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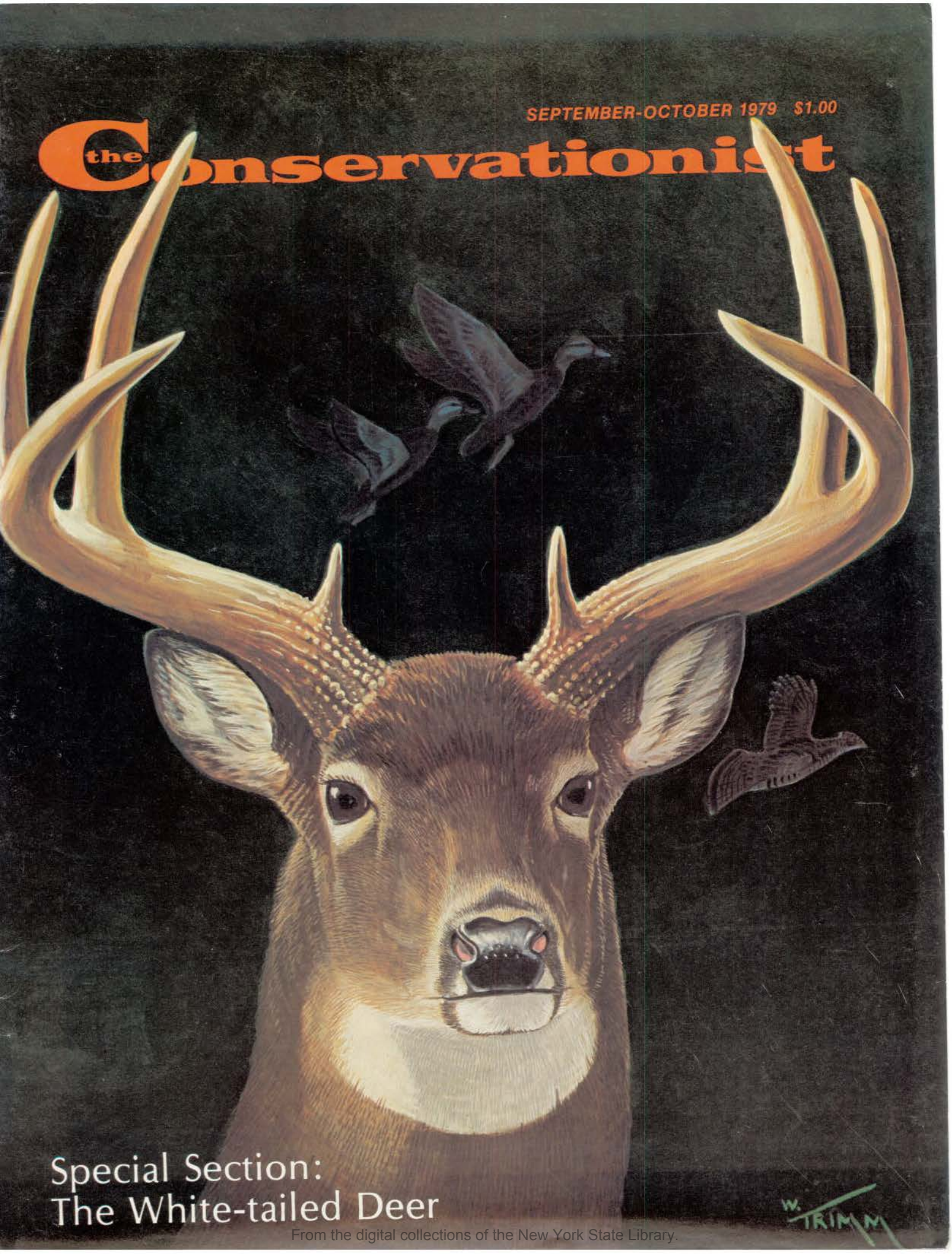

Special Section: The White-tailed Deer

Alan B. Schroeder

Pine Barrens Landscape

the Conservationist

Volume 34, Number 2 / September-October 1979

Paul Kelsey	2	White-tailed Deer
Stephen H. Clarke and Gerald P. Rasmussen	8	Managing White-tailed Deer
Timothy Nolan	12	The Long Day of an Environmental Conservation Officer
Morris A. Gordon and Ira F. Salkin	17	A Disease That Bears Watching
Roger Lowden and Vincent Santacesaria	18	Protecting the Quality of Venison
Samuel E. Bleecker	20	The Making of a Museum Exhibition
Ted Levin	22	Autumn — Fire Island
Richard S. Allen	28	1779 — The Revolution Moves West
Craig Doremus and Paul Kerlinger	33	Why Save the Pine Bush?
Charles J. Alsheimer	37	The Big Buck Club
Aileen Ossowski	40	The Story of Albert

DEPARTMENTS: About This Issue 1 / Letters 43 / Your Questions Answered 45 / Book Reviews 46 / Our Outdoors 48

EQ NEWS: How to Make Fish Safer To Eat . . . Jack Skea

COVERS: I In His Prime by Wayne Trimm / II Patterns by Fred Knauss / III Wind Umbrellas by Bert Turner / IV Clearing by Gary Francois

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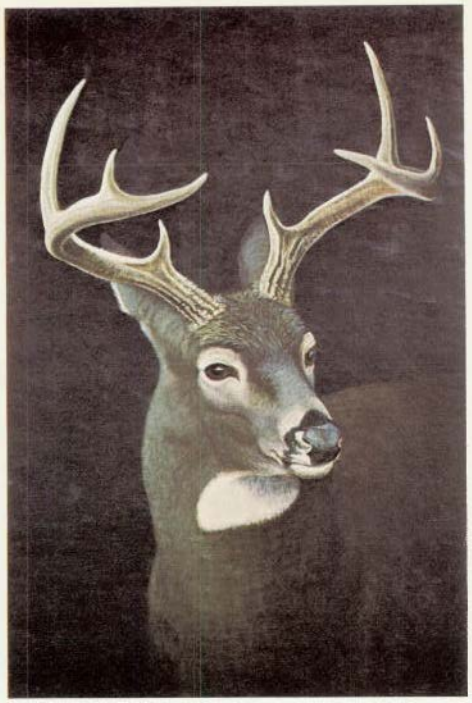
About this issue



White-tailed deer by Jean Gewolt
Based on photo by Leonard Lee Rue III

WHEN we decided to devote a goodly portion of this issue to the white-tailed deer I recalled a conversation I once had with a friend about deer and their fondness for apples. This man maintained an orchard of sorts along a back acre of his property and the whitetails were in the habit of dropping in rather frequently and feasting on the fruit, some of it still on the tree. When I asked him if he found the deer to be a nuisance as so many of his neighbors seemed to, he replied, "Well, I really don't mind all that much." And then pausing for a moment to relight his pipe, he added, more for his own benefit than for mine it seemed, "And besides, they're so damn pretty to look at." I do not think that my friend thought of himself as a sentimental man, but in expressing his delight in watching deer feed on his apples it seems to me he touched upon a feeling common to most of us when it comes to deer. For of all the wild creatures that we may encounter more or less in proportion to the paths we follow, none seems more beautiful or graceful or more delightful to the eye than does *Odocoileus virginianus,* the whitetail deer. People who do not like hunting (or hunters) are apt to use the whitetail deer as their frame of reference when giving vent to their anti-hunting certitudes. By the same token, deer hunters will tell you with equal sincerity of the great affection they feel for the animal they hunt. And having encountered many deer hunters in my day, I truly believe them. All arguments aside, we think our readers would like to know more about deer, its life cycle, the various trials and vicissitudes it is subject to, its remarkable adaptability, how it is managed by DEC and how the laws which help the managers manage are enforced. And who knows, even avid deer fanciers may learn something they didn't know before.

By the time this issue comes out, the New York State American Revolution Bicentennial Commission will be no more. We think this unfortunate. Its original mandate was to have run through 1981 but financial difficulties, a lack of support from the federal government, and a general apathy on the part of a large share of the populace has caused its untimely demise. Richard S. Allen's account of the last great campaign of the Revolution in New York, the Clinton-Sullivan Expedition, is not only fascinating in itself but may well serve as a valedictory for a task at once noble in scope and rich in accomplishment. The bicentennial celebration leaves behind some fond memories: local parades, commemorations and pageants, the NYS Festival Barge, viewed by over a million people, a host of good publications, the award-winning film "The Other Side of Victory," and the magnificent Parade of The Tall Ships. More significant I feel is the lasting reminder to our people of the great contribution made by New York in the molding and founding of the greatest experiment in man's ability to govern himself without the intervention of kings ruling by divine right or the vested interest of a hereditary nobility. It is, in my opinion, America's greatest contribution to civilization. Despite the fact that popular democracy has never taken hold in most of the world and is constantly being hard-pressed even in those countries where it has succeeded, the concept of a people ruling themselves remains an ideal for all nations. Not just an ideal either, a workable ideal. This was the purpose implicit in all the work of the Bicentennial Commission.

Finally, I wish to apologize to many of our readers who have written us complaining about a lack of articles on Long Island. By way of making amends we are presenting, in this issue, a photo essay by Ted Levin and Roy Morsch on the coming of autumn to Fire Island National Seashore with a promise of future articles on the great Long Island pine barrens, recently acquired by DEC, and articles on striped bass fishing, on the Connetquot, and commercial fishing off the Long Island Coast. — J.J.D.

The life cycle of New York's most popular wild animal

White-tailed Deer

by Paul Kelsey

IT was a perfect Memorial Day weekend for that first spring picnic, and four of us were on our way to join friends at a favorite spot on state land. As we cleared the crest of the hill, I caught a quick glimpse of a fawn standing in the tall grass of the unused meadow. Before we could come to a stop so everyone could see, it disappeared back in the grass. I had noted an apple seedling near where it stood, so two of us took our cameras and circled around to get good light and started moving in very slowly to see if we could get any pictures. It was still there, lying just as flat as it could, its neck outstretched on the ground and its ears laid down flat. We were each able to get two or three pictures as we approached before it suddenly bounded up and dashed across the road toward a spruce plantation. As we watched it run, a movement in the hedgerow by the plantation caught my eye, and there was the doe waiting to lead her youngster to a more secure location.

All across the state, similar little dramas were occurring. In probably a dozen cases, the fawn remained motionless and was actually picked up and carried home by well-meaning folks who assumed that it had been abandoned because there was no doe in sight and it appeared weak from hunger.

In New York the peak of fawning occurs during a four week period in late May and early June, though it may occur anytime from April to September.

In the more fertile Lake Plains, twins are the rule for adult does, and nearly half of the yearlings have a single fawn about a month after their first birthday. This high birth rate is dependent on the quality of their food, particularly during the winter months. By contrast, Adirondack does seldom produce twin fawns and yearling does never have fawns.

The actual birth site is where the doe happens to be at the time. As soon as the fawn is capable, they move to an area with good concealing low vegetation, for the fawn's main line of defense during its early life is to remain quiet and concealed. It is well adapted to this type of life. When it lies flat on the ground, with its head extended and ears laid back against its neck, it looks like a little brown log speckled with sunspots. In addition to this convenient color pattern of white spots on its reddish-brown body, it is scentless during its first four or five days. On numerous occasions dogs that are known to be deer chasers have been observed to pass just a few yards downwind from a concealed fawn without giving any sign of recognition. One reason that the doe is not seen around her newborn fawn is that her scent would be a giveaway, so she does her guarding from a discreet distance. She breaks this routine eight or ten times a day by coming to the fawn to nurse and wash it.

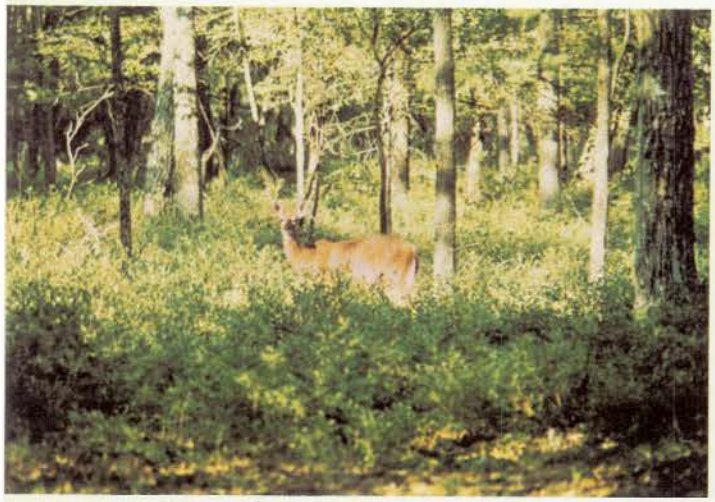
A careful check of fawns picked up as abandoned, reveals that most are less than five days old. During this period they still do not have strength enough to safely run from their natural enemies, so nature has programmed them to remain motionless. If the intruder had been anything but a person, the doe would have been right there to do battle with her sharp hooves, or to distract the enemy away from the hidden fawn.

A fawn develops rapidly during those first few days. It may get to its feet in 10 minutes, though it is an hour before it has strength enough to take a few shaky steps. During these early hours it is not steady enough to nurse while standing, so the doe lies down for this feeding the first day or two. A doe's milk is very rich, having about three times the protein and butterfat of the milk of a Jersey cow. Males average about 7½ pounds at birth, ranging from 4½ to 14½ pounds. The smaller females average about 5½ pounds.

At two or three weeks the fawn begins to supplement its diet with tender vegetation. Though they eat considerable natural food at two months, it has been demonstrated that they still require milk until they are three months old. The doe may permit her fawn to nurse for another month, during which time she obviously discourages the practice.

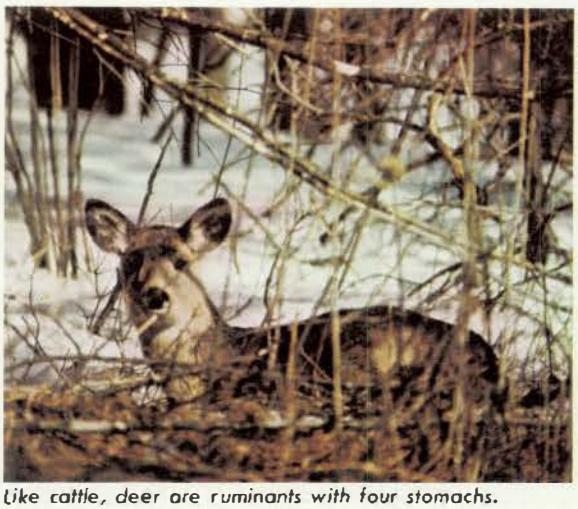
After a week or ten days, and until it follows its mother at about three or four weeks, a fawn may wander a little bit while it is alone. By this time it has started the characteristic deer habit of urinating on the tarsal glands on its hocks, thus leaving a distinctive odor wherever it goes. The doe then has no trouble tracking it down when she

Deer respond instantly to any sign of movement.



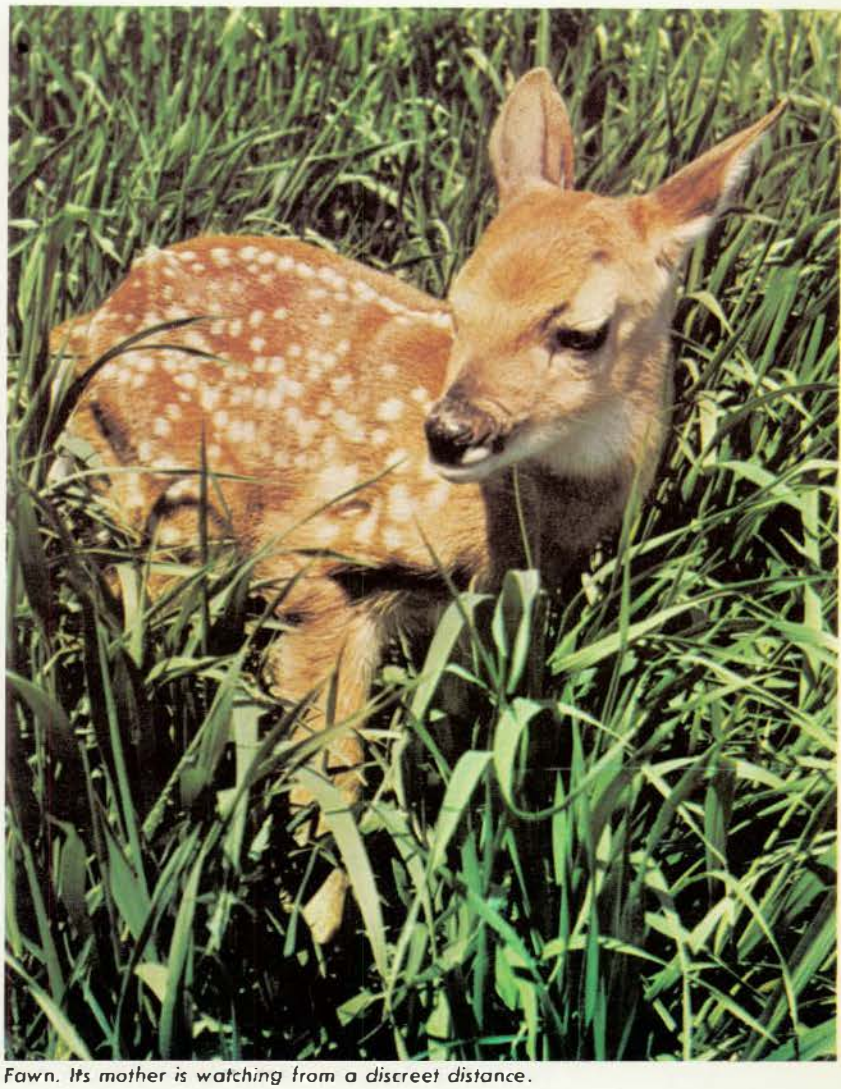
J. Goerg

Preferred browsing terrain



P. Kelsey

Like cattle, deer are ruminants with four stomachs.



Fawn. Its mother is watching from a discreet distance.

N. Drahos

During severe winters deer frequently invade cultivated fields and orchards.

N. Drahos

One of the Seneca Army Depot's famous white deer

returns. These tarsal glands are the ones which many hunters remove immediately to prevent its musk from tainting the venison. This practice has become a hunter's ritual, even though there is now little evidence that these glands will transfer any musk to the meat unless it is transferred on the hands or equipment of the hunter. During periods of excitement, the hair on the glands stands up and a strong musky odor is emitted as a signal to other deer.

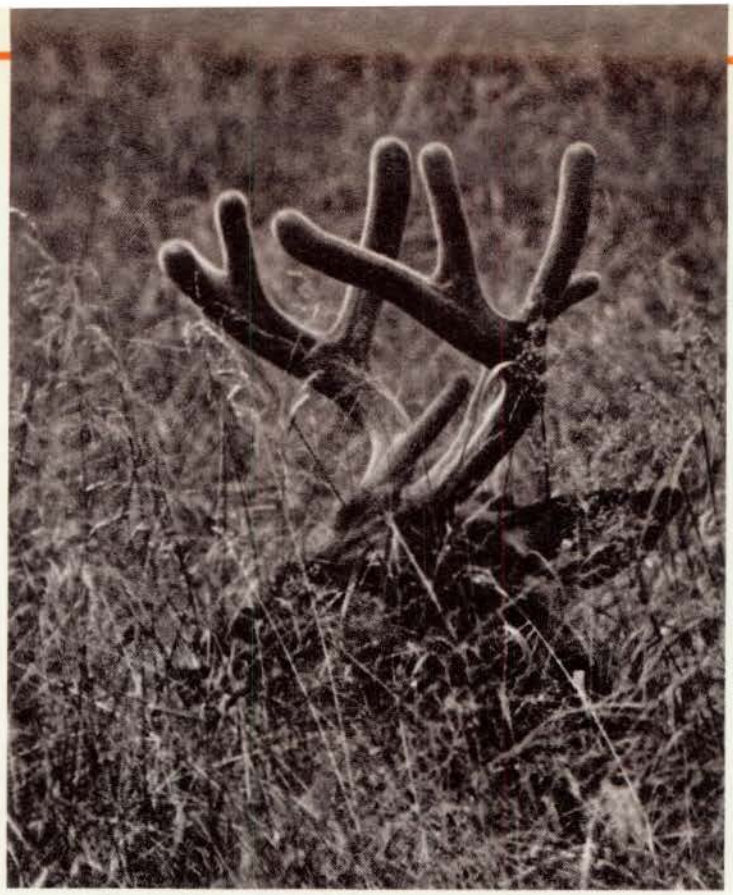
There are two other glands on the legs. The metatarsal gland is the little horny structure on the lower outside of the leg. It has an oily musk, but its specific function is not well understood, though it is probably for communication with other deer. Between the toes of all feet are the interdigital glands with a yellow, waxy material having a strong, penetrating smell which helps mark every track made by a deer for better identification by other deer in the area.

While feeding in open fields, most deer seem to be grazing like cattle. The ready availability of lush greens in agricultural lands has modified their feeding habits slightly, but basically deer are browsers, not grazers. Their natural niche in the ecosystem finds them along woodland borders, in overgrown brushy fields, or in woodland slashing resulting from logging or blowdown. Here they dine on the tender tips of wood vegetation, some of the favorites being apple, soft maple, striped maple, staghorn sumac, and arborvitae. Some of our timber trees, like hemlock, maple, ash, oak and cherry, are preferred enough so that the future timber production in a woodlot can be virtually wiped out if too many deer inhabit the area for too long a period. Though primarily browsers, in season other foods can be important. During the growing season when herbaceous vegetation is readily available, deer consume many different plants. The first greens of spring are particularly desirable. In the fall, the various mast crops are important. In a good acorn year deer will continue to dig through the snow just as long as they can to get to the acorns underneath. Standing corn has helped carry many deer through the winter.

Nature designed the deer so that it can eat large quantities of food hastily and then retire to a place of concealment and complete the chewing process at its leisure. Like cattle, deer are ruminants with four stomachs. The first and largest is the rumen, which can store 8-10 quarts of roughly-chewed food. At the deer's leisure, it can regurgitate a lemon-sized cud which it will rechew for about forty seconds. A quiet observer can watch the swelling in the deer's throat as the cud moves up or down. The completely chewed food then passes into the reticulum, a honeycomb-like lined structure the size of a softball. It is in the third stomach, the omasum, where real digestion begins.

While the fawn is wearing its spotted coat, the adults are also in their summer attire of reddish-tan solid hair with little underfur. Though this is fine for the hot weather, it offers little protection from the hordes of biting insects that swarm around them during the heat of the summer. As September rolls around they shed their red coats for the heavy grayish-tan pelage of two inch long hollow hairs underlain with soft curling hair, a combination which gives them a remarkably warm winter coat.

New York's white deer of the Seneca Army Depot are well-known. They are not true albinos, but genetic mutations that have white hair. This is much more frequent than true albinism, but under normal situations the white has poor survival value and populations don't develop. More common than the white



Paul Kelsey

Velvet outer coating on deer antlers

deer are piebald deer with varying amounts of white, which occur about one in every 4,000 deer.

During the warm weather, while the insects are annoying deer, they may spend a great deal of time in small ponds to avoid the insects and to eat the lush aquatic vegetation. This habit gives protection from biting insects but makes them vulnerable to one of their most common parasites, the liver fluke. The intermediate host of the liver fluke is an aquatic snail. When the larva of a fluke completes its life segment in the snail, it emerges and goes into a quiescent stage on aquatic vegetation, where it is ingested when a deer dines on the plant to which it is attached. From the deer's stomach, it migrates to the liver, where it develops into a large flat-bodied parasite. The Adirondack deer hunter often sees it when he slices deer liver for his first deer meat in camp. The fluke eggs pass through the bile ducts to the stomach and go on through the digestive system. If the eggs are fortunate enough to end up in a pond, they hatch and immediately seek out the aquatic snail, starting the cycle all over again.

There are several other common parasites that the hunter doesn't see, for they are in parts of the body not used for food. The lung worm, for instance, infects about half of the Adirondack deer, and nearly a third of the deer elsewhere in the state. Its life cycle is somewhat similar to the liver flukes, except that its intermediate host is a land snail. The nose bot fly larva is another. The adult lays its eggs in the nostrils of the deer. The larvae move back into the nasal passages and the space above the soft palate in the back of the deer's mouth, where they feed on the mucus. By the following spring, they are over an inch long, and emerge from the nostrils, falling to the ground where they pupate. After a metamorphosis of a month or two they become flies and seek out another deer to start the cycle over again.

As the fly season draws to a close and the deer switch from their "red" to "blue" coats, there is more going on than meets the eye, for the hormonal changes which are occurring will lead up to the breeding season. The first of these hormonal changes actually occurs early in the spring, when the lengthened daylight hours trigger the pituitary gland of the males to cause the testes to increase their production of testosterone. This hormone in turn starts the growth of antlers. All winter long the heads of the bucks and does are superficially the same. Concealed on the skull of the bucks are two bony pedicals, the tops of which have sensitive growth areas from which the bulbous velvet-covered antler tips push above the hair about mid-May. The velvet outer coating contains blood vessels supplying the minerals to build the new antlers. While growing, they are delicate and will bleed easily, and if damaged, may become deformed. As fall approaches, the testosterone in their system continues to increase, causing the antlers to mature. No longer needed, the velvet with its blood supply dries up, and is usually shed in about a 24-hour period in early September. The increased testosterone also changes the personality of the buck to that of an aggressive creature, first taking its vengeance out on small saplings, and then in competition with other bucks, for the does as they come into breeding condition.

The bucks are in breeding condition from September through February, so it is the does which determine the peak of the breeding season. In the Adirondacks, about half the does are bred during the second week of November, while in the southern part of the state, this point is reached during the following week. The first does may come in heat in early October, but it is early November before any significant number of does are ready to be bred. If a doe is not bred successfully, the first time she is ready, she will come in heat again at 28-day intervals.

As the breeding season draws to a close, the testosterone levels in the bucks begin to drop—and so do the antlers. Generally, the more mature bucks, those which have probably taken the most active role in perpetuating the species, shed their antlers first, with the younger bucks a week or two behind. Though the first antlers may be shed in early December, the bulk are probably shed during January, and the last may not go until March. One March 25th, I was photographing Canada geese in the corn and wheat fields near Aurora when I saw a herd of 12 deer, three of which still had both their antlers.

During the fall, since the bucks' thoughts have been on other things than eating, they often have lost 25 percent of their early October weight. Their

larger size lets them dominate the does and fawns in competition for the more limited supply of food which exists through the winter; otherwise they would be hard-pressed to survive.

The does and fawns generally enter the winter with a thick layer of fat under their hide, around their kidneys, and with large quantities of fat in their body cavity. This is fortunate, for as the snow covers the food and restricts their movement in search of food, times get hard and the fat reserve helps carry them until better days. As snow depths build to 15-18 inches, travel is restricted. Most people greatly overestimate the size of deer, not realizing that its heart is only 18-20 inches above the ground when standing on all fours. This means that with 18 inches of snow, deer don't make tracks, they make ruts. Before this snow depth is reached, they move to areas of less snow accumulation, such as the south slopes of the southern-tier, or the evergreen shelter belts of low lying areas as though there were invisible fences around them. In the Adirondacks, this is sometimes as little as 10 percent of the total range. When too many deer are confined to a wintering area for several successive years, the continuous overbrowsing can have a drastic effect on the survival of the more desirable food plants. Overbrowsing unfortunately reduces the number of deer that the yard can support in future years.

Recent studies at the University of New Hampshire have shown that deer have evolved a sort of "walking hibernation" to help them through the lean months of the winter. During the winter, a deer's metabolic rate drops, sometimes as much as one-third, a far cry from the hibernating woodchuck's drop in metabolic rate, but it does permit them to survive on less food than would be needed if they were operating on a full head of steam. Studies at Cornell University have shown a similar trend in the heart rate. Since this reduced metabolic rate is a result of the length of daylight, as the days get longer in March, their metabolic demands and corresponding activities begin to increase. This is a further explanation of why the end-of-the-winter storms put the finishing touches on the weakened deer that managed to survive the severe weather of mid-winter. They need more food for their increased metabolic rate, but they are still trapped in the yards with too little food.

For years, people, including early wildlife professionals, found it hard to believe that the deer were dying of starvation. Though all body signs showed lack of proper nutrition, deer always had a full stomach. It finally became apparent that there were certain plants from which deer could get food value, and others which were just stuffers, and from which they could receive no sustenance. These stuffing or starvation foods, such as pine, spruce, balsam, beech, grey and paper birch, blue beech, hop hornbeam, red cedar, juniper and alder are now used as indicators to the deer manager of overpopulations. When these otherwise seldom used foods are used in any quantity, it is an indication that the more nutritious plants have already been seriously depleted, and that there are too many deer for the available food supply.

As a large herbivore, the deer and its predecessors have always been prime targets of the large predators. The senses which they evolved over the eons still help them evade their major current predators, man and his dog. Of the three senses—sight, sound and smell—smell is the best developed and most depended on. Not only does smell play an important part in detecting enemies, but it plays a large part in their family and social life. Does and fawns locate each other by scent. During the rut, bucks in search of romance follow tracks of does. Deer are always reading the wind to keep informed. If possible, they approach feeding and resting areas going into the wind or thermal air currents. This is why they tend to rest high during the day to take advantage of the thermal updrafts, but go there early enough so they arrive against the last of the nighttime downdrafts.

Their eyes are excellent for picking up motion, but are monochromatic, that is, they see only in shades of black and white. This explains why the hunter can wear his blaze-orange hunting togs for safety, yet not stand out like a sore thumb to the deer. Visual acuity is less important because a motionless object can be studied with all senses until it is understood. However, only the deer which responded instantly to the first sign of movement of a springing cougar could have lived to pass on its genes to the next generation.

A deer's ears are always on the alert and moving like radar screens to pick up suspicious noises. They can pinpoint noises with surprising accuracy given enough time. Sharp noises will often cause them to stop, waiting for a repeat so they can locate it, a trick used by veteran hunters who whistle sharply at a running deer, hoping it will stop for a standing shot.

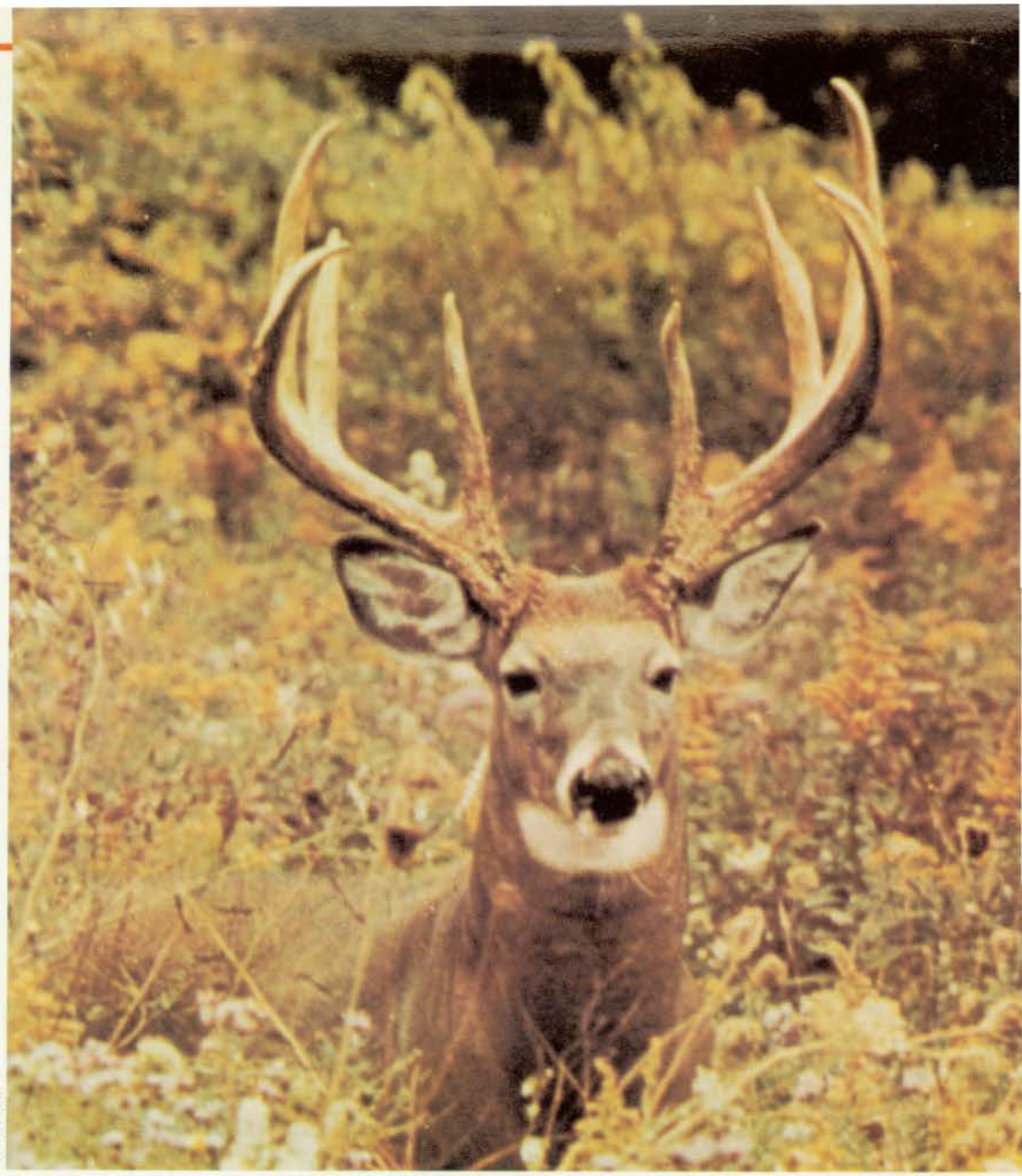
Deer may sometimes seem fantastically stupid as they circle, or come close to a quiet observer, trying to make out what new thing has appeared in their territory. But it is not stupidity but an insatiable curiosity which makes it possible for them to know what is in every part of their home range and what it smells and sounds like. Only when they know all that is normal and friendly, can they recognize something that is amiss without a moment's hesitation.

The white-tailed deer is a remarkably adaptable animal. Early subsistence and market hunting, plus the elimination of its natural habitat once drove it from most of the state. Given adequate protection and many acres of restored habitat, it has returned and become a common resident even in close proximity to man. Though man restored its habitat and protected it from undue hunting, he also eliminated its natural predators which formerly helped keep deer in balance with their food. Through good stewardship, this too can be overcome so a healthy deer herd can be around for years to come.

Paul Kelsey has been field editor for **The Conservationist** since 1970 and our resident expert on almost everything long before that. A graduate of Cornell in wildlife management, Mr. Kelsey came to work for DEC in 1946 and currently works out of DEC's Cortland office as a senior wildlife biologist. Mr. Kelsey is also well known for his "Conservation Comments," a weekly column he has been writing since 1948 and which is widely published in papers throughout New York. He has operated a deer checking station since 1950.

The goal of good deer management—a healthy deer herd living in harmony with human land use.

Peter Scofield



D C Woodruff

N.Y.S. Museum

Inadequate food and severe winter weather may cause starvation.

Releasing a deer after tagging

Paul Kelsey

Tagging deer is a common management technique.

Managing White-tailed Deer

by Stephen H. Clarke and Gerald P. Rasmussen

THERE is ample archaeological evidence that the whitetail deer has been an important part of man's life on this continent for many centuries, indeed since time out of mind. North American Indians, and much later our colonial forebears prized the whitetail and utilized every part of it—not only for food but also for clothing and even weapons.

No one knows exactly how many deer were on the North American continent when the first Europeans arrived, but given the wide range of heavily forested areas in the northeast, plus the fact that the deer is essentially a browsing animal which thrives best in forest clearings, it is safe to say that deer populations were probably not high, certainly not as high as today. Even with advances in weaponry, hunting a deer could be a formidable task and more often than not the hunter came home empty handed after a day on the trail.

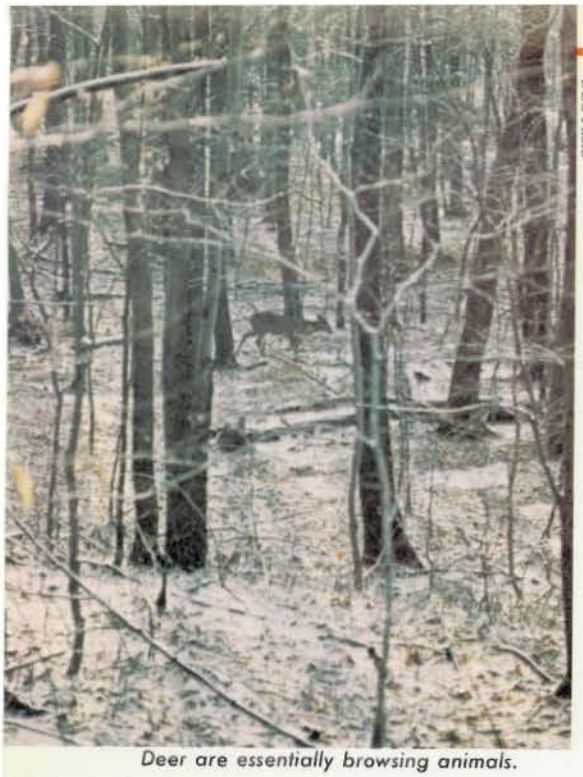
But with the increasing numbers of colonists came large scale clearing of forest land for farms, and this produced a marked change in deer population. Tree cutting produced more open areas and thus more accessible food, and with this ever expanding favorable habitat, the numbers of deer increased. This pattern continued from the colonial period until about the mid 1800's. But then another change took place. By the early 1880's nearly 75 percent of New York State was cleared for farmland. The remainder was mountainous and not suitable for farming. With the loss of the forest clearing that had provided abundant shrub and herbaceous food, plus continued high exploitation by farmers, deer numbers declined so rapidly that by the 1890's deer had almost been eliminated from the state except for certain areas in the Adirondacks. It was about this time that New York took steps to save its remaining deer and the science of deer management was born.

The first rudimentary regulations were aimed at curtailing exploitation of the deer. In the early 1900's recreation hunting was restricted or prohibited altogether in areas where deer populations had either been eliminated or were very low. In other areas, the maximum legal harvest was reduced from two to one deer of either sex. In 1912 hunting laws were further stiffened to allow a "bucks only" harvest—i.e., only deer having antlers three inches or more in length were legal game. Since female deer rarely grow antlers, this meant that virtually all deer harvested were adult males, leaving the does free to reproduce.

Two other factors also helped increase deer population. One was the extirpation of natural predators—i.e., the timber wolf and the mountain lion. The other was the steady abandonment of farmland, particularly in the Southern Tier, resulting in the regrowth of bushland and young forest, which as we have seen is the most productive deer habitat.

Other steps were taken to protect the increasing deer herd—deer jacking was prohibited, running deer with dogs was forbidden and the length of the season was shortened. The end result of all this regulation was to increase the capability of the land to support deer populations and to reduce deer mortality. By the early 1920's deer populations had been successfully reestablished in New York.

So successful were these measures that in order to avoid the reverse problem of excessive population buildup it soon became necessary to allow harvesting of adult does as hunters of earlier centuries had done. Why this should be so is easy to understand. Each adult doe, 2½ years or older, will bear approximately two fawns each spring (the average statewide rate is 1.71 fawns per doe). Each yearling doe, 1½ years in age, will have on the average of one fawn each spring (the average statewide rate is 1.45 fawns per doe). Female fawns can even bear young at the tender age of one year, but at the low average rate of 0.27 fawns per doe. The various reproductive



DEC Photo

Deer are essentially browsing animals.

rates add up to a deer population that *doubles* in size *every two years!* Even in the best habitat, such a population increase cannot continue for long. Eventually deer population density rises to a threshold level where mortality factors such as disease and starvation begin to reduce population.

Various methods of antlerless deer harvest were tried—sometimes deer-of-either-sex seasons, sometimes "doe days" (one or two days usually at or near the end of the "bucks only" season. But a more predictable and effective method of controlling population was needed, so a permit quota system for antlerless deer was developed. This system of annually issuing a specific number of antlerless deer permits to control the number of resident deer in a specific geographic area was put into effect in 1960. Originally called "party permits," such permits are now more correctly referred to as "deer management permits."

Habitat conditions and their ability to support deer populations vary throughout the state. Deer, like any other organism, are affected by and in turn affect the condition of their habitat. If population levels are too high, the naturally occurring plants which deer prefer can become overbrowsed (over-eaten). Some plants cannot tolerate this treatment, so food becomes scarce, and deer may be stunted in their growth. Some may even perish in an overused habitat. Moreover, if populations are too high, deer will eat agricultural crops, and farmers will experience serious crop damage.

Today, nearly 70 percent of New York is considered deer habitat, boasting a deer population of over 400,000. Based on studies within the last 40 years, the most desirable deer population densities have been determined for most of New York and assigned to a *deer range carrying capacity index* (see map). The index is merely a yardstick for measuring deer population levels against the limitations of available habitat and agricultural land uses. A population in balance with these limitations will result in an annual buck take within index values. But if the buck take is higher than the index value, it points to a deer population out of balance and steps will then have to be taken to reduce the deer population to acceptable levels.

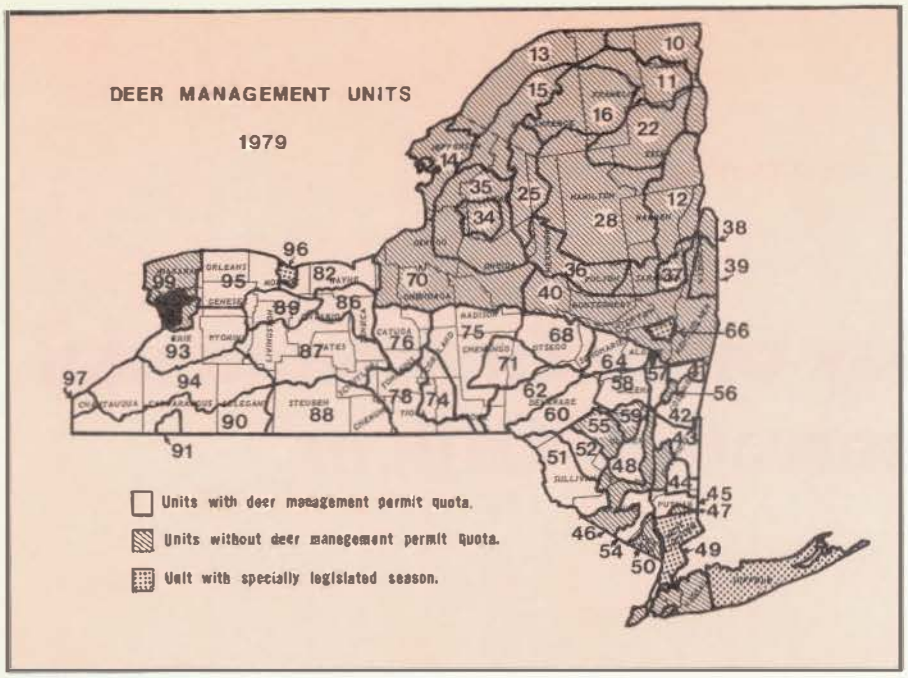
In portions of the state such as the Southern Tier, the population density that can be well nourished by available habitat is similar to the maximum deer population level which can be accommodated without undue conflicts with human land uses. In other portions of the state, however, notably the Great Lakes Plains, the habitat could easily supply the nutritional requirements of higher densities of deer. However, deer damage to crops was found to be intolerable to farmers in this intensive agricultural region when annual deer season harvests exceeded two bucks per square mile of deer range. At population levels that produced a harvest of 1.5 bucks harvested per square mile, agricultural damage was not completely eliminated, but the reduced damage was considered tolerable by farmers. Therefore an index range of 1.0-1.5 bucks harvested per square mile was assigned in the intensely farmed areas along both Lake Erie and Lake Ontario. Since habitat conditions change, the Bureau of Wildlife periodically evaluates buck take index levels to keep them attuned to current habitat and land use conditions.

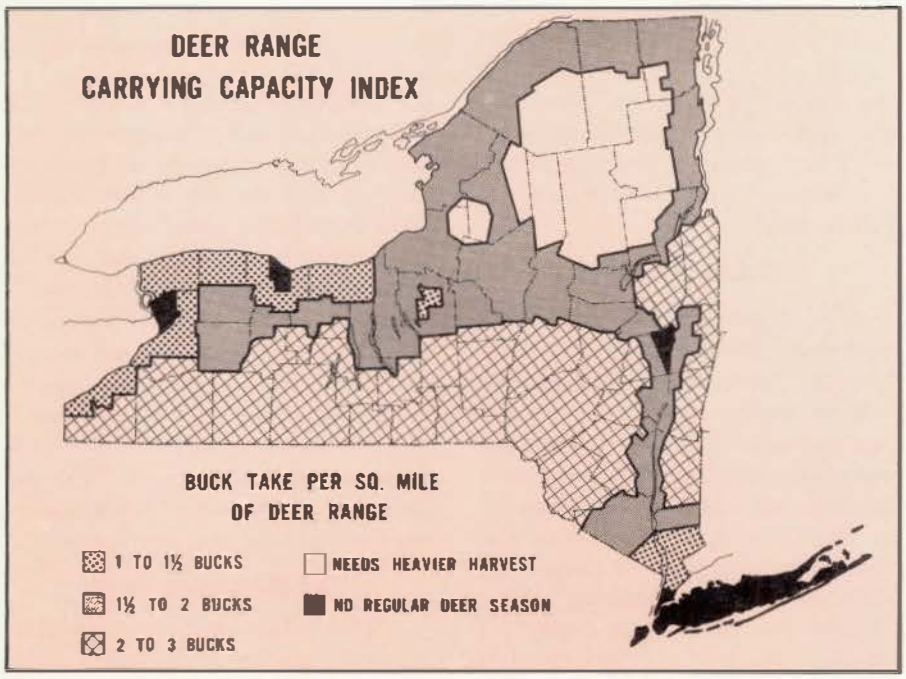
With refinements in the deer management permit system made since 1960, populations are now effectively managed in the Southern Zone, where legislative authority exists for permit harvests. Although antlerless deer permits could work equally well in some areas of the Northern Zone, there are other types of deer harvest that may be best suited and accepted in much of northern New York.

At present, the state is divided into individual geographic areas called deer management units (DMU's) (see map). Each DMU has relatively uniform deer habitat, human land-use conditions, deer population and physical condition characteristics. It must also possess hunter access conditions for optimum control of individual resident deer populations and boundaries recognizable by hunters. (See "What Is A Deer Management Permit?" THE CONSERVATIONIST, November-December 1977.)

Annually Division of Fish and Wildlife biologists and technicians collect biological data during the deer hunting season in order to monitor deer populations. These harvest data are vital for evaluation of trends in buck take, the age composition of deer populations, and the physical condition of resident deer herds in each deer management unit. From these analyses a permit quota is annually assigned for each DMU in the Southern Zone. The permit quota is set to hold the population within the most desirable level for that unit. If the buck take (and corresponding population) is higher than the unit index, a relatively high quota is issued. Conversely, if the buck take is lower than the index level, few or no permits are issued. In short, after 19 years of experience with the system, the removal of prescribed numbers of adult female deer can rather precisely cause the population to decrease, to remain stable, or to increase.

Snow and winter are inseparable for much of New York, and no other aspect of the range is more important to deer survival. When snow covers certain foods, deer must exert more energy to forage than the browse may be able to provide in food value. In many parts of the state, especially the central Adirondacks and central Catskills, deer move in large numbers from their summer range into very specific wintering areas called "yards." Where the forest is unmanaged and the population is unchecked, food will not be available in either suf-





ficient abundance or quality to maintain deer health. If the winter is particularly severe, ultimately some deer starve to death, beginning with the fawns and progressing to adults. Even where antlerless deer harvests are held, an unusually long confinement on winter range especially under deep snow will produce starvation deaths among fawns. But subsequent management can offset these losses.

In areas of the state accessible to hunters, antlerless deer harvests can manage deer to levels that will permit adequate growth of food. Successful deer population regulation depends not only on an adequate number of hunters, but also their distribution and suitable access to the herd. Landowners usually cooperate by allowing hunters with deer management permits to harvest deer on their lands. The winter of 1977-78 was severe in most of New York State. Where populations were at optimal levels practically no deer starved. In other areas with deer populations chronically higher than the optimum level, e.g., central Adirondacks and Catskills, fawn starvation was substantial. In inaccessible portions of the Adirondacks, such drastic results will continue to be the rule rather than the exception.

A management practice complimenting controlled populations is the improvement of winter habitat. Cutting trees on a rotating schedule provides for forest regrowth. By suitably designing the pattern of areas cut and the time between cuts, wildlife management specialists can provide deer with a continuous source of food. Such hardwood forest management adjacent to deer wintering areas, where coniferous trees are managed to provide adequate shelter, can help maintain populations. The practice is superior to artificial feeding of deer which deals only with symptoms of a problem and not the cause. Protection and replacement of the conifer cover portions of deer winter areas are also important for the future of the deer resource.

The Bureau of Wildlife has undertaken long range planning efforts for New York's future deer resource. Initial effort has focused on a Northern New York Deer Management Plan, and various management alternatives are now being discussed with the public. In the near future we should have a plan that has both public and biologist support.

During the last four years a new approach was used to redefine Northern New York ecological zones. These zones, important really for all wildlife management, were the basics for the Deer Management Units and they may also assist broader resource management decisions. All of the DMU's for Northern New York have been revised and are portrayed on the 1979-80 Big Game Guide. Up to date DMU's are important for insuring the most appropriate data analysis. They will be needed in the development of acceptable seasons, solution of conflicts, and realization of maximum resource values for northern New York deer management. Future deer management planning efforts will address the balance of the state.

Considerable recreational benefit has been realized from New York's deer hunting seasons. New York ranks sec-

(Continued on page 48)

The Long Day of an Environmental Conservation Officer

by Timothy Nolan

Dedication and a sense of humor get ECO Dennis O'Reilly through the ordeal of opening day.

MONDAY morning's dawn touched the eastern horizon at straight-up six o'clock, and before the light had erased the morning star, rifle fire was popping along the still-dusky shapes of Columbia County's hills and fields.

Day one of the deer gunning season, and Environmental Conservation Officer Dennis O'Reilly is conferring with his supervisor, Lieutenant Paul Bernstein, and fellow officer Gary Mulverhill. They establish broad areas of patrol and discuss the possibility of establishing a roadblock somewhere later in the day.

The logistics of the job are these: 658 square miles of territory split among three men in two cars, in one of the most heavily hunted counties in the state. The EnCon officers have no way of knowing how many licensees will be out today, but they do know 3,900 Deer Management Permits (party permits) have been issued in the two zones making up the county, and Bernstein says pressure will be heavy. "Between today, Thanksgiving, and the first weekend of the season," he says, "we'll see 70 percent of the season's total take harvested. We'll have plenty of business today."

"We sure will," O'Reilly says, "so let's boogie."

EnCon Training

"A great morning," O'Reilly enthuses. "This is our busy season, and I love it." He points the big green Dodge with the EnCon markings toward open land southeast of Chatham. "I had some complaints late last night and I didn't get done until three this morning."

He cruises slowly, studying field and wood and peering at cars alongside the road, explaining his training. "We go through the State Police Academy in Albany, learning defense training, criminal procedure and like that. Then we go more into conservation law while the troopers learn vehicle and traffic stuff.

"When we finish we have police officer status. We can make arrests, for, say, speeding, or driving while intoxicated, although we usually don't. We work closely with the state police, calling them in when their expertise is best for the situation, and they do the same with us."

The EnCon officer's uniform resembles that of a trooper, with the striped pantleg, knit tie, and stiff Stetson, but the color is green, not gray. And the car is filled with police gear: two-way radio, scanner, ticket book. There are binoculars on the seat beside O'Reilly and a sheathknife tucked in a sun visor. In a rack behind the seat are an automatic shotgun and a 30.06 rifle. "I carry a .38 pistol," he says, "We have to qualify with it once a year, and we go to school to learn changes in procedure."

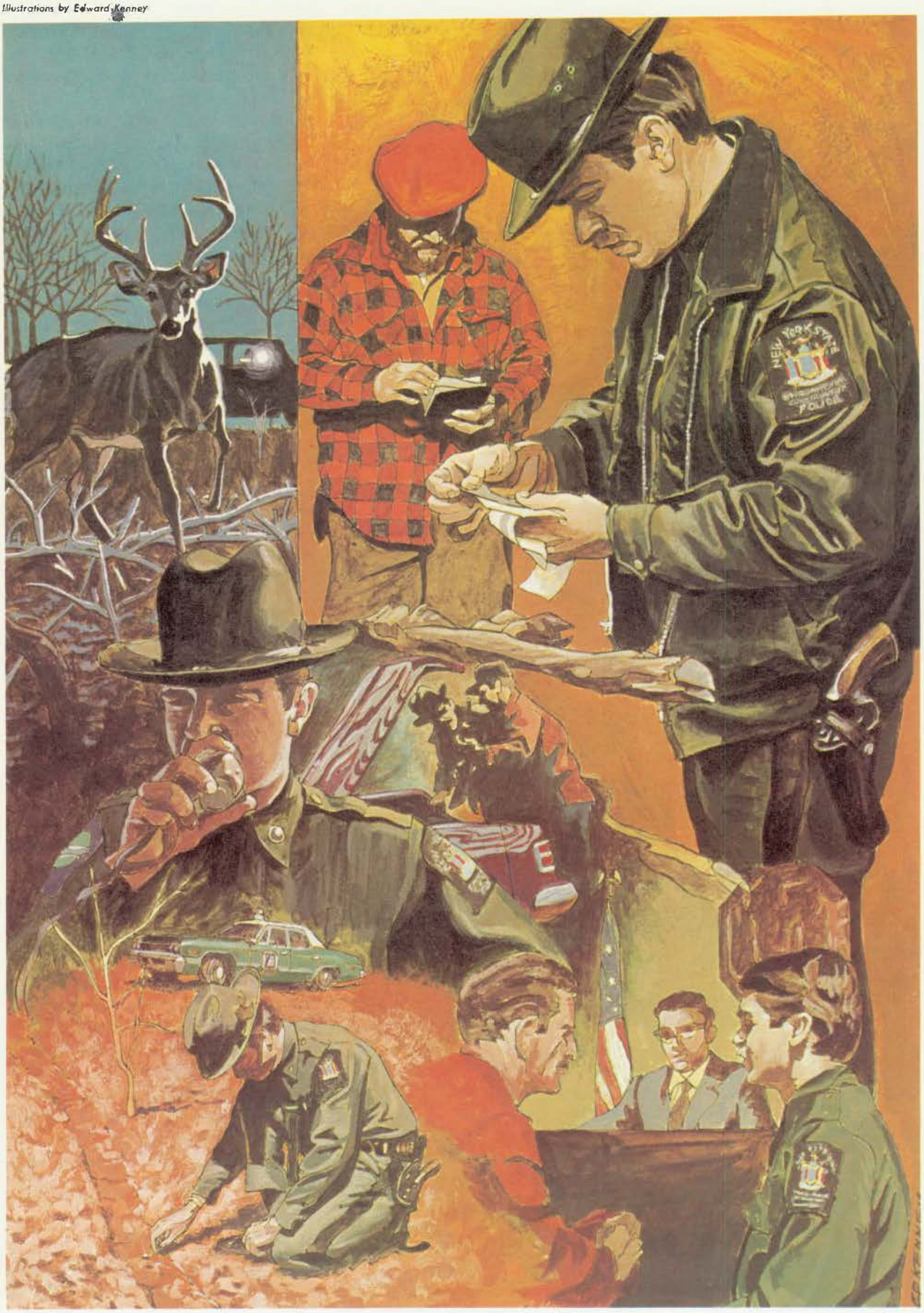
He stops the car and studies a diagonal tire track, marked clearly in the otherwise smooth dirt road. "This guy backed in and turned his lights into the woods, then pop, pop; deerjacker."

The Storybook Pinch

"Deerjackers are a big worry for us, especially just before the season opens. It's tough work, but man, it's worth it when you write one. We treat them like what they are; someone who just committed a crime with a gun. It's a heavy fine, up to $2,000 per deer, and they can have their hunting privileges revoked too. It's not as dangerous as it might seem, going after them, because hardly anybody wants to resist a police officer. I've told them, 'I'm going to arrest you, one way or the other.' And look, if somebody's going to stand in front of the judge explaining why the other guy's laying in the woods, it'sgoing to be me"

A group of hunters gathered by the

Illustrations by Edward Kenney



roadside yields the day's first look at a deer. O'Reilly stops short and hops from the car. "Hi," he says. "Hey, that's a beautiful buck. Now where's the tag?" The hunters produce the tag, most of it filled in. "Let me help you there," he says, and quickly puts the paper on the deer. Back in the car, moving again, he ponders out loud. "They didn't have the tag on, and they should have. Were they trying to rip me off? I don't think so. Good police work is 95 percent good sense. My guess is 1,000 deer will be killed in the county today, and if I wrote up everything I saw it would be like a cop on the beat; never get past the block the station house is on. The officer's judgment comes into play."

As the morning brightens orange and red patches filter through the dun brown woods and O'Reilly spends more time outside the car. A group of locals greets him by name. "How you going to get a deer with a cigarette and coffee in your hand," he asks while peering in a car parked by a farmhouse. "It's cold in there," they tell him.

"Cold," he scoffs. "It's beautiful." He moves slowly around the car as he talks. "Could you roll those bolts, please?" They do; he peers into the open actions looking for cartridges. "Thanks, now enjoy yourselves."

Posting Complaint

Two unhappy hunters in a pickup wave him to a halt, something of a switch in tactics. "Dennis," one says, "the whole damn county is posted this year." O'Reilly nods sympathetically. "What you should do," he suggests, "is come up in May and shoot woodchucks. Then how can they say 'no' to you in November?" Back in the car he is not quite as polite.

"These people try to get away with doing their homework opening day and they end up with nothing." He expands. "The locals tell you New York City hunters cause all the problems up here. That's a crock. City people are the best hunters, and the worst. A lot of them, you know, are very serious, very competent. They take time off from work, they invest money in transportation and a motel, and they think, hey, the way to get a deer is leave your coffee in the car, sit in the hard woods with a rifle and shut up. The other side of it is that some city people, just like some local people, don't know what the hell they're doing."

An Arrest

O'Reilly drives for awhile with only the radio transmissions breaking the silence, until he comes upon a station

wagon crawling along. "Road hunters," he says, slowing his car. "We'll watch them awhile, then go. This'll make a good check. These guys want to shoot a deer from their car. They've got two problems; it's illegal to have a loaded firearm in a car, and it's illegal to shoot from or across a road." He comes quickly up to their car. He is back just as fast. "They told me there's a deer lying in front of a station wagon back up the road. It could be a way to get rid of me, but we'll look."

The road hunters are right; a large doe lies hidden under the front bumper of a car. O'Reilly whistles. "What a deer! Untagged, no attempt to tag. This guy's going in." O'Reilly questions the landowner, who tells him there are hunters in his woods on both sides of the road. "I can't understand why they wouldn't tag the deer," the man says.

"Nobody's perfect," O'Reilly says caustically.

"But that's stupid."

"Greedy is the word," O'Reilly says.

"Unload Your Rifles"

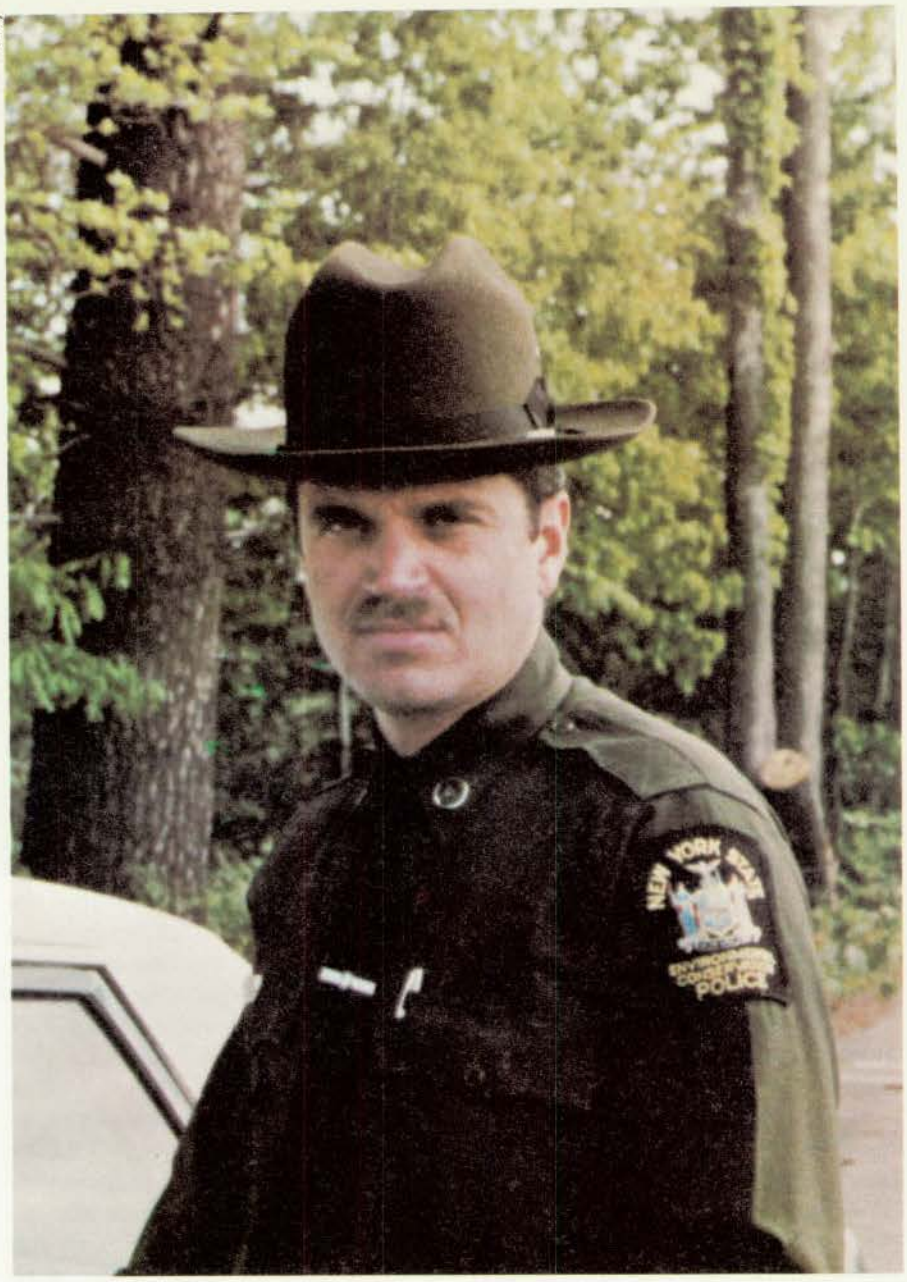
Two hunters have swung out of the woods south of the road. O'Reilly walks slowly toward them. "This could be tense," he says, "One of these guys may be up the creek, and they know it." The men, one short, the other enormous, waddle toward O'Reilly. They are heavy with clothing and equipment, and bright red seat cushions dangle like parachutes from their backs. The clumsiness is offset, though, by the spare, efficient look of slung rifles. "Hi," O'Reilly says. "Would you please unload your rifles." They do, wanting to know if there is a "problem." They are told there is, and their rifles are inspected.

Walking back to the cars, O'Reilly probes. The enormous man, dark and with a thick accent, is alone. The small man is not, and the remainder of his party, still in the woods, has indeed shot the untagged doe. He offers to bring them out, and O'Reilly lets him go. The large man is shocked to discover the deer has not been tagged. "Ooh-la-la," he says gravely. He tells a story of a confrontation he had with an EnCon officer last year. "I paid fine," he concludes, "for, for . . ."

". . . Improperly tagged deer," O'Reilly suggests.

"Yes," he says, beaming with delight and savoring the music of the words, "Improperly tagged deer. I was so nervous I left my hat at the judge's court. Twenty-five dollars and my new hat."

Ed Kenney



ECO Dennis O'Reilly

The party, entire this time, clomps out of the woods. Ownership of the deer is established, and O'Reilly tells the man he is under arrest for failing to tag it. He says he planned to tag it, but O'Reilly is having none of it. The deer is tied to the EnCon car, and with the hunters following O'Reilly heads to Austerlitz Judge Jeffrey Braley's home.

"I'm not going to keep the deer," O'Reilly says. "It's funny, people, normally well-adjusted people, get into the woods with a gun and they go a little nuts. I've seen people pay $500 fines without missing a beat, and then they find out they're not getting the deer back and they get tears in their eyes. Maybe I'm too lenient—I'm sure this guy was ripping me off—but he'll have his deer. Look, if I get around to having a retirement dinner and the best they say about me is 'He was fair,' I'll be happy. Sometimes I might think afterwards I let a guy off easy or went too hard on him, but all in all I sleep at night."

Judge Braley holds court in his dining room, meting out justice in coveralls

and stocking feet. The tag violation costs the hunter $50. Lieutenant Bernstein and Officer Mulverhill arrive with another big doe and two downcast hunters. They have no party permit and therefore have taken the doe illegally. They are fined $500 each, and the deer is confiscated. It will, Bernstein says, be given to a charitable institution in the county.

Shortly after noon, O'Reilly pulls into a driveway where a group is hoisting a buck into a tree. Tags checked, he returns. "The ladies are amazing shots," he says sarcastically, and explains that some hunters buy licenses for their wives, enabling the men to take two deer if they get the tags on and an alibi prepared. "That's not to say some women don't hunt and take deer," he cautions, "But I know some people fool around."

He heads east towards the Massachusetts line, meeting Bernstein and Mulverhill en route. They compare notes. "Business is good," Bernstein says dryly. Mulverhill, who has been detached from Franklin County for the opening of the season, says he is amazed. "I don't see this many deer in a year."

Bernstein says they will run a roadblock at dusk, and tells O'Reilly "We're making some good pinches."

"Me too," O'Reilly says. He grins. "I'm becoming a legend in my spare time."

He crosses Route 22 and climbs into the Taconic Mountains. The day has grown overcast, chill, and the roadside is dotted with pickups and station wagons. Riflefire crumps and echoes through the thick woods. He peers into cars, and one, a station wagon with two tagged bucks inside, catches his attention. "I could sit on this," he says, "But I may not have to. If he drives away with those deer inside he's illegal." He runs a motor vehicle check on the car, and when the address of the owner comes back he leaves. "He'll go north on 22."

Decide on Roadblock

O'Reilly meets Bernstein and Mulverhill at the Georgeport Truck Stop in Canaan. Over coffee they decide to run their roadblock at the junction of Routes 22 and 203. But first O'Reilly wants to see the station wagon again. As he climbs the mountain toward Austerlitz a hunter emerges from the woods. In the rearview mirror he watches the man stop. "He doesn't want to see the game warden," he says. He parks at the wagon and waits for the man, who appears presently carrying an unloaded shotgun.

"Where's your license?" O'Reilly wants to know.

"On my back," the man replies. He seems nervous.

"This is no good," O'Reilly brandishes the paper. "Your tag is gone. You're hunting without a license."

"I ain't hunting."

"You're walking out of the woods with a shotgun but you're not hunting. Is that right?"

"That's right. Hey, I come here, the first time, you hotshots are busting my butt. Can't a man be left in peace?"

O'Reilly asks for identification. The man has none. "I don't drive," he says. Cords stand out on his neck. O'Reilly grows brusque. "Where are you from?" The man names a county.

"What town?" The man's voice stumbles, he names a town. "That's the wrong county," O'Reilly says.

Darkness and snow flurries are falling together, and the remainder of the man's party begins to emerge from the woods. The discussion continues to be heated, and there are a dozen hunters gathering. As if summoned by magic, a Massachusetts game warden, Cliff Bouthellette, appears, and the tension eases perceptibly. The man's companions beg him to ease off. "The warden has a job to do," they tell him.

O'Reilly puts the man in the car. The rest of the party discusses Massachusetts gun law with Bouthellette, bouncing from foot to foot against the cold. The man emerges from the EnCon car clutching a ticket for hunting without a license. "Hey," O'Reilly calls.

"What now," the man growls.

O'Reilly is offering a paper bag and smiling. "Have a cookie," he says.

The Roadblock

The roadblock is busy. Flares, flickering flashlights, and busy officers. Almost every car stopped contains hunters, and many of them have deer. A few are written up, and the EnCon cars lead the detainees to the home of Austerlitz Town Justice Alfred Hyde.

The judge looks angry. "Dennis," he says to O'Reilly, "I'm sick of this. I'm going to hit these people hard." And he does. Dressed in red plaid, suspenders and cartridge belt, Hyde metes out $100 fines with a laconic finality that makes several hunters gasp. "You don't have the money?" he says to one. "That's all right, we'll bring you over to the Columbia County jail until you do."

When all business is disposed of—no one goes to jail although several leave rifles as collateral on their fines—the judge explains. "I've seen too much greed from these guys. You know, it's a privilege to hunt. Those who get a deer are the lucky few. Those who get greedy and don't tag, if they end up here, they're the unlucky few."

O'Reilly says it has been a good day. "That guy back up on the mountain was the tough one. He's the one who might've hauled off at me. It makes you run fast right here," he says, touching his neck just below the ear.

The snow flurries have stopped, the darkened woods and the radio are silent, and as the car runs along the curved shoreline of Queechy Lake in Canaan, tendrils of cat-ice flare in the headlights. It's just after 7 p.m.

O'Reilly says a 13-hour day coupled with three hours of sleep the previous night is beginning to tell on him. "If the radio stays quiet I'll be home in half an hour," he says. "I could use some sleep. Tomorrow is going to be another busy day."

The radio makes a raucous sound, and O'Reilly reaches yet again for clipboard and pencil. "Of course," he says, "I can catch up on my sleeping in July."

This article originally appeared in the Chatham Courier and is adapted and reprinted with permission.

Tim Nolan is a native New Yorker and a 1976 graduate of Manhattanville College, where he majored in American studies. He has worked for the Chatham Courier since January 1978, principally as a sports reporter.

NYS Health Dept.

Severe dermatophilosis in an adult male deer. Note the crusty eruptions and signs of infection near the mouth.

A Disease That Bears Watching

by Morris A. Gordon and Ira F. Salkin

Hunters asked to watch for *Dermatophilus congolensis*

A microbe infection, *Dermatophilus congolensis,* which causes devastating disease among livestock in Africa, Australia and the British Isles has made an appearance in America where it has been reported in domestic cattle in many parts of the United States, in sheep in California, in horses in both Vermont and New York State and in one fawn in South Carolina. Now it seems to be spreading among the wildlife in New York State. At present the infections do not appear to be widespread but because of its potential for causing havoc among both wildlife and domestic animals, it bears close watching.

D. congolensis started slowly in the United States in 1961 with a single infected white-tailed deer, the first known *Dermatophilus* infection to occur in any species in this country. Two more cases in deer were reported in 1972. Then in a single two-year period (July 1974 through August 1976) fifteen infected white-tailed deer were found in various counties of eastern New York State and in nearby areas of New Jersey and Vermont. At the same time the disease was found in raccoons. Eight cases, the first ever reported for this animal, were diagnosed in 1974.

Although no infections have been detected in cattle or sheep in New York State, the potential for an outbreak will increase as the infection of wildlife proliferates. Some breeds of cattle are more resistant than others to dermatophilosis, but the resistance of breeds raised in New York State has not yet been determined.

The first case of dermatophilosis in white-tailed deer also brought the world's first reported human infection. Deer hunters observed strange lesions in the hide of a deer carcass and brought the animal in for examination by scientists in the State Department of Environmental Conservation and the State Department of Health. Four of the people who handled the carcass found their hands and wrists dotted later with numerous eruptions, which looked like pimples but contained a watery fluid or pus. As the lesions healed, they were covered by brownish scabs. Laboratory studies showed that these lesions had been caused by *D. congolensis.* Since then a dozen or so human cases have been reported in North America, South America and Australia.

In animals a mild *Dermatophilus* infection may appear simply as a "paint brush effect," in which tufts of hair seem to be glued together, shaped like the tips of paint brushes. In more severe infections lesions may be scattered over various parts of the animal's body. These lesions resemble boils and are filled with a cloudy fluid or whitish yellow pus. Older lesions are usually covered by brownish scabs or crusts.

In regions where dermatophilosis is widespread there are serious health problems among domestic animals and subsequent economic losses to farmers and ranchers. In central and western Africa, for example, hundreds of thousands of cattle hides are downgraded or rejected every year because of blemishes and pitting. The disease is also widespread among sheep in England where damage to skin and wool entails considerable loss. No less important is loss of meat and milk production. Because the disease infects the lower extremities and the mouth region, the infected animal finds it difficult to forage for or ingest food. Eventually they may die of starvation.

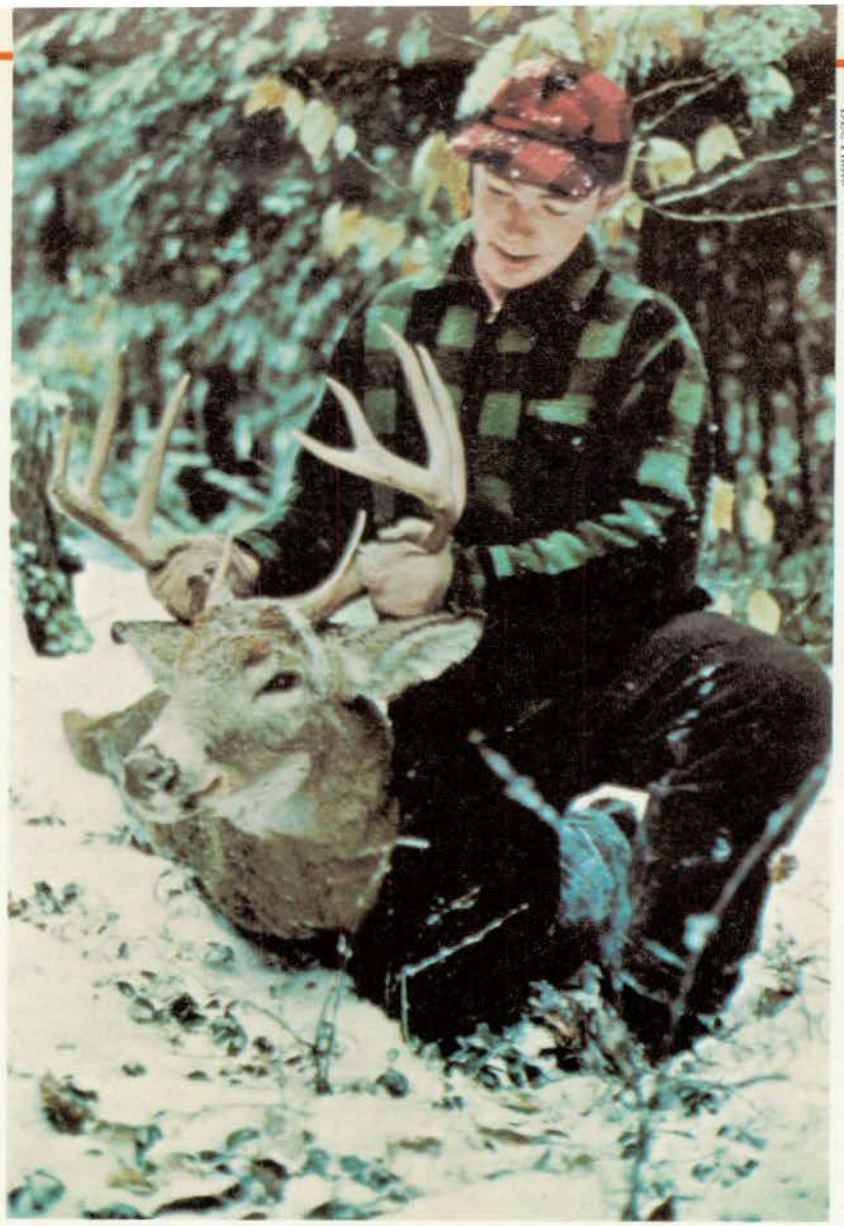
In New York State economic and health hazards of this magnitude are—for now—a distant threat.

Since *Dermatophilus* is found only on animal hides and wool—and on people who have handled the hides or wool—scientists now assume that the infection is spread by direct contact of one animal with another. (Biting flies and ticks may also transmit *Dermatophilus.* This possibility is being investigated.)

We know that for every infected deer brought to our attention, many more are going unnoticed, but we need more information on the prevalence of such infections in wildlife.

Deer hunters and other sportsmen can help. If you take a deer or any other animal with lesions like those illustrated in this article, please notify your local environmental conservation officer or regional wildlife biologist. He will examine the animal and, if warranted, remove the carcass for scientific study.

It must be emphasized that to the best of our knowledge, dermatophilosis is not dangerous to humans and can easily be cured by several anti-bacterial preparations. But if you or anyone you know develops skin lesions after handling deer or other animals, please visit your personal physician first. Then, if dermatophilosis is suspected, call—or have your doctor call—Dr. Ira F. Salkin, Laboratories for Mycology and Mycobacteriology, New York State Department of Health, in Albany. The number is (518) 474-2171.



DEC Photo

Protecting the Quality of Venison

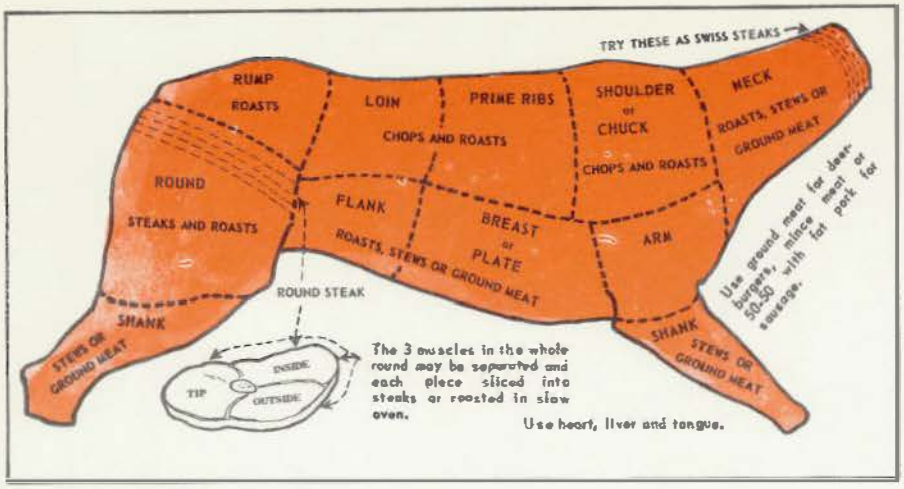
by Roger Lowden and Vincent Santacesaria

IT is a common experience that many people who taste venison for the first time are repelled by it. "Too dry," or "too gamy" are the most common remarks, and once having tried it, these people do not want to try it again, preferring instead to go back to the traditional meat dishes—which is too bad, for properly prepared and served, venison is as delicious as the best cuts of beef or pork.

The truth is that much good venison is spoiled because it has been mishandled, both by the hunter who took the deer in the first place and by the person (and it may be the hunter himself) who prepares it for the table. Each year successful deer hunters ruin thousands of pounds of good venison because of improper handling. Fully 25 percent of the meat is wasted because of spoilage and dehydration. In other cases where there is no outright spoilage, the quality of the meat often suffers from mishandling. The real enemy of good meat is bacteria. The hunter should, therefore, first concentrate on keeping his newly-killed deer clean and dry even before bringing it home from the field. In addition, proper field dressing will ensure that the quality of the venison will remain good until the hunter gets the carcass to a reputable meat cutter. To ensure the quality of your venison, we recommend the following procedures.

In the Field

Field dress the deer as soon as possible after the kill. Begin by cutting a cir-



cle around the rectum. The rectal opening is surrounded by bone and you should keep the knife blade scraping bone while making this cut. Tie the rectum with string so intestinal contents do not spill onto the meat. Now, with the knife blade pointed outward, make a shallow incision in the center of the belly, near the back of the rib cage. Cut towards the hind legs to a point just in front of the genitals. Leave the genitals attached to the skin. Don't cut deep and take great care not to break intestines and bladder.

Now reach into the abdominal cavity towards the hind legs and pull the rectal canal inwards. Remove the stomach and intestines as one unit. Cut the esophagus with care, so stomach contents do not spill out. Separate the entire digestive tract from the carcass.

The chest cavity is separated from the abdomen by the diaphragm. After cutting through the diaphragm, reach deep into the neck and grasp the windpipe with one hand. With the knife in the other hand, sever the windpipe. Be careful because it is easy to cut yourself here. Pull on the severed windpipe to remove heart, lungs and liver. Place the heart and liver in a plastic bag for cleanliness.

Turn the deer on its belly and elevate the hind legs for a few minutes for drainage. DO NOT WASH OR PUT SNOW IN THE CAVITY. Water enhances the growth of bacteria, especially in a warm carcass. Wipe the cavity with dry material if the intestines have been damaged. Don't attempt to remove the scent glands in the hind legs. They have nothing to do with the meat.

In transporting the deer from the field to your vehicle, it is very important to keep the animal clean. Drag the deer out head first. Go out of your way if necessary to avoid water in streams and puddles.

Tie the deer on the outside of your vehicle away from the heat of the engine. If you intend to have the deer commercially processed it's best to take it to the processor immediately. Choose one with good refrigeration and let him skin it for you.

At Home

If there is an unavoidable delay in getting to a processor or if you are going to skin the carcass out yourself, *hang the deer by the hind legs*. This is important for proper drainage and ease in skinning. If the deer is hung by the head, blood will settle in the hind quarters where the best cuts of meat are located and the quality of the venison will suffer as a result. All commercial meat is hung by the hind legs for this reason.

Make a short cut at each hock joint, between the tendon and the legbone where the skin is thinnest. Be careful not to cut the tendon. Put a strong bar through these slits and suspend the deer by the bar.

If you are going to process the deer at home, skin it at once. DO NOT ATTEMPT TO AGE THE VENISON AT HOME. Aging does indeed improve the quality of meat but only when the carcass is kept in a cooler with both temperature and humidity closely controlled. Attempts at home aging are the biggest cause of spoilage and dehydration.

To skin the deer, extend the field dressing cut rearward to the rectum. Make a cross-cut up the inside of each hind leg, ending by cutting a ring around the leg just above the hock. These cuts should be shallow, through the skin only, to prevent meat from coming off with the skin. Saw off the front legs just above the knee. Extend the field cut forward to a point where there is a swirl of hair at the breast bone. Stop here if the head is to be mounted, otherwise continue the cut the full length of the neck. To avoid getting hair on the carcass, don't make a cross-cut on the front legs. The skin will slip from the front legs when you peel off the hide.

Pull the skin loose from the hind legs. Then working from behind the deer, firmly grasp the hide and pull down. If any meat starts to come off with the hide, detach it immediately. Work the hide off to the base of the skull and detach the head.

If the head is to be mounted take the entire skin with the head attached, to the taxidermist. It's best to let him make the head skinning cuts. Hides for head mounts and those to be tanned with hair on should be taken to the taxidermist immediately to avoid slippage of hair.

Now cut up the deer using conventional methods or by boning.

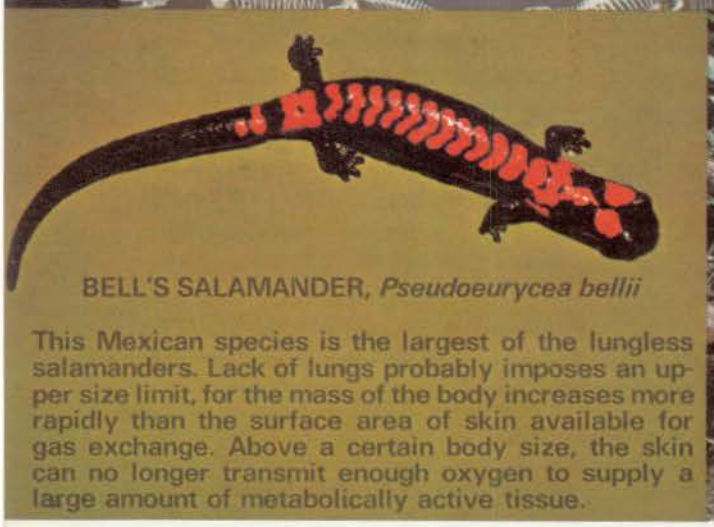
The flavor of ground venison can be enhanced by adding good lean pork in a ratio of 40 percent pork to 60 percent venison. Don't add pork or beef fat. Although venison is dry meat, it does contain grease and adding fat only makes it more greasy.

Finally, protect your venison by using good freezer wrap. Be sure to label it clearly so you can find those choice cuts when you dig in later in the year.

Roger Lowden works for Eastman Kodak. In his spare time he writes an outdoor column for the Rochester Times-Union and hosts a television program "Video Awareness."

Vincent Santacesaria has owned a meat market since 1958 and estimates he has skinned and processed over 10,000 deer. He also owns and operates Vince's Freezer Meats in Rochester, N.Y., and does a weekly Consumer Tips Program on Meat Buying for that city's Channel 13.

THE MAKING OF A M



BELL'S SALAMANDER, *Pseudoeurycea bellii*

This Mexican species is the largest of the lungless salamanders. Lack of lungs probably imposes an upper size limit, for the mass of the body increases more rapidly than the surface area of skin available for gas exchange. Above a certain body size, the skin can no longer transmit enough oxygen to supply a large amount of metabolically active tissue.

(Top—l. to r.) Skeletons (python, lizard, alligator, loggerhead turtle); "flying" frog (photo by R.G. Zweifel). (Bottom—l. to r.) Bell's salamander (photo by R.G. Zweifel); reticulated python; Museum preparator working on replica of Komodo dragon lizard.

Photos: American Museum of Natural History

by Samuel E. Bleecker

RAYMOND MENDEZ sat for several hours watching the water cascade over the shell of the turtle as it broke through the surface. When he had the image of the water fixed in his mind, he committed himself to re-creating the rippling effect in clear lucite. It took him nearly two weeks to grind the plastic down until it looked like shimmering water.

Vivian Stillwell hunched over a re-created frog for several days coloring it green. Frederica Leser exhausted nearly three months painting a 25-foot Burmese python scale by scale.

These individuals are three among nearly two-dozen preparators at the American Museum of Natural History in New York City who have devoted thousands of hours crafting the museum's newest and most complex exhibition, the Hall of Reptiles and Amphibians, which opened to the public in the fall of 1977.

Work on this hall began six years earlier. And by museum standards, this is not excessive, with some exhibitions taking a decade or more to complete. The hall provides several thousand feet of exhibition space and is "designed to present a detailed picture of both animal biology and environment—to show how animals get along in the world," says Eugene Bergmann, who designed the exhibition and supervised its preparation.

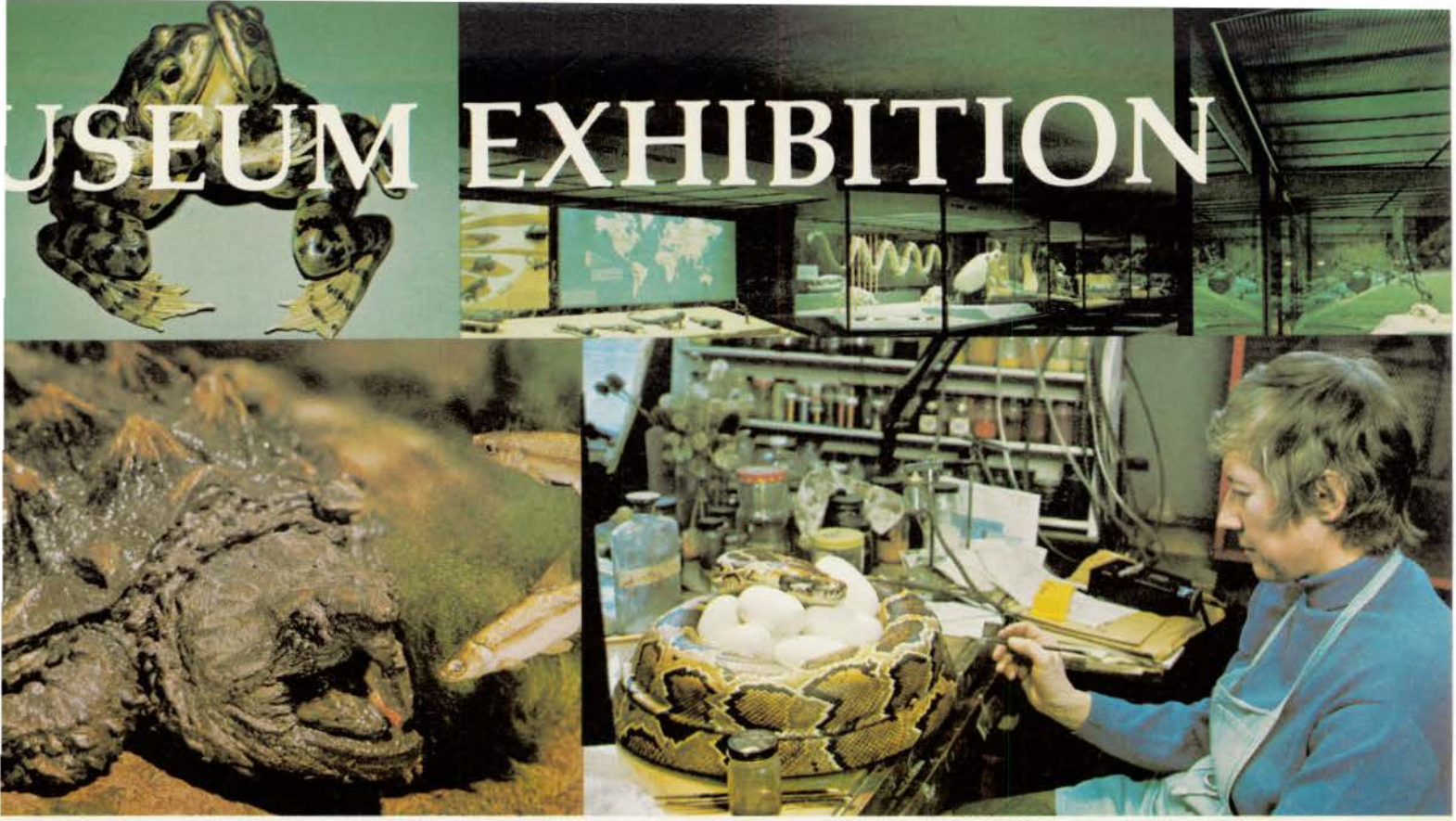
To do this the 107-year-old museum drew on its own collection of more than 200,000 reptiles and amphibians. And it spent what might be considered, in any other business, an inordinate amount of time insuring that every detail of the exhibit would be meticulously accurate. No leaf, branch, twig or stone will find its way into a display unless it is to be found in the natural habitat of the reptiles or amphibians showcased.

If an authentic specimen or artifact required for an exhibit was absent from the museum's own enormous collection, the museum asked outside scientists for it. For example, when materials and artifacts were needed for the extraordinarily life-like exhibit of sea turtles of Jupiter Island, the museum put out a call to scientists in Florida. Consequently, a scientist and a few assistants trundled off to the beach in a rented U-haul to shovel hundreds of pounds of Floridian sand into the entrails of the van. With extreme care, they uprooted beach grasses and tucked them away in specimen boxes. They also collected coconuts, sea shells and other beach debris and carted it all to the Museum of Natural History.

In Malaysia, another scientist snared a bizarre-looking flying lizard and shipped it off to the museum. In addition, rocks arrived from Sonora, Mexico; grass came from Taiwan; and bamboo from Southeast Asia.

Thousands more artifacts and specimens—snakes, toads, weeds and bushes—trickled into the museum at the request of Ruth Wadsworth, the museum's liaison with outside scientists, and Dr. Richard Zweifel, Curator and Chairman of the museum's Department of Herpetology.

Slowly the museum staff began completing the 10 showcases of the Hall of Reptiles and Amphibians. As materials arrived, Mr. Bergmann would fill out each showcase from the scale models he prepared earlier. Each model required four to six weeks of his labor. Bergmann's models are three-dimensional realizations of the ideas that Dr. Zweifel put into a book-sized scientific script outlining what



USEUM EXHIBITION

(Top—l. to r.) Male bullfrogs in combat (photo by R.G. Zweifel); View of exhibit area. (Bottom—l. to r.) Alligator snapping turtle catching his dinner; Painting o python cast.

specimens were to be displayed and which biological principles elucidated. This scientific compendium, which is the heart of the exhibit, was begun a decade earlier.

For Dr. Zweifel the exhibition was an immense frustration. "I could literally spend all day, every day doing the hall," he laments. Each week, he consumed several valuable hours in the museum's extensive natural history library discovering what is new that should be included in the exhibition. The 50-year-old scientist had done this for the last six years, with the launching of work on the hall.

"In the long run, however," he says, "we'll be proudest of the level of scientific information in the exhibition and with the quality of the displays."

The Reptile and Amphibian Hall will include as yet unpublished findings by not only Dr. Zweifel, but the two other herpetology curators, Dr. Charles Cole and Dr. Charles Myers, who also were instrumental in developing the exhibition.

For the first time the public can now see the mating behavior of lizards, snakes and turtles. "It's the first X-rated museum exhibition on animal reproduction," quips Mr. Bergmann. In addition, the public can see an exhibition of the parthenogenesis of animals—primarily certain species of lizards which reproduce even though there are no male members of the species.

Each detail of the exhibition is extraordinarily realistic and exquisite. "We're trying to pick a moment in time and freeze it," explains Mr. Mendez, who in addition to his fascination with the undulations of rippling water has devoted innumerable hours to the authentic recreation of lizards, toads and other reptiles and amphibians.

Replicas of animals are almost always accomplished by making polyester resin casts of the dead specimens. This was done for the bizarre-looking flying lizard captured in Malaysia, for example. However, for the rare Burmese python an entirely different tack was taken. The python was drugged and then draped in plaster for 20 minutes. A fiberglass reinforced polyester resin skin was made from the plaster mold. The python was returned unharmed to the New York Zoological Society. This was the first time a mold was made from a living snake without sacrificing it.

So extraordinarily lifelike are the museum's re-creations that fruits are succulent, insects are itchy, and snakes terrifying. One unsuspecting museum member inadvertently happened upon a cart of polyester snakes and shrieked. The American Museum of Natural History seems to have done the job right—it has another success on its hands replete with slippery toads, scaly lizards and squiggly snakes.

Samuel E. Bleecker is a former DEC employee who now works for Bell Laboratories in New Jersey. For many years he was a science journalist and has published in Harpers Magazine and several other well known magazines. He enjoys "urban hiking," which means walking along city streets to admire and photograph unique architecture.

August 26

Great white sheets of mist roll through the inlet and spread across the bay. Smothered by a sinking cloud ceiling and rising fog, Point Lookout's distant lights struggle to stay aglow.

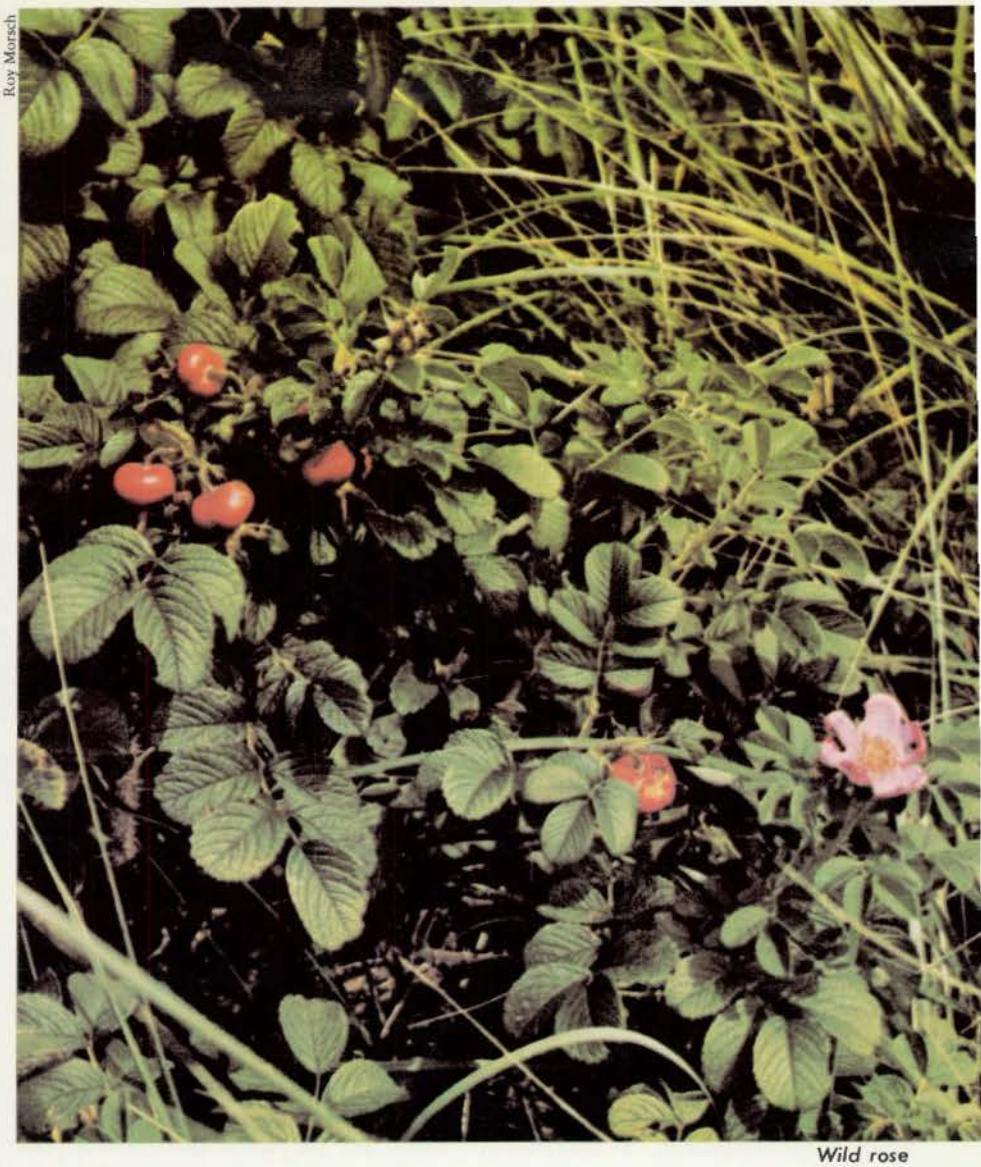
All the earth seems to sense that the great sleep is nearing. The embryo of autumn, nurtured in the womb of arctic tundra, shows its feathered head and gently prepares to engulf the beaches of Long Island.

Small flocks of dowitchers, each group tightly packed in "V" formation, shear the thickening air like hand-hewn Paleolithic arrows. Wrapped in vapor, they settle upon the smoky mudflats, scratching shoreline rubble as they await the start of autumn.

AUTUMN

FIRE ISLAND

Roy Morsch



Wild rose

September 3

Tall cordgrass has gone to seed, bathing the salt marsh with flecks of downy white. The magenta tassels of a legion of phragmites rustle in the wandering breeze. Crickets are singing now, dragonflies rush about, and the sky above the marsh boils with a bubbling cloud of tree swallows.

Even the wild rose wears the badge of the changing season. Violet flowers give way to ripening russet hips as the delicate petals float towards the sand.

Roy Morsch

Dragonfly

by Ted Levin

Roy Morsch

Monarch butterfly

September 21

The celestial clock strikes autumn, silencing the strident breeding grounds of terns and skimmers. The terns wing their way south, tracing the convolutions of the Atlantic coast enroute to humid river deltas of the Neotropics. The skimmers stay behind, jostling with shorebirds for space on tiny islets in Great South Bay.

September 12

Gale force winds whip the gray ocean into wild, compulsive waves. Each crack of the surf tears another chunk from the summer beach, leaving tattered walls of sand. The leeward side of every dune, like the cupped hands of a Franciscan friar, offers solace and rest to a congregation of wind ruffled passerines. Here the monarchs cling to purplish pieweeds sheltered from the storm.

A long-billed curlew, vagrant from across the great divide, explodes from a patch of beach grass, and an ornate male kestrel hawks its way westward along the dunes, while a doe and her fawn graze near the edge of the salt marsh, oblivious to the wind.

Roy Morsch

Terns

Egrets

Roy Morsch

Yellow clumps of goldenrod decorate the breeding ground. They are richly nourished by the remains of baby terns and skimmers who perished in the whirlwind of summer activity.

A few egrets still perch precariously on the spindly canopy of black pine—sentinels in the golden sunset.

Soon, even skimmers and egrets will be gone.

September 28
Gray Atlantic, driven by September winds
eats the summer beach.
Sand dunes bleed Virginia creeper
streaking crimson across their faces.
A gentle breeze whispers from the northwest
wafting a multi-colored robe of monarch
butterflies from a twisted cedar.
A flock of sandpipers, tightly packed,
flash black and white, swirling
down the beach bound by a single mind.
A blue-gray pigeon hawk slices the wind
with sharp wings, as a luckless warbler
explodes into an ephemeral rain of olive down.
A thousand voices shout autumn.

Roy Morsch

Sanderlings

Virginia creeper

Ted Levin

Ted Levin

The old lighthouse

Wind

Ray Morsch

October 6

The old Fire Island Light looms black and white above corrugated dunes. Blemished by years of neglect, chaffed by the sting of a thousand ocean storms, deserted and dark for decades—yet forceful as it wilts. A kestrel glides past, hovers a moment, then disappears along the edge of the bay. A half-dozen flickers pulsate into view; a loon torpedos overhead; starlings and doves pick their way past the withering foundation—only the clouds stay long enough to pay homage to its honorable retirement.

October 10

Autumn shines resplendent, its alchemy turning seaside goldenrod into captured sunbeams. A rusted brown marsh hawk weaves aroung the dunes, white rump flashing through the nodding spikes of beach grass. A straited sharp-shinned hawk hangs, suspended by the breeze, framed in the deep blue of a cloudless October sky.

October 12

The marshes serve as October's tabloid, recording the calligraphy of a score of creatures. The tracks of a great blue heron emerge from the cordgrass, meander down the beveled bank, out upon the mudflats, overshadowing the runes of tiny sandpipers.

A lingering clapper rail works its way around the scalloped edges of the salt marsh, leaving behind a road map of its travels. Around the bend, this plump "marsh hen" yanks at a marine annelid, while its gray feathered body fades into the mud.

The day wanes quickly. Muskrats appear along the edge of the marsh and rabbits leave their burrows.

A wall of color stains the sky, and the setting sun metamorphoses plain mud into red clay. A pair of snowy egrets rise from a tidal creek, golden slippers to the wind, dancing along the way to the great swamps of the Carolinas; and an osprey shot from Orion's bow cleaves the crimson sky.

Ted Levin

Osprey

Ted Levin

Tracks

Ted Levin was born and raised near the coast of Long Island. At an early age he began wandering and observing life along the outer beaches. Currently he is research associate of the Montshire Museum in Hanover, NH. He also teaches ecology and ornithology classes for New England College and the University System of New Hampshire.

Ted Levin

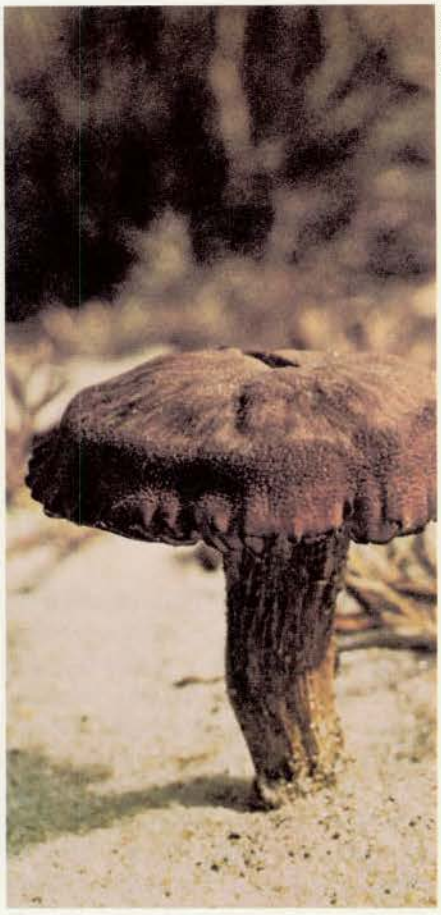
Beach grass

October 26

The gaunt, leafless thickets remind us that winter knocks louder on the door of autumn. Filigreed shadows of brown-stalked phragmites vibrate in the morning sun, and mushrooms rise from the open sand, casting spores across the beach. A concourse of chattering robins, propelled by a tail wind, works its way southward. Even flickers seem scarce and the sky holds no hawks as October gives way to November.

Roy Morsch

Brant



Ted Levin

Mushroom

November 6

Winter is blooming everywhere. The great wash of October yellow, which speckled the dunes, has ripened into fruit. Each rustle of the wind liberates seeds from brown withered goldenrods.

Gulls crowd the coastal skies—the beach is all theirs now. Dunlin own the mudflats, sanderlings the surf, and purple sandpipers the jetties. Brant have been arriving nightly as snow and darkness close off the Arctic. Owls appear on silent wings, crepuscular silhouettes above the rolling dunes. Bucks enter rut and thrash the bones of maple and cherry.

Autumn, having sown the seeds for the coming year, lies fermenting in the humus of a coastal bog, and winter bathes the tomb with cold gray light.

Clinton's men begin moving boats overland to Otsego Lake. (Artist unknown)

by Richard S. Allen

1779— The Revolution Moves West

On orders from George Washington, Generals Sullivan and Clinton destroyed the Iroquois civilization in western New York.

The English king has men as numerous as the leaves of the forest, gold as abundant as the dirt beneath your feet, and enough rum to fill Lake Ontario itself.

THIS example of successful frontier diplomacy was perpetrated on the leaders of the Iroquois Confederacy by Guy Johnson, nephew of the redoubtable Sir William and a prominent Tory, after he had plied them with food and strong drink at a meeting at Oswego. Persuaded by Johnson (who no doubt believed his own words), the Indians, heretofore neutral in the battle between England and her rebellious colonies, decided to throw in their lot with the British. Who could have forseen at the time that they would suffer horribly for their naivete and trust, or that within a few years their entire civilization would be destroyed?

For years the Iroquois had been the most prominent inhabitants of what is now central, southern and western New York. Their tribes of Senecas, Cayugas and Onondagas of the Finger Lakes region dominated the neighboring Eries and neutral Indians, and they were ideally situated to profit as middlemen for the furs produced by Indians further west.

The Five Iroquois Nations—Seneca, Cayuga, Onondaga, Mohawk and Oneida—agreed to live under what they called "The Great Tree of Peace" and were known as the Iroquois Confederacy. Later they were joined by the refugee Tuscaroras who came up from the south. Members of the Confederacy lived communally in an arrangement based on the clan. The women planted corn, beans and squash while the men hunted game for food and clothing—and showed their manhood by making war.

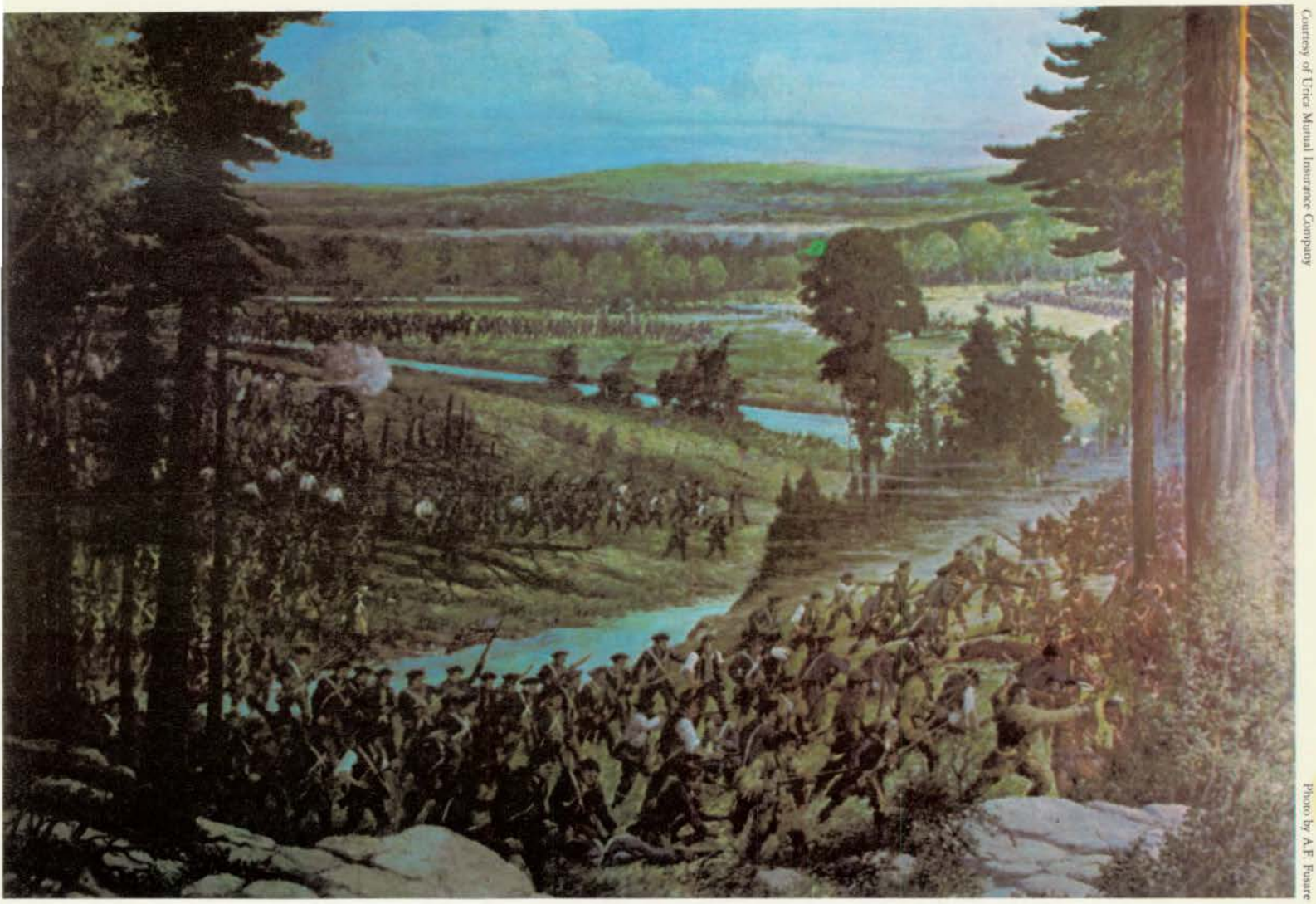
Originally, Iroquois villages were bark-covered "long houses" surrounded by palisades, beyond which lay roughly cultivated fields. Up to250 people might live in such an Indian "town," and there were dozens of them in western New York. The Indians did not practice soil conservation or reforestation. About every 10 years the so-called town was moved in its entirety to a new site. But by the time of the Revolution, many Iroquois, particularly the Senecas, had adopted European life styles which included frame houses, cultivated crops and even apple, peach and cherry orchards.

In 1763 the English, with considerable help from Iroquois warriors, finally drove the French from North America, and the informal alliance continued under the astute guidance of Sir William Johnson, Superintendent of Indian Affairs. Nevertheless, western New York was alive with hostile Indian preparations to stop the steady westward movement of white settlers. Sir William foresaw the danger and obtained a British proclamation forbidding further settlement west of a line extending roughly from present-day Rome to Binghamton. For eight uneasy years western New York was officially Indian territory.

Sir William Johnson died in 1774, and when hostilities broke out the next year between the British and the rebellious Americans, the frontier settlements of New York were for the most part in the hands of those who desired independence. Both factions courted the Iroquois.

The Iroquois Nations Take Up Arms

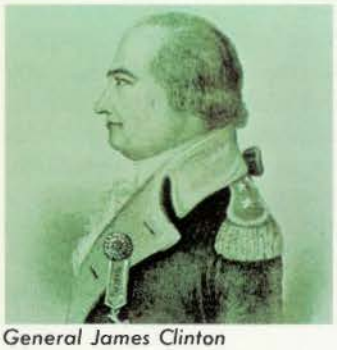
The new Continental Congress established an Indian Department which was supposed to "preserve peace and friendship and prevent the Indians from taking any part in the present commotions." General Philip Schuyler tried to negotiate these desiderata, but the Iroquois were heavily influenced by



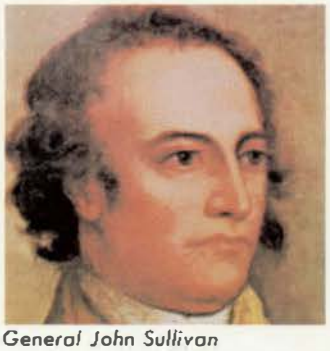
Courtesy of Utica Mutual Insurance Company

Photo by A.F. Fusare

The Bottle of Newtown by E.N. Clark. Ten American cannons helped rout Tory-Iroquois forces led by Butler and Brant.



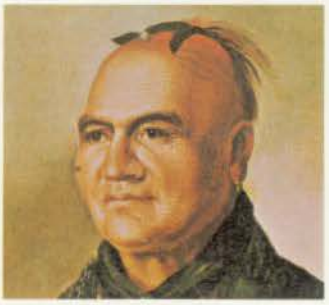
General James Clinton



General John Sullivan

Monument commemorating American victory at Newtown, August 29, 1779

Colonel John Butler

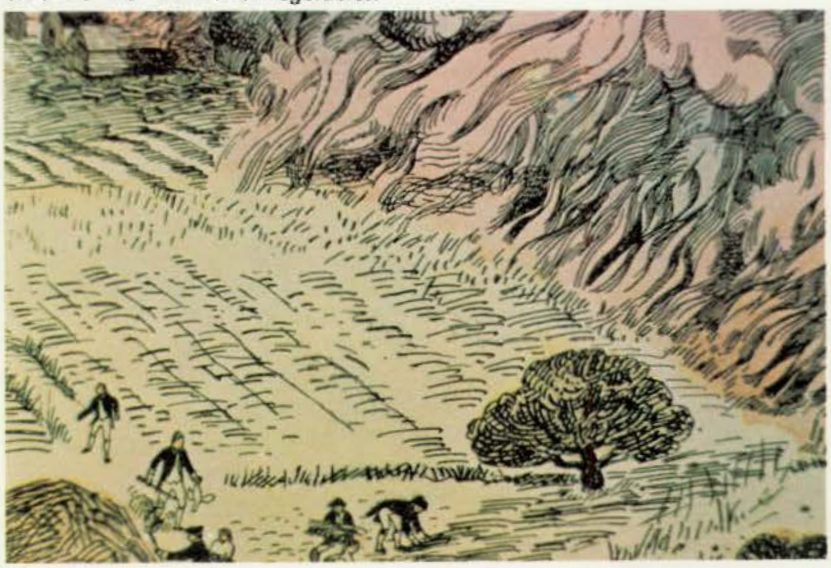


Captain Joseph Brant

All illustrations (unless otherwise noted) courtesy of Marjorie Hinman and NYS Bicentennial Commission

Sullivan's march to Tioga Point was described as "The Long Blue Snake."

Forty Indian towns in western New York were destroyed, along with 160,000 bushels of corn and all manner of vegetables.



their own Joseph Brant, a Mohawk chief who had been educated in Connecticut and believed (with considerable justification) that mighty Britain would soon put down the rebellion. And so, after Guy Johnson's speech at Oswego in 1777, the Iroquois agreed to side with the crown. Altogether, nearly 1,600 warriors of the Six Nations fought in the American Revolution on the side of the British.

Guy Johnson became *persona non grata* in eastern New York and fled to Canada. Then, in the company of Joseph Brant, he sailed for England to seek favors for British Loyalists and their Indian allies. In the new State of New York, military action was initiated by two Loyalists, Colonel John Butler and his son Walter. Together with other Loyalist families, the Butlers made the long journey from the Mohawk Valley region to the British stronghold at Fort Niagara, where they formed the notorious "Butler's Rangers." With mixed Loyalist-Indian forces, the Butlers prepared to wage war out of Niagara against all Americans, soldiers and civilians alike. It was not a pleasant prospect.

Back from his English junket, Guy Johnson harangued the stoic Iroquois, inviting them to "join us in a feast of flesh and blood of the Bostonians." ("Bostonian" was his name for anyone east of Fort Stanwix.) By the summer of 1777 sizable forces, including a thousand Indians, were readied at Fort Oswego expecting to sweep triumphantly down the Mohawk Valley to Albany. This expedition, which coincided with Burgoyne's invasion from the north, was cut short at the Battle of Oriskany, a bloody and indecisive engagement. The Iroquois (particularly the Senecas) suffered heavy losses. Not used to the "stand-and-be-shot" kind of warfare, they filtered off into the forest and left their red-coated allies to retreat by themselves.

The next season, 1778, the British mounted the war out of Fort Niagara on a different basis, resorting to terrorism. Under the Butlers, Joseph Brant, and Sir John Johnson, the Iroquois, smarting from Oriskany and out for revenge, took to the trails in marauding bands. Cobleskill was burned in May, German Flats in September, and the so-called

"Cherry Valley Massacre" took place November 11th.

These raids were part of a British plan to decoy badly-needed American troops away from Philadelphia and New York City, as well as to break the morale of the independence-minded frontier settlements. The fear which gripped the New York frontier as a result of the flurry of raids and torchings seemed to demand some retaliation. Moreover, crops from the Mohawk Valley were needed by hungry Continental soldiers. It was serious enough to bring a decision from the American commander-in-chief himself.

General Washington conceived an action, to be carried out by seasoned troops, that would punish the Iroquois by destroying their crops and villages. Congress concurred. Washington also considered the war temporarily at a stalemate. A military thrust into the interior wilderness would be unexpected, and give the new nation a basis for future claims to western lands then in the sphere of British influence.

The Sullivan-Clinton Expedition

What became known as the Sullivan-Clinton Expedition of 1779 was perhaps the most carefully formulated campaign of the entire revolution. Months of intelligence gathering and planning went into it, together with careful selection of officers, men and material. The commander-in-chief offered leadership of the expedition to General Horatio Gates, then basking in the limelight of his victory at Saratoga. Gates said he was too old (he was 57), and so Washington settled on 39-year-old General John Sullivan, an Irishman from New Hampshire. Hurrying to his task in June, General Sullivan began to muster some 2,500 men at a staging area in Easton, Pennsylvania.

Meanwhile, General James Clinton was gathering another 1,500 at Canajoharie, N.Y. Clinton, older brother of George Clinton, the first governor of New York, was a veteran of the French and Indian Wars. In 1779 he had a ten-year old son named Dewitt, who would later be famous for espousing the building of the Erie Canal.

Clinton and his men assembled 212 boats (or "batteaux") at Canajoharie, and hauled them 20 miles overland to Otsego Lake. It took almost two months, and all the boats were loaded with supplies for the entire expedition. This New York end of the campaign was an epic journey in itself. General Clinton's forces, encamped at the outlet of Otsego Lake, worked hard at building a dam to hold back the waters during the dry summer weather. As the lake rose, the food supply dwindled.

Many journals were kept by participants in the expedition. One records: "The long wait finally ended, and on Sunday [August 8] the general rose up and ordered the men to draw the boats from the lake and string them along the Susquehanna below the dam, ready to depart the next morning."

Sure enough, bright and early on Monday the dam was breached. Since it was so dry, "it became a matter of astonishment to the inhabitants down the river for about a hundred miles, as to what would have caused such a freshet in the river." The soldiers marched on both sides of the Susquehanna, while the supplies were carried along the artificially-induced flood waters.

This whole journey has been overlooked by naval historians of the American Revolution. In some ways it should take its place along with the birth of the United States Navy on Lake Champlain and the exploits of John Paul Jones. Remarkably, over 200 batteaux were built in a frenzy of carpentry in the Mohawk Valley. They were tugged, shoved and hauled over the hills to the headwaters of the Susquehanna. Then this flotilla proceeded over a hundred miles down a winding river and its branch, the last of it being an upstream poling and pushing operation.

The Susquehanna's upper reaches below Otsego Lake were so crooked that the first day the boats maneuvered 30 miles of flooded, torturous bends to match the 16 miles marched by the troops, with the 4th Pennsylvania in the lead and the 3rd New York in the rear. At Onaquaga, the Indian town destroyed by an American raid a year earlier, the Clinton Expedition nearly ran into Joseph Brant, who was waiting with a mixed force of Tories and Indians. But ruined Onaquaga had no supplies, so Brant left early to forage in the Delaware Valley. On July 22 he encountered American troops at Minisink Ford and inflicted over 50 casualties on the Orange County Militia there.

Despite joint Tory and Indian raids in the area, General Clinton refused to he drawn away from the Susquehanna and his planned rendezvous with General Sullivan at Tioga Point. The latter, worried about reinforcements, sent General Enoch Poor and 900 men up-river to meet the troops and boats from the Mohawk Valley. The two joined forces just west of what is now Binghamton, at a town called "Union" to this day. The officers celebrated by breaking out a barrel of rum. Three days later (August 22) Clinton's fleet was drawn up on the banks of the Susquehanna below Sullivan's new-built fort at Tioga Point (present-day Athens, Pa.).

The armies now fully combined. Two days later Sullivan was ready to go and the joint forces moved out in columns, with pack horses and cattle in the center, surrounded by advance guard, flanking units and rear guard—some 5,000 men. It must have looked formidable to the Indian scouts watching from the hills.

Intending to live off the land, the American army had provisions for only 27 days. Even in late August the nights were getting cool, and only one man in twelve was supplied with a blanket. Their route was up the Chemung River Valley, and in one place a road had to be built in the side of a perpendicular 20-foot bank. On one of the days the expedition had to ford the Chemung twice, and made all of three miles.

There was food for the taking on the river flats. One journal-keeper records: "For supper, I ate myself 10 ears of corn, a quart of beans and seven squashes." The size and rumble of the Sullivan-Clinton Expedition left little doubt as to its intent, and the reconnoitering Indian forces laid plans to attempt interference.

Under the Tory leaders John and Walter Butler, together with Joseph Brant, the Tory-Iroquois forces fortified the hills above the settlement of Newtown (east of present-day Elmira, N.Y.). There they waited in the broiling sun for three days. On August 29 the Americans stormed the hillsides on which some 800 Tories and Indians were barricaded. The 10 cannons brought

along by the Americans appear to have been a decisive factor in the seven-hour battle.

With troops in position, Sullivan ordered the artillery to open fire. The shells, bursting over their heads and behind them, gave the Indians the impression of being surrounded, and they broke and ran. The Tories on the higher ridges had to give ground in turn. Casualties were not high and the battle was a victory for the Americans, who vastly outnumbered the defenders.

After Newtown, the army was put on half-rations, but the troops did not grumble. The Chemung Valley was a virtual land of plenty, with the standing crops planted by the Indians available for both eating and destruction.

The expedition now turned north, through Catherine's Town (today's Montour Falls), and along Seneca Lake to Kana-da-Saga, the Seneca "castle" near present-day Geneva. During preparations to surround Kana-da-Saga, Major Jeremiah Fogg discovered his men: "Armed with almost every species of vegetable; each man with three pumpkins on his bayonet and staggering under the weight of shirts filled with corn and beans. . .

"You damned set of rascals," shouted the major, "what are you going to storm the town with? Pumpkins? Melons?"

The men sheepishly divested themselves of their vegetable accoutrements. As it turned out, Kana-da-Saga was deserted, and could readily have been taken with a bag of beans. At Kana-da-Saga the September frosts were closing in on the Sullivan-Clinton Expedition. Day after day the men destroyed Indian settlements. The soldiers found it hard to believe that on these fine farms and in these farmhouses lived people they had thought of as savages. Some of the empty frame wooden dwellings, hurriedly vacated, had fireplaces and glass windows. On the inside of many doors were written admonitions such as: "He who destroys this house—his children shall suffer for it!"

The dutiful army continued to burn Indian towns and lay waste the land. They were disciplined Continental soldiers, and their officers had their orders from the commander-in-chief. It is not surprising that the name the Iroquois gave to George Washington was "Ha-no-da-ga-nears," which means "town destroyer." (This, incidentally, remained the name they called succeeding presidents of the United States.)

The expedition now marched west. When the troops discovered the mutilated bodies of a scouting party at "Little Beard's Town" (Cuylerville, on the Genesee River flats), they were hardly in a mood for letting up on their war of attrition. Seventy houses of the town were put to the torch and 15,000 bushels of corn destroyed.

The Campaign Winds Down

At the Genesee, Sullivan and Clinton decided not to continue the expedition to Niagara. They were overextended, their supplies were running low, and expected reinforcements with supplies from Fort Pitt, ascending the Allegeny River, had to turn back from lack of adequate clothing to meet the increasingly cold fall nights.

With their cattle and plodding pack horses the army retraced its steps to Kana-da-Saga (Geneva). Peace overtures by the Cayuga tribe were turned down by officer decision, and General Sullivan sent two strong parties to destroy Indian towns on either side of Cayuga Lake. Nearing their old base at Tioga Point, great numbers of the tired pack horses gave out, and had to be destroyed. Years later their skeletons were discovered by settlers, giving the strange name of "Horseheads" to a present-day Chemung County community.

General Clinton's New York forces made their way back across the central section of the state to the Mohawk and Hudson Valleys. Sullivan's group returned to Pennsylvania, later reuniting with General Washington's army in New Jersey.

Although the Sullivan-Clinton Expedition did not reach Niagara as hoped, the troops had carried out Washington's orders: "This expedition is to be directed against the hostile tribes of the six nations. The immediate objects are the total destruction and devastation of their settlements . . . it will be essential to ruin their crops on the ground and prevent their re-planting."

The Sullivan-Clinton campaign did all this, and more. Forty Indian towns in western New York were completely destroyed, along with an estimated 160,000 bushels of corn and vegetables of every kind. Hundreds of Iroquois homes were stuffed with corn stalks and put to the torch. The orchards of apple, pear and peach trees were all girdled or ruthlessly chopped down.

At the time it seemed a strange way to make war. Justified or not, this early American "scorched-earth policy" was certainly effective. Even the ensuing weather conditions favored the Americans. That winter of 1779-80 was so "desperately cold" that it completed the demoralization of the homeless Indians. (In fact, it was so cold that Governor George Clinton of New York was unable to call the state legislature into session.)

Forced to flee to Fort Niagara, Iroquois men, women and children with no homes or shelter had to accept British charity. Holed up at Niagara they literally froze or starved and were never to recover.

The Sullivan-Clinton Expedition had destroyed the Iroquois civilization of western New York. The Indians, in aligning themselves with the British in the first place were tragic victims who had no real idea of the drastic consequences of a possible defeat and now could never hope to resume their former way of life or their old farming and hunting grounds.

Having seen the valleys and potential farmlands of the region, it was inevitable that veterans of the campaign would want to return. Peace treaties and land title changes followed the War for Independence. In western New York the American Revolution was the cruelest and hardest-fought. Now by an act of war all this fine land was opened for settlement.

Richard S. Allen served as director for the NYS American Revolution Bicentennial Commission. A native of Saratoga Springs, he was formerly a freelance researcher and writer specializing in the history of civil engineering, heavy industry, and aeronautics. Among his books are four dealing with covered wooden bridges and an award-winning history of early Lockheed aircraft.

Why Save the Pine Bush?

by Craig Doremus and Paul Kerlinger

Photos (unless otherwise noted) by Alan B. Schroeder

Defenders of this unique ecosystem continue a 25-year battle against bulldozers

TWENTY-SIX years ago an Albany, N.Y. newspaper reporter described the Pine Bush as "this lost world . . . a weird, wild and fascinating stretch of sand hills and scrub growth that intervenes between Albany and Schenectady."

Suburban development in the past half century in the neighboring townships of Colonie and Guilderland has reduced the Pine Bush considerably. The first major intruder was the Thruway, which parallels the ancient King's Highway where some of the old tavern walls still stand. Then came the Northway and several lesser ribbons of concrete. Sewer and water lines and landfills followed as day follows night. Having the misfortune to lie between two expanding urban centers, the Pine Bush became a hotly desired location for residential, commercial and industrial developers. Over the years preservationists have won only a few of the many struggles. They are making a last-ditch stand now that the original 40 square miles have been reduced to 4000 acres, with even these boundaries continually shrinking.

But *why* should its location doom this beautiful area? Should it not rather be considered a blessing that this sanctuary for rare plants and animals is so easily accessible to the citizens of two large cities? There is plenty of evidence that our population is leveling off, and this new development means we can afford to hold back the flood of asphalt if only the money can be found to compensate the landowners.

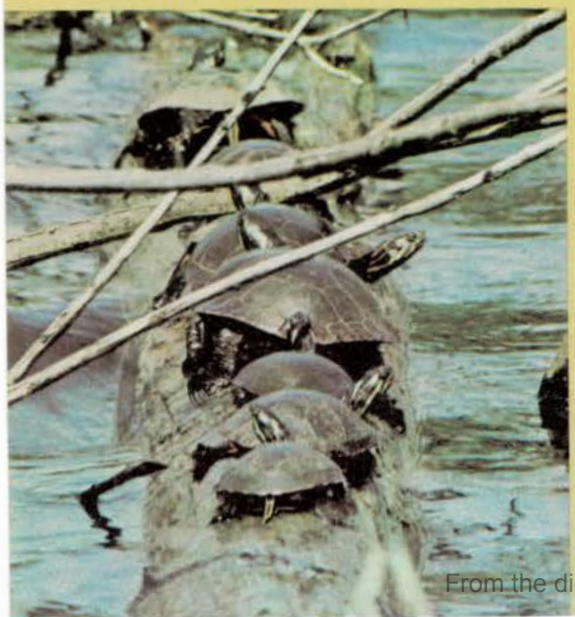
Nearly every city in the U.S. has at least one similar battle on its hands. More of these are being lost than won, and for this our grandchildren will not thank us. Perhaps this article will inspire residents of other areas to take up their local *cause célebre* with renewed vigor.

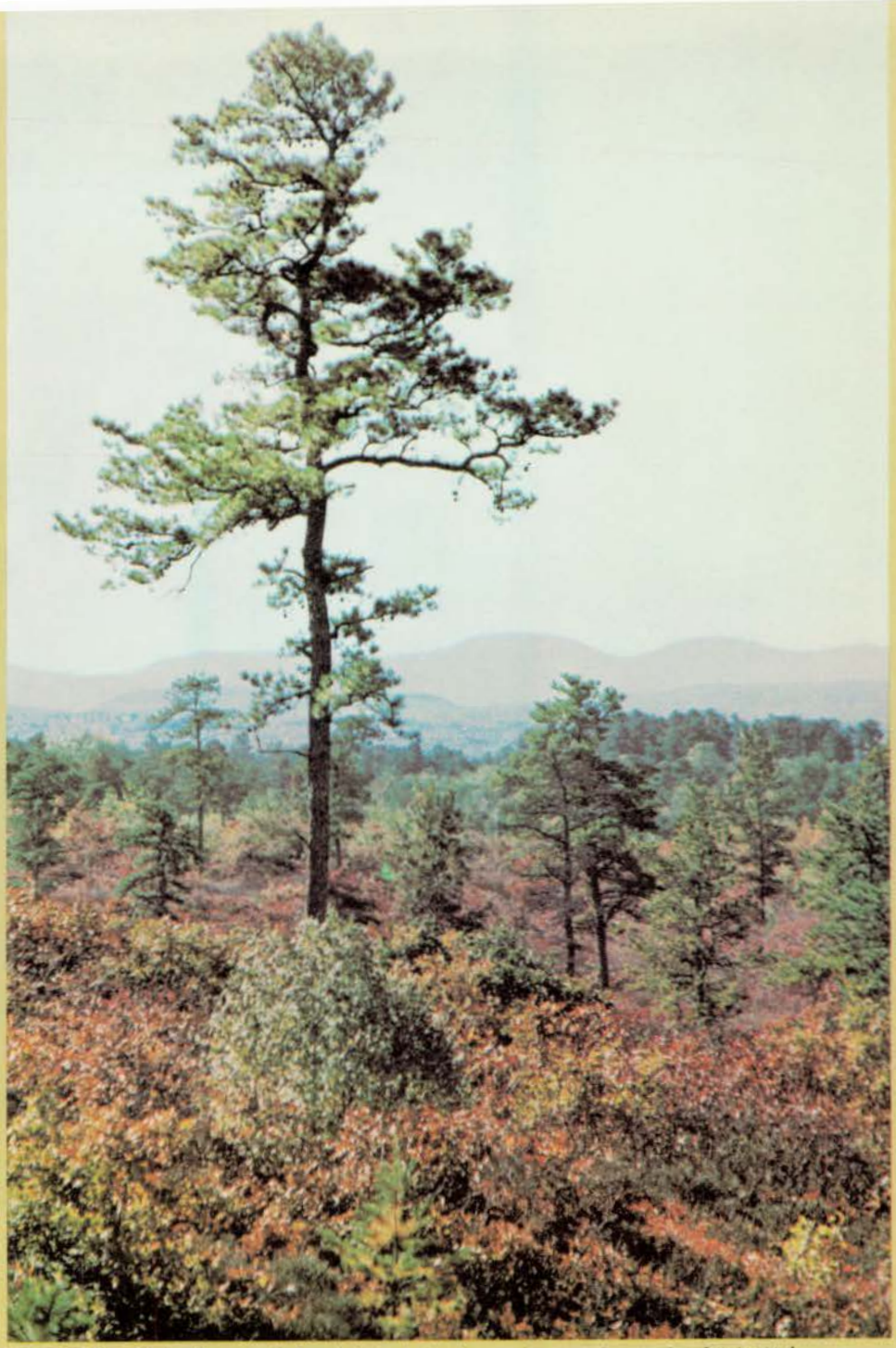
The formation of the Albany barrens

The highly purified water of the Pine Bush may be needed in the future.

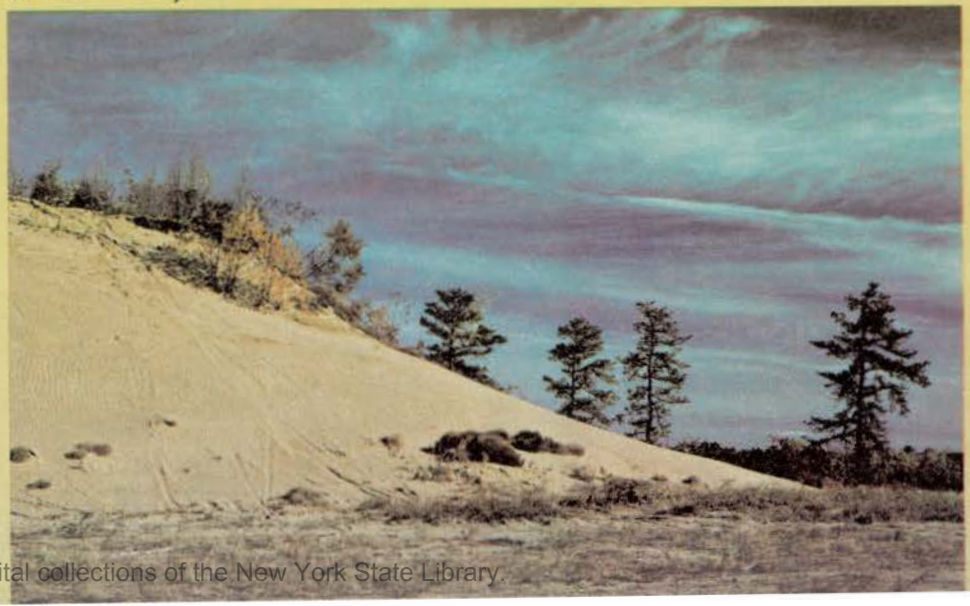
The area's most famous resident—the Karner blue butterfly

(Above) The Barren's boundaries—now only 4,000 acres—are still shrinking. (below) The painted turtle—one of many species that thrive in the area.





Albany's Pine Bush—the country's only inland pine barren. Its eerie beauty has fascinated travelers for 300 years.



C. Doremus

Encroachment of non-pine barrens plants. Black locust trees have invaded. Small oak shrub is the only original left.

C. Doremus

Recently burnt area. Standing twigs are remnants of pre-burn vegetation. New growth appears in lower shrub area.

Eastern bluebird is one of 150 species recorded by bird watchers.

began over 10,000 years ago as sand was deposited in the delta of the Mohawk River at glacial Lake Albany. As the lake drained, these sands were swept by years of wind until the landscape was dominated by dunes. Eventually a shrub plant community established itself, thus stabilizing the dunes against further erosion. The landscape with its special type of vegetation looks much the same today, except that if one climbs to the top of a dune the towers of downtown Albany are visible.

Pine barrens are characteristic of eastern coastal plains but are extremely rare in inland areas. Sandy soils, frequent fires, and the slightly warmer climate of the Hudson Valley are the strange combination that established and continues to maintain the distinctive plant and animal community of the Albany barrens, a term coined long ago by travelers impressed by the foreboding atmosphere of the landscape and its unfamiliar vegetation. Indeed, the barrens in New York and other locations were long considered wastelands and remained undeveloped until city population growth made some of them valuable.

Fire and Ecology of the Barrens

The key factor in Pine Bush ecology is fire. Every five to ten years most of the area catches fire. Without fire, northern hardwood forest species would invade, eventually replacing pine barren plants. The process in which one type of vegetation is replaced by another is called succession. For example, an abandoned field undergoes succession as weeds and grasses invade, later yielding in turn to shrubs and finally trees. An ecosystem like the Pine Bush in which succession is continually disturbed by natural phenomena such as fire has been termed a "disclimax" by ecologists.

Succession in the Albany barrens following a fire is extremely rapid. In the first year most of the plant species are reestablished. These plants are well adapted for recovery after fires. Some sprout from roots after fire kills their above-ground parts. Others have seeds that will germinate only after heat treatment. In fact, pine barrens plants have such high flammability that they seem to invite fire. By the fifth year after a fire a well-developed new shrub layer is fully established. This shrubby vegetation, dominated by two scrub oak trees which resprout from rootstocks, becomes so thick that walking is difficult in places.

In more open areas blueberry, smooth sumac, New Jersey tea, and bracken fern are quickly regenerated. Wild flowers are abundant—the wild rose, butterfly-weed, and pink lady's-slipper, to name just a few. Pitch pines are the largest trees in this community. The adult trees survive fires because of their thick, heat resistant bark, and because most fires occur only within the shrub layer close to the ground.

The Pine Bush biota are distinct from New York's coastal barrens because the species come from both the Atlantic coastal plain by way of the Hudson River Valley and the plains of the Midwest via the Mohawk River Valley. Consequently, the Pine Bush displays a unique blend of plant and animal organisms normally separated by many hundreds of miles. This freakishness transcends the merely unique, making the area very possibly a one-and-only.

The rare plant community together with the associated warmer and drier microclimate provides habitat for specialized fauna. The spadefoot toad, Fowler's toad, and hognosed snake are three species especially adapted to sand plain niches. When a fire occurs, these species burrow into the ground until it passes. Bird watchers have recorded over 150 species, but only a few dozen species actually breed there. The towhee, brown thrasher, and prairie warbler are characteristic pine barren birds. The white-tailed deer is one of the more conspicuous mammals. Rabbits, opossums, chipmunks and red-backed voles are some of the other mammals living in the Pine Bush.

The most controversial and most beautiful resident of the Albany barrens is the Karner blue butterfly, New York's only officially recognized endangered insect. The status of this insect has loomed large in the preservation versus development argument. Many a scornful remark by development proponents sums up the Pine Bush as "only a haven for a few butterflies"—a gross exaggeration to put it mildly. Another special insect of this ecosystem is the buck moth, which has a very restricted geographical range. Both these rare insects have very specialized niches. They are limited to a single species of plant as a food source while in the larval stage. The Karner blue's host plant is the blue lupine, while the buck moth feeds on the scrub oak. Because these species are so specialized and dependent on the Pine Bush vegetation community, disturbances of this vegetation could alter the habitat

Hognosed snoke

sufficiently to lead to their local extinction.

Preservation and Management

Three major and interdependent concerns must be considered: How large a preserve is needed? How to manage fires? How to prevent invasion of non-barrens species?

Because of the island-like nature of the Albany barrens, the plants and animals react in the same way as island populations would. Ecologists have shown that on small islands, extinction rates of plants and animals are higher than on large islands.

Fragmentation of the barrens by developments and roadways functionally decreases the size even further. Reductions in size of the Pine Bush are believed to be the reason for the disappearance of at least one bird species—the pine warbler, which bred there until the early 1970's in large stands of pitch pine forest.

As the size of these barrens is reduced, invasion of such weedy species as black locust and trembling aspen is accelerated. Even the most central dunes now have small stands of aspen. These species are not adapted to surviving fires and will be destroyed during the first fire. Light seeds of aspens and other invaders can be blown into the heart of a small preserve. A large preserve is more resistant to this mode of invasion.

Invasion followed by expulsion by fire is a dynamic process that is central to the long-term existence of the Pine Bush. Yet, too many fires can adversely affect pine barrens species. Because many of these plants resprout after fires, a sufficient time is needed between fires to regenerate photosynthetic material that replenishes food reserves in the roots. If these reserves are not replenished by man, plants will eventually cease resprouting, making the site more invasion prone.

Only after these factors are controlled by a preservation and management plan will the Pine Bush ecosystem be safe. Don Rittner, president of the Pine Bush Historic Preservation Project, Inc., says, "The unique character of the Pine Bush is the prime reason for conservation of the area. But if preservation of a *large* tract is not achieved, the entire ecosystem may go extinct."

In addition to ecology, other factors bear on the desirability of preserving the Pine Bush. Albany is a city with the common urban problems of a depressed economic base and marginal downtown sections which deteriorated as money and people flowed to dozens of suburbs. But this 30-year trend is slowly reversing as city after city discovers that the rehabilitation of downtown areas is economically, aesthetically, and environmentally more sensible than the development of pristine natural areas. Since the energy crisis seems likely to be with us far into the next decade, the rehabilitation of city housing, parks, stores, theaters, transportation, etc., will probably proceed at an ever faster pace. "Reconstruction of deteriorating sections of downtown Albany is a more efficient use of land and conservation of energy than suburban sprawl into the Pine Bush," claims Lynne Jackson, president of Save The Pine Bush, Inc. All the more reason why it would be tragic to destroy rare and beautiful outlying areas!

Economic and environmental considerations often compliment each other. The groundwater resource of the Pine Bush may be Albany's answer to water needs of the future. Rain water percolates quickly and is cleansed by pine barren sands resulting in a large aquifer of highly purified water. How much of this water will be channelled away from the aquifer or how much it will be polluted by development of housing tracts, roads and shopping centers is unknown.

The final argument for preservation derives its strength from the urban setting of the Pine Bush. Urban environments seldom have enough recreational areas for the needs of people. The Pine Bush is already well used by cross-country skiers, picnickers, joggers, hikers and blueberry pickers. Visitors are continually struck by the gaunt beauty of the barrens that has ironically been created by the destructive forces of fire.

As in most controversies, not all virtue lies on the same side. The most powerful arguments for development are summarized by Pat Mahoney, an engineer-consultant to a Pine Bush landowner, who maintains that "the rights of private landowners should be considered in any planning effort for this area," and Albany Mayor Erastus Corning II who says, "The City of Albany has invested money and resources in servicing water and sewer lines within parts of the Albany Pine Bush, and I favor development of areas serviced by the utilities."

In April 1978 a steering committee with representatives from the four involved municipalities was appointed by then-commissioner Peter Berle of DEC. The objective of this steering committee is to arrive at a sound plan for the Pine Bush based on ecological, economic, recreational and natural resource information. Information is now being gathered by a private consulting firm as well as by concerned private individuals. By the time this article appears, the recommendations of this study should be known.

A Pine Bush Preserve-Park could be one of the more distinctive urban parks in the United States. But if a large preserve is not established and managed properly, the entire Pine Bush ecosystem may be eradicated. Let us hope that this is not its ultimate fate.

Craig Doremus and **Paul Kerlinger** are DEC ecologists engaged in research on the vegetation ecology of northeast pine barrens with emphasis on preservation and management. They have studied both the Albany and New Jersey barrens and plan future work at Long Island and other barrens.

Doremus has a B.S. in biology from SUNY at Oneonta and a M.S. in environmental engineering from Rensselaer Polytechnic Institute. Kerlinger has a B.A. from SUNY at Oneonta and is presently a Ph.D. candidate in biology at SUNY Albany.

BIG BUCK CLUB

THE New York State Big Buck Club was founded in 1972 but the true beginnings of the club go back to the 1930's. During the 1930's and 1940's Clayton B. Seagears, of the State Conservation Department, started locating, measuring, and publicizing the big racks taken by New York hunters.

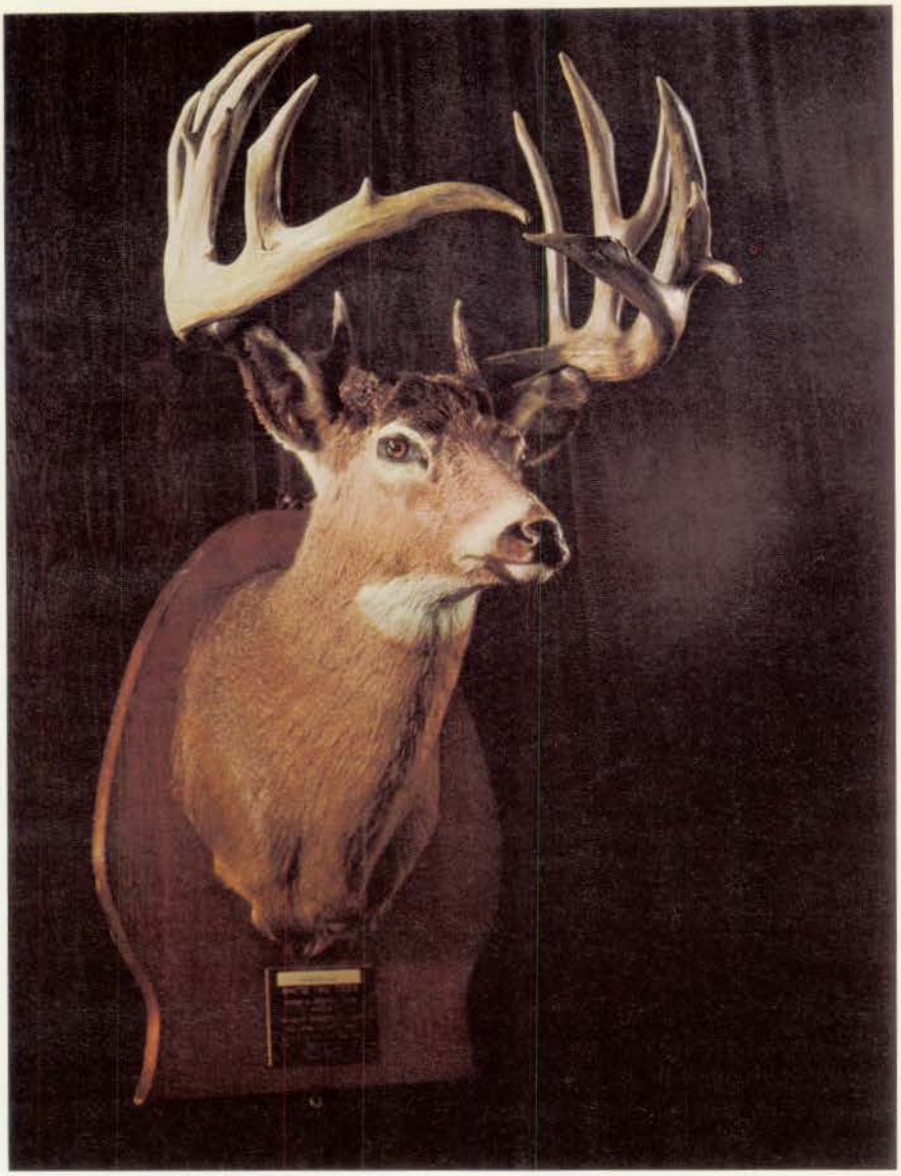
Using the system developed by the Boone and Crockett Club, Seagears put together photographs of New York State's ten best heads and published them in a 1946 issue of THE CONSERVATIONIST. In 1952 and again in 1963 THE CONSERVATIONIST displayed updated listings of the state's ten best heads.

Nearly ten years went by before Bob Estes, a dairy farmer and Boone and Crockett official from Caledonia, picked up where Seagers had left off. Estes started locating new racks as well as holding seminars and county fair displays, publicizing New York's big bucks. Finally, in March of 1972 Estes, Herb Doig and Wayne Trimm of DEC met in Delmar, N.Y. to formulate details of how the club would operate. Thus, the New York State Big Buck Club was born. At the same time Wayne Trimm offered to paint a portrait of the largest buck taken in New York State each year.

Since 1972 the Big Buck Club has branched out to every corner of the state. There are now forty measurers to score and assist in the recording of trophy whitetails. The club also sponsors many seminars, rack scoring days and has booths at various county fairs throughout the state each year.

Where Do The Big Bucks Come From?

Racks large enough for the Big Buck Club can be found in nearly every part of New York State. However, there are certain areas that seem to turn up trophy racks more frequently than others. Statistics show that the block of counties consisting of Livingston, Steuben, Allegany, Cattaraugus and Wyoming, all in western New York, are the best trophy hot spots in New York State, accounting for over 35 percent of the trophies registered.



New York State No. 1 buck.
Roosevelt Luckey
1939, Allegany Co.
Score 198-3

Photos by John Goerg

The Adirondacks also offer excellent trophy possibilities in certain areas. During the last few years St. Lawrence, Jefferson, Essex and Herkimer Counties have been producing some very fine trophy heads. During each of the last four years the state's largest racked whitetail has come from the Adirondacks. This is also one of the few places in New York State where a whitetail buck can grow to maturity, thereby enabling it to have the opportunity of growing larger antlers.

All in all New York State offers trophy minded hunters some of the finest whitetail hunting in North America. At this writing New York hunters have taken 24 bucks that exceed the minimum Boone and Crockett score for entry into their record book. This ranks New York in the top ten for trophy whitetails in the United States. A large percentage of the bucks meeting the Boone and Crockett minimum have been taken in the last ten years. This in itself proves that there are still bucks running the countryside that sport racks as large as those of yesteryear.

By using the statistics of the last ten years we know that for approximately every 32,500 hunters who take to the woods only *one* will be lucky enough to bring home a trophy large enough for the club.

A similar method shows that only *one* out of every 2,500 adult bucks killed will be large enough to make the Big Buck Club. **by Charles J. Alsheimer**

No. 2, Roy Vail
1960, Orange Co.
Score 181-3

No. 6, Daniel Sacco
1977, Jefferson Co.
Score 174-6

No. 7, Vincent Lennon
1973, Franklin Co.
Score 174-4

No. 3, Ed Beare
1943, Livingston Co.
Score 180-3

NON TYPICAL

N.T. No. 1, Homer Boylan
1939, Allegany Co.
Score 244-2

N.T. No. 2, Robert Wood
1944, Genesee Co.
Score 219-7

No. 8, Kenneth Bowen
1941, Livingston Co.
Score 174-2

No. 4, Herbert Jaquish
1953, Essex Co.
Score 179-3

No. 9, Denny Mitchell
1933, Essex Co.
Score 174-1

No. 5, Wesley Iulg
1944, Erie Co.
Score 176-2

No. 10, Martin J. Way
1968, Seneca Co.
Score 172-7

Bowhunting Big Buck Club winner
taken near Varna, Tompkins Co.
November 18, 1978 by Carlo Troise
Score 137-1

1978 BIG BUCK CLUB WINNERS

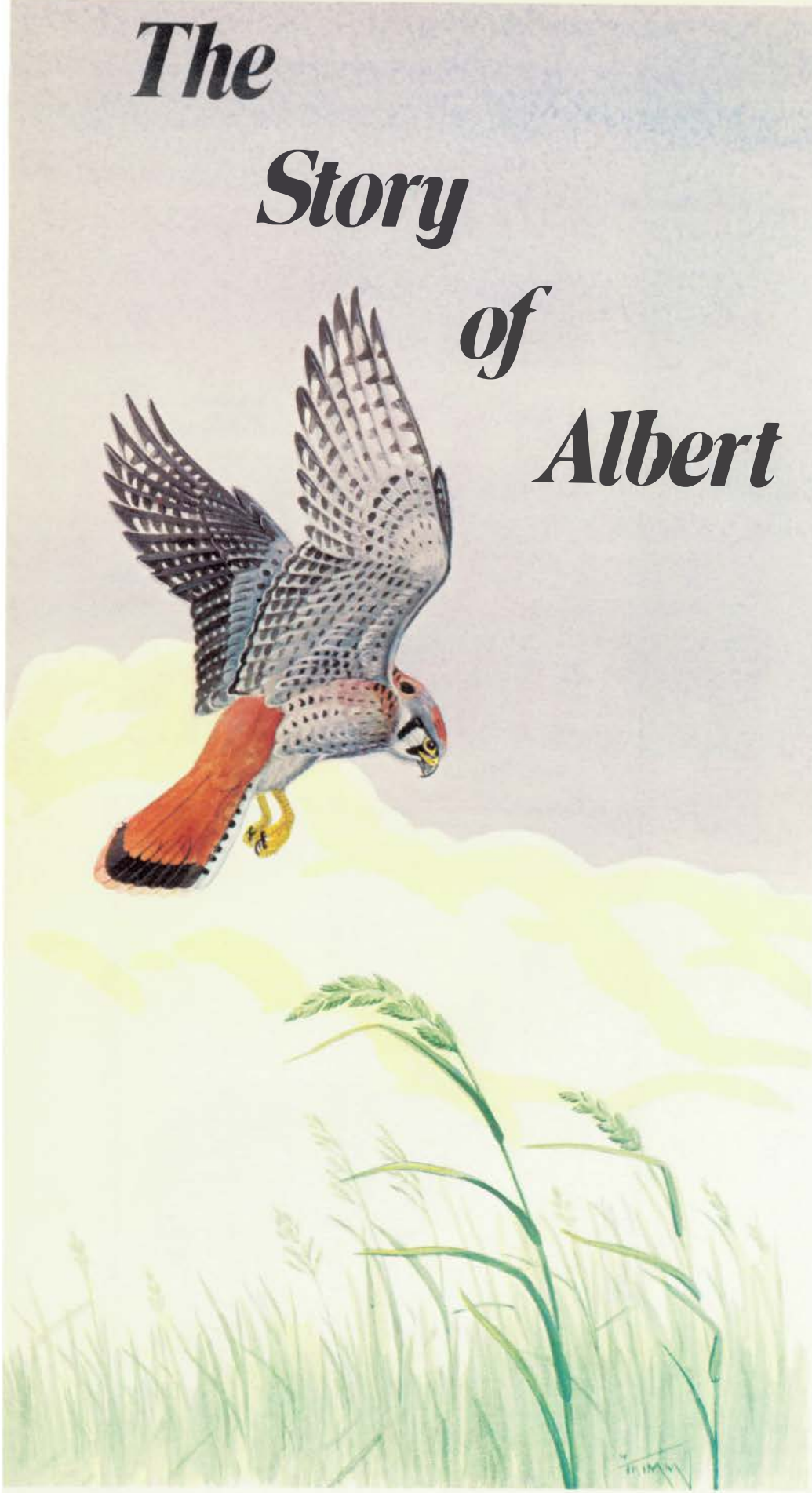
Big Buck Club
official belt
buckle by Sid Bell

A booklet listing more than 300 trophy heads submitted is available at $1.00 from the club address below.

Applications and information about submitting antlers for measurement may be received by sending a self-addressed stamped envelope to Big Buck Club, 90 Maxwell Rd., Caledonia, NY 14423. Final entry date is April 1st each year.

Gun Big Buck Club winner
taken in town of Hancock, Sullivan Co.
December 12, 1978 by E. Bruce Hiser
Score 156-2

The Story of Albert



Painting by Wayne Trimm

by Aileen Ossowski

Photos by author

HERE in the country, in all the years when my five children were small and demanding much of my time, there were seldom any spare moments for leisure activities. But, as with all things in life, the hectic times passed as one by one the children entered a new phase of existence, that of awareness of things around us. It is a marvelous thing to watch a child develop into a teenager, when the world suddenly opens up and presents new dimensions to be investigated, and questioned, and researched. As queries became ever more diverse, Mother became Chief Researcher, and it made these years, for me as well as for my children, a time of togetherness and closeness, something that cannot be bought.

The earliest of my recollections are the bags of odd pebbles and rock chips picked up on beaches on vacation, each one a prize because of its color, or shape, or composition. Our VW camper always had its corners stuffed with these treasures, to be researched when wearrived home. One son spent some weeks at a natural science summer camp, so we later found ourselves involved in the study of trees. On and on it went, a reeducation for me, and the realization for my family that learning can be fun when curiosity is encouraged and nurtured.

Living on a farm, the animal world, at least the domestic species, was always there providing a living classroom where all aspects of nature's ongoing cycle were taught in a most forthright, natural, and very beautiful way.

We became aware of the abundance of wild life on our woods and marsh areas, and out of this developed our interest in cataloguing bird species right in our immediate vicinity. The book "Birds of North America" and Mrs. Fran Howe's TV program from Burlington, Vt. played a large part in our learning about these beautiful creatures. We studied all facets of the birds' lives—their appearance in the spring, nesting habits, territorial claims, raising their young, food preferences, their glorious chorus of song on an early summer morning, and their fall departure.

A chance occurrence gave us a unique opportunity to study a bird at close range throughout his short span from fledgling to flier. My son was driving his motorcycle along a country road about two miles from home one July day in 1978. He came across a small flopping object in the middle of the road, stopped, and upon closer examination, discovered that it was a baby hawk. He nestled it in his gloved hand and drove slowly home with it. It was a pathetic little creature—baby-fluff still sticking out all over, wings that could flutter but were not strong enough to fly, and legs that wobbled and gave way after several short steps. One could see the beginnings of the creamy-colored speckled breast feathers, and rusty back and tail, and we knew that he was a baby kestrel. He did not seem to be injured, and we surmised that he must have inadvertantly strayed too far from his nest on his first attempt to fly.

We set him up on the garage workbench, nestled in some straw, and covered with a plastic wash basket weighted down with a board so that no inquisitive pussy cat could get at him. In the evening, we covered the basket with a large cloth, so he would feel warmer, we hoped. The next morning, he was still alive, and looking very alert, and hungry, obviously, as he would come to my gloved finger with his mouth open looking for food. The closest I could come to something similar to the chewed-up insects I assumed his mother had fed him was some mashed-up dog food moistened with water. I became quite adept at dropping small chunks into his mouth from a popsicle stick. Within two days he was taking it himself from the stick, and by Day 4, he was taking it directly from the dish, picking up lumps with his talons. A stick stretched horizontally through the wash basket became his perch.

Our aim became not only to save this little fellow, but to get him to fly, and eventually to hunt for himself, so that we could return him to the wild and know that he could survive on his own. By Day 5 he would perch on my gloved finger. With some patient maneuvering, I managed to attach to his leg a plastic twist tie, which was in turn attached to a length of light string. With this, I started to walk with him out of the cage into the house, and subsequently, out in the garden. The tie, of course, was because I didn't want him to suddenly take off and get lost in some grass or brush where he might starve. After several days, it was no longer necessary to tie him, as he seemed quite content to perch on my finger or hand, and I also discarded my glove, as he hung on tight with his talons, but never to the point where they hurt me. At this time, I named him Albert.

By Day 6 he began to remove his little baby fluffy down feathers, and was a sight to see as he preened his new feathers, running his beak along the whole length of each one to clean it off. This preening continued every day, and as he grew, his plumage was a delight to see and to stroke.

Day 8: Took him outside and started to encourage him to fly. He would sit on my hand, and I would whoosh him into the air. He would fly a few feet and then land, with a thump at first, but gradually learning to spread his wings to brake his landing.

Day 11: As it was evident that he would survive, I phoned Mrs. Fran Howe in Burlington, Vt. to find out how I could best start training him to wild food so he could learn to hunt. She advised grasshoppers, and small chunks of meat that he could tear apart.

Days 12 and 13: A family with children visited us over the weekend, and so I gave the kids the task of finding all the grasshoppers they could for Albert. They would watch wide-eyed as he took each one, held it in his claw, and ate it with relish. And if he grasped it rear end uppermost, he would reverse his hold on it, so that he always started eating it from the head down. By this time, he had become used to perching on anyone's shoulder, and eventually, their head. So we began to put the grasshoppers or meat or whatever on the ground, and he would swoop down, gobble it up, and always return to whatever shoulder or head was providing the perch at the moment.

Day 14: He flew 100 feet to the barn bridge, then allowed himself to be

Albert and friend

picked up and brought back to the garage. In the evening he left my son's shoulder and sat in a birch tree for two hours. The boy climbed the tree and got him down, only to have him take off again into a maple. As dark was coming, I didn't want to leave him out overnight, so I stayed there trying to coax him down. After another half hour he suddenly dropped on something that moved in the grass and then, calm as you please, came up onto my head. I took him into the garage, where he promptly flew up into the rafters. There I felt he would be safe from the cats. I put a dish of food close to him, and left him there overnight. The next few nights, this was his sleeping place as soon as dusk arrived.

Day 15: My clothesline poles stand about 8 feet high and 25 feet apart. These became his daytime perching places, from which he would dart to the ground to catch a grasshopper or a worm, and return to the pole. While I was picking beans in the garden, he sat on my head for half an hour without moving. Then he would go after something on the ground, come back, run up the leg of my jeans, up my back, and sit on my head again. This went on for several hours. Then back to the poles. I didn't put out food for him anymore, and so this pushed him to hunt more. Only in the evenings would I entice him with a small piece of meat. His eyesight was fantastic. From high up he could spot a green worm in the green grass, and from 50 feet away he could see a little piece of meat in my hand. I also always used the same call, "Hey Albert, C'mon Albert," and he came to me, landing either on my outstretched arm or my head.

Day 17: The previous day he spent entirely outdoors, perching here and there and hunting. He stayed out all night, and when I went looking for him this morning, he came immediately and sat on my head. Later, in the afternoon, he again divided his time between hunting from my head as I worked in the garden, and hunting from the poles.

Day 18: Saw him splashing around in a little puddle of water, so I put a tray of water on a lawn table, coaxed him to it, and he drank, then splashed and preened hpmself.

Day 19: He found an old dog bone on the lawn, and spent about two hours working at it. His talons and beak seemed to be very strong.

Day 20: Albert stayed out all night in the rain. This morning he flew down to the road, about 200 feet, and stayed on the roof of the milk house all day. When we came home late in the afternoon, he came at my call from the maple woods across the road, the farthest afield he had gone so far.

Day 22: Albert roamed far and wide and seemed to be getting enough food on his own. But he came every day to drink water from the pan.

Day 28: We were away all weekend, but on our arrival home Sunday night he came from the maple woods at my call.

Day 29: Didn't see him all day, but in the evening he came at my call for his little piece of meat, which I made a little smaller each time. How he loved to tear at it!

Day 33: Hadn't seen Albert for several days, but one of my sons had a glimpse of him this afternoon.

Day 40: Albert was not seen anymore. Being optimistic, I hoped he had found a mate and was thriving, perhaps to return to us next year?

Every time I went outside, I watched every bird on a tree, or wire, or anywhere, but no Albert. I was really sorry not to see him anymore, and hoped that he was alright.

September 18 (one month later): My husband and I were away all weekend, and our daughter said she had seen Albert perched on the Hydro wires in the neighbor's field. He was making some kind of noises, and there was another bird in the woods answering him. When she called to him, he didn't come to her but ruffled up his feathers and jerked his head back and forth, as he would always do when he was preparing to fly to us. So he seemed to recognize her.

Next Day: I saw Albert! Coming home along the road from picking elderberries. He was on the same wire as when my daughter saw him. And he responded in the same way when I called him in the familiar "Hey, Albert, C'mon, Albert." The other children saw him too, and so we knew that he was alive and well. But he had reverted to his natural wild state enough by now so that even though he acknowledged our familiar call, he made it clear that he had his own life to live and did not need us anymore.

So ends the story of Albert. A 40-day interlude in our summer that will long be remembered as a rare experience.

The crowning point would be next spring, if I suddenly go out one day and see that beautiful little rusty-colored creature sitting on a pole or a line nearby. Who knows? Stranger things have happened.

Aileen Ossowski and her husband, who is now office manager for a Quebec steel company, raised five children on a 250 acre farm 50 miles from Montreal. The farm has since been planted with 15,000 pine and spruce trees.

New York State Residents

Please Take Note

The Fish and Wildlife Law, Section 11-0919, Aid to Wildlife in Distress, requires any person who takes a protected species into custody to notify a conservation officer immediately by phone and confirm the report in writing within 48 hours in order to obtain a temporary permit for time-limited emergency care.

After the Frost
James McKean

LETTERS

East of the Hudson

I was most interested to read the feature stories in the March-April issue of THE CONSERVATIONIST.

"East of the Hudson" by Jack Casey and "The Poestenkill" by Eva H. Gemmill were of particular interest.

I was employed by the Manning Paper Company from 1937 to 1979 and was superintendent of the Mt. Ida Mill of that company from 1952 to 1962, at which time the mill was closed.

Among other things, I was responsible for the operation of the turbine, shown partially dismantled on page 4 of your magazine. This was housed in the building shown on page 5 of this issue and it is also shown in the background in a picture on page 14 in Eva Gemmill's story.

Dyken Pond shown on page 14 was the main source of water for our power generation and the gate in the Dyken Pond dam was opened and closed as needed to control the water level.

During a heavy storm about 1938 the Poestenkill flooded over its banks taking out a dam below the Mt. Ida Falls, just above where Ruff's Flour mill stood. The rampaging waters undermined the bank and washed away the road running from Cypress Street to South Troy along the north bank.

The caption on the photo of Ruff's Flour Mill on page 14 says it stood until 1965 but in actual fact I was present and watched a good part of this mill fall into the Poestenkill during this flood, which I believe was in 1938.

Douglass L. Bartow, Troy

Edward Waltz's Terns

The article on terns (May-June issue) by Edward C. Waltz lists four species of the subfamily Sterninae which may be found nesting within the limits of New York State. The gull-billed tern (*Gelochelidon nilotica aranea*) not mentioned in the article was found breeding on Long Island in 1975. For details see "The Kingbird", a quarterly publication of the Federation of New York State Bird Clubs, Volume 25, pages 179-183. Included are photographs of adult gull-billed terns, a nest with eggs and a chick. This event is also documented in the 1976 supplement to John Bull's "Birds of New York State."

John B. Belknap, Gouverneur

Pesticide Use

I read with pleasure Prof. Rienow's excellent review of "The Pesticide Conspiracy" by Robert Van Den Bosch and "The Least is Best Pesticide Strategy," edited by Jerome Goldstein.

Louis Bromfield in the 1950's convinced me of the futility of using more and stronger pesticides, after reading "Malabar Farm," "Out of the Earth," and "From my Experience." I have thought for a long time that my dad and Elmer Shear of Coeymans Hollow both did themselves in on the altar of pesticides in trying to produce high quality apples.

Bromfield said many times in his books that vegetation grown on a nutritionally balanced soil should resist insects and disease—eventually without use of pesticides. He proved it as documented in "From My Experience." That's why we included Experiment No. 9 in Air Pollution Experiments for Junior and Senior High School Science Classes—on the basis that vegetation so grown might have higher resistance to air pollution. I posed the possibility to the publishers of Organic Gardening—the Rodales. They did quote from my letter in the magazine but didn't reply and I suspect did nothing about it on their own experimental farm.

Someday I hope to duplicate Bromfield's methods on some of our land, and try new plantings of apples again.

Donald C. Hunter, Delmar

Letter from Scotland

Thanks to the generosity of the late Dr. William Law Watson, of New York, I am still receiving copies of THE CONSERVATIONIST and I write to tell you just how much it is appreciated.

In the editorial of your January-February issue you mention some of your critics. May I say that they should be ignored. You are producing the magazine just rightly. The whole set up of the journal seems to me to be just "spot on." The articles, the photos and other illustrations, the printing and general tone are very high indeed. It would be a pity to make any alteration.

I only hope that THE CONSERVATIONIST is read and digested by a very wide circle.

The copy that comes to me is passed on to a Mr. Ronnie Rose, Wildlife Of-

ficer to the Economic Forestry Group of Great Britain.

So, I hope that Dr. Watson's generosity and kindness is doing good long after his demise.

With all best wishes.

Robert H. Fraser

Stabilizing the Schoharie Aqueduct

The November-December, 1977 issue of THE CONSERVATIONIST featured a section on the Erie Canal which included an article on "The Schoharie Aqueduct." At the time of that article, the arches supporting the towpath were structurally unsound due to a lack of counter thrust from the demolished adjacent arches. One arch collapsed in the spring of 1977, and the remaining arches would continue to fall arch by arch.

The Saratoga-Capital District State Park and Recreation Commission retained our engineering firm to design a stabilization system. In order to design a stabilization system which disturbed as little of the physical fabric of the aqueduct as possible, we developed an innovative cable tieback system which will prevent further arch collapse.

Construction of the stabilization system was completed in 1978. For our engineering work on this project, we recently received a national award for engineering excellence by the American Consulting Engineers Council.

J. Thomas Ryan, P.E.
Ryan-Biggs Engineering, Troy

Move Over Edwin Newman

Being a word buff, it occurred to me that Mr. Alvin R. Breisch, author of the article on page 43, "The Alpine Zone," (May-June 1979) might be interested in this comment: In his second paragraph he says: ". . . spruce and balsam fir which comprise the subalpine forests." He, like so too many others, misuses the word "comprise." The word is an incorrect substitute for "compose," or "constitute," because it means just the opposite: "embrace" or "include." So we have to turn the sentence around to use his word: "The subalpine forests comprise spruce and balsam fir." Whenever I read this lecture, I include this example: "The fifty states compose the union; the union comprises the fifty states."

Semanticists tell me that they have given up on this spreading error; thus we shall ere long have the second word in our language that has two meanings that are diametrically opposed to each other. The other is "cleave."

R. L. Greene
Pelham, Massachusetts

Puma Restoration

This is a response to Mr. Cunniffe's letter in the May-June issue of THE CONSERVATIONIST. To the best of my knowledge, there is no over-population of whitetails in the Adirondacks at the present time. In fact, in most of the Adirondack region, whitetails are apparently scarce. Only in the central Adirondacks do we have a medium to low population of around 10 deer per square mile. At the present time, low deer prey densities may be a severely constraining factor to any thought of puma reintroduction.

There is a commonly held belief that predators do not affect their prey populations. Recent research throughout the country has shown that under some conditions, *large predators* can negatively affect populations of *large prey* animals. When prey populations are low under some adverse conditions such as deep snow, a large predator such as a puma may locally depress its prey population. Deer are an important wildlife resource in the Adirondacks because people enjoy seeing and hunting them. Thus, any decision to restock the puma in the Adirondack Park is a complex one at best.

Finally, pumas need large tracts of undisturbed space with prey if they are to survive. In the Adirondacks, the largest chunks of roadless area coincide with high elevations, deep winter snows, and the low deer densities which are prevalent on wild state lands. Higher deer densities coincide with logged private lands in the valleys, precisely where human populations are densest. Indeed, in one of our "small, quiet mountain towns" we are hosting the 1980 world winter olympics! Ours is certainly an uncommon "wilderness."

In sum, I believe that DEC's Bureau of Wildlife and its Endangered Species Unit are indeed acting prudently and responsibly in their present, cautious course.

Rainer H. Brocke, Newcomb

The Utica Marsh

I read the article on the Utica Marsh and I was quite upset to see that after DEC was granted the Pittman-Robertson funds that it posted the entire marsh except for the current landowners.

After reading this article I went back an issue or two and discovered an article about the problems of posted land and hunting access in the State of New York. It would appear that the state is practicing the same course of conduct which it was complaining about just a few months ago.

Mark F. Tattenbaum, Tonawanda

Acid Rain

Your article regarding the acid rain problem of the northeastern mountain areas has been of great interest to me. I have trod some sections of the Appalachian Mt. trail system, which impressed upon me a sense of the real outdoors.

The experiments of using powdered lime are fine for establishing that we may be able to accomplish something useful by some such method. I have wondered as to whether a long term natural approach is practical. Perhaps this thought has been considered. Natural limestones (dolomites) are abundant in New York State. It would seem that if rapid flowing sections of streams were strewn with varisized fragments a natural balancing effect would be created. Plantings would not be easy to make but there would be a long term effect. I also realize that many hundreds of feet would have to be covered, in turbulent streambeds, probably during winter months. But the distribution, even if rather concentrated, would not take on the appearance of an unnatural occurrence.

We know that any national attention to this sort of problem is quite remote. Fortunately the Adirondacks are not so large as to present a problem in being able to consider remedial activities. Joseph A. Kucher, Whitney Pt.

Your Questions Answered

conducted by Paul Kelsey

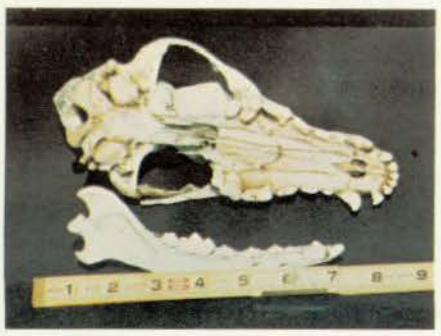
Skull Identification

Enclosed are photos of a skull I found off a dirt road in southern Columbia County. I have consulted Peterson's "Field Guide to Mammals," and find that this resembles the coyote skull shown, and has the proper dental formula. The book does not show a dog skull for comparison. Though it is more likely a dog, could this possibly be a coyote?

Larry Dubin, Livingston

Coyotes first invaded northern New York about 1920. Since that time they have spread so that now they are found throughout New York and New England, and have evolved into an animal that is slightly larger than the western coyote. Since the "Field Guide to Mammals," by Burt and Grossenheider, this has generally been accepted as an eastern coyote. They are common in the Adirondacks, and have been reported generally throughout the state in scattered, though increasing numbers.

The picture of the skull you sent is definitely that of a dog. The heel of the big molar on the lower jaw of a coyote is much larger than the same part on a dog's jaw, a characteristic which probably developed over centuries of different food habits. The coyote needs bone crushing teeth much more than a dog. The molar-palatine ratio between molars to the distance between the first premolars of the upper jaw is 2.3 to 1. If it is less than 2.7 to 1 it is a dog. If it is greater than 3.1 to 1 it should be a coyote, unless it is one of the long-faced dogs like the collie or greyhound.



"Honest Infractions"

The local game wardens seem to be putting on a drive for small and honest infractions. Some deer hunters had to pay a $25 fine because they carried their complete deer tag on their back as we have done for 30 years. Now in small print it says, "Detach your numbered tag and place it on your back." Why? If we lose all or part of our license we have to apply for a new one.

John Hlopko, Binghamton

It would be interesting to know the whole story behind the $25 fine paid by deer hunters for carrying their complete deer tag and back patch on their backs. This is simply a recommendation, so that when a hunter loses his backpatch, he still has his license and tag and can very easily get a new backpatch for 50¢. It is not a law or regulation, and could not possibly have been a violation. If the whole story was known, it is more likely that the hunter killed a deer, and had not invalidated his license by tearing off the tag. Over the years I have heard many of these stories told around the clubhouse that did not in any way resemble what I know actually occurred in the field.

Precocious Snowshoe Rabbits

A few years ago I read that snowshoe rabbits did not nurse their young, and that the young are born with their eyes open and ready to fend for themselves. I have mentioned this to several people, and no one agrees. What is the truth of the matter?

Fred Phillips, Phoenix

The young of snowshoe hare are very precocious, but to say that they do not nurse would be carrying it a bit too far. They are normally nursed for about four weeks, but in the meanwhile, they are learning to eat vegetation. That it is possible for them to learn to eat natural vegetation much quicker is demonstrated by an occurrence at the Delmar Game Farm years ago when they were trying to raise them for stocking purposes. A three-day-old snowshoe escaped from its pen and after a long search was given up as lost. A week later, it was seen and a box trap set for its capture. When recovered, the youngster was in perfect condition.

Planting Food Patches

I live in southern Allegany County and have some unused cropland. I have thought of planting food patches to help the deer and turkeys through the winter. Have you any suggestions as to what I might plant?

Wolfgang Miesner, Wellsville

If you are interested in planting food patches for deer and turkey, your best clue is to look and see what plants well adapted to the area are well used. In any part of New York where field corn will mature and harden, it stands head and shoulders above any other planting. It stands above the snow too. The chances are that unused Allegany County cropland is not very good corn land, but for wildlife purposes this can probably be adequately overcome by fertilizer. If you have south slope situations where deer concentrate, another good plant is winter rye. This should be planted in the spots where the first bare ground appears so that it will be quickly available.

Waterfowl Stamps

The waterfowl stamps are so beautiful that they are cherished by collectors and decorators. Why can't they be signed across the back instead of across the face? Wouldn't that accomplish the same result?

Marvin Case, Olive Bridge

A waterfowl stamp used for hunting is not valid unless attached to the hunting license and signed across its face. If it was signed on the back, as soon as it was attached, the signature would be concealed. If it were not so easy to remove a stamp and place it on another license, it would not be necessary to have the stamp signed. To accomplish this, it would be impossible to remove the stamp from a license, and collectors wouldn't like that either. Thus to insure that the stamp is used by only one hunter, it is required that it be used in the present manner.

Book Reviews

Conducted by Joan Taylor

A Species of Eternity, by Joseph Kastner, 350 pages, E. P. Dutton, $8.95.

This highly readable account of the development of natural history in America concludes with the death of Audubon in 1851.

Beginning with the contributions of Cadwallader Colden of Coldenham and continuing on with the work of such diverse naturalists as John Bartram, Thomas Jefferson and Lewis and Clark, the book is replete with details of plant gathering and exchanges, efforts at identification and very human idiosyncrasies.

Kastner, who is a former editor of Life, shows the journalistic eye for detail not only in his coverage of specimen gathering and identification but also in his selective choice of personal anecdotes in his character portrayal.

The 19th century art of letter writing certainly flourished among the naturalists as many of them maintained regular prolific correspondence through the years, revealing personal ambitions and frustrations as well as exhilaration with moments of success in their work.

In addition to the correspondence, a voluminous amount of plant and animal material was exchanged among the naturalists and hundreds of specimens were shipped across the ocean to England.

Peter Collinson once complained, "This business of procuring foreign seeds brought on me no little trouble to carry on such correspondence, keeping accounts, receiving and paying money, attendance at the customs house to procure delivery of the seeds and then dispersing the boxes to their proper owners."

In addition, Collinson complained to Linnaeus, "You have not sent me the least specimen of either fossil, animal or vegetable. It is a general complaint that some people receive all and return nothing."

Real impetus was given to the field under the auspices of Thomas Jefferson, an avid natural historian himself. It was his patronage that aided Andre Michaux, a man who in just eleven years outdid everyone before him in the number of plants discovered or identified.

It was Jefferson also who indulged his passion for natural history in sponsoring the expedition of Lewis and Clark. The diaries from the expedition yielded new and valuable information not only on plants but on birds and animals in the West.

Concluding with the chapters on Alexander Wilson and his gifted competitor, John James Audubon, Kastner brings to an end his absorbing history of the romantic age of American natural history.

Reproductions of drawings and etchings from the period contribute greatly to this already-fine volume.

— Joan Hinkemeyer
Denver Public Library

Greenpeace III, Journey into the Bomb, by David McTaggart with Robert Hunter, 375 pages, William Morrow & Co., Inc., $10.95.

Frustration, hardship and sacrifice are often the coin with which protesters must pay for their beliefs. Rarely has this been made more starkly evident than in "Greenpeace III."

In June 1972 France announced its intention to continue to conduct nuclear tests in the South Pacific, in defiance of the Atmospheric Test Ban Treaty which had been signed by U.S., Russia and Great Britain. David McTaggart, a Canadian, and a few companions sailed from New Zealand in McTaggart's thirty-eight foot sloop *Vega,* renamed *Greenpeace III* for the Greenpeace Foundation which supported the effort to protest the French tests. Arriving in the vast area cordoned off by French warships in violation of the international laws of the sea, the small crew achieved not only a masterpiece of seamanship but also managed singlehandedly to delay and frustrate a major power's military plans. After causing serious and expensive delays in the French schedule, *Greenpeace III* was rammed by a French minesweeper, repaired at the Mururoa atoll by the French and returned to New Zealand.

The following year McTaggart again sailed his vessel to the test area against seemingly insurmountable odds, as the French continued their program of detonating nuclear devices in the atmosphere in the face of worldwide opposition. This time French commandos boarded Greenpeace III and beat up McTaggart and his first mate, Nigel Ingram. McTaggart nearly lost an eye.

Here is a true adventure story of the highest order, told against a background of intrigue, subterfuge, the international trade in uranium and the jockeying of emerging atomic nations. McTaggart's eye-opening book sheds light on clandestine deals between Canada and France which left him roasting like a chestnut over the fires of international politics. Although most of us have shed our naivete regarding the duplicity, double-dealing and sham of international relations, McTaggart's tale brings these matters down to the human level where the reader can relate and care.

"Greenpeace III" is worth reading on several levels: for its epic sea adventure quality, for its revelation of chicanery and cruelty among the front office and back alley atomic bomb boys, for its often moving story of a man and his smashed up life, and not the least because it is a lesson in getting up and going on after you have been knocked down—again and again and again.

Some of the story seems so incredible that the reader will welcome the confirming evidence contained in the two picture sections of the book. You may come away from reading the book shaking your head and saying as did this reviewer, "My God! It really did happen."

Not all "as told to" or collaborative books of this nature are successful. The McTaggart-Hunter effort skirts most of the obstacles to produce a book which will keep you turning the pages as effectively as the best suspense novel.

— Alvin Fick

The Masters on the Nymph, edited by Michael Migel and Leonard Wright, Jr. Illustrated by Dave Whitlock, 272 pages, Nick Lyons Books, Doubleday & Co., Inc.. $14.95.

Here is a new book on nymph fly fishing, and it may well be the one book on nymphs to have. It is an inspired collection dealing with most aspects of nymph fishing, each authored by an expert in the field.

The nymph has come a long way since the "chewed up" wet fly favored by the astute angler of a century ago who, knowingly or not, was fishing a rudimentary nymph. How nymphing evolved makes a fascinating beginning followed by well-forged chapters, each given over to a different phase of an art grounded on scientific inquiry. The depth to which the authors of "The Masters on the Nymph" probe the subaquatic life of streams, devising means for taking trout *on the fish's terms* will give pause to devotees of the dry fly who, in many cases, look for success on their own very human terms. We are given river types, natural nymphs peculiar to each, and imitations and techniques for fishing them which provide a passport for successful nymphing from coast to coast.

The text is visually enhanced by many photographs. Lucid, step by step instructions for tying nymphs are accompanied by some really superb drawings of naturals and imitations.

While "Masters" could be regarded as a source-book for testing and expanding the experienced nympher's methods it also has the rare quality of providing an excellent introduction to nymphing for anglers of another persuasion or for those who are new at the game. There are chapters which, alone, are worth the price of the book.

I would not be surprised to see "The Masters on the Nymph" emerge as one of the most valuable books published thus far on the lore of American fly fishing.

— Del Bedinotti

World Record Game Fishes, 1979 Edition, 272 pages, International Game Fish Association, Ft. Lauderdale, Fla., 33316, $4.95 plus $1.00 postage and handling.

This is a book by fishermen for fishermen. For anyone with questions about a variety of piscatorial pursuits, particularly related to salt water, this book may well have the answers. The contents lists: A guide to salt water fishes, A history of angling, How to start a fishing club, The joys of salt water fly-fishing, Development of fisheries management, Illustrated fishing knots and splices, Game fish tagging programs, in addition to the world record fishes.

The listing of these world records, both salt and fresh water from all over the world, gives the angler a dream fish against which to measure his or her own success. In a world where there is a tendency to think the biggest is the best, such a listing makes fascinating comparisons. New York State, for example, was the home waters for world records for black bullhead at 8 pounds, muskellunge at 69 pounds 15 ounces, northern pike at 46 pounds 2 ounces, and summer flounder at 22 pounds 7 ounces, plus many records for a variety of species taken on particular weight lines.

The articles are short and interesting and whet the appetite for further reading. The emphasis in this book is on salt water with one page writeups and line drawings, including distribution, features, coloration, behavior patterns and general comments of the major salt water game species. Included is a brief note on fishing methods for each.

It is logical for such a book to attract advertisers who know that fishermen are also big spenders for tackle and gear and this one is no exception. Most of the full color illustrations, besides the cover, are found in the ads. In spite of the shortcomings of article superficiality I find this an interesting and useful addition to the fishing library. While I never really expect to challenge any of the world's records, it is fun to dream. This book gives form to the dreams.

— H.W.T.

Books Received

Wild Orphan Babies, Caring For Them, Setting Them Free, 2nd edition, by William J. Weber, D.V.M., 159 pages, Holt, Rinehart & Winston Inc., $6.95.

Tyrannosaurus Rex, by Millicent Selsam, 41 pages, Harper & Row, young readers, $5.95.

Speaking of Birds and the River, by Mary K. Chanler, 31 pages, Dorances & Co., Inc., 35 Cricket Terrace, Ardmore, PA 19003, $2.95.

The Abalone Book, by Peter C. Howorth, 80 pages, Naturegraph Publishers, P.O. Box 1075, Happy Camp, California 96039, $3.50.

Elephant Seal Island, by Evelyn Shaw, 62 pages, Harper & Row, $4.95, young readers.

The Peak Experience, Hiking and Climbing for Women, by Carroll Seghers II, 302 pages, Bobbs-Merrill Co., Inc., $10.00 cloth, $7.95 paper.

Over Cape Cod and the Islands, An Aerial View, by Stephen Proehl, 139 pages, Houghton Mifflin Co., Boston, $11.95.

Arctic Journey, Paintings, Sketches and Reminiscences of a Vanishing World, by Peter Buerschaper, 126 pages, E.P. Dutton, $14.95.

The Great Sundial Cut-out Book, by Robert Adzema and Mablen Jones, 104 pages, Hawthorn Books, Inc., $9.95.

Alaska: Promises to Keep, by Robert B. Weeden, 254 pages, Houghton Mifflin Co., $9.95.

The South Fork, The Land and the People of Eastern Long Island, by Everett T. Rattray, 228 pages, Random House, $10.00.

Talking Bones, Secrets of Indian Burial Mounds, by William O. Steele, 63 pages, Harper & Row, young readers, $6.95.

Coal: The Rock that Burns, by Walter Harter, 128 pages, Thomas Nelson Inc., 30 East 42nd Street, New York 10017, $6.95.

(Continued from page 11)

Deer Management

ond only to Pennsylvania in the number of licensed big game hunters in the U.S. About 700,000 New Yorkers held big game licenses during the 1978 big game season. The 82 consecutive days during the 1978 season provided an estimated 3½ million hunter days.

Even more impressive is the impact deer hunters have on New York's economy. The amount of money spent on big game hunting licenses and permits provided nearly five million dollars to the Conservation Fund, which is used exclusively for fish and wildlife management purposes. An additional nine million dollars is realized in the meat value of the deer harvested. Most significant is the expenditure of money on hunting equipment, groceries, lodging and transportation which easily exceeds 100 million dollars. All these amounts accrue annually, much as interest comes every year from any investment. If the total of these values are thought of as interest at a modest 7½ percent, then the principal would be worth a mammoth 1½ billion dollars. This is a minimal value of the deer resource because there are aesthetic values which are practically impossible to define or place a value on. Obviously the white-tailed deer is a very valuable New York State natural resource. As a well-managed deer resource it will not only maintain its values but will also contribute to the balanced ecology of the state.

Stephen H. Clarke is an Associate Wildlife Biologist with DEC's Bureau of Wildlife. For the past six years he has been leader of the Big Game Unit which coordinates research and management of New York's white-tailed deer and black bear. Previously he worked as a regional wildlife biologist for DEC.

Gerald P. Rasmussen is a Senior Wildlife Biologist working on statewide research and management programs for the white-tailed deer at DEC's Wildlife Resources Center in Delmar. A graduate of Clarkson College of Technology, Mr. Rasmussen earned a masters degree in wildlife biology from the University of Massachusetts. He previously worked for DEC in two other positions, with the Office of Environmental Analysis dealing with tidal and freshwater wetlands programs in the Region 2 Office, and with the Office of Educational Services as a Seasonal Conservation Educator at the Cape Vincent Fisheries Research Station.

OUR OUTDOORS

Eye Protection While Afield

by Jay "Fishy" Fullum

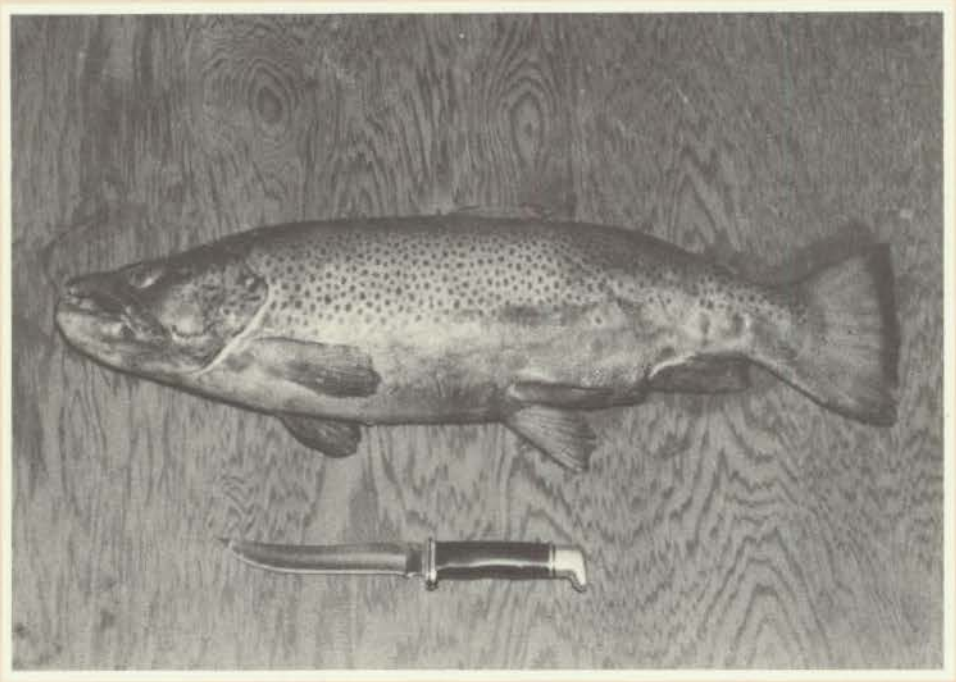
MOST of our game species prefer to inhabit areas of dense cover. As a result, the successful hunter spends much time traveling his or her way through the thickets rather than walking around them.

Pushing your way through the branches and brush will flush out more game, but it also has a negative side. Each season many hunters end up at the eye doctor, requiring treatment for corneal scratches.

The surface of the eye is very sensitive. If a branch snaps back into the surface of your eye, the result is extremely painful, and remains painful until new cells finally repair the damage. Corneal scratches inflicted by snapping branches are particularly bad since some types of bacteria and fungi in wood seem to slow the normal healing process, lengthening the painful ordeal.

I recommend that everyone wear some type of glasses afield. If you normally don't wear glasses, purchase a pair with plain clear safety glass, a pair of the kind that adjusts to the light, or just common sunglasses, *and* then wear them. By so doing you will spend more time in the field and less in the eye doctor's office.

DEC Photo



How to Make Fish Safer to Eat

by Jack Skea

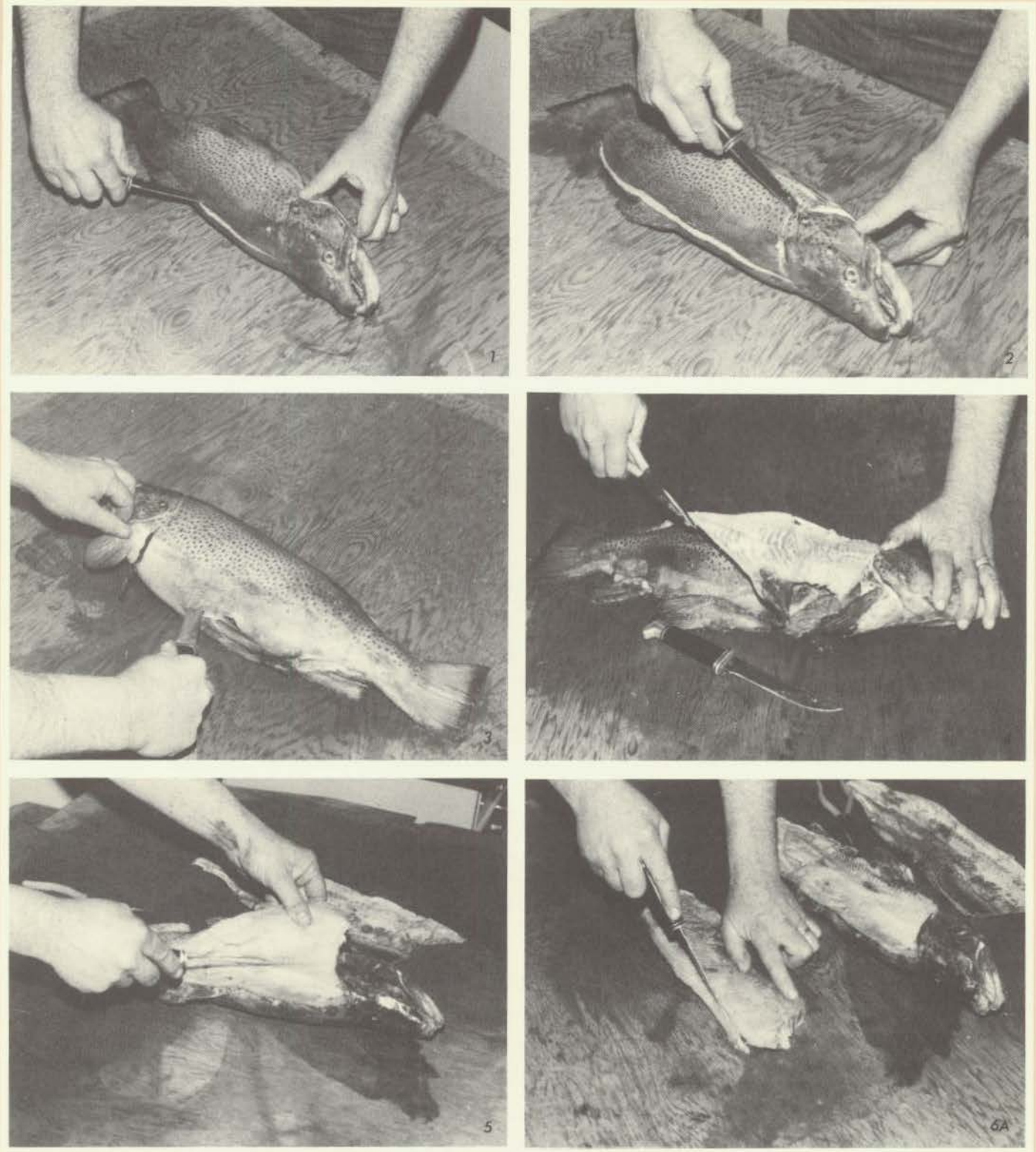
"How to" photos by author

THE thrill of hooking and landing a large game fish can be lessened if the angler is unable to show it to his friends and take it home to eat. From this perspective, the ban which was imposed in 1976 on the possession of certain fish from Lake Ontario was indeed unfortunate. The detection of PCB and mirex in levels above what health officials considered safe to eat came right at the peak of the development of an outstanding trout and salmon fishery in Lake Ontario. Since then angling activity was reduced by about 70 percent, and this caused economic hardship along the entire south shore of Lake Ontario.

Even as the possession ban was being imposed, however, work was underway at a DEC facility in Rome, N.Y. to determine if levels of these two toxic chemicals could be reduced by different methods of fish preparation and/or cooking. It was realized that once in the environment both mirex and PCB were persistent chemicals and would remain there for a long time. Therefore, it was imperative that a method be employed which would allow some utilization of the fishery while the sources of these pollutants were located and eliminated if possible.

A pilot study using Lake Ontario lake trout indicated that the manual removal of skin and fatty tissues could reduce existing levels of mirex, PCB and DDE by about 50 percent. These results stimulated considerable interest and a

(Continued on EQN V)



(Continued on EQN V)

1. Make a shallow cut through the skin (on either side of the dorsal fin) from the base of the head to the tail.
2. Make a cut behind the entire length of the gill cover, cutting through the skin and flesh to the bone.
3. Make a cut along the belly from the base of the pectoral fin to the tail. This cut is made on both sides of the anus and the fin directly behind anal fin.
4. Grasp the skin at the base of the head (preferably with pliers) and pull towards the tail, removing both the skin and belly meat. If belly meat does not come off with skin, trim it off. Discard this trimmed material along with the skin.
5. Remove the fillet and repeat steps 2 through 5 for the other side.
6. Trim the two fillets as follows:
   A. Remove ½" strip from the top of the fillet and discard.

6. 8. Remove ½" strip (¼" from each side) of the lateral line along the entire length of the fillet and discard.
7. The fillets are now ready to be consumed.

(Text continued from EQN III)

full-fledged study was undertaken, utilizing brown trout and smallmouth bass, two major game species in Lake Ontario.

Sixty smallmouth bass and 70 brown trout were collected from 1975 to 1977. These fish were split into several groups to study the effects of trimming and cooking on contaminant levels.

Brown trout were broiled and smoked, while smallmouth bass were baked and deep-fried. Additional studies using both species were conducted on trimming alone.

The first major study was the trimming of both smallmouth bass and brown trout. Trimming included the removal of the skin, dorsal and ventral fat, and the lateral line fat. (See "Making Fish Safer To Eat," THE CONSERVATIONIST — September-October 1978.)

In every case, mirex and PCB levels in the trimmed sample were significantly lower for both smallmouth bass and brown trout.

Smoking brown trout fillets without first removing the skin and fat did not give consistent reduction in the levels of these contaminants. The individual variation was so great that there is no guarantee that the reduction in one compound will guarantee a reduction in the other, or that a reduction will occur for either chemical when smoking a single fish.

Smoking has been suggested as a means of reducing contaminant levels because a large amount of oil appears to run out during smoking. Mirex and PCB do not, however, leave the untrimmed fillet at the same rate. Statistical analysis of these data has shown that there is no correlation between oil lost due to smoking and reduction in levels of PCB and mirex.

Broiling brown trout fillets with the skin and fat removed did not produce a reduction in the concentration of these compounds. There was, however, some reduction in average total amounts of mirex lost in the cooked portion. Levels of PCB were not reduced, however, and there was no guarantee on a single fish basis that (as with smoking) broiling would reduce these compounds significantly.

Smallmouth bass fillets, which had been baked, lost some oil during cooking and also showed a loss of mirex and PCB. This oil loss was directly correlated with the contaminant loss. This differs from brown trout, where there was no correlation between contaminant loss and oil loss.

As with the other cooking methods, however, although there was some loss of contaminants on the average, there was a great deal of variability between fish.

The final cooking method tested was deep-frying of trimmed fillets of smallmouth bass in corn oil. This produced a large reduction in the concentration of both PCB and mirex and an even greater reduction in the total amount lost during cooking.

Analysis of the used cooking oil showed residues of both these compounds, while the amount of oil present in the cooked fillet was considerably higher than before cooking. Thus, it is apparent that there was a transfer of oil, as well as contaminants between the fish fillet and the cooking oil during cooking. For this reason, it is recommended that the cooking oil be discarded and not reused.

This study was instrumental in the decision to lift the ban on the possession

of certain fish from Lake Ontario on March 31, 1978. At this time, it was also decided to discontinue chinook salmon stocking and to continue to stock only enough coho salmon to provide fish for contaminant sampling purposes (40,000 per year).

Subsequent studies utilizing chinook salmon showed that trimming reduced PCB levels by 24 percent and mirex by 16 percent. Since concentrations of mirex and PCB in chinook salmon were 0.41 ppm and 12.1 ppm (parts per million) respectively, it is obvious that these levels could not be reduced below FDA actionable levels (5.0 ppm for PCB and 0.1 for mirex) by trimming.

On April 18, 1979, DEC Commissioner Robert F. Flacke decided to resume stocking of both species of Pacific salmon (200,000 chinook spring fingerlings and 175,000+ coho smolts) and leave the decision on whether to consume them up to the individual. At this time, he indicated that spring salmonoids were generally safer to eat and that fall-run Pacific salmon should be utilized mainly as trophy fish, since they contain considerably higher levels of PCB and mirex than spring fish.

With the decision on whether or not to consume Lake Ontario fish left entirely up to the individual, it should be emphasized that the fish are still contaminated, and the Department of Health recommends that only one meal per week be eaten of smaller fish and no larger fish should be eaten. In addition, children and women of childbearing age should consume no contaminated fish from Lake Ontario.

In summary, it was found that proper trimming of smallmouth bass and brown trout from Lake Ontario can significantly lower levels of mirex and PCB. The removal of the skin, dorsal, ventral and lateral line fat by the methods outlined can reduce the concentration by about 43 percent in brown trout and 64 percent in smallmouth bass. Chinook salmon only showed reductions of 16 percent for mirex and 25 percent for PCB, however.

Of the four cooking methods studied, deep-frying of trimmed fillets in corn oil was shown to give the highest and most consistent additional reduction in levels of mirex and PCB for smallmouth bass. Baking smallmouth bass and smoking and broiling brown trout each produced significant reductions in the total amount of contaminant present in the fillets, but there was considerable variability among individual fish. Because of this variability, no guarantee can be made that on an individual fish basis any of these three methods would result in a reduction in contaminants. Deep-frying smallmouth bass, on the other hand, consistently reduced all three contaminants.

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It is felt that the reduction in concentration is the best criterion for judging the efficiency of the method tested, since this means that fewer contaminants are consumed for each gram ingested. Therefore, no matter what cooking method is used, it is strongly recommended that the trimming procedure shown in Figures 1-7 be followed.

Readers who want further details of this study may obtain copies by writing to: Bureau of Environmental Protection, Room 526, DEC, 50 Wolf Road, Albany, New York 12233.

Health Advisory

To minimize potential adverse health impact, the N.Y.S. Department of Health recommends that:

- You eat no more than one meal (½ pound) per week of fish from any water in the state;
- Pregnant women, nursing mothers, infants and young children should not eat fish with elevated levels of mirex, PCB and/or mercury;
- You eat no eels from the Hudson River, Lake Ontario and its tributaries to the first barrier impassable to fish, or the St. Lawrence River;
- You eat no lake trout, chinook salmon, coho salmon over 21", rainbow trout over 25", brown trout over 18" between 7/1 and 2/28, or catfish, from Lake Ontario and its tributaries to the first barrier impassable to fish;
- You eat no smallmouth bass over 12" taken from the St. Lawrence River or from Lake Ontario, east of Oswego Harbor, and no smallmouth bass taken from Lake Ontario, west of Oswego Harbor.

Levels of PCB and mirex can be reduced by removing the skin and fatty portions along the back sides and belly of smallmouth bass, brown trout, and lake trout. Trimming will not reduce these levels in chinook salmon.

A fish filleting guide is available from DEC upon request.

Jack C. Skea is an Associate Aquatic Biologist with DEC's Bureau of Environmental Protection office in Rome, N.Y. He earned a B.S. degree from SUNY College of Environmental Science and Forestry at Syracuse in 1962 and has been involved in studies of the effects of toxic substances on fish and wildlife since then.

The picture of a herring gull on the contents page of the May-June 1979 issue should be credited to Stanley W. Ziminski.

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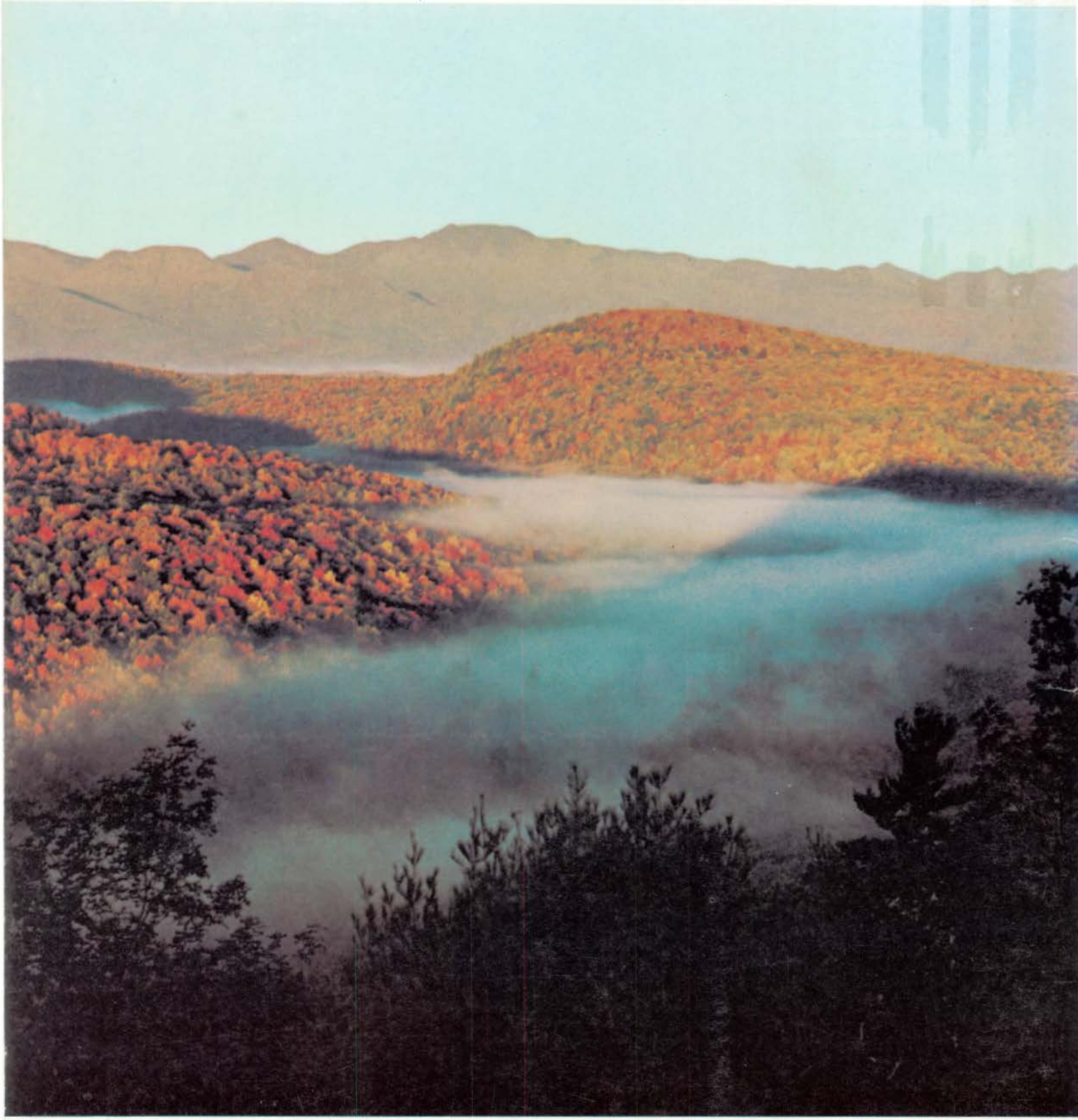

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