrubs and other plants--did the fire kill them? Well, if it did, they've certainly grown back haven't they? Hmmm..... I wonder if that underground stem on the saw palmetto helps it in a fire?

Before man ever visited or resided in the everglades, fire was a natural force. Lightening started fires throughout the pines and sawgrass many times per year. What time of year would most lightening fires start in the 'glades?

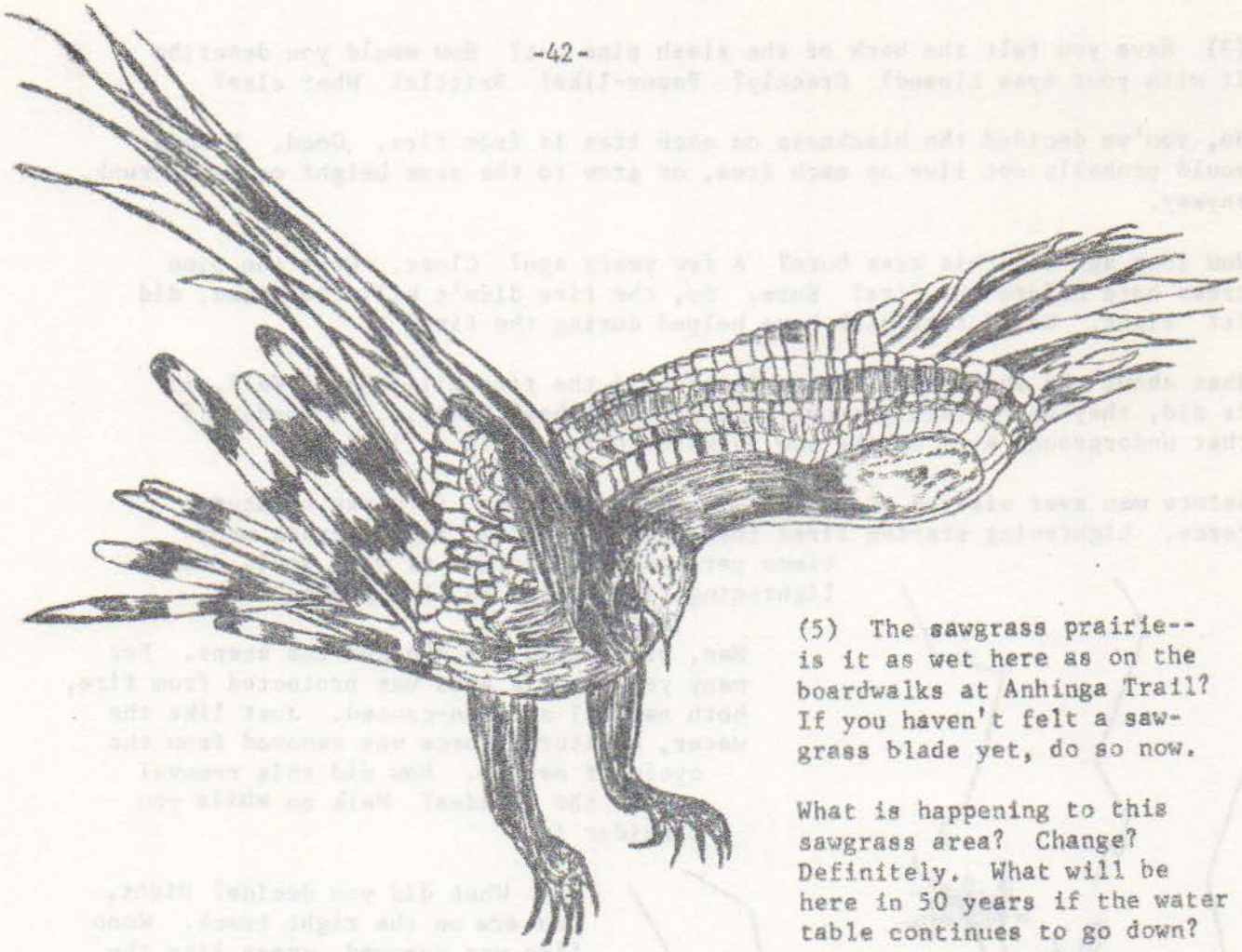


Man, of course, has changed the scene. For many years, this area was protected from fire, both natural and man-caused. Just like the water, a natural force was removed from the cycle of nature. How did this removal affect the 'glades? Walk on while you consider it.

(4) What did you decide? Right, you are on the right track. When fire was removed, areas like the pinelands began to grow up. In fact, the undergrowth became so thick, that it began to outcompete the pinelands. A hammock began to form on the limestone ridge where the pines reside.

Man has reintroduced fire in the everglades. Each year, many acres of land, both pinelands and sawgrass, are burnt to preserve the continuity of the natural system that has been upset. The Park Service burnt this area several years ago, and will burn again in several years.

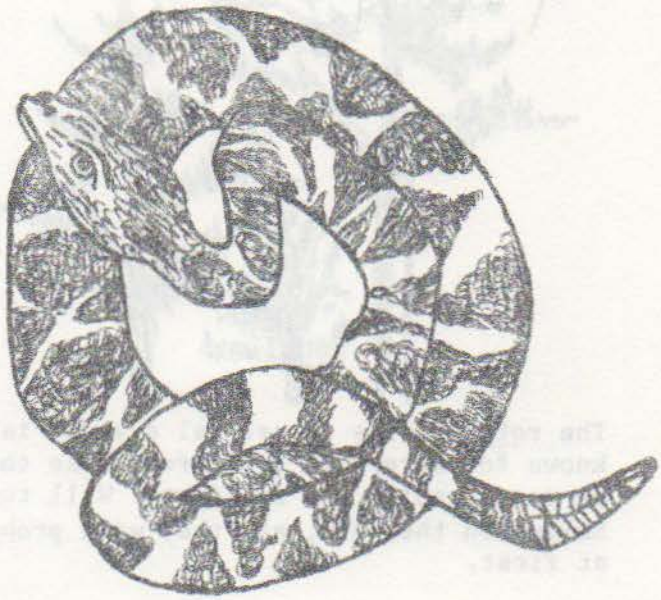
The role of fire in natural systems is barely understood, but one thing is known for sure: in some areas like the pinelands, fire is just as necessary as water, soil, and sunlight. Will that be easy for your students to appreciate? Enlighten them now, and they will probably accept it much easier than you did at first.

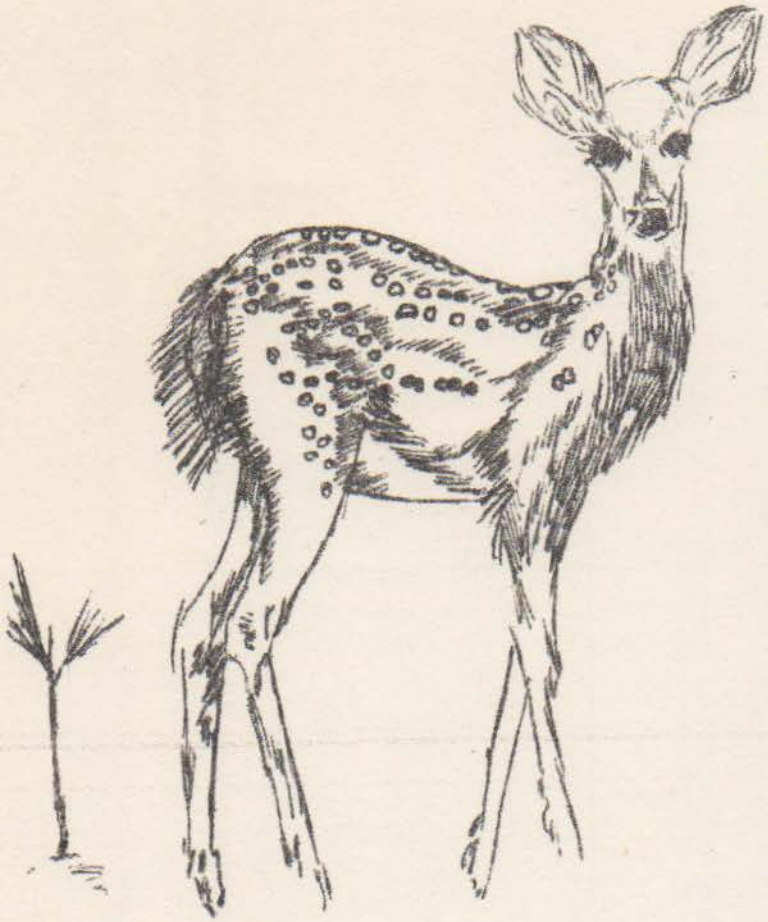


(5) The sawgrass prairie--is it as wet here as on the boardwalks at Anhinga Trail? If you haven't felt a sawgrass blade yet, do so now.

What is happening to this sawgrass area? Change? Definitely. What will be here in 50 years if the water table continues to go down?

Whenever you stand at the border of two or three natural systems, your chances are good for seeing or hearing various animals. They like to flit back and forth between the two areas like the pines and sawgrass here. Listen. Anything? A woodpecker working on an insect-infested pine tree? A hawk screeching in search for a snake? Insect sounds?



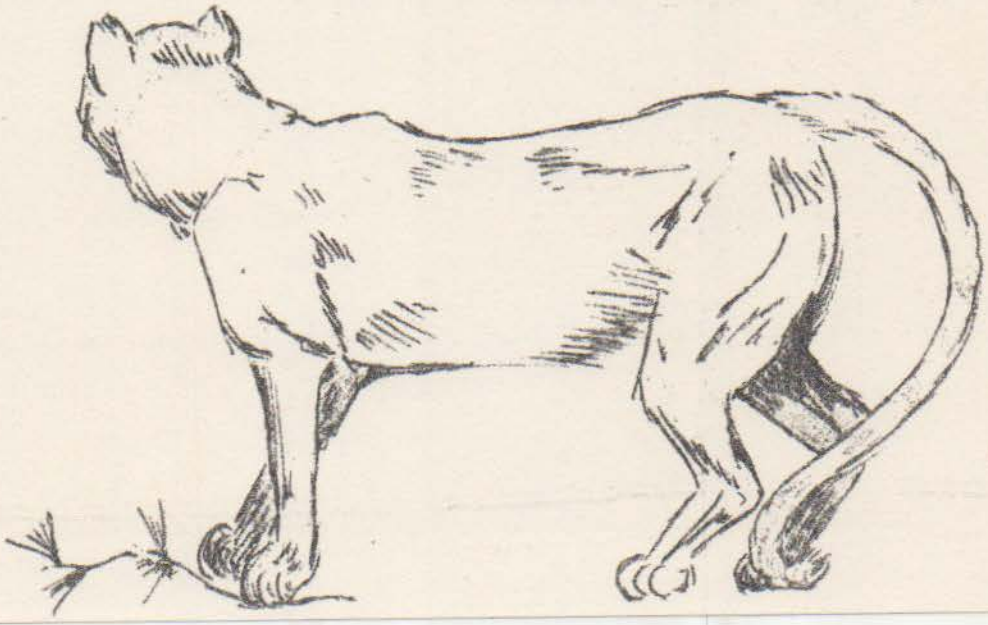


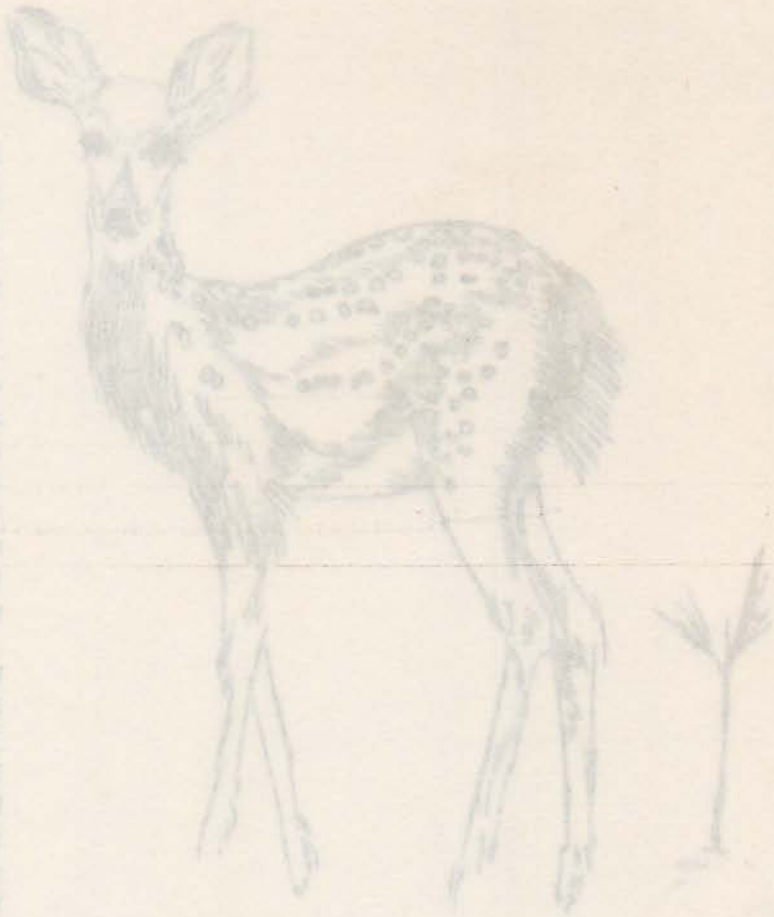
Deer love to feed in the sawgrass and sleep in the pinelands. Can you find tracks or droppings which says they were here?

(6) Wow! Look at that crooked tree ahead! What caused that? Lightening? A cougar stepping on it when it was a seedling? Loggers? Does this tree remind you of anyone you know personally? (There was a crooked man, who smiled a crooked smile; he lived in a crooked house, and walked a crooked mile.)

When non-Indians first came to Southern Florida, they wanted lumber for houses like they had in Europe and the northern states. Unlike the Indians who made chickee roofs from palm leaves, these people wanted wood frames and solid roofs.

Naturally, the pinelands gave them their source to satisfy this need. The pinelands you have walked through were once logged by these very people. Everything here is second-growth. Perhaps wood in your house came from this forest. These new pines are much smaller than those of yesteryear. Give them time, though. Come back in 50 years and see how they are doing.





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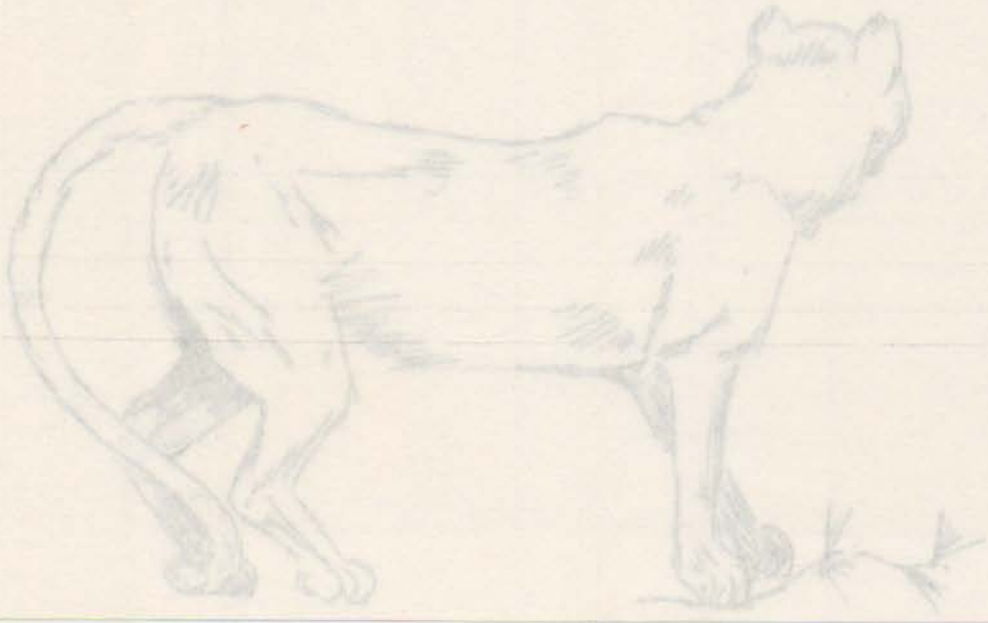
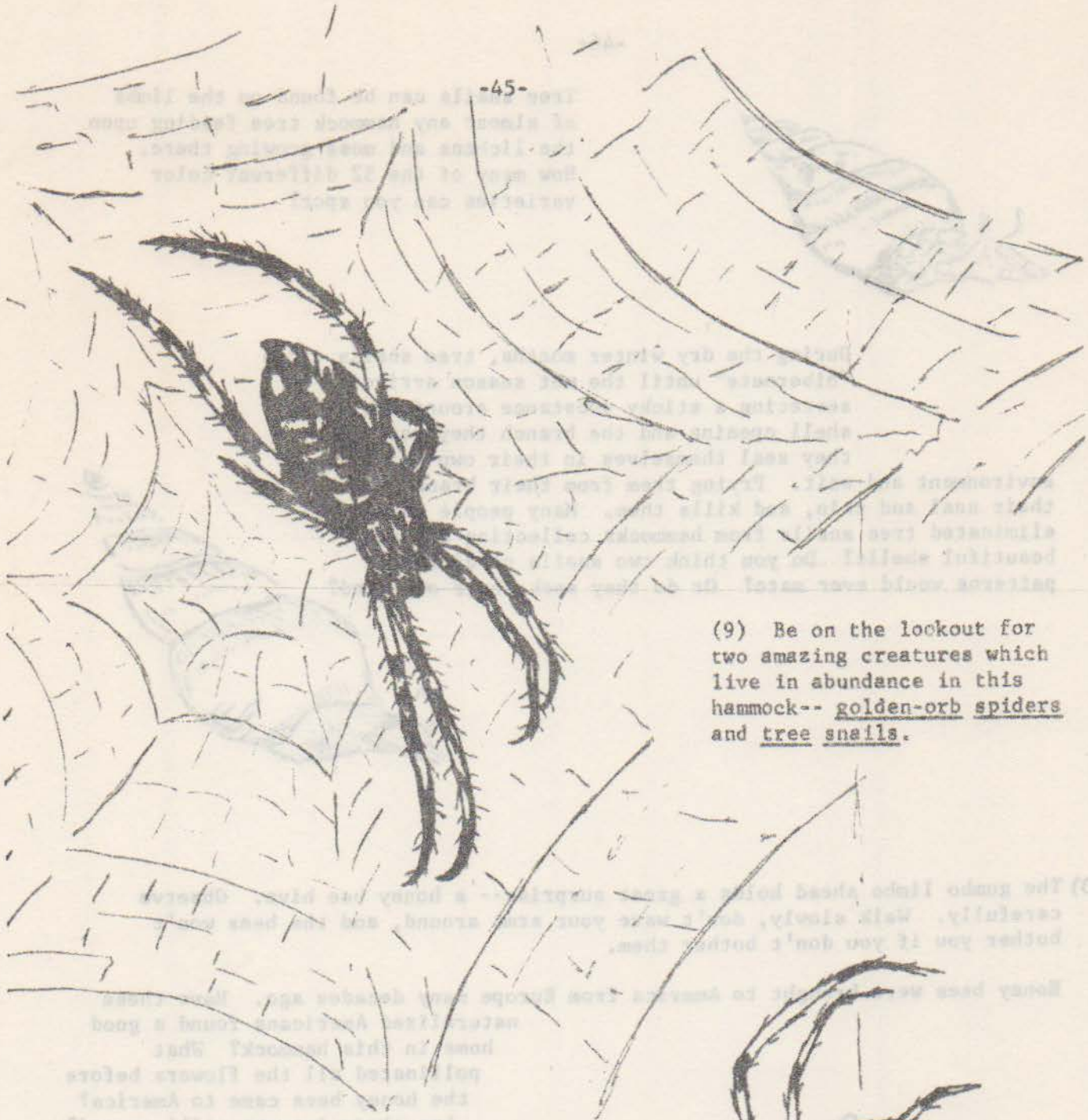
(6) Wow! Look at that crooked tree ahead! What caused that? Lightening? A cougar stepping on it when it was a seedling? Logger? Does this tree remind you of anyone you know personally? (There was a crooked man, who walked a crooked mile; he lived in a crooked house, and walked a crooked mile.)

When non-Indians first came to Southern Florida, they wanted lumber for houses like they had in Europe and the northern states. Unlike the Indians who made chickee roofs from palm leaves, these people wanted wood frames and solid roofs.

Naturally, the pinelands gave them their source to satisfy this need. The pinelands you have walked through were once logged by these very people. Everything here is second-growth. Perhaps wood in your house came from this forest. These new pines are much smaller than those of yesteryear. Give them time, though. Come back in 50 years and see how they are doing.





(9) Be on the lookout for two amazing creatures which live in abundance in this hammock-- <u>golden-orb spiders</u> and <u>tree snails</u>.

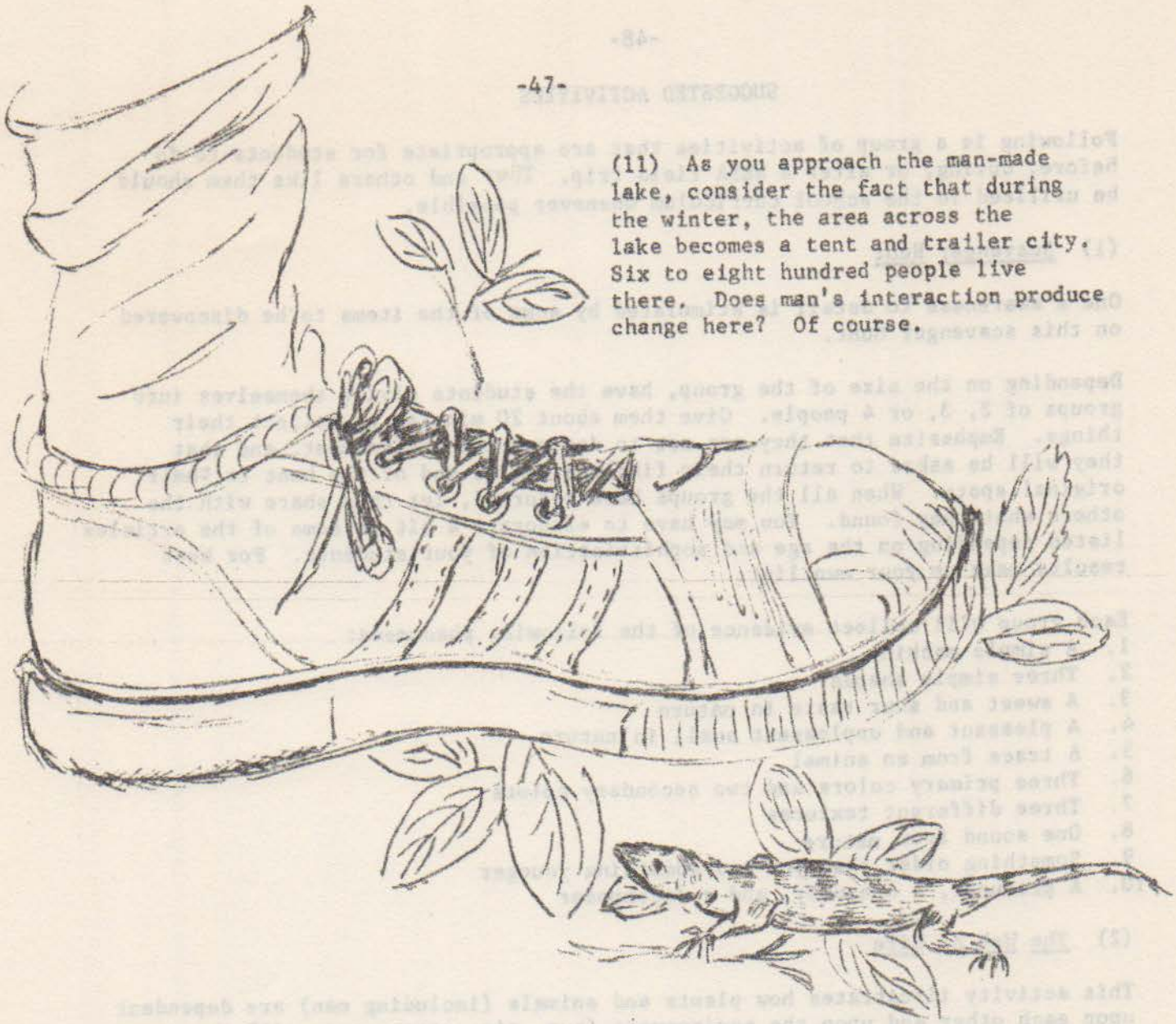
Golden-orb spiders are easier to spot. Just look for the familiar pattern of a giant spider web, with the beautiful spider sitting in the center. Has the spider had a good day? What kind of prey has it been catching? Why is it called golden-orb? Almost all spiders face the ground as they wait for an insect to wander into the web. Is the golden-orb this way? Only female golden-orbs make the giant webs. Can you find the tiny male spiders?

Tree snails can be found on the limbs of almost any hammock tree feeding upon the lichens and moss growing there. How many of the 52 different color varieties can you spot?

During the dry winter months, tree snails often "hibernate" until the wet season arrives. By secreting a sticky substance around their shell opening and the branch they rest upon, they seal themselves in their own moist environment and wait. Prying them from their branch rips their seal and skin, and kills them. Many people have eliminated tree snails from hammocks collecting their beautiful shells? Do you think two snails of different patterns would ever mate? Or do they seek their own kind?

(10) The gumbo limbo ahead holds a great surprise-- a honey bee hive. Observe carefully. Walk slowly, don't wave your arms around, and the bees won't bother you if you don't bother them.

Honey bees were brought to America from Europe many decades ago. Have these naturalized Americans found a good home in this hammock? What pollinated all the flowers before the honey bees came to America? Are those insects still around?



(11) As you approach the man-made lake, consider the fact that during the winter, the area across the lake becomes a tent and trailer city. Six to eight hundred people live there. Does man's interaction produce change here? Of course.

One way man has changed this area is by feeding the two or three alligators which live in the lake. The alligators have become unpredictable and approach people for handouts, rather than avoiding people as they would normally do. This makes them dangerous. When they become too aggressive, they must be destroyed, even though it's not their fault. Is this fair? How should students be taught that feeding wild animals is wrong. Is telling them enough? Or do we have to make them first appreciate the problem and motivate them to alter their behavior. A tough task, but a worthy one to work for. A day at the everglades is a place to start. But it is only a start. Good luck and much success as you carry your experiences back home and to the classroom.

SUGGESTED ACTIVITIES

Following is a group of activities that are appropriate for students to do before, during, or after a NESA field trip. They and others like them should be utilized in the school curriculum whenever possible.

(1) Scavenger Hunt

One's awareness to detail is stimulated by some of the items to be discovered on this scavenger hunt.

Depending on the size of the group, have the students divide themselves into groups of 2, 3, or 4 people. Give them about 20 minutes to collect their things. Emphasize that they are not to destroy the environment, and that they will be asked to return their findings at the end of the hunt to their original spots. When all the groups have returned, let them share with the others what they found. You may have to elaborate a bit on some of the articles listed depending on the age and sophistication of your students. For best results make up your own list.

Each group will collect evidence of the following phenomena:

1. A simple machine
2. Three simple shapes
3. A sweet and sour taste in nature
4. A pleasant and unpleasant smell in nature
5. A trace from an animal
6. Three primary colors and two secondary colors
7. Three different textures
8. One sound from nature
9. Something older than you and something younger
10. A producer, a consumer, and a decomposer

(2) The Web of Life

This activity illustrates how plants and animals (including man) are dependent upon each other and upon the environment (sun, air, water, and soil) for survival through a "web" of interrelationships, and what happens if the web is damaged.

Players form a circle. Each student is given an "I belong" button which identifies him/her as some part of the environment, such as the sun, air, water, soil, different types of plants and animals. Next, the leader unwinds string from player to player, crisscrossing back and forth across the circle. When each player is connected, each is asked to explain his/her importance in the web. Then the leader lets go of his/her end of the string, resulting in an unraveled web. A discussion follows concerning the interrelatedness of all things in the web, and what happens when the web is upset.

(3) Trust Walk

This activity emphasizes the ability to learn things about one's environment

without the sense of sight, as well as the ability to trust one another.

Have students pair up and give each pair a blindfold. One student leads his/her blindfolded partner on a trust walk by having him/her feel things and listen to things. After the walk is over (5-10 minutes) return to the original spot, remove the blindfold, and then see if the student who was blindfolded can recreate the walk he/she just did. Emphasize to the person leading the walk to be the other person's eyes, and to be extremely careful to prevent tripping, etc.

(4) Micro-trail

Small worlds can be as fascinating as big ones, as this activity illustrates.

Each student should gather ten small sticks (1-2 inches long). When a student has ten sticks, issue him/her a strip of colored tape, a magnifier, and a peanut in a shell.

Each student is to "lay out" a minature nature trail, a micro-trail. The trail has to be viewed through the magnifier, and the sticks and tape can be used to mark important points.

After each student finishes his/her micro-trail, announce that they can have visitors at their mini-park; price of admission is one peanut. All visitors have to visit the park on hands and knees, viewing it through a magnifier. Peanuts can be eaten at end of activity.

(5) Attention!

Some plants and animals are adapted to attract attention. This activity explores some of these patterns.

Discuss some of the patterns in nature which attract attention, such as warning signals (white tail on deer), or warning colorations (yellow and black stripes on bees).

After the discussion, have the students create a design which will attract attention in a particular habitat. First, give each student a card and have them write their name and favorite color on it. Then have them choose one of the following patterns and write it on their card: checkered; stripes; rectangles; spots; diamonds; or triangles. Finally, have them choose a habitat and write it on their card from the following: grassy; leafy; rocky; wet.

Now, place all the cards in a hat and have each student draw one other than their own. Don't let them tell whose card they have.

Have each student make a design that will attract attention in the habitat indicated on the card. Each student should use the pattern and color listed, and pick one other color of his own choice. Everyone should make the design as outstanding as possible (have marking pens, paper, etc. on hand) and place it somewhere in the appropriate habitat.

When everyone has finished each person should try to find the design made for him/her.

(6) Touch Bags

The objective of Touch Bags is to help students familiarize themselves with textures found in the environment. It is based on the SPICE theme of Similarities and Differences. You will need a touch bag for every four students; newsprint; pencil; crayons; construction paper; glue; and one paper bag for each student.

Before class, prepare touch bags. Try to include a variety of objects having different textures. Be sure to include natural and man-made objects. Include objects of metal, cloth, and wood.

Originate the activity by organizing the students into groups. Let each student take turns feeling and describing the things in the bag. Either record the words the students use to describe the objects or list them on the board. Have groups swap bags and repeat the procedure.

Ask each student to make up a touch bag for the rest of the class. Caution them not to include objects which might harm someone else. Allow time for exploring the bags.

Next, group students in pairs. Blindfold one student. Remind the students that they are responsible for the safety of their blindfolded partner. Have the other student lead the blindfolded student in touching common objects such as desks, walls, books, carpet, etc. Let the students reverse roles and repeat the procedure.

Follow up these activities by letting the students make rubbings of different textures outdoors. Have them make a touch book, putting a different texture on each page.

(7) The Growing Tree

The young pine tree becomes the focal point for this activity because it directly relates to all of us in its youth. We are all in the process of growth: physical, mental, and spiritual. With "growth" there is always thought of "future." We will consider the future of the young pine tree. For the moment, listen to a very famous tree remark about its future:

> I do not like worrying about the future. I am not altogether on anybody's side, because nobody is altogether on my side, if you understand me: nobody cares for the woods as I care for them.
>
> from Towers by J. R. R. Tolkien

Well, we care hopefully, so let's consider the future of this pine tree. Fire and hardwood trees interact very much with the pine tree. Now, because this pine is in Everglades National Park, it will probably reach its full growth. If fire does not interact with hardwoods and pines, pines will eventually

disappear from the everglades. How:

- if hardwoods are allowed to grow unchecked by fire, they will shade the pines and kill them;
- if hardwoods are allowed to grow before the "shading out" point, fire may rage through the area and, having so much fuel, kill the pine trees as well as the hardwoods;
- if fire comes at regular intervals, the young hardwoods will die out and the pine trees survive because they are fire-resistant.

With this background in mind, try these activities: the pine tree will be the center of the circle (or a student may be selected to play the pine tree). One child is chosen as fire. The rest of the children form a circle around the pine tree to represent young hardwoods. The fire on the outside of the circle attempts to break through the hardwoods to the pine. The fire is only stopped if tapped by two hands (of same tree or two different trees). The fire gets three minutes to accomplish its task. If the fire gets through, he becomes the pine tree (pines increase and hardwoods are reduced in number). If the fire does not get through, then the fire becomes a hardwood and the game must start all over.

(8) Leaf Prints

You will need the following materials:

1. Colored construction paper or assorted color tissue papers
2. Ink Rollers
3. Printing ink
4. Old newspapers (to keep picnic tables clean) or sponges to wipe tables clean.

Have students collect leaves of different shapes, sizes, and textures. Students should place the leaves face down (rough side up) and roll printing ink on them. Place the paper over the inked leaf (do one at a time) and press down until clear print comes out.

Discuss overlapping of prints and color. Contrast ink, paper, and composition.

(9) Rock Friend

Students should increase their awareness of senses other than sight in this activity.

Ask each person to find a rock and to examine it carefully. Tell them to get to know their rock as if it were their best friend. Then ask everyone to pass their rocks to you. Pass the rocks back out to your right and have them identify their rock. After all the rocks have been identified, take the rocks back up. Now have the students close their eyes, and identify their rock by its texture.

Do not tell them in advance why they are feeling the stone and emphasize the importance of not looking at the stone. After everyone has his or her rock, tell them that this is their pet rock, and they may do whatever they want with

it. Suggest that they give it to a special friend without that friend knowing where the rock came from.

(10) Identifying With A Natural Object

The purpose of this activity is to encourage the students to learn to identify with nature. It can also be used as an ice-breaker.

As the students walk along the trail ask each person to pick up a natural object that reminds him or her of themselves. Tell them that these objects will be used in an activity.

In a clearing have the group sit in a circle, talk about why activities are done in a circle. Ask the group what they usually say to a person when they are first introduced (name, school, etc.). Then ask them how much about themselves these things really tell (not very much). Tell them that this time they're going to introduce themselves a little differently. Ask them to tell what they are really like by comparing themselves to the object. The leader should go first, and every student in the group should have a turn. Encourage openness by being open yourself. Explain beforehand that you do not want scientific definitions and do not allow them. By asking leading questions, the leader may guide those participants who have trouble. Always be encouraging!

(11) Angles

This activity increases sensory awareness and illustrates that any object has more than one side to it.

Have the group sit in a circle. The leader picks up a natural object, such as a pine cone, and passes it around the circle. As each person receives the object, he must describe it from a different point of view. Encourage participants to use senses other than their sight. Imagination on the part of the leader is a must.

RULES AND REGULATIONS

The following rules and regulations will help your field trip run more smoothly:

(1) The park and your school system require that one qualified teacher accompany each class. A qualified teacher is one who has participated in a workshop at Everglades National Park either this school year or last school year.

(2) Your students must eat lunch at the picnic area at Long Pine Key. No picnicking at Royal Palm is permitted.

(3) No food of any kind is allowed on the trails. The temptation to feed animals is simply too great. Violations of this rule can result in dismissal from the park.

(4) Students should not be allowed to purchase soft drinks or food at Royal Palm. They should all bring food and drink with them.

(5) Have your day's agenda planned prior to arrival. The workshop you attended should have provided you with some ideas and tools to plan your day. Rangers will help and work within your planned framework.

(6) When you arrive at the Visitor Center, ask a uniformed person to phone the Environmental Education Group to come meet you.

(7) When a ranger-naturalist joins you and your group, please inform him/her of your agenda. Every attempt will be made to assist, but your day should be planned so that you could conduct your activities unassisted. In general, rangers will anticipate an active role at Royal Palm, and a supportive role at Long Pine Key.

(8) Collecting of any type within the park is not permitted.

(9) The throwing of any objects at the wildlife is not permitted. Violations of this rule can result in dismissal from the park.

(10) If you are using a Dade County bus, the maximum carrying capacity is 72 (including teachers). Please do not try to extend this limit. You will be asking the driver to jeopardize his/her license.

FIELD TRIP FOLLY (or HOW TO INSURE THE FAILURE OF YOUR FIELD TRIPS)

1. Do not bother preparing your students for what they are to see and experience.

2. Ignore until the last minute mere details concerning transportation, insurance, parental approval, school administration cooperation and sanction, and other mundane items such as suitable clothes.

3. If you travel by bus, do not take the trouble to look at things along the way. After all, if you do this, the students might learn something while travelling. What is better--"one-hundred bottles of beer on the wall," or an understanding of the area being driven through?

4. When a car caravan is used, you (in the lead car) should spring out at each stop, go to the particular instruction spot, and start talking at once to the few breathless students who have raced after you. If you do this properly, you can be finished and back in the lead car before the last car of the caravan has caught up and its students disembarked.

5. Since you are so good, you obviously do not need to go over the route carefully, prepare a route log with highlights and stops specified, or do other preparatory work. It is only those people who have run many field trips who persist in such silliness.

6. When hiking the trails, get the youngsters strung out as much as possible; then they will not be close enough to hear you or ask questions.

7. Do not pay any attention to the fact that there are resource people as close as the nearest telephone who would be glad to assist you with planning the trip.

8. After the field trip is over, put it out of your mind; and for Pete's sake do not review it with your students.

9. If you faithfully follow these instructions, you too can join the ranks of those who know from experience that field trips are nowhere near as valuable as cut-and-dried classroom instruction. Agassiz did not know what horrible things he started when he said, "Study nature, not books."

(from Wilson Clark at Eastern Montana State College, Billings)

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* Tebeau, Charlton W. 1968. Man in the Everglades. University of Miami Press; Coral Gables, Florida.

Van Matre, Stevern. 1974. Acclimatization. Acclimatizing. American Camping Association; Martinsville, Indiana.

* Available from the Everglades Natural History Association; Everglades National Park; Box 279; Homestead, Florida 33030.

RESOURCE MATERIALS

Adventure in Environment
National Environmental Education Development Materials (K-8)
Silver Burdett Company
Box PM-S
Morristown, New Jersey 07960

Brevard County Environmental Curriculum Materials (K-8)
Center for Environmental Learning
705 Avocado Avenue
Cocoa, Florida 32922

Environmental Studies (all ages)
Addison-Wesley Publishing Company
Menlo Park, California

Martin County Environmental Curriculum Materials (K-8)
Environmental Studies Center
2900 NE Indian Drive
Jensen Beach, Florida 33457

Outdoor Biology Instructional Strategies (OBIS) (4-8)
Lawrence Hall of Science
University of California
Berkeley, California 94720

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A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If I had influence with the good fairy who is supposed to preside over christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from sources of our strength.

If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in. Parents often have a sense of inadequacy when confronted on the one hand with the eager, sensitive mind of a child and on the other hand with a world of complex physical nature, inhabited by a life so various and unfamiliar that it seems hopeless to reduce it to order and knowledge. In a mood of self defeat, they exclaim, "How can I possibly teach my child about nature--why, I don't even know one bird from another!"

I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused--a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love--then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way for the child to know than to put him on a diet of facts he is not ready to assimilate.

Rachel Carson
A Sense of Wonder