

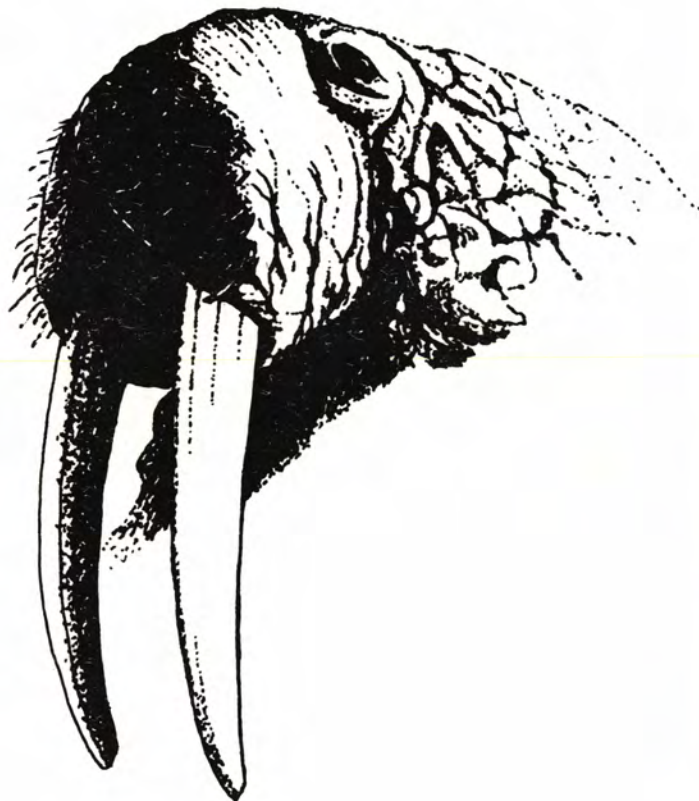
# Nature Study

## Rare and endangered mammals

Indiana Bat  
Spotted Bat  
Black-tailed Prairie Dog  
Utah Prairie Dog  
Kaibab Squirrel  
Delmarva Peninsula Fox Squirrel  
Block Island Meadow Vole  
Beach Meadow Vole  
Gray Whale  
Blue Whale  
Humpback Whale  
Atlantic Right Whale  
Pacific Right Whale  
Bowhead Whale  
Timber Wolf  
Red Wolf  
San Joaquin Kit Fox  
Glacier Bear  
Grizzly Bear  
Black-footed Ferret  
Southern Sea Otter  
Florida Panther  
Ribbon Seal  
Caribbean Monk Seal  
Hawaiian Monk Seal  
Guadalupe Fur Seal  
Florida Manatee or  
Florida Sea Cow  
Tule Elk or Dwarf Elk  
Key Deer  
Columbian White-tailed Deer  
Sonoran Pronghorn  
California Bighorn  
Peninsular Bighorn

## Peripheral mammals

Coatimundi or Chula  
Jaguar  
Jaguarundi  
Ocelot  
Margay  
Woodland Caribou  
Mountain Caribou  
Musk Ox



## **ENDANGERED MAMMALS**

## Status-undetermined mammals

Abert's Squirrel	Round-tailed Muskrat
Eastern Fox Squirrel	Polar Bear
Texas Kangaroo Rat	Pine Marten
Big-eared Kangaroo Rat	Fisher
Salt-marsh Harvest Mouse	Everglades Mink
Guadalupe Mountain Vole	Wolverine
Louisiana Vole	Canada Lynx
Florida Water Rat or	Elephant Seal



# Study Nature In Nature



*John J. Padalino – President, ANSS*

One recommendation of the United Nations conference on Human Environment convened in Stockholm 1972 was for organizations to “. . . take the necessary steps to establish an international program in environmental education, interdisciplinary in approach, in school and out-of-school, encompassing all levels of education, and directed towards the general public.”

As one of this nation’s more venerable environmental education organizations the American Nature Study Society has as one of its tenets to study nature in nature, to make “. . . truthful observations that may, like beads on a string, finally be threaded upon the understanding and thus held together as a logical and harmonious whole.” As we approach the Society’s diamond jubilee we will be directing our energies to places where nature study occurs—the city, the coast, the field, and nature centers, involving endangered species, early adolescents, and special populations including the handicapped.

Though the 1970’s were a decade of historic environmental achievement, we may now focus our efforts on helping people to develop sufficient concern for the aesthetic aspects of environments.

– John J. Padalino

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# Nature Study

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*Cover Illustration: The Atlantic Walrus by Kathleen Blanchard-French. Although not extinct, the mammal has been extirpated from New England. Endangered mammals list adapted from Rare and Endangered Fish and Wildlife of the United States (Washington, D.C.: 1966).*

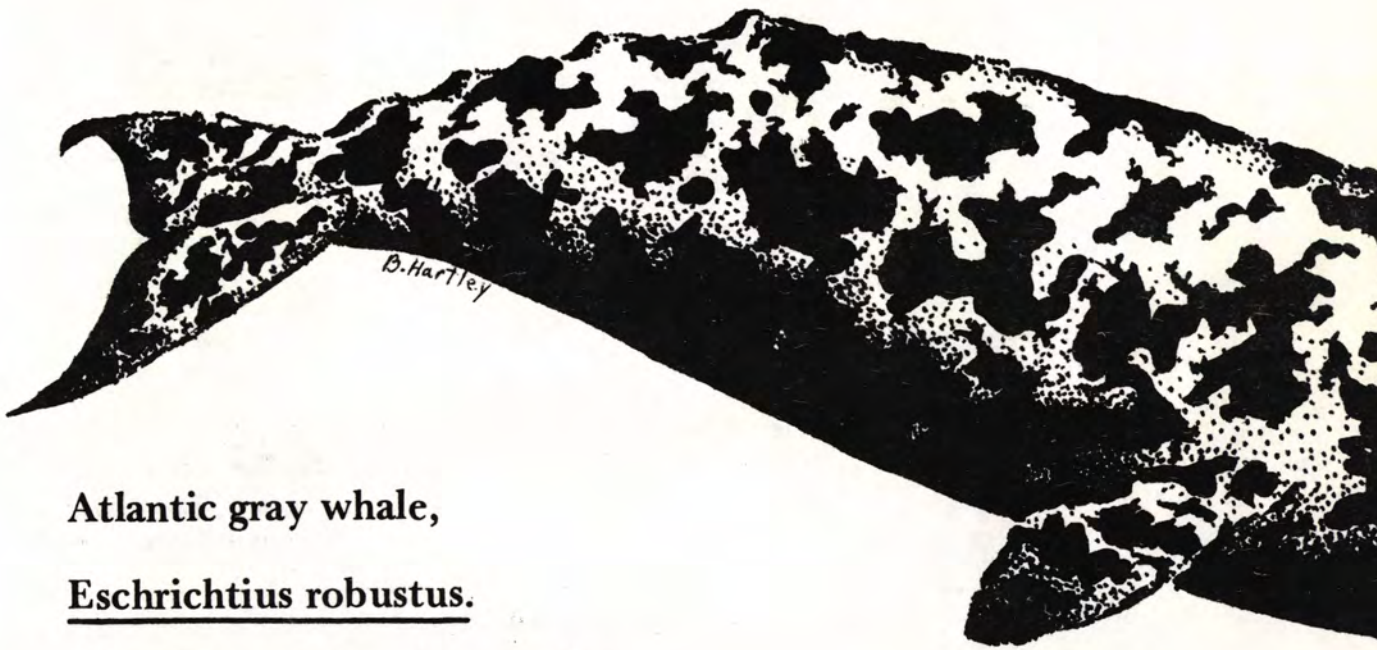
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JUNE, 1980

The 17th and 18th  
centuries were  
a gloomy era  
for North American  
wildlife.

## New England's



Atlantic gray whale,  
Eschrichtius robustus.

Virtually no historic records  
of this animal are  
available today.



# EARLY LOSSES

by Kathleen Blanchard-French

**OF THE MANY GEOGRAPHIC** regions of North America which have suffered human exploitation, among the earliest hit was the Northeast coast. Studded bays, jagged inlets, and rocky islands characterize this rugged, fog-bound coast. Stretching from Maine to Nova Scotia to Newfoundland and the Labrador Peninsula, it is the home for a relatively few species of birds and mammals which are uniquely adapted to the harshness and rigors of oceanic or coastal life.

Seabird species in the alcid group—puffins, murre, razor-bills, and great auks—concentrated by the hundreds and thousands at breeding sites on rocky islands; hence, they were particularly vulnerable to the egg and millinery trade and the opportunistic endeavors of many individuals for cheap, plentiful meat. Massive, slow whales were

also easy targets for exploitation—with blubber, bales, teeth, and other parts being turned into cosmetics, perfumes, corsets, pet foods, and oil for lighting the homes of settlers in America and their forebears in Europe.

These were the "limitless resources" which amazed explorers like Cartier and others in the 1500s. But populations of some, like the Labrador duck, sea mink, and Atlantic gray whale, may have already been small by then. Few people later remembered them. Today we have only the barest of knowledge concerning their habits, distribution, and general appearances. It is perhaps ironic that in order to learn about some of these animals which lived a mere 200 years ago, scientists must resort to subfossil bones from shell heaps and archeological sites, comparing whatever bits they unearth to similar living forms.

**WHO WERE THESE** animals that were led either to extinction or extirpation from the Northeast coast? Although knowledge about them is severely limited,

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*KATHLEEN BLANCHARD-FRENCH is Assistant Director of Atlantic Center for the Environment, Ipswich, Massachusetts.*



# Till Death

## Do Us

### Part

by Karen Nolan



**WHALEWATCHING HAS** become popular. In Baja California, Cape Cod, Hawaii, and Long Island, reservations must be made far in advance for a daytrip to see the whales dive beneath the boat. Raised on the tales of Moby Dick and charmed by those strangely gentle, small eyes in such huge bodies, many Americans thrill at the sight of the humpback and the beluga.

Behind the almost wistful and always wondering awe inherent in the tourists' reactions is an underlying current of anger. When the last whale has disappeared and the excitement has died down a little, an ever recurrent thought occurs: "How can anyone kill an animal like that?"

The plight of the whale has become one of the rallying cries of the environmental movement. For millenia these ocean giants were plentiful and roamed freely. Yet within a span of only fifty years their numbers dwindled rapidly due to one reason, which is simply that humans found a use for the whale.

Early on in the history of whaling, men set out in boats from the shore when a whale was sighted. The catch was small and incidental. After an industry became

organized, and ships were built expressly for the two-year voyages and world-wide searches, it was relatively soon that new inventions improved this dangerous but successful business. The whale harvest increased. When the cannon-fired harpoon appeared, and steam ships became reliable, it was not long before it was possible to process a whale within one hour. That left a lot of time to look for more whales.

#### **CONSIDER THE BLUE WHALE.**

The largest mammal on earth, this whale can reach 100 feet long and weigh 150 tons. Its size made it attractive to the whale hunters, and this whale, of them all, was hunted the most diligently. In 1935, 16,500 blue whales were harvested in Anarctica; meanwhile, the combined total of all other species was 1,800. Due to this popularity, the number of blue whales declined from an estimated 100,000 whales in 1934 to fewer than 32,000 in 1942. By 1965, only 4,400 blue whales were left. By international law, it is now illegal to hunt the blue whale.

The blue whale is an endangered species. In other words, it could, with very little provocation, become extinct.

Extinction is normal; it is the fate of every living species. A plant or animal evolves over thousands and millions of years. During this time, it is subjected to a great variety of climatic and geologic

changes. The species must adapt to every new condition, or its population will dwindle and finally, the species will cease to exist.

Every living species has a distinct role to play in its particular ecosystem. When one species becomes less capable of functioning successfully, another species will fill the gap. Lucretius, in "On the Nature of Things" wrote an early definition of evolution: "Nothing remains forever; what is was. Everything is on the move. Everything is transformed by nature and forced into new paths. One thing, withered by time, decays and dwindles. Another emerges from ignominy and waxes strong. So the nature of the world as a whole is altered by age."

**THE GREAT HORROR** about the small number of blue whales, like that of almost every other endangered species today, is that the whale's evolutionary timetable had not yet run out; it was still quite capable of functioning within the ecosystem to which it had adapted. It was outside rules—human rules—which led to the very near demise of a species.

Some people are beginning to ask themselves, "Do I have the right?" Others—in fact most people—answer, "Yes, I certainly do." Humans are the dominant figure on the earth today. The dominant figure will always put great pressure upon the

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*KAREN NOLAN is Secretary of the American Nature Study Society.*



other species. What the issue of endangered species is asking is: "Aren't we putting an *excessive* amount of pressure upon other living species, and by so doing, digging our own species' grave?"

**ENDANGERED SPECIES** is probably the most popular issue of the environmental movement. Vertebrates, and mammals in particular, provoke the most sympathy: it is easier to feel sorrow after looking at the gentle eyes of the seal than to rid oneself of that primordial fear of beetles.

Two-thirds of the species that ever existed on earth are extinct. Like the dinosaur, their time ran out. However, extinction is a rare event. It occurs normally only during climatic and geologic upheavals. These events, in fact, take place over millions of years, so that for instance, while most of us think the dinosaurs disappeared fairly rapidly, it in fact took a million years. One species of dinosaur became extinct every thousand years.

In contrast, during the last 2,000 years, 250 species are said to have become extinct. What is appalling is that more than one-third of them have become extinct since 1850. The rate is also accelerating: today, over 800 mammals, birds, reptiles and amphibians are endangered. Fully one-tenth of the world's plants, that is 20,000 flowers, trees, etc., are in the same position. No one knows the precise number of fish and invertebrates.

A species becomes what we call endangered when it cannot maintain a sufficient number of individuals to maintain the species' existence; in other words, when more individuals die than are born. There are a number of reasons why this should happen.

If an ecosystem is disrupted, a number of species are displaced. Food, water and shelter are lost. A sudden plague, viruses and other diseases are common causes of death. Predators, if too numerous, may deplete the colony.

Lately, the most usual reason for species' loss is exploitation, that is, human exploitation. This happens in several ways: either by the use and/or destruction of the habitat, or direct use of the species itself.

**INDIRECT CAUSES**, such as forest clearings, draining swamps, buildings and industries displace huge numbers of life forms. One particularly obvious and horrifying example of the problems caused by such actions is evident in Hawaii. Fully

half, more than 900 species, of Hawaii's plants are in danger of becoming extinct. There are 250 species already extinct.

The myriad forms of pollution and the lavish use of chemicals are as responsible for the decimation of wildlife as land use. The effects of these actions may occur in places and things where one would never expect them. DDT and its cousins have been well-publicized, for both their good and bad points.

However, the most obvious form of exploitation is that of hunting on massive scales, without regard to the animal or plant population as a whole.

During the nineteenth century, there were many adventurers who sought fame and fortune by searching for rare orchids. There are quite a few extinct orchids today. One reason for the search was the same as for the whale hunt: money.

There are other reasons for overharvesting what is, after all, a limited supply. One is plain sport, the most obvious example of which is the story of the bison. The Eastern bison was extinct by 1850. It is believed that in 1700, 60 million bison roamed America. Easy prey for rough men, they were the targets of hunting parties leaning out of train windows when the west was the frontier. The hero, Buffalo Bill, shot 250 buffalo one day for a great culinary delicacy, their tongue. By 1890 only a few dozen buffalo were left.

Today, luckily, game species are strictly regulated to prevent this possibility from occurring again.

It was too late, however, for the passenger pigeon, which like duck and geese, was a favorite game food of early America. In 1808 Alexander Wilson, the father of American ornithology, counted 2,230,272,000 passenger pigeons in a single roost in Louisville, Kentucky. The roost was not unusual; huge swarms of pigeons covered the eastern United States at that time. The pigeon was a docile bird and easy prey. The usual manner of hunting consisted of groups of men entering the woods where the birds nested, shaking the trees to drop them from the nests, and simply clubbing or poling the birds. The men then took what they wanted and allowed the hogs to eat the rest.

In 1860, the passenger pigeon was abundant. Twenty years later there were no longer any large flocks. The last one died in the Cincinnati Zoo in 1914.

**FASHION HAS ALSO BEEN** a major reason for depletion of a species. In fact, many of the older environmental so-

cieties were founded during the early part of the 20th century to protest the use of animals for the momentary whims of the fashion world. Imagine how many ostriches met their fate in 1912 to supply the 161 tons of ostrich feathers imported to France. In that same year, 86,315 herons and cranes, 26,618 birds of paradise, and 27,650 crown doves were killed for the London fashion industry. Alligators, tigers, otters and a great many others met similar fates.

Although there have been many laws during this century making it illegal to hunt animals, it has not put an end to such profitable businesses. Poaching continues. The gyrfalcon, that marvelous predator of the north, is reputed to sell for \$25,000 on the black market.

Nor can old prejudices be easily erased. Predators in particular are subjected to the angers of their enemy, humans. Wolves are said to be fond of deer and cattle. Hawks are rumored to like lamb, foxes are fond of chicken coops. It is not whether these statements are true, but the power of these beliefs that are important to the status of a species. A wolf may be part of an endangered species, but will that stop the man who thinks it is eating his cattle, which are his livelihood?

*"Extinction is normal;  
it is the fate of every  
living species."*

**IN THE UNITED STATES** there are 800 species of birds, 400 species of mammals, 460 reptiles and amphibians, 660 freshwater fishes and thousands of invertebrates. Although it is difficult to tell from early records, the U.S. Fish and Wildlife Service estimates that 32 birds, nine mammals and six fishes have become extinct since the coming of the Europeans.

There are 20,000 plants in the United States. The Smithsonian Institution lists ten percent as endangered, while 100 are extinct. Efforts to preserve these species are young, and meet with much opposition.

The major method of preserving a species is through habitat protection. Typical measures include suspending the commercial use of the species, control of pesticides and pollutants, preserving the natural habitat, suppressing pests and non-

*(continued, page 18)*



# definitely not a zoo

by Wendolyn Tetlow

ON A QUIET country lane southwest of the Great Swamp at the foot of the Watchung Ridge near Millington, New Jersey, you may pass a small sign by the side of the road that says New Jersey Raptor Association. Beyond the sign is a modest house among the trees surrounded by numerous wood and wire structures that, at first glance, look something like kennels or tidy farm buildings. But inside these neatly painted units are bright-eyed owls, alert red-tailed hawks, sprightly kestrels, and sometimes a goshawk or peregrine falcon. People who don't know what the word raptor means stop to ask if they can

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WENDOLYN TETLOW is a New Jersey writer specializing in environmental topics.



*Leonard Soucy with Cornell-raised peregrine falcon—  
one wing had to be amputated*

see the animals in the zoo. Leonard J. Soucy, Jr., President of the New Jersey Raptor Association (NJRA), enthusiastically welcomes passersby, but as he shows them around, he tells them, "This is *not* a zoo . . . it is a rehabilitation center for birds of prey."

Years ago, the NJRA began as a small group of people interested in predators. Today it is a private, non-profit, tax-exempt organization with a membership of 300 dedicated to rehabilitating injured or orphaned raptors, and to educating people about the importance of birds of prey, many of which are on the Federal and state endangered or threatened species lists. "We're not asking people to like them," says Soucy. "We're just asking for tolerance . . . for people to leave them alone. Respect can come later."

**WHEN NEIGHBORS** and friends found out about Soucy's interest, they began to give him injured raptors they had found. "I started out with a cellar and cardboard boxes," he says. But in the past seven years, the rehabilitation center has grown to as many as 135 at one time in large, airy outdoor facilities. The newest building is a 40-foot flight pen, built in part by money donated by the Summit Nature Club. Inside the pen a tenacious goshawk flies back and forth strengthening a wing that was broken in two places. Found riddled with gunshot in northwest New Jersey during the migration season, it was brought to Soucy who was able to remove the gunshot with the assistance of a veterinarian and carefully set the wing. And because of the new exercise pen, it is only a matter of weeks before the gos-



hawk is strong enough to be on its way.

Another smaller building is a heated facility where severely injured birds can recuperate. A screech owl with seared feathers is currently recovering here after being removed from a chimney. When the bird molts completely and regains its strength, it will be released. This building also houses a freezer that contains over 2,000 rats and mice—food for the raptors.

Not all, like the goshawk and screech owl, can be released, however. Some orphans, such as the young barn owl Soucy raised from an egg, are "imprinted on man" (dependent upon man) and cannot function on their own in the wild. These are either retained at the rehabilitation center for educational purposes or transferred to other state and Federally-licensed individuals or institutions interested in stimulating public awareness of raptors.

However, of the 1,000 raptors that have been handled at the rehabilitation center, 56% have been released. During a two-year period, from 1977 to 1979, 235 birds of prey, many endangered or threatened, were successfully rehabilitated. These included 107 owls, 86 kestrels, 34 buteos, 1 goshawk, 1 harrier, 1 sharp-shinned hawk, and 1 peregrine falcon.

**MOST RAPTORS** are admitted to the rehabilitation center in the spring and fall. "Sometimes in the spring a kestrel finds a perfect hole in a tree for five eggs," says Soucy, "but the time comes when that hole isn't big enough for five fat fledglings, and sooner or later someone gets shoved out. This is when people bring me abandoned birds." In one year three adult kestrels at the rehabilitation center fled and fledged 47 orphaned kestrels.

In the fall many are injured by hunters. A peregrine falcon raised by Cornell University Laboratory of Ornithology in 1978 and released at Sedge Island near Barnegat was found injured by gunshot at Hackensack Meadows. The NJRA was able to revive it, but had to amputate one wing. The falcon is now being used as an educational tool by the NJRA.

Soucy does not like to keep raptors like the peregrine falcon in a cage for long, but when he does, he makes good use of it. "Letting 25 kids touch and see it up close beats all the books they can read about them," says Soucy. By taking non-releasable raptors to lectures at public schools, clubs and organizations, Soucy

and other members who lecture for the NJRA are able to dispel some of the myths about birds of prey. "You can tell people that a hawk will eat a snake or a rat, and they'll accept it. But to tell them that a hawk will take a harmless bunny . . . well, that's a different matter! What we really want people to see is that a 3/4 pound raptor isn't going to make off with their pet collie or baby brother."

Rehabilitation and fostering interest in and concern about birds of prey are only half the NJRA's goals. On call 24 hours a day, members have relocated raptors from many unusual places. Soucy removed a kestrel using 30 meters of nets from a large warehouse in an industrial complex. "It had been there for three days but they found out that a health inspector was going to pay a visit that week, so they called me and said, 'Quick, get this bird out of here.'" Others are commonly removed from hatcheries and game farms. "We try to tell people that removing one red-tailed hawk or great horned owl isn't going to solve their problem because another will soon find its way in . . . we even offer to put wire over the tops of pens at the game farms to keep the hawks and owls from getting in."

Another of the NJRA's main concerns is a banding project done on the Kittatinny Mountain in northwest New Jersey in cooperation with the U.S. Department of the Interior, Fish and Wildlife Service. The seven members of this project are licensed by the Federal Government and the State of New Jersey to band migrating raptors. From late August to early December 1979 they spent 900 hours on the Kittatinny Mountain at two different locations, banding 990 individuals. Although the main purpose of the banding project is to discern population trends, the banders also record abnormalities such as deformities or albinism and treat injured birds. For example, in 1979 quills were removed from the talons of an injured golden eagle. And a red-tailed hawk was treated for a broken leg.

**TO LURE THE RAPTORS** into the traps pigeons, starlings or house sparrows are placed in leather harnesses in an open area on the mountain top and controlled by strings from within a nearby camouflaged blind. When a hawk flies overhead, the bander in the blind pulls the strings and moves the pigeon to attract the raptor's attention. If the raptor dives on the lure, the bander quickly

springs the trap as the raptor lands. Large species of raptors are trapped in strong mesh nets that are placed on the ground, and smaller species are caught in barely-visible mist nets that hang from poles placed around the lure.

Once the raptor is caught, it is weighed, measured, sexed, its overall condition checked, and an aluminum band placed on its leg. Then it is immediately released to minimize trauma.

Even though only one to two percent of the bands are returned, useful information has resulted from these returns. For instance, a merlin was reported in Cuba three weeks after it was banded on the Kittatinny Mountain. As Soucy says, "That bird was traveling!"

Over a period of 10 years, the NJRA banders marked 5,594 individuals, including endangered and threatened species such as 2 bald eagles, 4 peregrine falcons, 20 merlins, 45 red-shouldered hawks, and 16 harriers. This data is submitted to the Fish and Wildlife Laboratory in Patuxent, Maryland, where it is stored in a computer and made available to individuals for research purposes. The data is also sent to the Hawk Migration Association of North America which compiles and publishes data reported by interested organizations participating in the annual hawk migration along the North American flyways.

In a continuing effort to support Federal and State agencies on raptor-related affairs, the NJRA cooperates with the National Wildlife Federation and the New Jersey Division of Fish, Game and Shellfisheries in conducting the Annual Mid-Winter Bald Eagle Census in New Jersey. In 1979 this nation-wide count revealed a total of 9,834 bald eagles in the lower 48 states, 6 reported in New Jersey by the NJRA.

**ON THE STATE LEVEL**, the NJRA has supported the New Jersey osprey recovery program along the New Jersey coast, a program initiated by the New Jersey Department of Environmental Protection that is attempting to reestablish endangered ospreys by transplanting fertile eggs from nest sites in Maryland and Virginia to nests in New Jersey. Because members of the NJRA are experienced in handling birds, they were once called to rescue a female osprey whose head and one wing were caught in a plastic six-pack holder at a nesting site in Sandy Hook—eventual death for her and her young.

*(continued, page 19)*



The bushy-tailed "weed"  
of the dog family is  
moving east.

# COYOTES ON THE MOVE

by John I. Green

**THE COYOTE**, casually loping over the crusty snow of a northeastern field, is my candidate for one of the least endangered mammals. Unlike the timber wolf and the mountain lion, both of which are extinct in the northeastern United States, this bushy-tailed "weed" of the dog family has successfully adapted to the human demands made on rural territory.

Mountain lions and wolves require extensive wilderness ranges, which are rare in the northeast. As Olympic ski jumps, highways and villages are built, the coyote stepped in to fill the gap the lion and wolf left in the ecological food chain. Capable of living in farming country, the coyote actually moved eastward from the mid-west, and occupied New York for the first time in the 1930's. By the 1970's, the coyote was a regular feature of the New England rural landscape.

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*Past ANSS President JOHN I. GREEN is Professor of Biology at St. Lawrence University.*

Frequently food habits are the limiting factor in survival of a species as environmental quality deteriorates. The coyote food list contains a wide variety of species. There's no doubt about the carnivorous habits of coyotes, but the animal's success where humans are a part of the landscape is due to its omnivorous habits. In northern New York, coyotes steadfastly pursue snowshoe hares, and bring down an occasional white-tailed deer. Unfortunately some individuals also develop a taste for sheep. They are opportunistic and will scavenge anything from dead cows and green apples to a stray cattail fruit lodged in the winter's ice. Any flavor will do!

Soon after the coyote adapts to a new area calls for control and for the reinstitution of the archaic bounty system are heard. Wildlife management laws which designate special seasons for hunting and trapping the animal may save the species if not the individual. The presence of coyotes is a plus for all, bringing a wolf-

like element into the human-encumbered ecosystem. Actually, the name "brush-wolf," shortened by many to "wolf" connotes a romantic notion of danger and fearful nights around a campfire that the coyote and even the timber wolf can only live up to in "reel" life.

**THE SOCIAL TIES** among coyotes are not strong. Loose family packs of parents and young travel together the first summer, then break up, usually in late December, as pairs take off alone. They mate in winter and the young are born in spring.

This is the critical time for the coyote family. The bitch reacts to danger swiftly by moving her family of six or more pups to a new site. Over a dozen well-dug dens made by one family may be found within a square mile. Males also take responsibility both for guarding the dens and for feeding the mother and pups by regurgitation. Rarely, an aunt will help the parents care for the litter.



In open country, coyotes are relatively easy to observe. In the forested northeast this is best done when snow is present. When the snow conditions are right my students go out in groups of three, traveling on foot, snowshoes or cross-country skis behind the wandering animals.

They have already been trained with compass and map reading exercises and cold weather first aid. They have the skills of tree and shrub identification essential to an accurate description of habitat, as well as a list of local raptors and mammals. Their day-packs contain a topographic map, compass, first aid kit, waterproof markers, and fire starters. We add a

handle to a quart can to boil water for hot soup and cocoa.

#### WHEN TRACKS ARE FOUND

one group follows them while another backtracks. Students sketch the tracks directly on a mimeographed map of the area while they seek answers to behavior, prey species, hunting success, and distance travelled.

By doing each day's trip on a separate map and keeping records from year to year, ideas of population density and population cycles take on meaning. As E. Lawrence Palmer once wrote in *Nature Magazine*, "He who runs may be read."

**WHETHER ONE** starts with a coyote or fox track or even the tracks of local dogs much can be learned by this kind of study. Books can be used to enlarge the concepts of worldwide canid species such as the hyena in Jane Goodall's *Innocent Killers*, or to bring the meaning close to home with *Canis familiaris* in Lorenz' *Man Meets Dog*. Field study can be supplemented by Hope Ryden's delightful book, *God's Dogs*, which describes the coyote as "Flexible in his habits, cooperative with his kind, opportunistic by nature, catholic in his tastes, capable of observational learning, suspicious, tough, ingenious." □



Coyote paw prints. Coyotes often attain speeds of up to 40 m.p.h. in pursuing fast game.

## Caring for Injured Baby Birds

Most people want to take care of the sick animals and baby birds they find. This concern is admirable; however, leave the creature alone!

Every spring nature centers are besieged with telephone calls requesting help in caring for the baby sparrow found at the base of a tree, alone and unable to fly. The callers fear the parents have deserted the fledgling, which is unable to fend for itself and will soon die. This fear is needless; in most cases the bird has not been abandoned. Parent songbirds often leave their infants for extended periods of time while searching for food. Likewise, most birds leave the nest before they are capable of sustained flight. The wisest move a human can make upon finding a baby bird is to let it remain where it is. The parent birds will find it.

Sometimes, the bird actually is aban-

doned. This is a sick bird, one which has parasites or internal diseases. Nor is it unusual for the weakest of a brood to be pushed from the nest by its parents or siblings. If a nest has been blown from a tree, return it as near as possible to the original place. If you have handled the bird, replace it where you found it, or perhaps, if it has feathers, put in on a branch out of the reach of predators.

Many people, however, are not hard-hearted enough to accept this procedure and attempt to care for the bird themselves. Thus, they subject themselves to a schedule of feedings every 15 to 30 minutes for two weeks. Nor does this practice guarantee the animal's survival; many people assist in the bird's demise by feeding the wrong food. Bread, one popular diet, is a sure mistake. The best diet consists of a mixture of baby pablum or egg

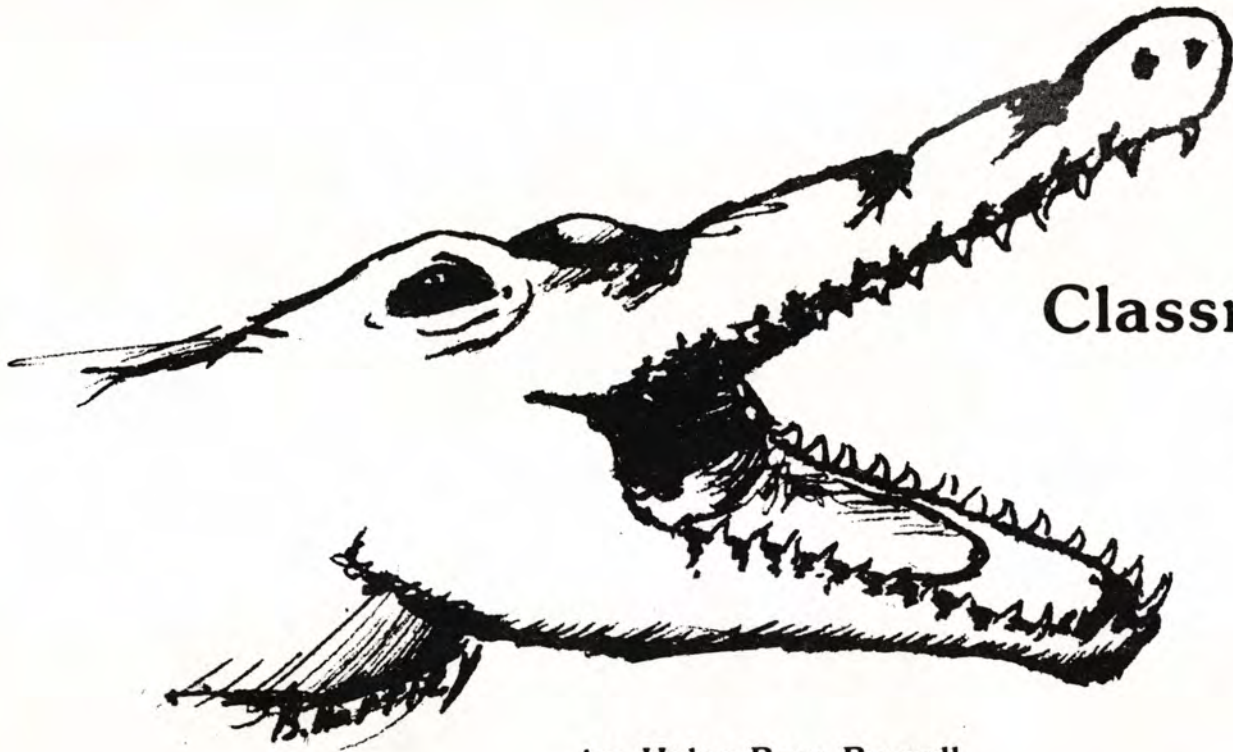
yolk and water, fed with an eye dropper.

There comes a time when the bird must be released into the wild. A released bird's chances for survival are very small. It has a severe handicap because the bird has not learned to fend for itself. Only its parents can teach it what to eat, and where this food can be found. There is also the problem of predators, which the bird has not learned to fear.

There is one factor not many people are aware of: special federal and state permits are required to treat wildlife. The requirements for obtaining these permits are stringent, and there are few people who have them. Caring for these animals is tricky and requires much time—if you cannot ignore the baby bird, call the nearest nature center for advice.

— Karen Nolan □





## Classroom

## Pets ?

by Helen Ross Russell

**MOST COURSES** of study urge teachers to keep pets in the classroom. They say that pets: 1. Help children to understand animals and their needs, 2. Help to teach interrelationships, 3. Teach growth and reproduction, 4. Develop a caring sense of responsibility, 5. Provide a lonely child with something to love.

Actually the introduction of pets into the classroom does not guarantee any of these things without careful teaching. All too frequently the lessons taught by classroom pets are negative, irresponsible and tragic. Think about these true stories for a few minutes. A ten gallon terrarium with sand, a pan of water, a dead branch and a cactus was the "home" of a twelve-inch long lizard. I had caught glimpses of this lizard when I travelled in a third world country, they were quick glimpses because the animal always dashed out of sight. This specimen lay still, it had no place to dash. It wasn't stalking food, there was no food for it to stalk.

I asked, "What do you have here?"

"A lizard."

"What kind?"

"I don't know."

"Where did it come from?"

"The pet store."

"Where did the pet store get it?"

"I don't know."

"Why do you have sand in the terrarium?"

"Because the man at the pet store told us to."

"What does it eat?"

"Mealy worms."

"What are mealy worms?"

"A kind of worm that the pet store sold us."

"Why did you buy a lizard?"

"Because we wanted a pet and we wanted something different. We had a rabbit last year and a guinea pig the year before. They have a python up in sixth grade but that costs too much."

I went to the sixth grade. A beautiful six-foot python was established in a ten-gallon terrarium. Nearby was a round bowl with two dozen goldfish. The fish were gasping for air at the water surface.

I said, "These fish are going to die of suffocation. There are too many in the bowl, the water is warm, and there aren't any green plants to release oxygen."

"Oh, that doesn't matter. We only have the fish to feed to the snake."

At least one classroom in almost any school will have a ten-gallon straight sided aquarium housing a half-dozen handsome goldfish. They have no oxygen problem even though many of the aquariums have no plants. A motor runs twenty-four hours, filtering the water and introducing

air. When I question the teacher the answer invariably is, "It doesn't use THAT MUCH energy, and it is so easy." Balancing an aquarium with fish and plants and snails is difficult; but isn't this interrelationship what aquariums are about?

**THE STORIES** could go on and on: the white mouse mother who killed and ate her babies and dismayed her early childhood owners; the female hamster that killed her mate and upset a fourth grade. Both animals were reacting to an unnatural situation in a perfectly natural way. Many rodents will kill their young when they are upset, and too much supervision of birthing and nursing can be upsetting. Hamster females are notoriously aggressive where males are concerned. In the wild males avoid females unless they are in heat, and they leave the area quickly after mating, but in a cage a male has no way to escape an angry female.

**EXPERIENCES** like these are disturbing. No one enjoys witnessing infanticide, murder, and cannibalism; and when we have been the unwitting but undeniable cause of these actions, our sadness is two-fold. It takes a knowledgeable teacher skilled in helping youngsters to analyze the situation and talk out their fears, unhappiness and anger to keep the situation



from becoming a major tragedy that can permanently destroy children's enjoyment of animals.

Badly managed, snakes as pets can turn off children and increase fears. In one classroom that I visited the teacher owned a python. He loved snakes and was impatient with anyone who did not appreciate their beauty. He fed the python live white mice. More than half of the class found this objectionable. In fact, after living with the snake for a month and being subjected to weekly mouse feedings, anger and dislike were the dominant classroom feelings.

There can be no doubt that watching a snake feed can be a fascinating experience, but I felt a strong empathy for the rebellious students. Watching a constrictor kill and eat mice that cannot possibly escape, loses value geometrically with repeated performances.

In fact, the presence of pythons raises serious questions. Pythons, many lizards, land hermit crabs, parrots, many tropical fish, monkeys come to us from third world countries of the tropics. They are captured in the wild, flown here and sold to live in homes and schools as pets. Many will die quickly. None will reproduce and carry on their species. All are torn from the fabric of a delicate ecosystem. There are laws prohibiting the importation of endangered species—dead or alive. But how long will a species remain unendangered when it is treated in this way, and when we teach our children that this is not only acceptable but a good thing to do?

Until the second half of the twentieth century pets were largely limited to a few domesticated species: dogs, cats, ponies, burros, guinea pigs, goldfish, guppies, rabbits, pigeons, canaries and some parrots. It was common practice to trap and cage wild birds in the Victorian period, but bird protection laws eliminated this practice in the United States in the early twentieth century.

In the late 1920's and 1930's the sale of baby alligators as pets along with wholesale harvesting for leather led to these ancient reptiles becoming an endangered species. (Under protection they have made a comeback and today need control in some areas.) Baby alligators, if they survived as pets, grew into smelly, aggressive, dangerous reptiles, that usurped family bathtubs, got dumped on zoo and college science department doorsteps, or were released in bodies of fresh water cre-

ating serious problems for all concerned until they were killed by winter weather.

Soon a new pet, baby turtles, replaced them. Most baby turtles came from southern United States. They appeared in five and ten cent stores in two forms *au naturel* and with decorated shells. The main difference between the two was that turtles with painted shells died sooner. Today only adult turtles are sold as pets. Some are kidnapped in third world countries, some are native species.

With all the pressure on both reptiles and amphibians with water pollution, acid rain, receding habitat and breeding areas all over the world, resulting in diminished numbers everywhere, turtles, snakes, lizards, salamanders, toads and frogs do not belong on the pet market.

**PET SELECTION** and use in classrooms should be based on several considerations.

1. It should be a domestic animal that has been reared in captivity and is capable of reproduction there, i.e., dogs, cats, rats, mice, rabbits, hamsters, gerbils, canaries, parakeets, pigeons, goldfish, guppies, some tropical fish, and *Anolis*, the American chameleon.

2. It should fit the classroom situation. Dogs and cats are not suited for classroom situations. It is illegal to have birds in many states. Guppies and tropical fish require specialized equipment and care.

3. How will the animal interact with the children? For twenty years I carried the scar inflicted by a "friendly" female hamster. Many hamsters are good pets but it isn't safe to generalize—they vary just as dogs and cats do. Of all the little mammals guinea pigs are the most docile and mild mannered, to each other and to humans. Their babies are fully furred, bright eyed, and capable of running about at birth. With a seventy-day gestation period and an average of two young per litter, guinea pigs do not overpopulate a classroom as rapidly as hamsters, gerbils, rats, rabbits, and mice. All of the latter have a fifteen to thirty-day gestation period, give birth to blind, naked babies, and are understandably more excitable.

This does not mean that guinea pigs should be used to the exclusion of all other mammals; it does mean that teachers should know their children and their animals and their goals in bringing them together. Gerbils and hamsters are not permitted in the southwestern United States since they could adapt to life in

the outdoors and could create the same kind of problems that rabbits created in Australia.

**IN 1911** when Anna Botsford Comstock wrote the *Handbook of Nature Study* she noted that the keeping of pets frequently failed to achieve the hoped for results. She stressed the need to observe the adaptations and habits of the animal and think of them in terms of success in the wild situation; she urged teachers to have children observe the behavior, growth, food preferences, etc. and keep a notebook. She provided outlines for studying three pets, dogs, horses, and rabbits. Obviously only one of these would be a classroom pet. The others, even in 1911, would be observed at home, would be a school visitor, or would involve a field trip.

Frequently things that teachers hope to achieve by keeping a pet in the classroom may be done better by taking a field trip. Zoos are wonderful resources, as are nature centers, school grounds, fields, vacant lots and city streets.

ANSS member Richard H. Pough, in writing about his Audubon Bird Guide, stresses the fact that learning the life history and life style of a bird and the way that it fits into its ecological niche trains children and adults to be environmentally concerned in a way that making a life list of hundreds of birds does not.

*"Crickets have been kept as pets in China for centuries."*

A pet need not be an animal in a cage. It can be a pair of house sparrows rearing a family in a pipe above a stop light on a city street that children observe and come to appreciate on a daily basis, or a squirrel in a park, a pair of mallard ducks that live on a pond within walking distance of the school, a spider in the corner of the classroom window sill or any other animal that can be recognized as an individual and observed on a continuing basis.

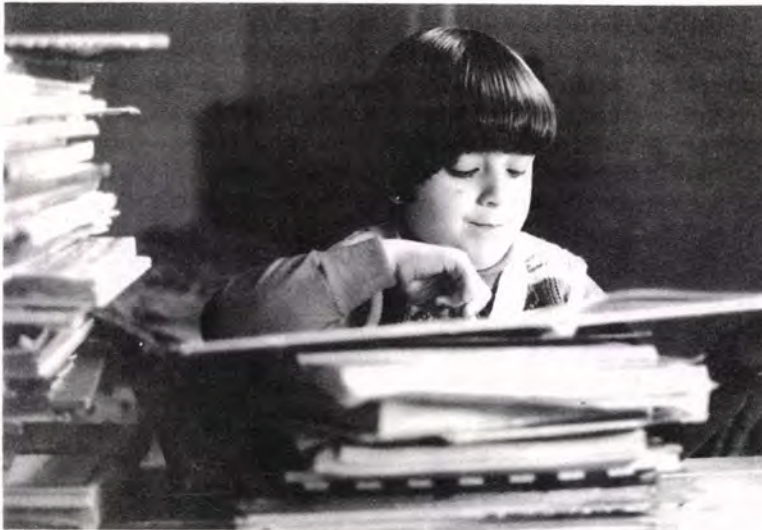
When children go to nature centers there is a great desire to lug all the living things back to the classroom as pets. Obviously the effect of harvesting vertebrates in a nature center is similar to purchasing them from third world animal-nappers; the species becomes an endangered species,

*(continued, page 19)*



# GOOD READING

for Environmental Education



## Ross Hutchins Wins Children's Book Award

*Ross E. Hutchins' books on natural history  
have delighted children for over thirty years.*

by Louise Ritsema

and Helen Ross Russell

**THE EVA L. GORDON** Award Committee consisting of Jessie Kitching, Verne Rockcastle, Louise Ritsema, chairperson, and Miriam Dickey has selected Ross E. Hutchins as the recipient of the 1979 Eva L. Gordon Award for Children's Science Literature.

Ross E. Hutchins is a well-known entomologist and an expert nature photographer, who has written books on natural history for children for more than thirty years. Many of his books are illustrated with his own photographs.

Born in Montana, he grew up on a cattle ranch near Yellowstone Park. At Montana State College he majored in biological sciences and later received his Ph.D. in zoology and entomology from Iowa State College. Ross Hutchins, for many

years Director of the State Plant Board of Mississippi and Professor Emeritus of Entomology at Mississippi State University, lives in Mississippi, devoting his time to travel, writing, and photographing plant and animal life. He is listed in *Who's Who* and *American Men of Science*.

Dr. Hutchins' articles and pictures of natural history subjects have appeared in encyclopedias, books, and magazines, including European publications. Among his books for adults is *Hidden Valley of the Smokies*, a naturalist's adventure in the Great Smoky Mountains. His book *Insects* is a reference work of enduring value. It is usable by adults and young people.

His books contain information on entomology and on the micro-aspects of natural history. They encourage children to look very closely at nature around them. They contain delightful first-hand observations and excellent photography including tips for children on nature photography. He has stayed the scientist, yet

has had the skill and enthusiasm needed to bring all ages into his professional field. Few entomologists have taken such a wide audience to the doorsteps of insects and insect life.

**BASICALLY ROSS E. HUTCHINS'** books fall into three categories. The majority are straight-forward reporting on a group of plants or animals. Of the books of this type nineteen deal with insects.

*Insects and Their Young* is a fine example of these books. It opens with an introductory section on classification and types of life histories. This is followed by a description of the primitive insects: the silverfish and bristletails and the springtails. The descriptions include life history, habitat, food and behavior.

The remaining hundred pages of text are divided between insects with gradual, incomplete and complete metamorphosis. In each of these sections a general discussion of each order is followed by a short

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*Louise Ritsema is chairperson of the Eva L. Gordon Awards Committee.  
Helen Ross Russell is editor of Nature Study.*



description of representative families including specific examples of family members and some of their more interesting habits.

In addition to the table of contents and index the book contains 176 black and white photographs. Many of these are pictures of insects in various stages of development but some provide details of activities like a cross-section of a yellow jacket nest, a mud dauber wasp transporting a ball of clay, hundreds of Braconid wasps emerging from the cocoons attached to one Sphinx caterpillar, a flying rhinoceros beetle, a feeding dragonfly nymph.

Altogether the 127 seven-by-nine-inch pages provide an excellent overview of the world of insects.

*The Bug Clan* has 107 black and white photographs on 127 pages. This book provides more detailed information on the

two insect orders that are true bugs: *Homoptera* and *Hemiptera*. It describes a total of twenty-two families, nine more than were included in the section on bugs in the foregoing book. In addition, each of the major families is described in much greater detail; thus this book has ten pages on aphids as opposed to two.

A final chapter, "Friends and Enemies," tells of and documents photographically, some of the fascinating relationships found among various insects and members of these orders; including parasitic wasps, predatory crickets and caterpillars, as well as larval and adult lacewings and ladybird beetles along with protective ants who defend aphids from enemies. By a straightforward account Ross E. Hutchins has spun a tale that is often stranger than fiction.

*Tonka, the Cave Boy* is an entirely different type of book, yet it bears the

stamp of Ross Hutchins' writing: Scientific accuracy, careful attention to detail, readability, and a style that makes you respond with interest and warmth to the subject of the tale.

In this case, Tonka is a boy approaching young manhood in a community of Amerindians who lived in a cave in northern Alabama 8,000 years ago. The experiences that shaped his life are based on the artifacts, bones, and graves that have been carefully excavated from the floor of Russell cave by archeologists from the National Geographic Society and the Smithsonian Institution. In writing a plausible tale from this archeological evidence the author helps modern young people develop an appreciation of a generally unknown life style coupled with a sensitivity to the feelings and hopes of the makers and users of those ancient tools.

(continued, page 18)

## A List of Children's Books by Dr. Hutchins

Photogs: Photographs by Dr. Hutchins

*Insects—Hunters and Trappers.* Photogs. Rand McNally, 1957

Praying mantis, firefly, etc., including suggestions on how to photograph.

*Strange Plants and Their Ways.* Photogs. Rand McNally, 1958

Mistletoe, dodder, slime mold, jumping bean

*Insect builders and Craftsmen.* Photogs. Rand McNally, 1959

*Wild Ways; a Book of Animal Habits.* Photogs. Rand McNally, 1961

*Lives of an Oak Tree;* il. by Jerome P. Connolly, Rand McNally, 1962

\* *This Is a Leaf.* Photogs. Dodd, Mead, 1962

Leaf mechanisms, types, curious aspects

\* *This Is a Flower.* Photogs. Dodd, Mead, 1963

*This Is a Tree.* Photogs. Dodd, Mead, 1964

\* *The Amazing Seeds.* Photogs. Dodd, Mead, 1965

How seeds germinate, travel; some specific seeds

*Caddis Insects: Nature's Carpenters and Stone Masons.* Photogs. Dodd, Mead, 1966

\* *Insects* (not a children's book). Il. by Stanley Wyatt and with photographs by Dr. Hutchins. Prentice-Hall, 1966

\* *Plants Without Leaves;* lichens, fungi, mosses, liverworts, slimemolds, algae, horsetails. Photogs. Dodd, Mead, 1966

*The Travels of Monarch X;* il. by Jerome P. Connolly. Rand McNally, 1966

*The Ant Realm.* Photogs. Dodd, Mead, 1967

*The Last Trumpeters;* il. by Jerome P. Connolly. Rand McNally, 1967

*Adelbert, the Penguin;* il. by Jerome P. Connolly. Rand McNally, 1969

\* *Galls and Gall Insects.* Photogs. Dodd, Mead, 1969

\* *The World of Dragonflies and Damselflies.* Photogs. Dodd, Mead, 1969

With a few drawings that seem to be by Dr. Hutchins (one is initialed)

\* *Hop, Skip and Fly: an Insect Book;* il. by the author. Parents Magazine Press, 1970

*Little Chief of the Mountains; Coyneys or Pikas;* il. with drawings by Jerome P. Connolly. Rand McNally, 1970

*The Mayfly;* il. by Jean Day Zallinger. Addison-Wesley, 1970

*The Cicada;* il. by Arvis L. Stewart. Addison-Wesley, 1971

*The Saga of Pelorus Jack;* il. by Jerome P. Connolly. Rand McNally, 1971

\* *Scaly Wings: a Book About Moths and Their Caterpillars.* Parents Magazine Press, 1971

*The Carpenter Bee;* il. by Richard Cuffari. Addison-Wesley, 1972

\* *Grasshoppers and Their Kin.* Photogs. Dodd, Mead, 1972

\* *Insects in Armor: a Beetle Book.* Photogs. Parents Magazine Press, 1972

\* *The Bug Clan.* Photogs. Dodd, Mead, 1973

*Paper Hornets;* il. by Peter Zallinger. Addison-Wesley, 1973

*Tonka, the Cave Boy;* il. by Tak Murakami. Rand McNally, 1973

*How Animals Survive.* Photogs. Parents Magazine Press, 1974

\* *Insects and Their Young.* Photogs. Dodd, Mead, 1975

\* *Trails to Nature's Mysteries.* Dodd, Mead, 1977

*Autobiography—*for age 12 up

\* *A Look at Ants.* Photogs. Dodd, Mead, 1978

\* Books in print



# NEWS and Notes



## Dusky Seaside Sparrow— Most Endangered

The U.S. Fish and Wildlife Service reports that the nation's most endangered species, the dusky seaside sparrow, may be taken into captivity for safekeeping and propagation under a proposal by the Florida Game and Fresh Water Fish Commission. Only 13 of the small songbirds are known to exist.

The Florida agency's proposal is contained in an application for a permit under the Endangered Species Act. It is based on the recommendations of a group of federal, state and private experts appointed by the Service to devise a recovery plan for the species. The sparrow's numbers have been dropping by half each year since 1977. Experts believe capture and propagation is the best hope. □

## Peregrines Move to a Zoo

The peregrine falcon has become a symbol in the struggle to restore endangered species to their native realms. Severely affected by widespread and uncontrolled usage of pesticides, most notably DDT, this noble raptor, master of the skies, was brought to the verge of extinction over most of its range. The recent successes with captive breeding and release, in hopes of restoring wild populations, serve as a glowing example that it just might be possible for man to reverse some of his sins against nature and wildlife, if he starts now and does not falter.

In October of 1979, ZOOAMERICA, at Hersheypark, Hershey, PA, quietly introduced two peregrine falcons into a new exhibit, the only peregrines to be permanently displayed in a zoo in North America at this writing. The birds each had suffered wing damage at the hands of man, and were unfit for release into the wild. They had been nursed back to health and cared for by the staff of the USDI's Migratory Bird and Habitat Research Laboratories, who found it necessary to try and donate the birds to a suitable institution. ZOOAMERICA was recommended for several reasons. It is a themed zoo with exhibit areas divided into five bioclimatic zones of North America, each area including representative plants and animals of the specific region. ZOOAMERICA receives a very large number of visitors each year, especially in the summer months, when it is included as part of Hersheypark's admission fee. Public education is one of its main points of emphasis, every attempt is made to enlighten the visitors about the natural history of native North American plants and animals and the plight of many of our threatened and endangered species. The exhibits themselves are as large and naturalistic as possible, making for healthier and more settled specimens. Naturally, the

offer of the peregrine falcons was readily accepted, as they would be receiving a comfortable home in a large, open exhibit, and would become a strong and important example in ZOOAMERICA's attempts to enlighten and educate its visitors.

The two falcons have become well acclimated to zoo life by now. Their strikingly beautiful appearance never fails to elicit awed responses from visitors, and serves to emphasize the messages of near extinction and subsequent conservation that are carried in the graphics in front of their exhibit. Hopefully, their service to their species will not stop there. It has been determined, by weighing the birds, that both are females. Attempts will be made to artificially inseminate them, and any young falcons will then be released into the wild. Consequently, although they have been injured and confined, relegated to a life of captivity, the two peregrine falcons at ZOOAMERICA may now serve to enlighten, and add a touch of sobering humility to the lives of many visitors. Their kind was nearly gone. Now the peregrine, along with the host of all endangered species, must be restored to the wild ranges, for man's sake as much as their own.

— Mark Gruin □

## Upcoming Issues

The next issue of *Nature Study* will focus on environmental education. It will be mailed to subscribers in late summer.

The following issue will be devoted to THE COAST. President Carter has declared 1980 as "Year of the Coast." We would welcome suggestions or contributions on the subject. □



## American Attitudes on Endangered Species Vary

What do Americans really think about saving endangered species and other issues that affect wildlife? A three-year study by Dr. Stephen Kellert of the Yale School of Forestry and Environmental Studies issued a first report late in 1979.

Of eight selected issues, the public knew most about "killing baby seals for fur" (43% knowledgeable) and "effects of pesticides such as DDT on birds" (42% knowledgeable). Only 34% were knowledgeable about the Endangered Species Act, and only 17% had some knowledge about the much publicized snail darter/Tellico Dam controversy.

The public's support for endangered species protection when it would increase costs for an energy project varied with the animal; there was overwhelming support for protecting the bald eagle, mountain lion, crocodile and an endangered butterfly, but opposition to protecting the endangered plant, snake or spider. Support also varied with the nature of the project; most people supported a hypothetical water project endangering a fish whereas 60% opposed construction of a dam for a "nonessential" recreational lake which would similarly endanger a fish.

Surprisingly, 77% thought it would be

all right to kill whales for a useful product if the species hunted was not endangered. But 69% felt strongly that porpoises should not be hunted under the same conditions; they would rather pay a higher price for tuna than see the tuna industry continue killing porpoises.

The researchers hypothesized that these apparently contradictory responses may be related to the whaling tradition in the U.S. (I would suspect that television programs depicting friendly clever dolphins and porpoises are an important factor. —R.Y.)

The researchers linked support for protecting endangered species with the animal's attractiveness, close biological relationship to humans, reason for endangerment, economic value, and importance in American history and folklore. (Here the key role of nature educators becomes evident, for the animal's attractiveness to someone is largely a learned response.)

People most likely to support the protection of endangered species were highly educated, people under 35, residents of areas with more than 1 million population, people with higher incomes, professionals, and residents of the Pacific Coast and Alaska.

## The Return, Perhaps, of the Panther

The largest, rarest and most secretive of the wild American cats, the eastern panther, may be coming back from the brink of extinction for a second chance, according to an article by Michael Frome in the June 1979 *Smithsonian*. Recent sightings by professional biologists and rangers confirm reports of the large cat during the 1960's from south central Canada through isolated areas in New England, the Adirondacks, the Appalachians, some southern lowlands, and the Ozarks.

But conclusive data is slim—the eastern panther (alias puma, cougar, mountain lion, catamount) has been definitely photographed only in Florida, plaster casts and photos have been taken of tracks in Virginia and West Virginia, and a young male was shot in 1976 in West Virginia. But even though they are eager for more evidence, many concerned biologists and wildlife officials have avoided discussion of the eastern panther's comeback, for fear of encouraging the "shoot to prove I saw it" philosophy. A Canadian biologist, Dr. Bruce S. Wright, concluded in 1972 that the eastern panther had passed the immediate danger of extinction, but only by the "merest fraction." He estimated the total number surviving in eastern North America (exclusive of Florida) at not more than 100.

With protection from its only real enemy, humans, the eastern panther has a chance for a slow comeback.

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### POSITION OPENING

#### TEACHER/NATURALIST FOR ECO-SHOW ON THE ROAD

Responsibilities: primary responsibility for the presentation of the Eco-show on the Road program to school groups and community organizations outside the Academy; presentation of other classes and workshops of the Museum; assist with the planning, preparation, and teaching of ongoing programs which include museum lessons, auditorium programs, week-end lecture/demonstrations, and classes; participate with the implementation of new programs in environmental education; other duties as assigned.

Qualifications: B.S. degree in the natural sciences or related fields; at least one year experience with teaching the natural

sciences; previous teaching experience with elementary or secondary students required; teaching certificate preferred; ability to speak comfortably in front of large groups of people and to work effectively with audiences of differing cultural and ethnic backgrounds; experience with audio-visual equipment; experience with handling live animals; theatrical experience desirable; work on weekends and outside of normal 9-5 weekday schedule required; must own a car which can be used in programs.

Contact: Dr. Dennis M. Wint, Academy of Natural Sciences, 19th and the Parkway, Philadelphia, PA 19103, (215) 299-1052.

## The Bottom Line

Recently in Australia, Dr. Kenton Miller, Chairman of the Commission on National Parks and Protected Areas for the International Union for the Conservation of Nature and Natural Resources (of which ANSS is a member), warned that the 1980s are our last chance to protect the earth's ecosystems. He outlined plans for a global approach to preserving the most important ecosystems. He described worldwide preservation of genetic materials as "the bottom line of the argument." Working for this global preservation system depends on political action. Dr. Miller stated, "Eco-politics is the highest form of ecology. It may be the highest form of politics." (From *Tjurkulpa*, Newsletter of the Australian Conservation Foundation, Dec. 1979).



## Early Losses (continued)

the attitudes and events that led to their destruction mark the 17th and 18th centuries as a gloomy era for North American wildlife.

Perhaps best known of the extinct coastal species is the great auk, *Pinguinus impennis*. This flightless member of the alcid family stood 28 to 30 inches tall. Its black head, body dark above and white below, large dark bill and white oval spot before each eye, combined with its "stately" upright stance give it the look which produced the name "penguin." It was considered to be the most powerful and swiftest diving bird in North America.

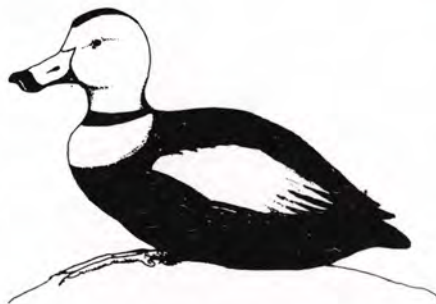
The great auk was first recorded by French sailors who fished off Newfoundland's Grand Banks as early as 1497-1498. It ranged in Newfoundland on Funk Island off the northern coast, Cape Freil, and other islands, as well as off Nova Scotia, Iceland, the Faroes, St. Kilda, and others. It wintered in Massachusetts and possibly as far south as Florida.

The colonial nature of these flightless birds made them easy prey for merchants, travelers, and fishermen. They were driven like cattle aboard ships or into pounds, clubbed to death, thrown into kettles of boiling water, or salted down. Practically every bit of their bodies was used: salted down bodies were sold in place of salt pork; large single eggs were eaten and later prized in collections; the fat and feathers were turned into bait; years later, heaps of bones from former harvests were ground into garden fertilizer.

Although little was known of the great auk's habits and distribution, its increasing rarity was recognized just in time for collectors to deliver its fatal blow—in 1844 the last recorded specimen of great auk was taken off Iceland. Today, all that remains as reminders of this once abundant seabird are 80 specimens and 70 eggs in museums around the world, excavated bones from shell heaps as far south as Florida, and its closest living relatives, the razorbill, puffin, and murre.

Of much less fame is the Labrador duck, *Camptorhynchus labradorius*, popularly known as the pied duck or sand shoal duck. About 29 inches long, the male was beautifully marked in black and white, the female grayish-brown above, grayish-white below. Its bill, rather long and broadened, possessed unusually large lamellae. It was keenly adept at capturing shellfish, small fry, and seaweeds.

**FIRST RECORDED BY GMELIN** in 1788, the Labrador duck is now thought to have nested on rocky islands off the North Shore of the Gulf of St. Lawrence (Quebec and Labrador), wintering off Nova Scotia south to New Jersey. Popular belief once suggested that its range, and that of the great auk, extended into the Arctic, but that notion is now considered untrue.



*Labrador Duck*

Far from being considered good eating, its lure were the eggs and feathers sought by American millinery traders until 1760, when excursions became unprofitable due to insufficient numbers of remaining birds. At their wintering grounds on the Long Island marshes they were easily shot, and it was there in the fall of 1875 that the last confirmed specimen was killed. Another specimen is said to have been shot three years later near Elmira, New York, but since it was eaten its identification cannot be confirmed.

Reports that John James Audubon or his son, John Woodhouse Audubon, ever saw a nest of this species are questionable. Ironically, the species slipped away without a single confirmed nest record, without a single egg in existence, and with little more than 42 specimens in museums around the world. Almost nobody remembers the Labrador duck—not even the people in the tiny villages along the Gulf of St. Lawrence where it bred.

**THE SEA MINK**, known also as the "seashore" or "giant mink," was the largest form of mink ever to inhabit North America. Its range consisted of the coasts and outer islands of Maine and Massachusetts, with possible extensions into southwestern Nova Scotia and the salt marshes of Connecticut.

The sea mink was characterized by a large rostrum, abruptly ascending nasals, coarse, reddish fur, and a larger tooth row measurement. It was supposedly very fatty and smelled fish-like, but evidence from shell heaps indicates that it provided the Indians, who called it "Mouse-beysoo," or "wet thing," with a good source of food. During the 17th and early 18th centuries it was avidly sought by traders for its large pelt which brought higher prices. Rather than trapped, it was hunted with dogs and shot or driven out of cracks in ledges with crowbars or smoke. With its range restricted to the rocky Northeast coast, it was unable to withstand the relentless hunting pressures of the time; hence, it became extinct somewhere around 1860 to 1880, but no one is certain exactly when.

**BASED ON SKULL FRAGMENTS** found in a kitchen midden in Hancock County, Maine, the sea mink was first described in 1903 as a new species, *Lutreola macrodon*. Ernest Thompson Seton and others considered it to have been roughly 25% larger than the present form of mink on the Northeast coast, and 15% larger than the Alaskan mink, the largest form extant. Unfortunately such estimates could only be made from accounts by Maine traders and the skeletal remains from Indian shell heaps in Maine and Massachusetts.

Recognizing the need for obtaining at least a specimen of the extinct animal, Seton made a statement in 1921 which was answered by the discovery of a mounted specimen owned by Clarence Clark of Maine. The specimen had supposedly been taken off Campobello Island in 1894. The only known specimen of its kind, it was eventually sent to the National Museum in Washington, D.C., where it was examined by Richard Manville and his staff in 1965. Their conclusion was that the Clark specimen was merely an unusually large mink; subsequently, the sea mink was reduced to subspecific rank as *Mustela vision macrodon*.

The lack of subfossil material of smaller forms of mink within the sea mink's supposed range strengthens the conclusions of Manville and his associates. But to some mammalogists, the taxonomic status of the sea mink will only be answered by further discoveries of subfossil materials.



To certain trappers in Maine, it will always be considered the "giant mink."

The largest of the coastal animals to have recently disappeared is the Atlantic gray whale, *Eschrichtius robustus*. Virtually no historic records of this animal are available today, but stories indicate that a moderately large population was exterminated in the early 1700's by whalers. During its time, no skeletons or skulls were ever saved, and today the only sources of material for study are Pleistocene and Recent bone deposits. The first description of the Atlantic gray whale may possibly be Dudley's account of the "scrag whale" from New England in 1725:

"The Scrag whale is near a kin to the Fin-back, but, instead of a Fin upon his Back, the Ridge of the Afterpart of his Back is scragged with half a Dozen Knobs or Nuckles; he is nearest the Right Whale in Figure and for Quantity of Oil, his Bone is white, but won't split."



*Atlantic Gray Whale*

**DUDLEY'S MENTION** of the "Bone" (whale bone or baleen) might refer to the fact that in the gray whale the baleen plates are light brown or nearly white and are very thick and heavy.

At least five genera have been assigned to the Atlantic gray whale since its first description. Although still an uncertainty, skull and skeletal fragments unearthed since then suggest that the Atlantic and the California gray whales were actually the same species. It may be inferred that the Atlantic form resembled its Pacific relative in all respects, including its swimming, feeding, and migratory behaviors. Its size was certainly about the same, with adults averaging 39 to 46 feet. As with the California form, mothers may have aggressively defended their young, a practice which has earned the California gray whale the nickname "Devilfish."

If the taxonomic status of these two whales were firmly established as conspecific (the same species) one might predict a proposal for a future mammoth and undoubtedly controversial restocking of its former range, the Atlantic Ocean.

Although by no means extinct, the Atlantic walrus, *Odobenus rosmarus*, or "sea horse," was extirpated from coastal New England and the Maritime Provinces by similar exploitation. Moving north to portions of the Canadian Arctic, Barrow Strait, Greenland, and Eurasia, its extension into frigid waters may have helped spare it from early extinction.

A ten-foot male walrus may weigh 2000 pounds, but the female a petit 1250. Its short, squarish head, whiskered face, and rough, wrinkled skin bear an almost humorous resemblance to humans. The massive neck contains a pharynx which can be inflated for buoyancy or to produce sounds. The tusks, which grow up to 25 inches in length, may be used in defense or for digging for clams, worms, or whelks. *Odobenus*, the genus, means "tooth-walker"—a name referring appropriately to the walrus's habit of using its tusks to assist in climbing onto ice floes.

Accounts describe the walrus as having been heavily hunted in the 16th and 17th centuries on several islands, namely, the Magdalen Islands, St. John's, and Anticosti in the Gulf of St. Lawrence, several islands off Cape Breton, Sable Island east of Nova Scotia, and Miscou Island in the Baie de Chaleur. Harvested by the thousands by European merchants and parties from Boston, walrus bodies were used for meat and oil, their hides for making rope, harnesses, whips, and boat skins. Valuable ivory from their tusks was turned into carvings, tools, and scrimshaw art. On Sable, Miscou, and other islands the walrus was extirpated by around 1650. By the middle of the 18th century it probably stopped breeding on the islets and shoals of the Gulf of St. Lawrence.

Fossil evidence indicates that the range of the Atlantic walrus may have extended during the Pleistocene as far south as the coast of Georgia. Climactic changes following the glacial period forced it to retreat north, so that by the time of early exploration its southernmost breeding site was Sable Island. Very little historic information is available to document its occurrence in New England. Only one live specimen from there was recorded—that of a probable immature at Plymouth, Massachusetts, in 1734.

Estimates during the last decade are that from 20,000 to 40,000 Atlantic walrus occur in the Eastern Canadian Arctic. Proper management regulations are needed in order to protect and preserve what numbers still remain of this massive toothed species.

**HAD THE GREAT AUK,** Labrador duck, sea mink, gray whale, and Atlantic walrus survived the heavy exploitation by colonists, merchants, and explorers of the 17th and 18th centuries, the coastal region of New England and the Atlantic Provinces would, indeed, be a different place today. Perhaps tourists could observe the seasonal migration of gray whales from the dunes at Race Point on Cape Cod. A raft of great auks might be commonplace for fishermen at Fogo, Newfoundland, but a single individual off Massachusetts' Cape Ann would bring ecstasy to the serious birder. Sportsmen might sit around the fire in cozy Maine camps telling tales of the three-foot long mink they had seen that day. And maybe children of remote villages like Harrington Harbour on the North Shore of Quebec would, upon seeing the Labrador duck, take pleasure in knowing yet another species among the limited variety of life forms struggling to survive in the harsh climate of the North.

The extinction and extirpation of these vivid and colorful life forms is a regrettable loss to our northeast shores. Recorded information about them is pitifully small, as manifested in lingering questions over the taxonomic status of the sea mink and Atlantic gray whale. They disappeared long before the enactment of laws protecting endangered species and their habitats. The current list of domestic and foreign endangered species now numbers in the thousands. These animals, unfortunately, never made it to that list. Recognizing this loss, we should strive all the more to protect the variety of life forms which remain, for the benefit of ourselves, our future generations, and the animals themselves.

#### *Suggested Reading*

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native species, and in some cases, captive breeding.

Protection in most cases means simply to set aside a sufficient amount of land to allow the species the best possible chance for survival. According to the Marine Mammal Act of 1972, and the Endangered Species Act of 1973, all other federal and state agencies are required to ensure that their programs do not impinge upon critical habitat. Unfortunately, this provision has been seriously undermined in the case of the Tellico Dam and the snail darter of Tennessee.

**IN SOME CASES**, such as the condor, it is unlikely that habitat protection will be enough. The condor is a timid bird, frightened of people. It does not reproduce until it is six years old and produces only one egg every two years. If its mate dies, the male will not take another.

At one time, the condor flew majestically over the entire west coast. It was hunted for its quills, for its eggs, as a predator. Today, only 50 condors are alive and surviving in two colonies in Northern California. However, the numbers are slowly growing smaller, and it has been suggested that a captive breeding program, like that of the peregrine falcon, be tried. Such programs are as likely to be unsuccessful as successful, however, as zoos have been aware of for many years.

While the precarious and questionable success of bird and animal breeding programs is understandable, given the problems of breeding and introduction to the wilds, there may be some hope for plants.

A recent program in Nevada has undertaken the task of reproducing five species of rare cacti from the Sonoran Desert. The Plant Resources Institute has borrowed a technique developed by the orchid industry, called micropropagation, or cloning.

Simply, by taking a pinhead size of the plant, adding a nutrient broth and growth hormones, and waiting, replicas of the parent plant will be produced. Of course the task is far harder than it sounds: the exact combination of growth factors must be present in the nutrient broth. It also remains to be seen whether the laboratory-grown plants will succeed in the wild. Plants are notoriously fussy about their locations, and will meet with just as difficult obstacles as the peregrine fledgling.

**ON THE OTHER HAND**, simply leaving the species alone may be successful. The American alligator, once considered a great nuisance, was harvested to the number of 10 million between 1800 and 1949. The reptiles' numbers were so reduced during the 1950's that Louisiana made it illegal to hunt it in 1964, and was followed by a Federal law in 1969. Combined Federal and state laws and the enforcement programs were so helpful that the population increased and the alligator is believed to be no longer endangered in some areas. There are now 750,000 alligators in the southeastern United States, allowing for a limited hunting season in Louisiana, and they are again becoming a nuisance in Florida.

In some cases, it is expedient to integrate several types of management action. For example, three species of western trout were listed on the endangered species list in 1969, the Lahonton cutthroat trout, the Paiute cutthroat trout, and the Arizona trout. These fish had become endangered through the destruction, or modification, of their streams and by the introduction of non-native trout species. Through habitat improvement, breeding programs, and the removal of the non-native species, these fish are no longer endangered.

**IT IS DIFFICULT** to be so large-minded to empathize with other species that do not obviously touch upon our own lives. It is even more difficult to restrain one's own prejudices and desires. Suddenly we are being asked to do so, for the sake of other species. Naturally, most people will not care; some people won't comply. Typically, we will feel for one particular species, and not consider the broad view at all.

There are a great many reasons given for saving endangered species: for beauty, unknown economic benefits, the necessity of natural diversity, unknown benefits to human health, and future generations. All of these have to do with the question of "what does it have to do with me?". If these reasons bide some time for endangered species, then these reasons are valuable. In the end, we are going to have to humbly acknowledge our interdependence with the rest of the world, including the one-tenth of the species on the earth today which may easily become extinct. □

**ANOTHER GROUP OF BOOKS** including *Adelbert, the Penguin*, *The Last Trumpeters*, *The Saga of Pelorus Jack* and *The Travels of Monarch X* tell the story of a specific animal or group of animals. Each is illustrated by Jerome Connolly using one color to supplement the black and white drawings.

*Monarch X* describes the flight of one tagged monarch butterfly from the tagging station in Canada to a remote area of Mexico. The story is based on the reports that have come back to Ottawa from the tagged butterflies over the years.

*Pelorus Jack* was an albino whale that lived in New Zealand at the beginning of the 20th century. Special legislation was passed to protect him from whale hunters and fishermen. Events in his twenty-year life make a delightful story which subtly reinforces concepts of ecology, conservation and an appreciation of the natural world.

*Trails to Nature's Mysteries* is an autobiographical tale written for children. Two adult books, *Hidden Valley in the Smokies* and *Island of Adventure*, beautifully round out that autobiography. In them you see Ross Hutchins as a part of the natural world. Here the man and the ecology of the area combine to make a setting for the panorama of life which unfolds in these two different but equally beautiful areas.

Thus in *Islands of Adventure* we find Ross Hutchins sitting on a moss-draped branch of a live oak observing insects, mammals and birds going about their activities without any awareness of his presence. On another occasion we watch through his eyes "The little dramas" enacted in the environs of a cypress lake through a twenty-power telescope. The cast of characters here includes muskrats, egrets, alligators, alligator snappers and other turtles, pileated woodpeckers, a mud snake, various fish, wood storks and roseate spoonbills.

**EACH CHAPTER** is an ecological study in itself and in his careful observation and quiet enthusiasm we learn much about the author who travels carefully, respecting the ecosystem, and then, with superb photographs and well-written prose shares his experiences in such a way that his readers are led to grow in appreciation of and responsibility for Earth's interwoven whole. □



## Definitely Not a Zoo (continued)

A member of the NJRA climbed the telephone pole where the nesting platform was situated and placed a net around the nest while the female was away. When the osprey returned to the nest, the net was sprung, she was taken from the nest, and the six-pack holder was removed.

Members of the NJRA not only assist in State and Federal programs, they also initiate their own. One such program is an annual mid-winter hawk census in New Jersey. Information collected from this count is charted and studied to determine population patterns. In the future this data will assist the New Jersey Division of Game, Fish and Shellfisheries in determining which species should be included on the endangered species list.

Even though an endangered species list is necessary to protect certain species of raptors, members of the NJRA believe that action should be taken long before a species becomes endangered. "Habitat is the key to insuring the survival of raptors," says Soucy. "You can release hundreds of hawks in an area, but if the habitat isn't there to support them, they won't survive." With this in mind, the NJRA donated money to the Snake River Birds of Prey Sanctuary along the Snake River in Idaho for purchase of land to insure the survival of the many species of raptors that breed there.

Because there are not the large tracts of protective habitat for purchase in New Jersey that there are in Idaho, the NJRA continues to rehabilitate and relocate raptors, and to inspire enthusiasm for birds of prey. One project that Soucy is currently undertaking is an 8-page pamphlet describing the owls of New Jersey. The information in this pamphlet will update and add to what little accurate printed material is now available about owls in New Jersey. In the future pamphlets about other species of raptors also will be available. "This is one way of reaching the people," says Soucy, "... of letting them know that man and raptors can co-inhabit this earth."

□

## Classroom Pets? (continued)

or even extinct, if not nationally, certainly locally. Talking this situation over with children before making a trip to a nature center can head off immediate problems and build attitudes necessary for the survival of life on Earth. Some invertebrates, particularly insects, along with a sample of the food on which they were found, may usually be spared by the nature center. Caterpillars, (DO NOT TAKE GYPSY MOTHS), grasshoppers, katydids, aphids and crickets all are vegetarians. Caterpillars and aphids will require the same food that they are found on, the others will accept a wide range of food and can provide some interesting feeding studies. Except for aphids which may be brought home undisturbed on a branch of their host plant only take one or two of a kind. All of these animals are active in the daytime and live above ground. They can be extremely interesting.

**CRICKETS** have been kept as pets in China for centuries. You can find cricket cages for sale in Chinese shops, but you don't need a special cage, a jar with a screen or cheese cloth lid will do. Crickets are as musical as a canary; they have simple and cheap food requirements; the sexes are distinct and, given proper environment in a terrarium they may even reproduce.

Visitors also can achieve the results that teachers sometimes hope to achieve with classroom pets. A study of coyotes, wolves, foxes or the members of the dog family can be enriched by a carefully planned visit of a dog. A toad may come to school for a day or a week if suitable

housing and food is provided; but it should then be returned to its wild home. This has several distinct advantages. With limited time observation will be directed and constant so that as much or more will be learned without the frustrations and responsibilities of a resident pet. In addition, in restoring the animal to its ecological niche students are actively participating in protecting their home, the Earth, and learning the most important lessons of all.

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- Russell, Helen Ross. *City Critters*. Information on the most common vertebrates and invertebrates that have adapted to humans and can be adopted as a wild pet and successfully observed at any school site. Published by the American Nature Study Society. *Winter Search Party*. Contains information on rearing invertebrate pets while respecting the ecosystem.

## Complimentary Copies for Members

ANSS members can obtain a free copy of *Exploring Environments* by Ruth Yarrow and High Rock Park Conservation Center staff by sending their name, address, and \$1.00 to cover mailing costs to Ruth Yarrow, 407 Hancock St., Ithaca, N.Y. 14850.

*Exploring Environments* is an illustrated handbook of 45 environmental education activities, under the chapter headings of "Awakening Sensory Awareness," "Basic Ecosystem Processes," "Discovering Adaptations," and "Environmental Consequences." Some activities, e.g., a simulation of natural selection using colored

toothpicks, will be familiar to many ANSS teachers. Others, such as a game using familiar food containers to introduce food webs to urban children, are fresh and effective approaches. All activities have been used with groups; many are easily adaptable to teach both children and adults. While a number are indoor activities, most are designed for introducing or following-up outdoor exploration.

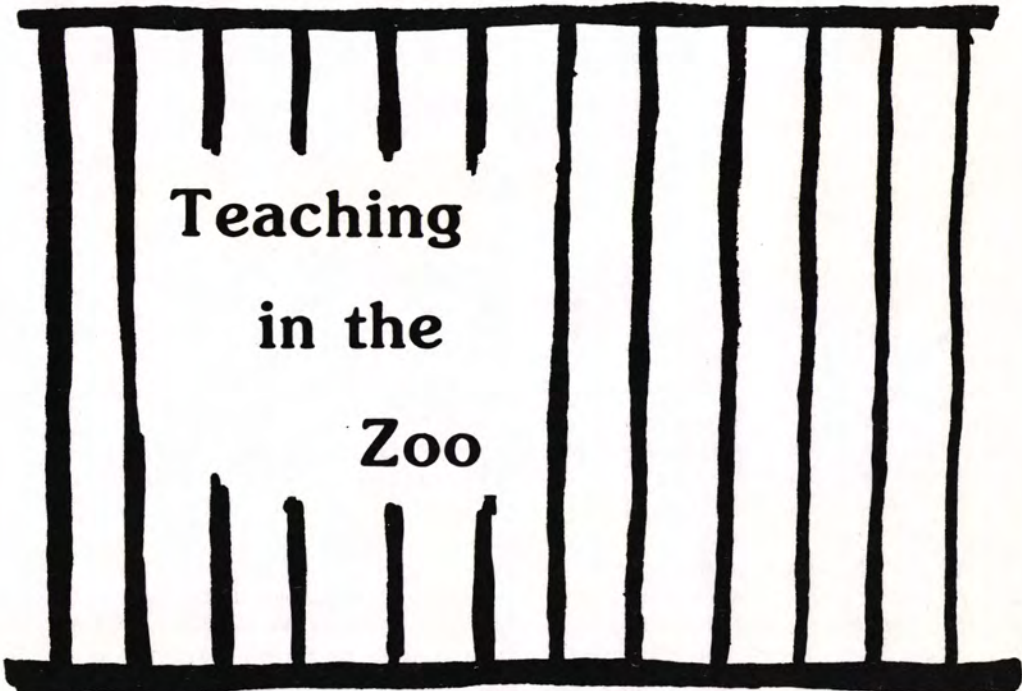
Additional copies may be obtained for \$5.00 each from High Rock Park Conservation Center, 200 Nevada Ave., Staten Island, N.Y. 10306. Discounts for bulk orders are available.

□



# TIPS

## for Environmental Education



### Teaching in the Zoo

by Jean H. Case

**NO ONE KNOWS** exactly where or when the idea of a zoological garden began. Our earliest records came from Egypt in 1949 B.C. and China about 1000 B.C. with Greece and Rome following closely behind but there is archeological evidence of caged animals in prehistoric times. Supposedly one of the finest collections of animals that ever existed was owned by Montezuma. The story is that his park contained practically the whole fauna of Central America. Three hundred keepers were employed just to care for the water birds kept on his ten ponds, and five hundred turkeys were killed each day for his birds of prey. The first European zoos were in Vienna in the 17th century, and in Berne, Switzerland, where one has existed for four hundred years. The first so-called "modern" zoo was founded in London in 1828 and many followed after that. Although we use the word "zoo" frequently, the word itself, when it was first coined by an English comedian

(1867) was referred to as a "regrettable vulgarism." The first modern American zoo was in Philadelphia (1859), where many now extinct species were exhibited at one time or another.

Zoos over the years have been called antiquated, overcrowded and generally depressing, many of them with too many species, crammed into too little space and behind too many iron bars.

**THE ENTIRE** concept of zoos has changed and is continuing to change radically. No longer is the zoo just a place to "see" animals, it is now a *complete learning experience*. The truly modern zoos are providing animal exhibits in surroundings similar to the natural habitats and the zoo is becoming a world without bars. Modern zoos are playing a major part in the preservation of animals. Everyone knows that a zoo is less desirable than the animal's natural habitat but unfortunately zoos may provide the only sanctuary available to many species. Captive breeding is imperative to save some species and the world's leading zoos are working hard at it. Some species such as Przewalsky's horse exist only in zoos, having become extinct in the wild.

How can we, as educators, tap this valuable resource?

The zoo is as serious an educational institution as any university. The future of wildlife depends upon education, thus many zoos now have very extensive educational programs. Docent programs have become common across the country. A docent is an instructor or teacher who is not a regular member of the staff of the institution. They are, in most cases, highly trained individuals.

**LET ME GIVE YOU** an example: Some years ago I developed an educational program using a group of volunteers. It was a joint effort between an Audubon society and a Zoological Garden. It was designed to provide course work on zoo animals (habits, life history, adaptations), as well as basics of how to make a presentation to a group, carry programs into schools, and care for wild animals. It was believed to be the first joint effort of its kind in the country. The docents took an eight-week course in practical zoology—dealing specifically with the animals found at the zoo. Each docent was given a notebook with a fact sheet on every animal at the zoo, a glossary of terminology, and

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a list of reference books. The fact sheets covered such information as behavior, adaptations, habitat, diet, and growth. If the animal was an endangered species, then that status was also included. The classes included such things as an explanation of animal classification, a study of reptilian orders (live snakes to be handled), and care of captive animals. Independent study was recommended and advanced courses in ornithology, herpetology, taxonomy, animal behavior, and zoology were offered to docents once they had toured for a season. The University of Bridgeport gave accreditation to the course. Those who wished to apply could receive three units for the course entitled "zoo practicum" under the Department of Biology, to be used for graduate or undergraduate credit. The United States Department of Agriculture sent two people to audit the classes and to use the notebook to help with animal requirements.

What does all this mean? It means that a trip to the zoo can become an important educational experience. The student quickly finds out that there are differences between mammals, reptiles, and birds. An elephant, for example, is not just a large, lumbering animal with a long trunk. The elephant is the largest of the land mammals. The trunk is an elongation of the nose, the nostrils being located at the tip. It is used for gathering food and water and for bathing and smelling. Elephants have a very good sense of smell. They swing their trunks to and fro to test the air for danger and use it to throw dirt on their backs for protection from heat, insects and sunburn. An adult male can reach a height of 10-11 feet at the shoulder and weigh 4-6 tons. He will consume approximately 50 gallons of water daily and several hundred pounds of food. Elephants have only 24 teeth which emerge 4 at a time, one at each rear point of the jaw and eventually are discarded at the midpoint, by which time 4 more have emerged at the rear. When all six sets have been used up, the animal will starve to death since it can no longer eat.

**OR LOOK AT THE SLOTH.** Is it just a lazy animal hanging upside down in a tree? The sloth is the slowest of all living mammals and the most completely arboreal of all the South American forest animals. It spends its entire life upside down, rarely leaving the trees, eating,

sleeping, mating and giving birth to its young in an upside down position while hanging from the branches. The curved claws are adapted for hanging and they hang on so tightly that if a sloth dies you cannot pull it down, you must lift it up to unfasten it. The sloth is so slow it might take all day to move forward one foot. Sloths even sneeze slowly! Their bodily functions are so regulated that they can go a week without defecating so that they can wait for the concealing sound of rain. Algae grows on the fur forming a protective coloring. Here we have a symbiotic relationship—the algae protects the sloth and the sloth gives the algae a moist place to grow. Nocturnal not diurnal; arboreal not terrestrial; herbivorous and fructivorous, not carnivorous—a whole new vocabulary has been learned.

*"The zoo is becoming a world without bars."*

A trip to the aviary can introduce a child to the colorful world of birds. Brightly colored parrots, the fruit eaters, catch the eye. But the success of fruit eaters depends on the certainty of their food supply. Their bright colors and raucous voices are not just idle inventions of nature. Clumps of fruit are often miles apart, so the fruit eaters let each other know when and where fruit is available. With the aid of vivid patterns and violent voices that enable them to recognize their own kinds at a distance in the open. Under the canopy of trees, however, their strongly contrasting plumage actually makes them blend with the shadows of the foliage and sunflecks so that they are hard to find when they are quiet. Parrots have prehensile tongues, can be right or left handed, and have few enemies because of their powerful beaks.

A quick look at the owls—everyone's favorite—and what do we see? Huge eyes look at us from the front of the head; the beak deflected downward allows for a better area of vision; fixed eyeballs require the owl to turn its head to see things at the side. And, if we watch long enough, we can see that the owl can turn its head 270° to compensate for the inability to move its eyeballs. Soft, downy feathers allow owls to fly silently. The great horned owl has a voracious appetite and

will hunt its prey by a variety of methods—from seizing his victims on the wing, to perching and watching, to wading and even walking in search of his prey. Great horned owls are even known to feed on skunks. The barn owl is considered the "farmer's best friend." Research over the years has shown that an old barn owl will catch as many mice in one night as a dozen cats. The barred owl hunts the same area as the red-shouldered hawk, hunting by night while the hawk hunts by day. The two birds have been known to share a nest.

A visit to the Reptile House can open up a whole new world to a child. New words such as *constriction*, *Jacobson's organ*, *elasticity of jaw*, *pit-viper*, *fangs*, *hibernate*, and *cold-blooded* become second nature.

What does all this mean? It means a more exciting and rewarding experience that a child will long remember. What we are really saying is **TEACHER AND ZOO, COOPERATE TO EDUCATE.** □

#### PRACTICAL TIPS

- 1 Contact the zoo well in advance of a planned trip.
- 2 If docents are available, request a guided tour.
- 3 Explain what your specific interest is—i.e. North American animals, endangered species, reptiles, etc.
- 4 Request that materials be sent to you, in advance of the trip, to prepare the student.
- 5 Prepare questions, work sheets, and trip boards for each child.
- 6 Be prompt. Remember there are others with appointments too.
- 7 Wear proper clothes — sneakers and long pants will do nicely. Sandals cause slipping and tripping.
- 8 Do not feed the animals unless so specified. They will not benefit from your feeding. Many beautiful and valuable animals have died because of feeding by the public.
- 9 Discourage eating or buying food during your tour. Plan enough time before or after for snacks or lunch.
- 10 Discipline is your responsibility. An entire trip can be spoiled by an unruly child.
- 11 Follow up your trip to the zoo with reading, writing, art, reports, and letters to the docents.



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