New Jersey OUTDOORS

January/February 1983

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January/February 1983
VOL. 10 NO. 1

New Jersey OUTDOORS

From The Editor

In making up this issue I noticed that it is Vol. 10, No. 1 which makes it the first issue of the 10th year of publishing this series of New Jersey Outdoors. When I first proposed this version of NJO back in late 1973, I never dreamed that nine years later I'd still be editing and publishing this magazine. But I'm still at it and, for the most part, I'm still enjoying it. It has been the love affair of my middle years. And how many love affairs last that long?

But these nine years would not have been possible without our ever-expanding family of subscribers—growing from 6200 in 1974 to almost 69,000 in 1982. This growth is reflected in the following figures: income from New Jersey Outdoors subscriptions in 1973 totalled about $12,000; the projected subscription income this fiscal year will be about $340,000. Our Reader Survey Returns (see editorial, November/December 1982) confirm that our subscribers are loyal, they like what we're doing, and they are concerned about their state.

Of course, we do have some problems. Now and then I receive calls from irate subscribers complaining that we cashed their check in July and they hadn't received the September/October issue; or the complaint, I sent in my renewal check in September and I received another renewal notice the next month asking me to pay up before my subscription expired . . . You get the picture. Subscription fulfillment and circulation are the biggest bugaboos in publishing, for all paid subscription publications.

Because you have been such faithful and patient subscribers, and have hung in there despite some circulation foulups, we are going to reward you. In response to many requests, we have published a 12-page index of all the articles that have appeared in this series of *New Jersey Outdoors,* Volume 1 through Volume 9, January/February 1974 through November/December 1982. The index lists each article, the author(s), the issue, and the year for about 550 articles that have been published in this period.

To receive the index you must send a No. 10 (business size) stamped, self-addressed envelope to:

New Jersey Outdoors (Index)
CN 402
Trenton, N.J. 08625

On 11/30/82 the editorial office of New Jersey Outdoors was moved to the Labor & Industry Building in Trenton. As of this date I do not have a phone installed, but I can be reached at (609) 292-3541.

In this issue

Now about combining cross-country skiing with ice fishing? Does that appeal to you? If so, read *Cross-Country Fishing,* by Don Kamienski, a frequent contributor.

I have not forgotten *The Storm of '62* and thousands of residents from the storm-ravaged coastal areas will never forget that fierce Atlantic storm. Authors Karen J. Kominsky, a planner specializing in beach access and coastal policy and a public participation coordinator, and Susan D. Halsey, staff geologist specializing in coastal geology with the Division of Coastal Resources, remind us with words and pictures of that March northeaster some 21 years ago.

The back cover photograph by David A. Bast, another frequent contributor, introduces the "N.J. in Focus" article titled, *A Winter Wonderland,* by author/photographer Robert J. McDonnell. The article spells out *how, when,* and *what* to use when photographing in winter.

Deborah A. Boerner is back with *The Charcoal Industry in New Jersey—The Early Years,* with historical photographs and background information provided by George Pierson, Chief of the Bureau of Forest Management. Ms. Boerner, an editorial assistant with NJO for the past two summers, has written many articles for our publication.

Frequent contributor Dr. Stephen J. Zipko has written about *A Unique Approach to Forestry Education* for this issue. Mr. Zipko, a biology teacher at Randolph Intermediate School, describes in his article a four- to five-week multi-disciplinary course which is adaptable for use in any indoor and/or outdoor classroom.

Bird hunter and field trialer Scott McGonigle writes about *Field Trials at Assunpink* (Assunpink Wildlife Management Area) held in early February of each year. The dates for the 1983 trials will be available in January.

A new author, Joanne Vanlstendal, wrote and illustrated the article titled, *An Archeological View of New Jersey* for this issue. The author is a member of the New Jersey Archeological Society.

"Eel spearing is a venerable avocation that was probably imported by European colonists who had cultivated a taste for eels in the old country." So says author Frederick Everson in the article titled, *Eel Spearing: Archaic Sport on the Jersey Shore.* And he's probably right!

Add a man and his dog to a snow-covered abandoned orchard in December, and you have a perfect day for *Winter Grouse,* an article written by Al Peinecke. The author, who has appeared here before, enjoys entering the winter domain of the ruffed grouse, year after year.

If you enjoy hiking in the snow-covered hills and dales, read *Walpack Valley and Bearfort Mountain: A Winter Essay* by new author Colleen O'Donnell. Ms. O'Donnell is a student at Glassboro State College.

Author Inge Buenning writes . . . "weeds are plants which grow where they are not wanted." How true. Especial-

continued on page 23

Steve Perrone

Cross-Country Fishing

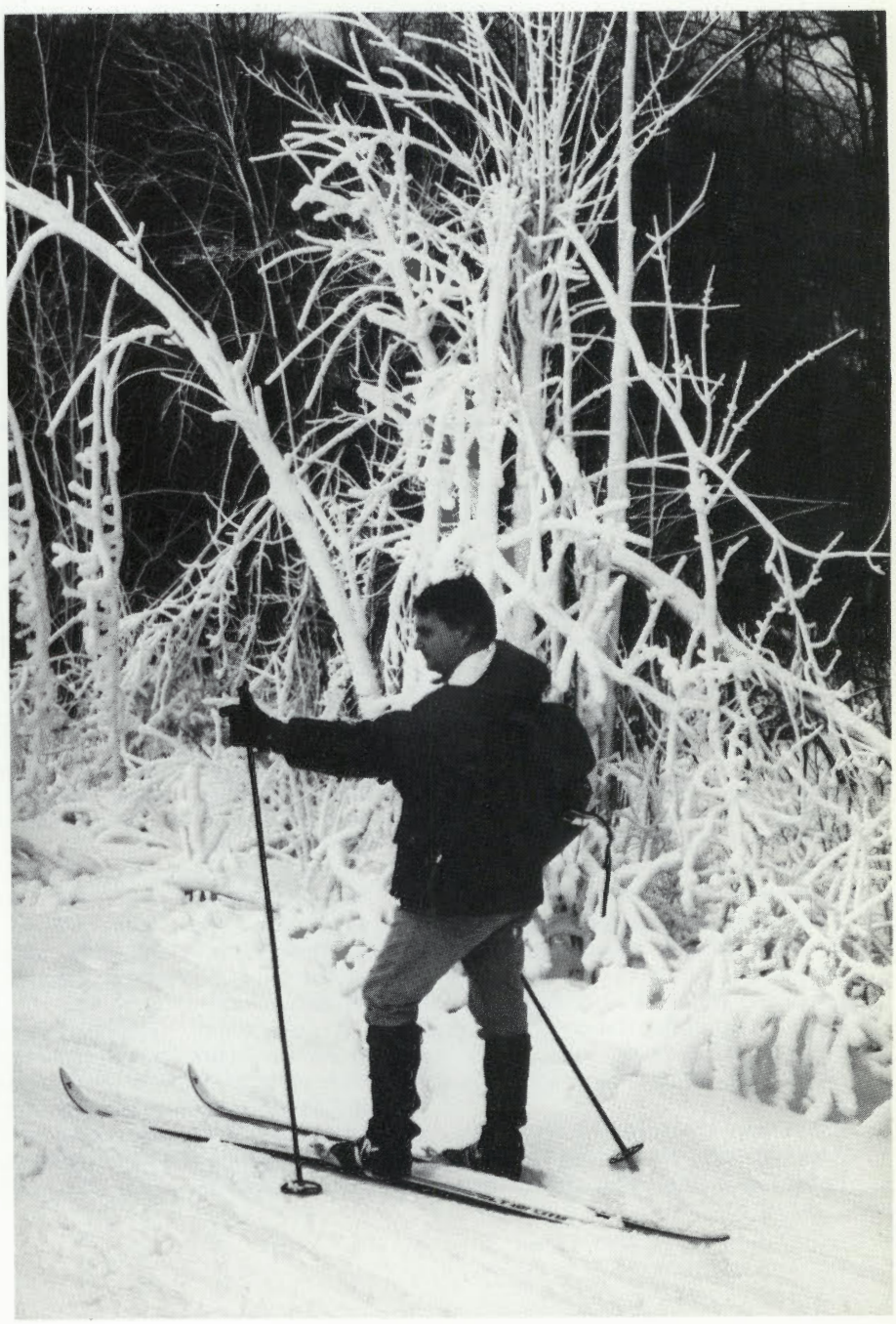
By Don Kamienski

Most articles that are written concerning seasonal outdoor activities tend to deal with one specific sport. There are articles about hunting, some deal with fishing, others about hiking, canoeing, birdwatching, etc. However, in this article, I merge two winter sports that I think can be enjoyed in combination with each other. Two activities that are gaining in popularity during the winter months here in New Jersey are cross-country skiing and ice fishing. More and more tournaments are being sponsored by various organizations each year for these two sports. For the most part, participants in either of these two sports tend to concentrate their efforts on one or the other, never thinking a combination of both sports is practical and fun. I too was under this misapprehension until a few years ago when a major east coast snowstorm blocked a rural road that was my only access to a backwoods pond that offered outstanding winter fishing through the ice.

As luck would have it, I still had my cross-country skis in their rack on top of the car. It was just a matter of slipping on the skis and boots, stuffing a few pieces of fishing equipment into various pockets, and then skiing through the trackless, powdered snow towards the isolated pond. Needless to say, I had the pond all to myself, and both the fish and the weather cooperated to make that day a memorable one.

It's now several seasons since that initial sojourn through the winter woods for a few hours of ice fishing, but I've learned a few things along the way which might prove helpful to those who want to go cross-country fishing.

One of the joys about cross-country fishing is that it can be enjoyed without a large outlay of cash for equipment. For instance, a decent pair of cross-country skis with poles and bindings can be purchased for around $50. Ski boots average around $25. These prices can be reduced even further if you watch for off-season or clearance sales at your local stores. Once you've bought skis, boots, and poles, you have everything you need to provide your transportation through the snow. You don't need any fancy clothes, but I suggest that you dress in layers. Buy skis that are waxless and therefore suitable for most types of snow and terrain. There will be occasions, however, when the snow will be too wet and will stick to the bottom of your skis, making movement difficult. When this occurs, I spray the bottom of my skis with some teflon that I keep in an aerosol can in my pocket. This can be purchased at most quality ski shops.



Now that you've equipped yourself from a travel standpoint, let's talk about ice fishing equipment. Since you will be providing your own locomotion for the trip to the frozen lake or pond, the equipment you take along should be both lightweight and functional. I use a 30-inch jigging stick to which is taped a small ultralight spinning reel containing four pound test monofilament. Heavier weight line should be avoided when jigging as it tends to get stiff in cold weather. A small plastic box holds my hooks, jigs, sinkers, and snaps. Most of my ice fishing tends to be with a jigging rod, but there are times when I also take along a few tipups to use in tempting largemouth bass and pickerel. These tipups are also lightweight and easily portable.

Rather than stuffing all this gear into pockets, it all fits nicely (along with an extra pair of gloves, socks, matches, camera, thermos, and food) in a medium-size backpack you can purchase at most camping stores. Be certain that the straps on the pack are padded and provide you with enough room for a comfortable fit.

If the pond you're heading for is thought to be frozen, you need to bring along something to chop or cut a hole into the ice. The fastest way to cut such a hole is to use a sharpened auger. However, augers are too long, heavy, and cumbersome to carry when gliding along on cross-country skis. As an alternative, I place a small lightweight axe in my backpack with the blade covered, and it does a reasonable job of cutting a few holes in the ice. Usually, I fish spots on the lake at which I've already cut holes on previous outings, so the thickness of the ice at these particular spots is somewhat less than normal.

As you catch fish which you intend to keep, let them lay on the ice and depending on the temperature level, they should be frozen in a matter of minutes. After a full day's fishing, you can place the frozen fish into a plastic trash bag and then into your backpack for the return trip to your car. All fish you do not want to keep should be returned to the lake as soon as possible in order for them to grow a few inches before next year's ice fishing season begins.

There's a world of difference in skiing at some of the more popular spots in the state as opposed to skiing down a backwoods road towards some isolated pond. Gone are the crowds, noise, and daily trail fees of the popular resorts. What remains are the sound of your skis as they create flowing ribbons of parallel tracks in the freshly fallen snow, the sound of the winter wind as it rushes through stands of pine trees whose branches are bowed under a heavy blanket of frosted snow, the frozen forms of snow sculptures that have only been seen before you by the wildlife. There are plenty of spots in north and south Jersey where a rural road or trail terminates at a productive pond or lake. The best way to locate these areas is to pick up a topographic map of the area where you want to ski and fish. Then when Mom Nature dumps her mantle of fresh white snow, pack your skis and tackle and enjoy some cross-country fishing.

PHOTOS BY AUTHOR

Remembrances Of Things To Come

THE STORM OF '62

Long Beach Island has become densely developed since 1962 as indicated by this 1979 aerial photo DR. SUSAN D. HALSEY

By Karen J. Kominsky and Susan D. Halsey

Each year, the chance of a coastal storm or hurricane reminiscent of the Great Atlantic Storm of March, 1962, threatens to disrupt the lives of thousands of people who live and work along the coast. The Great Atlantic Storm was, by any measure, one of the most fierce storms of historical record. It struck with unprecedented fury as it toppled hundreds of houses and businesses, washed out shore roads, and consumed oceanfront by the mile.

This year marks the twenty-first anniversary of the Great Atlantic Storm. The debris and damage it caused have long since been cleared, buildings have been reconstructed, and a tremendous amount of new development has taken place, making the shore more densely developed now than it was before the 1962 storm. New Jersey has been lucky not to have experienced a storm of similar magnitude in the past 21 years, but that luck is bound to run out.

To increase public awareness of coastal storms and hurricanes, the New Jersey Department of Environmental Protection and the New Jersey Historical Commission co-sponsored a commemoration of the Great Atlantic Storm in Surf City last summer.

It was the hope of the DEP and the Historical Commission that the program would help citizens to better recognize and address the problems created by the threat of coastal storms. As former Governor Richard J. Hughes, a keynote speaker, commented, "There is no jewel like the Jersey shore. We have grandchildren coming along. We want them to enjoy the things we're enjoying here on July 24, 1982."

It is easily forgotten that 21 years ago, from March 5 to March 7, life along the coast was severely threatened. The Great Atlantic Storm, a northeaster, came at the time of the highest tides and brought snow, sleet and rain along with gale force winds. Blocked by a Canadian high pressure system to the north, the storm centers converged off the east coast and stalled. Unable to move, the storm grew in intensity.

Due to the full moon, normal tide predictions were about one foot above average. However, the storm surge pressing on New Jersey's shoreline increased the tides by at least five to six feet. Reports of waves 20 to 30 feet high were common. The unusual height of the tide continued for five consecutive high tides. These two factors were the key to the extensive flooding and washover of the low barrier islands from Manasquan Inlet to Cape May.

As Civil Defense forces put their evacuation plans into action, the State Police were called in to combat looting, bar sightseers from the area, and set up roadblocks. Thousands of people were evacuated inland from shore-ravaged coastal areas, leaving their homes behind to weather the storm.

Many did not fare well; 1,853 homes were completely destroyed, 2,000 were considered to be total losses. Many homes were left precariously on their pilings, as 16 to 18 feet of sand was swept away from beneath them. In many cases, the cost of replacement exceeded the value of a home. A total estimate of 300 million dollars (in 1982 dollars) of property was lost.

Utilities did not escape harm either. Roads were flooded with water and covered with sand, and water and sewer pipes were clogged with debris. The Loveland Town Bridge (Bay Head to Manasquan Canal) collapsed. Long Beach Island's water supply was contaminated. There was an estimated total of 30 million dollars of damage to infrastructure along the coast.

High tides washed out roads and filled them with floodwaters on Long Beach Island

PHOTOGRAPHER: CHARLES EDGAR NASH
COURTESY OF BEACH HAVEN PUBLIC LIBRARY

House adrift in Barnegat Bay

PHOTOGRAPHER: RUSS ZITO

Severely eroded sand left this house at Barnegat Light standing precariously on its pilings.

PHOTOGRAPHER: CHARLES EDGAR NASH
COURTESY OF BEACH HAVEN PUBLIC LIBRARY

Cape May sustained heavy damages from waves and winds

SOURCE: STATE ARCHIVES

Each shore community suffered to some extent from the storm. The greatest loss of homes occurred in Sea Isle City where 545 homes were destroyed. Five miles of dunes required reconstruction as well. Parts of the Atlantic City Boardwalk were destroyed and Steel Pier was severed, sustaining over one million dollars in damages. Ocean City's boardwalk was also razed, and a large number of homes were lost. In addition to wave and wind damage, Cape May experienced even more difficulties from the fires that broke out due to the breakage of gas mains. A mile of beach at the north end of Avalon was lost along with 25 blocks at the southern end. Two million dollars worth of property was destroyed in Brigantine.

Barrier islands were not alone in the suffering as more inland areas such as Manahawkin Meadows and Pleasantville were flooded. Mainland areas such as Allenhurst, Asbury Park, Long Branch and Sea Bright were heavily storm damaged as well.

Long Beach Island sustained severe damages. From the air during the storm, the island appeared to have been swallowed by the sea. One person reported that, "waves were tossing over the island into Little Egg Harbor and washing into the sea. The sea had the whole island under its surf." The hardest hit municipality on the island was Harvey Cedars where half of the town's homes were destroyed. To the south at Holgate, the destroyer USS *Monssen* was beached. It tooks weeks to free and one naval officer was killed in the operation.

The storm brought many other tragedies. Besides the loss of homes and belongings, at least 12 persons lost their lives. Fatalities included members of rescue crews, utility repairmen and those trapped by flood waters.

On March 9, the New Jersey coast was proclaimed a major disaster area by Governor Richard J. Hughes and President John F. Kennedy. In addition to local and county assistance, federal and state monies then became available for repairs. Disaster assistance included field offices, health and safety protective work, emergency repairs to essential facilities, and disaster loan funds.

The U.S. Army Corps of Engineers implemented a beach protection pro-

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N.J. in Focus:

A Winter Wonderland

by Robert J. McDonnell

Iceboats are a reasonably common sight on some of New Jersey's lakes and rivers. This iceboat was photographed on the Shark River—a rare place to see such a craft. The radar antenna in the background is located at Camp Evans, and was included in the picture so there would be no doubt as to where the picture was taken.

To some people, photography is like baseball: primarily a spring and summer sport with a World Series in fall when tree leaves become chameleons. Alas! These folks—right after Game Seven—treat their cameras to a winter vacation by stashing them in the far recesses of a warm cozy closet. STOP! Before you squirrel your equipment away, think twice, because winter offers many picture-taking opportunities that run the gamut from the exciting to the romantic, to the truly unusual.

This issue's column will first list some of winter's more obvious picture opportunities. Then, we'll point out some of the season's less obvious, yet wonderful picture-taking circumstances. Finally, subsequent sections will touch upon some important techniques needed to ensure that what you see is what you capture on film.

"Let's go to the videotape!"—the hallmark expression of a popular TV sports reporter—reminds us that winter is football season and time for other outdoor winter sports as well: skiing, ice-skating, and ice-boating, for example. These activities offer many action-filled, exciting pictures. One thing you should understand, however. The best sport photographers are those who fully understand the sport they're photographing, because they can anticipate the peaks of action and thus be ready for them. Please notice that I didn't say you had to be a participant in the sport, you just need a more than passing knowledge of its *ins* and *outs*.

But suppose winter sports don't interest you? What else is there to photograph? Undoubtedly, many of

you are incurable romantics (I'm one of you, happy to say) who relish other miens or personalities of winter in New Jersey. The essence of a blizzard, the ambiance of deserted Shore towns with oceanfront buildings boarded tight in a state of hibernation, and the amorphous patterns of shells scattered along a desolate beach are all worthwhile photographic subjects. Problem is: these subjects reside in the minds of their observers and can't be easily defined by anyone except those persons. However, if you can relate to the concept of "things that are, that aren't" you can probably envision many such imaginative scenes. Capturing a mood or emotion on photographic film and paper remains one of photography's most challenging, yet rewarding endeavors.

Nothing's wrong with searching for beautiful winter scenics, either. You should be forewarned, however, that scenics top the list of favorite photographic subjects (next to children), so to capture a striking and captivating scenic requires good vision and composition. In passing I'll mention that judges of photography contests see more "sunsets" than they care to and so do magazine editors. But remember: once your proficiency increases, photograph to please yourself and you'll rarely go astray!

If none of the circumstances described thus far piques your interest, perhaps you might enjoy photographing the many species of birds that winter in our state?

Now for some specifics! Electronic technology has given us camera equipment that is lightweight, easy to use, and reliable. You needn't worry about taking your camera out in the cold for fear that it might in some way be damaged. Moreover, unless the weather is really inclement—rain, sleet, or snow—your camera does not have to be hidden under your coat until you're ready to shoot. If weather conditions are poor, by all means protect the camera.

One way to photograph a scene during a winter storm simply involves standing in the shelter provided by a doorway. Another straightforward approach is to stay in your car, roll down the window, and fire away! Did you ever think of taking a picture during a snowstorm without leaving your house? One of our most respected photojournalists, the late W. Eugene Smith, once presented an entire essay comprised of pictures taken from an open window in his New York loft. The work's title? "As From My Window I Sometimes Glance." Sorry—*no* excuses for *no* winter pictures.

What about exposures? Should you follow your meter's recommendation, or not? If you're photographing a snow scene in bright sunlight, your meter will be fooled because snow, being highly reflective, will trick the meter into thinking there's more light than there really is. This effect is also true of beach scenes, summer or winter. The solution is to take a number of exposures of the same scene: one at the meter reading for a dark version (sometimes a nice effect); one at a full f-stop *more* exposure than indicated; one at two f-stops *more.* Remember: film is the photographer's cheapest investment, so when you see a striking scene, it's best to take a few exposures, as indicated above. Then you can select the best rendition of the scene when the processed film returns.

Taking many exposures of the same scene is also a wonderful way to learn, especially if you keep good notes that correlate film's frame number, camera's exposure settings, and lighting conditions. This technique is called "bracketing" and usually the photographer exposes film with the camera set as indicated by its meter, at one f-stop *less* than indicated, and at one f-stop *more.* Notice that I didn't recommend "bracketing" for snow and beach scenes. Why? Because I know from experience that these conditions will rarely result in overexposure of the film; therefore, I didn't suggest exposures at one or two f-stops *less* than the meter reading.

Now, what about lenses? For photographing football games and wildlife, telephoto lenses ranging in focal length from 200 to 500 millimeters or more are needed. You can get away cheaper if you have a 200 millimeter lens and buy the *matched* 2X converter offered by the camera/lens manufacturer. (Avoid inexpensive converters like the plague—they are less than optimal both optically and mechanically; they can ruin not only a picture, but your camera as well.) A 200 millimeter and a 2X converter will allow you to choose between a 200 or 400 millimeter lens.

Scenics require use of either a "normal," wide angle, or telephoto lens, depending on the scene and your position relative to it.

Closeup views of snow or ice-covered boughs can be taken with either a telephoto, a 50-millimeter "normal," a macro lens, or a "normal" equipped with diopter (+1, +2, or +3) lenses. Once again, lens selection is a function of your position relative to the subject. Sound too complicated? Don't be afraid to experiment. Learning is by doing.

Of concern to me now is your safety. If you are photographing a football game from the sidelines, be aware that the action appears different when you're looking through a telephoto lens. Surely you've heard of tunnel vision. Well, when you're photographing with a telephoto lens, you have tunnel vision! Things happen very quickly, so watch your step or you may get tackled as well as the pass receiver you're trying to focus on.

The same holds true when photographing wildlife. There's always the desire to get one step closer, especially if your lens is too short to fill the frame with the subject. Please be careful. Ice can be thin and winter water—lake, river, stream, or ocean—feels twice as cold when all or part of you is in it!

Finally, another note of caution is necessary for sporting enthusiasts who are also photographers. If you ski or ice skate, by all means bring your camera equipment. But *don't* go down the slope or on the ice with your camera dangling from your neck or attached firmly to your chest via one of the "hitches" now available for just this purpose. Regardless of your sporting expertise, you might take a spill and if you do, your camera becomes a dangerous weapon. Think about falling forward atop a camera. The force of the fall will drive the camera into your chest or ribs and you'll hurt for a long, long time.

In winter, then, the rule is: safety first, camera and picture second.

Good Luck and Safe Shooting!

The Charcoal Industry In

by Deborah A. Boerner

Photographs and background information provided by George Pierson, DEP's Bureau of Forest Management

This is the first article in a two-part series on charcoal-making in New Jersey. It outlines the early history of charcoal production in the state. The second article, to be published in the next issue of NJO, will explore the question of whether charcoal can become a viable energy alternative in New Jersey today.

Charcoal pit burning.

Charcoal is a rare commodity today. Even at summertime barbecues, the convenience of the modern gas grill has made charcoal almost obsolete. But it wasn't always this way in New Jersey. Before coal deposits were discovered in Pennsylvania, charcoal was the main industrial fuel powering this and surrounding states through the Industrial Revolution. South Jersey in particular, with its vast expanses of pine and pine-oak forests, figured prominently in charcoal production of the 1800s. Charcoal burners, or colliers, of the region supplied local shipbuilders, glassworkers, sawyers, and most of all, ironworkers with the fuel they needed to power their businesses.

The earliest method of producing charcoal was to hollow out a tree, line it with clay, then burn wood inside the primitive kiln. Woodsmen soon found a way to char a larger quantity of wood at one time. They stacked cordwood in huge mounds, leaving a hollow core by building a triangular crib of wood in the center of the mound. Then, to make it as airtight as possible, they covered the outside of the mound with a thick layer of sand, sod, clay and/or pine needles.

The object was to burn the wood incompletely, so that chunks of charcoal were left behind. The burning was started near the middle of the mound, through an opening left at the base. Once the burning had started, the opening was covered. Smoke and gases escaped from the top and through small openings left around the base of the mound for draft.

A veteran collier could tell how the charcoal was progressing by the color of the smoke emitted. Typically, the smoke started out a dirty white, changed to a pale and then a heavy yellow, and finally turned a thin bluish gray. If the collier allowed to much air to enter the kiln, the smoke would thin out, turn grayish white, and become acrid-smelling. This meant that the burning was advancing too rapidly and would result in charcoal that was over-burned and powdery. Too little air, on the other hand, would not allow for uniform burning.

Because the coaling process was so variable, the mounds had to be watched night and day. About eight days were needed to char an 8-cord mound (or pit-kiln, as they are misleadingly called), and up to 20 days for a 50-cord pit. The collier often lived in a cabin nearby or in a tarpaper shanty on wheels that he moved with him from job to job. While the mounds were burning, it was important that the collier be on hand to spot any cracks that developed and to cover them over with clay or loose turf.

When the charcoal burner decided that the process was complete, all the openings were covered and the mount was left to cool for one to five days. He learned not to be too anxious to collect the rewards of his efforts, for if any of the charcoal was still hot when brought into the open air, it would surely ignite

George C. Rowand, MacDonald's Branch, Lebanon State Forest 1927. Charcoal-cutter's cabin. Note the absence of oak trees in surrounding woods.

New Jersey-The Early Years

Covering pit with floats.

Bagging charcoal.

and burn the whole pile. Only when the collier was absolutely certain that the charcoal had cooled was the kiln opened and the charcoal collected, broken up, bagged, and sold.

The charcoal business was handled in numerous ways. Some colliers owned enought woodland to support their demands for charcoal. Others bought some or all of their cordwood from someone else. At times, a landonwer would even donate standing timber if the collier agreed to cut it himself; in this way, the landowner had his land cleared without having to do it himself or pay for the job. The larger charcoal producers, including those associated with furnace and iron forges, bought timber and hired professional colliers to char it. And naturally, in the desolate expanses of the Pine Belt of more than a century ago, there were sure to be cases of timber trespass.

Some of the charcoal was shipped to Philadelphia, north Jersey (though it had local supplies), and New York. More often, though, charcoal was in such high demand in south Jersey that it was marketed locally. The iron industry was its chief consumer. Tremendous amounts of charcoal were needed to fire the forges and furnaces which converted the famed "Jersey bog ore" into "pig iron" and bar iron. The charcoal and iron industries were so interdependent that when the forges closed down for cold weather or some other reason, the colliers felt the drop in demand and also took a vacation.

So when coal deposits were found in Pennyslvania and the iron industry moved west, the demand for charcoal in south Jersey plummeted. This marked the end of south Jersey's era of prosperity. Many towns were bustling centers of activity one day and ghost towns the next. Today, the foundations of their fallen buildings are hardly discernible within the pine forests that have since swallowed them.

However, the Pennsylvania coal deposits were found just in time. If it had not been for this discovery, the industries of the Pine Barrens would have collapsed for another reason. The colliers who supplied the charcoal that kept south Jersey going for so long had been ignorant of some very basic forestry principles. In most areas, they cut each year more than the annual forest growth. Over the years, this could not help but result in exhaustion of the timber supply.

Even furnace operators, who would have been wise to plan ahead for future charcoal needs, did not. It's been estimated that for each furnace, at least four square miles of surrounding woodland were needed. It's also been said that nearly eight times that amount, or 20,000 acres of forested land, was required to adequately supply a successful bog-ore furnace. The latter is a better estimate, because it allows proper management of the forest as well as a perpetual charcoal supply. For if 1000 acres were cut each year, it would be 20 years before the first 1000 acres would have to be cut again. Though the trees in the Pine Belt do not attain great girth in 20 years, they will reach diameters of 7 to 12 inches in that time—certainly large enough for cordwood that's to be stacked and burned for charcoal.

Unfortunately, the colliers and ironworkers, though they were hardy woodsmen, were not foresters. They saw miles of unbroken forest and thought it would last forever. Indeed, it could have if they had known what to do. Perhaps the whole course of South Jersey history would have been changed if they had known how to make this renewable resource last forever. As it was, many charcoal burners turned to other trades when it got tougher for them to produce charcoal close enough to the buyers to make a profit. So when the iron industry moved west, some went with it. NJ

A Unique Approach To Forestry Education

By Stephen J. Zipko

PHOTOS BY AUTHOR

During the past several years in this magazine, I have reported several successful ways by which my students are exposed to environmental education, both indoors and out. This article discusses an approach to forestry education which emphasizes development of experimental skills along with the use of audiovisual aids, guest speakers, and even a classroom debate on clearcutting and its ecological effects. The forestry unit takes the form of a four- to five-week minicourse within my biology classes. The course is multidisciplinary, featuring studies akin to language skills, law, history, sociology, math, art, and woodworking in addition to botany, zoology, genetics, evolution, and ecology. Most significant, the course is adaptable for use in any outdoor and/or indoor classroom, for any age group. In fact, one forester has told me that many of the 63,600 private forest landowners in our state require this kind of education as much as youngsters.

The objectives, then, of this minicourse are:

1. To expose students to field and classroom activities designed to foster development of analytical thought
2. To make youngsters aware of and concerned with the benefits of a forest
3. To provide a basis for dealing effectively with future uses of a forest
4. To relate this environmental topic to learning in other disciplines
5. to prepare students for future action beyond the classroom by giving them the opportunity to be citizens now

Tree Rings

It is important for students to begin the forestry minicourse with an activity designed to introduce them to tree anatomy and growth while causing them to experience the excitement of scientific discovery.

Students can compare tree growth in hardwoods (such as oak, maple and beech) and softwoods (evergreens) by studying their annual rings through pencil tracing (fig. 1) To do this, they attach a piece of white paper across the diameter of a stump or fallen log with thumb tacks. They then tace the pattern of growth rings by running a pencil back-and-forth against the direction of the rings. I have even had some groups of youngsters go outside with saws to cut a recently felled tree at several points along its trunk (fig. 2). This illustrates to students that the number of rings decreases from the base of the trunk to the top. The reason is that, in general, growth begins at the top of the tree and progresses toward the base.

Pencil tracings are done for several stumps or logs, in both the same and different forests. We first work within the hardwood section, then in a stand of white pine (*Pinus strobus)* (fig. 3). Within each forest, the environment surrounding every naturally occurring stump is recorded as to estimated soil drainage, topography, nearness of other trees of the same or different species, and whether the stump had grown near a stream and in an open, sunlit area. Advanced high school and college classes could also estimate degree of canopy coverage.

Youngsters next compare several pencil tracings of the same tree species in the same area. They attempt to match the growth rings of one with those of the others by cross-dating, a method of dating long dead wood (including trees, posts, and structural beams) by comparing the ring patterns in the older wood with the patterns in more recent wood. Such dating is based on the fact that there is a variation in ring size from one ring to another. Examination of a number of wood samples from a given area reveals that variation in ring sizes appears to follow a pattern. If the same pattern can be identified in two pieces of wood, one piece of which has been dated, then, by using the pattern common to both pieces, the second piece can be dated (i.e., cross-dated) from the first piece.

Students thus try to match up the pencil tracing of one species with that of another species in the same area. They then cross-date the pencil tracing of one species in one area with the pencing tracing of another species in a different area. In each case, the students thus attempt to find out the ages of the trees while searching for differences in microenvironment that they may explain any differences in growth

FIGURE 1

Pencil tracings permit youngsters to observe first-hand how environmental conditions affect growth of wood. All photos by the author.

FIGURE 2

Students saw fallen beech tree at several points along its length so that they may compare numbers of growth rings from the base to the top.

FIGURE 3

Pencil tracings of several logs from a stand of hardwoods . . .

patterns as revealed by the structure of the annual rings. Increment borers may be used during this initial study. These are instruments designed to remove a radial sample of wood from the middle of a standing tree without cutting the tree down. Regardless of the instrumentation used, my youngsters submit their results in lab reports. These are corrected for errors in language skills as well as sceintific accuracy.

After analyzing these tree-ring data, students are shown a 16mm film entitled, "How Old Is Old?" Distributed by Time-Life films, Inc. (100 Eisenhower Drive, Paramus, NJ 07652), this 30-minute film describes how tree-ring dating, nuclear clocks, and modern technology have made it possible to date objects more precisely. The tree-ring dating portion reinforces concepts learned during the pencil-tracing exercise by answering the question: When was an old Arizona cliff-dweller village born?

Seedling Competition

Now youngsters are ready to participate in an indoor lab activity in which they will find that growing plants compete for all kinds of environmental needs. They learn how the density of seedlings influences their growth rates. Students likewise experience firsthand the idea of thinning a population of growing plants in several ways. They observe which method promotes the fastest growth of the remaining plants.

During this lab, students plant several varieties of pea seeds and observe their growth rates to better understand how the lumber industry uses various techniques to grow and then cut trees in such a manner that they promote the fastest growth to satisfy our need for wood and paper. Each youngster's goal as a "forester" during this study, then, is to grow a "crop" of "trees" so that, within 2 to 3 weeks, his or her group of people has the most seedlings measuring at least 10 centimeters (4 inches) in height. To accomplish this objective, the members of each group decide if, when, and how to thin out some of the seedlings (they must decide which ones) to encourage rapid growth of the others.

First, however, each group of students pokes drainage holes in the bottom of three milk cartons prepared with potting soil for planting of pea seeds of a specific variety at three different densities. Student names and date of planting are placed on each carton. The cartons are now watered lightly with Miracle-Gro solution and kept in plastic planting trays (fig. 4). Students themselves must decide how many pea seeds and which of three varieties they wish to plant. They must plant each seed four centimeters (2 inches) deep. Pea seedlings take 7 to 14 days to sprout. Once they grow their first leaves soon after that, each group decides if, when and how to start thinning its "crop," as well as how often. Wooden dowels in the soil act as supports for the growing plants. Student groups must record how many seeds they planted in each carton, when and how often the seedlings were thinned, and how many plants were removed.

As the youngsters plant their seeds, I plant several test plots of all three pea varieties ranging from fast growers to dwarf seeds. Students then compare the percent germination of their variety with the comparative germination achieved by all varieties in my planting tray (fig. 5). They likewise compare the rates of growth of their seeds with growth rates of other varieties. The graphed results of this lab teach youngsters not only which density of plantings promotes the best growth in the shortest time, but also which thinning plan is the most desirable.

Genetic Improvement and Cloning

Because different varieties of peas are studied during the investigation above, students observe firsthand how assorted traits can be artifically selected by human breeders. And, since the youngsters have previously studied concepts germane to natural selection and evolution, all of this leads quite naturally to coverage of past and current research pertaining to timber-stand improvement.

Students are thus exposed to the idea of creating genetically improved "supertrees" that grow taller and straighter, with greater volume and adaptability to differing climates, with

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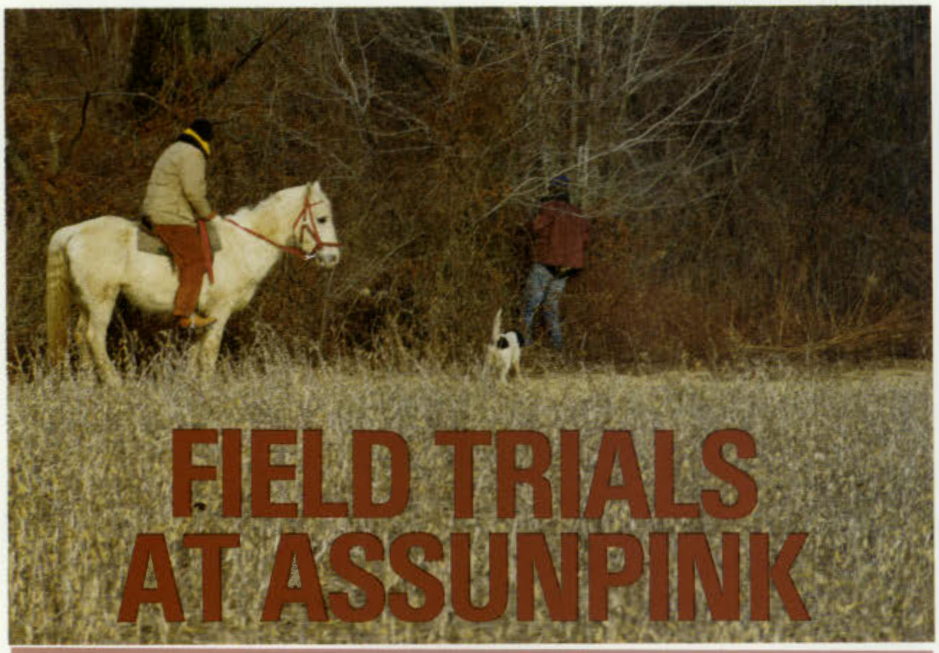
WARREN GARRETSON



Handler flushing bird as judge observes.

FIELD TRIALS AT ASSUNPINK

by Scott McGonigle

For many New Jersey bird hunters, early February is a time when the anticipation of opening day is replaced by the reality that the shotgun must be racked and the bird dogs kenneled for another nine months. But this doesn't have to be the case, and for some it isn't. A new season is about to begin: field trials. While other lament the swiftness of time, field trialers just shift gears.

And most of this shifting is done at Assunpink WMA (Wildlife Management Area) where more than 100 bird dogs compete each weekend before and after small-game season. During the year more than 30 FDSB (Field Dog Stud Book)—sanctioned trials are held in New Jersey with some two-thirds run at Assunpink. And for good reason: the 5,400-acre WMA is regarded by experienced trialers as being among the best in the Northeast. Because of its varied cover and abundant acreage, it is rivaled only by Baldwinsville in New York.

Assunpink, accessible from Routes 524, 539, 541, is ideally located in the center of the state. Each year it is selected as the site of prestigious championships: Mid-Atlantic Association, Region II All-Age, and Region II Shooting Dog. It may soon be the site of the first foot-handled shooting-dog championship in the Northeast when the Sussex County Field Trial Club upgrades its annual spring classic.

Field trials are divided into two seasons: spring and fall. The spring season opens, with snow often covering the ground, the weekend after small-game hunting closes in mid-February. Each weekend a member club of the New Jersey Field Trial Association hosts a different trial. This continues until May, when the sport takes a break for summer fishing, then picks up again on Labor Day weekend and continues (at Assunpink) until the opening of small-game season in early November.

It's a long season. These enterprising bird hunters have reversed the calendar. Instead of working their dogs three-months-on and nine-months-off, they changed the numbers to have nine months of bird-dog-related activity. Most find that their bird-hunting success improves because of the field trials. Not only are the bird dogs better prepared for opening day, but so are the owners.

Field trials, like most sports, have rules and traditions that should be learned before entering a dog. In the first trial I entered, I put a bell on a pup I was running in the puppy stake. I later learned that dogs are seldom belled at the Assunpink trials, and then only in foot-handled stakes. I did not break any rules, but I did tread lightly on tradition.

Unlike other sports, field trials have no losers. In all the trials I attended as a participant, judge, or spectator, I have never heard anyone say that they lost. A field-trial stake can involve from four to more than a hundred dogs. Only three will emerge as winners—and sometimes none. It is a sport where on any given day a dog either wins or does not. It never loses.

FDSB-sanctioned trials, where two bird dogs of the pointing breeds are braced together, are divided into two classifications: open and amateur. Open trials, as the name implies, are open to everyone, both amateurs and pros, and are more difficult to win. Amateur trials are limited to amateur handlers, who cannot train or handle dogs for a fee.

The trials, which may be either horseback or foot handled, are divided into different stakes: puppy, derby, shooting dog, all-age, and gun dog.

Puppy stakes, by a complicated set of rules, are basically for dogs under 18 months old. In puppy stakes the judges are looking for a pup that shows promise of maturing into a class shooting dog. They want to see a pup that will run with style and independence, a pup that will reach out for birdy objectives on his own without urgings from his handler. "Biddability," so very important in a practical gun dog, is given little or no consideration in most puppy stakes. Often, placement goes to the pup that runs the widest, but still manages to negotiate the 20-minute course and be seen when time expires.

What is most surprising to newcomers about puppy stakes is that bird work by the pup is not a factor to be considered by the judges. In puppy stakes the judges are mainly looking for running and style; bird work comes later when the pup is a derby.

Derbies, are for dogs under two-and-a-half years of age. A derby-age dog should demonstrate his ability to find and point game birds. By the rules, he is not required to be steady to wing and shot, but should be staunch (hold his point until the handler flushes the bird). In actual practice, though, most derby winners in spring trials are steady. It's just a matter of the dog doing more than is required.

As in the puppy stakes, the judges are looking for potential in the derbies. A derby that makes a few minor mistakes will often be forgiven by the judges if he makes up for it by showing great class in the way he hunts, and is clearly superior to his competitors.

Biddability becomes more important in derby stakes because of bird work. A dog that is not responsive to his handler's commands may easily get lost, only to be found after the 30-minute stake is over—and be out of judgment.

Shooting dog and all-age stakes are for finished bird dogs. The dog must be steady to wing and shot, back his bracemate on sight, and should a bird flush wild, stop to flush. A finished dog, on striking scent, must immediately es-

SCOTT McGONIGLE

English setter about to be released after a well-mannered find.

tablish point and remain motionless until his handler arrives, flushes the bird, and fires a blank gun. The dog is then sent on to find another bird. He may not mark the bird that was just pointed.

If the dog's bracemate is on point, the shooting or all-age dog must back on sight and remain rigid throughout flush and shot. If the bracemate displays poor manners and breaks, the backing dog may not. Bad manners on the part of a bracemate, though a temptation, are never an excuse. Any breach of manners —even a step or two—will mandate the judges to order the dog picked up (eliminated from competition).

The most noticeable difference between shooting dogs and all-age dogs is distance. One of the best definitions I have heard of a top all-age dog is one that runs away—almost. To keep the judges' attention, an all-age must always be running to the extreme perimeters of the course. The shooting dog, by contrast, should have a more restricted range, and be seen by the handler and judges at more frequent intervals.

All-age and shooting-dog stakes will run from a half hour up to three hours. Classics and championships are of at least an hour's duration.

All the trial clubs in New Jersey have a walking gun-dog stake. This is the best stake for a bird hunter with a mature, but not steady, bird dog to enter. In this stake, judgment ceases at flush. The dog has only to be staunch. More important, this is a foot-handled stake for dogs that do not have the extreme range of some horseback dogs, and for handlers that are not especially fond of handling from horseback. It is the kind of trial to which most bird hunters can better relate.

For this reason, foot-handled stakes, even for finished shooting dogs, are growing more popular at the Assunpink trials. Currently, one club, the Central Jersey Bird Dog Club, has all four stakes for foot-handled dogs on its program: puppy, derby, shooting dog, and walking gun dog. Two others, the English Setter Club and the Sussex County Club, sponsor hour-long, foot-handled classics. The English Setter Club runs their classic on their own grounds in Medford in the fall, while Sussex County holds their classic at Assunpink in the spring.

Dogs that compete in foot-handled stakes are often referred to as "meat dogs." In many cases this is true, because when hunting season begins these dogs easily make the transition from trial dog to gun dog. But just any old meat dog won't do—it has to be a class meat dog. It isn't enough for a dog just to go out and find and point a few birds; he has to hunt hard and look good doing it. In reality, foot-handled dogs that consistently win are just scaled-down versions of wide-ranging, all-age superstars.

Permeating all the stakes is class. It is the common adhesive that binds the different trial clubs together. While there may be much disagreement on a dog's proper range, how he hunts a piece of cover, or his speed, all agree that to place in a FDSB field trial the dog must have class. It isn't any one thing that the dog does well, but rather his total performance and effort as he hunts and handles game. Class, like all intangible qualities, is hard to pinpoint.

It is not seen in the normal sense. It is felt by the eye of the mind, transmitted to the pit of the stomach, and manifested by goose pimples. It is seen through the same eye that keeps Beethoven alive and well, Michelangelo timeless, and the English setter, Count Gladstone IV's, win of the first National Championship in 1896 no less memorable than today's winners.

Class is not only doing better, it's doing more. It's the cracking tail a dog displays as he searches for game. It's the dog, that after covering one objective without finding birds, moves right on to the next. It's finding birds when there are none, and when found, the muscle-quivering intensity of the point.

Class is the high-headed manner of confidence that gives assurance that birds have been found and are well pinned. It is loftily watching the covey rise to wing and not moving a muscle when every instinct says go, and it's finishing a brace stronger than beginning.

It doesn't take too many trials for a novice to recognize class in a bird dog. A few memorable braces will leave their impression and mental standards will be set. Anything less will never again be completely satisfying. But this is the reason for field trials: breed improvement—the search for the perfect bird dog.

Among the pointing breeds, trial dogs are showing constant improvement toward their original destiny: hunting. This is accomplished by the high standards set by the trial clubs, and by the individuals adhering to the breeding axiom of the-best-to-the-best. Bench (show) dog counterparts have been bred using standards that ignore the pointing breeds' heritage. As a result, bench-bred dogs are as useful in the field to today's sportsmen as Damascus barreled shotguns.

Since most gun dogs are from field-trial breeding, sportsmen contemplating a new bird dog should consider attending a few of the trials at Assunpink. They should inquire about the different breeds and the different lines within each breed. Almost everyone who trials dogs is more than willing to share information. But, as in any other sport, everyone's an expert, and the information and opinions will vary. Some will be good, and some will not. Most will be benignly prejudiced.

Someone looking for a setter pup would do well to ask a pointer man which is the best line of setters. And for a pointer, ask someone with a setter. Even though they own dogs of different breeds, they are all familiar with the

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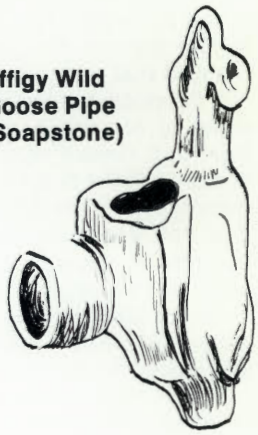
Paleo Fluted Projectile Point

Grinding Corn

Ground Sloth



Effigy Wild Goose Pipe (Soapstone)

AN ARCHEOLOGICAL VIEW

New Jersey, at least 10,000 years ago, was inhabited by hunting and gathering groups known as paleo-Indians. Archaeological research—artifact analysis teamwork with anthropologists, botanists, and geologists—enables us to piece together a part of the puzzle of the more than 10,000 years of continuous human history and environmental development in New Jersey.

When these early people lived here the climate was much colder, and wetter conditions prevailed. The landscape ranged from tundra to spruce-pine parklands. Their existence was largely based on big-game hunting (mastadon, mammoth, ground sloth, and so forth). They utilized the natural nomadic cycles of these animals and thus were nomadic in lifestyle themselves. They also took advantage of the seasonal availability of plant foods such as nuts, berries, roots, and tubers. They probably lived in small family units, working together and living in balance with their surroundings.

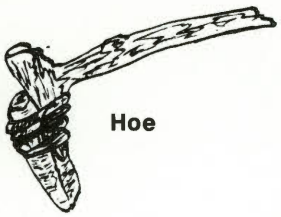
About 7000 BC, changes began to occur in the climate, partially because of the recession of the last glacier, and slowly a pine-dominant forest replaced the tundra environment. The culture known as Early Archaic then emerged; these people were still hunters and gatherers. Different types of stone tool-making (lithic technology) emerged, suggesting modifications in lifestyles. The people were more proficient in woodworking, which led to an increased control over their environment. With development of the polished stone tool edge, land could be cleared, and geographic mobility was increased as the woodworking techniques were used to develop dugout canoes.

Finally, around 4000 BC, the climate changed to our present warmer, drier conditions, which brought about the growth of vast tracts of oak-hickory forests in New Jersey and the rest of eastern North America. The people of this period developed what is known as the Late Archaic culture. For the first time in the archaeological record there is evidence that these people were utilizing the natural resources in regulated cycles (seasonal rounds). Settlements were established in each area that was providing the specific resource; river encampments during spring and summer, forest and woodland encampments during fall and winter.

During the Late Archaic period (4000 BC to 1800 BC) we see evidence of a tremendous population explosion, which proves the success of these people in their quest for survival. The sites of this period are more numerous than those of any other period in New Jersey's archaeological record. Tool types changed greatly and had multiple functions. We see a more elaborate form of ceremonial burial, indicating the importance in their worship of a diety and afterlife.

The Transitional culture represents a short-lived, specialized phase (1800 BC to 1000 BC). It is characterized by dependence on water-related resources, with evidence of fish and shellfish almost always being associated with these sites. An abrupt change in projectile point types occurred and the use of stone bowls prevailed. The use of materials not native to the region indicated either a continued nomadic round or well-established trade with groups in other areas. Burial and mortuary customs became somewhat so-

ILLUSTRATIONS PROVIDED BY AUTHOR



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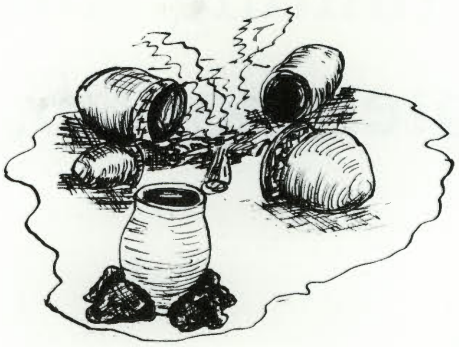
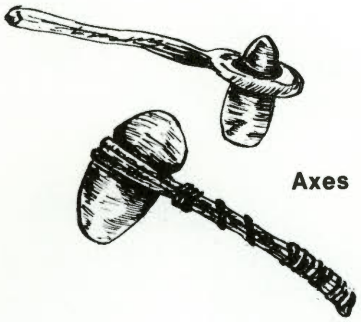
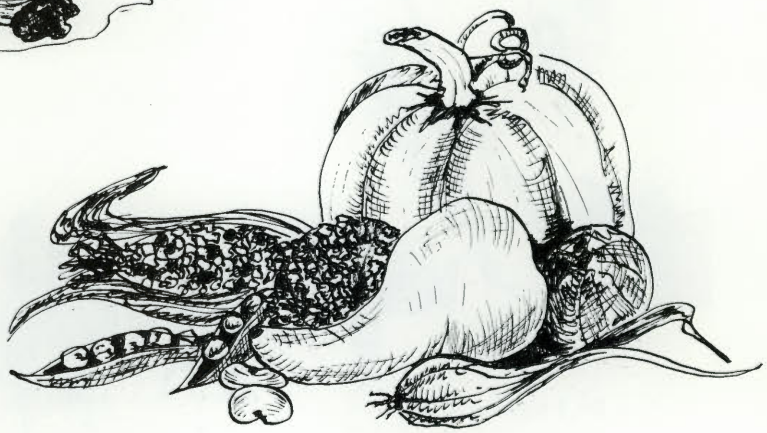


Pottery Making



Axes



OF NEW JERSEY

By Joanne VanIstendal

phisticated, indicating a continued religious structure within the society.

During the Early Woodland period (1000 BC to 500 BC), true pottery and the beginnings of farming appeared. As food production increased, these people had more time and an apparent need to develop a complex social and religious way of life. The first use of tobacco (probably gathered rather than cultivated) is indicated by archaeologists' recovery of both stone and ceramic smoking pipes. Mortuary ceremonialism reached its peak in Early Woodland culture, with the development of much more elaborate ritual and grave offerings.

In Middle Woodland times (500 BC to 700 AD), pottery had become more sophisticated in sizes and impressions. Many polished stone tools were needed for woodworking and forest-clearing. Hunting and fishing supplemented the farming of corn, beans, squash, tobacco, and pumpkins. Specific tool types for hunting are an enigma during this period; only a few are recognized in the Delaware Valley as being Middle Woodland in origin. The settlement patterns of these Indians are more stationary and campsites have grown into villages. In this space of time the "bow and arrow" develops as the major hunting weapon; earlier the javelin or a spear-throwing implement was used.

Late Woodland (700 AD to 1650 AD) is the period we know as being inhabited by the Lenape. Sites yield a higher frequency of agricultural farming implements, as well as chipped stone points, always triangular in shape. The pottery takes on more varied design styles. Agriculture is supplemented by hunting and fishing. More permanent settlements occur, with circular or cigar-shaped houses. Large storage pots were buried up to their rims, serving as food keepers, and meats were dried. Both men and women wore articles of ornamentation (bear claws, shark teeth, stone and shell beads, pendants and amulets). Religion was based on a multitude of gods with one supreme being called "Manito."

During the period of Historic Contact (1650 AD to 1800s), trade was accepted by early whites and Indians alike. Guns, iron tools, clothing, alcohol, and brass arrow points brought about severe changes in Indian culture. Toward the middle of the 18th century the Delaware people (so named by early European settlers because they lived on the banks of the Delaware River) had either moved west or died of white man's diseases such as smallpox. A tract of land was set aside in Burlington County (Indian Mills) as the first Indian reservation in America. It housed a few of the remaining Lenape in 1759, but by 1800 the last of the Delaware fled the disease-ridden area for New York, Canada, Oklahoma, and other western states.

As humans evolved in New Jersey, they started to change their environment, as they themselves changed from hunters and gatherers to farmers, making life easier and becoming less dependent on the natural environment.

Our modern environment is as delicate as it was 10,000 years ago and often we think that it is only "human nature" to exploit it. Archaeological investigation of ancient cultures can help us to discover what it is like to live with understanding of and respect for, our environment. NJ

National Hunting And Fishing Day
September 25, 1982

Do I have a bite?

Allen caught one too.

Beach Buggy members instruct students.

Once again the New Jersey Beach Buggy Association hosted the students and advisors of the Johnstone Training and Research Center in Bordentown for a day of surf fishing at Island Beach State Park. This is a very special day for the 50 to 60 handicapped students; it is the day they talk about all year back at the center. They fish—some with great patience, they wade into the chilly surf, and they walk up and down the beach laughing and conversing . . . Then they have a hot lunch, and back to the fishing poles.

The fish were not too cooperative on this sunny and breezy day, but the students remembered last year when they all caught fish. And some were looking forward to next year . . . wait 'till next year. NJ

PHOTOS BY PAT BOFFO

Students wade into surf.

Cythia caught the first fish.

Environmental News

START-UP FUNDS FOR PESTICIDE LAB. DEP Commissioner Robert E. Hughey waits his turn as Jacqueline E. Schafer, Region II Administrator for the U.S. Environmental Protection Agency (EPA), signs the document awarding a $436,500 grant to DEP to support the staff and activities of the department's new pesticide laboratory and enforcement complex for a one-year shake-down period. With this payment, DEP received a total of $2.4 million as the federal share of the facility's overall cost of $2.6 million. In addition to operating the laboratory for its own purposes, DEP will be able to serve as a contract laboratory consultant for agencies in other states as well as for other arms of New Jersey state government. The facility is located in Ewing Township, Mercer County.

The New Jersey Infrastructure Bank Proposal . . . an innovative way to fund capital programs

On September 29, 1982 Governor Kean announced his proposal for the New Jersey Infrastructure Bank. The bank would be the first of its kind in the nation, and represents a major shift in the way New Jersey addresses its capital needs problems.

New Jersey's infrastructure is in disrepair. Deteriorating public systems—sewers, solid waste disposal systems, water mains, roads, bridges and transit systems—are barriers to economic growth. Many of these infrastructure problems are directly related to environmental quality in New Jersey, and also undermine the state's program to attract and retain business investment. However, repairing the state's infrastructure and preventing further deterioration requires large amounts of capital. The New Jersey Infrastructure Bank represents the state's plan for financing these capital needs.

Up to now, moderately successful crisis management has made it possible to avoid the reality of a crumbling infrastructure; but the problem grows as does the cost of the solutions. In repeated efforts to "get through the budget year," state, county, and municipal governments have found it easiest drop those budget items which lack visibility or a persistent constituency. As a result, capital needs have been consistently underfunded in the budgetary process.

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Survey findings: RADIATION LEVELS DO NOT EXCEED FEDERAL/STATE LIMITS

On October 28, DEP issued its report on the April/May 1982 radiological survey of the off-site thorium contamination in Wayne, along Sheffield Brook, a tributary of the Pompton River. Findings indicate it is unlikely that, with current property use, any individual would be exposed to radiation levels that exceed existing federal and state standards. All water samples meet established federal and state radiological standards for drinking water. Radon-222 air sampling shows concentrations within background levels for New Jersey.

This Passaic County area was the site of thorium and rare earth extraction from monazite ore by Rare Earths, Inc., and later by W. R. Grace and Co. from 1948 through 1971. DEP's Bureau of Radiation Protection's technical survey covered gamma radiation measurements, radionuclide concentrations and of radon gas concentration in air samples. (For additional information or a copy of the report, write to the division at 380 Scotch Rd., Trenton 08628.)

SUPERFUND DOLLARS OK'D FOR WORK AT TOXIC SITE IN GLOUCESTER COUNTY

Federal and state officials this past October 29 signed a $3.2 million Superfund contract (90 percent federal funds, 10 percent state money) for a feasibility study and remedial action program at the Bridgeport Rental and Oil Services (BROS) site in Logan Township, Gloucester County. BROS is an inactive waste oil recovery and disposal facility.

Background: BROS (already the scene of corrective actions) is a 25-acre site consisting of a tank farm of more than 80 tanks and process wells. An 11.5-acre waste oil lagoon with a capacity of more than 50 million gallons was formed by previous sand and gravel dredging operations. The contents of the unlined lagoon seeped out, contaminating both surface and ground waters as well as a number of nearby private wells.

Continued from page 16A

INFRASTRUCTURE BANK

Now, with the difficulties of the federal budget, it has become clear to all states that there are no magical long term answers to our capital needs problems, and that short term bailouts are unlikely.

The bank concept originated with Commissioner Robert E. Hughey of the Department of Environmental Protection in response to the dramatic cutbacks in federal funding for the wastewater treatment construction grants program. New Jersey is faced with a critical problem in that $2.4 billion in additional construction is needed to meet our clean water goals. For fiscal years 1982-1985 Congress has authorized New Jersey to receive only $385 million to accomplish these federally mandated goals. This leaves the state with a significant funding shortfall, since at present the state can fund only 11 out of 237 eligible projects.

The New Jersey Infrastructure Bank provides a means for the state to maximize the use of all funding sources to meet our clean water goals as rapidly as possible. Through the bank, all sewer projects could be funded in about ten years. It also would allow New Jersey to end its dependence on federal appropriations for this purpose in the relatively near term, and would provide a continuing source of funding for sewer construction and rehabilitation.

In addition to wastewater treatment facilities, other infrastructure needs to be addressed initially by the bank are:

—water supply and distribution
—resource recovery, and
—highways and mass transit

In just these four areas over $10 billion in investment is needed, and yet federal and state funding authorizations will meet only about one fourth of these needs. The bank charter will be sufficiently flexible to allow inclusion of additional infrastructure programs.

The bank provides a vehicle for state assumption of responsibility for federal programs while minimizing the financial impacts of these programs on users and on the state budget. The bank would be capitalized with federal and state appropriations, proceeds of state bond issues, revenues and possibly private capital. It would function by providing funds to users of the bank, governmental units, through revolving loan programs from these capital sources. Loan repayments would maintain the equity capital of the bank and provide a source of funds for subsequent loans. The bank also would serve as the statewide financing vehicle for the local share of project costs, as well as the vehicle through which the state itself could issue revenue backed bonds for various infrastructure purposes. A portion of the bank's capital would serve to enhance the credit worthiness of localities which otherwise might not have access to public credit markets.

The bank's activities would mitigate the impact on local user charges caused by federal funding cuts. For example, communities which can expect *no* federal support for their sewer projects, which are at least 200 of the 237 eligible projects in New Jersey, would see their user charge increases cut in half or more if funded through the bank rather than by going it alone.

In addition, establishment of the New Jersey Infrastructure Bank will accelerate project funding, thereby avoiding significant inflationary costs that go with project delays.

Enabling legislation for the bank has been introduced in both houses of the New Jersey Legislature and has been referred to the State Government Committee in each house. An amendment to the Federal Clean Water Act also is necessary to allow loans instead of grants for sewer projects. Efforts are underway to inform administration officials and congressional representatives about the New Jersey Infrastructure Bank proposal and to gain the necessary flexibility in the Clean Water Act. New Jersey voters will be asked to pass a referendum next fall allowing loans from state bond proceeds to be repaid to the bank instead of to the General Fund.

The bank is the result of many months of work by financial experts and state and local officials. It is the first comprehensive effort by a state to tap all available funding sources to make a changing situation work to the advantage of our communities. It will not instantly solve all infrastructure problems, but it will maximize the use of existing resources in addressing the state's enormous infrastructure needs through a coordinated, long-range planning, development and financing process. The bank is a potential national prototype for states seeking to solve these problems while the federal government continues to restrict its role in funding capital needs. Through a cooperative effort at the state and federal levels this concept can become a reality, and a new era of environmental improvement and economic growth can begin.

Robert Raimann

DEP sponsored an exhibit to acquaint educators with, and to distribute, various educational materials on environmental protection programs at the New Jersey School Boards Convention recently held in Atlantic City. Smokey the Bear, who appeared courtesy of Division C of the New Jersey Forest Fire Service, a unit within DEP, was the most photographed "person" at the convention. Above, Smokey visits with Jennifer Yeager, a senior in the Dental Assistant program at Ocean County Vocational School in Toms River.

DEP SEEKING APPLICANTS FOR LIFEGUARD POSITIONS

Though the winter winds are still blowing, DEP's Division of Parks and Forestry must plan ahead to be ready to serve the public this summer. Applications for lifeguard positions at state-operated inland and ocean swimming areas will soon be available at high schools throughout the state, state park, forest and historic site offices and the division's Trenton office. Candidates must be at least 16 years of age, have proof of physical fitness, and pass swimming and lifesaving tests to be held at inland and ocean areas. Successful candidates will be paid a minimum $3.55 an hour for an average 40-hour week. New Jersey is an equal opportunity employer. For further information, write to DEP, Division of Parks and Forestry, State Park Service, CN 404, Trenton 08625.

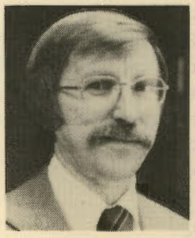
NATIVE PLANT RESCUE SQUAD

The natural landscape is everywhere disappearing as native meadow and woodland plants are obliterated by bulldozers preparing construction sites. This loss is emphasized by traditional landscape design practices which rely upon the use of exotic hybrid and imported plants arranged in patterns completely unlike the patterns of a natural landscape.

In New Jersey, the Delaware and Raritan (D & R) Canal Commission recently initiated a Native Plant Rescue Squad to encourage the preservation and use of native plants in public and private gardens and parks. James Amon, executive director of the commission, explained that volunteers who are interested in wildflower gardening are contacted when the commission learns of construction projects planned for the canal region. The commission supplies a map of the site and the name and phone number of the project's sponsor. It is then up to the Rescue Squad members to seek permission to visit the site before the bulldozers and to remove any valuable native plants that they want. The plants are then transplanted to either public parks or private gardens, depending upon the desire of the volunteer.

Amon said that he got the idea from a similar program carried out by the North Carolina Botanical Garden. It could, he points out, be pursued by any planning board in the state. For further information, contact James Amon, Executive Director, D & R Canal Commission, CN 402, Trenton 08625. Phone: 609-292-2101.

GASTON NAMED DIRECTOR OF WATER RESOURCES



John W. Gaston, Jr., 36, of Trenton, became director of DEP's Division of Water Resources in October. Gaston was associated with the division from 1969 to 1974, first as a staff engineer and later as supervisor of water quality management planning. From 1974 until he rejoined DEP, Gaston was a consultant to governmental agencies and businesses in the areas of environmental impact, water management, sanitary facilities and land use. He is a New Jersey licensed Professional Engineer and Professional Planner.

A PROUD MOMENT FOR DEDICATED VOLUNTEERS. A program celebrating New Jersey's accomplishment as the first state to put its portion (70 miles) of the Appalachian Trail on publicly owned lands was held at Stokes State Forest on October 2. During the ceremony, New Jersey-New York Trail Conference volunteers, who have been building and marking 25 miles of relocated trail, were singled out for special thanks and given hiking staffs as mementos of the occasion (above).

Participants in the program reflected the cooperative effort received from governmental agencies and private organizations to achieve the goal. Representing New Jersey: Governor Thomas Kean, DEP Commissioner Robert Hughey, and DEP Assistant Commissioner for Natural Resources Helen Fenske. Representing the federal government: Project Manager David Ritchie of the National Park Service's Appalachian Trail Project Office. Representing trail clubs: President of the New York-New Jersey Trail Conference Donald Derr and President of the Appalachian Trail Conference Ruth Blackburn.

RESOURCES INTERPRETIVE SERVICE ESTABLISHED

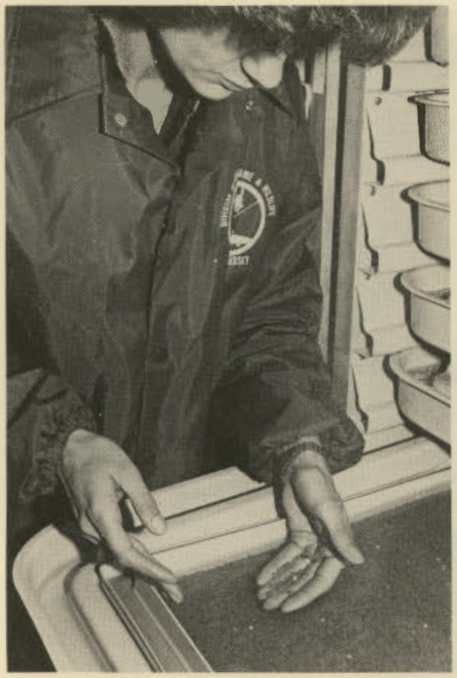
Commissioner Hughey, in Administrative Order 29, established the Resources Interpretive Service (RIS) to provide a coordinating and servicing function to strengthen the information and educational initiatives of all divisions and offices in DEP. The RIS operation will bring together existing staff involved in various public outreach programs and projects, such as publications, graphics and exhibits. Also, to be established within the RIS are an Environmental Education Advisory Committee (composed of New Jersey environmental educators and natural resource professionals); Interdivisional Environmental Task Force (composed of departmental educators and naturalists); and an Interdivisional Graphic Arts Task Force.

TO REPORT ABUSES OF THE ENVIRONMENT CALL ACTION LINE 609-292-7172

The goal of the RIS is to provide better service to the public through strengthened programs in cost-effective manner. The RIS will function under the direction of Assistant Commissioner for Natural Resources Helen C. Fenske.

GREEN ACRES REPORT . . . THE FIRST 20 YEARS

DEP's Office of Green Acres has published a report tracing the development and accomplishments of New Jersey's Green Acres Program over its first 20 years, 1961-81. Much of the credit for the program—considered one of the nation's most successful state open space acquisition and recreation development funding programs—is given to New Jersey's voters who have steadfastly supported the four Green Acres bond issue referendums. There are Green Acres projects in all 21 counties—in rural areas and large urban centers, at the shore and in the mountains. For a copy of the report, ***GREEN ACRES: NEW JERSEY'S OPEN SPACE AND RECREATION LEGACY,*** write to DEP, Office of Green Acres, CN 404, Trenton 08625.



Cindy Roach, a fisheries worker at the New Jersey Pequest Trout Hatchery and Natural Resource Education Center, examines some of the 600,000 rainbow trout eggs which will be the first fish to be hatched and reared at the new facility. The disease-free trout ova were supplied by the Federal Fish Hatchery at White Sulphur Springs, W. Va. New Jersey will soon receive 500,000 brown trout and 500,000 brook trout eggs for hatching. These trout will be ready for stocking in 1984.

TIDELANDS UPDATE

Maps: Between May 27 and October 13 (1982), the state Tidelands Resource Council adopted a total of 854 tidelands claims maps delineating coastal area lands flowed or formerly flowed by mean high tide waters.

Amendment rejected: New Jersey voters in the November 2 general elections rejected a proposed amendment to the state constitution which would have allowed the state legislature to set the amount any private owner would pay to obtain clear title to coastal land once washed by the tide. This means the current law, under which the land or the rights to it cannot be conveyed to any private owner at less than state-appraised market value, remains in force.

PINELANDS

The state's program to purchase tracts identified by planning studies as critical to the preservation of the Pinelands ecosystem has resulted in the acquisition of 18,660 acres in the unique Pine Barrens between July 1979 and mid November 1982, through DEP's Pineland Acquisition Program.

DETAILED MAPS AVAILABLE FROM DEP

Planning for Spring outdoor activities in New Jersey like hiking, cycling, camping and fishing is easier when you use detailed maps available through the Department of Environmental Protection. The U.S. Geological Survey Topographic Quadrangle maps provide this necessary detail at a scale of 1 inch equals 2000 feet.

A five-color format makes these maps easy to read. Topographic contours in brown let hikers, campers and cyclists know surface features and their elevation before leaving home. Wooded areas are green and publicly owned lands are outlined in black. Water features are well detailed in blue and are invaluable to the fisherman. Roads and trails are shown in red and black. Many other natural and man-made features like marshes, beaches and buildings are also shown.

Each map measures 22" x 27" and covers just over 56 square miles. Maps are $2.00 each postage paid. An index to these maps and a detailed legend are available free from:

New Jersey Department of
Environmental Protection
Maps and Publications Sales Office
Bureau of Collections and Licensing
CN 402
Trenton, New Jersey 08625
(609) 292-2576

Also available free on request is a Price List containing a variety of maps and geologic publications for sale.

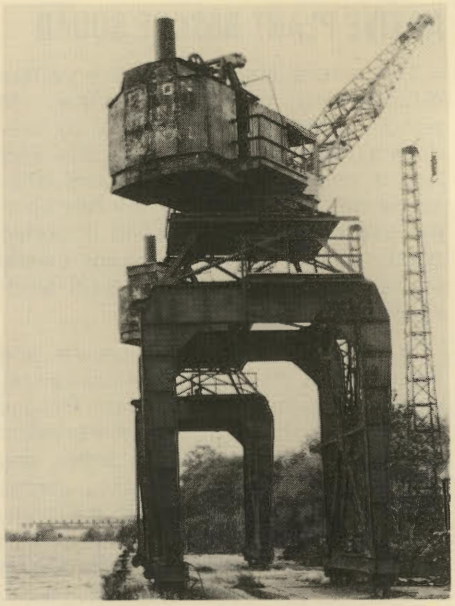
HUNTERS: TROPHY DEER DEADLINE: FEBRUARY 18

February 18 is the cut-off date for entering the annual state record deer program sponsored by DEP's Division of Fish, Game and Wildlife in cooperation with the New Jersey Federation of Sportsmen's Clubs. The competition is divided into two divisions—the 200-pound club and the antler club. Entry blanks are available from the division office or wildlife management area offices. Address all correspondence to DEP, Division of Fish, Game and Wildlife, CN 400, Trenton 08625.

CONFERENCE CALL

The New Jersey Recreation and Park Association will hold its annual conference March 13-15 at the Sands Hotel in Atlantic City. The association's membership includes state, county and local park professionals in park and recreation planning and operation. Further information is available from Frank Guidotti, DEP, Division of Parks and Forestry, CN 404, Trenton 08625.

Terry Karschner



The Hog Island Cranes, *which have been placed on both the state and national registers of historic places, were built in 1917 for use at the Hog Island shipyard near Philadelphia—one of the largest yards built to meet America's massive shipbuilding effort during World War I. The two cranes standing in Marine Terminal Park as reminders of the once-busy Port of Trenton, were sold as surplus by the federal government to Trenton in 1930 and have been in their present location since 1932. The huge steel structures stand on four feet, and are about 400 feet tall and have a 15 ton capacity.*

PARK ATTENDANCE TOPS 4.5 MILLION

State parks, forests, recreation areas and historic sites welcomed a total of 4,556,163 visitors this past summer (June/July/August 1982)—an increase of 935,388 visitors over the total for the same period in 1981, according to DEP's Division of Parks and Forestry. Among the factors contributing to the upsurge in park use were the two "free entry" programs in effect this past summer. The programs encouraged weekday use of the parks (free admission on Tuesdays) and carpooling (free admission any day for "five or more persons in one car").

SITING COMMISSION APPOINTS GIMELLO

Frank J. Dodd, chairman of the state Hazardous Waste Facilities Siting Commission, recently announced the appointment of Richard Gimello as executive director of the commission. Gimello had served as chief of DEP's Office of Public Participation for two years before assuming his new post.

Two eelers pose with catch PHOTO BY MELVIN EVERSON

EEL SPEARING: Archaic Sport on the Jersey Shore

By Frederick Everson

A law was recently passed in Vermont that will allow commercial fishermen on Lake Champlain to take eels by means of an electric shocking process. I suppose the bill got through because of the unappealing physical appearance of the eel itself—a long, snakelike, slimy creature designated a trash fish by most sport fishermen. But there are those on the Jersey shore who will think it an unjust fate for one of nature's unique creatures.

Anyone who has ever put in a long day plying an eel spear on an 18-foot handle through the ice on the Navesink or Shrewsbury River will understanding, though I suspect that there are few eelers left these days. Twenty years ago, you were likely to find 40 or 50 eelers on the ice in Red Bank on a Saturday or Sunday morning; now you will rarely see a solitary old man with his spear, sled, and ax, and then only if you search all the old haunts in Red Bank, Long Branch, and Belmar.

Eel spearing is a venerable avocation that was probably imported by European colonists who had cultivated a taste for eels in the old country. Walt Whitman, the famous American poet and New Jersey resident, was familiar with the sport and wrote of eel spearing in *Leaves of Grass.* Chances are he was an eeler himself, for the pastime was in vogue in the last century. European immigrants created a heavy demand for eels around the Christmas holidays, as they were (and still are) an important part of Old World traditional holiday dishes. The peak demand for eels still occurs during the Christmas season.

In years gone by, a freeze before the holidays would have brought a large number of eelers down to the mouths of Navesink, Shrewsbury, and Shark Rivers, but it seems the eels' numbers have dropped off—along with interest in spearing. It makes me sad to think of it because there was a camaraderie amongst the old timers that made it so much fun. To understand, you have to know something about eel spearing.

The art of spearing the eel is a matter of feel, coupled with the knowledge that the eel will lie parallel to the current. But first a hole must be cut through the ice. Traditionally this is done with an ax, like those used to chop wood. In 20 years of eeling I never saw anyone use a power auger—I guess it would have been a sacrilege. The location of the hole is chosen at random, and the only way to tell if you have cut a good hole (one harboring eels beneath it) is to use your spear, and even then you can never be too sure. One old-timer I knew claimed to have never cut a hole in his life. He would simply wait until you were through with yours and go in and take what you missed. More often than not, he would spear more eels out of the hole than the fellow who chopped it.

Continued on next page

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EEL SPEARING

Unlike a conventional fish spear, the eel spear impales its victim not when thrust, but when it is drawn back through the mud. The spear is usually fan shaped, bearing eight or ten prongs, and divided in the middle by a dull, bayonet shaped blade. Most of the spears that I have ever seen were home-made, the best being constructed of spring steel with well-sharpened hooks.

The spear was attached to a wooden handle that would run anywhere from 16 to 20 feet in length, depending on which river you speared, and was an inch to an inch and a half in diameter. A good handle had lots of feel to it: flexing gently when the smallest eel was hit, yet rugged enough to haul a three-pounder out of its winter bed.

An experienced eeler works around his hole in an ever widening circle, taking short side steps and thrusting the spear into the bottom with each step. Most eelers use a wooden grip affixed to the handle to indicate the angle of the spear, so that it can be kept perpendicular to the run of the current. It is a hit-and-miss process for the most part, but where you find one eel, you will often find many.

Once an eel is speared it must be quickly brought to the surface or it will work its way free. The handle is drawn up through the hole, hand over hand, with all due speed. This makes the wearing of heavy rubber gloves a necessity for most, though some of the old-timers wore wool socks over their hands. Any effect those socks had on the ice cold water than ran down the handle was, I am sure, purely psychological.

Eels taken through the ice in brackish water are always males. Female eels live in fresh water and return to the ocean only to spawn. Both European and American eels share the same spawning ground—the weedy depths of the Sargasso Sea (of Bermuda Triangle fame). While the eels of both continents intermingle on the spawning beds, there is no known instance of an American eel ever being found in Europe, nor vice-versa. The journey back to the United States takes the newborn elvers nearly 3½ years. Once they reach coast, males remain in brackish water, while females continue on to freshwater homes, regardless of obstacles. It is truly a spawning run that would win the envy of any rainbow or salmon.

When eels were plentiful 20 years ago, a day's catch of 150 pounds was common. Obviously, no one family could consume such quantities without growing gills, so the excess was sold to local fishmarkets. In 1965 the going price for eels was 40 cents a pound, 60 cents skinned. We seldom bothered to skin the catch; massive quantities of beach sand were required to counter the slime, and the loss in weight made it a waste of time.

The eels we kept for our own consumption were smoked, pickled, or fried, according to size—the biggest being smoked and the smallest pickled. I must confess that I probably caught a ton of eels before I finally broke down and ate one. The eel is, after all, not visually appealing and will writhe about in the pan as you fry it. Smoked I find it to be very much like whiting, if not better in texture and flavor, and the same can be said for fried eel, if only you can disregard the wriggling in the pan. I have never yet tasted anything comparable to pickled eels—they are a delicacy of incomparable flavor.

In reality, there is nothing at all common about the "common" eel. *Anguilla rostrata* is an extraordinary New Jersey native, and so is the nearly forgotten pastime of eel spearing.

Continued from page 5

STORM OF '62

gram which involved the construction of protective dunes as required along the coast. An estimated 26 million dollars of work was needed to secure the coastline to prevent more damage if another storm occurred.

Shore residents immediately set about to repair the damage. Residents returned to begin to clear debris, salvage property, and dig out homes. Some returned to find that little, if anything, remained of what they had left behind.

Many coastal communities set out not only to restore things to their former condition, but to forge ahead and provide "bigger and better" homes and facilities. Through a heroic effort, most resorts were ready to receive summer vacationers by Memorial Day. However, all of the damage took years to repair or replace.

The events of March, 1962 were recalled on the evening of July 24 to honor the memory of the most powerful and destructive storm New Jersey has experienced since the 1944 hurricane. Attended by over 400 shore residents and visitors, the program created a sense of the event through talks by former Chief Justice Richard J. Hughes, who was governor of the state at the time of the storm, and an oral history panel composed of shore residents, as well as films, slides and photographs. Reynold Thomas, Mayor of Harvey Cedars; Jim Mancini, Mayor of Long Beach Township and Jack Lamping, the Ocean County Public Information Director in 1962 told tales of the storm through the panel moderated by Howard L. Green, Director of the Oral History Program and Acting Director of Research of the New Jersey Historical Commission.

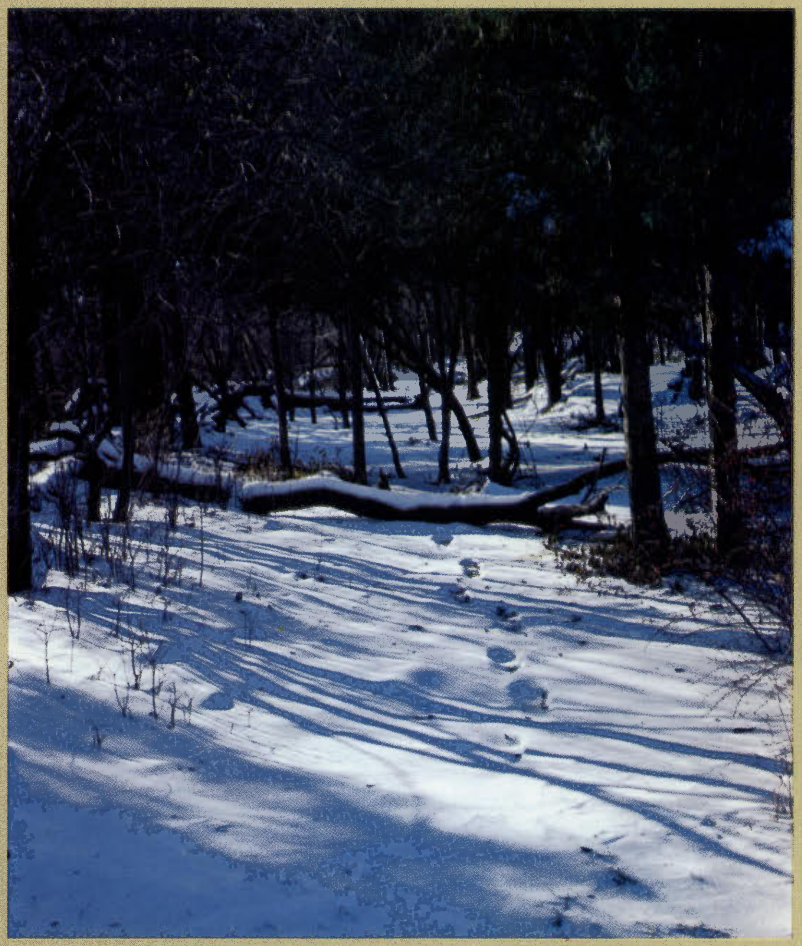
The program also featured a spirited talk by Dr. Neil L. Frank, Director of the National Hurricane Center in Florida. Dr. Frank, a nationally recognized authority on hurricanes and coastal processes, spoke about the very real threat of coastal storms and the precautions which should be taken in living, working, building, and recreating along the shoreline.

Frank believes that extensive waterfront development and densely populated barrier island along the coast have made the United States more susceptible to hurricanes now than at any other time in history. New Jersey's coastline is one of these imperiled areas. "We are saying that bad hurricanes along the Jersey Coast are relatively rare events but we need to be prepared", Frank said. "When one does occur, the effect is going to be profound."

Although there is no correct or easy solution to the threats and problems caused by coastal storms, the issue must not be forgotten. It is important to maintain continued awareness, thought and discussion by those who live, work, and visit at the shore. The twenty-first anniversary of the 1962 storm is an appropriate time at which to reflect upon the tragedies it caused, the lessons it taught, and the lessons still to be learned.

WINTER GROUSE

By Al Peinecke



Entering the winter domain of the ruffed grouse.

October's blaze of color had subsided into November's somber tones, and with December came a white mantle to quiet all.

But autumn's grouse hunting spark still glowed—perhaps it never does go out. The drummer hard by spring's trout stream holds promise for the fall, grouse chicks along a woods road during late summer easily distract one from the day's objectives.

Now it is winter, and winter affords a renewed opportunity to pursue the ruffed grouse, after the seventh-inning stretch as it were. Most of the fuss and feathers of the early hunting season and the holidays has calmed.

A late afternoon glance from the window during respite from the fly-tying bench indicated the gentle snow was about to end. Brightening skies and about three inches of new snow bespoke of a promising tomorrow. A time to seek out the ruffed grouse in winter quarters.

The morning is crisp and clear. The Labrador is ready, she always is ready. As we make our way toward an old abandoned farm, snow, fused by the sunlight and prompted by a gentle breeze, slithers from overhanging boughs. Nice day to have a dog!

Along a crumbling stone wall which separates a small swale from the remnants of an aged orchard we encounter the mincing tracks of several grouse, one foot precisely in front of the other as they pick their way amongst the downed timber, brush and brairs, indicating they are in no hurry. The Lab's rudder-like tail waves enthusiastically as we follow opposite sides of the hedgerow.

Near the end of the orchard a grouse roars off low behind the stone wall—a professional survivor. Immediately two more flush and the gun speaks as the bird on the near side is about to clear a tall cedar. Without any bidding the Lab is on the scene and proudly brings to hand a handsome gray-tailed grouse.

After the mutual admiration amenities are concluded, examination of the contents of the bird's crop discloses some small greens and a mix of apple and poplar buds, staples of the grouse's winter diet.

Breaking out onto an old woods road which probably was the way in and out of the old place, we pass some tumble-down foundations. The rutted road beckons and we are impelled to follow.

The road wends its way along a small brook, and proceeding upstream we find pines, hemlocks and small mountain swales. Squirrels have been here and deer have passed through.

The quiet of the place is suddenly broken as a grouse zooms out of a tall hemlock which we had passed. The gun barks and the bird sails on to become a small speck crossing a hardwood ridge. As one of our early mentors once declared: "To hit is history, to miss is mystery." Amen.

The old road peters out at what might have been an old pasture, the edges now growing up in brush. As we emerge from the evergreens two birds flush wild from the far side—seed stock.

After a brief pause during which the dog is offered a tid-bit and we munch on an apple we elect to return by way of an obscure path on the opposite side of the brook.

Time was, back in the 1930s, when hunting upland game in "tracking snow" was illegal. This has long since been amended and present-day regulations offer the shotgunner extended opportunities for days afield.

In a lifetime, which at times seems

Continued on page 27

Hardy-looking fellow driven by a team of huskies.

PHOTOS BY AUTHOR

WALPACK VALLEY AND BEARFORT MOUNTAIN: A WINTER ESSAY

By Colleen O'Donnell

January is a month of gray skies, solidifying ice, and deepening snowdrifts.

But one need not be frozen or snowbound. There are sleds, skis, skates, and snowshoes to carry one across the ice and through deep and lasting snows. This discovery led my friends and me through quiet, wooded areas of New Jersey, where the only trails were those left by dogsled, the only tracks belonged to snowshoes and wild turkey.

We were nomads in a frozen land. The season, bringing ice and snow, had crystallized and purified our world. Winter was upon us. In less than a week our footprints left trails throughout isolated, wooded portions of Morris, Passaic, and Sussex counties. We hiked across Charlottesburg Reservoir, along the Bearfort Mountain ridge, and throughout the Walpack Valley, where wild turkey prints stitch paths among stands of hemlock and pine, and hidden brooks bubble quietly in nearby forests. Signs of bear have been discovered in these wild areas. The trails in these areas yield excellent skiing, snowshoeing, and sledding.

While snowshoeing through the Walpack Valley, our footsteps were stilled by the sudden presence of half a dozen or so wild turkeys, who strutted across our path, less than 50 yards ahead of us. The silent procession of these regal birds was breathtaking.

Minutes later, a hardy looking fellow, his face bloodied, his beard flecked with ice crystals, whooshed past us, drawn by a team of huskies. Red pom-poms bobbed about their necks, and the sound of bells tinkled in the cold, frosty air.

I drew a deep breath, sucking in the cold air, the rich scent of cedar and pine filling my head. I felt as if I had just walked off a cold page from the frozen world of Jack London. Our journey had just begun.

Perhaps the most challenging and picturesque of our winter treks was along the Bearfront ridge and the area round Terrace Pond. The ascent of Bearfort Mountain proved to be strenuous. As I trudged up the

mountain I envisioned ancient Indian fires built high upon these mountains, the wisps of smoke curling in the distance. The airs of the Great Spirit seemed to linger among the tall trees and steep cliffs.

Here, at an altitude of 1380 feet, we discovered Terrace Pond, lying frozen and isolated. This wild gem of pristine water is surrounded by massive cliffs of puddingstone and thickets of highbush blueberry. The 1200-acre tract, lying within the eastern boundaries of the Wawayanda plateau, is actually part of the Newark watershed. The name "Wawayanda" is Indian for "water on the mountain," an apt description of Terrace Pond.

Geologically, this portion of the state is referred to as the Reading Prong or the Jersey Highlands. The Highlands include trails west of Greenwood Lake and south of the New York border. And here we discover the Newark Basin. Many of the trails follow dirt roads and paths which penetrate some of Jersey's finest topography. Blueberry swamps and jungles of rhododendron with their great, glossy leaves lend an exotic, tropical, quality to the landscape. Here too, evidence of bear has been discovered.

Bearfort Mountain south of the old warwick turnpike is now open to hiking clubs in the New York-New Jersey region. Terrace Pond is the most attractive part of this area. During the summer of 1978, Terrace Pond was officially designated a natural area. It is now owned by the state and managed by the Department of Environmental Protection. Permission to hike in the area may be secured by writing Wawayanda State Park, Box 198, Highland Lakes, N.J. 07422, or phone the Newark Watershed Conservation and Development Corporation in Charlotteburg at 201-697-2850. There is some camping allowed by permit only.

A detailed contour map of the area may be purchased for $1.95 from Walking News, Inc., Box 352, Canal St. Station, New York, N.Y. 10013. Request map no. 36-A, which shows Bearfort Mt., Wawayanda Plateau East, and Pequannock Watershed.

Puddingstone Rock outcropping.

Swamp near Bearfort Mountain-Newark watershed.

The map includes portions of Sussex, Passaic, and Morris counties, and also includes a section of Charlotteburg Reservoir. By sending a 20¢ stamp to the same address you may obtain a free index of all regional maps. The *New York Walk Book,* published by the New York-New Jersey Trail Conference and the American Geographical Society, is an excellent reference book for the hiker who explores either state. The geology is fascinating and the book details interesting New York/New Jersey boundary walks. The fifth edition of this text is currently available. Write the New York-New Jersey Trail Conference, 20 W. 40th St., New York, N.Y. 10018. Request their pamphlet, the *New York-New Jersey Trail Conference,* which highlights where the trails are, trail conference publications, history of the organization, and how to join. NJ

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WEEDS IN WINTER

By Inge Buenning

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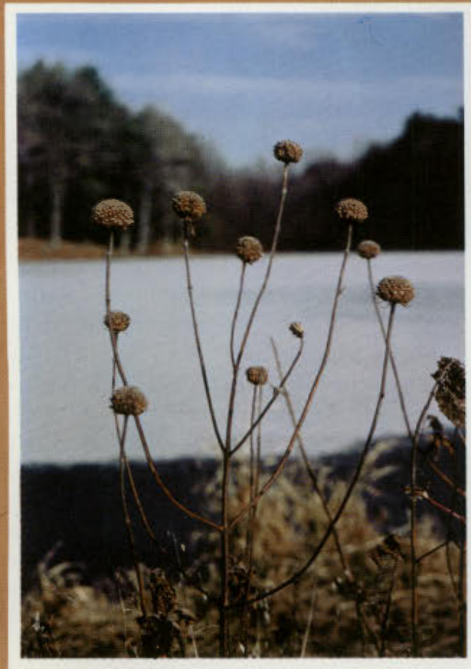

5

Weeds are plants which grow where they are not wanted. They usually grow rapidly and abundantly on land affected by human disturbance, such as abandoned fields, roadsides, and empty lots.

Most plants that we call "weeds" are not native to the United States but were introduced by the early colonists. The plants they brought with them were familiar herbs and spices, medicinal and ornamental plants that reminded them of their homeland. Other species were introduced via seeds attached to clothing, baggage, or the fur of animals. These new plants quickly established themselves in the cleared homesteads, dispersing over fences and stone walls to compete with and crowd out many native species.

The definition of "weed" is a matter of opinion. Dandelions may not be wanted on your front lawn but they may end up in your salad or wineglass; fox-glove is a source of digitalis, a heart stimulant. Many weeds are colonizers in early stages of succession, reclaiming the land, binding the soil, and functioning in erosion control.

Another important function of weeds, especially in winter, is a source of food or shelter for many animals. The tall stalks of last summer's wildflowers may seem lifeless and dull. But closer examination reveals a kaleidoscope of browns, golds, and bieges; intricate and delicate shapes and textures. The stems may house insects (as in goldenrod galls), small flattened bundles of leaves close to the ground may be buried under the snow ready for the next season's bloom (as in mullein), or the weed may have a long taproot that allows it to overwinter (as in Queen Anne's Lace).

The key to recognizing winter weeds lies in becoming familiar with the seed- or spore-containing pod. Although pods vary in shape and size their function is the same: the dried pod splits open to distribute the seeds produced by the mother plant. This may be accomplished by encasing the seed in barbs that adhere to clothing or fur, or by attaching the seed to delicate tufts of silken threads that the wind carries along. A few species of weeds break off near the ground, allowing their seeds to shake out as the wind rolls the plant from place to place.

The following plants are common weeds found in winter along the edges of ponds and marshes, in open fields, or along the roadsides. Unless otherwise stated, all closeup photographs are four times the normal size of the plant.

1. Common Burdock: *(Arctium minus)*

The latin name *Arctium* originally came from the Greek word for bear. Burdock is a European biennial—it takes two years to flower and produce seed. The first year a rosette of velvety leaves close to the ground is formed. During the second summer Burdock grows a tall stalk with tubular pink flowers which forms the burs later in the fall. The burs have recurved hooks which easily adhere to fur or clothing. Burdock, a branching 2-5 foot tall weed, is usually found in fields or along the roadside.

2. Wild Bergamot: *(Monarda fistulosa)*

Bargamot is a native perennial plant and a member of the mint family. This 2-4 foot, showy-flowered weed is very common along roadsides and in pastures. As the tubular purple flowers drop off, Bergamot pods take on the appearance of a rounded honeycomb.

3. Dogbane: *(Apocynum cannabinum)*

This native, shrub like weed is widely distributed in fields and roadsides, along railroads and edges of fields. The fibrous inner bark of Dogbane, also called Indian Hemp or Choctaw Root, was used by American Indians as a source of cloth and twine. According to Kalm, "When the Indians were still living among the Swedes in Pennsylvania and New Jersey, they sold 30 feet of these ropes for a piece of bread."

The pods of Dogbane are paired and pencil-thin, unlike Milkweed pods which are larger and not paired. However, like Milkweed, Dogbane does have silk-parachuted seeds.

4. Evening Primrose: *(Oenothera biennis)*

As the name implies, this plant's yellow flower opens usually at night and may be pollinated by a night-flying sphinx moth. This weed is a biennial, spending its first year as a lanceolate-leaved rosette. In the second year, the plant produces a tall stalk that lasts throughout the winter. The dried fruit of Evening Primrose looks like small, delicate wooden flowers and may be the winter home of insect larvae. Evening primrose can be found along roadsides and in fields.

5. Queen Anne's Lace: *(Daucus carota)*

During the reign of Queen Anne, lace collars were very delicate and intricate. The inflorescence of this weed resembles the patterns of those collars, hence the name Queen Anne's Lace. After the flowers are gone the umbel with its developing seeds draws together in such a way as to form a "bird's nest." This biennial plant, a relative of the domestic carrot, can be found in fields and along roadsides.

6. Seedbox: *(Ludwigia alternifolia)*

Seedbox is a member of the Evening Primrose family. Flowers and hence the dried fruit are on short stalks attached to a 2-3 foot central stem. The name "seedbox" refers to the small, squarish pods. This plant's habitat is usually marshy areas such as along the edges of ponds or lakes. NJ

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IN THIS ISSUE

ly when they grow on your front lawn. Read *Weeds in Winter,* by Ms. Buenning, her second effort in our magazine.

The article titled, *Hopewell Valley's Unique Outdoor School,* was written by Matt Hoffman and Carol Kelly, two teachers involved in this program. Doug Dickenson, a science teacher, developed this idea of extending the classroom curriculum to the out-of-doors.

This issue's Wildlife in New Jersey series is introduced by the illustration of the adult Gray Fox and kits on the inside back cover by wildlife illustrator Carol Decker. The article titled, *The Gray Fox* was written by wildlife biologist Dave Chanda, a member of the natural resource education unit of the Division of Fish, Game, and Wildlife.

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fewer knots and greater resistance to disease and pests. Youngsters are told how, in the 1950s, genetic research programs began in the South originally to shorten the time necessary for certain pines to produce seeds, from 16 years down to three to five years. Increasing demands for wood pulp and paper necessitated the onset of some type of artificial selection program for loblolly (*Pinus taeda),* longleaf (*Pinus palustris),* shortleaf (*Pinus echinata),* and Virginia pines (*Pinus virginiana).* Thus, the supertree concept took root (pun intended).

Production of supertree seeds and seedlings involves several steps. Foresters first search established forests for evergreen trees that appear to show the champion characteristics outlined above. This, however, takes time. One California company inventoried one million redwoods *(Metasequoia glyptostroboides)* and found just 200 trees suitable for breeding.

Mature, vigorous branches from these trees are collected by shooting them off near the tops with a 12-gauge shotgun. Two-inch cuttings from their tips are grated onto young, ordinary seedlings growing in an orchard. The graft is covered with plastic and paper bags to conserve water until normal transport of water is established between the rootstock and graft. The graft will produce seeds of the kind that would come from the parent tree, so that its progeny will have the desired traits of the parent. Each parent tree, however, is tested by controlled pollination to see if its offspring have the desired traits. A bag placed over the "flowers" of a grafted tree to prevent foreign pollen from reaching them. At an appropriate time, pollen from another parent tree is injected into the bag. The resulting seeds are planted and the progency later observed. Once it is known that seeds carry desired parental traits, seedlings grown from the seeds are used to establish commercial forests.

Whereas the above technique shortens the time necessary to produce seeds, the cloning method (also known as tissue culture) completely eliminates the seed stage and may begin to satisfy the demand for wood, now estimated at 500 million new trees annually. Redwood plantlets are cloned from branched tips, needles and stems with a 30 percent germination rate compared to six percent in nature. A one-centimeter section of plant tissue is place in either a test tube or dish containing water, glucose, minerals and growth hormones. After a few weeks, the tissue produces shoots with tiny needles. These are placed in another container with glucose and growth hormones to stimulate root production. One-year old shoots are then planted in soil. Although this method has been successful in developing test-tube versions of Virginia, longleaf, and loblolly pines besides redwoods, it has not yet produced Douglas-fir, commercially the most valuable tree species in North America.

FIGURE 4

After planting the seeds, cartons are returned to planting tray until seeds germinate 7 to 14 days later.

FIGURE 5

Youngster measures heights of three varieties of pea seedlings planted by teacher in same test plot. She then will compare the percent germination of her variety in her milk cartons with the germination of that and the other varieties in this plot.

Both these methods of producing supertrees have their critics. This is one reason why I invite the industrial arts teacher to speak to the class about the modern lumber industry, with special emphasis placed on processing of supertree wood. After showing students some of the ways wood is cut in the lumber mills (68 of which still exist in our state) by bringing them to his wood shop, he demonstrates the ease with which so-called supertree pine boards can be cracked wih bare hands.

He, along with some plant geneticists, believes that it will be difficult to improve on what nature has already provided genetically in the coniferous forests of the Southeast and Northwest. He contends that the best genetic strains developed naturally through slow, gradual adaptation to different soils and microclimates. Some foresters out West claim that supertree branches sometimes crack under the weight of snow while ordinary branches don't. Such foresters are also concerned about forests filled with genetically identical trees, since a disease or insect infestation would sweep

through it. Although we can double the yield of our forests, we eventually run into limiting factors such as rainfall, climate, frequency of fertilization, and how the growth of competing brush is controlled.

This is no small problem, especially when one considers the enormous demands we place on forests throughout the nation, not just in the Northwest and Southeast. Here in New Jersey there is still much logging. An average volume of 23 million board feet of sawtimber is harvested annually. Other products such as veneer, pulpwood, piling, and wood chips add up to an annual total of 73.7 million board feet, in addition to over one million cords of firewood. New Jerseyans use 2.1 billion board feet per year. By the year 2000, the demand will be 3.1 billion board feet. Since such figures are incomprehensive to adults as well as youngsters, just tell your classes that each Sunday edition of the New York Times requires the cutting of 153 acres of loblolly pine, and that all the paper needed for the cups, napkins, and bags used by McDonald's hamburgers gobbles up 315 square miles of such forest annually. They will get the message!

Classroom Debate

In fact, they may get the message so well that, like my students, they might arrange a classroom debate centered around modern forest management. First, have them view another Time-Life film entitled, "The Renewable Tree." This movie, lasting one hour, discusses such management in light of the four timber-cutting methods used by the lumber industry. In one method called shelterwood cutting, trees are removed at several stages of development to provide sunlight, room and protection for new seedlings to grow. During a second method called selective cutting, the most mature trees are selected for cutting. After they are removed, their neighbors provide seed for new trees. Both methods permit natural reforestation, afford seedlings protection, and cause a gradual change in forest conditions, enabling young trees to adjust to a slowly changing environment.

The third harvesting method is seed-tree cutting, in which ten percent of the best seed-bearing trees are left on the site to provide the seeds for the next crop of trees. This cutting system works well on flatter topography with the fast-growing southern pines. After about 20 years, the new trees are thinned to prevent overcrowding. The remaining pines can be harvested 30 years after the original cut under favorable growing conditions.

FIGURE 6

Soil erosion demonstration shows how both volume of water runoff and amount of soil sediment in that runoff increase after clearcutting. Test plot on right represents the control "stand" of trees on a similar mountain slope at almost the same angle of elevation.

The last harvesting method, called clearcutting, is the most controversial. All the trees, bushes and shrubs in a block of 100 acres or less are cut, both those that are commercially valuable and those that are not. Standing timber is left between the logged areas. In time, seeds should blow in from the surrounding forest and seedlings take root. The new stands are thinned periodically. About 40 years later, the new trees provide seeds for a neighboring block, which is then cut. A few decades later, the first block is harvested again. This method produces even-aged trees that have no competition from older growth for sunlight. In theory, uncut timber should be left on the windward side of the harvested area.

Some environmentalists say clearcutting is unsightly and causes erosion because loggers don't leave any trees standing to hold back the soil in a clearcut area. Loggers, on the other hand, state that nature has always clearcut Douglas fir and some other species. They say that clearcutting is better because water that would normally be used by mature trees in these sites is allowed to move downslope into drainage streams and reservoirs. They also claim that fewer roads need to be built to haul out trees from a clearcut, compared to the many roads needed to get into an area where only the largest trees have been cut. Loggers, therefore, rest their case primarily on economic benefits of clearcutting especially in these inflationary times.

Ecologists also state that tree companies use too much nitrogen fertilizer to beef up the growth rates of trees, and that this fertilizer gets into downstream rivers where it encourages too much algal growth which chokes such streams, killing much aquatic life. Other experts don't like the use of herbicides by tree companies to keep down the growth of deciduous trees which otherwise take most of the ground water away from pine trees. These herbicides also get into streams and human water supplies.

Students are exposed to these varying viewpoints, not only in the film but also during a classroom demonstration of erosion prior to starting the debate. The demonstration consists of two planting trays in which pea seeds were planted three weeks prior to this discussion. After "clearcutting" the seedlings from one tray with a knife or razor blade so that the roots are left buried in the soil, the trays are elevated at an angle to simulate the type of mountain slopes on which clearcutting is done. Students then pour "rain" into the upper end of each tray simultaneously, and collect the runoff at the

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lower ends into plastic containers located in a sink (fig. 6). Youngsters not only observe the difference in volume of water runoff between the two trays, but also the difference in soil sediment carried away.

The debate itself takes two or three class periods to complete. Youngsters debate not only the clearcutting issue relative to other timber-cutting methods, but the recent desire of the lumber industry to gain permission to cut old redwood stands in preserved areas out West, as well as whether the industry should be allowed to clearcut trees in our national forests. Each team of two to three volunteer debaters selects which side of the issue it wants to represent. The debaters then carefully plan their arguments. Such selection and planning requires about two weeks, so it is best to announce the debate and call for volunteers midway into the minicourse. Debaters are told that the rest of the class, not the teacher, will judge and grade their performance based on presentation of evidence to support their arguments.

Such evidence in our debates has consisted of interviewing student "witnesses" and guest experts on wildlife and forestry from New Jersey, in addition to use of visual aids such as bulletin boards assembled by students, printed handouts given to class members, and charts or maps taped to the chalkboard (fig. 7). Other class members finally grade each debater via secret ballots. These are folded and placed in a ballot box constructed by one of the students in the wood shop.

FIGURE 7

Teams debate the effectiveness of thinning a stand by using wall displays and a cross-section of an oak tree.

Conclusion

The debate signifies the climax of a forestry minicourse which, above all else, forces youngsters to *think*—think about how wonderfully structured trees are; think about their renewability when utilized wisely; think about their economic benefits; think about their recreational opportunities; think about their protection and food for wildlife; and think about their protection of our watersheds. Too many students in schools, camps and youth groups are not required to think about such aspects of their environment, their place in it and responsibility for it. They are the future voters who will be called upon to either support or give the axe to programs designed to improve their environment. Not knowing what the issues are and have been and not thinking about them will be just as bad as voting against that environment which we teachers should be getting our students to love and respect. The environment already has too many enemies; let's not add apathy to the list.

What do *you* see when you look at a tree? More importantly, what do your *children* see?

For more information and copies of student lab activities described in this article, please contact Dr. Stephen J. Zipko, Randolph Intermediate School, Millbrook Avenue, Randolph, NJ 07869.

Footnote: The above minicourse is suitable for use around Arbor Day. You can reserve pine seedlings at your county agricultural center for distribution to children after April 1st. Also send for free materials about trees from the following.

American Forest Institute
1619 Massachusetts Avenue, N.W.
Washington, D.C. 20036

California Redwood Association
1 Lowbard Street
San Francisco, California 94101

Western Wood Products Association
1500 Yeon Building
Portland, Oregon 97204

St. Regis Paper Company
150 East 42nd Street
New York, New York 10017

Weyerhaeuser Company
Office of Resource Education
Tacoma, Washington 98401 NJ

National Wild Turkey Federation Convention

The 7th Annual National Wild Turkey Federation convention will be held at the Hyatt in Cherry Hill, New Jersey, February 18 and 19, 1983. The convention, which will celebrate the Federation's 10th Anniversary, will be hosted by the New Jersey State Chapter with Howard Brant, outdoor editor of the *Star Ledger* (Newark) and *Jersey Journal* (Jersey City) as convention chairman.

The Grand National Wild Turkey Calling and Owl Hooting Championships, wildlife art auction, commercial exhibits, hunting seminars, JAKES program, and banquet will highlight the two-day affair.

Leonard Lee Rue, III, of Blairstown, New Jersey, world-renowned wildlife photographer, author, and lecturer, will unveil his new wild turkey slide program.

Other seminar speakers include Dwain Bland, Rob Keck, Jim Craig, Sheila Link and Shirley Grenoble, Jim Norine, Carl Brown, and Bob Eriksen.

For additional information, write the National Wild Turkey Federation, Inc., P.O. Box 530, Edgefield, SC 29824, or call 803-637-3106 between 9 a.m. and 5 p.m. E.S.T.

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WINTER GROUSE

to have "gone to the dogs," it has pleased us to hunt grouse with several breeds. Each has left some special anecdote.

One springer spaniel would bark in utter frustration when he arrived at the point where a bird had flushed wild. A Brittany always planted a firm paw upon a downed grouse until certain the bird was secured.

On a day when the snow was beginning to stick to the ground a free-wheeling orange and white setter slammed into point where a steep gully intersected a logging road. The grouse flew straight down the gully and seemed to give a derisive flick of his tail as the shot harmlessly whistled by.

A blue-Belton setter only would hunt familiar covers *her* way. Efforts to take her on a leash to the opposite end of a cover and work back proved futile. She merely returned to the usual starting point and proceeded to find birds, doing it *her* way.

When retrieving, the above-mentioned Labrador always had a pleading eye which said: "Don't drop it!"

The Lab seems to have the least amount of difficulty with snow and ice balls forming between the pads. Any dog with retrieving capabilities is at once a relief and a satisfaction, especially in heavy evergreens.

Wintertime often finds small coveys of birds in areas where food and protection from the weather are in close proximity. Sunny, warm days may bring them to hillsides where some of the snow has melted. Rhododendron and mountain laurel where interspersed with wild blueberries, affords both cover and food.

The sun's rays begin to dwindle as we near our starting point. A bird erupts from a cedar thicket and vanishes before we can get into action. Another scuds away low and the shot catches him crossing a miniature clearing. Any sign of fatigue the dog had shown now vanishes as she bounds after the bird. Vibrating from head to tail she returns and delivers the capping climax of the day.

Home is the hunter, with a modest bag, and thoughts of a rewarding day afield in the crisp winter air.

The Labrador is a useful dog for grouse hunting, especially when it comes to finding downed birds.

This is not a "big bag bragging game." The rewards are many aside from the actual bag. The surroundings, the quiet, the dog work, the tracks of wildlife in the snow, a pause alongside a stream to reflect upon trout fishing, all contribute their share to the day.

Although temperatures have plummeted and snow blankets the land, pursuing the ruffed grouse offers pleasant times afield as the days begin to lengthen. ND

Hopewell Valley's Unique

by Matt Hoffman
and Carol Kelly

Two girls investigate the stream bed of the Stony Brook. MATT HOFFMAN

Students identify wild flowers and wild herbs in the field. RUSS SELGER

Hopewell Valley Regional is a small district of five schools nestled among the rolling hills and farm lands of northern Mercer County. Though only 10 miles north of Trenton, the community of nearly 60 square miles has been able to hold its rural flavor.

In the Valley, nearly 13 years ago, Doug Dickenson, a science teacher at the Junior School, developed an idea of extending the classroom curriculum to the out-of-doors. It was decided that the sixth graders from the then four elementary schools would study three environments: the field, the forest, and the stream in a natural setting.

In an agreement with the Stony Brook-Millstone Watersheds Association, the district began to use the nearly 500-acre Watershed farm as an Outdoor School. The farm, which is located off Titusmill Road between the boroughs of Pennington and Hopewell in Hopewell Township, is still being used.

When the first groups used the farm in 1969, the only buildings standing were a large, white dairy barn and an aged carriage house. The barn was still set up for milking cows, with stalls and concrete floors; this became the dining hall. The old weathered carriage house was used as a dormitory, and the children literally slept in the loft.

Enthusiasm for the program grew, and improvements began. The barn was completely remodeled, but before the first group could use it, it was set afire by an arsonist and burned to the ground. Later the carriage house was "spruced up," and two bunkhouses were built by Industrial Arts students from the Central High School. These three buildings are in use today when the sixth graders from three elementary schools—Hopewell, Toll Gate, and Bear Tavern—conduct their programs at the Outdoor School.

The Outdoor School provides students with direct field experiences related to their Ecology unit of study. In the field, students have an opportunity to see first hand the things they have learned about in class. These situations become real to them as they make close, personal observations.

However, Outdoor School provides more than an academic atmosphere. It provides a place for students and teachers to interact more freely. It provides a place where students can better know themselves through new and challenging situations. It provides an opportunity for students to learn about

Outdoor School

Students perform a soil test on the forest floor. RUSS SELGER

With the help of a teacher, a sixth grade student negotiates the "Bosun Chairs."

MATT HOFFMAN

responsibility and group living, but perhaps its most important function is to enable the students to develop an appreciation and affection for the out-of-doors. As the egrets fish and the geese land in the nearby pond, they watch with interest, even awe. The call of a pheasant and the blaze of a shooting star are all exciting events.

The academic program at Outdoor School does much to heighten this type of awareness. The students are divided into three groups, and on a rotational basis they study the three communities of the field, forest, and stream with the aid of specially developed study booklets.

In the field, students identify plants, conduct soil tests, and investigate the animal life. Interest runs high when they find a mouse run, or as the group meanders along a deer trail. They catch, examine and release insects after noting their unique adaptations to their environment.

At the same time, a group is busy in the forest community. Here, students discuss the differences between a coniferous and a deciduous forest. They identify common trees through leaf study and bark rubbings. They look for signs of animal life in the different forest levels. An activity the students especially enjoy is the fallen log study, a detective-like project through which the students come to realize how a forest recycles itself.

Simultaneously, a third group is at the stream busily engaged with dip nets and seines. With careful investigation, they may find more than 30 different species of animals, among them crayfish, freshwater clams, creek chubs, water scorpions, fisher spiders, johnny darters, dragonfly nymphs, and water striders.

Culminating the two-day Outdoor School program is the confidence course. This is a series of rope-climbing activities designed to allow the student to challenge themselves in a unique and different way. These activities go by such names as the Kitten Crawl, the Tension Traverse, and Bosun's Chairs.

While half the group is going through the confidence course, the other half is involved in group problem-solving games designed to encourage group cooperation.

Since the Outdoor School is completely self-contained within the district, no outside kitchen staff is employed. Therefore, the children from each school are actively involved in the preparation at mealtime (of course, without the help of tireless parent volunteers, we would probably starve). After each meal, the children pitch in to clean up the dining area, mopping floors, scrubbing tables, and washing dishes. It's enjoyable to watch the children pull together; for some, it's a new and even exciting chore.

When the evening meal is completed and cleanup finished, the children and their teachers gather around a campfire to share anything from group games and astronomy to ghost stores; or a guest speaker may address them on a nature-related topic. Later, the children may participate in acclimatization activities, such as a night hike where children are left alone in a field for a short time to better use and understand their senses.

These evening activities make for a near family-like setting, adding a real dimension of closeness to the two days spent here. NJ

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FIELD TRIALS

better lines in each. This helps to avoid an answer tainted by kennel blindness.

Training advice is also readily available. Just mention a problem with bird dogs to a field trialer and advice will follow. Ask someone else and more will follow—usually different. It's a good place for fresh ideas. There are few trialers who have not had the same dog problems in common: the same ones that everyone has with his first few bird dogs.

The cost of entering a dog in one of the stakes will very depending on the size and importance of the trial. Expect to spend $10 to $15 for a puppy entry. Derbies usually start at $15, and shooting dog and walking gun dog are around $20. Entry fees in open trials are usually more expensive than amateur because half of the fee money is divided among the three winners. Championships and classics start at $50.

Most bird hunters already have most of the equipment that will be needed. What they may not have, though, is a blank gun. These range from $10 for an inexpensive model that shoots crimps only, to $65 for a well-made gun that will shoot both crimps and blanks.

It is necessary to have some kind of tie-out chain to keep the dog restrained while waiting for his brace to come up. And there should be some kind of shelter for the dog if the weather turns sour. The handler should have clothes for all types of weather. A warm March sunrise can easily turn to rain or snow with little warning.

WARREN GARRETSON

Cape Island Intrepid, winner Grand National Grouse Futurity, and Ocean County and Central Jersey derby stakes; a Jersey-bred English setter.

The trial clubs arrange to have rental horses available for handlers and spectators for about $3 per brace. In most cases these are easy-riding trail horses that do not require the skill of a steeplechase rider. Hot breakfasts and lunches are available on the grounds at the clubhouse that is shared by all the clubs.

Just as a fine table setting complements an elegant meal, the backdrop of Assunpink is the perfect place to show the best bird dogs. The acreage is sufficient that the biggest-running all-age dogs may be shown in their best light. And the cover is varied enough so that the closeworking gun dog finds the area equally challenging. Each weekend brings participants from throughout the Northeast who are attracted by the quality of the grounds and trials.

Field trials provide bird hunters an added dimension to their sport. They can add greatly to their outdoor recreational hours while improving their bird hunting. But trialing may present an unexpected problem: it may become addictive. There may be more recreation than expected as one weekend trials leads into the next.

The thrill of placing the shot charge accurately on a rising grouse or woodcock is temporarily replaced by another stimulus: the excitement of competition. The satisfaction of pheasant-under-glass or quail-on-toast-points is further enhanced by blue ribbons on the wall, and the acknowledgement by impartial judges that a carefully selected pup of two or three or four years ago was a wise choice. The pup gave more meaning to the upland sport, put birds on the table and ribbons on the wall. He became a winner.

Wildlife in New Jersey

GRAY FOX

By David Chanda

LEONARD LEE RUE III

No animal has ever enjoyed a reputation quite like that of the fox. Known as an intelligent and cunning animal, numerous stories abound as to its ability to outwit both fox hounds and sportsmen with clever tricks.

The phrase "sly as a fox" and the term "foxy" are complimentary terms derived from the fox's legendary craftiness. In addition, General Erwin Rommel, the famous German field marshal, was known as "The Desert Fox", a tribute to his cleverness in war tactics during World War II.

The fox has long been an important part of sporting history. It is a favorite quarry not only for sportsmen, but also for those who engage in fox hunts for social pleasure. The traditional fox hunt conjures up a picture of red-coated hunters, mounted on horses galloping after fox hounds and shouting "Tally-Ho!". Although the social fox hunt is not often seen today, hunting and trapping the fox is still popular.

The Gray Fox *(Urocyon cinereoargenteus),* is found throughout New Jersey. It lacks the glamour of its flashy cousin, the Red Fox, nor is it as fast or strong. Also, the Gray Fox is not as bold and can not tolerate human encroachment as well as the Red Fox. However, it matches the Red Fox's craftiness as a hunter.

The male and female Gray Fox look alike. They both have a long black-tipped bushy tail, and a salt and pepper coat on the top of their head and back. They each have reddish brown fur on the sides of their necks, chest, and belly, and on the bottom of their tails. Fox are not large animals, and the average weight of a Gray Fox is approximately ten pounds.

The Gray Fox and Red Fox, although they are in the same family, are rather intolerant of each other. However, their habitat preferences tend to keep them separated. While the Red Fox prefers open hardwoods and field edges, the Gray Fox likes swampy areas and dense thickets. For the Gray Fox, the thicker the cover, the better.

This habitat preference of the Gray Fox has made it a difficult quarry to pursue. Once the chase begins, the Gray Fox heads for dense brush, which is often impenetrable by fox hounds and hunters. If this trick fails to elude the dogs, the fox will run for its den. If the den is not in the area however, the Gray Fox will rely on an unusual escape tactic—it will climb a tree!

This is an unusual ability, and in fact, the Gray Fox is the only member of the dog family that is able to do this. Not even its cousin, the Red Fox, can accomplish this feat.

It is not known for certain how the Gray Fox is able to climb trees. Many people believe that they have retractable claws. In reality, the fox's claws are curved and short, but not retractable. It was also thought that the Gray Fox could only climb trees that were leaning, but straight trees present no problem to a fox trying to elude its pursuers. Apparently, the short claws dig into the bark of the tree and allow the fox to get up to the first branches, where it can then proceed to hop up from branch to branch as high as it wants to go, and feel secure from the fox hounds below.

The Gray Fox has a very broad diet. It eats a considerable amount of vegetable material, but basically, the Gray Fox is opportunistic, and what it eats depends on the season and the food which is available. Small rodents, such as mice, are the mainstay of the fox's diet. However, it also eats grasshoppers and other insects, frogs, small birds, an occasional rabbit, and turtle and bird eggs. Berries such as wild grapes (also known as fox grapes), and mast crops such as beechnuts are also favored by the fox.

The Gray Fox does most of its hunting at night. It can range as far as ten miles in its travels. The distance the fox covers each night depends on the availability of food and how hungry the fox may be.

Sense of smell is extremely keen in the Gray Fox, and is by far its most important tool in hunting. The fox will use its nose to trail prey over a considerable distance. The fox's sense of hearing is also well-developed, and is most useful in tracking prey at close range. It has been said that a fox can hear a mouse squeak in a field at 100 yards.

As with other wild dogs, the Gray Fox is color blind. However, this does not mean it has trouble seeing, because its eyesight is excellent. But even if it were blind, a Gray Fox would still have a chance of surviving, because it can rely on its senses of smell and hearing to locate food.

There is a limit to what a fox can kill and eat. Seldom are they able to catch an adult turkey or beaver. Even game birds such as grouse, quail and pheasant, while occasionally are taken, are not important staple items in the Gray Fox's diet, and the fox has no effect on their population numbers.

In the past, it was believed that to increase the numbers of small game animals (such as pheasant and quail) in a habitat, all the predators must be eliminated from that area. This belief led to many towns paying a bounty on predators such as the Gray Fox. Fortuntely today, modern wildlife management has shown that predators seldom have an effect on a prey population, and generally, it is the prey population that determines the number of predators a habitat can support. It has also been shown that the bounty system, as a control on predators, does not work. For example, the removal of fox for the bounty had no effect on the fox population in Pennsylvania. That

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GRAY FOX

state placed a bounty on fox from 1907 to 1968 and after 61 years the fox population was as high as it had ever been. In addition, many abuses of the bounty system were reported. Most often, these abuses were due to the methods of collection of the fox. Towns often required various parts of the animal, such as a leg, an ear, or tail, to be presented to the municipal clerk. In this way, bounties could be collected on the same fox by turning in different parts to several towns. In addition, many fox were killed in areas which offered no bounty, but were presented in a town that had a bounty on fox.

There are two roaming times each year for the Gray Fox. The first is in February when the male travels in order to locate a female and start a family. As with most dogs, they will remain together until the kits are old enough to be on their own.

The female selects the den and readies it for a family. The den may be in an abandoned woodchuck burrow, a cave, or occasionally in a hollow log or branch in a tree. The female will line the den with grass and give birth to a litter of about five young in April. The young are born with their eyes shut and nearly hairless. At birth they only weigh 3-4 ounces. For the first few weeks the female must remain with the young almost constantly. During this period the male hunts and brings food back to the den.

At about five weeks, the kits begin to make brief trips outside the den. Although fox do not have many natural enemies, the young at this stage may be killed by hawks or owls, and because of this, they do not wander far from the den. Most of the kit's day is spent exploring every new object that presents itself, and wrestling with siblings.

At about two months, the kits are left alone frequently while the female hunts. At about three months the young begin to hunt with their parents. The fall begins the second roaming time for the Gray Fox. This is when the family breaks up and drifts apart, and the parents also separate. The fox may move as much as 40 miles during this fall period, because there is less food available. Another purpose of the fall roaming season is the establishment of individual territories. Though territories will overlap, and a fox will not be a total loner during this period, the strong mating bonds are gone until the next spring's roaming season.

The winter is the most stressful period for a Gray Fox. This is when the population is most susceptible to disease, starvation and predation. Some common diseases the Gray Fox suffers from are sarcoptic mange, heartworm, distemper and rabies. All of these diseases may be transferred to domestic animals. Although distemper and mange pose little threat to people, rabies can be transmitted to humans.

Disease is one of the methods nature uses to control Gray Fox populations. These diseases are generally density dependent, which means as the fox population increases, the chance of disease outbreak also increases. In some areas of New Jersey, sarcoptic mange has drastically reduced the fox population. Sarcoptic mange is caused by a small mite and results in loss of hair, large sores and secondary infections. An animal in the wild that contracts mange never recovers and suffers a lingering death.

Trapping is a tool used in wildlife management to reduce overcrowding of fox populations. This decreases the chance of a major disease outbreak and in turn helps to insure a healthier Gray Fox population. Trapping Gray Fox provides a considerable challenge to New Jersey trappers. The trapper must become intimately familiar with his trapping area and the habits and behavior of the fox. The most effective way to trap a Gray Fox is with a dirthole set (also known as "the buried bait" set) using a leghold type trap.

Many people have questioned the humaneness of a leghold type trap. (Actually the trap should be called a foothold trap as when properly used it will catch the furbearer around the pad on its foot.) In a recent scientific study conducted by the Pathology Unit of the New York Department of Environmental Conservation, 150 foxes were trapped in leghold type traps, marked and released. The study found no debilitating injury to the foxes trapped in this project. Contrary to popular belief, these leghold type traps do not maim foxes but merely hold them until the trapper arrives. Furthermore if non-target animals are captured, they can be released unharmed from a leghold trap.

Fox trapping can also provide supplemental income for the successful trapper. Each year New Jersey trappers harvest approximately 6,000 Gray Fox worth over $240,000. Fur processing also generates additional economic stimulus. New Jersey has almost 150 fur processing plants which employ nearly 800 people (many of these plants are the wholesale fur buyers who act as the middleman between the trappers and the coat factory). Finished coats are not only beautiful but represent a naturally renewable resource, as opposed to synthetic coats, which are derived from petroleum by-products, a limited non-renewable resource.

After endless retelling, legends of the fox's cunning and intelligence have become matter-of-fact. There's the story about the fox that came across a flock of sheep while being hunted by a group of hounds. In an ingenious ruse, the fox climbed on back of one of the sheep, and rode it for two miles, successfully eluding the hounds by erasing any trace of its scent. In another feat, there is the story of the fox which carried off whole coops of chickens in a single night. And of course, one must remember the crafty fox who slipped through a tiny hole in the fence to enable him to drag away the old gray goose.

Though man has often exaggerated his cleverness, the Gray Fox is indeed crafty and intelligent, and is a very interesting animal to study. NJ

FRONT COVER
Atlantic City Lighthouse—Photographed by David M. Campione

INSIDE BACK COVER
Gray Fox and kits—Illustrated by Carol Decker (See article on page 31.)

BACK COVER
Winter's Magic—Photographed by David A. Bast (See article on page 6.)


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