

Conservationist



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Although classified as threatened, this red-shouldered hawk study provides clues to whether it could make a comeback in New York State.

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Keep Our Streams Open

How Public Fishing Became a Reality in One Catskill Community

Photos by author

by Ed Van Put

"ROSCOE is Trout Town U.S.A." hails the billboard along the Route 17 Quickway. Situated at the junction of the Beaverkill and Willowemoc Creek, this tidy little village has been a trout fisherman's haven for more than a century. A key element in its continued success has been a state program providing public fishing rights on these two celebrated streams—a program which received an enthusiastic welcome on its creation half a century ago.

Today weekend regulars can tell you the names of every pool downstream of Roscoe, when the mayflies will hatch and maybe even where to Watercolors by Edward Kenney

find a big trout, but very little about the fishing rights that are the foundation of their angling enjoyment.

In a sense, the public fishing rights program's lack of visibility is a measure of its success. Many of today's anglers take for granted their right to fish these famous trout streams, not realizing that the right was once nearly lost forever.

As early as the 1870's, the posting

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Fishing at the head of Cairns Pool, the Beaverkill's most popular spot.

of trout streams had become a fact of life, at least in the Catskills. Once the railroads penetrated this mountainous region, the word spread far and wide that it offered excellent trout fishing. Eager for new and continued passenger service, the railroad began stocking streams, pioneering an angling tourist trade that exists to this day.

Some local residents turned their farms into boarding houses, catering to the new fishing tourists. Others sold or leased streamfront property to fishing clubs whose affluent members commuted regularly to fish their club waters protected from non-members by posted signs. Boardinghouse owners were soon posting their stream properties to preserve the trout for the paying guests. By 1900, practically all of the upper portions of the Beaverkill, Neversink, Rondout and Willowemoc were closed to public fishing. In 1903, Theodore Gordon, the legendary Catskill fly fisherman and fishing journalist, reported in *Forest and Stream*, "More farms are posted every year, and miles of the best waters are leased from owners, or a strip of land on both banks is purchased by clubs or individuals, sometimes for a trifling sum in cash."

Around the turn of the century, brown trout were stocked in lower river environments too warm for native brook trout, creating additional miles of trout water for the public trout fishermen. But the steady growth of posting soon cut off use of these waters.

Nearly two decades passed, however, before it became clear that the

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Ferdon's Pool has an access ramp for the handicapped and a bench for resting.

local public was in danger of losing access to the remaining trout streams as well. The best and most popular section of the Neversink, the very water that Gordon fished while developing dry fly fishing, was suddenly closed.

In May, 1919, the Liberty Register announced. "There have been parties around town the past week who are buying up the stream rights from Halls Mills bridge down to, or as near to our covered bridge as they can..." A related editorial said, "City residents blessed with money, and desirous of having something good all to themselves, are buying up the Neversink River, it is said, with the intent to post it and keep it for themselves alone. People will not come here if there is no place to fish. Next year if all the streams are posted, the hundreds of fishermen who have been coming here will go elsewhere. Let's keep our streams open!"

It soon became known that Edward R. Hewitt, wealthy New York City industrialist, had indeed purchased a large portion of the Neversink River. Perhaps bending to the pressure of the local populace, Mr. Hewitt announced through the press that fishing would be allowed, but not to everyone—only residents of Sullivan County might fish, "with a fly and during the day, during the open season." The invitation was not extended to hotel visitors or summer boarders, and was withdrawn after three seasons, Claiming that the stream had been poisoned and dynamited by "lawless elements," the industrialist



Hazel Bridge Pool on the Willowemoc Creek





A welcome for anglers along the Beaverkill

announced that no anglers would be allowed on his property without a permit.

The editor of the Livingston Manor Times refused to believe anyone from his village was involved in such unsportsmanlike behavior, and protests swelled in the local press. Local anglers believed they had created the great trout fishing in the Neversink by stocking the stream over a period of many years, and it was unfair to close it now. Others questioned the legality of the posting. "Complaints are loud and many that the city sportsmen coming into the county are buying up the fishing courses, and are making it impossible for the natives to go out and enjoy a day's sport," wrote one. To counter the trend, the first proposal for a public fishing program surfaced.

Fearing the eventual closing of all public streams, 20 clubs, representing 5.000 sportsmen from four coun-

ties, met to pursue a public fishing program. Local sportsmen's concerns over posting were spearheaded by the Liberty Rod and Gun Club and its president Roy Steenrod, who suggested that the four counties form an alliance to better represent sportsmen. In 1923 the Sullivan County Democrat reported that the sportsmen's alliance had drawn up a bill to be introduced at this session in Albany, asking that one million dollars be set aside for the purchase of streams, lakes and land in this section. "If the bill passes," predicted the paper, "the streams of Sullivan County will be bought and opened up for fishing for all."

Club members who lived along the Neversink felt its loss through posting, but were equally concerned over other streams: was it just a matter of time before they, too, were posted? Could this happen to the nearby Beaverkill? the Willowemoc? Would public trout fishing have a future? Among this farsighted group were men now famous throughout the world of fly fishing. Roy Steenrod, a skilled flytier and fisherman, originated the famous "Hendrickson" dry fly. Roy learned to tie flies from Theodore Gordon, with whom he had a close friendship; he inherited many of Gordon's personal belongings, including his fly tying vise and materials. Another club member, William Chandler, operated a fishermen's lodge on the Neversink and was an expert fisherman and conservationist. Chandler developed the "Light Cahill" dry fly, a pattern found in most everyone's fly box. George W. Cooper, a blacksmith from De Bruce, was one of the Catskills' first flytiers; his popular "Female Beaverkill" is still the best imitation of the female spinner during the Hendrickson hatch. Of equal fame

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was Herman Christian: guide. flytier, trapper and woodsman. This "master of the wet fly" worked full time at finding, then catching, more big trout than anyone in the Catskills. All these men knew Gordon and were influenced by his concern over the future of trout fishing.

The 1923 bill for initiating a public fishing program was not successful, and in 1925 the Liberty Rod and Gun Club announced it would attempt to purchase, on its own, narrow strips of land along the Beaverkill, Neversink or Willowemoc for the purpose of fishing. This idea was never carried out, perhaps because of its cost, or maybe due to the club's loss of leadership; that year, President Roy Steenrod became a full-time employee of the then Conservation Department, serving as a game protector in his native Sullivan County.

Liberty area residents first read about the possibility of a state public fishing program in a 1931 editorial of the *Liberty Register*. Citing a "shortage of public trout streams near New York City" the editor stated the Conservation Department was thinking of "leasing streams for public fishing, and two of those were nearby."

A program for purchasing permanent fishing easements on privately owned streams did not become reality, however, until 1935. In that year, the New York State Legislature allocated \$100,000 to the Conservation Department "for the acquisition of narrow strips of land including streams, and rights-of-way thereto and the acquisition or lease of fishing rights in streams and rights-of-way thereto which are desirable to provide public fishing."

By acquiring "the sole and exclusive right, privilege and easement of occupying and using at all times hereafter as a fishing ground and for no other purpose, for the use and benefit of the public," the state secured the public's right to travel the stream and banks over those portions purchased for the purpose of fishing only; swimming, camping or any other activity were prohibited.

In December of 1935 the Livingstone Manor Times reported "all waters of the Willowemoc, Beaverkill and Neversink rivers will be thrown open to public fishing at the opening of the 1937 season. All anglers will greatly rejoice, for at the present time quite large and important sections of these celebrated trout streams are closed to public fishing and additional pieces are being prohibited each year." Unfortunately, the paper overestimated the capabilities of the new state program.

Conservation Commissioner Lithgow Osborne soon put local expectations into harsh perspective, announcing that the state had \$100,000 to spend on fishing rights, but the purchase of rights on the Beaverkill and Willowemoc would be too costly. Acquisition had begun on streams in the western part of the state but none in the Catskills, because purchases there would be far more expensive than anywhere else. "We want to make this initial appropriation to go just as far as we can and to pay a low cost per mile. This we could not do in the Catskills."

It was not until April of 1937 that local anglers heard the news they had waited so long to hear. Speaking at the Lenape Hotel, at the annual dinner for the Liberty Rod and Gun Club, Commissioner Osborne confirmed that negotiations were underway with landowners along the Beaverkill and Willowemoc.

The next month, Commissioner Osborne returned for a speaking engagement and two days of trout fishing. Along on the trip was Duncan G. Rankin, supervising forester, who had successfully negotiated the fishing rights along the Beaverkill and Willowemoc, with game protector Roy Steenrod acting as guide. After fishing the newly acquired water at Hazel on the Willowemoc Creek, "Commissioner Osborne told his fishing companions that he was greatly pleased with the state purchase at Hazel and was markedly impressed with the area as a trout fishing center," reported the local paper.

Today, approximately 30 miles of privately owned streambank along the Beaverkill and Willowemoc Creck are open to public fishing. These public fishing rights have provided enjoyment for generations of anglers. With continued respect for the land and its owners, this outstanding program will have a bright future.

Half a Century of Success

The year 1988 marks the 53rd anniversary of New York State's public fishing rights program. During this time, over 1,100 miles of fishing rights easements and 240 points of access (parking areas and footpath rights-ofway) have been purchased all across the state. Total expenditures on the acquisition program, to date, amount to more than two million dollars. The acquisition program was originally funded by an appropriation from the Conservation Fund (primarily license revenues) and has subsequently been funded by Bond Acts passed by public referendum in 1960, 1972 and most recently in 1986. The 1986 Environmental Quality Bond Act continues funding for the public fishing rights acquisition program. DEC plans for the acquisition program include two main thrusts: to acquire additional rights along streams that already have significant rights to fill in gaps in the state's holdings, and to initiate new stream rights acquisition efforts on qualifying coldwater (trout), warmwater (bass) and tidal (tributaries of the lower Hudson River) streams. Anyone interested in selling such rights to the state or seeking more information about the program is urged to contact the nearest DEC regional office. 2

Ed Van Put is in charge of the purchase of public fishing rights as a principal fishing technician in the Region 3 office of DEC. He has published fishing articles in myriad fishing magazines.

Bring Us the Tired, the Lost, the Maimed -

Spie



Orphaned animals like these opossum babies are often brought to animal rehabilitators.

Scattered throughout the state are many people who care for wildlife in one way or another. Some enjoy driving back roads late in the day to watch and photograph deer. Many are bird watchers, some limited to keeping track of the feathered visitors at their bird feeders while others wade swamps and brave blizzards to meet the birds on their own grounds or waters. Some of those who care for wildlife are hunters, and some are adamantly against hunting, yet they share a common interest of concern. Out of this great mass of people there are some that put their concern into action. These are people known as wildlife rehabilitators who are licensed by DEC to care for sick, injured or orphaned wildlife until the bird or animal is healthy and can be released back into the "wild." If the creature cannot be rehabilitated then it is the job of the rehabilitator to legally dispose of it.

Rehabilitators are very special people. They must be willing to accept phone calls at all hours of the day and night. They must be willing to accept the expense of creature care. Often, particularly with young animals, around-the-clock care is necessary. There is always the chance of incurring injuries or disease from handling the animals. The rehabilitators must be willing to accept the emotional trauma of having an animal die after months of dedicated care or of putting one to death because it could not be released to survive on its own. Then the bittersweet time comes when success means the return to the wild of an animal that has become a friend. These are people who often feel that the great diversity of life is an essential measure of our survival.

What does one do to become a licensed wildlife rehabilitator?

• A person must be more than 17 years of age, a resident of New York

The Wildlife Rehabilitator

State, of good character and reputation and be so endorsed in writing by two unrelated persons in the community.

- The applicant must never have been convicted nor have pleaded guilty to any violation or misdemeanor of the Environmental Conservation Law, settled and compromised a civil liability nor have been convicted of any misdemeanor or felony within the previous three years.
- A written test relating to the field of wildlife rehabilitation must be passed with a grade of 80 percent or higher.
- And finally a person must meet with and pass an interview with a regional DEC employee responsible for the wildlife rehabilitation program.

Usually the interview will also include an inspection of the facilities to be used by the applicant to house and care for the animals. Many rehabilitators accept only species that they feel they know they can help. Some creatures require special veterinary services and this too is the responsibility of the rehabilitator. Considerable time is also spent providing accurate information to the public about wildlife and the laws.

So why do people let themselves in for all the work, expense and heartaches that go along with wildlife rehabilitation? Perhaps it is a form of human domination over other creatures where a person can determine whether a creature lives or dies and thereby feel a sense of power. Perhaps we all need to care for others in trouble and receive gratification in helping those less fortunate. And perhaps it is the sheer joy of success that provides a wonderful feeling that is remembered forever. Perhaps this is what Hanna Richard felt as a rehabilitator in New York City as described in the following story.



Unless the mother deer is known to be dead, fawns should be left alone. It is difficult to raise a fawn without making it too tame for release.

What's Two More?



Three young barn owls from Fort Tilden



Barn owl family at Jamaica Bay Wildlife Refuge

by Hanna Richard

EING a licensed wildlife rehabilitator in Brooklyn is not an easy task. There are only three of us within the five boroughs and during nesting season-mid-April to the end of August-we can expect several dozen phone calls a day. Some days bring 10 to 15 injured or truly orphaned young birds. Twelve years ago I made up my mind to try to help our native wild bird population and my husband, Artie, agreed to help me in my licensed hobby in any way that he could including his financial support. It is indeed a licensed hobby since one must have a permit from the U.S. Fish & Wildlife Service and a license from DEC to handle our native wildlife. Little did we know, at that early date, how time-consuming and financially burdensome my hobby would become.

Each year we both give up part of the spring and most of the summer and, with the help of some very dear friends, tend to our feathered charges. There is only one goal, the eventual release of the creature to the wild from which it came. No two days are alike and this is what makes it so interesting. Each day has its own surprises, almost like opening carefully wrapped gifts at Christmas.

May 28th, 1986 stands out especially in my mind. The phone rang for the ninth time and it was only 8:30 a.m. It was the foreman of a wellknown construction company which was ripping up an overpass on busy Richmond Avenue on Staten Island. The work must go on but six little barn owls were in the way. Could we pick them up and raise them? No, we could not pick them up because Artie was in Queens repairing a cardinal nest that had been blown out of an evergreen the night before, and he had the car. And no we couldn't raise the young owls because they might be-



A banded owlet at Staten Island

From the digital collections of the New York State Library.

come imprinted on humans and be quite tame and friendly, thus making eventual release to the wild totally impossible. But, first things first, we had to get the owlets to our home. It was the usual story, the construction company could not spare a single person to bring the birds. Our good friend Scottie Jenkins, a Staten Island birder and active naturalist, after my pleading call, went over and removed the birds from a piece of styrofoam, under the overpass, which the parents had chosen for a home. Scottie showed up several hours later with four barn owlets, the ages being about three weeks for the smallest and a little over four weeks for the largest. But only four? According to Scottie, that is all there were. I distinctly remembered the man saying there were six. But I had to get to that tomorrow, today there were four hissing, screaming babies to be cleaned up. The little ones had accumulated feces and pellet matter, the size of lima beans, on their toe nails. They would never have been efficient hunters, that's for sure. I soaked their feet in warm water, first turning the radio on full volume to avoid scaring the neighbors with the ungodly wails and hisses of the new additions. After the babies were cleaned up, relatively calm and settled, in a huddle, in a large wooden box, I defrosted 20 mice, put them at their feet and walked away. They had a tough day and needed some welldeserved rest. When Artie got home, he was thrilled to hear the news but sorry that he was not here to help clean the orphans, however he promised to take photos the next day.

For me the next day arrived before it got light when I was awakened by a symphony of loud, piercing food cries instead of the usual alarm clock. The four youngsters had finished their mice and wanted more. Never in my life did I defrost mice so fast (microwave ovens come in handy) once again with the good will of my neighbors uppermost in my mind. Now to find out what happened to the other two chicks. After a long talk with the foreman, who was uncooperative, I casually mentioned CBS News, the Daily News and the Staten Island Advance. I soon found out that one of the workers wanted to keep the missing two for pets. The foreman was only too glad to drop them off, saying it would be no trouble at all, ah, the power of the media.

These two owlets were larger, four to five weeks old, louder and more vile than the others. They got the same treatment, bath and food, then they were reunited with the rest of the gang. There they were, six sad, little faces minus their father, who so expertly hunts the rodents and brings them to mom, and minus mom, who, in turn, feeds the little faces. Poor orphans because of man and "progress" which is so often the case. But, all was not lost and we were beginning to get the feeling that these little barn owls had come to the right place.

For the past few years we have been actively involved with Gateway National Recreation Area's natural resources personnel monitoring barn owl nest boxes. There are now 20 of them evenly distributed at Jamaica Bay Wildlife Refuge, the islands in Jamaica Bay, Floyd Bennett Field and Fort Tilden. Being bird banders we have the rare, and often gratifying, opportunity to check all the boxes and band the youngsters along with some adult females, who are often very reluctant to leave their eggs or young. So far this year we had not gotten around to checking the boxes. Now it became a dire emergency, the six babies needed a home and had to be placed with foster parents quickly so as not to risk becoming tame by being with us. This should not be too big a problem since, contrary to widespread belief, owls cannot smell or count, therefore the foster parents would not reject the orphans as would mammals. It was really just a matter of finding homes that contained approximately the same size owlets as the ones we had to place. We decided to check the boxes

that were the most difficult to get to first. Those were the ones located on the islands. The National Park Service offered their boat and a ranger to get Artie there. All he found were eggs and owlets either too small or too large. He banded the larger chicks and one was subsequently captured, on its migration south, on Oct. 31, 1986 at Cape May Point, New Jersey while we were there helping with the hawk banding project.

Early on the evening of June 4, 1986 the two of us, accompanied by three good friends and a carton full of babies, set out to have a peek into the box at Floyd Bennett Field. There were six owlets already there. We banded them, along with our two smallest orphans, and stuck all eight back. Our friends were uncomfortable with the thought of already six owlets, and now eight. Were they going to make it? (A pellet analysis, done by Artie, of all 38 pounds of box debris collected after nesting season, showed no sibling predation or barn owl remains of any kind indicating that all eight fledged.) Okay, now let us move on to Fort Tilden. One box was the home of a bunch of baby squirrels and another provided seven empty beer cans a place to hang out. The third box began hissing upon our approach and we all knew what that meant. When we opened the door we saw two very angry, fuzzy faces peering at us from a corner. They were just the right size to pop in the other four. Again our companions were not sure about the advisability of this box-stuffing. We just closed our ears feeling certain that we were doing the right thing. Surely it was better than raising them ourselves. We checked the box at the end of August-it was empty. We thought about those little owlets for a long time and often looked at the many slides that we had taken, wondering how they had made out.

It is the summer of 1987, a year later, and time to investigate the progress of our nesting barn owls this season. It is my turn to go out in the



A young barn owl peers out of a bird house at Canarsie Pol.



Portrait of an adult barn owl

boat with the ranger and another volunteer, this time to Canarsie Pol, another one of the islands in the bay. There are four boxes to look into. One box had three chicks and a previously banded mom. The three owlets each received a serially numbered bandcourtesy of Uncle Sam. Mom did not fly but stayed with the nestlings watching my every move. It is always so exciting when one encounters a banded bird, trying to remain calm at these times is almost impossible. Carefully and gently I rotated the band on mom's leg. She didn't seem to mind. Why did number 816-85924 seem so familiar? Hurriedly I scrambled down the ladder and groped for my notebook. As I checked the numbers tears came to my eyes and there was a tightness in my throat. This mother was one of the orphans we had placed in the box at Fort Tilden the previous summer, one of our little orphans. Now here she was with three adorable fuzz balls of her own. I got goose bumps and an overwhelming feeling of pride and joy came over me. We had done right by this orphan, I felt certain, and couldn't wait to get home to share this wonderful news with everyone.

But this is not the end of the story. One June 9 we received two barn owlets evicted from a niche in the Fire Island Lighthouse which was being restored. Work must go on so the babies could not remain there. The only mother that had the same sized juveniles was 816-85924 and we just knew she wouldn't mind if we imposed on her. We were not disappointed, she calmly looked at her suddenly enlarged family and we both had the feeling that, had she been able to talk, she would have said: "I know what this is all about, I've been there-oh what the heck, what's two more?"

Hanna Richard has a great interest in wildlife, and, with her hushand and friends as assistants, she serves as a licensed wildlife rehabilitator in Brooklyn.





Some species of amphibians show care for their eggs. These toads will defend the territory until the eggs are laid.

To Be or Not to Be: Fathers in the Animal Kingdom

by Katherine Ambrus

NE of the welcoming signs of spring is hearing the music of songbirds once again. The red-winged blackbirds, for example, return to sing "konk-la-ree" enthusiastically, as if their call celebrated the very coming of warm days and sunshine. It is usually the voice of the male red-winged blackbird one hears initially, and it is not merely Blue jays at the nest. Both parents help raise these young. spring he is celebrating. Male redwinged blackbirds, as with most male birds, sing in order to establish a territory for the upcoming mating season. Their songs suggest to other males of the same species, "Stay out, I am here, this place is mine." In fact, the male red-winged blackbirds arrive well before the females, in order to secure a territory and prepare for mating. The birds will then protect their territory throughout the springtime, until their nestlings are grown. One may often see a male robin or a male blue jay chasing others away or singing excitedly to protect its family.

This territorial defense is an important function of male birds. It assures a monopoly over the nesting materials and food supply within the protected area. Male birds, in other words, sing to support their families. Some readers may interpret this behavior as that of a concerned and dedicated father. Most male birds are good fathers, indeed.

But what about the other fathers in the animal kingdom? Where are they? In many animal species, males do not participate in raising their offspring.



Mallard hens have the protection of the males who are fiercely protective of their domain. The main work of raising the young is the job of the hen.



Smooth green snake Parental care is rare among reptiles.

The vocal sac of this male American toad is fully inflated while he is calling to attract the females.





A young snapping turtle has remnants of duckweed clinging to his shell as he suns himself



This large number of turtle eggs is not unusual. There is no parental care of the eggs or the young.



A young merganser will receive care primarily from its mother.

Young striped skunks are weaned in about two months and disperse when about three months old. Before then the mother skunk keeps close control of the young.



Male rabbits are chased away by the females soon after mating. Male deer do not protect their fawns. Neither snake mothers nor fathers care for their young. Yet a male fox will risk his life to lead a predator away from his family. Why are there such differences in fatherly behavior among animals?

In nature, the level of parental behavior is based on the needs of the offspring when they are born. It also depends on the number of young ones. For example, snakes are born with the abilities to move about and feed themselves. Several hundred snakes may hatch from one nest at a time. Therefore, little care is needed for baby snakes, and there is a good chance that some of the babies will survive to maintain the species. Birds, on the other hand, are born in fewer numbers, perhaps four to seven in a nest. They remain utterly helpless for the first few weeks. In fact, they demand so much food and so much care that both malc and female parents must cooperate if the young ones are to survive. Parental activity is sometimes termed "investment" in the animal kingdom; both animal fathers and mothers invest only enough care to insure the survival of their offspring.

Parental involvement, or non-involvement, in animals is part of balancing each population in its natural community. For fish, amphibians and reptiles born in large numbers, many young ones will serve as an important food source for other predatory species. Also, if the young ones were continuously protected by the parents, the result would be overpopulation, and perhaps even starvation for many. Parenting in each species of animals is part of nature's strategy to maintain a healthy and balanced environment.

Many animal males certainly do not exhibit good "fatherly" behavior. From a human point of view, their indifference might seem neglectful and selfish. However, in nature, the habits of males and females are not to be morally interpreted. Parental involvement is not consciously chosen. Rather, the roles of fathers and mothers are adaptations for survival and for balance. They have evolved as solutions to specific, environmental stresses that the species as a whole must face.

Each species has its own unique form of parenting. Nevertheless, among the major classes of vertebrates, generalizations about parental behaviors can still be made. It is interesting to compare the level of parenting with the specific challenges the offspring face. Baby birds, for example, must first survive in a fragile egg. Then they are born naked and helpless. Newly born birds of prey need to rely on their parents for food for sevcral months. Male birds, therefore, must contribute as much as the female for the young ones to survive. They assist in nest building. After the eggs are laid, the males take turns with the females to incubate the eggs. And they continuously share in feeding the nestlings, which cat so often that several hundred food trips may be necessary each day. One careful study showed that a male titmouse made over 500 food-gathering trips in one day. Male house wrens are the most loyal of fathers. Male house wrens alone feed the fledglings after they leave the nest, while the female leaves her first nest to breed again.

All this time, the male bird defends his territory to maintain a constant supply of resources. Male birds can be fiercely protective of their domain. Mallard ducks begin searching for a bountiful nest site long before the females are ready to mate. Male geese will hiss and peck at other rival males. Blue jays have even been witnessed harassing crows and owls to keep them away. This defense of a territory is extremely important for supporting the nestlings.

Reptiles, on the other hand, are not such active parents. Reptile eggs, such as turtle or snake eggs, are usually buried by the female in sand, soil or vegetation as a means of protection



Most of the time male woodchucks live as bachelors in solitary dens.

B. Ivy

and temperature control. Snakes and turtles are usually born in large numbers relative to other species; turtles may lay up to 50 eggs in one nest. The young reptiles are born with the ability to move about freely and, also, to feed themselves. All these advantages increase the chances that at least some of the young reptiles will survive on their own. Therefore, parental care is rare among reptiles. In most species, the females abandon the eggs soon after they are laid and buried. In garter snakes and water snakes that do not lay eggs, the mother does not care for the babies once they are born.

Amphibian young, however, require more attentive parents in order to survive. Often, either the male or female amphibian will protect the eggs at the early, most vulnerable state of development. Amphibian eggs are not protected by a shell and may easily be swallowed by predators. In addition, they need to be kept moist and are sensitive to temperature changes. Since amphibian eggs are fertilized externally, the male has the opportunity to care for and even guard them. Until the eggs are successfully fertilized, male frogs and toads may defend a territory by using their powerful hind legs. Some exotic frog species guard their eggs on their bodies. The male European midwife toad, Alytes obstetricians, carries strings of eggs around on his hind legs and even swims with the eggs to keep them moist. In another frog species, Rhinoderma darwinii, found in Chile, the male keeps the eggs in a pouch in the back of his mouth until the tadpole stage is complete. In most frogs, any parental care stops once the eggs are hatched. Of the several thousand eggs that are laid, many will hatch and survive to reproduce.

A few species of fish also exhibit some protection of the eggs during their development. Although in many species of fish, the females simply release several thousand eggs that float freely in the water, sunfish are an ex-

ception. The male sunfish builds a nest on the bottom of a pond by swishing his fins through the sand and carrying stones away in his mouth. Usually he locates the nest near the roots of aquatic plants. He then lures a female into the nest, but chases her away after the eggs are laid and fertilized. The male sunfish continues to protect the nest until the eggs hatch. Male stickleback fish also display a similar paternal behavior. They have even been observed to "fan" the eggs, waving their fins back and forth to maintain a fresh supply of water and oxygen. Soon after the young fish are hatched, however, parental care ceases to exist in fish.

It is rare among mammals for parental duties to be shared between the male and the female. It is primarily the responsibility of the female to care for the offspring because mammal mothers must bear the babies internally during the early phases of development. The pregnancy stage serves as an effective means of protecting the young until birth. However, male mammals are physically isolated from their offspring during this time. Once the babies are born, they are again dependent only on their mother for food. Mammals distinguish themselves from other animals by breastfeeding their offspring with milk, and this responsibility falls on the female until the babies are more developed. The father's assistance is just not necessary in most mammal species. Male bears, deer and rabbits, for example, are not involved in parenting. Their only responsibility is mating.

With some mammal species, however, males do participate in feeding the young ones once they are weaned. They may also protect a territory around the nest or den. Paternal involvement is usually noted among species that mate for life. Male beavers, for example, assist in building the den and bringing food to the pups. A fox father will do the hunting for his family and will carry partly digested food back for them. He then regurgitates it for the others to eat. Male foxes have been observed leading a pack of hunting hounds astray in order to prevent them from finding the den.

Wolves have a unique method of parenting. Their family structure is based on the pack, rather than a single male and female. Although only the dominant male and female mate, all members of the pack share in parenting. Since only one pair of wolves has pups, it is in the interest of the other pack "aunts" and "uncles" to assist in caring for the pack's only offspring. After the pups are two or three weeks old, several different wolves will feed them in a similar manner to foxes. After a hunt, any member of the pack can be responsible for regurgitating food back for the pups. An aunt wolf often will "babysit" the young ones if the mother wishes to join a hunt. The aunts and uncles will also cooperate in playing with the youngsters. The pups will learn the important skills of hunting from all of the pack members once they are ready. The bonds of a wolf family include parenting, hunting and defending their territory. The strength of this pack family gives the pups a major advantage in survival.

It is not enough, however, to mention only the unusual habits of various animals as parents. One must look beyond the specific cases in search of a general pattern. In each species, the level of parental care in animals is related to the needs of the young ones and the conditions under which they are born. Parental involvement, or non-involvement in many cases, is an important part of nature's strategy for maintaining healthy and balanced populations. An understanding of the patterns among bird, reptile, amphibian, fish and mammal fathers and mothers leads to a deeper appreciation for the orderliness and stability in natural communities. -

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In Praise of Good Green Grass

by Frank Knight

STEPPE, pampas, veldt, alpine meadow-romantic names of wide open, faraway places. Tundra, prairie, tidal salt flats, freshwater marsh-vast natural areas around the world dominated by grass.

Always in awe of superlatives, we usually think of trees as the most magnificent of plants—symbols of great size, strength and longevity. Trees shade us from the sun, break the force of the wind and provide the world's most valuable building material. Grass seems to pale by comparison. But grasses are the meek that inherited the earth. On the African plains, grass witnessed our humanization. Its cultivation (wheat in the Middle East, rice in China, corn in America) enabled the development of the great civilizations. Grass comes in third (after orchids and composites) as the family with the largest number of species, but it is the undisputed champion in producing the largest number of individuals among the higher plants.

Not only are there more grass plants than any other, grass is the most widespread. Grass endures polar regions and mountain tops, draws moisture from deserts, survives immersion in

Bluejoint grass growing among cattails

(Above) Winter snows collect on packed grass providing shelter for small animal life.

The Conservationist, July-August 1988

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marshes and repels the salts of tidal flats. Grass thrives on extremes. Chances are that if it is too hot, cold, windy, wet or dry for other plants, grass will grow there. Humans are the grass counterpart in the animal kingdom in being the most widespread, but we cannot often boast of having a positive impact on the environment. But where grass pioneers, food, shelter, shade and stable enriched soil all result from its presence.

Of course, the most important attribute of grass is that it feeds the world. It is the food of choice for countless animals ranging in size from tiny insects to huge elephants. Grass in the form of wheat, rice, corn, barley, oats, rye, sugar cane, millet and sorghum is the cornerstone of our food supply. We grow it both for our direct use and as food for our livestock. Or, as the Bible says it most simply and poetically, . . . all flesh is as grass, and all the glory of man as the flower of grass.

It is no accident that grass is the perfect plant. It is ideally suited to its many environments and tasks. Grass is a no-frills, tough worker which has solved all the problems associated with life in the hot, dry, windy open. Even though it is as different-looking as bamboo, corn and timothy, all grasses are basically the same. They have hollow stems with solid joints and two ranked leaves-one per joint. Leaves are two-parted: the sheath is a split tube that surrounds the stem, and the blade is usually long and narrow. The wind, which can be a liability in drying plants out and blowing them over, has been put to good use by grass in both pollination and seed dispersal. Not requiring colorful petals, fragrance or nectar as do insect-pollinated flowers, grass flowers are tiny and inconspicuous and the grass plant efficiently packs many dozens of them into the inflorescence.

The wind whips a patch of squirrel-tail grass.



From the digital collections of the New York State Library.



Grasses are among the first plants to invade abandoned farmlands.

Meadow fescue



Tall crabgrass





Timothy grows in dense dumps.

Kentucky bluestem



Spring and summer winds carry pollen from plant to plant; fall winds carry the fruit of these unions. Feathery hairs associated with the seeds hitch a ride on the wind for easy dispersal far from the parent plant.

Hollow tubular stems are amazingly strong (as human scaffold designers have more recently learned) and grasses are among the tallest herbs. The big bluestem and Indian grasses of the tallgrass prairie are said to have hidden a man on horseback. The reed grass of New Jersey's Meadowlands, and in damp waste places everywhere, commonly grows 12 to 15 feet high, and we have all seen two story corn stalks on display at county fairs or proudly nailed to the side of a barn.

One of the most remarkable qualities of grass has resulted in its being the only real choice for playing fields and lawns. Most plants grow from their stem ends. Nip the tip and the plant either stops growing or must begin again from a lateral bud. Grass grows from its base so neither the teeth of grazers nor mowing machines can stop or temporarily interrupt the growth. Basal growth also rightens plants flattened by wind, hooves or football shoes.

Grass adaptability to the harshest environments is no handicap to life in a lawn. Lesser plants would quickly die from the abuse. Lawns are regularly trampled and then cut so short that there is barely enough leafage to sustain growth. To compensate, we periodically overdose the lawn with chemicals and drown it with water.

Grasslands are one of the world's four major biomes (widespread vegetation types). The other three are forest, savannah and desert. Grasslands comprise about one-fifth of the earth's land surface where it is the dominant and persistent vegetation. Savannahs are intermediate between forest and grassland with low, widely spaced trees. Climatic factors are the main ones determining which biome will occupy any one geographical area,

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Grasses are the basic plants supporting American agriculture.

Muhly



Slender mannagrass bends easily in the





W. Banaszewski







Poverty grasses are ideal resting places for the delicate damselfly. Grasses form anchoring places for the funnel-weaver spider webs.







Fringed brome

Grasshoppers feed extensively on grasses.

Sumac leaves form a brilliant backdrop to ripe poverty grass.







A timothy head in flower

Yellow foxtail



and rainfall is the most important. Grasslands thrive on annual rainfall ranging from 10 to 30 inches. Deserts occur where there is less rain; savannahs and forests where there is more.

One need do absolutely nothing to produce a grassland on cleared land in New York. Just stop growing crops or stop mowing the lawn. By the end of one growing season a full fledged field of mostly grass will have developed. After two or three years, a prairie resembling those of the west will result. But to keep it a prairie requires work. In Kansas it would be a prairie for evermore. In New York, grassland is an early transient step in the inevitable succession to forest. A great deal of energy must be expended to maintain grassland here. The land must be grazed or periodically burned or cut to prevent the invasion of woody plants.

After 1800 farmers by the droves left the land. In New York much of this land abandonment was permanent resulting in the quick return of the forest. In just 100 years New York reverted from 25 percent to more than 60 percent forested.

High quality grass requires even more energy to sustain it. New York's livestock farmers who grow sod crops—pasturage for summer grazing and cured forage for winter feeding must till, lime, plant quality grass seed and fertilize to maintain good production. Since each soil type requires different sod management, farmers have their soil tested periodically. Grazing or mowing will keep fields in grass indefinitely, but without all the extra effort and input weeds will multiply and production will drop significantly.

Despite the fact that New York is in the forest biome, it has a very rich grass flora. In fact it probably has more species of grass than a comparably-sized area in the Great Plains. There the topography is fairly uniform and there are relatively few distinctly different habitats. The plains are (or were before agriculture) a sea of grass

dominated by only a few species. But New York which has salt marsh at one extreme and alpine mountain tops at the other with 136 other distinct habitats in between provides the right conditions for many grasses. There are nearly 170 native species with more than one-third of them classified as rare. At least two species are thought to be extinct. Then there are another 65 or so species of grass that have naturalized in New York. Many of these were introduced for agricultural or lawn use. And finally there are another 90 species classified as "rare introductions"-plants that either do not persist or do not spread from their sites of introduction.

The word grass comes to us from the old Aryan root, ghra-, to grow. The Latin word for grass, gramen comes from ghra as do our words green, grain and grow. Humus, the organic portion of the soil largely derived from grass, comes from the same root word as humanity. Grass is an integral part of our humanity-it nurtured our beginnings and it feeds us now. I suspect that our involvement with grass runs so deep that we are not consciously aware of all the implications. For example, dismissing our preoccupation with grass lawns as just a status symbol is too simplistic an explanation. John James Ingalls, senator from Kansas from 1873 to 1891, eloquently and more accurately described our relationship to this most important plant:

"Lying in the sunshine among the buttercups and dandelions of May, scarcely higher in intelligence than the minute tenants of that mimic wilderness, our earliest recollections are of grass; and when the fitful fever is ended, and the foolish wrangle of the market and forum is closed, grass heals over the scar which our descent into the bosom of the earth has made, and the carpet of the infant becomes the blanket of the dead."

Frank Knight works as an environmental educator in DEC's bureau of environmental education and conducts the popular "Your questions answered" feature for THE CONSERVATIONIST.



Those Chasing

by Elizabeth Day Darlington

Red admiral



Tiger swallowtail

AVE you ever been attacked by a butterfly? A few years ago I stopped along a woodland path to watch a mourning cloak butterfly. Though this was a day in mid-June, these large butterflies are often seen in very early spring, emerging from hibernation on warm sunny days even as patches of snow still lie on the ground. Their

notched, angular wings—deep brownish-maroon—are bordered with light straw, and a row of light blue dots separates the straw from the maroon.

To my surprise, the butterfly zoomed toward my face repeatedly, wings beating rapidly and noisily. I held out my hand and wiggled it, and the butterfly landed on my arm. A few days later, in the same spot, this or another mourning cloak flew at—then landed on—my husband's black-andwhite-striped baseball hat. But soon another mourning cloak flew into the area, and the first one took off, chasing it up and away into the woods.

What was this creature up to? Was it a male or female? Was it defending something, and if so, what? A special food supply or egg-laying area? Or perhaps a female? Why did it fly at me, something so obviously lacking in butterfly attributes? Do other butterfly species engage in similar behavior—and if so, where might I go to observe it? What sex was the second mourning cloak, and why did the first one chase it?

It turns out that a number of male butterflies defend small territories against other males in order to attract a mate. While we expect territorial behavior from birds, dogs and humans, it is startling in such delicate creatures as butterflies. The males chase. race or even fight intruding males. They may pursue other things as well-falling leaves, birds, various insects, dogs, horses and humans. Possibly the males have trouble distinguishing a butterfly of their own species from a number of other moving objects. But Dr. John Alcock, the well-known animal behaviorist, thinks a more likely explanation is that this is spillover behavior: the males are just

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Racing, Butterflies



Painted lady

so anxious to chase off other males that they will go after anything, if no males are around to chase.

Females out shopping for a mate know just where to find male territories. (Just as human females in search of males know where to go to find them.) It saves energy to visit these spots rather than to hunt aimlessly about the countryside. Moreover, the most vigorous males will be the ones who are able to defend territories, so a female is more likely to get a healthy, vigorous mate. With this genetic endowment, her offspring will have a better chance in life.

Sometimes a number of males of the same species gather in one place, each defending his own little territory near those of other males, a behavior called lekking. Several mourning cloaks may defend territories 10 to 20 feet apart along the same woodland trail. Alcock says that mourning cloaks are strongly influenced by landmarks; as soon as a male hatches from the chrysalis, it imprints on certain landmarks such as a prominent tree or an opening in the forest. The area where my husband and I were "attacked" must be a desirable spot, for it has defending male mourning cloaks year after year.

Male great purple hairstreaks, brilliant bluish-purple butterflies found widely in all but the most northern parts of the United States, gather on certain prominent hilltops. Alcock discovered that each one perches on a tree or bush. When another male hairstreak flies toward his tree, he chases it around the tree and then high into the air. The two spiral around and around each other as they ascend.

Alcock reports that, early in the chase, he could often hear the clashing of their wings. Usually the invader loses, but if the resident male is weak or slow, the new male takes over the territory. Female hairstreaks fly over the perches at high speed, providing yet another test of male vigor: to mate, he must be able to catch her.

Male indra swallowtails, large, showy creatures found in the moun-



Black swallowtail



Bonded purple



Baltimore

tains of Colorado, Nevada and California defend an area around the plants that swallowtail caterpillars eat plants in the carrot (Umbelliferae) family. They probably choose this location so they can mate with females that are about to lay eggs, or with younger females as they emerge from their chrysalises.

Indra males are not as polite as the purple hairstreaks, and in fact, sometimes get into violent aerial fights, battering each other with their wings. Wings, antennae, and legs may be severely damaged. In their fascinating book, *The Evolution of Insect Mating Systems*, Thornhill and Alcock tell of one case in which a male indra lost half of a hindwing, one leg and one antenna. The tips of both forewings were broken and one forewing was badly torn. How different such pugnacity is from the popular image of butterflies.

The black swallowtail, so common in open fields in New York State, is far less violent. The males lek along hilltops—as do a number of other species. Robert Lederhouse, who studied them extensively, found that the



Least skipper



Buckeye

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From the digital collections of the New York State Library.



A flight pattern of a butterfly chase

strongest males are able to defend the best perches—those at the top of the hill. To defend his territory, a resident male chases off an intruding male swallowtail by circling around and around him, up into the air. Sometimes the chases are more like human sprinting races—straight and fast. Or the two may zig-zag like a dog chasing a rabbit. If the intruder sees that the resident is stronger and faster, he does not stick around, but leaves to find a weaker male or an empty territory.

The females "know" that the strongest, healthiest males are the ones in hilltop positions, and they often fly straight through less desirable sites to the hilltop males. A female shows her interest in a male by circling his territory. When the male leaves to mate with her, another male may take over his territory, but only until he comes back and reclaims it.

When a resource is common, it makes sense that contests will be more half-hearted. Speckled wood butterflies, found in Europe, north Africa and Asia, defend sunspots on the forest floor. (As you might expect, sunspot territories shift throughout the day as the sun moves across the sky.) N.B. Davies discovered that whatever male is occupying a given sunspot is always able to chase away intruding males. The woods are full of sunspots, after all, so why waste valuable energy trying to steal someone else's sunspot when you can just go elsewhere and find an undefended one?

However, Davies was able to induce prolonged conflicts by removing a resident male from its territory and then releasing it, once a second male had claimed the spot. Both males thus thought of themselves as the rightful owner and the two engaged in repeated upwardly spiralling chases.

If you wish to observe males defending territories, do not look where butterflies are feeding. Territories are seldom around such places. Look in openings or along trails in the woods, in gullies or along streams or woodland edges (certain skipper species), on tree trunks (pearly eyes and question marks), along ridges and hilltops. If you find a defending male, you might try releasing another butterfly or perhaps a bumblebee or other large insect into the area. Watch for the male's reaction. Observing butterflies can be a fascinating pastime.

A Few Butterfly Species Found in New York State

Northern pearly eye: Lethe (Enodia) anthedon

Pearl crescent: Phyciodes thares

Question mark: Polygonia interrogationis

Mourning cloak: Nymphalis antiopa Buckeye: Precis coenia (Junonia coenia)

Great purple hairstreak: Atlides halesus

American copper: Lycaena phlaeas americana

Black swallowtail: Papilio polyxenes Silver-spotted skipper: Epargyieus

clarus Hoary edge skipper: Achalarus

lycidas

Arctic skipper: Carterocephalus palaemon mandan

Least skipper: Ancyloxypha numitor Fiery skipper: Hylephila phyleus Long dash skipper: Polites mystic Whirlabout skipper: Polites vibex Southern golden (or zabulon) skipper: Poanes zabulon

Northern golden (or hobomok) skipper: Poanes hobomok

Painted lady: Cynthia cardui Red admiral: Vanessa atalanta Banded purple: Basilarchia arthemis Baltimore: Euphydryas phaeton

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Northern oriole above its hanging nest.

From the digital collections of the New York State Library.





Mallards nest in thick grass on shore.

by Chris Dwyer

he warm sunny days have finally etched away the cold grip of winter. The days are longer, and the birds have finished the long journey from their southern wintering grounds to start a new year. Birds are filling every niche in search of the best locations to nest and rear their young. For the many different types of birds, each has its own nesting needs to meet when selecting a location.

Depending on the particular requirements of the bird, it will use one of several nest types: a floating nest over the water, an open nest on the ground, an open (cup) nest in trees or a cavity nest.

In the wetlands, birds are beginning to gather old cattail and bullrush tops left from the previous year to build their floating nests. The thick vegetation of the new year keeps the nest stable as it grows up around the nest, as well as providing cover for the nesting bird. This island-type nest tends to be more successful because of its isolation, since it is less likely to be disturbed. It is thought that birds may have adapted to building over-water nests to reduce the predation by land mammals. Birds such as loons, grebes and diver ducks are a few of the many types of birds that take advantage of these isolated nests.

While some waterfowl nest over the

water, others, particularly the dabbling ducks, will nest in thick vegetation on land. Along with other groundnesting birds such as field sparrows and upland plovers, they begin the nest by scratching out a shallow depression in the dirt. They gradually pull in surrounding vegetation while sitting inside the nest bowl. As the bird lays its eggs and incubates, it continues to pull in more vegetation. In the case of ducks, they pluck down feathers from their breasts and line the inside of the nest bowl with them. This increases the insulation of the nest, and helps to keep the temperature of the eggs stable when the hen leaves to feed in the afternoon. By removing the down feathers from her breast, the hen creates an area of bare skin called a brood patch, which will allow more direct heat to reach the ducklings after they hatch. Most species that nest on the ground have precocial chicks, which means that the chicks have downy feathers and are ready to leave the nest about a day after hatching.

When one thinks of a bird's nest, it is almost always of the typical cuptype nest found on tree branches. This is the most common type of nest, and it is used by most birds. After the bird selects a site, it begins to gather materials for the nest. The size and amount of materials depends greatly



Dwyer



Coots nest among cattails. Here a newly hatched young bird dries off as another egg starts to hatch.

The tree swallow is one of the species of birds that nest in cavities, in this case a nest box.



Killdeer lay their eggs on bare ground with almost no nest construction.



Great horned owls will often use platform nests but some seem to prefer cavities in trees or small caves.

Yellow warbler nests are very soft and deep. These nests are often used by cowbirds, a species that never builds its own nest nor raises its own young.

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From the digital collections of the New York State Library.



Brown thrashers build cup-shaped nests.



on the size of the bird. The larger birds gather twigs and branches, while the smaller birds gather grasses and mud. They begin the nest by using coarse materials to make an outer shell, gradually working finer materials into the nest until the innermost cup or bowl is lined with fine grass tips. The bird shapes the nest with its breast and belly as it continually adds to it by pivoting around in the nest, much the same as a potter would apply pressure on the base and sides of a bowl to shape the clay.

Although most birds start from scratch when building nests, birds of prey often use pre-existing nests which they may add to or repair. Eagles, for example, add to their nest year after year. The process in which eagles gather materials is quite different from other raptors. While other raptors may gather branches from the ground, the eagle gathers branches while in flight. The eagle flies out over the tree tops to select a dead branch tip. Grasping the branch with its talons, the eagle folds its wings as if to land. The weight of the eagle will bend the branch back until it snaps, and then the eagle quickly resumes flight with the branch in its talons. As the eagle's nest grows from year to year, the size of the nest depends on the ability of the tree to support it. If the eagle chooses to build a nest in a dead snag, the use of that nest may not be as long as a nest built in a live tree. Occasionally, small birds take advantage of the size of the eagle's nest, and make a nest of their own in among the tangle of branches.

The ultimate in protection and shelter is the cavity nest. With the security it provides from the elements and predators, nestlings can remain and develop unmolested over a longer period of time. Chicks of cavity nesters are often altricial, which means they hatch unfeathered and helpless. The cavity nest gives the chicks a greater chance of survival. The safety, along with the low amount of potential nesting sites, causes a high competition

From the digital collections of the New York State Library.



Great blue herons often build large loosely constructed nests high in hardwoods.

for cavity nests. It is thought that one of the main causes for the decline of the eastern bluebird is the competition for available nesting sites. Thanks to the many birdwatchers, naturalists, Boy Scout troops and 4-H members who have taken the time to construct and put up nest boxes, the bluebird is now making an excellent comeback. With the decline of the elm, many resulting dead trees which provided nesting opportunities have become more and more scarce as they are cut down, or as they decay and fall to the ground naturally. The loss of highly desirable nesting locations makes the placement of nest boxes essential so that they may provide future nesting sites.

The bird's ability to conceal its nest from predators is a behavior that is essential to the survival of the species. A bird that successfully conceals its nest will produce young that are more likely to do the same. While birds such as waterfowl rely on the concealing surrounding vegetation, other birds, like the grouse and the marbled godwit, rely on their feather patterns and egg coloration for camouflage. Larger birds, which have very few if any avian predators, choose to nest higher up in trees to avoid predation by ground dwelling animals. Be it on the ground or high in a tree, a key to nesting success is its location. Birds that have adapted to building strong effective nests will raise birds that may carry on this tradition.

While out walking along the woods, meadows and wetlands, look closer at that thick clump of grass, the bushes and the trees for birds that may be nesting. With a little luck and a trained eye, you may just find one of nature's spectacular events.

Chris Dwyer is a graduate of SUNY. Cobleskill where he earned a degree in fisheries and wildlife technology. He is currently attending the University of Montana. His seasonal positions with the U.S. Fish and Wildlife Service and freelance photography have enabled him to spend many hours working with wildlife.

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The Life and Times of the Red-shouldered Hawk

by Scott Crocoll and Jim Parker

N a clear, cold morning in late March, with several inches of snow on the ground, we walked along an unpaved road in rural Chautauqua County. A blue jay called in the distance or at least that is what we first thought it was. The further up the road we traveled, the closer and louder the sound became, until suddenly over the tops of the trees a redshouldered hawk soared into view. The reddish color of its breast, belly and wing coverts contrasted with the black and white pattern of the rest of its plumage-giving affirmation to the contention of some naturalists that the bird is one of the most attractive raptors in North America. The red "shoulder" patches (actually a chestnut color on the bird's wrists) are usually evident only when the bird is perched or flying low.

The red-shouldered hawk is a member of the genus *Buteo*, the soaring hawks. Buteos are the birds we

It is easier to spot existing hawk nests before the leaves obscure them.



Red-shouldered hawk Painting by Poul Connor



Unmarked "windows" on the wings of a flying red-shouldered hawk are good field marks.





Leopard frog (top) and pickerel frog







Milk snake



Red squirrel

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From the digital collections of the New York State Library.

should call the "buzzards" or buzzard-hawks. (The term "vulture" is really the only title we should reserve for our scavenger bird, the turkey vulture.) The red-shoulder is about midway in size between the larger redtailed hawk and the smaller broad-winged hawk, but all three species look much alike. The red-shoulder's range includes most of the eastern United States, and the southern parts of Ontario and Quebec. There is a disjunct Pacific coast population from California south to Mexico.

Because so little attention had been paid to red-shoulders in New York we decided in 1978 to undertake a study of this hawk species in conjunction with research work done on the broadwinged hawk in Chautauqua County, the furthest western county in New York. (Glen Johnson of the SUNY College of Environmental Science and Forestry is currently in the middle of a five- to six-year study of the nesting and foraging habitat of the red-shouldered hawk in northern Oswego County.) Chautauqua County can be divided roughly into two physiographic zones (ecozones), the Lake Erie plain along the lake, and the Appalachian Plateau (as was described by Nate Dickinson of DEC), which begins several miles inland of the shore. The land along the lake has been used largely for agriculture with considerable acreage in grapes. The uplands have been extensively farmed and lumbered, resulting in a mosaic of habitat types. These range from barren land to forest succeeding into the typical maple-beech-hemlock forest originally associated with this part of the state. During the 1930's, much abandoned farmland on the plateau was replanted with monocultures of several species of conifers, a type of habitat rarely acceptable to redshoulders.

We studied red-shouldered breeding biology for three years and were surprised to find 19 active territories. This was because Dr. Robert Andrle of the Buffalo Museum of Science and John Bull in the Birds of New York State indicated a substantial decline in numbers of red-shoulders in western New York in the recent past. Both authorities allowed that the species was still breeding in various parts of the state, but now at densities much lower than many years ago. Nevertheless, to us, it looked like the redshoulder was probably the second most abundant nesting raptor in Chautauqua County.

The red-shoulder is predominantly a creature of the deep forest. During most of the summer breeding period that it spends with us in New York, it prefers extensive stands of mixed deciduous-coniferous forest. And usually it is thought to associate with river bottom old-aged forest with a relatively open understory and a dense canopy cover. Although in western New York, we found it in the forested uplands, red-shoulders still were choosing nesting areas near some kind of wetland or water, where they caught a considerable portion of their food.

In New York, the red-shoulder is primarily a seasonal resident. It migrates to the southern states in October and November. During the winter months, it is as "thick as flies" in places like the cypress swamps and pine lands of south Florida. It is a rare winter resident in New York with only a couple of individuals, probably hard-pressed to find food, being seen each winter. In western New York it reappears in the latter half of March when individuals can be heard calling like bluejays, and pairs court above their extensive wooded haunts.

One of the best ways to identify an active nest is the presence of freshconifer branches on top of a large stick structure. Although most raptors that decorate their nests with greenery use whatever is available near their nest trees, red-shoulders in Chautauqua County seemed to show a preference for eastern hcmlock sprigs. It was the only greenery we found in any nest, but it may indicate no more than the abundance of hemlock in red-shoulder habitat.

Although red-shoulders nest in many different species of trees, in Chautauqua County they showed a clear preference for American beech; slightly more than a third of the nests we found were in beech. John Bull, in the Birds of New York State, also found this preference in the nest records he reviewed for the entire state. Our nests averaged about 44 feet from the ground, and were within approximately a half mile of standing water, either a stream, pond or swamp.

Red-shoulders began laying eggs in early April in western New York and incubated the eggs for four to five weeks. This means they begin nesting, and consequently hunting to feed their young, about three weeks before their close relative, the broad-wing. Otherwise, the two species would probably experience greater competition for food. The average clutch size was three eggs on our study area, but ranges from one to five across the species' North American range.

A dramatic change in behavior occurred with onset of incubation. Whereas during courtship and nest building the red-shoulders were easily seen and quite vocal, after incubation bcgan the birds became much more quiet and sccretive. The only time we provoked any calling during their incubation period was when we disturbed the nest trce itself.

As with many other raptors, nest defense and aggression against intruders varied among individual birds. Females are typically the more aggressive nest defender and the larger partner in raptor pairs. But still some females simply left the area at our approach. Others perched nearby and called. Still others attacked us by swooping on us and almost striking our heads with their talons. An example serves nicely to illustrate the difference in behavior between individual birds; in this case between a male and femalc of one pair. On one nest visit one of us climbed the nest tree to

A red-shouldered hawk looks over its territory.

check on the seven-day-old young. The female flew off the nest and began to circle the nest and call. Occasionally she dove at the individual at the nest. Shortly thereafter, the male arrived at the nest with an castern chipmunk. He seemed oblivious to the actions of the female, and when trying to land to leave the prey item. almost hit the person at the nest in the head. The male hawk fell backward out of the nest and disappeared. Even when aware of our presence, he showed no aggressive behavior whatsocver. The chipmunk, which was still alive, skittered down the side of the tree and into cover. What a reprieve!

Like red-shoulders everywhere ours at the Canadaway hatched their eggs asynchronously. This means that red-shoulders start incubating their clutch with the first egg, and barring some form of mortality to the eggs, eggs will hatch in the order that they are laid; usually at least a day apart. Since each clutch hatched over several days, there was usually considerable difference in size among the nestlings.

When hatched, the nestlings were covered with soft gray down and had barely open eyes. Ornithologists tcrm this type of hatchling semi-altricial; about all the young could do was raisc their heads, beg, eat and defecate. The nestling period lasted about five weeks, with young leaving the nest mainly during the third and fourth weeks of June in Chautauqua County. But the average fledging datc varies across the state. It averages one to two weeks later in the more northern portions of New York, and more than likely, the difference is due to differences in climate which force the northern hawks to arrive and begin nesting later.

Red-shouldered hawks are generally sit-and-wait predators. This means they perch on some object, usually deep within the woods, and watch for prey. Once potential prey is sighted, they launch from their perch and drop like a bomb to grab it. And lucky, indeed, is the person treated to see this demonstration of carnivorous efficiency. The hawks are opportunistic and will take whatever they can capture. Made up mostly of small mammals such as chipmunks, shrews and voles, their total diet includes various insects, crayfish, fish, frogs, toads, turtles, snakes, rails, songbirds, muskrats and even rabbits. Red-shoulders are not heavily built, but their legs arc long, and their talons powerful.

Because, like a number of other raptors, the red-shouldered hawk is on the decline in many parts of its continental range, it had been given, as of 1984, some type of special status (endangered, threatened, special concern or rare) in no fewer than 17 states. In New York it has been classified as threatened, which is probably wisc until we know more about its abundance on a wider scale.

A decline in numbers was first noted more than 50 years ago. Therefore, some researchers theorized that pesticide problems, at least in part. were responsible for the more recent decline, just as had been found in ospreys, bald eagles and peregrine falcons. To test this idea, Charles Henny and his colleagues of the United States Fish and Wildlife Service, carried out studies of red-shoulders in Maryland in the 1960's. They found that although eggshell thickness (a common symptom of pesticidc contamination in raptors) was lower in the period of DDT use compared to pre-DDT usage, the reduction in eggshell thickness was not nearly of the magnitude that was required to cause reproductive failure in bald eagles and other raptors. Pesticides did not appear to be the problem.

More recently, researchers like James Bednarz, of the University of Iowa, have suggested that the decline of red-shouldered hawks is due primarily to a loss of habitat. The redshoulder's necd for expanses of mature woods has put it in conflict with many human activities, including home development, timber harvest and farming. Fragmentation of extensive forests has eliminated red-shoulder breeding habitat and increased breeding habitat for the red-tailed hawk. The red-tail is a much more common species that uses extensive open areas in conjunction with small woodlots during the breeding season. The loss of wetlands contiguous with forest has probably also been a factor. It has reduced the quality of redshoulder habitat by reducing its prey base.

Fortunately, at least here in New York, there is reason to be optimistic about the condition of the red-shouldered population. Our Breeding Bird Atlas project has found the red-shouldered hawk to be widely distributed, and this, in turn, shows the benefit of a thorough atlas project. And in places where large areas of old farm. land have reverted to forest, like Chautauqua County, habitat for the rcd-shoulder has once again become available. Also, a number of the division of fish and wildlife's upland management areas support extensive stands of mixed coniferous-deciduous woods. These may in the future, if not already, support breeding red-shouldered hawks.

The red-shoulder has one other thing going for it. Some rcd-shoulder pairs have shown surprising tolerance of humans by nesting quite close to human habitations where extensive forests surround the dwellings. We can only hope that, with the preservation of some large areas of forest land and the return of former forest areas into forest land, we will see the redshouldered hawk return to its former abundance in New York State.

Scott Crocoll is a conservation biologist with DEC's habitat inventory unit. He obtained his M.S. from SUNY College at Fredonia where he studied the nesting ecology of broad-winged and red-shouldered hawks.

Jim Parker is a raptor ecologist with more than 20 years of research, teaching and rehabilitation experience. He has taught at SUNY College at Fredonia and at the University of Maine. He is currently a private environmental educator and consultant in Maine.



Love Affair with a Quarry

by Barbara Van Dyk

A rock hound from central New York tells of a favorite haunt

HE first time I saw the quarry, I knew I had found a special place. The pit was huge and in its bowl lay quiet pools of intensely turquoise water. I had gone to the quarry to look for fossils: cephalopods, to be specific, kin to the chambered nautilus. A friend had told me I would find some there in an outcrop of limestone on the quarry's south rim. "Big as dinner plates," he had told me, which was all I needed to hear. I put my dog in the car, packed a sack and a hammer and set off in search of a prize.

That was not my first trip in search

of old life; I have been charmed by fossils for years. Growing up near the shores of Cayuga Lake, I had become well acquainted with crinoids and brachiopods and had filled my pockets many times with weathered grey stones. I did not know what their names were back then, nor could I have begun to imagine their age, but the shapes of the fossils intrigued me and I hoarded them.

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NOTE: Only authorized groups will be allowed to visit the quarry. Arrangements for visiting must be made at least two weeks in advance. Any group visiting must present proof of carrying their own liability insurance. For permission and directions write (don't call) Phillip Rafferty, Seneca Stone Corporation, P.O. Box 76, Fayetteville, NY 13065.

I still covet fossils, now that I am an adult, but my prey is more exotic; brachiopods and crinoids strike me as mundane. It is the nautiloids that haunt me now-their spiral forms are to me the essence of mystery and grace. The thought that they have lain in their rocky beds for millions of years, unchanged, tuned in to a time scale I have memorized but cannot comprehend appeals to my sense of wonder.

I first visited the Seneca Stone Corporation's quarry near Canoga in 1984. I have made many visits since then, drawn by the fossils and by the grandeur of the quarry itself. Fifty feet deep and half a mile wide, it sits in the middle of a cornfield near the north end of Cayuga Lake—a cavity of iron-stained limestone and shale, dotted, in wet weather, with pools of bluegreen water.

Because the quarry is actively mined, it looks a little different each time I visit; I typically find a few more embayments carved into the rim and a few more piles of debris. Fortunately the place where my favorite fossils reside—a 30 by 80 foot platform of limestone at the south edge of the pit—has so far remained unscathed.

As my friend told me, the fossils just sit there exposed on the platform like tiles or big plates: hundreds of them frozen into the rock, their chambered walls standing out in relief and gleaming with pyrite that long ago replaced the original shells.

The fossils are so well integrated with the bedrock that I cannot dig them out, so I take pictures or rubbings instead. But even if I could extract them, I would hesitate to disturb them: they have slumbered there for millions of years, nearly four hundred million, in fact, cradled in sediments left behind by an ancient, Devonian sea.

It comforts me to think of them there—gleaming, cosmic spirals indifferent to the elements and the passage of time. I cannot help wondering if the relics of our own age will last as long,



Looking across the quarry from the west side. The fossil area is further to the right out of the picture.

The weathered fossil clearly shows the partitions of this straight cephalopod shell.



From the digital collections of the New York State Library.



Quiet pools of intensely turquoise water

Cross sections of the coiled nautiloid cephalopods show the chamber partitions.



Garcia

Some of the fossils show a rusty look.



The author stands at the south end of the quarry near the fossil platform.

or be anywhere near as beautiful.

The rock exposed in the Seneca Stone Corporation quarry near Canoga, like much of the rock underlying central New York, is roughly 400 million years old. It is sedimentary material, consisting of hardened layers of mud, silt and sand grains that settled out of the oceans that covered much of what is now eastern North America during the Devonian Period, a portion of the geologic time scale that ranged from 360 to 410 million years ago.

Many of the creatures that lived in those oceans had hard outer skeletons, or shells. (Vertebrates, or animals with backbones, evolved later.) When the organisms died, their shells settled to the ocean floor and were gradually buried in sediment. As the sediment hardened—a process that can take thousands of years, the shells dissolved, leaving impressions of themselves behind. Some of the fossils we find are impressions, or molds; some are casts: stone replicas of the shells made by sediment that filled up the molds. In other fossils, like those at Canoga, the original shell material has been replaced by more durable minerals such as calcite or pyrite.

Cephalopods A large class of predatory marine animals that move by ejecting water through their body cavity. Many cephalopods have a straight, or coiled, chambered shell protecting their soft tissue, which resides in the outermost chamber.

Subclasses of cephalopods are distinguished by the complexity of their suture pattern, i.e., the linear pattern visible on the shell's outer surface that corresponds to the junction of the outer shell and the interior chamber walls. The suture pattern of nautiloids is smooth and simple, while the patterns of more highly-evolved cephalopods are convoluted.

Many kinds of nautiloids, both straight and coiled, existed during the Paleozoic Era (245 to 570 million years ago). The chambered, or pearly, nautilus found in the Pacific Ocean is one of the few representatives of the subclass that still exists.

Crinoids Also called sea lilies, crinoids are marine animals characterized by a long stem and bulbous "head," or calyx, that live attached to the ocean floor. The Cheerio-shaped disks which, when stacked atop one another, make up the stems are commonly found in Paleozoic rocks: the calices are less commonly found.

Brachiopods Filter-feeding animals with two opposing shells that live in the ocean attached to rocks, coral or the ocean floor. Brachiopods were abundant and widely dispersed throughout the Paleozoic Era; today they are a minor group found primarily in Arctic regions.

Barbara Van Dyk is an executive staff assistant at Cornell University. She has a B.A. from Wellesley College and is involved in free-lance writing related to science and technology.

Letters

Desperately Seeking Woodchucks

CONSERVATIONIST readers—I need your help. You have far more opportunities to watch woodchucks than we Iowans have. Tell me what you have observed of their behavior: How do they get along with other animals? With other woodchucks? Do they tolerate strangers around their dens? Do they hibernate alone or in company with others? How do adults relate to their young? What is the youngest (smallest) young you have seen out of the den? Why do woodchucks do so well when they have so many human enemies?

I have been a woodchuck watcher for many years, having tagged and retrapped them to study their movements. Recently I had two adults, male and female, in a pen equipped with two hibernating chambers below ground. They carried much bedding into both dens in late autumn. Then in December they moved all of the bedding from one of the dens into the other and hibernated together,

Chance observations by hunters and hikers may reveal aspects of woodchuck behavior that will help me interpret what I have seen. If you will write, telling about your experiences, I will tell you how mine compare. Thanks!

> Richard Trump 1511 13th St. Ames, Iowa 50010

Landscaping for Birds

In the letters section of your January-February issue, there is an inquiry from Ralph and Inez DeCook of Newark concerning landscaping for attracting birds.

In addition to your suggestion of sources of information, may I make the following recommendation:

In the January-February issue of

the magazine Birder's World, which is Vol. 1, Number 1, there is an excellent article by Dr. Gustav Swanson, entitled "Developing a Bird Garden." Dr. Swanson was formerly chairman of the department of conservation at Cornell University, and for a time executive director of the Cornell University laboratory of ornithology.

> Sally Hoyt Spofford Portal, Arizona

Oneida Lake Pike

Last summer we had very poor success in finding any pike in Oneida Lake. In previous years the fishing has been very good. What happened to the pike?

> Mrs. R. Abbe Vernon

• In referring to pike, I assume you are writing about walleye. The walleye population remains abundant in Oneida Lake. However, there has also been a great abundance of young gizzard shad in the lake over the last four years. The gizzard shad is a member of the herring family and, when available, it is preferred forage for many game fish. An abundance of young shad that are just the right size for feeding walleye results in tough fishing because the walleye are rarely hungry. You can compare it to selling Spam sandwiches at a free roast beef barbecue.

We monitor the Oneida Lake walleye population closely. The spring 1987 population was estimated at more than 660,000 adults. The fish are there, but unfortunately angler catch in the 1988 fishing season will again depend on the numbers of gizzard shad produced from this year's spawning.

> Patrick J. Festa Supervising Aquatic Biologist Inland Fisheries Section



Unique Bird Feeders

My wife and I enjoy feeding the birds year-round which presented a problem when we began to plan a three-week mid-winter vacation. Who could feed the birds? We did! I constructed an adaptation of the Audubon bird feeder using four, four-inch PVC pipes. A ladder is used to fill the feeders.

Enclosed are pictures to help other bird enthusiasts solve similar problems. Adaptations are very broad and can be made to meet many individual needs. Note that tops, and of course bottoms, are capped to keep out snow and rain. Perches are also arranged in such a manner as to allow the dowels to be removed and hence the bottom caps for easy cleaning.

> Jay W. Elliott Appleton

Correction

The correct spelling of the artist's name on the color plate of the American shad on page 12 of the March-April issue should be Hugh Chrisp.

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Hemlock Woolly Adelgid

Can you tell me how much of an effect the woolly adelgid is likely to have on hemlock in New York State and New England? What treatment is possible to protect individual trees?

Tom Moore Cumberland, Rhode Island

I conducted a survey for the insect in Dutchess, Putnam and Westchester counties. I found it in the City of White Plains. No hemlock were dead, but the trees were heavily infested with the white egg sacs of the adelgid. The egg sacs look like Q-tips on the twigs. There are no effective natural controls of the adelgid. Because it produces two generations per year and each generation is prolific, its numbers build rapidly.

There are effective insecticides. Unfortunately, there are no practical ones against adelgid in forest trees. Ornamentals can be protected using several registered pesticides. The least toxic of these pesticides are insecticidal soaps and oils, which kill adelgids by suffocation. When using pesticides, read and follow the product label. Suffocants require thorough coverage of the twigs and needles in order to cover the adelgid's body and block its breathing.

Spraying of infested ornamentals can occur between mid-April through late October. It may be necessary to repeat a spray after several weeks to achieve adequate control. If one waits too long to spray, it may be too late to save the tree. At present, adelgid infested trees in Connecticut are not surviving attacks unless sprayed. Elsewhere, it appears that the adelgids do not kill the trees. In New York State, we do not have experience with the adelgid to say what the effect of the adelgid feeding will be.

During February or March, you should inspect your trees for the white egg sacs. In spring and summer, heavy adelgid infestations will cause the hemlock foliage to yellow and prematurely drop its needles. Other causes of poor hemlock health include spider mites, salt sprays and elongated and round scales that live on the undersides of hemlock needles. Your local Cooperative Extension Agent can help you sort out the type of problem affecting your hemlock and suggest reme-

> Michael J. Birmingham Associate Forester

Busy Beaver

My beaver have a series of six ponds, one below the other, and they commute daily through all of them. In January when the ponds froze over solid they could no longer go over the dams from pond to pond, nor could they get out at all. They solved this dilemma by cutting a hole through the dam about a foot below the ice. The water which rushed from the upper pond through this hole created enough turbulence to keep a small area below the dam from freezing in all except the very coldest weather. We did have short spells of -20 degrees when they were frozen in. However, most of the winter they have been able to get out through this small pond to cut fresh food.



•f course when the water rushed from the upper pond through the hole it lowered the water level of the upper pond. The original ice cover collapsed and the water then froze over at the new level. You can see in the enclosed snapshot where the original level of the pond was, since the ice clinging around bushes in the pond stayed there. The picture of the upper pond shows the dam, where the water usually was up to the top and ran over, with the pond level about a foot below the top of the dam.

> Harriet Dowdall Burlington Flats

The Environmental Conservation Institute

OW safe is solid waste incineration? What is the effect of indoor air pollutants on your health? Why should students

understand the hazards of their future jobs? "Technology and the Environment - Issues for the 1990's" is the theme of the 18th annual Environmental Conservation Institute, July 11-15 at the State University College campus at Cobleskill. This one-week program for teachers will feature indepth presentations by leading environmental health professionals, supplemented by field trips and participation in a hands-on workshop project. Most of all, it is an opportunity to spend an exciting week interacting with other teaching professionals who care about environmental health and want their students to develop an awareness of the environmental concerns they will face in the next century. This course may be taken for two graduate credits as "Topics in Ecology" through the State University of New York at Albany biology department.

The institute is sponsored by the American Lung Association of New York State and its Affiliates, in cooperation with the New York State Education Department and the State University of New York at Albany. For an application and further information please contact: American Lung Association of New York State, 8 Mountain View Ave., Albany, New York 12205 or telephone (518) 459-4197.

Books conducted by Joan Taylor



Backtracking—The Way of a Naturalist, by Ted Levin, 220 pages, Chelsea Green Publishing Co., One Court St., P.O. Box 283, Chelsea, VT 05038, \$17.95.

Whe find Ted Levin attempting to coax a fisher out of his bathroom in the first paragraph of his book, Backtracking—The Way of a Naturalist. How he came to have a fisher in his bathroom is the very question asked by the author in the last sentence of that first paragraph, and I quote, "How the hell did I get into this?" With that question Ted Levin begins his story and shares with us some of his experiences with nature and her creatures. His book is both informative and enjoyable reading.

The beginnings of Tcd Levin's interest in natural history may have started in earnest with the twig his mother found ncar the Mandelbaum's bushes. What made it so curious was the hard brown foam-like mass that encircled it. He took the twig to school, put it in his desk and forgot all about it until one day in early spring when mantises began emerging from his desk. It became quite clcar that the hard brown foam-like mass had been a mantis egg case waiting for just such a spring day to hatch. After all the mantises were safely gathcred up and released, he publicly dedicated himself to the

study of mantis natural history.

Ted Levin's studies did not end with the mantis, but have gone on to include a great variety of species and their habitats. *Backtracking* weaves its way from the Mandelbaum's bushes and the suburbs of Long Island to Machias Seal Island in the bay of Fundy, Crystal River in Florida, fox watching along Route 5 which parallels the Connecticut River, to places far and wide and back again.

As with the fisher in the first paragraph Levin's encounters with wildlife are often up close and firsthand and therefore unique. He has learned much and shares with us some interesting stories: one having to do with the owl's eye and another about the facial pits of the rattlesnake. In the last sentence of the last paragraph of his book he tells us of his hope of being a part of the solution to the problem of the loss of our open spaces through development and with it the habitat it provides for our wildlife. Backtracking is worth reading to the very last sentence.





The Still-Hunter, by Theodore S. VanDyke, 390 pages, Gunnerman Press, P.O. Box 4292, Auburn Hills, MI 48057, \$21.95.

n the early 1950's while bow hunting in eastern New York I observed an adult doe and a short while later a heavy-racked white-tailed buck visit a "scrape" (a pawed-out scent posting, exposing bare carth). The buck then followed the trail taken by the doe, apparently by scent. I thought I had unlocked one of the true secrets of hunting rutting whitetails at the time. It was more than a dozen years later when I first saw an article on hunting over scrapes in one of the popular outdoor magazines. I was amazed to read in T.S. VanDyke's *The Still-Hunter* several references to "scrapes" and their association with the rut, as this fine deer book was published in the 1800's.

Still-hunting is not as the name implies—remaining still while hunting deer; instead, it is the art of slow, quiet, cautious movement, stopping periodically for careful observation before moving on cautiously and watchfully. VanDyke devoted much of his life to the pursuit of deer. He hunted in the East, the upper Mid-West and along the Pacific Coast. His observations and conclusions are based on his own personal experiences and could only have come from many years spent in the deer woods.

Scouting and tracking techniques are covered extensively. The senses of his quarry, hunting on snow and in a variety of weather conditions in open and timbered deer ranges and what to do once a deer has been hit are all discussed in considerable detail. A lengthy treatise on the subject of deer rifles and bullets used at the time, while not totally applicable to current deer hunting, gives one an appreciation for the technological advances made in modern firearms, bullets, scope sights and related hunting gear.

The Still-Hunter covers each facet of this fine sport in such detail that this writer—about to enter his fortieth year of deer hunting, not only gleaned some fine techniques information but also found the hook extremely enjoyable reading.

Even after the more than one hun-

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From the digital collections of the New York State Library.

dred years since initial publication, this book remains a classic in the sporting literature of America and the principles of successful still-hunting are as applicable today as when T.S. VanDyke penned these marvelous words hack in 1882.

-Bill Hollister



Running With The Fox, by David Macdonald, 224 pages, Facts on File Publications, 460 Park Avenue South, New York, NY 10016, \$22.95.

avid Macdonald, one of the top authorities on red fox behavior, has put together a truly fascinating book. Illustrated with very nice fox drawings by Priscilla Barrett and photos mostly by the author and his wife give the book a visual charm.

But the book is much more than a collection of excellent pictures. David Macdonald is a well-recognized scientist and animal behaviorist who, from childhood, has been particularly intercsted in the red fox. His study of the species reflects the carcful research of the Oxford trained scientist and the trained and responsive eye of a field naturalist and has produced one of the most definitive works ever done on this canine.

The red fox is one of the most widely distributed of the wild dogs with minor variations reflecting environmental differences in its range. Color and length of hair are some superficial differences but basic behavioral traits are fairly constant throughout its pan-continental distribution. So this study is almost as significant in New York State as it is at Macdonald's home in England.

The pattern of the book is interesting. The main text is a very personal relating of the author's experiences with wild foxes in several countries as well as with some fairly tame ones held for closer observations. It is here the reader gets to know Niff, Sickly, Wide Eyes, Whitepaws, Snowflake and Big Ears, to name a few of the main subjects. The narrative writing is very good and holds a reader's interest as the trials and tribulations of being a fox in this modern world are related.

Scattered throughout the book arc 32 box sections presented in a much more objective scientific style of writing. Some of these include: What are foxes? How far do foxes travel? Do foxes kill for fun? What is the fox's scent? Can wildlife rabies be controlled? Do foxes limit the numbers of their prey?

For the most part these mini essays are excellent but every so often the author waxes a bit mystical in his comments. In the section "Why do foxes live in groups?" in talking about a young vixen he says, "It might be to her advantage to stay home even though we know that in fox society that might involve postponing her own reproduction due to her subordinate status. In contrast, if her chances of securing a territory of her own elsewhere were high then tolerating such a postponement would be disadvantagcous." I am sure he did not mean to imply a conscious decision on her part.

•ne other thing bothers me about this book. Some of the photos are captioned and some are not. Many of the ones not labeled show interesting bchavior that I wish was further explained. Usually the pictures relate to the text on the page where they are printed but not always.

But for these minor shortcomings this is an excellent book for people who like foxes or enjoy watching and interpreting animal behavior. You will learn a great deal about this catlike fox and will enjoy the learning experience.

_W.J.T.



Your questions answered by Frank Knight



False Face

What is this caterpillar that we found in our backyard in late August? The black and yellow spots give the appearance of mouth, eyes and eyebrows. Shortly after we took pictures, it began folding the leaf around itself and by the next morning it was tightly enclosed.

Susan Miller Kingston

Your spicebush swallowtail caterpillar is one of three swallowtail butterflies that commonly occur in the Northeast. The others are the black swallowtail whose caterpillar can become a pest in parsley beds and the very familiar tiger swallowtail. The eyespots on the caterpillar's back are thought to discourage predators. If this fails, fleshy horn-like projections emitting a strong, disagreeable odor are thrust out from behind the caterpillar's head. The other swallowtail caterpillars are similarly equipped, but not all have false faces.

Another characteristic that swallowtails share is visible in your picture. They lay down a mat of silk on the upper surface of a leaf and then draw the leaf edges together to hide when not feeding. Just before transforming into a chrysalis, the spicebush caterpillar turns color from green to dull orange. It gets its name from one of its favorite foods. Yours is resting on sassafras, another food plant.

Phoebe Nest

A pair of phoebes have nested under our house deck for two years. They raised one brood the first year and two the second. Is it common for pheobes and other species to raise more than one family per year?

Michael Ruzich Stanfordville

Birds are classified as being singlebrooded or multiple-brooded. Hawks and owls are examples of singlebrooded birds. Many of our song birds are multiple-brooded. If course, both types will repeatedly try again if a nest is destroyed. Many of our multiple-brooded birds produce two families under ideal conditions. Exceptionally, some species produce three families.

Interestingly, with most other birds, you would not have made your observation because most birds construct a different nest in a nearby location for their second clutch of eggs. Phoebes and the few other birds that construct nests in locations protected from the rain reuse the same nest. As a result, you could easily monitor your phoebes' entire nesting period.

Phoebes choose a wide variety of nesting sites. Nests have been found under bridges, on sides of buildings, under overhanging edges of banks, on upturned tree roots and in mine shafts, wells and caves. The most unusual one I have observed was in the fireplace of a building ruin.

Squirrel Songs

I have often wondered why gray squirrels cluck in the fall. Could you explain?

Ronald Smith Springwater

The gray squirrel is no doubt the most familiar wild native mammal to most New Yorkers. It is enjoyed daily throughout the year from city parks to deep forests. Almost anyone who wants to can become familiar with its behavior and calls. Gray squirrels are noisy and have a large vocabulary. Among the main calls is the "love song" — not at all musical — but certainly sweet to the ears of another squirrel. It is given by both sexes and I have seen it most often written as *quack-quack-quack-quaaaaaa*. This sound of contentment is most often heard during the two breeding seasons of midwinter and June and July. Then there are nasal throaty grunts, purrs or teeth chattering given when one squirrel approaches another, and signals mild stress.

One of the commonest is a rapidly and repeatedly given cherk-cherkcherk. This expression of excitement and a warning to others is, I suspect, the fall clucking you describe. It is given throughout the year but fall is a time of increased conflict in the squirrel world so the call could be especially noted then. From mid-summer to the middle of autumn, young squirrels leave their mothers and try to establish new home ranges with many squabbles about who can live where. Established squirrels repel intruders. Warning calls are accompanied by tail flicking, the more rapid the movement the greater the excitement.

Besides the obvious benefits accruing from calls during the mating season, calls provide other benefits. They prevent extreme aggression and bloodshed between squirrels. They more often "talk out" their disputes. Warning calls signal danger and sometimes result in several squirrels cooperating to drive off a predator.

Early Swamp Maples

I have noticed that the red maples turn color earlier in swamps than they do in more upland habitats. Can you explain?

Chester Visneski, Jr. Harveys Lake, Pennsylvania

The main "trigger" for leaf color change in the fall is the shortening day length. Trees chemically respond to this by gradually sealing off the

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leaves which then lose their green color allowing the always-present yellow to appear. Leaves of red maples form new red pigments associated with the breakdown of sugars trapped in the leaves. Stress factors in a tree's environment can hurry this process along. One might guess that red maples growing in a swamp never wanting for water are advantaged, not stressed. But the truth is the opposite-wet roots absorb less oxygen and are subject to freezing damage in winter. So these swamp maples turn color sooner than their otherwise identical kin growing on well-drained uplands or hillsides.

As fall approaches watch for similar stress-induced early changers almost anywhere trees grow. An early changer might be growing over a shallowly covered rock layer resulting in low nutrients and insufficient moisture. Or it could be growing over a seep causing the same stress as in swamps. Sometimes just a single branch turns color early. Look closely for signs of breakage or other damage.

Hummingbird Moth

I thought I was photographing a hummingbird, but when I saw the pictures, it was obviously not. What is this insect that flies like a hummingbird but looks more like a bee?

> William Keefer Binghamton



I suspect that many people assume that hummingbirds are visiting their flowers when in fact they are seeing a hummingbird moth. They are very similar in flower preference, size, shape and especially in their flight. Both animals' wings move so rapidly that they appear as a blur.

We usually think of moths as being slow moving night flyers with fully scaled wings. Actually there are two groups of clearwing moths. The hummingbird clearwing has a smaller relative, the bee or snowberry clearwing, that looks like a bumblebee. The other group of clearwings can be serious pests of fruit and forest trees in their larval stage. Adults look and act so much like hornets or wasps that very few people ever get close enough to tell the difference.

Bats, Birds and Burdock

I found two bats stuck to a dead prickly plant. How did this occur and why were there two bats?

> Ralph DeVito New City

Your bats had the misfortune of getting caught in a burdock, a coarse weed of open disturbed areas. The July-August, 1986 THE CONSERVATION-IST had a photograph of a similarly caught chickadee. I suspect that birds are more frequent victims of this common plant than bats since birds land on it while bats get snared as they fly by. The most likely explanation for two victims on the burdock is that the second was responding to the distress calls of the first.

My advice is to eliminate this pest on your property. It is a nuisance to pets and people since its burs stick to fur and clothing. Although burdock is used as a vegetable in Europe and Japan, its only other redeeming value is its being the inspiration for the Velcro fastener.

Snow Blowdown

While driving through eastern New York last fall, I was wondering about the long-term effects of the early October 1987 snowstorm that so seriously damaged the forests. Will this calamity be a boon to wildlife by providing more den and nesting sites? Will tree diseases increase and spread due to the extensive in jury?

> Joseph Walsh West Chazy

People who do not live in the area of the storm's path should see the widespread devastation which resulted in trees missing limbs, completely bent over or blown down. Only with a great deal of difficulty could I make any headway in trying to walk through a forest soon after the storm. Whole trees and large limbs were strewn everywhere. A combination of heavy wet snow, high winds and unfrozen ground even damaged or destroyed evergreens which are designed to stand up to heavy snowfalls.

Residents will forget the damage during the summer when the leaves hide the broken limbs but the damage will be visible for decades. The benefit to wildlife will be of shorter duration. Deer, rabbits and rodents which eat twigs or gnaw bark only benefit the first winter while the inner bark is fresh. Animals that use brush piles for cover will enjoy this habitat improvement until the wood decomposes. This benefit will be offset somewhat by the brush being an increased fire hazard with the possibility of more severe forest fires. Among the longer-lasting benefits will be more tree nesting and resting cavities which will provide additional opportunities for woodpeckers, squirrels and owls. It is true that damaged trees will be more susceptible to diseases with still more benefit to cavity nesters, but the disease will be limited to damaged trees. Ş

Dead Wood Gulch

HIS is a wild uncharted part of our woods and it is easy to mistake the property lines and wander off through the heavy underbrush till you see No Trespassing signs, that are not ours. The area is thick with giant stumps left by a lumber company that came through these woods once and hacked away timber for their mill. Dead trees lay in a tangled mess and in order to make any headway, you find yourself walking around almost in circles. It reminds me of the book, Girl of The Limberlost, I read and enjoyed as a child. The woods in that book were just as wild and tangled, a dream world and an untouchable existence.

I am not a naturalist, but as I tramp through here, expectations grow with every step. You see wild flowers, of unknown origin, tree stumps that are art objects of statuary. Then suddenly you come face to face with nature: like facing a deer, its gaze is so fiercely concentrated, it produces a curious illusion. There is a feeling that you are being taken apart like a watch. Then comes the release when with a wag of the tail it leaps into the brush. 1 listened and caught sight of movement overhead in a tree. A weird bird that I had not seen before on the land appeared. It looked awkwardly upholstered and too heavy to take off. I never have found its like in any bird book. It was close to being a hawk but not quite.

Two creatures I had encountered in less than a minute and I thought of Thomas Hood's "I saw old autumn in the misty morn, stand shadowless like silence listening to silence." For it had been in complete silence that I noted both deer and bird. The sounds of silence penetrate more clearly than the fury of a storm. Yet there was such communication, you felt and knew that both deer and bird were not overwhelmed by my presence, they merely let me cross the borderline that exists between animals and humans, for an instant, a vortex of sensibility.



Who interrupted whom? Nature is full of interruptions; it is only man who resents them. Some of the very best of experiences happen as a result of letting oneself be interrupted. There are animal tracks too, places where deer have bedded down, rabbit and woodchuck scat. Creatures are bound together in this wild universe of nature,

It is as intoxicating as love is intoxicating, to think about. Fantasy on fantasy abounds here. The long trunks of trees cause one to look up to find the first leafed branch. The trees are too big for us, the heroic is too big for us or we are too small for it.

There are ferns of every variety in the deep damp places. Great fallen trees are rotted and sprawled over the forest floor like drunken giants. Moss and plants have made homes in their cracks and they have become great planters. Here a pileated woodpecker comes to the stump of one. It obviously has been working long and hard at excavating a deep rectangular hole in search of carpenter ants.

"Speak to the earth and it shall be at peace with thee" is what an ancient sage said. Why should a phrase of one of my favorite Bach pieces suddenly enter my mind? The Andante in F, a low chord swaying, breathing notes of quiet grace, it rises to a height of hope and is like sunlight peeping through these trees.

Perhaps it is the mind's way or attempt to express emotion, awe, wonder, to remember and articulate in great music. And great music draws thoughts of a loved one. Was I alone yesterday in this world? I was alone as a plant growing in the shadow of the forest is alone. Today and now, I am awake, my spirit has risen to the heights of these trees and the air I chose to breathe is serene.

These woods, this dead gulch of reality, is a discipline and a vitality. It teaches the existence of growth in a free and unrestricted environment and it urges us with the energy of hope because in these dead trees spring plants, plants full of the green of a new existence. Was it for this the wild geese paused just now, spreading their wings against the sky and bringing shadows where the sun had broken through the trees? Did they pause to feel the earth beneath the ferns, the wildness? Did it give them strength to continue their flight?

No real glimpse of insight into cach other. I on the ground, they in flight. Smaller birds like pigeons and mergansers and crows simply lift themselves into the air, but geese make a great display of taking off and landing. They seem to transform themselves in the air. Emotive energy is as impertinent as is plastic power. In the simplest, most commonplace minute of a person's life, there is the same fullness and intensity with a unity of the lines of sight and insight, image and idea. One grasps intuitively these sensations-not the thread, but the full scope of a living moment.

-Clue Tyler Dennis

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