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Outdoors



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NEW JERSEY OUTDOORS CREDO

This publication is dedicated to the wise management and conservation of our natural resources and to the fostering of greater appreciation of the outdoors. The purpose of this publication is to promote proper use and appreciation of our natural, cultural, and recreational resources, and to provide information that will help protect and improve the environment of New Jersey.

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The views and opinions of authors do not necessarily represent the opinion or policies of the Department of Environmental Protection or the State of New Jersey.

FROM THE EDITOR

Too Early for Spring Fever?

I'm writing this during Thanksgiving Day week and the weather has been almost like Spring—55° to 65° with lots of sunshine. Although this material is for the January/February issue when the weather is supposed to be snowy and cold, I'm wearing a short-sleeved shirt.

You must have noticed that the front cover is a William Leather photograph of an ice

fisherman, and the back cover is a Dave Bast photograph of a snow-covered woodland. I hope by the time you receive this issue the weather becomes seasonal—snow, ice, wind, the whole bit—because I'd be somewhat embarrassed if the weather hasn't cooperated with my selection of photographs and articles and you're still wearing a short-sleeved shirt (or blouse).

IN THIS ISSUE

What do you do in January when the temperature dips to below freezing and the wind chill factor is a -10 or so? You become familiar with *Ice Fishing Basics for Lake Hopatcong*, an article written by Robert A. Martin. The author, a freshwater fishing guide and a member of the 1983 B.A.S.S. Federation State Team, is chairman of the Department of Biological and Allied Health Sciences at Fairleigh Dickinson University.

In the article *The Texas Tower: New Jersey's Sunken Treasure*, contributing Editor Cathie Cush describes the events leading to the destruction of Texas Tower Four on January 16, 1961. Interwoven into the text is the description of a dive made on the Texas Tower wreck by a group of South Jersey divers, including the author.

And if ice fishing is not your bag, try *Ski Touring*/"If you can walk..." by frequent contributor Rosalie Strachan. The article describes where to go, what's there, and how much it will cost.

Writer Michael Toth says *New Jersey's the place to hunt deer*. He has plenty of experience and his reasons are compelling. The author is Associate Editor of *Outdoor Life* magazine, so he should know.

Outdoorsman Frank Dale, a frequent contributor, writes about *Deer Lake/A Quiet Park* section of Allamuchy Mountain State Park. Keep it a secret and enjoy the solitude of this out-of-the-way place.

Out of the hammock, into the soil was

written by Byron Griffin of Ocean, a new contributor to our pages. The author described his piece as "a light-hearted look at the trials and tribulations of the novice vegetable gardener." I'll buy that. The illustrations were provided by Anthony Hillman.

Geology of the Passaic River Basin was written by free lance writer Susan Barry, her second effort for NJO. The article describes how the Passaic River Basin came to be, and the value and importance of the wetlands in this basin.

Douglas W. Smith of Normandy Beach is an avid backpacker, member of the Appalachian Trail Conference, N.Y.-N.J. Trail Conference, and an English teacher from the C.W. Goetz School. He also wrote *A Walk With Casey Kays*. In the 1960s and 70s Casey Kays, his typewriter, the Lenni Lenape League, and other concerned citizens "saved" Sunfish Pond for all of us to enjoy.

We Need Wetlands! by William Vibbert describes our wetlands, and what special places they are for wildlife and people. The author is employed by the Division of Parks and Forestry as a Parks Superintendent at Cheesequake State Park.

A Wetlands Primer titled, *Freshwater Wetlands* is presented as a snapout centerfold insert. This piece was compiled by Cathie Cush from material supplied by the Natural Resources Wetlands Committee.

In the article titled *New Jersey Canada Goose Populations*, Fish, Game & Wildlife

Biologist Paul Castelli describes the migrant and resident Canada Goose studies in progress in eight states along the Atlantic Flyway.

A Winter Photo Foray is just that—a winter picture story by outdoorsman/photographer Al Peinecke.

Are you familiar with Cape May diamonds, Petersite, or Prehnite? No. Then read *Mineral Collecting in New Jersey* by Helen Collins, her first effort here. She has been published in *The New York Times* and *New Jersey Monthly*. She is employed as Asst. Director of Public Information at Stevens Institute.

Historical writer Robert P. Sheridan, Sr., in his first effort for our publication, writes about *A Battle in Princeton* in January, 1777.

Carol Decker's painting on the inside back cover introduces the "Wildlife in New Jersey" series article titled *Red Tailed Hawk*, written by Wade Wander of Somerset. The author (MS in Ecology, Rutgers) and his wife, Sharon Ann Wander, an NJO contributing editor, recently formed a consulting firm, Eastern Ecological Services, specializing in natural resource inventories.

A second Natural Lands Trust print by artist Stefan Martin is featured on page 33.

Steve Perrone



FISH, GAME & WILDLIFE PHOTO

Ice Fishing Basics for Lake Hopatcong

BY ROBERT A. MARTIN
PHOTOS BY AUTHOR

The cold north wind whipped across the lake, flinging dry, powdery snow into my face. My beard was full of the stuff, and my moustache was stiff as a board from exhaled water vapor which had condensed on its surface. The wind chill was probably 20 below and dropping rapidly. But I wasn't cold. Inside my padded snow mobile suit, which incidentally made me feel like the fat man at the circus, it was pretty comfortable. Fur-lined boots and gloves plus a woolen head mask kept winter's worst from taking its toll. But it was bad outside. A frog would have been freeze-dried in milliseconds. Now what was I doing, you might ask, to expose myself to such potential danger? Was I an advance scout for an Arctic research team? That would make some sense; suffering and doing something really important. It wasn't so. I was simply ice fishing on Lake Hopatcong while my wife and daughter, brighter by light years than I, basked in front of a cozy, crackling fire, chuckling at daddy's stupidity. But men have always ignored the common sense of women, so why should I be different? And I was actually (sort of) having a good time. The pickerel were biting, and at that point in my fishing career we were eating pickerel regularly. Thus there was the added compensation of bringing home the bacon, so to speak.

Ice fishing was not something I had done until we moved onto Lake Hopatcong six years ago, and one of the first surprises to me was that any fish would be willing to bite in that frigid water. As a biologist, and one who occasionally dabbles in physiology, it had been my impression that most poikilothermic ('cold-blooded') creatures became dormant when their environment approached freezing. So I was not prepared for the large stringers of pickerel and perch that ice fishermen hauled out. Some bass, trout, and crappie were also caught, but not at all locations. Enthusiastically I trooped down to the local tackle store and bought a bunch of cheap tipups, the ice fisherman's basic weapon. Since then I have enjoyed many a winter foray onto the lake and have developed some basic techniques which I hope you will find useful.

THE TIPUP

Think of a reel with line and a hook at the end, but no handle. Take the reel and attach it to a pole so that the reel can freely spool out line if a fish is hooked. Attach a minnow or herring to the hook and let it swim away under the ice, through a hole which you have opened. Then plunge the reel into the water. You now have the business end of any variety of tipup, which we'll call for convenience the *reel*. If a fish strikes it can take out line as it sees fit. Now we only have to figure out how to support the device and to get it to tell you there's a fish on the other end. Expensive aluminum tipups come with fold-up tripod legs, but the cheaper versions have two wooden cross extensions, attached on a spindle to the central pole, which support the latter in a vertical

position.

When a fish takes the bait and the reel begins to turn, the force of the fish's run triggers the release of an *indicator shaft*, a metal rod with a colored flag at one end. Triggering methods and construction of the indicator shaft differ among manufacturers, but in all cases the flag pops up into the air, announcing a strike.

It is crucial that the entire reel be submerged in the water. Otherwise ice will form on the line and reel, precluding it from turning freely, if at all. If the reel cannot turn, a fish can take the bait without releasing the indicator shaft.

State law limits the number of active holes to five. If you fish through one hole with a jigging rod only four tipups can then be used.

Tipups run from about three to over ten dollars and can be purchased in season from any local tackle store. In the Lake Hopatcong area I would recommend Ramsey Outdoors, Lake's End Marina, Bait and Boat, and Sportsman's Cove shops.

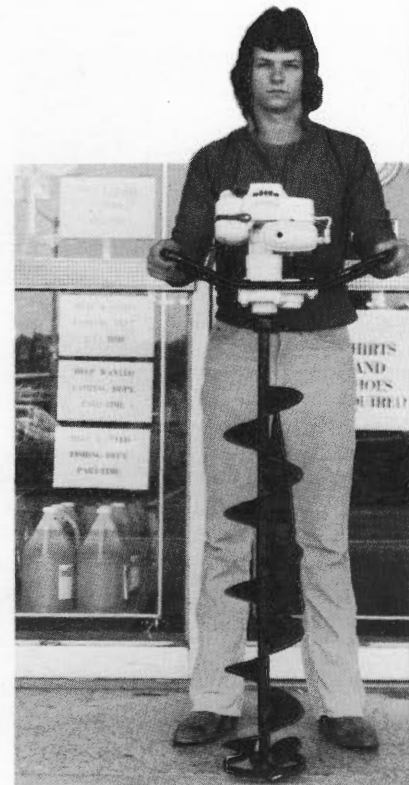
So now you've got a tipup. But what do you do with it and where do you go to fish?

DRILLING THE HOLE

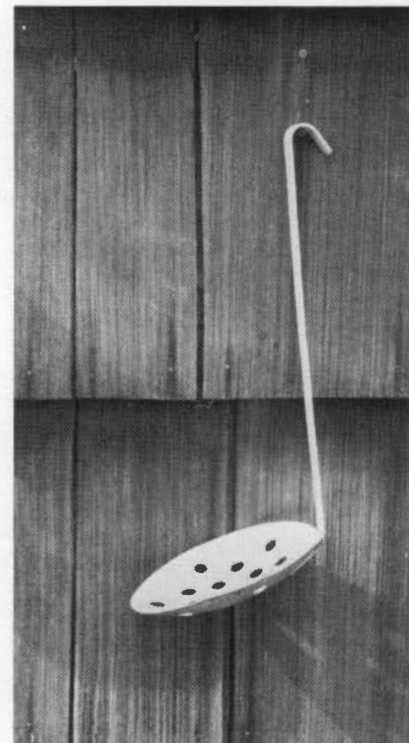
When the ice is thin and new almost anything will work. However, when the ice is eighteen inches thick and hard as a rock, special equipment is required. Three basic types of tools are used. The *spud bar*, a long, heavy iron or steel bar flattened to a chisel on one end, is used to manually chop a hole through, bit by bit. It works, but it takes a lot of time and sweat. Large manual *augers*, which make the workload somewhat easier, are available in a variety of forms. Some have a corkscrew appearance, others have a sharpened shovel blade at the business end. By far the most superior piece of equipment for drilling holes in ice is the *power auger*, a large drill driven by a gasoline powered, air-cooled engine. All augers are made in different diameters to drill different size holes. Six and nine inch sizes are common. Don't worry about the hole being too small. Anything too big to fit through a nine inch hole shouldn't be allowed to crawl around on the ice near your feet anyway!

As you would expect, there are significant differences in the price of each device. A spud can cost less than 10 dollars, a manual auger less than 50. Power augers usually run about 200 dollars. But don't despair; Lake's End Marina and Sportsman's Cove will rent you one for about 10 dollars a day.

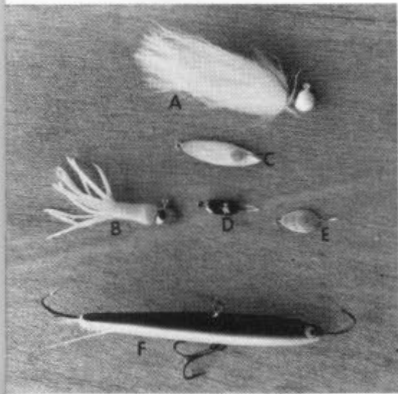
An ice scoop, a large aluminum spoon with holes drilled in it, is necessary to remove ice chips from the hole following drilling. That sells for about two dollars. This scoop is also used to break up and remove ice that forms around the tipup in the hole. The reel will still function as long as it is submerged, but on very cold days a heavy layer of ice will just about cement the tipup in place, making it difficult to get at the fish once you have it on the line.



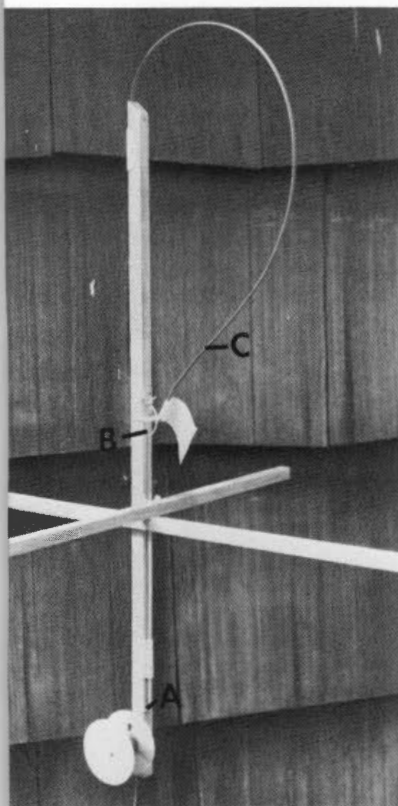
Charlie Nestor of Ramsey Outdoors, Ledgewood with a power auger.



An ice ladle for removing shards of ice from a water-filled hole.



Jigs (A, B), spoons (C, D, E) and a lure made by Rapala that are used for jigging through a hole in the ice.



An inexpensive tipup set to release. The unit is submerged up to the level of the cross bars, which support the structure on the ice. When a fish runs with the bait, the spool turns and an extended flange from the spool moves the base of the release rod (A) which shifts the top of the release rod (B) to kick the indicator shaft (C) off its perch.

BAIT AND TACKLE

Tipup reels do not come with line. Purchase spools of heavy braided nylon or heavy monofilament (50 or so pound test) line and fill most of the spool with that. Then attach about 24 inches of monofilament, at least 12 pound test. All this heavy line is needed so that the line is not cut by the ice at the base of the hole as a fish is pulled through.

Attach a long-shanked hook directly to the line. Don't bother with metal leaders. I also recommend tying on a small spinner about 18 inches above the hook. The spinner provides flash and thus acts as a fish attractor.

Bait varies with the local store. Sometimes alewives (called 'herring' in the stores) are available, but more often minnows are all that can be purchased. Take the herring if you can get them, but minnows can be very effective. Medium and large individuals run about two dollars a dozen. When the fishing is good, two people can easily go through two dozen minnows. I hook the minnow though the back, just above the vertebral column. The fish may not live quite as long as one hooked through the lips, but it also doesn't tear off the hook so easily. There's nothing quite as absurd as setting the hook on a presumed gamefish, reeling in the line, and finding nothing but a pair of minnow lips attached!

In order to keep the minnow down in the water, away from the ice, attach a sixteenth ounce split shot to the line a foot or so above the minnow.

NOTE: If you don't follow any other instruction or suggestion in this article, buy a small tropical fish net to use to remove minnows from your bait bucket.

If tipup watching or jabbering with your buddy becomes excessively boring, you may remove one tipup from the ice and try a more standard technique of fishing, called jigging, to lure up a fish. In order that you're not too far from the hole, unique short-handled jigging rods can be used. With this method, special, usually tiny, lures are simply lowered to the desired depth through the hole and 'jigged', or moved up and down with an upward and downward series of flicks of the wrist. These motions should not move the lure more than a few inches at a time. Bait, in the form of beetle larvae called 'mousies', can sometimes be purchased to attach to the lures, but it isn't really necessary.

WHERE TO GO

Without doubt, for the most action you want to fish for pickerel and perch, which seem to be more mobile during the winter than other species on Lake Hopatcong. These fish prefer weedbeds, so look for shallow areas around Landing, King's Cove, Halsey Island, Brady's Bridge, River Styx, or Woodport. Bass and trout relate more to dropoffs, channels and deeper water in winter, although they can also be taken shallow in the right areas. For these fish, look for the edges of weedbeds near deep water. Struc-

ture maps of Lake Hopatcong are available at Ramsey Outdoors in Ledgewood and Lake's End Marina in Landing.

CATCHING THE FISH

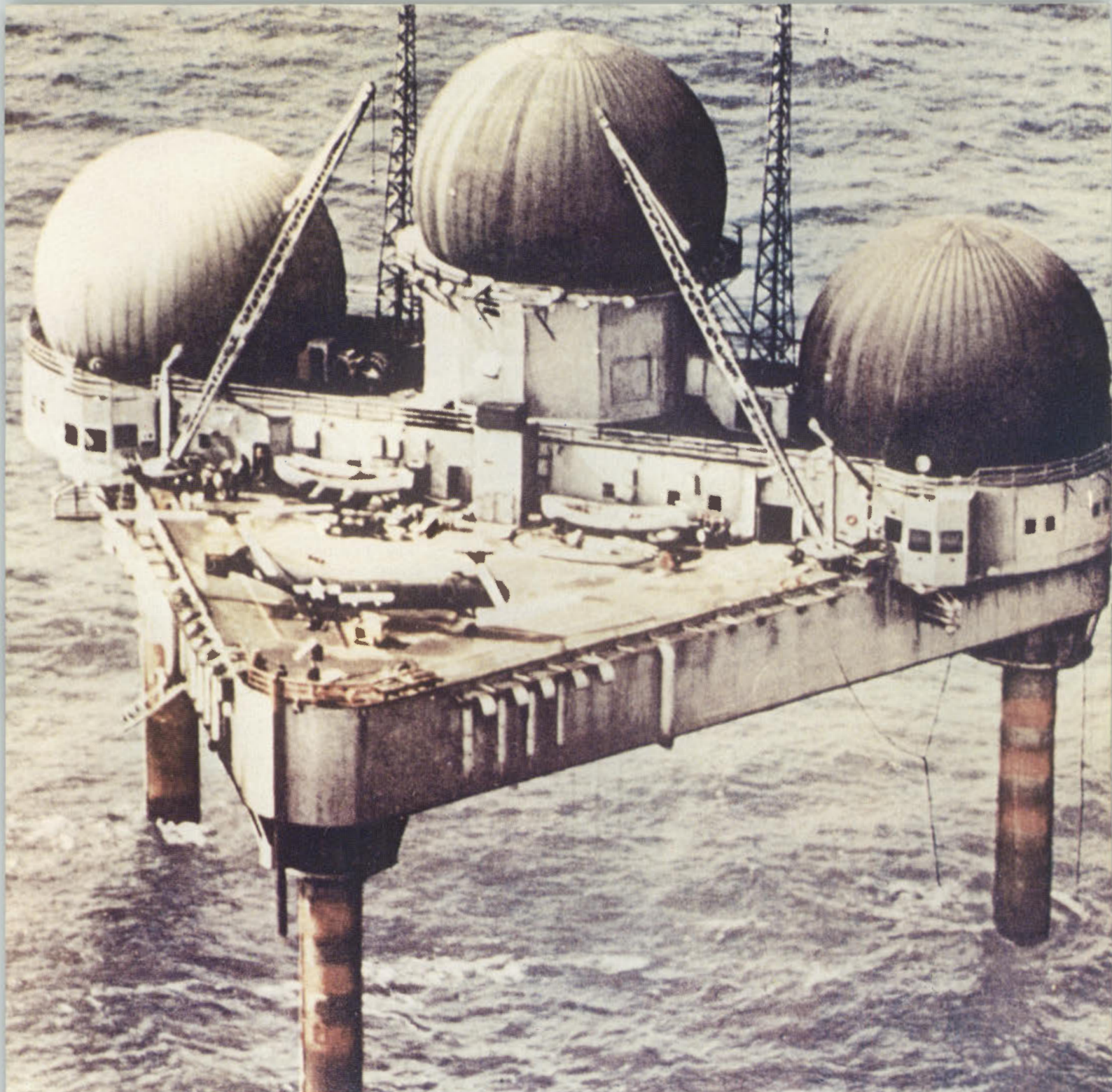
I have seen some pretty amazing things out on the ice when a flag goes up in the air. Most fishermen can't stand walking to the tipup; they have to run. This is as it should be. It's actually fairly exciting to see that flag pop up in the air. If it hasn't snowed, and the ice is clear, many people prefer to slide to the tipup. Sliding to the tipup should probably be an olympic event. Some folks have really perfected the operation. Of course, it's what happens next that determines success or failure. Failure is almost certain if you simply stare at the reel as it spins madly, a large fish at the other end heading merrily out to sea with your herring between its massive jaws. As with a strike in open water, setting the hook is essential. This does not mean that you should yank the line with all your power, but it does mean that you should take the line firmly in one hand and give it a solid tug or two. Then pull in the line as fast as you can, hand over hand. There will be a tense moment or two as you try to bring the fish in sideways through the hole. That won't work. A 24 inch pickerel cannot fit sideways through a nine inch hole. It won't bend, either. This is where a lot of fish are lost, but that's the way it goes. Just do your best and get the fish out on the ice as soon as possible. I usually dig a extra hole and keep my fish alive on a stringer under the ice, but the cold weather will also keep them pretty fresh just lying out on the surface.

WHAT TO WEAR

Don't kid yourself. It gets awfully cold out on a lake in the dead of winter. Wear longjohns, woolen socks, and warm boots. The feet usually go first. A skier out west has recently begun advertising some herbs to put in your socks that will generate heat. I have not seen the stuff on the market in this area, and I don't know the brand name. Keep your eyes open and let me know if you find it. In absentia, any one of a number of heavy rubber boots with felt liners are satisfactory. Break down and buy a snowmobile suit. They're also the best things to wear for open water fishing in cold weather.

CONCLUDING REMARKS

I'm not a great ice fisherman, but I don't go out on the ice anymore so much to catch a fish as to enjoy the freedom of a quiet, pretty winter's day and the camaraderie of other fisherman and families. A winter lake offers recreation to skiers, snowmobilers, hockey players, dog walkers, and general rif-raff like myself, who just can't stand to be cooped up all winter and who are in any case just killing time for that real northern fisherman's delight, ICE-OUT!



U.S. AIR FORCE PHOTO

THE TEXAS TOWER,

New Jersey's sunken treasure

By CATHIE CUSH

An 80-mile-per-hour banshee screeches across the Atlantic. Massive waves careen, collide, crash against each other.

The Texas Tower Four staggers like a drunken man, lurching crazily on its unsteady legs. The 28 men inside await a reluctantly-granted rescue. From

miles away, an aircraft carrier slices blindly through the gathering storm toward the endangered embodiment of the blip on her radar screen.

Then the signal disappears.

Some 20 years later the charter boat *White Star III* cuts through the late summer night toward a

spot roughly 75 miles east of Barnegat Light. Just before dawn, the mate throws the anchor, and the 20 divers on board gather their gear. At the edge of the Hudson Canyon they wait for sunrise.

One hundred-eight-five feet below sleeps Texas Tower Four, one of the most intriguing of many wrecks off New Jersey's coast.

Our excitement grows as we pull on wet suits and weight belts, hook regulators to tanks of compressed air, check depth and pressure gauges. We are college students, mechanics, computer salesmen. Half a dozen are from New Jersey; others are from Pennsylvania, New York, Ohio. All are experienced divers, and all have come to dive the clear waters of the Gulf Stream and to explore the huge wreck.

Advances in equipment have helped scuba's growing popularity. According to one sport diving industry report, 200,000 new divers are trained each year. The number of those who dive in New Jersey has doubled in the past 10 years. Although the often murky and usually cold water is a far cry from the Caribbean, Jersey wreck diving offers a special attraction. Off the beaches full of summer visitors lies a quiet world with a variety of sights—sunken schooners, barges, even the casualties of World War II—a veritable maritime museum.

The Tower dive is special. The site's distance from shore alone (about seven hours) makes the trip a major undertaking—but to say it's worth the effort is an understatement. Visibility, there at the edge of the Gulf Stream, can reach 100 feet or more. The marine life is spectacular in variety and often in size: Bluefish, tuna, ocean sunfish, even whales have been sighted on Tower tips. And then there is the Texas Tower itself.

Rescue Too Late For Early Warning Tower

Built in Portland, Maine, in 1957, it was to be one of five Air Force radar stations along the northeast coast. Two were never constructed. Two others, off New England, were eventually built and have since been decommissioned. The structures resembled Texas oil rigs, and so were named "Texas Towers."

Tower Four, the deepest of the three, stood on a shoal near the edge of the continental shelf. Three mammoth legs, or caissons, supported the 6,000-ton, three-decked platform 67 feet above the sea. One of the legs held water to be distilled for use by the 73-man crew, the United States Air Force 4604 Support Squadron. The other two were filled with fuel oil.

According to a 1959 Squadron yearbook, the structure was worth \$8 million, and an additional \$4 million worth of radar, radio and associated equipment were placed on board before the tower became operational on April 8, 1959. Other sources would double the value of the tower and the equipment on board.

Four months later, on August 29, the first of a series of damaging storms battered the radar station. Hurricane Daisy threatened the tower and all personnel were temporarily evacuated. No one was hurt, but the storm did \$500,000 damage to the understructure.

A second hurricane, Donna, struck in September of the following year. Donna hit the tower with 50-foot waves and 130-mph winds, mortally wounding the tower that had become known to those on board as "Old Shaky," and wiping out its radar system.

All but 14 crew members were evacuated, and 14 civilian repairmen were brought on board to attempt to rectify the damage. Their efforts, as well as those of the divers who tried to strengthen the understructure with steel cables, were unsuccessful.

By winter conditions aboard the tower had worsened, but the Air Force hesitated to evacuate completely because they feared that the abandoned radar equipment could easily have been captured by Russian trawlers fishing in the area. When the order to evacuate finally came through, in the second week of January, it was too late. The Texas Tower sank in a storm on Jan. 15, 1961, at 7:33 p.m. while the aircraft carrier *Wasp* raced to its rescue.

Submarine Sightseers Take the Plunge

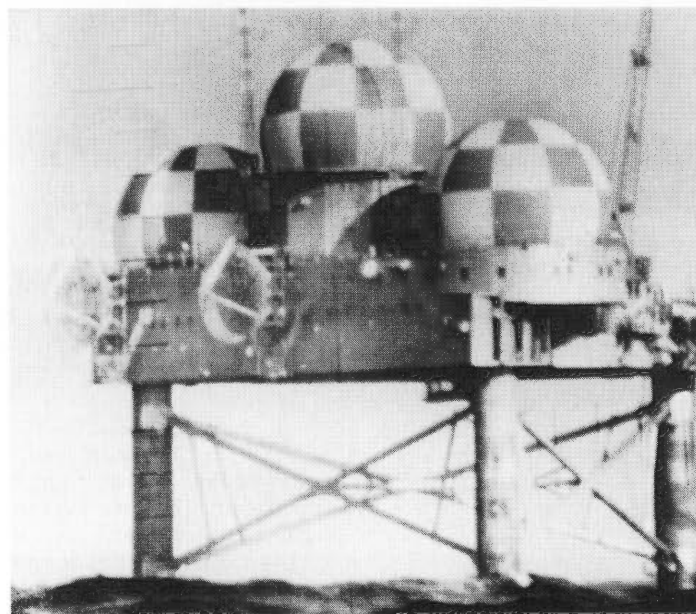
Trip organizer Bob Gale, a former dive shop owner who now resides in Cherry Hill, is the first one in the water. The rest of us follow one by one through a gate in the *White Star's* side. We slide down the anchor line, descending in pairs into the azure silence of the Gulf Stream. We reach the top part of the wreck, a corner of the huge tripod, at about 75 feet.

Fronds of seaweed growing from the wreckage wave to us like giant fingers. Four of us—Gale, Robert Hires, also of Cherry Hill; David Hineline, of Atco, and myself—swim over to a dome made of metal girders that sits on the now sloping upper deck. The current is strong, and the anemone-covered wreck is slippery. I grab a hold of what was once a doorway and my body ripples in the water like a wind-blown flag.

We continue our exploration, soaring weightlessly from one spot to another, pausing occasionally to peer up at the calm surface a hundred feet above our heads. But even with the tremendous visibility, it is impossible to see the entire wreck at once. It's just too big. We peek inside darkened rooms that once housed sleeping quarters for 75, a library, a

These are edited captions from AP/Wide World Photos taken in January 1961.

*Jan. 16, 1961—TEXAS TOWER DESTROYED—Here's the Texas Tower, an Air Force attack warning system installation 75 miles off New Jersey coast, which was wrecked in storm with 28 men lost. Picture was taken recently through periscope of USS *Sablefish* attached to submarine base here at Groton, Conn.*





To Search For Tower—Divers R. Rago, smoking cigarette, and James Cahill, right, and a marine engineer, Davey Crockett, left front, take places in boat of destroyer escort USS Blandy late Jan. 16 as they prepare to search for Texas Tower that sank during a storm the night before. The Tower, part of radar warning system, was located about 75 miles from Barnegat Bay. Crewmen from the Blandy, one of Navy vessels participating in rescue efforts, are in background. Associated Press photographer Anthony Camerano reported Jan. 17 from the Blandy that diver got no response to taps on side of Tower.

gym, a hobby shop with potter's wheels, a galley, an infirmary, control panels and generators. Without a blueprint of the tower, it is impossible to do more than guess which rooms we might have come across.

Divers inspecting the tower are a lot like the seven blind men who discover an elephant: Each touches a different part of the wreck. But Gale, who has been here before, has an advantage. He knows where to find one of the dive's most awe-inspiring sights. He signals to us, then takes off toward one of the deck's kelp-covered corners. We reach the edge and look over. Beginning several yards below us, a giant caisson—one of the tower's legs—extends down into blue-green nothingness.

But the word "nothingness" may be misleading. The sea at that particular spot is full of life. This is where deep-sea fishermen come in search of marlin and mako sharks, and for tuna that may run several hundred pounds. The rust-and-cream colored anemones that blanket the deck are the size of luncheon plates. And clouds of smaller fish, like bergalls, hover around us, sometimes staring at us

face to face through our masks. When the underwater history lesson ends, marine biology class begins.

An observant man once said, "What goes up must come down." The reverse is doubly true for divers. After much too short a time we must return to the surface. Our stay is limited both by the finite air supply we carry on our backs and by the amount of nitrogen absorbed by our tissues while we are breathing compressed air. After a wait of several hours, when some of the nitrogen passes out of our systems, we may dive again, but only for another short time—perhaps twenty minutes or so. And then it will be time for the long journey home.

As with skiing, *apres-scuba* is as much a part of the sport as the diving itself. Once the gear is battened down, we break out the grub. We've got hoagies and ham sandwiches; someone brought a grill to fry up bacon and eggs. The morning's adventure has whetted appetites, and we know, as we swap stories and the captain heads the *White Star* toward home, that today we've tasted of something special.



Ski touring: If you can walk...

BY ROSALIE STRACHAN
PHOTOS BY AUTHOR

A few years ago, cross-country skiing enjoyed a sudden surge of interest. Anyone and everyone wanted to try this "new" type of skiing that was supposed to be as easy as walking.

However, many who tried ski touring quickly became discouraged. It wasn't nearly as easy as Bill Koch made it look, skimming along through fresh powder and swooping gracefully down hills. For most people, at least in this area of rather warm winters, it was more like shuffling through wet cement.

Until it came time to climb a hill. The snow that seemed so sticky on the level felt more like a well-polished bowling alley on the hills. Those Olympic skiers on TV just trotted straight up; no problem. But beginners made as much progress as a hamster on an exercise wheel, slipping three feet backwards

down the hill for every foot they climbed up. As for stopping and turning ... Well, that's why you fall, isn't it?

If you're one of those who tried Nordic skiing but gave up, try taking a few lessons (yes, lessons) and see how much more enjoyable a day on skis can be. And you don't even have to leave New Jersey.

Two YMCA conference centers become New Jersey's largest ski touring centers during the winter months. The 600 acre Fairview Lake Ski Touring Center, near Blairstown, is dominated by a ridge of the Kittatiny Mountains. Gentle slopes near the cabins and the 110 acre lake serve as beginner's terrain. More experienced skiers can explore the approximately 20 kilometers of varied trails, even skiing into the adjoining Delaware Water Gap National Recreation Area or to the Appalachian Trail.

Above: Many ski touring facilities have wide, flat trails for new skiers. (Silver Lake)

Opposite: These rocks will help teach you to turn and stop, fast!

The most popular trail, basically flat to gently rolling, parallels the Appalachian Trail and heads toward what operated for a few years as the White Forest Ski Touring Center. A favorite intermediate trail circles the lake. Be sure, however, to follow the direction of the arrows. Part of the trail climbs a section of what seems to be a stream bed, with many rocks and twists.

Fairview Lake is open for skiing seven days a week as long as the snow lasts, and it seems to have found a very nice pocket here. Instruction is available weekends, with the number of instructors, usually three or four, varying with demand. Skis can be rented every day. Trails are marked as to ability level with maps available as well.

Most people bring snacks and beverages, although a limited amount can be purchased at the warming hut/rental shop. Reservations can be made for both lodging and meals if you want to spend a few days.

Costs: Trail fee, \$3; rentals, \$8; instruction, \$6.
Fairview Lake Ski Touring Center, RD 5, Box 230, Newton, NJ 07860. Phone: (201) 383-9282.

Surrounded by the Hamburg Mountain Wildlife Management Area, Silver Lake Ski Touring Center's 300 acres are about ten miles south of Vernon Valley/Gorge. Like Fairview, Silver Lake has a small lake and wide, flat trails that serve as novice terrain, with about 20 kilometers of trails in all.

I found the area to be trickier skiing than Fairview Lake with more trails that are narrow and winding. The dominant feature seems to be rocks: rocks the size of cars, rocks the size of houses, rocks piled on rocks.

Silver Lake is only open weekends. A map is available showing the trails and degree of difficulty, although it is distorted to show the lake area enlarged while the more distant trails are given less space even though they may be longer. Bring your own food/drink.

Costs: Trail fee, \$4; rentals and lessons, \$8 each.
Silver Lake YMCA, Silver Lake Road, Stockholm, NJ 07460. Phone: (201) 827-7212.

If you're itching to try Nordic skiing but Mother Nature hasn't been cooperative, Craigmour offers instruction and skiing on man-made snow. Craigmour's approximately two miles of touring trails, which depend on natural snow, offer a surprising variety of terrain from novice through "Help!" Already popular in Western resorts and permitted at some New England areas, Norpine skiing (using Nordic skis on Alpine slopes) is also allowed here.

Costs: if you're a lazy cross-country skier and want to use the lift rather than climb the hill, you have to buy a regular ski lift ticket for \$14 weekends, \$10 weekdays. Rentals, \$10; lessons, \$10.

Craigmour, Green Pond Road, Newfoundland, NJ 07435. Phone: (201) 697-4501.

For a unique ski touring experience, try Wild West City where the trails lead "along the streets of Dodge City" as well as through the more usual woods and fields. Open for skiing seven days and four nights a week when there's snow, Wild West City has museums and shops as well as cowboy saloons where tired skiers can take a break.

Costs: Trail fee, \$3.50; rentals, \$7; guides, \$5.
Wild West City, Netcong, NJ 07857. Phone: (201) 347-8900.

The Quarry, near Hamburg, has about 5½ miles of trails winding through the cliffs and ponds of an abandoned rock quarry. Refreshments, rentals, and instruction are all available.

Costs: Trail fee, rental, and instruction, \$10 each.
The Quarry, Hamburg, NJ 07419. Phone: (201) 827-4200.

Several county park commissions also offer Nordic instruction. Skis can be rented at local shops; bring your own refreshments.

Probably the most complete program is offered by the Somerset County Park Commission at Lord Stirling Park Environmental Education Center. If there is snow, on-snow lessons are held first with instruction by staff member Bob Shay. Otherwise, a brief film is shown followed by a lecture/demonstration on equipment, safety, dressing for conditions, and where to ski.

Lessons are given on the 3½ mile section of trail where skiing is permitted. A small hill provides a practice area for stopping and turning on the otherwise-flat terrain.

For the more adventurous, two four-day-weekend trips are scheduled to Garnet Hill Lodge in New York's Adirondack Mountains. You don't have to be an experienced skier for these longer trips; on-snow lessons are part of the plan.

Workshops will be held at 2 p.m. on December 8 & 9, 22 & 23; January 5 & 6, 26 & 27; February 2 & 3, and March 2 & 3, at a cost of \$10 per session. The Garnet Hill trips are January 10-13 and February 7-10.

Environmental Education Center, 190 Lord Stirling Road, Basking Ridge, NJ 07920. Phone: (201) 766-2489.

In January, Union County offers ski touring instruction at Watchung Reservation's Trailside Nature and Science Center. Information and sign-up is through the Nature Center with actual instruction provided by Pete Streeter of Hills and Trails Ski Shop, Clark.

As with Somerset County's program, on-snow instruction is given, if possible. If not, a similar lecture/demonstration is held. About 15 miles of trails provide excellent practice for stopping, turning, and climbing. (Watch the rocks!)

Cost: Probably \$5-7. (Not set yet.)

Trailside Nature & Science Center, Watchung Reservation, Mountainside, NJ 07092. Phone: (201) 232-5930.

The Center for Environmental Studies of Essex County runs "one or two" ski touring classes during the winter as well as an out-of-state trip to Frost Valley in New York's Catskill Mountains.

Center for Environmental Studies, 621 Eagle Rock Ave., Roseland, NJ 07068. Phone: (201) 228-2210.

Ocean County also reported that ski instruction is held, but information wasn't finalized.

Ocean County Park Office, 659 Ocean Avenue, Lakewood, NJ 08701. Phone: (201) 370-7360.

New Jersey offers ski instruction at a wide range of touring facilities for those who enjoy the traditional woody setting and for those who'd like to try something different.

Remember to call ahead before going. Conditions may be better (or worse) than where you are; prices, facilities, and hours can change.



New Jersey's the place to hunt deer

BY MICHAEL C. TOTH

The six-point whitetail took one cautious step at a time down the steep ridge side, testing the mild September breeze with flaring nostrils. The mid-afternoon sun couldn't penetrate down to the forest floor through the still-green foliage, so the buck was alternately bathed in light and concealed in shadow as it slowly worked its way toward my position beneath the drooping branches of a pine tree.

The deer was about 25 yards away by the time I had my bow to full draw. The wind had shifted, though, and the animal scented the presence of an intruder. The buck slowly raised a foreleg and stamped the earth twice. I loosed the broadhead, but the twang of the bowstring was all the buck needed to bolt. The sound of the arrow clattering on loose shale reached my ears as I watched the buck's white flag disappear through the trees.

A quarter-mile behind me, cars and tractor-trailers roared by on Interstate 80, ignorant of my encounter with the whitetail.

Most New Jersey hunters will realize that I was bowhunting in their home state. At the time, I knew of many other hunting areas where the ambience was much more satisfying, but this particular section of woods was home to a lot of deer. Truck traffic or not, I didn't see another bowhunter there during the course of the season—but I did see plenty of whitetails. I didn't take a deer that year, but what I learned in one season of hunting this area would have taken me years in another Eastern state.

Many deer hunters in New Jersey have been on the receiving end of the following statements:

"New Jersey deer hunting isn't as good as deer hunting in other states."

"There's a hunter behind every tree in New Jersey."

"In New Jersey you can't hunt deer with a rifle, which is much more effective than a shotgun."

I've heard coarser criticisms, of course, about New Jersey deer and deer hunting. The sources of these statements, though, are usually people who have never set foot in the New Jersey deer woods, the extent of their knowledge of the state having been gleaned from a through-the-windshield view of the New Jersey Turnpike.

Compare the deer hunting that's available in neighboring states. In Pennsylvania, hunters are allowed to take one deer a year. It does not matter if it is during the bow, buck, special permit antlerless, or muzzleloader seasons. If a hunter harvests a deer on the first day of the fall bow season, he has reached his legal limit for the year. He may not hunt during the rest of the bow season or during any of the other deer seasons.

In New York, hunters may take two deer a year, if a permit is obtained beforehand. Otherwise, the legal limit is one.

If you pick up a copy of the *1984-85 New Jersey Deer Guide*, you'll see that hunters are allowed to take two deer during the fall bow season, two deer during the six-day firearm season, two deer during the muzzleloader season (or, depending upon the zone, one or two deer during the special shotgun season), and two deer during the winter bow season. If the hunter applies for and receives a permit to

hunt in the Great Swamp National Wildlife Refuge during the special shotgun permit season, he may take two deer there, plus a third in a designated portion of the refuge.

So, if a deer hunter applies for and receives the proper permits, it is legally possible for him to take nine whitetails during the course of one hunting year in New Jersey.

To do so would be an astounding feat, and I haven't heard of anyone who has. But in terms of time spent in pursuit of deer—and the chances of putting venison in the freezer—Jersey's got the other states beat.

Over the 1983-84 season, 23,305 deer were taken by New Jersey hunters, counting the harvests of all seasons. This figure may not sound impressive when compared to a state like Pennsylvania, which had a total reported harvest of 136,293 whitetails last year.

But let's take a closer look. According to the most recent figures available, Pennsylvania has a total of 24,884 square miles of commercial forest land—in other words, suitable deer range. New Jersey contains 2,488,000 acres (or 3,887.5 square miles) of "hunnable land," although only about 52 percent of this land is actually hunted (private holdings and areas near roads and highways are included in the tally). If this land can also be considered whitetail range, simple divisions on a calculator show that the number of deer killed per square mile in Pennsylvania rounds out to 5.5—compared to six deer per square mile in New Jersey. Even if you don't take into consideration that 48 percent of land that isn't hunted, these figures show that for every two square miles of land in each state, the harvest is one deer higher in New Jersey.

Bob Powell hunts deer every year in his home state of New Jersey, yet he spends a week in Pennsylvania every year during the buck season. Last year, Powell shot four deer—three of them in New Jersey.

"I spent six days hunting in Pennsylvania and saw seven deer," says Powell. "The last was a six-point, which I shot and tagged."

But Powell took a six-point during the New Jersey buck season, too—and a spike buck later in the week. To top off the season, an eight-pointer fell to his muzzleloader during the special permit hunt later on. All three bucks came from the same North Jersey swamp.

Are there a lot of hunters in the New Jersey deer woods? In popular hunting areas, yes, you will see other hunters. Much public land is overlooked, though, such as the Delaware Water Gap National Recreation Area in the northwest section of the state. Anyone willing to hike more than a few hundred yards up a mountain there may well find the area devoid of hunters. And the Pine Barrens, in the south, is actually considered to be underhunted.

Hunting in another state to avoid masses of hunters won't necessarily solve the problem, either. A couple of years ago, I was hunting on the morning of opening day in a neighboring state. I was in an area that I had scouted previously. It overlooked a swamp that contained a good amount of deer sign. Although the swamp and surrounding ridges were

Jack Lawson of Newton displays his fine Sussex County buck taken during the fall bow season a couple of years ago.

on public land, the nearest paved road was more than two miles away and I had never seen evidence of another hunter while scouting the spot, even during small game season.

I reached the area while it was still dark and waited for legal shooting to begin. Five minutes after it started, I heard footsteps to my left. I slowly turned my head and spotted another hunter walking parallel to the swamp. He saw me, waved, and walked over, not bothering to avoid breaking dead branches and leaves with each footstep. He hunkered down next to me and lit a cigarette.

"See anything?" he asked, as if he had just met a friend in a department store.

"Just you," was all I could manage to get out.

* * *

Shotguns loaded with slugs or buckshot are the only legal firearms allowed during the buck and special permit shotgun seasons in New Jersey. I've listened to ballistics arguments concerning the pros and cons of shotgun hunting for deer until both protagonists turned blue in the face, and I certainly don't intend to come up with a solution here. But the effectiveness of slugs and buckshot, when used within proper range, can't be faulted.

A 2¾-inch, 12-gauge shotgun shell loaded with double-O buckshot sends nine lead balls, each measuring .33 inch in diameter, to its target. At close range, say 40 yards or under, most of the pellets should hit a deer-sized target. And many deer have been felled with only one pellet striking a vital area. For running deer at close range, most experienced deer hunters agree that it's tough to beat a load of buckshot for reliable and effective stopping power.

Rifled slugs never gained notoriety as long range cartridges. But with a straight-shooting shotgun, they can be amazingly accurate out to 50 yards and, with an iron-sighted or scope-equipped shotgun, shooters can put slugs into a 12-inch target at almost twice that range.

The .30-30 rifle cartridge is a very popular caliber in Eastern states, where rifles are legal during deer season. According to the ballistics table in the 1984 Remington catalog, a .30-30 cartridge loaded with a 170-grain bullet develops 1,827 foot-pounds of energy (or "stopping power") at the muzzle. Yet a 12-gauge, 2¾-inch shotgun cartridge loaded with a one-ounce rifled slug developed 2,364 foot-pounds of energy at the muzzle—more than 500 foot-pounds more than the .30-30.

At 50 yards, the energy of the slug drops off to 1,342 foot-pounds, while the .30-30 is still humming along at 100 yards with 1,355 foot-pounds. The latter is certainly more effective at long range, but the rifled slug doesn't play second fiddle when hunting deer close in. And when was the last time you shot a deer at over 100 yards?

So think twice before you spend inordinate amounts of time and money to hunt deer out of state. The hunting may be good wherever you're planning on going, and it's difficult to put a price tag on enjoyment. But as you drive to the state border, take a look around. The best deer hunting you may ever experience could be right here at home.





Deer Lake: A Quiet Park

BY FRANK T. DALE
PHOTOS BY AUTHOR

Deer Lake



The two men looked a little shabby, but maybe that's unfair. Let's say they were wearing old clothes. This, coupled with the fact that they suddenly appeared from the woods seemed suspicious. I watched them closely, if unobtrusively.

The gear they were carrying looked familiar when I saw it. Then one of them lifted up a string of pickerel. They were ice fishermen. But where had they been fishing? I had lived in the area a long time and knew of no lake or pond within walking distance. I waited.

When they drove off I retraced their footprints into the woods. There were the only ones revealed in the inch or two of snow that lay on the ground. A two-mile walk through fields overgrown with barberry and cedar led me downhill, gradually but inexorably. At last, through the trees, I saw it. It appeared first as a large snow-covered field but the dozen or so holes chopped in the ice verified my destination. I had reached the deserted shore of a lake. I had discovered their secret.

Deer Lake and the nearly 2500 acres that surround it have, since then, become the Deer Lake Park Section of Allamuchy Mountain State Park. Little else has changed.



To find Deer Lake you take a dirt lane turn off Route 517 to the east a couple of miles north of Hackettstown, in Warren County. There are a few houses along this six-mile stretch of unpaved road but most of them can't be seen except in the winter when the trees are bare. After about four miles the driver comes to a barricade and must park his car and continue on foot. The road now enters heavier woods, mostly maples and oaks, with an occasional copse of conifers. The trees on either side of the road are completely free of underbrush except for ferns, and the hiker can see deep into the woods.

Soon the lake appears on the left and the road curves toward the shore. A few of the trees at the water's edge have been girdled by beavers and in some cases felled. Two large beaver houses are discernible across the water.

The road, now really a path, crosses the pond outlet, a stream that tumbles downhill to the Musconetcong, two miles away. The path then hugs the shore, first passing through a grove of pines and then through hardwoods, their branches meeting overhead. It circles most of the pond and then ends.

On this side of Deer Lake the land is higher and the woods and fields behind it slope upward. At

lakeside fingers of land jut into the lake. Here the walker can sit, back against a tree, to meditate or admire the sparkling radiance of the water to his front. This area is warmed by the afternoon sun and even in winter is a pleasant place to pause. This is the side that the beavers chose for a home.

Ducks and geese abound when the ice is gone, and, in early Spring, bass can be seen near the shore nesting. The clear water is an aggregation of blue, green, and azure hues. Readers of *Walden* will have a feeling of regret, for this quiet beauty needs a Thoreau to do it justice. Deer Lake and the wooded hills that surround it must be virtually unchanged since primeval times. The lack of almost all of the usual organized activities will make this area inhospitable to those who are looking for a wooded Disneyland. Other state parks will suit them better. Here is a quiet, splendidly isolated forest and lake where one may wander all day with hardly any human contact. Here the simpler pleasures, walking or cross country skiing, may be enjoyed.

The people of the Division of Parks and Forestry of the State of New Jersey are to be congratulated. They have done something quite unique with the land around Deer Lake.

They have left it alone.

Out of the hammock and into the soil

BY BYRON GRIFFIN
ILLUSTRATIONS BY ANTHONY HILLMAN

1975 was the year that growing a vegetable garden first appeared on my list of New Year's resolutions. It has appeared on each one since, a record exceeded only by "use dental floss."

By the spring, however, I had always managed to talk myself out of it. My reasons ranged from "Do we really need more parsnips?" to "Won't it attract assorted pests like boll weevils to the yard?"

Finally last year, in an effort to save some money, eat more fiber, and avoid doing aerobics for exercise, I tilled the ground for the first time. Now, looking back over my diary of that first year, I'm not totally convinced that I should have left the hammock.



JANUARY

anthony hillman

First order of business was to order seed catalogs. Requested two and four showed up in the mail. (Hope I get as good a return on my vegetables.) Also received a Roto-Tiller brochure. I'm not so sure I need one though, for a 5x15 plot.

Now after reviewing the catalogs, one thing is certain. The garden must be expanded to encompass everything I ordered! Already I've redesigned the layout a dozen times and now plan to use virtually every inch of available yard space. I do expect a controversy though, about the row of cauliflower under the badminton net.

Snap bean selection is posing a particular problem. Do I order the hardy, meaty variety that is stringless and excellent for freezing or do I go with the tender, disease-resistant type that holds its yield high off the ground? Decisions, decisions, decisions.

And how about radishes? True, no one in the family likes them but they're supposed to be easy to grow and they do mark the row. Best of all I figure I can give some to the neighbors. That way I won't be obligated to give them tomatoes or peppers later on.

February

The weather outside is dreadful. Swirling snow and bone-chilling cold. The Ground Hog predicts six more weeks of winter. Since when is a rodent a reputable source?

We did finally have a balmy tease day and I puttered around the yard measuring. Unfortunately, I brought a good bit of the garden back inside on my boots. My wife is not at all convinced that this garden is a wise venture.

My seeds arrived today. I hope they have reliable people packaging them. I find it hard to believe that a cabbage seed is a tiny speck and a bean seed is about 50 times bigger.

As March gets closer I can't help but wonder why they give an extra day to February every four years. Why not give it to a nice month like June? You know, maybe I'm at least starting to *think* like a gardener.

March

I'm like a caged animal now, waiting for the ground to dry. Today is six weeks before the frost-free date but who can work the soil with six inches of snow on it?

I have this constant urge to redesign the garden. One day I pencil the beets in next to the onions and the next day I substitute cauliflower and lettuce. My wife says that the Invasion of Normandy took less planning. Ha ha.

I visited the County Extension Service and learned two things.

1. I have soil, not dirt.
 2. My soil is very acid and almost entirely clay.
- I asked the County Agent what I should put in. He suggested a patio. (He must be an agent for my wife, as well.)

To sweeten the soil I'm supposed to add limestone at the rate of five pounds per hundred square feet. Spent the greater part of the weekend trying to convert that formula to a 5x15 plot.

April

Onion sets looked like a good buy at the store. Half of them were already growing. If they can grow in mesh sacks just think what they'll do in dirt. I mean soil.

Finally got out and did some planting. Learned not to plant lettuce on a windy day. We may have

It popping up almost anywhere.

I got worried when no turnip sprouts appeared after seven days so I dug down to take a look. Turns out they started growing down instead of up toward the surface. (Probably caused by nematodes although I'm not sure exactly what they are.) No problem though, I just turned them right side up. If I hadn't caught them in time, I might have ended up feeding the Chinese.

May

Started eggplant seeds in peat pots. Three sprouted in one, none in the other. A third one got so soggy I put my thumb through it. Grrrr ...!

Put cutworm collars around the peppers and pans of beer to trap slugs. My daughter's boyfriend's reaction to all the dead slugs floating around was "what a way to go!" He's an even bigger concern to me than the nematodes.

Radishes have come up beyond my wildest expectations. They're a bit skimpy since I couldn't bear to thin them. The problem is getting someone to eat them. Finally solved that by volunteering to bring them to the Lodge picnic. My brother-in-law seems miffed—he's supposed to bring clams.

June

Tops of the turnips have popped through the soil. They're purple. The ones we have at Thanksgiving are yellow. Nematodes at work?

A guy at work gave me some advice. Cucumbers need plenty of water but don't give them too much. Very enlightening. Actually, because of a sub-par nozzle more water runs down my arm than out the hose. I wind up watering until I've had enough, not the plant. Shouldn't be a problem for long though, I always wind up losing nozzles anyway.

Slugs managed to get into the lettuce. Worthless creatures. Imagine what someone would have to do in a prior life to get reincarnated as a slug.

The watermelon and pumpkins are growing like crazy. The vines reach almost to the gas grill.

July

Since I got kicked out of the Lodge I have plenty of time to spend in the garden. Everyone loved my zucchini until I mentioned that I douse the plants with manure tea. I slept two nights on the couch at my wife's insistence because of it. (Actually she's still mad because I bought the Roto Tiller.)

Tried using an all-purpose pesticide on my tomatoes. One squeeze and half the canister came out, covering the plant with white powder. If there were any bugs around they were buried alive. At least it shows I mean business!

Two items to keep for further reference.

1. Yellow turnips are called rutabagas. (I could have sworn that was a disease my Uncle had.)
2. Staking a tomato does not mean driving a stick through it.

Two items requiring further investigation.

1. Does pepper come from peppers?
2. What is a nematode anyway?

August

The vines have now taken over the gas grill. I've got to work fast to save the lawn furniture. I may be all thumbs but they are turning into green ones!

The sun has baked my soil so that it's rock hard. Shouldn't be any problem though, since I've seen grass growing through a sidewalk before.

Explained to my wife my plans for a compost pile. I'm going to mix kitchen scraps with rotting weeds

Continued on page 34



Anthony Hillman



Geology of the Passaic River Basin



Kettle hole utilized as a natural hazard on the Morris County Golf Course.

By **SUSAN BARRY**
PHOTOS BY AUTHOR

Not long ago I decided to donate my body to science. (When a body of water makes that kind of a decision, you know it's going to be an interesting case.)

For example, do you know of anyone who has been frozen and steamed, scalded and filtered, flushed and sprayed and siphoned, channeled and piped, sipped and soaped and drained and pumped, sailed on, swum through, sucked up in clouds, dumped down in hurricanes, blown across continents? I've traveled millions and billions of miles, in dozens of

exciting shapes: hail, sleet, snow, rain, mist, fog, and what the weather-people call humidity. I have lived as springs and creeks and brooks and lakes and rivers and oceans. I've been around since the beginning of everything, and I've been a part of it all.

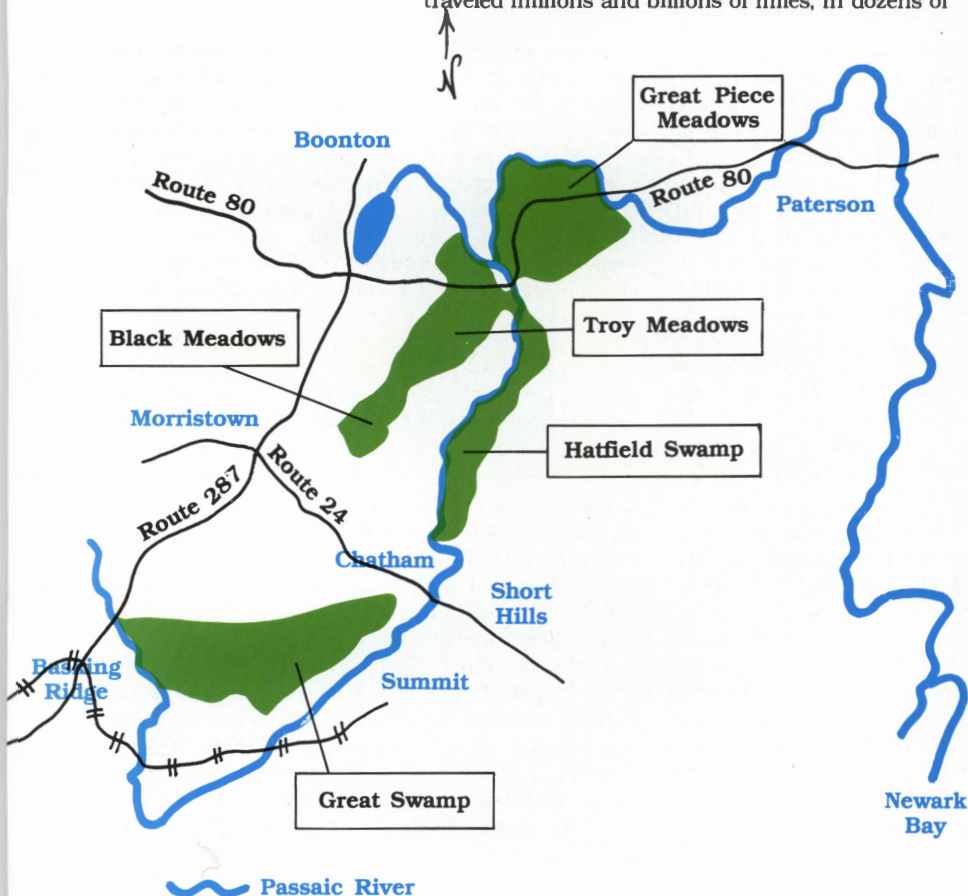
Today I'm the Passaic River. Tomorrow I'll be part of Newark Bay. With any luck, by next week I'll be caught up in the Gulf Stream heading north to Greenland. A month later you could find me heaved up on some huge iceberg floating out to sea where I could melt into another current and wind up in South Wales or South Africa or South Korea or South California. That's what I mean about the varied life.

But suppose we could limit this journey of mine. Suppose, for one reason or another—the surface features, the atmospheric conditions, the prevailing winds, the man-made containments—suppose I never left New Jersey, that in one form or another this old body of mine, the Passaic River, has been here for more than 500 million years. Several times 500 million years, probably. Just imagine what I would have seen.

For a prolonged period, I was part of a very warm sea. That's all there was: seawater. Scientists can't even find clear fossil records of life back then, only ripple marks and ancient compacted limestone. There was no "dry" land, although what you'd call the ocean floor was here. It seems strange to say "the ocean floor of New Jersey."

It wasn't long—maybe around 500 million years ago—before the land on the bottom started heaving and shifting. There were mammoth explosions that sent rocks and lava thousands of feet into the air. Ridges of mountains thrust up through the sea, cooling as they came, and the land began to claim space, sliding and grinding and folding itself into mounds and plateaus and steep, sharp, jagged hills. The violence lasted for 300 million years, altering irrevocably the face of this piece of the planet.

Of course, the pyrotechnics did not occur in just one sequence. You can see evidence of quiet stages in-between if you look at places where I've cut through the ancient rock and revealed the layers of faulted and twisted sediment, especially near





Dave Moore, Executive Director, N.J. Conservation Foundation, on the top of Moggy Hollow.

Chatham. Recent cuts made by road crews at Interstate 287 near Morristown revealed the active past, too, but my friends, the grasses, may have covered the evidence there by now.

For most of the last 200 million years, the central part of New Jersey was a broad valley, stretching between two higher uplifted areas: the highlands on the west, made up of precambrian gneiss and granite from the old volcanic epochs, and the three waves of the Watchung Mountains on the east, whose composition is primarily basalt, a fine-grained product formed from rapidly cooling lava in the more recent triassic period. The valley stretched up into New York, and it was watered from the hills behind Chatham, Morristown, Boonton and Pompton Lakes.

The gap at Short Hills was probably the major spot where my waters converged to form the mighty old Passaic River that then flowed into the ocean. In the sediments that were deposited during those gentle years are fossils that include fish, reptiles, traces of plants and tracks of dinosaurs, so the valley was a fertile spot. The Jersey City Reservoir in Boonton sits in a quarry whose deposits contained numbers of fish fossils discovered when it was being actively worked; and dinosaur footprints in Great Piece Meadows indicate that at least twelve different species of those giant quadrupeds lived here.

After the volcanic eras, the next big change, and I mean *really* big change, came just a short time ago by the geologic calendar. Scientists use the words "dramatic" and "devastating" to describe the forces which totally restructured the valley and altered my course forever. At some point within the last fifty million years, those forces called glaciers chomped and gouged and ripped out huge chunks of rock from the sides of hills and the floors of valleys, and devoured every living thing in their way.

Inexorably, the ice licked down into my valley, just as lava once flowed here. The frozen monster river, stretching almost thirty miles across, covered the entire northern part of the state and plugged the only drainage gaps for my flow. First, the small outlet at Little Falls was blocked, forming a lake which was soon overtaken by the advancing ice. Then my major outlet at Short Hills was blocked and quickly filled with the debris from the north: rocks, crumbled sediments and chunks of compressed ice. There was no place for my water to go except into the valley that remained, and as the ice continued to move, I began emptying into the space between the front edge of the glacier and the southern curve of the Watchungs. The Passaic River became Lake Passaic.

The farthest stage of this glacial advance is marked by a vivid line called the "terminal moraine," which can be followed all across the state and beyond as the delineation of the Wisconsin period of glaciation. In New Jersey it runs roughly through Perth Amboy, Metuchen and Plainfield; north of the Watchungs below Morristown; through Dover, Hackettstown and Belvidere, then west, as a mounded ridge of crumbled rocks and loose pebbles and chunks of mountains that bear no resemblance to our "native" valley stuff. It was pushed along in front of the glacier and left behind when the ice began to melt. The roadway for Route 24 was cut right through it.

Of course, the terminal moraine was not all that was left from that frigid process. There are long mounds called "kames" in the middle of the valley made from debris settling out of the ice. As the

glacier retreated, melting water on the surface washed sediment into depressions on the top and sides of the ice mass, and that sediment eventually became huge mounded deposits on the old valley floor. The Erie Lackawanna Railroad line crosses Interstate 287 near Basking Ridge on the top of a kame.

Kettle holes, formed when huge chunks of ice melted after the glacier's retreat, were also utilized by man (ever the opportunist) as natural hazards on the Morris County Golf Course and for parking lots behind the Jersey Central Power and Light Company off Punchbowl Road in Convent Gardens.

About four miles northeast of Florham Park to Hanover is another glacial landform called an esker. A ridge of sand and gravel that was deposited in a stream channel under the glacier and remained when the ice melted, has become a raised land formation. Several quarries have operated in that esker over the years.

The extent of Glacial Lake Passaic (in my prime) is projected to have been sufficient to cover an area north of Boonton and Paterson all the way south to Basking Ridge, as far east as Short Hills and Summit, and west to Morristown. I finally became deep enough—I filled the valley with 240 feet of water in some places—so that I reached another cut in the high ridge to the south, this time at Moggy Hollow, where I could flow into the Raritan in magnificent falls, and then on to the sea. At that time Lake Passaic was thirty miles long and eight to ten miles wide. You can still see wave-cut terraces and remains of my beaches on the cliff behind the Veterans Administration Medical Center at Lyons, but you have to look more closely now, because the vegetation has begun to obscure those traces.

The ice of the last glacier remained in Morristown for about 200 years, geologists think, before it began its final melt, around 10-15,000 years ago. As the ice withdrew, it uncovered the gap at Little Falls again, so I changed my course and flowed out through the lower elevation there, leaving Moggy Hollow as a great revine once more. For a time several smaller lakes, my offspring, remained in depressions across the valley floor, but they, too, drained gradually, creating swamps and then eventually dry, arable land. The evidence of those lakes remains as the Great Swamp, for example, and as other wetlands—Black Meadows, Troy Meadows, Hatfield Swamp, Little Piece Meadows, Great Piece Meadows, and the Bog and Vly Swamp Meadows.

The wetlands that still function as part of my ancient past provide an important service in draining my overflow when it rains. But man, still the opportunist, has filled in and built on so large an area of those last spongy places, that there is no space for me to spread out anymore. My current becomes stronger and my volume increases so rapidly during a rain or in spring with melt from the snow, that I flow over my banks and cause property damage of great magnitude. People whose homes are built on those filled-in wetlands don't realize that they're really living in part-time rivers.

There are plans to fill in more and more wetlands, including all of those I named and others that don't even have names. There are also plans to channelize me and build massive tunnels to re-route my flow. It seems that my future will not be as exciting as my past, unless we're getting to the time for another dramatic change in this Passaic River Basin. After all, things have looked pretty much the same here for five to ten thousands years. I just might be ready for another ice age!

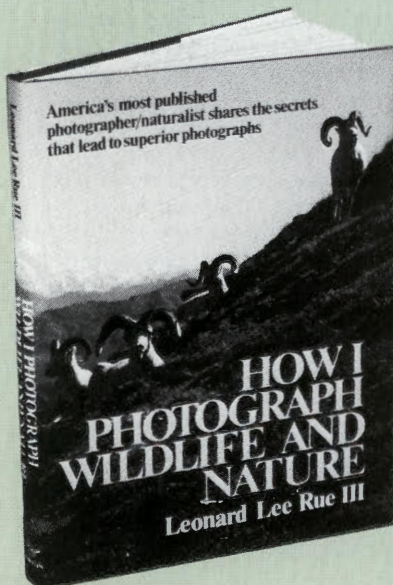
"Down the Shore"

Barnegat Lighthouse, 125 years old, stands majestically in a panorama of rolling sand dunes. . . . This is just one picture from a 1985 calendar entitled "Down The Shore" by photographer Ray Fisk, a regular contributor to *New Jersey Outdoors*.

"Down The Shore" captures classic elements of the changing seasons along the Jersey coast in a portfolio of 14 photographs illustrating the 13 month calendar. The pictures are from the Long Beach Island area, but they contain the visual elements common to the whole Jersey shore—a solitary bay clammer working as reflections of sunlight play upon the water; a surfer propelled from a wave in a dazzling splash of seaspray; distant hunters watching a flock of brant take wing. It also includes some scenes from the adjacent mainland, such as the tableau of a Pine Barrens cranberry bog at harvest time.

Fisk is a former editor of Long Beach Island's *SandPaper*, and now works as a freelance photographer contributing regularly from south Jersey and the shore to United Press International, *The New York Times*, and other publications.

"Down The Shore" is available at a limited number of bookstores and gift shops in New Jersey for \$6.95. It is also available by mail (for an additional \$1.75 postage and handling charge, plus 6% sales tax, if appropriate) from Ray Fisk, Box 353, Harvey Cedars, NJ 08008.



Anything and everything you ever wanted to know about photographing wildlife and nature. This excellent "how to" book is available at bookstores throughout the state.

Personally autographed copies of "How I Photograph Wildlife and Nature" are available for \$19.95 plus \$1.50 shipping. N.J. residents please add 6% sales tax.

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**2000 Miles on the
Appalachian Trail
Donald J. Fortunato
7 Halko Drive
Cedar Knolls, N.J. 07927
1984 \$6.95 157 pages**

In *2000 Miles on the Appalachian Trail*, Don Fortunato presents the reader with more than just an interesting account of walking the entire Appalachian Trail. The book contains a wealth of information on backpacking techniques, and on the natural history, geology, and Indian lore that are a part of the Trail experience.

This book is a must for hikers, potential 2000-milers, or anyone who enjoys the beauty and grandeur of the Appalachian Trail.

Don Fortunato's articles and photographs have appeared in books and magazines including: "New Jersey Outdoors," *Appalachian Trailway News*, and Ed Garvey's "Appalachian Hiker II." Don holds a B.S. in Environmental Science and is employed with the USDA Soil Conservation Service.



“WETlands are not WASTElands...”

New Jersey State Library

A Freshwater Wetlands Primer

Swamp Mallows
MICHAEL BAYTOFF



Lake Absegami BEVERLY BEAUREGARD

Freshwater Wetlands

"Everything is connected to everything else"

—Barry Commoner
The Closing Circle

Bogs, marshes and swamps were once viewed as waste areas with little or no productive value. But that image is changing. We now know that freshwater wetlands play essential roles in retarding soil erosion, lessening flood and storm damage, filtering and assimilating dissolved nutrients, and recharging underground aquifers. They also provide habitats for many species of fish and wildlife.

Ironically, just as the natural value of freshwater wetlands is being recognized, their value is increasing for another reason. Surging population growth, the need for agricultural development and rapidly disappearing vacant space has put the value of these lands at a new premium. But those who cry, "Fill it, build on it, turn a profit," could cost the rest of us an ecological fortune.

Freshwater wetlands are any area (natural or man-made) that is flooded or saturated with fresh surface water or ground water often enough and long enough to support vegetation and aquatic life that is typically adapted for life in saturated soil conditions. Their appearance ranges from seemingly dry woods to open water. They may appear different with each changing season. For example, many lowlands and flood plains adjacent to water-courses are flooded during spring and highwater periods with water from several inches to a foot deep. However, during most of the year they appear dry. Similarly, in wet meadows and marshes, the groundwater is often present just beneath the surface during much of the year. Depending on the season, these areas may be dry, soggy or extremely wet.

According to the U.S. Fish and Wildlife Service,

approximately 12.7 percent of the state, or 613,528 acres, are comprised of freshwater wetlands. These include regulated areas within the Pinelands and the Hackensack Meadowlands. Proposed legislation, the Ogden Bill, would regulate 316,000 acres of wetlands outside those areas.

The most common type of wetlands in New Jersey are the palustrine (freshwater) hardwood swamps. These are found in all five physiographic regions of the state, from the mountainous northern counties to the outer coastal plain. The composition of these wetland communities varies from one region to the next, although some species, such as red maple, can be found in most.

Other types of wetlands found in the state include coniferous dominated swamps, bogs, emergent marshes and shallow open water, (ponds, etc.).

These highly productive biological systems provide an exquisite example of an eternal cycle of life, death and reuse. The remains of plants and particles brought in by rivers nourish a community of life in the mud. Apart from the snails that may be present on the surface, the mud often shelters distinctive worms, specialized bacteria and microscopic forms of life. Plants and organisms in turn provide food and cover for fish and wildlife in various stages of their life cycles. When wildfowl converge on wetland habitats, they return fertilizer to the land surface, perpetuating the cycle and circulation of nutrients.

These areas have far-reaching importance economically as well as ecologically. For instance, many freshwater fish depend on freshwater wetlands for food sources, as well as for feeding, breeding and spawning grounds. The diverse habitat offered by these wetlands is essential to the many life cycle

This article was compiled by Cathie Cush from material supplied by the Natural Resources Wetlands Committee.



Great Brook in Great Swamp R.S. JOHNSON

requirements of fish. Open-water wetlands (rivers, streams, lakes or tidal waterways) provide for the needs of resident, migratory (for example herring or striped bass) or stocked (trout, largemouth bass) species.

Even vegetated wetlands benefit fisheries by maintaining and improving the water quality through entrapment of pollutants, sediments and nutrients. These nutrients encourage the growth of riparian plant communities, which in turn provide shade and cover for fish. Nutrients also increase the growth of algae, which provides food for foraging fish. Without wetlands, the populations of many commercially important species could decline drastically.

Many species of birds, including the endangered osprey and bald eagle, spend their entire lives in freshwater wetlands. Ducks, geese, herons, owls, hawks, songbirds and shorebirds use wetlands for feeding, breeding, nesting and as cover from the elements or predators. Wetlands, with their varied habitat, harbor a higher diversity of birdlife than simpler habitats. Some observers have spotted as many as 246 different species.

Otters, raccoons, beavers and muskrats also rely on freshwater wetlands. These fur-bearing mammals, in turn, provides many trappers in the southern part of the state with income—an estimated \$3.5 million annually. Wetlands also provide habitat for several species of mice, shrews and moles, which play an important role in the ecosystem's food chain.

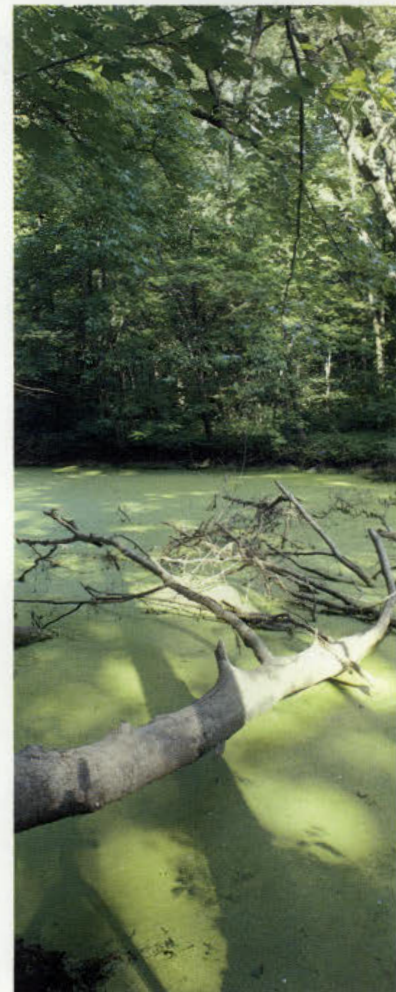
Freshwater wetlands are also the sole habitat of many species of amphibians and reptiles in New Jersey. These animals may be less conspicuous, but they are also vital links in the food chain. Many

frogs, toads and salamanders help control the number of bothersome insect pests such as mosquitoes. In New Jersey, the endangered bog turtle, Pine Barrens tree frog, timber rattler snake and eastern salamander live their lives in freshwater wetlands.

Most of the approximately 35 species of amphibians indigenous to New Jersey are totally dependent upon freshwater wetlands for reproduction. Loss of these breeding grounds is the primary cause for decline of the seven species of amphibians listed as threatened or endangered. On the whole, reptiles are less dependent on the freshwater marshes. But most of the 14 species of turtles in the state depend on wetlands for survival.

The destruction of freshwater wetlands can adversely affect wildlife that does not use them directly. Commercial fisheries in estuaries and near ocean waters depend on the cleansing action of freshwater wetlands to provide waters which are clean and capable of high productivity. If freshwater wetlands are allowed to decline, most certainly New Jerseyans will suffer with reduced yields of commercial fish and tainted shellfish harvests that may have to be banned from markets and restaurants.

Perhaps the most beneficial function of wetlands to both fish and wildlife as well as to humans is their value in flood control. Wetlands act as natural detention areas to store flood waters, and in many cases they act as recharge areas to underlying aquifers and the groundwater table. The protection of wetlands, particularly linear wetlands along stream and river corridors, is essential if aquatic waterways are to be guarded from future channelization, levees or other structural methods that alter, degrade or eliminate riparian habitats. For



Hatfield Swamp PAUL AYICK



Great Swamp Sunset PAT DALY

example, once a natural river is channelized for flood control, it is turned into a trough for storm-water management. This leaves little hope for any future fishery.

The heavily populated areas in the Passaic River Basin have experienced extensive flooding over the years. More than \$50 million in flood damage was confirmed in 1984 alone. To address this issue, the U.S. Fish and Wildlife Service analyzed freshwater wetland loss in the area. Comparing photographs from 1940 to 1976, surveyors determined that Passaic County lost 14.5 percent of its wetlands in that 36-year period. Wetland filling for commercial, residential and industrial development was responsible for 60 percent of the losses.

Further study indicated that an estimated 66 percent of the county's original freshwater wetlands may have been lost since early colonial settlement.

Studies have shown that flood peaks are significantly lower in watersheds with a high percentage of fringing freshwater wetlands than in areas without them. The loss of wetlands in Passaic and other counties within the Passaic River Basin has undoubtedly accelerated flooding problems within the Passaic River Watershed.

Freshwater wetlands require protection for other reasons, too. Timber, cranberries and blueberries are important wetlands harvests in the state, and wet meadows are used for grazing. Because of the high biological productivity and diversity they support, wetlands are ideal outdoor laboratories and living classrooms for studying ecology, biology and natural history as well as for public education and interpretive programs.

Another important reason to preserve wetlands is that they fill a need for open space. These areas serve as visual buffers for recreation facilities and adja-

cent land uses, in addition to providing a host of recreational activities, such as swimming, boating, hunting, fishing, hiking, nature appreciation and photography. Nature walking and bird watching rank as the ninth and twelfth most popular outdoor activities—a trend that is projected to continue into the years 1990 and 2000.

Many people look to natural areas for recreation and spiritual and physical refreshment. As the state becomes more crowded, the demand for unspoiled nature found close at hand will become more urgent. With the disappearance of open space and our remaining wetlands, it will become increasingly difficult to meet the need for beauty in our surroundings and quality in the lives of all our citizens.

The New Jersey Green Acres Program, created in 1961 and funded through the passage of bond issues, has provided 50 percent matching funds to acquire open space and parklands. The new Green Trust provides local governments with low-interest loans for open space, including wetlands acquisitions, and aids in wetland preservation through wetlands acquisition and recreational development controls. The preservation of wetlands ensures open space for current and future recreational use and the perpetuation of a valuable environmental resource.

Because of their public values, freshwater wetlands provide one of the state's most important natural resources and should be regarded as highly as clean air and clean water. Ecology is a reverence for the earth. In New Jersey, there is a feeling for wild nature even in the face of a consumer economy. A new determination to preserve freshwater wetlands, coupled with legislation and technological capabilities, will make it possible to reverse the downward trend of degradation.



Casey Kays at Sunfish Pond

PHOTO PROVIDED BY CASEY KAYS

A WALK WITH Casey Kays

BY DOUGLAS W. SMITH

Tucked away in the northwest corner of the state, high atop Kittatiny Mountain at an elevation of about 1,380 feet, lies Sunfish Pond, one of N.J.'s natural wonders. A few ridges away in Hackettstown lives Casey Kays.

If not for Kays, the chances are that Sunfish Pond wouldn't be as we know it today. Kays, as some may recall, spearheaded the "Save Sunfish Pond" campaign of the 1960s and 70s. This campaign has been called the beginning of the conservation movement in N.J. and has been an obsession of Kays for almost 20 years.

In 1961 a tract of land which included Sunfish Pond was sold by the state to a power company as part of a planned hydroelectric plant. Sunfish Pond was to be a reservoir for this plant, adorned with monstrous retaining walls and with a pipeline of mammoth proportions attaching it to the Delaware River. This project would have had a disastrous effect on the pond, the Appalachian Trail (which runs adjacent to its western shore), and the entire watershed of the pond. In the opinion of many, including

Kays and the soon-to-be-formed Lenni Lenape League, the pond would be destroyed, virtually wiping out with a few swipes of the dozer's blade something it had taken nature millions of years to make—a glacial pond on top of a mountain, a natural phenomenon unique in New Jersey, and an area of unquestionable beauty.

Incensed by the ignorance of this whole concept, Kays initiated a letter writing campaign which would gain national attention. He chose to fight big business with pen, paper, and determination. We know the outcome. The utilities gave Sunfish Pond back to the state after eight years of war with Kays, the Lenni Lenape League, and Legions of concerned citizens from across the country. As Dave Moore of *The Forum* puts it, "Casey won in a remarkable David and Goliath confrontation which lasted for years and came to symbolize the environment for millions in New Jersey."

A walk to Sunfish Pond with Casey Kays is quite an experience. Such an excursion, as I found out, offers a great deal of insight into the man who help-

ed save Sunfish Pond as well as into the pond itself.

We met early one day at the headquarters of Worthington State Forest and set out for Sunfish Pond. Kays led the way from the parking lot of the ranger station to the beginning of the Douglas Trail, named in honor of the Supreme Court Justice William O. Douglas for his involvement in the movement to save Sunfish Pond. Douglas took part in a pilgrimage to the pond in June of 1967 and was quite vocal in opposing the use of the pond as part of the hydroelectric project. At the stone-encased commemorative plaque Kays recalled the event and was extremely complimentary regarding Justice Douglas. Apparently it was an extremely hot, humid New Jersey day and Douglas—69 years old at the time—insisted on making the two-and-a-half-mile climb to the pond along with the 633 other participants. Kays said that he admired the judge's tenacity. When questioned about the importance of his own tenacity in the fight to save the pond, Kays merely said, "I was born with the gift of being able to stick to things. The thing that I learned which proved to be most important was how to take disappointment and turn it into energy."

As we began to climb in earnest, it became apparent that Kays, despite his roughly 60 years, was in fine shape himself. Clad in jeans, workboots, and a nylon parka, he walked with a strong rhythmic gait, showing little regard for the grade or the weight of the stuffed daypack bearing down on his broad shoulders. At no point in the course of the day did it appear that my barrel-chested hiking companion was taxing his lungs in the least. My 29-year-old lungs, I'm afraid, could make no such boast.

Although Kays will make no claim to being anything other than an avid day-hiker, one gets the feeling that he has the woods savvy to handle just about anything that may come up. His knowledge of the local plant and animal life seemed as extensive as his understanding of the geology, geography, and history of the region. I couldn't help think-

ing to myself how impressed I was with this man's dedication to the pursuit of any and all information regarding not only Sunfish Pond but also anything even remotely associated with it.

As we continued up the rock footpath Kays would supplement the discussion (usually some aspect of the pond) with a tree identification or a tidbit about the rocks on the trail. His willingness to share information with a willing listener was equaled by his hunger for new information which the listener might supply as recompense. I've hiked with a lot of knowledgeable outdoors people, but only a few were as unpretentious as Casey Kays. Unlike that of many self-professed nature buffs, his presentation of nature trivia was tactful and in good taste, never obnoxious or overbearing. Usually I find myself making appeals to heaven, asking for help in finding a way to silence my overtalkative companions; that never happened on my hike with Casey Kays.

Onward and upward we went, ascending the lazy switchbacks of the Douglas Trail. After about a mile and a half we passed from climax deciduous forest into a breezy grove of hemlocks somewhat divided by a cool, swift mountain stream. It was here that Kays became exhilarated. For adjacent to the stream and somewhat hidden by brush and years of abuse were the remnants of a terra-cotta tile pipeline which was built in 1912 and had gone from Sunfish Pond, down the west side of Kittatiny Mountain, under the Delaware River, and into Buckwood Lodge, which was owned by the Worthington family. This pipeline was constructed so that the Worthingtons could have the water of Sunfish Pond to drink in their estate. Later, according to Kays, Buckwood was to become what is now known as Shawnee on the Delaware. The magnitude of the pipeline project seemed overwhelming to Kays, and rightfully so, because the idea of imbedding a pipeline in Kittatiny Mountain with only manpower and the limited technology of 1912 was bold to say the least.

Shortly, the Douglas Trail intersected the Appalachian Trail. Our pace quickened as we continued on the Appalachian Trail toward Sunfish Pond.

We met a husband and wife out for a walk on that chilly yet pleasant day. After greeting them, Kays reached into his pocket, pulled out something resembling a file card, gave it to the man, and said, "I pass these out when I'm up here; it's self-explanatory." On the card there was a picture of Kays, a drawing of Sunfish Pond, a brief description of the pond and its controversial history, an appeal not to litter, and a line about his unpublished manuscript, *The Whispering Waters of Sunfish Pond and Tocks Island*. Kays had these cards printed at his own expense, and he uses them to help educate the public. Although the pond itself was given back to the state, there are still roughly 370 acres east of the pond which have not been reacquired from the power companies and this jeopardizes the watershed of the pond according to Kays. The cards explain this problem.

He gave out close to 50 of those cards that day and I can gladly say that as we retraced our steps down the mountain at the end of the day I didn't see one of them on the ground. Perhaps a few more soldiers had been recruited to help continue the fight to save "All of Sunfish Pond."

I could tell that we were getting close to the pond for two reasons. First, we were encountering more

Casey Kays



DOUGLAS W. SMITH

and more people. It seems there are always people at Sunfish Pond and for good reason—it really is a beautiful and serene place. Second, I could see Kays getting just a little bit anxious. I made sure that I saw Casey's face when he first saw the pond on that day. When he did, his expression was almost beyond description. It was a very special look, kind of like when a father looks at one of his offspring and says to himself, "You're really something, kid." I'll never forget that look.

We skirted the western shore of the pond, pausing occasionally to police litter which had been left by previous hikers. Kays admitted that he had almost come to blows on a number of occasions when he'd confronted people for littering around the pond. During the 60s, Sunfish Pond was a meeting place for people in their teens and twenties and the litter problem was completely out of control. Casey admitted that he would get sick to his stomach because of the litter that he would see at the pond. I just can't figure out what would make someone litter anywhere, least of all at a place like Sunfish Pond. How much efforts does it take to stick a candy wrapper in your pocket? How can a person who litters be deserving of the opportunities afforded by the great outdoors? Casey couldn't figure that one out and neither can I.

We passed the pond's outlet and decided to stop for lunch on a picturesque glaciated boulder field next to the pond. It was here that conversation focused on Kay's unpublished manuscript, *The Whispering Waters of Sunfish Pond and Tocks Island*. The book chronicles the politics of the conservation movement to save Sunfish Pond, focusing on key people and their involvement in the controversy. Kays spent 12 years writing the book and he calls it, "My own true love story." Despite the fact that he has had the work professionally critiqued and edited it remains unpublished, and I could sense that this is more than a slight irritant for Kays. He does insist on the importance of having it published by saying, "I'm not interested in making money on the book—I want it in high school and college libraries to show what little people can do and to show the politics of conservation in N.J. during the 60s and 70s and how we can change things around. We (meaning the Lenni Lenape League) created the atmosphere. We were the ones who broke the conservation efforts wide open in New Jersey." I couldn't help but hope that someday the book does get published so that there isn't a void in the history of conservation in our state. We finished our lunch, cleaned up more than our own mess, and continued north on the Appalachian Trail along the edge of the pond.

Casey reminded me of a mink as he darted from rock to rock peering into the pond as a mink would in search of prey. He was looking for fish. Sighting fish in a pond normally wouldn't be anything out of the ordinary but that's not the case with this pond because all the native fish were poisoned in 1960 as part of an experiment to introduce game fish. The experiment failed and the pond was without fish of any kind for years. In 1973 there was an attempt to reintroduce the pond's native fish; whether the attempt was successful is questionable, but Kays has seen pumpkin seed sunfish and what he believes to be yellow perch in the pond in recent years and they are two of the native species that were reintroduced in '73. I was hoping for fish to be sighted on that day but none were; I did, however, have the opportunity to watch Casey Kays looking

for fish in Sunfish Pond and that was a treat in itself.

Not too much further along our way we had to leave the Appalachian Trail in order to complete our hike around the pond. The Appalachian Trail continues on its northward course roughly another 900 miles to its northern terminus, Mt. Katahdin in Maine. AS we circled the pond Casey would pause frequently to highlight a particular point of interest. Often he would perch on a rock outcropping as he spoke resembling a preacher addressing his congregation from a pulpit. I thought this particularly fitting, because I doubted that there was any place on the face of the earth that Casey Kays considered more of a church than Sunfish Pond.

As so went the day on which I had the opportunity to hike with the man who had so much to do with saving a pond that I'd come use as a refuge in perhaps the same manner as he. I'd learned about the pond and I'd learned about a number of the people from all walks of life who formed an alliance to fight to save the pond. But most of all I came to learn a great deal about a man named Casey Kays and his love for Sunfish Pond. Perhaps he says it best in this poem that he wrote some years back;

Sunfish Pond

Silently I stand alone beside your whispering
waters—and look toward the western sky
I think of you and dream of time
I count the years and dry my tears and watch the
setting sun—
I say a prayer for You and time
Because I love You—Your Solitude and Mine.

Casey Kays will probably take many more hikes to Sunfish Pond between now and the day that his ashes are cast to the wind over its waters. I'm thankful that I had the opportunity to hike with him on one such day and for the chance to get to know the man who *is* Sunfish Pond.

Sunfish Pond



Family on boardwalk (Bill Vibbert)
Three generations of hikers enjoy a fall hike on a fresh water wetland boardwalk at Cheesequake State Park.



Cardinal flower (Bill Vibbert)
Regarded by many as the king of America's wildflowers, the Cardinal flower is found only in fresh water wetlands. Sneezeweed in the background is another wetland wildflower.

WE NEED WETLANDS!



Despite the fact that New Jersey is known as an industrialized state with many urban centers and a sprawling suburbia, New Jerseyans take pride in the large expanses of open space that remain preserved throughout the state. While the South Jersey Pinelands are the best example of the commitment New Jersey has made to protect those regions displaying our natural heritage, there is a lesser-known, and perhaps less appreciated, natural resource that lies within a few minutes drive of everyone—New Jersey's wetlands. From the extensive salt marshes along our coast to the hundreds of tiny pockets of freshwater wetlands dispersed throughout the state, wetlands offer the best opportunities to see and appreciate the sights and sounds of nature.

To the uninitiated, wetlands, or "swamps", may be regarded as the uninviting domain of insects, dense vegetation and oozing soil that promises wet feet to the intruder. But visitors who get to know these most productive of natural ecosystems become hooked by the rich diversity of things to see and do. Wetland habitat is essential to the survival of hundreds of species of plants, birds, reptiles, and amphibians, as well as many small mammals such as mink, otter, muskrat, beaver and raccoon. Nearly

one-third of all endangered or threatened species of plants and wildlife are found in wetland habitat. In winter, deer, ruffed grouse, quail, skunk and other upland species of wildlife seek food and shelter in wetlands.

Birdwatchers and photographers find wetlands the best places to see wildlife; and for those interested in wildflowers, freshwater wetlands are the place to go. From the first purple and green skunk cabbage flowers poking through the March snow to the majestic blood-red cardinal flowers accenting golden September marshes, wetlands offer the best opportunities to see wildflowers.

During the fall migrations of ducks and geese, hunters launch grassed sneakboxes to pursue waterfowl that use wetland habitat as breeding grounds, migration stopovers, and wintering areas. But hunters seek something more than their limit of ducks; they seek the feeling of closeness with nature that is heightened by the lonely pre-dawn cry of a drake wood duck or the soft whispering wings of waterfowl as they circle decoys for a closer look. Through Ducks Unlimited, waterfowlers have contributed \$237 million to wetlands preservation since 1937.

In much of urban New Jersey, wetlands are

BY BILL VIBBERT

Sunset on a marsh (Jim Rozmus)

"What I loved to hear was the bongo booming of the bittern you never saw, and the cawing of the crows, and the occasional shrill scream of a hawk as it swooped low and graceful over the tips of grass, looking, always looking, for something to swoop on and seize.

I never thought too much about a marsh, but it's really the richest piece of real estate in the world."

—Robert Ruark



nature's last outpost, providing habitat for a surprising array of plants and animals. The extensive wetlands along the Passaic and Hackensack Rivers are still excellent places to observe wading birds, hawks, owls, shore birds, and many species of waterfowl. Liberty State Park, in Jersey City, has become popular with birdwatchers who marvel at the variety of wildlife attracted to the protected coves, salt marshes and ponds in the natural area. Liberty Park is one of the best places in New Jersey to see canvasback ducks that arrive in late winter and stay through March. New Jersey's largest freshwater wetland is the Great Swamp, in Morris and Somerset counties, where interpretive programs prepared by the Somerset County Park Commission and the U.S. Fish and Wildlife Service describe the cultural and natural history of this unique preservation area which was once designated as a jet port site.

The fate of our freshwater wetlands will play a crucial role in our future. Much of our water supply enters underground storage aquifers through wetlands that hold and purify water. Wetlands provide natural flood control by storing storm water through the process of absorption and releasing it slowly, preventing a deluge of silt-laden runoff. Preservation of wetlands can reduce the need for ex-

pensive water control projects which seldom completely solve the problem. Our health and our economic future depend on sufficient supplies of high quality potable water, and water supply has moved to the forefront of public policy issues in New Jersey.

Recognizing the value of our tidal wetlands, the New Jersey legislature passed the Wetlands Act of 1970, which prohibits destruction of salt marshes that provide livelihood for commercial fishermen, recreation for thousands of New Jersey's citizens, and habitat for uncountable species of plants, fish, and wildlife. Since the implementation of these wetlands regulations in 1972, filling of salt marshes has been reduced from an average of 1,900 acres per year in 1970 to less than one acre per year now.

In contrast, our freshwater wetlands are still being filled at an alarming rate. Since much of our freshwater wetlands are widely scattered in small pockets throughout the state, they are more difficult to protect. Perhaps we have not yet realized the economic value of wetlands. Or maybe we haven't realized what special places freshwater wetlands are—not only for wood ducks, muskrats, and cardinal flowers, but for people, whose lives are enriched by a diverse environment containing an abundance of all forms of New Jersey's natural heritage.

Green Heron (Bill Vibbert)
New Jersey's most common heron, the Green Heron, is found in both fresh and salt water marshes. The Green Heron is one of nature's most adept fisherman.

Hunters (Bill Vibbert)
Waterfowl hunters enjoy a fall day on the Wading River in Wharton State Forest. All waterfowl are dependent on wetland habitat for survival.



New Jersey Canada Goose

BY PAUL CASTELLI
PHOTOS BY AUTHOR

Many Canada geese are changing their traditional migration patterns and, as a result, New Jersey is playing host to ever increasing numbers of geese. There are two Canada goose populations in New Jersey; migratory geese, and resident geese. Both populations are at all time highs, yet problems and questions regarding each population remain.

Migrant Populations

In the past, Canada geese used to migrate through New Jersey on their way to their wintering grounds in North and South Carolina. Today, much to the delight of local birdwatchers and waterfowl hunters, many geese migrate no further south than New Jersey where they find everything they need to survive the winter. Food is available in the form of harvested corn and bean fields, winter wheat and rye, and lawn grasses at parks, golf courses and corporate headquarters. Water and a safe refuge are found in the same places. Southern states, like North and South Carolina which used to be the center of wintering goose populations in the Atlantic flyway are not as happy. Their goose populations have been steadily decreasing.

Local Populations

The good life in New Jersey is so appealing that many geese are staying all year. While no exact figures are available, more geese than ever before are non-migratory residents. These geese are loved and protected by landowners and the public when they occur in low numbers. Let the numbers reach 100 to 500 and then look out! Peoples attitudes change fast. Complaints range from excessive noise, to damage to farm crops and lawn grasses, to aggressive ganders chasing and biting children and dogs during the spring breeding season. On several occasions geese have nested in shrubbery near the entrance to corporate offices. For several weeks the

gander would threaten and attack people going into and out of the building. But by far the most common complaints involve goose droppings. Geese foul swimming beaches and municipal drinking water reservoirs. Several freshwater beaches have been temporarily closed due to fecal contamination attributed to local geese. In addition, they leave their "calling cards" on golf course greens, park lawns, and public sidewalks. Surveys done by the New Jersey Division of Fish, Game and Wildlife have found that Canada geese, both residents and migrants, have caused over \$80,000.00 in annual damages to landowners in recent years. And these surveys are far from complete.

All of these problems have caused some of our resident geese to be thought of as "nuisance geese" by their human neighbors. The U.S. Fish and Wildlife Service has even gone in and removed especially troublesome flocks, relocating them to southern states. The problem is that without habitat alteration, these areas are still top-notch goose habitats and more geese soon move in to fill the void. In order to obtain information which can help solve the problems created by record numbers of Canada geese, the New Jersey Division of Fish, Game and Wildlife is involved in several Canada goose studies.

Migrant Canada Goose Study

If you see a goose with a yellow plastic collar on its neck this winter the information gained from observed collared geese could help waterfowl biologists solve the riddle of why the great honkers have changed their traditional migration patterns. Federal and state waterfowl biologists in eight states, from New York to South Carolina, will be trapping about 10,000 geese this fall using rocket nets. These geese will be marked with 3-inch-long



New Jersey Waterfowlers and other sportsman's organizations volunteered their help on this program.



Corral Trap used to catch flightless resident birds for banding.



Resident geese banded in June with grey neck collars.

populations

yellow neck collars and aluminum leg bands. Each collar has a large black number and letter code that can be read through binoculars at 100 yards. Reports of sightings by hunters, birdwatchers, and paid observers will be important to the success of a major study aimed at determining the migratory and wintering patterns of Canada geese along the Atlantic Seaboard. Data will aid in developing new management strategies for these birds. Now in its second year, the 3-year study is funded by the U.S. Fish and Wildlife Service and states in the Atlantic Flyway.

Federal and state biologists in New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, and South Carolina are attempting to document the movement, behavior, and survival rates of Canada geese on their wintering sites. The multi-state project is coordinated by Richard Malecki, U.S. Fish and Wildlife Service coop-leader of the New York Cooperative Wildlife Research Unit at Cornell University, Ithaca, New York.

"The success of this species speaks well for their management by state and federal wildlife agencies," said Malecki. "However, there is a growing need to learn more about these important migratory birds to insure proper management in the years ahead."

Agencies involved in the study include the U.S. Fish and Wildlife Service; New York State Department of Environmental Conservation; Pennsylvania Game Commission; New Jersey Division of Fish, Game, and Wildlife; Maryland Wildlife Administration; Delaware Department of Natural Resources and South Carolina Wildlife and Marine Resources Department.

During the 3-year study, biologists with these agencies expect to trap and mark more than 30,000 geese in all eight states. With the banding program now in full swing, geese with neck collars and leg

bands are expected to show up in hunters' bags and, also will be seen more frequently during this winter.

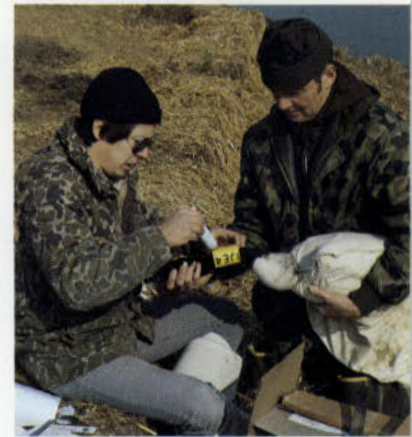
Resident Goose Studies

Since 1982, the Division of Fish, Game and Wildlife has leg-banded more than 500 resident Canada geese each June in an effort to measure the annual movements and survival rates of our local Canada goose populations. This study will continue through June, 1986. Geese are easily captured at this time of year because the adults molt their feathers and are flightless for several weeks and the young are not yet able to fly. The geese are herded into temporary corrals made of fishnet called drive-traps. Then they are removed and banded. This banding effort has been concentrated in Hunterdon, Mercer, Middlesex, Morris and Somerset counties where large resident Canada goose populations exist.

Leg-banding data is useful in determining annual mortality rates and movements; however, there are several drawbacks to leg band studies. In order to obtain any data a banded bird has to be recovered (shot, found dead, or recaptured) and it must also be reported. The proportion of birds which are eventually recovered and reported is low, usually less than 10%. Therefore, large samples of birds must be banded to get a reasonable amount of recovery data. With neck-collar studies, the bird need only be handled once and data can be obtained from many more birds, both living and dead. Survival and population estimates can also be made by month or even by week if enough observations are made.

Hunters Help Study

The New Jersey Waterfowlers Association has donated 500 gray neck collars to the Division of Fish, Game, and Wildlife for use in studying resident Canada geese. With volunteer help from the New



Placing neck collar on a goose.

continued on page 32



As erect as honor guards, cedars stand alongside a snow-fenced field in a display of winter pageantry.

A WINTER PHOTO FORAY

COMMENTS AND PHOTOGRAPHS BY AL PEINECKE



Perhaps the elusive "January thaw" has come to the North Jersey hills. If only a facsimile, the day will do until the real thing comes along. A clear blue sky and pristine, snow-covered fields, dotted with tall cedars, seem to invite a winter photo foray.

Many times past I have said: "I should have taken my camera." For those with a winter outdoors persuasion it is rewarding to do just that. Hiking, cross country skiing, skating, hunting, ice fishing, all offer chances for photos. As for clothing, your hunting or hiking togs will serve well.

Winter is not necessarily synonymous with hibernation. Weather conditions may be such that extensive travel is not appealing, but outdoor photo possibilities exist in nearby New Jersey woodlands and parks. Clear sunny days are interspersed throughout the months of the short days, making it pleasant to be afield.

It has been a fine January day, brisk, but not bitter, sunny, with a light breeze, and an interesting variety of woodland scenes and wildlife habitats to observe and photograph on a day spent roaming the North Jersey countryside.

Cross country skiing offers excellent chances for photos. The occasional "break" might be a good time to get an impromptu shot.



A late afternoon winter sky over Tranquility. Striking cloud formations may be captured by camera-carrying outdoor enthusiasts.



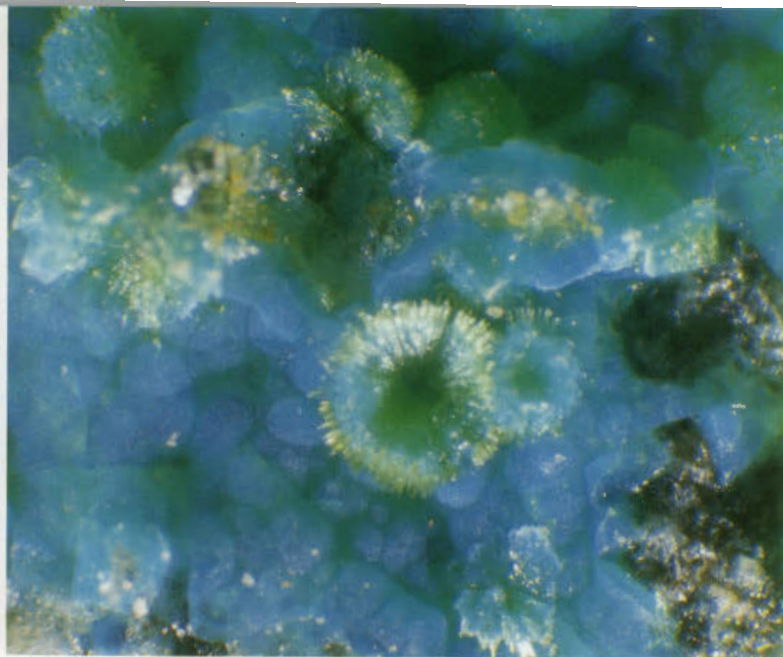
A brisk walk on a clear winter day was part of our yesteryear. Here, the author's father, a perennial outdoor enthusiast, heads down a country road after the 1936 station wagon has been parked.

Once in awhile good fortune comes the way of the winter grouse hunter, and a photo enables the occasion to be relived at some future time.





Prehnite



Petersite

Mineral Collecting in New Jersey

By HELEN COLLINS

PHOTOS PROVIDED BY
THE PATERSON MUSEUM

From the northernmost peaks in Sussex County to the southern tip of Cape May, New Jersey is a mineral collector's delight. Within its borders hundreds of specimens range from one-of-a-kind to commonplace, from brilliant to dull, from semi-precious to ordinary.

Mineralogists from around the country flock to the 18th-century zinc mining village of Franklin, whose dazzling array of glowing minerals has earned it the title of Fluorescent Capital of the World. On Paterson's Garret Mountain enthusiasts have unearthed a wealth of crystallized oddities, many phantom-like in appearance as one see-through mineral formed on top of another. Far to the south on the Atlantic coast, beachcombers sift the sand for the lovely quartz crystals known as Cape May diamonds. And on Secaucus' Laurel Hill high above the turnpike, foragers found one of the state's newest claims to fame, the recently discovered Petersite.

"It's all here," according to Wolfgang Vogt, a member of the Bergen County Mineralogy and Paleontology Society. "Exciting specimens," says Vogt, who leads his club's 125 members on monthly tours, "can be found anyplace in the state—at dumps, at excavation sites, even in your own backyard."

It was on just such an expedition on Laurel Hill, formerly known as Snake Hill due to the heavy infestation of black snakes in the surrounding marshlands, that a local hobbyist spotted something unusual about a simple piece of sandstone. A longtime collector and the author of a book on the minerals of Laurel Hill, Nicholas Facciolla pocketed the piece for further investigation.

Even under a microscope he couldn't identify the tiny cluster of apple green crystals, so Facciolla brought the specimens to geologist Thomas Peters, director of the Paterson Museum. He, too, was baffled and passed it along to a researcher at the Smithsonian Institution. But the process didn't end there.

Official designation of a brand new mineral requires the permission of delegates from more than 26 countries, all members of a commission on new

mineral names. Only after each representative has certified that the specimen has never been seen before can it finally be named by the scientist who described it.

Of the 58 minerals first identified at Franklin and neighboring Ogdensburg, 30 have never been found anywhere else in the world. But Facciolla's discovery, dubbed Petersite in honor of Thomas Peters and his brother, also a geologist, is believed to be the first from anywhere else in the state.

Franklinite, the black oxide found when the outcrops of ore at Franklin were detected in the 17th century, was identified in 1819 by a French chemist. Today many more New Jersey minerals bear names reflecting their ancestry or origin. Recent finds include lennilenapeite, named for the Indians that once inhabited the area; walkkilldellite, found in the dell of the Walkkill River; and kittatinyite, from the Algonquin word meaning "endless hills." There is a sussexite, an ogdensburgite, and a sterlinghillite whose namesake is the Sterling Hill zinc mine at Ogdensburg.

"New Jersey ranks up there as a leader in new minerals," declares Russell Titus, mineralogy curator at the Paterson Museum. It rates high in famous localities as well, primarily because of the world-famous collection at Franklin and the abundance of crystallized varieties at Paterson.

Franklin's rich zinc-manganese-iron deposits have yielded 300 different minerals, a number vastly greater than any other place on this planet. Even more amazing, 60 are fluorescent, the largest number recorded at any one site. These luminescent specimens, activated by the manganese they contain, look like ordinary rocks by day. But by night, under an eerie ultra-violet light, they reflect a rainbow of hues ranging from shocking chartreuse to deep violet, fiery red to lemon yellow.

Although no new minerals have yet been named for Paterson's Garret Mountain, it too is known for the sheer number and diversity of species it contains. Known as the First Watchung Mountain, this region was recently declared a national natural landmark because of the volcanic spectacle as-

sociated with its creation 190 million years ago. The same explosion is believed to have opened up the Atlantic Ocean.

It began at a time when New Jersey was close to north Africa, Titus explains, and lava flowed from a fissure in the earth. As it came in contact with water, the lava developed into piles of spherical blobs known as pillows, and the famous Paterson crystals began to form in the openings between them. Later, solutions left behind by waters that washed over the surface created still more crystals, all intricately interwoven and hidden inside the drab exterior of this hearty trap rock.

Prehnite from Paterson, the most sought after of this region's minerals, is found in collections throughout the world. Usually a soft shade of sea green, it sometimes occurs in grape-like clusters, occasionally as single crystals, and at times in patterns resembling sheaves of wheat. Quartz is abundant as well, and samples of the amethyst variety range from deep purple to light lavender, depending on the amount of iron they contain.

On display at the Paterson Museum are specimens covered with microcrystals, tiny and needle-like in appearance; pieces coated with jewel-like rosettes that are actually the pink hemispherical masses of the mineral albite, and rocks adorned with pinpricks of crystal that look like the sharp quills of a porcupine. A specimen of stilbite, one of the zeolite group of minerals which formed under conditions of low temperature and pressure, has the distinctive shape of a man's bow tie.

The strong basalt of the Paterson area continues to be quarried and used for roads, railroad ballast and grading, along with crushed stone from more than 30 other operating quarries in the state. There were once hundreds of mines here as well, but only the Sterling Hill zinc mine continues to operate.

The earliest mine in New Jersey—and possibly the first in the country—was the Pahaquarry Copper Mine, opened in 1654 by Dutch adventurers. An iron mine at Tinton Falls soon followed and by 1774, according to the New Jersey Geological Survey, 225 iron mines were in existence. Manganese and titanium were also mined, along with the rich zinc found only at Franklin and Sterling Hill.

New Jersey mines, records show, played a significant part in the Revolutionary War. At the American Mine north of Somerville, just enough copper is said to have been extracted to produce a single brass cannon, which was later fired at the enemy during the siege of Yorktown. Bog iron smelted at Allaire Village and Batsto was used for cannon balls. And Old Mine Road leading from the Pahaquarry mine was trampled on by troops rushing to strengthen Washington's weakened army just three days before his historic crossing of the Delaware in December 1776.

The number of mines swelled during the next hundred years but most had ceased operating by the end of the 19th century. The remainder followed by the 1950s, when Franklin Furnace finally closed its doors. Yet Franklin is still the state's most popular spot for mineral collecting.

Collecting is no longer permitted on Laurel Hill, the former site of a penitentiary, an almshouse, a mental institution and a hospital for incurable diseases. The towering rock formation has been nearly leveled and once again houses prisoners in a temporary annex for Hudson County. The New Street and Prospect Park quarries, for many years abundant sources of Paterson minerals, have closed their



Amethyst

doors to collectors as well, and special permission is needed at many other locations.

But serious collectors still find plenty of places to swing their sledge hammers in search of specimens. Stressing the importance of joining a group both for the knowledge and for the accident insurance it provides, Vogt continues to bring the members of his Bergen County club into Paterson, where they find crystallized minerals on the east side of the Passaic River and in an abandoned city lot. Other favorite spots are Carmelian Brook in Stirling, where chunks of carnelian can be dug with a pail and shovel; the Edison Quarry in Rudetown, the source of 18 different varieties, and Lake Valhalla, known for its excellent serpentine. Vogt leads his group to the Bound Brook Copper Mine, where piles left over from the 18th century operation remain; to brooks in South Amboy and select spots along the Raritan River; and once a year, when it opens its doors for its annual open house, to the Limecrest Quarry in Newton, where he has found semi-precious stones such as ruby and sapphire.

One Sunday he leads an expedition to the swampy clay pits in Sayreville to forage for carbonized wood, amber and marcasite. Instead of wearing the customary hard hats and wielding sledge hammers, members of the group don high rubber boots and cart only shovels, rakes and hoes here.

Vogt begins by detailing what happened 70 million years ago, when a small forest of trees was buried underground on this site. The clay cut off any oxygen from the wood, he says, and caused it to carbonize until it began to resemble charcoal logs covered with carbon crystals.

As the digging begins, he picks up a piece of amber and tosses it back into the gravel, instructing the crowd to study it carefully. "Train your eye on it," he advises, explaining the importance of searching selectively to avoid bending over for anything that catches the eye.

By the end of the day, many carry home two-foot long logs and buckets of rock, hopeful of finding superb specimens under more careful scrutiny than the tiny magnifying loops they carry can provide.

Living history...

a battle in Princeton

ROBERT P. SHERIDAN, SR.
PHOTOS BY TERRY KARSHNER

Few experiences are more satisfying than a trip to Princeton, a diverse college town where the past and the future exist in the same moment of time.

The world of the future and "high-tech" is manifest in the Institute of Advanced Studies and the James Forrestal Campus of Princeton University. The past is apparent in such venerable structures as Nassau Hall, first occupied in 1756, and Mac Lean House, erected in 1756 as the home of Princeton's early university presidents. Even these buildings are not as old as Morven, the center of political and social events since 1750.

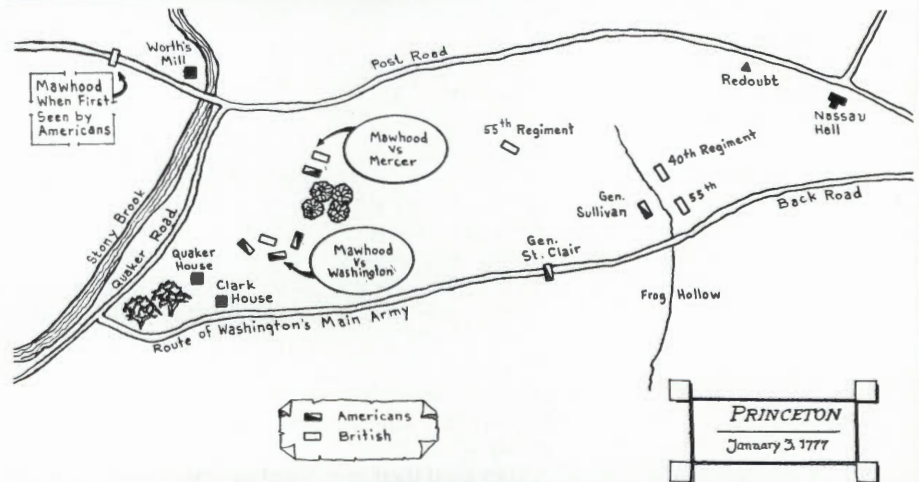
The student of the American Revolution associates the town and university with the pivotal Battle of Princeton in January 1777, which wrested most of New Jersey from British and Hessian occupational armies.

A warm, sunny day is conducive to remaining out of doors and becoming immersed in the historical events that turned a village from peaceful pursuits to incredible violence.

Begin a tour of the battle site by traveling west on Nassau Street until it intersects with Mercer and Stockton Streets. There, you can study the impressive Princeton Battle Monument, a 50-foot sculpture cut from Indiana limestone and dedicated to the heroes of the American Revolution. Gen. George Washington leads his troops, urged on by a woman representing the Spirit of Liberty. Hugh Mercer, who died in the battle, is distinguishable among the figures. He is being supported by another soldier.

Older residents say that when the monument was new, and the sun struck the figures obliquely at dawn or dusk, the monument became infused with flesh tones and seemed alive. The monument is the work of American sculptor and painter Frederick William MacMonnies.

Continue southwest on Mercer Street. It becomes Mercer Road or the Princeton Pike (State Highway 583). Approximately one and a half miles from the Battle Monument, you will arrive at Princeton Battlefield State Park. Here, near Quaker Road, on the morning of Jan. 3, 1777, the Battle of Princeton began. Two hundred years later, a replay of that struggle was staged for the Bicentennial of the





American Revolution.

The 18-century Prince Town and Princeton today provided interesting contrasts when the Battle of Princeton was reenacted by more than 1,000 living history hobbyists. The scene shifts back and forth between 1777 and 1977, and the present is lined to the past.

January 2, 1777: Inside the Alexander Douglass House in Trenton the light from candles within a glass-sided lantern exaggerated the features of the men hovered over a map on the rude table. Generals Arthur St. Clair and John Sullivan had joined generals Hugh Mercer and Nathaneal Greene to ponder their next move. The glow from the lantern provided feeble but mellow illumination to the outlines of the tactical map, which centered on the village of Prince Town in the Jerseys. From a military standpoint the situation was untenable. Gen. George Washington, who called this council of war, bore the responsibility of devising a way to extricate a cold and weary army from what might prove to be a fatal trap.

This was the second day of the new year of 1777. British Gen. Charles Cornwallis was rushing heavy reinforcements from New York headquarters to the Trenton area. A concentrated attack could come very soon. The men in the room knew well that the next day is might be all over; a military disaster that could not be averted. The end of a new nation as well.

Later that same evening, at the council of war meeting in Alexander Douglass' home, all eyes were fixed upon their tall leader.

"Gentlemen," began Washington, "I need not advise you that we cannot wait here to experience the gentle ministrations of Lord Cornwallis. We are indeed in a most untenable position. Accordingly, keep our watch fires burning through the whole of this night. I intend a little deceit to extricate us. Note how the temperature is falling. Soon the roads will be passable and our wagons and cannon can be mobile. We must slip away and confound the enemy when he arrives at daybreak."

January 2, 1977: All morning the reenactment folk were meeting kindred souls actively participating in the American Revolution Bicentennial Celebration.

They paid their own travel expenses, took leave of jobs and professions and gave up a good part of their holiday season to honor the nation's Bicentennial. One bank executive didn't like to think about returning to his desk in a few days. It would feel strange to have a tie around his neck again after days spent in the practical and comfortable deer-skin hunting shirt, trousers and Indian moccasins. It was even more pleasant to be assailed by hostile "redcoats" than by some of his more aggressive bank customers!

January 3, 1777: The lieutenant of artillery in the American lines was having a bit of trouble clearing the touch hole in one of his cannons. The vent pick he was using was made of brass wire about an eighth of an inch thick and nine inches long. One end curled into a round eye and the lieutenant's palm was closed around it. But his hands were so cold that the pick slipped from this grasp as he jabbed the sharp end into the hole in the side of the cannon to clear some of the caked gunpowder residue.

He attacked the vent hole again, this time with more determination, and cleared the powder.

"Good!" he mumbled to himself. "Be a bad turn

of events if this piece misfired and killed us, not the enemy."

The soldiers tending the watch fires in the front of the American camp felt a little better off than their comrades, who were huddled in the cold and trying to snatch a brief rest before the impending British attack. The temperature had dropped to below freezing and the mud and slush congealed in the roads.

Quietly the word was passed down the line: "We are moving on!"

Non-commissioned officers cautioned their men not to make excessive noise and implored them to march quickly. Lord Cornwallis' advanced posts kept the watch fires in the American camp under close scrutiny—too close, perhaps, because the British did not see the rebel army slipping away.

January 3, 1977: Some of the American reenactment troops kept symbolic fires burning the evening of Jan. 2, 1977, to commemorate the same act that deceived Cornwallis long ago.

Just after midnight, when fires were burning brightest in the American camp, a trucker was heading south to Philadelphia on the Trenton Freeway. As his gaze drifted out the window on the driver's side, he was surprised to see the flickering glow from several fires spaced at apparently regular intervals. He reached for his citizen's band radio. In an affected southern drawl, (he was really from New York), he tried to learn what the fires were all about.

"Hey ... good buddies ... Smokey ... any of y'all catch the fires in Trenton off Route 1?"

January 3, 1777: In the darkness the Americans headed northeast. By some miracle of perseverance, the head of the column reached the Quaker Road a few miles southwest of Prince Town at dawn. The day was clear and cold and the advanced unit of the Continental Army saw the Stony Brook Quaker Meeting House silhouetted against the rose-colored horizon.

Col. Charles Mawhood was at that time leading the 17th Regiment of Foot over the Post Road. The 17th was on the way to Trenton in advance of the remaining 40th and 55th Regiments, who were to follow the next day.

At Clark's orchard Mawhood and the Americans confronted each other. Volley after volley of musket fire ripped through the trees. Hoarse cries of anger and pain mingled with the pall of black powder smoke that engulfed the struggling men. The furious British attack overwhelmed the bone-tired Americans.

Gen. Hugh Mercer felt his horse lurch suddenly and collapse beneath him. He struggled to his feet and found himself in a battle for his life. Several British soldiers charged him with bayonets gleaming. Mercer parried the thrusts with this sword but there were too many sharp edges. Seven thrusts punctured his torso. He was down, mortally wounded, but death was agonizing days away.

Gen. Washington spurred his horse and galloped back to rally the troops. Continentals of the 7th Virginia Regiment and Col. Hand's riflemen poured volleys into Mawhood's left flank. At the same time the New Englanders attacked the British right.

Mawhood was in big trouble. He was outnumbered and was being assailed on three sides. The British line cracked for the last time, leaving nearly one-quarter of their number dead or wounded.

The survivors fled back to the Post Road and the

Reenactment of the January 1777 surrender of British troops after the Battle of Princeton.

Battle at Princeton

continued from page 31

bridge at Worth's Mill. American riflemen pursued the British, urged on by an exuberant Washington, who was heard to shout: "It's a fine fox chase, my boys!"

A young artillery officer opened fire on the British-occupied Nassau Hall, College of New Jersey. A lucky shot whizzed into the building and smashed a large portrait of His Royal Majesty King George III, ruler of England and all her possessions. It was an excellent shot by a young man who would be a great statesman in the new republic—Alexander Hamilton. The jittery occupants of Nassau Hall surrendered.

January 3, 1977: The morning was cold but brilliant. The sun cast mauve shadows across Princeton Battlefield. A huge crowd assembled around the battlefield and media people were busy setting up equipment for movies, television and still photographs. An estimated 20,000 people attended the event—surely more than had participated in the actual battle.

The American troops formed at the juncture of Route 1 and Quaker Bridge Road south of Princeton. The march to the battlefield began at 8:30 a.m. and the Americans confronted the British reenactment troops representing Colonel Mawhood's units. The mock battle had all of the elements of the original one, but was confined to an area for convenient spectating.

The battle ranged back and forth across the field of glistening snow. Artillery fire sent great clouds of smoke out over the struggling British and Americans, sometimes obscuring the action. Delighted spectators never expected this level of realism.

Modern phenomena not experienced by the orig-

inal soldiers were the cheering sections and the waving aloft of big placards by the more exuberant spectators. Large hand-printed cards contained such provocative messages as: "Wait Until the Tricentennial!" and "Mawhood's Minions." These gave the British a small expression of sympathy. Most of the accolades went to the Americans: "Let's Go Colonists—Yea Team" and "Power to the Revolution."

The outcome was never in doubt, unlike it was 200 years ago. This time, the Americans and British joined forces for a triumphant three-mile march to Cannon Square on the Princeton University campus. Here, in front of Nassau Hall, a moving closing ceremony was held at noon. Virginia's Gov. Mills Godwin, former New Jersey Gov. Robert B. Meyner and then-New Jersey Gov. Brendan T. Byrne formally reviewed the combined British, Hessian and American reenactment troops.

The 20th century has returned to Princeton. Nassau Hall is no longer a military hospital and bridge headquarters alternately for the Continental Army and Crown Forces. An ornately-framed, full-length painting of Washington replaces the portrait of George III.

Many of the open fields are now covered with asphalt and concrete. So, too, are the artifacts and residue of that long-ago struggle. (It should be noted that Princeton Battlefield State Park has preserved a substantial portion of the open fields.)

The link to the past is not yet broken. A certain spirit survives in the men and women who adopt the personalities of their ancestors. The link will not be broken as long as there are people who care about preserving our heritage and who make history live.

Canada Goose

continued from page 25

Jersey Waterfowlers, Bergen County Waterfowlers and other sportmen groups, 500 geese were neck-collared in addition to the 500 geese which are normally leg-banded. Observers hired under the migrant goose study are recording both grey and yellow neck collar codes enabling biologists to gather data on two goose populations at no extra cost.

The Division plans to continue this cooperative study for two more years at which time the leg band and neck collar data will be analyzed in order to determine how large the population of resident geese is in New Jersey; where and when resident geese move throughout the year; what is the average survival rate of resident geese, and what are their major mortality factors and when they occur. In addition to these tagging studies, biologists will be examining Canada goose nesting in order to

measure the productivity of our resident flocks. Taken together these studies will provide the baseline data needed to construct a life equation for our resident geese. This equation will be the basis for our future management of our resident geese and the yardstick by which we can measure the success or failure of our management programs.

Neck Collar Sightings

Persons observing live neck-collared geese are encouraged to report their sightings to the Division of Fish, Game and Wildlife. For the information to be useful to researchers, reports would include all of the information requested on the form below. People who find dead geese, and hunters who bag neck-collared geese are urged to report data to the address listed on the legband.

NECK-COLLARED GOOSE OBSERVATION FORM

Observers Name:		Exact Location:		
Address:				
Telephone #:		Nearest Town	County	State

Date	Neckband Color	Code Color	Neckband Code	# Geese in flock	# Geese W/Collars	Habitat	Comments

Please send all information on neck-collar sightings to Paul Castelli, Assunpink Wildlife Management Area, RD #3 Robbinsville, NJ 08691.

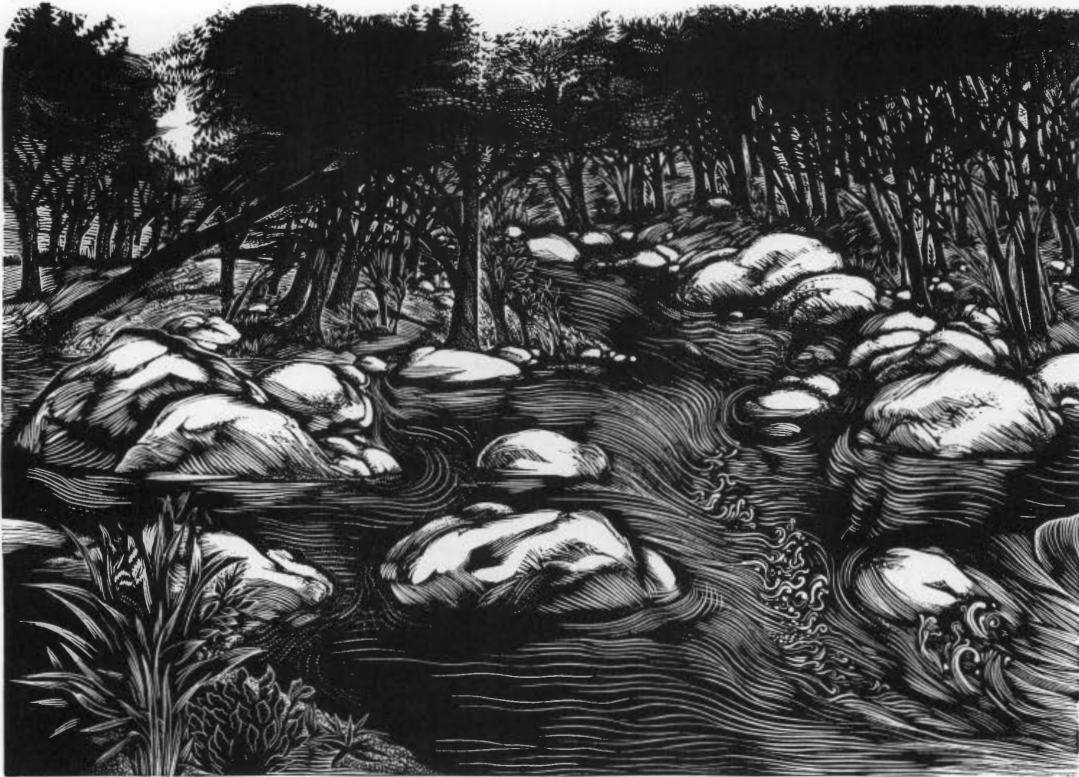
STATE OF NEW JERSEY

NATURAL LANDS TRUST

presents

"MORNING STREAM"

by
Stefan Martin



"The donation of land preserved in its natural beauty is a priceless and enduring gift made to present and future generations."

The Edition

To commemorate the 15th anniversary of the Natural Lands Trust, a series of special edition Stefan Martin wood engravings are being released during 1984. The first two engravings of the series are now available and the third will be completed in November. There will be 250 prints in each edition, 200 of these may be purchased and 50 will be retained by the Natural Lands Trust.

Each engraving will illustrate an object of the Trust's preservation efforts. The first engraving of the series, "Perigrine Falcon," is representative of those species of wildlife which are threatened by the careless acts of man, yet can be restored by his thoughtfulness. The second engraving, "Morning Stream," typifies a northern New Jersey river habitat and symbolizes the dawning of the Natural Lands Trust as a vital force in the pursuit of habitat preservation. The engravings are printed on 12" x 16" sheets of okawara paper, a natural white handmade Japanese rice paper and the image size is 8½" x 12". Each is hand printed, signed, numbered and titled. Prints of this size normally sell for \$200 (depending on the level of detail), but are available through this special series for \$125.00 each.

The Artist

Stefan Martin has mastered the exacting art of end grain wood engraving, a print technique demanding extraordinary skill and patience. His wood engravings and

incised paintings have been widely exhibited in one-man and group shows throughout this country, and have been shown in South America, Europe and China. He has received a number of grants and awards and is represented in numerous museum, institutional and private collections including the Museum of Modern Art, the Metropolitan, the Holmberg Museum, Smithsonian Institution, Chicago Art Institute and the Rockefeller Collection among many others. Martin is a former Vice President of the Society of American Graphic Artists and currently serves as Art Director of the Printmaking Council of New Jersey.

The Natural Lands Trust

The Natural Lands Trust, a non-profit public corporation within the Department of Environmental Protection, encourages through donation, the preservation of natural areas, endangered species habitat and land dedicated to passive recreational pursuits.

To Order

To order, send a check or money order in the amount of \$125.00 payable to the Natural Lands Trust, c/o The Office of Natural Lands Management, 109 West State Street, CN 404, Trenton, NJ 08625.

The proceeds from the sale of the prints will further the preservation efforts of the National Lands Trust.



and plenty of animal droppings in the yard. This will activate millions of bacteria and attract earthworms. Not surprisingly, I spent the next two nights sleeping on the couch.

September

Minor setback with the corn. Turns out it's the kind they feed to cattle. Plenty of compliments on my cherry tomatoes though (I'm the only one who knows they're really Beefsteaks that ripened small.)

My neighbor has promised to look after the garden during our vacation. I'm concerned though, because he's made verbal threats against my raspberries in the past. Seems the suckers keep popping up among his flowers. Picky, picky, picky. He doesn't know it yet but he also has lettuce in his lawn.

Learned about an alternative to pesticides. It's called the bug-juice method. You pick a bunch of the bugs, liquify them in a blender and spray the juice on the plants. (The couch isn't all that bad once you get used to it.)

October

Spent one entire day hiking from one end of the pumpkin vine to the other but didn't find any fruit. On the bright side, the vines did hide the garage well so I'll probably get away with not painting it this year.

Returned from vacation and found the garden looking even better than before I left. Brought over some radishes to my neighbor to thank him. Turns out he hurt his back and never got to do anything. There's probably a message in there somewhere.

Harvested kohlrabi today. The kids wouldn't eat it claiming it looked like it was from outer space.

Decided against apprising the wife of two new anti-pest techniques.

1. Hang up sweet-soaked clothes to ward off deer.
2. Used dried blood to dispel rabbits. (The couch begins to get cold this time of year.)

November

I got rid of the rest of the radishes by giving them out on Halloween. The kids promptly got rid of my mailbox.

The canning of pickles produced some setbacks. Most of the jars wouldn't seal so we now have 14 quarts in the refrigerator.

Cleared most of the debris from the garden and turned over the soil for winter. Where do all these rocks come from anyway? I cleared them all out in the spring. Must be rock seeds in the soil.

December

The garden is clear now. Everything has been removed for the winter.

I'm encouraging everyone to play lots of badminton this month and get it out of their systems. No takers though.

Two positive notes.

1. Apparently the Government didn't approve the application my wife sent in for a crop subsidy.

2. The police never found out that I killed a praying mantis. There's supposed to be a \$50 fine.

Got lots of gardening gifts for Christmas and everyone in the family seems really enthusiastic about next year's crops. Even my wife went on and on in front of all the relatives about what a terrific garden I had. Everyone seemed so enthusiastic about it and I was clearly the center of attention with stories of nematodes and "burpless" cukes. I just hope that next year they don't expect as engaging a dissertation on dental floss.

Dear Editor

New Jersey Outdoors welcomes letters from readers. Letters for publication should include the writer's name and address and should be mailed to: Editor, New Jersey Outdoors, CN 402, Trenton, N.J. 08625. Letters may be edited for reasons of length or clarity. Please keep the letters coming. We'd like to hear what you think about the magazine. We'll also try to answer questions and if we cannot, we'll ask our readers for help.

A Bit of a Slip

In the November/December issue, there is an error in the caption for the picture of Spring Cabin. As far as I know, Spring Cabin is located very close to the New Jersey School of Conservation, in Stokes State Forest, not High Point State Park! The spring is a nice place to cool off your feet after a long hike.

Keep up the good work,
Chris Budesa
Verona

Sorry, Spring Cabin is in Stokes State Forest (Old Kittatinny Mountain Reserve) and was built around 1907, long before the days of the CCC. The Forestry Service has a 1908 picture showing State Commissioner Alfred Gaskill standing in front of Spring Cabin.

Santiago Procella III
Pennington

Right you are. Somehow that slipped by us. Thanks for the information.

Our Popular Covers

I am very much interested in buying a small reproduction of the deer photograph on the front cover of the November/December issue. It would be an ideal gift for a dear friend. Since I save my copies of NJO, I would hate to cut one up.

Marjorie Carroll
Iselin

Please contact the photographer, Leonard Lee Rue, III, at RD #2, Box 88A, Blairstown, NJ 08725.

A few weeks ago, I picked up a load of logs at my local dump. Within a few days I broke out in hives, pimples, and other signs of poison ivy, poison sumac or poison oak. And now I don't want to use the wood since I don't want to break out again. Is there anyone near Upper Saddle River who could help me identify the wood? It would come in handy.

Thank you.
Benjamin P. Wilson
Upper Saddle River

Try Your County Agent

I have a large horsechestnut tree that browns and wilts every summer. Last year we had it treated and fed by a local tree company and it seemed to respond (browning was delayed.) This year we did not treat the tree and the browning/wilting occurred very early—in July. Any suggestions how to preserve this nice old tree?

Charles Whedon
Westfield

For both these questions, the best place to go for advice is your local County Agricultural Agent. The Agents are part of Rutgers' Cooperative Extension Service and are experts on most everything that grows. To contact your local Agent, call your county clerk's office and ask for the Extension Service.

Maps Would Help

We echo the sentiments of reader Royle in the September/October issue, in calling for maps in future articles. In this connection the map appearing in that issue for the article on Patriot's Path is grossly inadequate. North is not shown, the usual convention of orienting North toward the top of the page is violated, and the portion of Patriot's Path running through Morristown National Historical Park is omitted.

Lest this letter seem to carping, we hasten to add that we love NJO is all other respects.

Dorothy Vosseller
Perth Amboy

We'll try harder next time.

Living History

I am a member of the 2nd New Jersey Regiment Revolutionary War Living History Reenactment Group, Maxwell's Brigade, Helm's Company. Have you ever done an article on New Jersey's reenactment groups? Many are experts on 18th century life-styles and revolutionary history. They do everything from reenacting full scale battles, such as the Battle of Monmouth, to crossing the Delaware on Christmas Day.

Barney DeLoach
Dover

As a matter of fact, there's an article about the bicentennial reenactment of the Battle at Princeton in this issue.

Tulip Poplars alias Tulip Trees

The September/October issue lists a tulip poplar tree. Some months ago, I tried to identify a problem that affected what I thought was my tulip poplar tree and could not find "tulip poplar" listed in any reference. Then I accidentally discovered a "tulip tree." Our county agent, Longwood Gardens and most books I have looked at, call it "tulip tree." Many dictionaries refer one to "tulip tree" if they even mention "tulip poplar." I really believe that "tulip poplar" is fiction.

G. Lewis Oddy
Coopersburg, Pa.

Well, not quite fiction. Tulip poplar, tulip tree, yellow poplar, white-poplar and whitewood are all common names for *Liriodendron Tulipifera*.

Red-tailed Hawk

BY WADE WANDER

When a good old boy from Oklahoma sat down to talk with his honey lamb, the hawk they watched make lazy circles in the sky was probably a Red-tailed Hawk. Rodgers and Hammerstein must have conjured up boyhood remembrances of this big bird because they wrote about it in their beautiful hit song "Oklahoma." In fact, many people have seen this impressive bird of prey, although most may not have realized it. Scout troops hiking the Appalachian Trail in October have pointed wonderingly at them, the trucker pushing his rig yet one more time along the Turnpike in Linden, spots one between puffs of his cigarette, and the farmer pausing on his John Deere sees one as he looks up into the hot August sun.

The Red-tailed Hawk is today the most familiar and widespread large hawk in New Jersey. It can be seen in every county in the state virtually every month of the year. Nearly two feet in length, this robust bird carries about 3 pounds on a 4-foot spread of wings. Although there is considerable variation in plumage, most Eastern adults have a broad rufous tail and white underparts with a dark "belly-band." Immatures feature brownish-gray tails and somewhat darker underparts.

Red-tails frequent open country interspersed with patches of forest. Their large, bulky stick nests are placed high in a deciduous tree on, or near, the edge of a woodlot. During fair weather, mated pairs engage in spectacular courtship flights with the smaller male diving or "stooping" on the female, who, at the very last moment, rolls onto her back and presents her talons on outstretched legs. The pair will then briefly lock talons before flying off to a nearby perch and copulating. In New Jersey, most females lay their 2 or 3 eggs in April or May. During her four weeks of incubation, the female is fed by her mate. The young first stretch their wings in flight when 6 to 7 weeks old.

Like most predators, Red-tailed Hawks are opportunistic feeders. They catch and eat anything from skunks and porcupines to birds, snakes, and frogs. Even fish, turtles, and earthworms are known to have been captured by Red-tails. However, their staple diet consists of a variety of small mammals. Hunting is done on

the wing—usually while effortlessly soaring in those lazy circles, searching for movement far below with phenomenal eyesight 8 times as sharp as our own! When prey has been located, Red-tails will often hover before making their strike.

Although Red-tailed Hawks can be found commonly in any season of the year, they are most abundant in New Jersey in winter, when birds from less temperate climates arrive. At this time they are easily seen, perched like sentinels in the leafless trees—playing the hawk's game—waiting and watching, always waiting and watching.

Usually hawks are seen singly or in pairs, but at certain times of the year one can witness to a truly spectacular natural phenomenon—the mass migration of hawks. On brisk days in late October and November, when the winds are northwest, several hundred Red-tailed Hawks can be seen in a single day from such places as Sunrise Mountain in Stokes State Forest and Raccoon Ridge, near Blairstown, Warren County. On such days, Red-tails come soaring down-ridge, sometimes alone, sometimes in small groups. Now and again the stream of Red-tails will be pleasantly interrupted by the magnificent: a Golden Eagle or a Goshawk, or once in a great while, a rare visitor from the far north, a Gyrfalcon. These are the stars of the show, but the story belongs to the Red-tails.

And one day, if you're lucky enough to be propped up against a comfortable rock atop Raccoon Ridge, and the cold wind against your face seems to increase your level of understanding and awareness, reflect upon those farsighted men and women who first fought to preserve such places. These people carried binoculars up to their favorite lookouts and so spawned an ever growing following of enthusiastic hawkers, some of whom visit those very same lookouts today. Sadly, though, some people carried not binoculars but guns, and the slaughter of hawks that followed cannot easily be forgotten, nor should it be. Happily for the hawks, and for people like you and me, these courageous people won their struggle. But my friends, this is another story for another time. For now, go out and watch a Red-tail, and wonder what it would feel like if you could do what a hawk does.

FRONT COVER

Ice Fisherman on Round Valley Reservoir. Photograph by William Leather.

INSIDE BACK COVER

Red Tailed Hawk. Illustration by Carol Decker.

BACK COVER

Silence. Photograph by David A. Bast.



New Jersey State Library

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