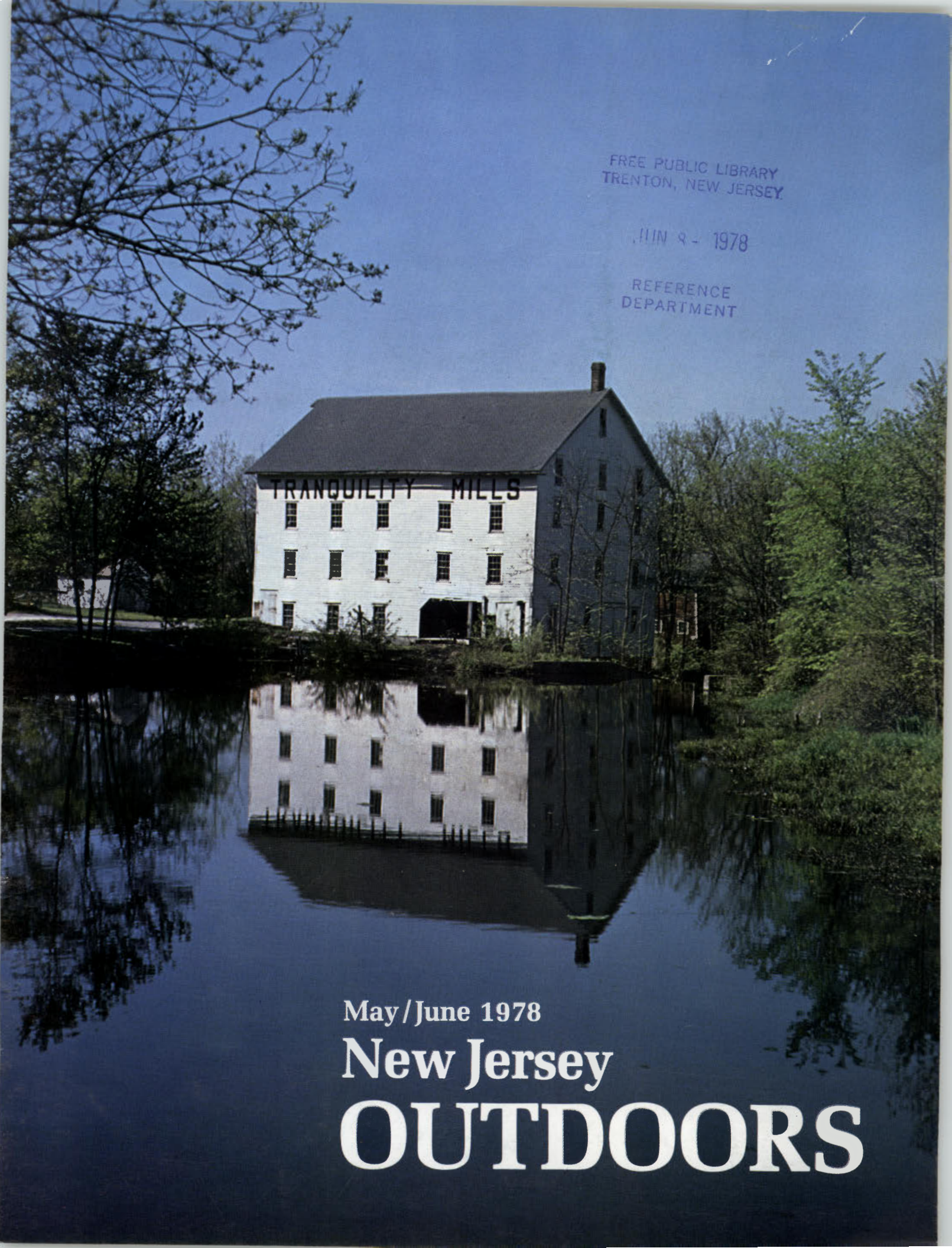

May/June 1978

New Jersey OUTDOORS

NEW JERSEY OUTDOORS is the bi-monthly magazine of the Department of Environmental Protection of New Jersey. This publication is dedicated to the wise management and conservation of our natural resources and to foster a greater appreciation of the outdoors.

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from the editor

"If Conservation is so important—Why?"

Recently, I received a letter from a boy scout, a member of Troop 52 in Woodbridge, New Jersey. He said "having been sick I've just gotten around to your May/June 1977 editorial." He was referring to a piece in which I condemned our throwaway society for littering the New Jersey landscape and offered, as a common-sense solution, a returnable beverage container bill.

Scout J. Umback writes that Boy Scout Troop 52 was actively involved in a recycling effort for four or five years that included glass, paper and aluminum cans. He says in this period Troop 52 recycled over 300 tons of glass. Some of the money was used to take Troop 52 on trips and campouts; and some was donated to the churches of each faith in the Woodbridge area. Also, after the Wilkes Barre flood of 1972, Troop 52 purchased a rowboat and oars for the Penn Mountain Council Scout Camp to replace one lost in the flood. These items were also purchased with money earned from the recycling operation.

But suddenly, says Scout Umback, the Troop 52 recycling operation was shut down by the local building Inspector's Office for "running an unhealthy business in a residential zone." According to Scout Umback, they were located less than 300 feet from the turnpike at Exit 11. He ends his letter with two questions: "Carbon monoxide is healthy?" and "If conservation is so important—why?" I wrote for additional information so that we could determine exactly "who" and why this recycling program was shut down. Possibly, with more information we can help Troop 52 get back into recycling.

An item of interest in this area: A booklet called *The ABC's about beverage containers* is available free for a single copy—15¢ each for additional copies. Write to National Wildlife Federation, 1412 16th Street, N.W., Washington, D.C. 20036.

IN THIS ISSUE . . .

In the March/April issue we introduced a new author, Patrick Sarver, an associate editor at Outdoor Life magazine—he's back with *Spring Hiking in the Kittatinny Mountains.* Photographs by the author.

Our fresh water fisheries biologists have provided us with an up-to-date fisheries profile of Prospertown Lake, located in the Prospertown Lake Wildlife Management area in Ocean County. Read the short article, *Fishing in Prospertown Lake;* buy a 1978 fishing license, then pack your gear and try your luck.

And now that you've purchased a fishing license, read the article *See How They Grow* by Fisheries Biologist Robert Soldwedel, and test your angling skills on the lake trout in Round Valley. Of course, you must put them back until they grow up.

A new author, Dr. Oliver Donovan, Assistant Professor of Biology at Jersey City State College, writes about catching, tagging, and preparing shark meat for the table in the article *Down Jersey Jaws.* This is a part of the biology class activity at JCSC.

Not so Barren a Path by Millard C. Davis, another new author, can only be described as pure Pine Barrens. Mr. Davis is the author of *The New Woods,* a book about New Jersey's Pine Barrens, published in 1974 by Alfred A. Knopf, New York. The author has been published in various journals and is President of the American Nature Study Society.

A continuation of our Wildlife in New Jersey Series—*The Eastern Garter Snake* by Joan Galli and Robert Pierro. As per usual, this article is introduced by the full color illustration of the Eastern Garter Snake by Carol Decker on the inside back cover, suitable for framing.

DEP's New Cleanup—On the Waterfront, by Carol Tomson, introduces still another new writer to our readers. Author Tomson writes about the Waterfront Cleanup Project, funded jointly by the state and federal governments, which involves the renewal of 23.6 million cubic feet of debris generated from 2,230 derelict vessels and 100 deteriorated piers and wharves. Photos by Harry Grosch.

Author J. A. Starkey asks *Can They Come Back* in his article about the seven members of the *Saturniidae* family of giant silkworm moths. The color photos in this article were taken by the author.

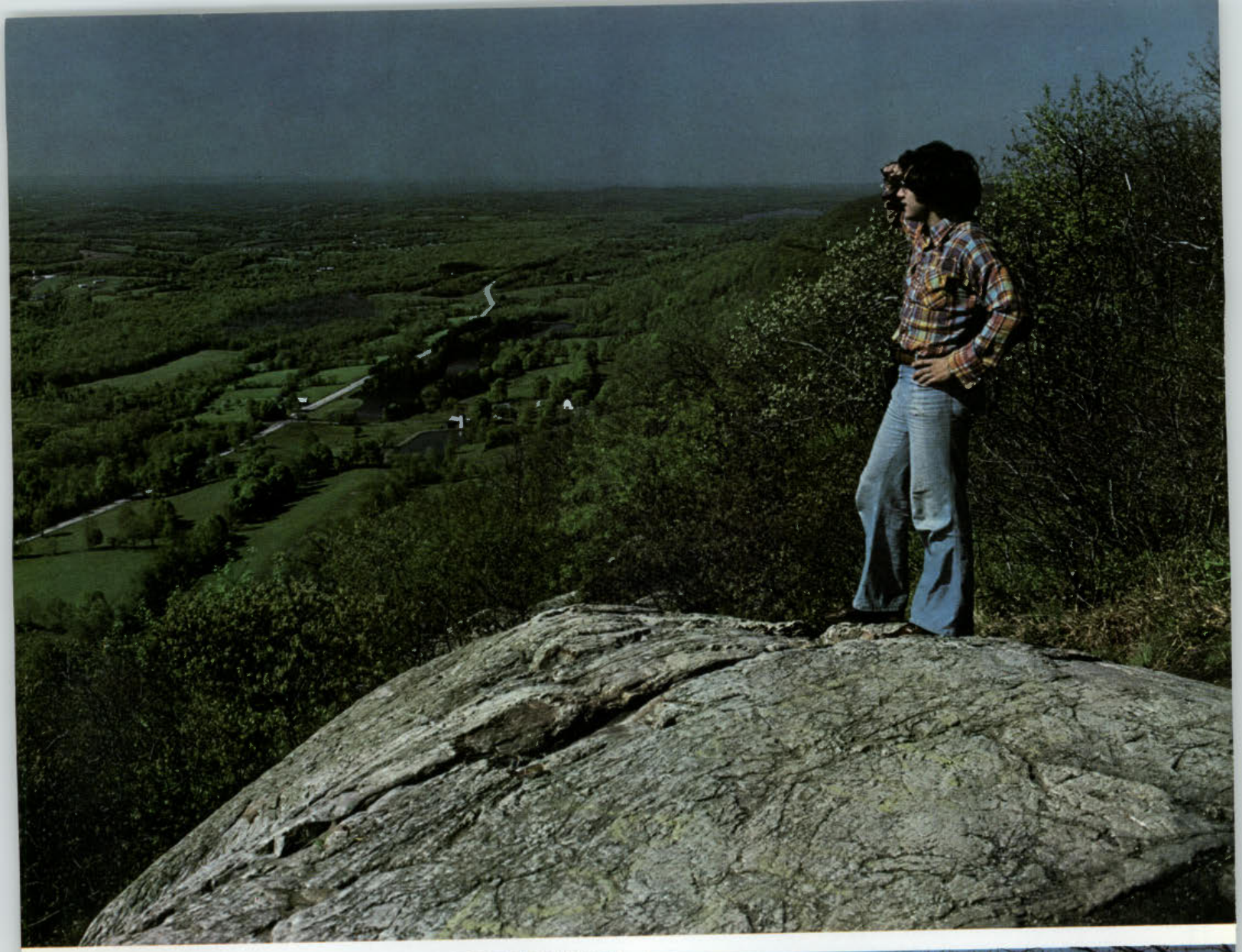
Join the growing ranks of bluebird enthusiasts who erect hundreds of bluebird houses and spend untold hours monitoring the nesting results. *Giving the Bluebird a Helping Hand* by Bob Byrne tells how you can become involved in this activity.

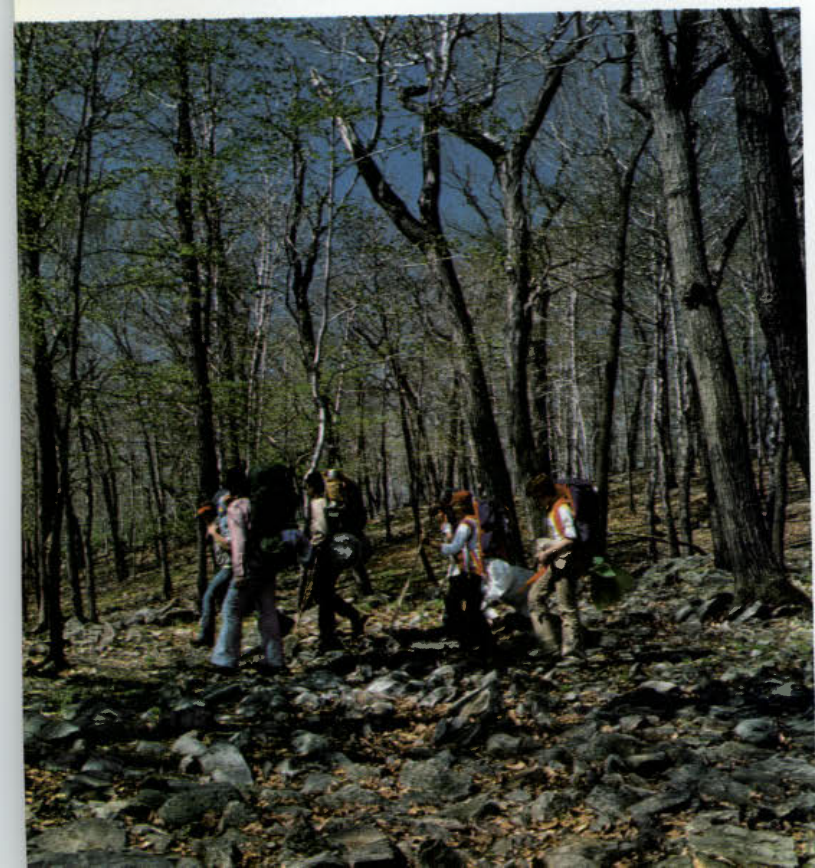
OF Fiddleheads and Fronds by Sharon Ann Brady and Wade Wander describes some New Jersey ferns and where they can be found. Color photographs were taken by the authors who have collaborated on several articles for New Jersey Outdoors.

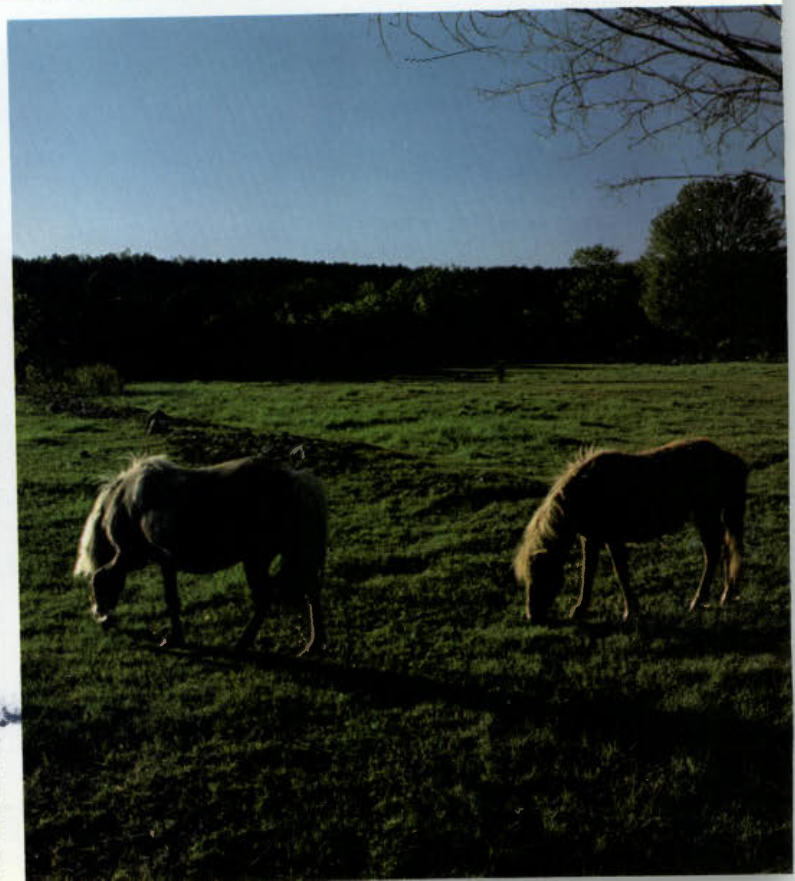
The Environmental Studies Program at Cook College, initiated in 1977, will be repeated this year. Scholarships are available for this 5-credit program and registrations will close on May 19. Read the article for details.

Beginning with the July/August 1978 *New Jersey Outdoors,* our yearly subscription price will increase by one dollar to $4.00 per year. The two-year subscription will be discounted to $7.00 and the three-year subscription will be discounted to $10.00. So before the price goes up, purchase multi-year subscriptions for yourself, your family, and your friends. *Do it now.*

Steve Penna



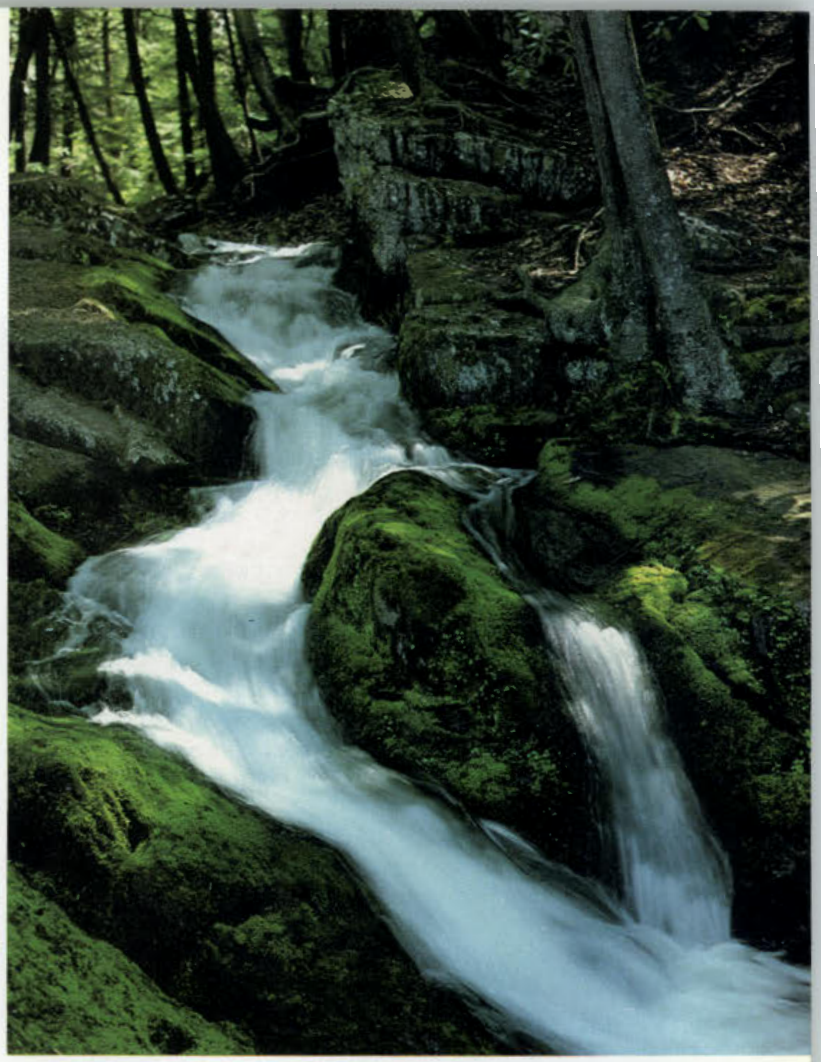




Spring Hiking in the Kittatinny Mountains

BY PATRICK SARVER

PHOTOS BY AUTHOR



On a crisp, clear morning in spring, the hiking in New Jersey's Kittatinny Mountains ranks among the finest in the Northeast. Although the peaks of northwestern New Jersey are not as high as those in other states, the tranquil farming valleys, wooded uplands, and scenic vistas of the Kittatinnys match the beauty of the more famous mountain areas to the north and west of the state.

TOP LEFT—
The view from Sunrise Mountain, near Appalachian Trail, Stokes State Forest.
FAR LOWER LEFT—
Hikers on Appalachian Trail, Worthington State Forest.
NEAR LOWER LEFT—
Ponies in field, near Stokes State Forest.
TOP RIGHT—
Tillman Creek tumbles through Tillman Ravine, Stokes State Forest.
LOWER RIGHT—
Sunfish Pond, Worthington State Forest.

Continued on page 4

Continued from page 3

Spring Hiking

The Kittatinny Mountains, which form the highest mountain ridge in the state, stretch 40 miles from the Delaware Water Gap in Warren County to High Point State Park at the northern tip of the state in Sussex County. Much of the ridge lies on state and federal land, divided between High Point State Park, Stokes and Worthington state forests, and the Delaware Water Gap National Recreation Area. On the west, the Kittatinnys are bounded by the Delaware River Valley. To the east, they face the scenic expanses of the Paulins Kill and Wallkill River valleys.

The Kittatinnys, named for the Lenni Lenape word meaning "chief town," were first settled in the early 1700's. Dutch settlers from the Hudson Valley drifted into the area on the Old Mine Road, which runs along the Delaware River and across lower New York state to Newburgh. Although the Kittatinnys were settled early, they are still one of the least-developed sections of the state. Their scenic beauty and rural charm has changed little from last century.

The variety of trails in the Kittatinny Mountains make the area good for almost any kind of spring hike. The scenery ranges from the dense hemlock stands at Tillman Ravine, to high rocky ridges, to the many ponds and streams scattered throughout the Kittatinnys. In spring, the trails aren't as crowded as they are on summer weekends, and the new foliage and flowers give the mountains a light brushing of color seen only at this time of year.

Spring usually comes a week or two later to the high elevations of the Kittatinnys than in the valleys around them. Although the lowlands may have a full cover of green, trees near the top of the Kittatinnys' rocky ridge may be just beyond budding stage. Hiking from the crest of the ridge to the valleys is like a short trip through time, with a glimpse of the transition of seasons along the way.

Hiking the woodlands and valleys of the Kittatinnys in spring is one of the best places to observe wildlife in the state. The thick woods are home to many animals including beavers, whitetail deer, woodchucks, rabbits, raccoons, foxes, and—on rare occasion—black bears. The upland forest has many kinds of birds, as well.

The primary trail through the Kittatinny Mountains is the 42-mile stretch of the Appalachian Trail from the Delaware Water Gap to High Point State Park. Although this portion of the 2,000-mile trail is probably the busiest segment, it is relatively uncrowded in spring and the scenery along the way is among the best the state has to offer.

One of the most popular hikes in the Kittatinny Mountains is a four-mile section of the Appalachian Trail that leads from the Delaware Water Gap to glacier-carved Sunfish Pond in Worthington State Forest. Two alternate trails that are shorter but steeper climb through Worthington State Forest to Sunfish Pond from the Old Mine Road. Another scenic trail nearby leads to the top of Mt. Tammany, where there is a sweeping panorama of the Water Gap, the Delaware River Valley, and the Pocono Mountains of Pennsylvania beyond.

Farther north, trails in the recreation area wind along the Delaware River, through the woodlands at Watergate Ponds and Van Campens Glen, and across the bright green hills near Peters Valley and Millbrook. Much of the Delaware Water Gap National Recreation Area north of Worthington State Forest is privately owned, and a map should be checked closely before exploring this portion of the Kittatinnys.

Stokes State Forest, which has nine miles of the Appalachian Trail, is also crisscrossed by 25 miles of other marked trails. The terrain ranges from the high ridge at Sunrise Peak, where there is a spectacular view of the Wallkill and Paulins Kill valleys, to 10,000-year-old Tillman Ravine. Tillman Brook drops sharply down a steep gorge in this nature area through a forest of 150-year-old Eastern hemlocks. Along the western edge of Stokes, trails lead along the Big Flat Brook, one of the top waters for spring trout fishing in New Jersey.

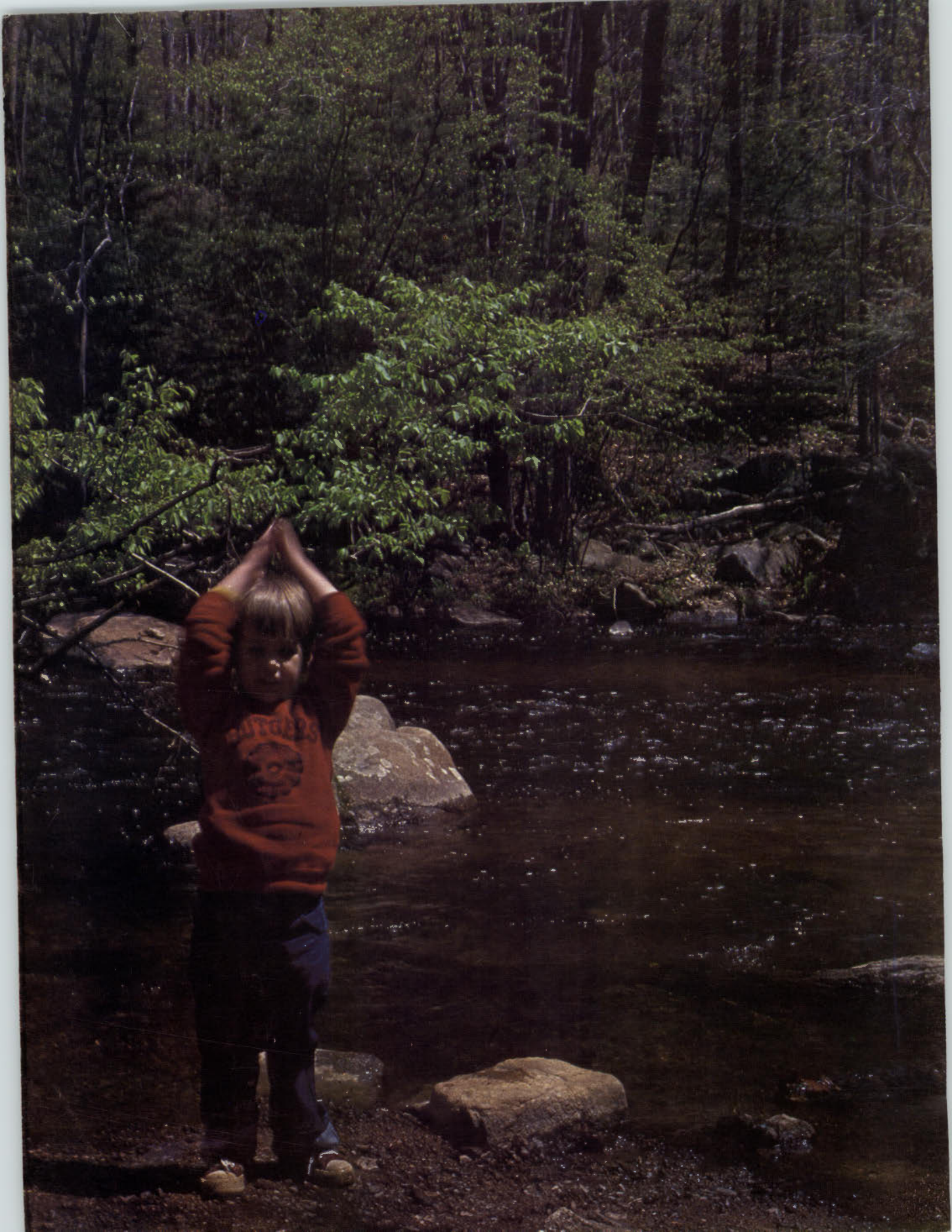
At the northern end of the Kittatinnys, the Appalachian Trail cuts eight miles, through High Point State Park. From the Monument and the trails along the top of the rocky ridge in the park, there are sweeping views of hardwood forests encompassing the Delaware River, the Pocono Mountains, and the Catskills. Nestled below the ridge are several sparkling lakes surrounded by pastel hues of the forest's early spring foliage. These include Lake Marcie, highest in the state, and Sawmill Lake at the park's campground. Kuser Nature Area, 300 feet below the Monument, also has much in the way of animal and plant life to explore in spring. At the southern end of the park, there are also a number of beaver dams that can be seen in the marshy headwaters of the Big Flat Brook.

From the trails along the lowland valleys to the Appalachian Trail atop the highest ridge, the scenic variety of the trails in New Jersey's Kittatinny Mountains makes these hills one of the best places to explore on foot in spring. For spring hiking, they're hard to beat. □

Editor's Note: For additional information on hiking, picnicking, camping, and other recreational activities in New Jersey's State Parks, Forests and Historic Sites, write to the Bureau of Parks, P.O. Box 1420, Trenton, N.J. 08625.

Corrections to *The Muzzle Loading Rifle*, by Wilfrid E. Feldman in the Jan./ Feb. 1978 issue.

On page 31, left column, last paragraph, the fourth line should read, "A *3/8"* fiber glass cleaning rod . . .". A 3/4" rod could (3/4" is .750) not fit either a .450 caliber or a .500 caliber rifle bore. The three lines below should read, "Equipped with an interior *10 x 32* threaded brass ferrule . . ." (not 10 inches x 32 inches). Under "BIBLIOGRAPHY" the first line should read, "The Kentucky Rifle", by Capt. John G. *W.* Dillin . . ."




Carol Decker

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not so barren a path

petition with oaks is in the pitch pine lowlands, where pitch pine is almost the only tree. Here you can often see sand of the Lakewood series, with white grains across the surface and brown ones below. The water table lies only three feet below at the most. In such ground people need to use sewerage pipes, septic tanks being almost impossible. On most of these pitch pine landscapes young pines are not even around. The reason is that their seeds cannot break through the litter of needles and block of bark. The inference here is that they can germinate only on bare ground, which is exposed only by fire. In the lowlands it is easy to count the rings of "whorls" of pine branches all the way to the top and so estimate accurately the year of the last major fire. When tall oaks do occur with the pines, here you can guess that the land was protected against fire.

Ponds and sedgy-grassy marshes which are scattered about here make such areas places which you walk through with care. The curious spongs, pronounced "spungs" like "rungs," are pitch pine lowlands where the grayish, drooping-leaved low shrub called leatherleaf dominates. Dead leaves in the crown indicate that they have just passed through a harsh, killing winter. Ponds and streams here may be half-covered by savannas of leatherleaf and other shrubs.

During spring some people come to the Barrens just to collect the freshly emerged bracken ferns. While the later fronds are poisonous and have made these umbrella-like ferns an anathema to farmers with livestock, the fiddleheads of youth are delicious, whether eaten right on the spot or prepared like asparagus. These are one of the first plants to sprout up after a fire. And while the ground is clean you can easily see how common are white-tailed deer here, by checking for their tracks in the clearings.

You don't have to look far for animal evidence in the Pigmy Forest, the Plains. Here, in a land of four- to six-foot-tall pitch pines and blackjack and scrub oaks, pine cones that have been gnawed down look as large as Christmas ornaments as they indicate the presence of red squirrels. Break open a gray dead tree trunk only an inch or so in diameter, and out pour termites. Deer prints hold the sand for a while, out in a dwarf land where much of the understory consists of such shoe-level plants as reindeer lichen, *Hudsonia,* pyxie moss, bearberry, and broom crowberry.

How strange this forest is becomes even more clear when you realize that pyxie moss only looks like a moss. Actually the dense mats are of a flowering plant. I have seen it during spring when the white flowers on the minute green leaves reminded me of artistically knitted flowers sewn onto a hand-knit blanket. At that time of the year pyxie was paralleling in the Pgymy Forest what bloodroot, spring beauty, and others were doing in hardwood forests not too far away. During summer the leaves turn reddish, then bronze in autumn, like various oak leaves of the taller Barrens forests.

While pyxie moss is a southerner, reaching up the Atlantic coastline in isolated spots from South Carolina, a near relative is an alpine type, occupying cold mountain summits. Both have found success in lands of little competition. So also has the flat tangle of woody stems called broom-crowberry. Essentially this shrub may be a relic, left over from the glaciers and now living in a kind of safety at the southern end of its coastal plain range.

Like these, many good things end in the Pine Barrens. I have a prized photograph of one of the butterflies, the red spotted purple; even though spending its summer on the wing, this lively butterfly which loves the refuse along shady roads, travels almost no farther along the coast south. And the golden red variegated fritillary suspends its northward ascent up the coast here. Leaf-cutting ants terminate their building of new crescent-shaped nests pretty much within the Barrens borders as far as New Jersey is concerned. Anderson's tree frog occurs but sparingly outside these cedar swamps, and almost invariably in such habitats.

Hopefully, with care for these remarkable forests and wetlands, this sort of ending will be the only sort. And we may even have one or two beginnings, such as that of Hessel's hair-streak. For forty years before its discovery, no new butterfly had been seen in the northeastern part of the United States. If the Pine Barrens itself is a holdover from glacial times, as some authorities believe, or even if we view it merely as the remarkably untouched community it still is, who knows what further secrets it holds? And which we must protect. □

FRONT COVER

Tranquility Mill on the Pequest River in Sussex County — Photographed by Bob McDowell

INSIDE BACK COVER

The Eastern Garter Snake — Illustration by Carol Decker *(See article on page 12)*

BACK COVER

A Young Hiker Pauses by the Black River in Hacklebarney State Park — Photographed by Robert R. Fales

asphodel sends up its spartan stalk that terminates as a spike of tiny massed orange blossoms. Each flower of meadow beauty, *Rhexia virginica,* spreads four broad magenta petals behind a spidery tangle of projecting golden anthers. Alive or fading, these half-clenched male parts remind me of the autumn flowers of witch hazel. Finally, some travelers are lucky enough to see along marshy sides the pink St. Johnswort *Triadenum virgininum*—it is the only local St. Johnswort so colored.

Where such streams expand into semi-marshes, the white candy-like heads of pipewort poke out of the water on rod-like stems that are devoid of foliage. Down at their bases, several feet deep, spread out the elongate sharp leaves. About it are often scattered the pancake leaves of water shield, gelatinous to the touch. Here and there around the country the leaves, stems, and roots of water shield are eaten in a salad, but I do not find the plant listed in such a standard work as Euell Gibbons' *Stalking The Wild Asparagus.* Fragrant water lilies are not mentioned either. Their tubers, like the rootstocks of water shield, are nutritious with starch and can be treated like potatoes. No need to feel wasteful of nature's bounty here if you skip these items—local mammals and birds will be just as pleased. To catch the water lily blossoms most full open, come on a bright summer day between seven in the morning and one in the afternoon, for they are just opening or closing before and after that period. I also find them partially shut during the day if clouds cover as much as 60 to 70 percent of the sky.

While many people miss the cedar swamps and streams as they pass through the Barrens, no one fails to notice the forests of ragged pines so far inland. If you are coming from the seashore, they at first seem but an extension of low coastal growth. Soon, however, the forest asserts itself by towering over almost all else. The ability of the pines to sprout again after a forest fire has given them at least temporary dominance in many parts of the Pine Barrens. In others the many oaks rule, while elsewhere they split the land fifty-fifty.

One autumn I began naming some oaks of the Pine Barrens by their interesting varieties of leaves. (I was taking a relatively dangerous route, tackling an art which is often best left to comparing acorns—but these may be missing where gray squirrels have been particularly active). Holly leaf oak illustrated in gracefully embayed leaves with needle-tipped lobes why they are so named. Post oak took its name from the fence posts it became so readily in the hands of pioneers, but for the origin of *Stellata,* from post oak's scientific name of *Quercus* (oaks) *stellata,* I could easily look to the leaves: those of post oak are shaped somewhat like stars. Leaves of a blackjack oak, though, might come in two distinctively different forms. Fortunately both always suggest to me the broad boat-shape of certain old-time blackjacks or "saps." Black oak I picked out for its lobes which expand near the tips; those of similar red oak narrow down. Chestnut oak leaves are easy for anyone to recognize from their sharply wavy margins; once I even discovered two American chestnut saplings while looking closely for the chestnut oaks which had been showering a particular path with mahogany- and butter-colored acorns. During one extended episode a migrating swarm of grasshoppers called the "post oak locust" made a kind of history among chestnut oaks here as the insects moved through the Lebanon State Forest tract of the Barrens. The overwhelming mass left its most permanent known record there by destroying not post but chestnut oaks while marching along at the rate of about one tenth of a mile each year.

Oak-pine forests are likely to be the most impressive of the piney woods, rising up to 50 feet or so. A mixture of oaks lives here, with some having favorite stands. Black oak you can find in many stands, but to be sure you have it try peeling off some bark along a twig—the inner lining will be yellow to orange. This pigment once made a powerful dye, but it also had to be leached out by a tanner before he tried to use the tree's tannin for curing leather. Chestnut and white oak may rule another territory and scarlet oak yet a third. Thus these forests exist as patchworks, a hardwood quilt held together by pitch pines.

Blackjack oaks and pitch pines dominate most of the areas where the more extensive studies have been done to date. These are stocky forests, with the pines reaching up 25 feet and the oaks getting only 10 to 15 feet tall. Here is some of the best lowbush-blueberry and black-huckleberry picking around—though I prefer collecting my blueberries along a cedar lake shore as I drift along in a canoe.

Possibly the best places to visualize how pitch pine fits in and has done so well in the face of com-

Continued on page 32

Atlantic White Cedar in Oswego Creek

Continued from page 11

not so barren a path

balanced drops of rain from an early morning shower. The drops had been balled up into extra-large jewels.

Where such cedar bogs deepen into lakes, snow geese roam in, often by the hundreds during autumn as they head down the coast for wintering grounds between here and North Carolina. Sometimes they make a gigantic nonstop flight that carries them 1,600 miles, from James Bay in Canada to the Gulf Coast in Louisiana. Sunlight striking their feathers can make a flock that is more than a mile away appear as a flashing streamer, one that may be made up of nearly a thousand birds. When several thousand descend on a phragmites marsh, even those tall bony reeds may be stomped flat over hundreds of square yards. During spring they again return, heading for their summer breeding grounds in the Arctic. From here their next leap may be so great that they span New England with hardly a rest. And their voices, thousands strong coming down through the night, say "We are here, and going."

Their counterparts, the whistling swans, fly so high that even their doubled or tripled whistle may be missed. They leave not so often from trampled land but from ruffled water where they have been poking down for roots and stems. I see them in lesser numbers so that their half dozen skips on the water show up all through the take-off. Old cranberry bog lakes hold scattered flocks which I pick up one by one walking through the Barrens.

It was only a half hour into one evening after watching such scaling flights of whistlers that I saw my first Pine Barrens sunset. A loose string of clouds stretched in undulating threads across the horizon like an immutable migrating flock of the birds. I then noticed in almost contacting parallel another such "flight," the reflections of those clouds across acres of cedar water.

By way of contrast, traveling down one of the Pine Barrens streams like the Mullica River or Oswego Creek brings you face to face with a swiftly changing slice through several different wildlife and forest types. Sometimes you can *hear* the difference. Pine warblers, often facing down while chipping at insects under the pitch pine bark, are seasonally so evident that their trilling has been termed "The Song of the Pine Barrens." Listen for notes which mount the chromatic scale to separate out a companion, the prairie warbler. It is not, incidentally, a bird of the prairies but of young forests. Most breed in openings, often where the Barrens are brushy with not only low trees but switch grasses and broomsedges.

During one canoe trip we were relatively inundated with bird songs over a brief straight stretch of the winding Oswego Creek. Within only a few seconds we heard redstarts, white-throated sparrows, rufous-sided towhees, white-breasted nuthatches, yellowthroats, and Carolina wrens—and we saw a turkey vulture. So gentle is the usual pace of this stream that it is no surprise to drift down past schools of whirligig beetles that are swimming upstream.

One moment you sail under pines and oaks, another beneath the white undersides of swamp magnolia and the scarlet autumn blaze of black-gum leaves. Then the columnar spires of Atlantic white cedar.

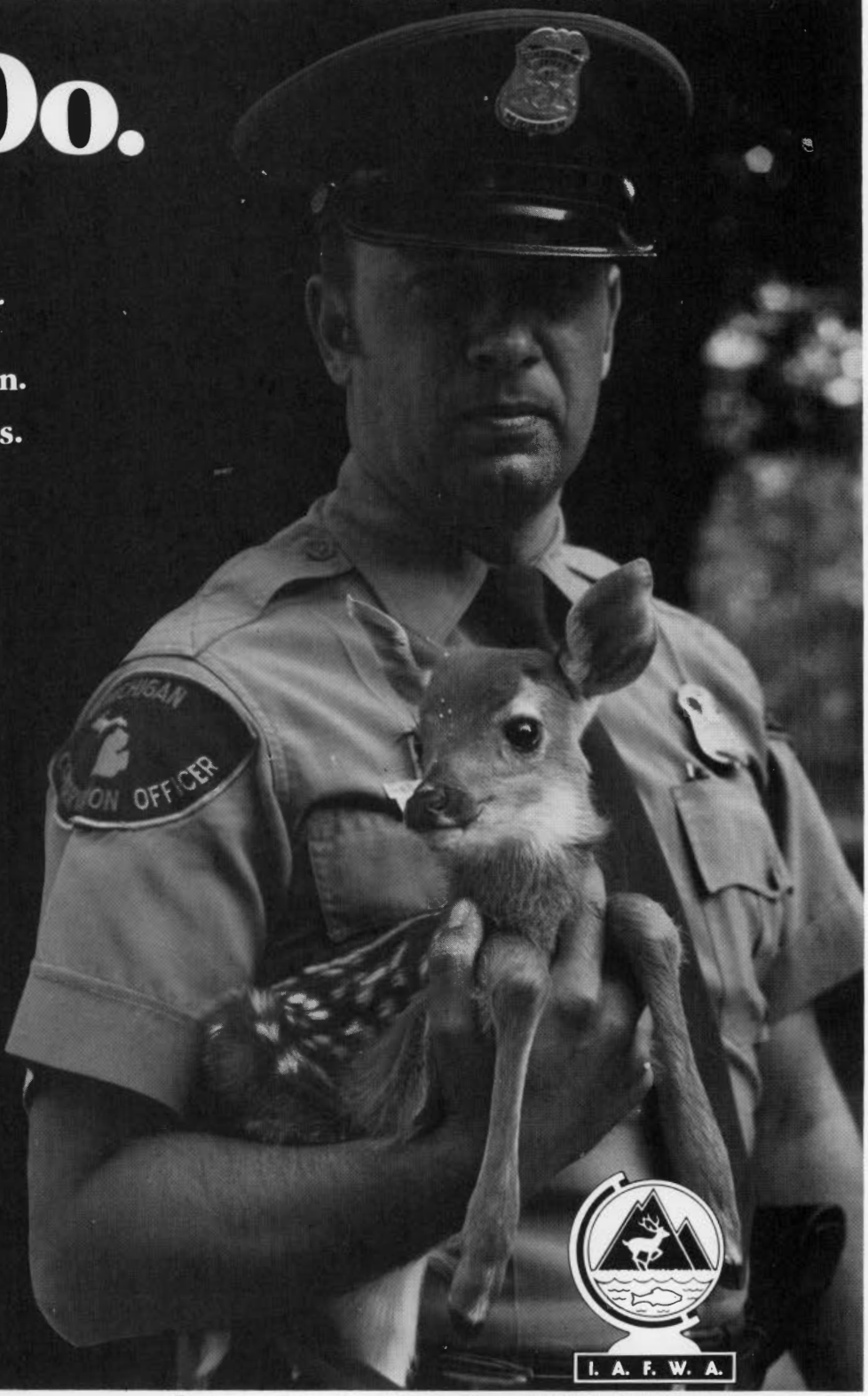
A low understory of mountain laurel is likely to parallel almost all of your narrow defile. Along with it come moments during many weeks of midsummer when the long narrow clusters of the white flowers of sweet pepperbush shake nearby. The single pigtail of each fruit makes these shrubs easy to identify while on trips during winter. Blueberries can hardly be missed. They form a wiry hardwood stand beneath even such low woodland layers as leatherleaf and sheep laurel, or lamb's kill.

Late summer is the right time for mixed colors here. Bloodred leaves of huckleberry, best separated from blueberry by the glisten of resin on its leaves, point upward beneath powdery white cedar cones. Over among nearly barren gravels bog

Bladderwort, Thread-leaved Sundew

Bog Iron in Cedar Bog

Care About America's Wildlife. We Do.



A well meaning person gave this conservation officer what they thought was an orphan fawn.

Don't pick up fawns. In most cases their mother is watching nearby, waiting for you to leave.

International Association of Fish & Wildlife Agencies

1412 16th Street, N.W., Washington, D.C. 20036

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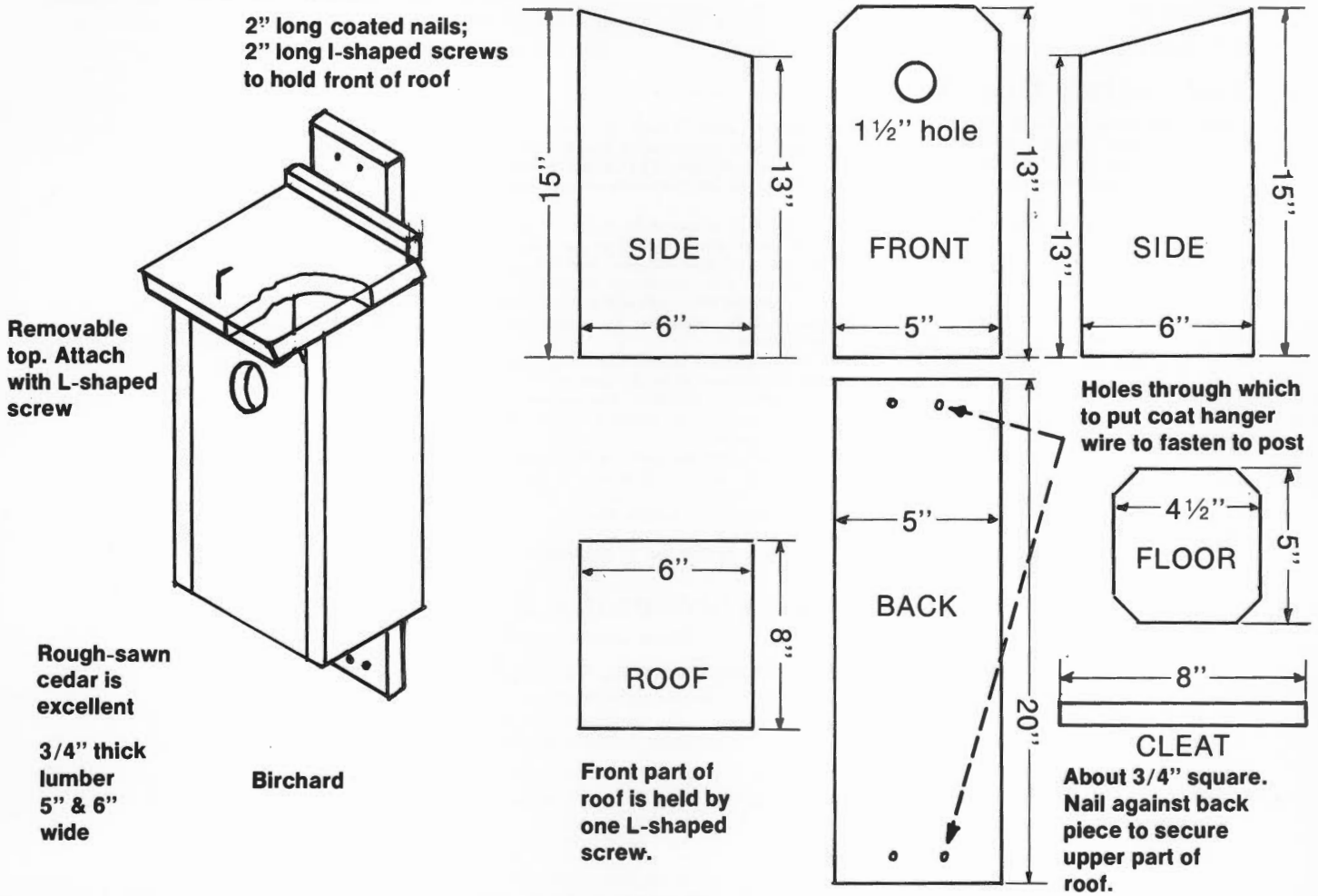
bluebird

This project was also aided by the Sussex Vo-Tech carpentry shop which sawed the rough lumber into the component parts for the bird houses.

The accompanying plans are all you need to start a similar project with a class or group. For additional information on bluebird habits and how you can help I strongly recommend reading *The Bluebird* by Lawrence Zeleny.

With your help the bluebird might again become a common species in New Jersey. □



Laura Slowinski and Timmy Woodcock install a bluebird house near the edge of a field.

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C.O.'S Corner

One man jumped out of the vehicle and attacked him. A citizen who saw the struggle called the police. When a policeman arrived, he was assaulted by the same man. The man was subdued and charged with criminal and game law violations.

* * *

CO Beebe apprehended a "deer jacker" who then assaulted CO Beebe with a shotgun and fists. This person was charged with a number of game law and criminal statute violations.

* * *

Then there was CO William Hutchinson who almost "bought it" when a pickup truck, driven by deer law violators, came so close to striking him that "Hutch" felt the truck's side view mirror brush his clothing. Lt. Austin Perrone and CO Hutchinson then pursued the truck and apprehended the three occupants. □

H.O.W.—Help Our Wildlife

The conservation officers of the Bureau of Law Enforcement of the New Jersey Division of Fish, Game, and Shellfisheries are conducting the Help Our Wildlife (H.O.W.) program to give the citizens of the state an opportunity to help curb violations of the New Jersey fish and game laws and related outdoor abuses.

The main purpose of H.O.W. is to encourage sportsmen, farmers, rural landowners, and citizens in general to report fish and game violations via a report card sent to district law enforcement offices. Report cards are available from the district law enforcement offices and the Division office in Trenton.

When report cards with signed names and addresses are received at the office, a letter of acknowledgement will be sent to the cooperator. If an unsigned card is received, no acknowledgement can be sent.

However, in both cases the local conservation officers will thoroughly investigate the complaint and follow through on the case.

It should be emphasized that individuals should report violations even if they can not completely fill out the card or prefer not to sign it. This will at least alert law enforcement personnel to violations in an area and provide them with valuable information.

The program is a means by which the average citizen, or those who complain of the lack of law enforcement, can now become involved by providing officers with sufficient information and evidence to insure the arrest and conviction of the violators. H.O.W. provides the opportunity to become involved.

Any one, sportsmen or non-sportsmen, can now meet the obligation of all good citizens to report the fish and game law violations they witness. (The actual apprehension of violators is left to the appropriate authority.)

While the program has been introduced primarily to help reduce hunting violations, it has value during all the seasons and should be used during the fishing season to reduce littering, trespass, and other violations.

In summary, H.O.W. is a cooperative, long-term program to enhance the sportsman's image by eliminating from the field those who fail to meet the standards of true sportsmanship.

LAW ENFORCEMENT OFFICES

Northern District
Lt. Arthur Wendelken
P.O. Box 386, Chester, N.J. 07930
201-879-7108

Central District
Capt. Matthew Ferrigno
RD #3, Robbinsville, N.J. 08691
609-259-2120

Southern District
Capt. John Russack
P.O. Box 388, Williamson, N.J. 08094
609-629-0555

Division Office Trenton
New Jersey Division of Fish, Game, and Shellfisheries
Box 1809, Trenton, N.J. 08625
609-292-9450 □

Polyphemus Larva

Polyphemus Moth

Ailanthus Silk Moth

Continued from page 19

CAN THEY COME BACK?

The rarest of the silkworm family, although generally distributed in New Jersey, is the *Angulifera,* or Tulip Tree Moth. The larvae feed on the tulip tree, sassafras, and wild cherry. Their cocoons are rarely found because they are small and usually on the ground. A male moth which closely resembles the female *Promethea* is undoubtedly the rare *Angulifera.*

There is present concern about the survival of the silkworm moths. Decreasing numbers have been recorded in recent years, and the cocoons which were to be found readily 20 years ago are now scarce. Several explanations have been offered but no one applies to all situations. Habitat destruction is an obvious factor and has occurred over large areas, but the moths are scarce even where the habitat is apparently unchanged. The decrease in numbers is widespread.

Increasing pollution is a strong possibility but it is interesting to note that the Cynthia is as plentiful as it ever was. Its food tree thrives in the pollution of the cities and the moth is usually found wherever the tree grows. Smog has been suggested as the principal factor. The theory is that the smog affects the dispersion and reception of the pheromones and so reduces the reproductive capabilities of the species. The larger populations of Cynthia in and near the cities indicates that that species is unaffected.

The various silkworm caterpillars which feed on wild cherry and sassafras have a plentiful food supply but not many of them can be found. These trees grow both in polluted areas and in areas with little pollution; the moths are equally scarce in both situations. The use of pesticidal sprays shows a similar pattern. In the places which have never been sprayed there are no more moths than elsewhere. The most recent theory offered is that the ultraviolet street lights now in common use act as attractants which concentrate the adult moths for predators. The total area unaffected by the ultraviolet street lights is relatively large and the moths are scarce there also.

All these species can be grown in captivity without difficulty and are available from biological supply houses. Transplanting cocoons into selected areas does not produce an increase in numbers in the following years. The release of fertilized females has not resulted in increased populations. Their predators have not changed in number or kind. Under protected conditions the moths can survive, but in the wild they are in difficulty.

Whether the silkworm moths can make a comeback may be entirely out of human control. Already we may have changed the environment so much that the effects are now irreversible. The ecological factors are interrelated in so many ways of which we are presently unaware that we are unable to predict the total effect of any single factor which we may cause to change. Is it possible that pollution, in its various forms, is already so widespread that none of us is safe anywhere? □

Summer '78 Environmental Workshop for Teachers

This year's interdisciplinary environmental workshop is being held on the Cook College campus from July 10th to August 3rd. This 4-week *5-credit* hour program is designed to provide inservice elementary and secondary school teachers with a balanced exposure to a wide variety of environmental problems endemic to the state of New Jersey in particular, and to the Middle Atlantic states regional area in general.

Those accepted for participation in the workshop will be responsible for a 50-dollar registration fee. All additional tuition fees as well as housing and meal expenses for those planning to live on campus will be covered through scholarships under-written by special grants to the program. Deadline for applications is May 19, 1978.

During the summer of 1977, 25 science and environmental studies teachers were involved in a six-week, six-credit program that proved to be more than the standard summer-session course. Coordinated by Dr. Arthur Edwards of Cook College and cosponsored by the American Society for Environmental Education and Cook College, the program drew on the unique resources of the sponsors and presented a dynamic course integrating the study of natural-resource management and environmental quality, along with the political and social aspects of the environment.

More than 12 large industries, basically dealing with energy in the northeast United States, combined their efforts and talents with the college faculty to further broaden the unique experience. The teacher-students were given the opportunity to hear presentations from both the academic and industrial communities and then given the opportunity to further analyze today's environmentally oriented problems and draw their own conclusions. In addition to traditional topics of environmental sciences, the program included a discussion of wildlife management with Robert McDowell of the Division of Fish, Game, and Shellfisheries. It was interesting to note in evaluating the class that only one person out of twenty-five had ever received any formal instruction in wildlife management, prior to the Cook College course.

Although most of the teachers in the class were nonhunters, a three-hour unit on hunter education and ethics, presented by Dr. Charles Drawbaugh, Professor of Education in the Graduate School of Education, and Dr. Roger Locandro, Associate Dean at Cook College, was very well received and evaluated. The methods and techniques presented in the Hunter Education unit are a small part of a larger cooperative effort between the college and the Division of Fish, Game, and Shellfisheries. The two professors have developed a series of innovative methods of instruction. For the past two years, they have been engaged in a series of seminars to provide methods and techniques of teaching hunter education. Their program has been given to over 600 Hunter Education instructors in New Jersey.

A subsequent research project is now underway to evaluate the Hunter Education program, the value of the program to instructors, and the end result—not only how well the students in the Hunter Education classes perform in the final Hunter Education examinations but also how their attitudes change.

Results of the summer program were even better than expected. New programs have been developed for the 1978 Summer Session. For further information regarding this workshop, please write or phone:

Dr. Arthur Edwards, Jr.
Director, Summer 78
Interdisciplinary Environmental Education Workshops
Education Department, P.O. Box 231
Cook College, Rutgers
The State University
New Brunswick, NJ 08903

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fiddleheads

cut, Lady Fern, growing in clusters along partially shaded paths. The very similar Hay-scented Fern grows in sunnier locations and when crushed in the hand gives off the fragrance of freshly mown hay. Perhaps growing with it we will find the New York Fern, its light-green fronds tapering in width at top and bottom. If we leave the path and climb the rock-strewn hillsides, blue-green bouquets of the Marginal Woodfern rise on chaffy stalks from crevices everywhere. Further on through the woods should our path descend a cool moist ravine we may be fortunate enought to find the exquisite Maidenhair Fern growing beneath a stony bank, its feathery leaflets arranged on circular fronds swaying gently in the summer breeze.

By mid-summer most of New Jersey's ferns have reached their full development. The casual fern hunter can now anticipate finding three late maturing and less obvious species. On partially shaded hillsides the broadly triangulate leaves of the Broad Beech Fern grow. In a shadier area not far away, another fern raises its fertile frond like a rattlesnake's tail above a lacy-cut triangular leaf; it is appropriately enough the Rattlesnake Fern. And in almost any location, sun or shade, fields or woods, the foot-high fronds of the Ebony Spleenwort rise ladder-like on shining dark-brown stems.

Refreshing late summer rains may "resurrect" a fern which, though with us all along, has withered during the long, parching summer. It is the Fragile Fern, small and bright green, clinging to crevices among roots and rocks.

By early fall, when the woods no longer echo the songs of the Wood Thrush and the Red-eyed Vireo, and the oaks, hickories, and maples respond to the change of season with a change of color, the ferns too respond. Some, like the Sensitive Fern, wither on the first frosty night, while others like the *Osmundas* go out in a blaze of oranges and reds.

But this does not signal the end of the fern hunter's quest—some species still remain. The Marginal Woodfern now reveals the reason for its other name, Evergreen Woodfern; its leaves remain green throughout the winter though its graceful fronds now lie prostrate on the ground. Common Polypody is another evergreen fern that is especially noticeable during our winter months, growing in dense mat-like colonies among rocks and boulders. In similar habitats or along the banks of now-frozen streams, still one more fern beckons to us through the early winter snow—the Christmas Fern, whose welcome touch of green made it a traditional holiday decoration.

There are of course many more species of ferns both rare and common to find in New Jersey; you can find more information about them in *A Field Guide to the Ferns* by Boughton Cobb, and in the delightfully written *How To Know the Ferns* by Frances Parsons; written in 1899, this classic is still available as a Dover Publications reprint. □

New Jersey Association for Environmental Education—Programs 1978

June 3: Saturday Program at the Wetlands Institute, Stone Harbor, Cape May County.
Activities will include a tour of the Institute and a description of some of the scientific and educational efforts that are taking place.

A number of interesting environmental education activities are taking place in the Cape May County area. Organizations involved are the N.J. Marine Sciences Consortium, the N.J. Bureau of Parks, the N.J. Audubon Society, and the Cape May Bird Observatory. Sites include Cape May Point State Park, wetlands, Higbee Beach, the Consortium facilities in Seaville, and the Institute. These various programs and facilities will be described during the morning session.

For the afternoon, an outdoor experience is planned. Following the afternoon session, we will gather at a local restaurant for a late lunch.

September 23: A Geologic Tour of North Jersey.
This field trip will feature a car caravan beginning at a site in the northeast portion of the state. The caravan will wind its way westward toward the Delaware Water Gap. Along the route, several stops will be made to investigate the various geologic formations that are encountered. The stops will include time for collecting and picture taking.

The trip will wind up at a restaurant in northwest New Jersey for a late lunch and a wrap-up of the program.

Both events require pre-registration so that we can estimate the number of participants. For further information or a note that you plan to attend, write to the New Jersey Association for Environmental Education, Box 333, Island Heights, N.J. 08732.

7 NEW JERSEY ENVIRONMENTALISTS, AGES 5 TO 12, ARE WINNERS IN RANGER RICK NATURE CLUB CONTEST

Among the 127 winners named by the National Wildlife Federation in the annual Ranger Rick's Nature Club Contest—ranging in age from 5 to 12 and representing 35 states, the Canal Zone, and five other countries—were seven New Jersey entrants.

One of five third-prize winners was Sally Harlow, age 7, of Bound Brook, New Jersey. The six fifth-prize winners from New Jersey are Royce Bari, 9, Colts Neck; Jenny Dickinson, 10, Whitehouse Station; Tom Hoopes, 12, Long Branch; Todd Nielsen Myers, 5, Medford Lakes; Sharon Smith, 12, Peapack; and Richard Solomon, 9, Freehold.

The winners were chosen from among more than 4,000 boys and girls who submitted written solutions to a hypothetical land use problem affecting wildlife and water.

Entrants read a story in the September, 1977 issue of Ranger Rick's Nature Magazine for children in which a pond providing wildlife habitat was going to be drained for construction of new homes. The contest involved answering three questions about building near the pond and writing a conclusion to the story telling how the conflict between wildlife habitat and human development should be resolved.

Marginal Woodfern has leathery evergreen leaves of a distinctive blue-green color.

The Cinnamon Fern typically grows in large groups in wet woodlands. Note its large size and the cinnamon-colored fertile fronds.

Common Polypody is another one of our leathery evergreen ferns. Its once-divided leaves commonly grow among rocks and boulders in both upright and prostrate forms.

Broad Beech Fern, characterized by its triangular, backward-tilting leaf, often grows as scattered individuals or in small groups.

Sensitive Fern, with its coarse, broad-bladed leaf of somewhat variable shape, is one of our least "fernlike" ferns.

Lady Fern is a "typical" fern, with lacy-cut leaves growing in small graceful clusters.

Royal Fern often makes its best growth in standing water. Leaves somewhat resemble those of the Black Locust tree.

As summer approaches and the *Osmundas* reach their peak of growth, other common ferns make their appearance in New Jersey's woods and meadows. It is now that we find wet meadows overgrown with the unfernlike Sensitive Fern, its broad flat sterile blades contrasting with its brown bead-like fertile spikes. Growing in poor sterile soils exposed to full sunlight one will surely come across masses of the Bracken Fern, just about our most abundant species. Its fiddlehead emerges looking like a miniature eagle's claw, which soon unfolds into a large three-parted leaf.

To find more species of June ferns our walk must take us into rich, shaded woodlands. It is here that we will find the delicate, lacy-

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# of fiddleheads and fronds

BY WADE WANDER
AND SHARON ANN BRADY
PHOTOS BY THE AUTHORS

A barely audible *tse, tse, tse,* can be heard over the gently rustling branches of the April woods. Thin and weak, and altogether tentative as if its creator were not sure this was the time or place to utter it, the sound persists. As we approach, a small form flits into view. The Black and White Warbler, along with spring, has returned to the woods of New Jersey. Spring beauties carpet the forest floor with white blossoms while Red Maples ornament the canopy with scarlet. Robins are caroling their claims to the best nest sites. Yes, all the obvious signs tell us that spring is here at last.

But there is one more sign that might easily be overlooked in the midst of spring's dazzling display. Looking for the warbler we passed it and indeed almost stepped on it. Along a streambank, just pushing up through last year's leaf litter, are velvety green balls, some wrapped in silvery and rusty wool. In just a few more days we will recognize them as the fiddleheads of the great *Osmunda* ferns—the spring pioneers among some 53 species of New Jersey ferns. As the days pass, the fiddleheads rapidly grow and uncurl their divided leaves, called fronds, revealing themselves to be of three species. The Cinnamon and Interrupted Ferns appear quite similar, with two-to four-foot light-green fronds growing in vase-shaped clusters. They may be told apart by their fertile, or spore-bearing fronds. The fertile fronds of Cinnamon Fern are borne in clublike masses on stalks separate from the leafy sterile fronds; green at first, they soon turn the cinnamon color which gives this fern its name. In contrast, the club-like dark-green fertile leaflets of Interrupted Fern occur in the center of leaves which otherwise appear similar to the sterile fronds. When the ripened spore cases drop off in early summer the frond retains the "interrupted" space. The Royal Fern, which may reach a height of six feet, has widely spaced oblong leaflets which give it a much coarser appearance than its two relatives. It bears delicate light brown fertile leaflets at the leaf tips. Look for these ferns in wet locations—such as streambanks, pond edges, and swamps, where they seem to add a tropical touch to the landscape.

Interrupted Fern is easily identified by the dark-green spore-bearing leaflets on the fertile frond. Sometimes prefers slightly drier habitats.

The involvement of man in wildlife problems can be expressed in many ways, ranging from total apathy to total immersion with many gradations in between. If you're looking for a "vocation" that has a broad range of participation and is self satisfying you might consider joining the growing ranks of bluebird enthusiasts, who every year erect hundreds of bluebird houses and spend untold hours monitoring the nesting results.

The Eastern Bluebird was once a very common nesting species throughout New Jersey. During the past 30 years, however, the bluebird population has suffered a serious decline. The exact cause for the decline is unknown but several factors may be involved.

Probably the most important reason why we have fewer bluebirds is the elimination of nesting sites. Bluebirds require a hollow cavity along an open field to successfully rear young. Selective cutting of hollow trees and replacement of hollow wooden fence posts with steel ones has eliminated most of these nesting sites.

Competition with introduced species such as the Starling and the English Sparrow for the few remaining nesting cavities has also contributed to a reduction in bluebird populations.

The widespread use of DDT and other commercial insecticides is also suspected in the bluebird population decline. The physiological effects of these insect poisons is not clearly understood but it is thought that these poisons can cause infertility in bluebirds.

All these problems involve man-related habitat changes, which can be reversed if a helping hand is given. Recent bird surveys indicate that bluebird populations may be increasing. This possible growth may be attributed to the energies and concern of many groups and individuals.

One of the groups is the second-grade class at Green Township Primary School in Warren County. Under the guidance of Junius Birchard, the class constructed 78 bluebird houses. The houses were distributed among the youngsters, who erected them near their own homes.

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Second-graders Howie Viersma and Lynne Pastor construct a bluebird house under the guidance of J. W. Birchard.

Second-grader Howie Viersma works on a bluebird house.

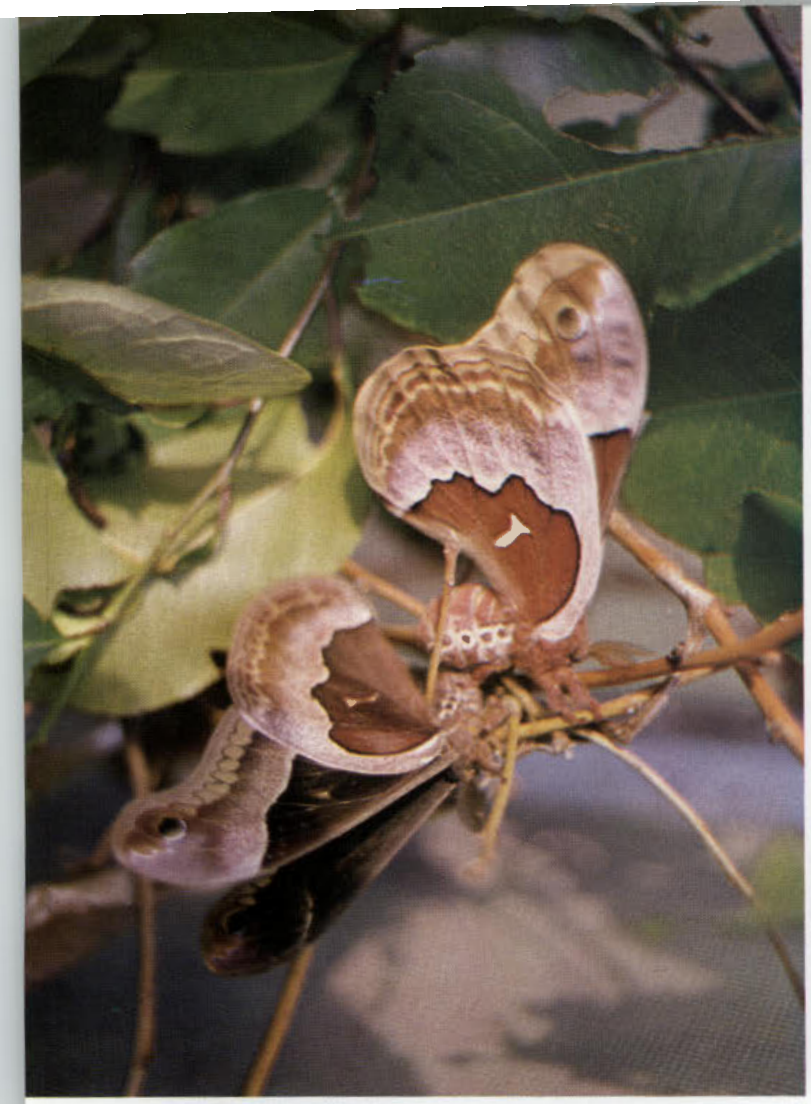
giving the bluebird a helping hand

BY BOB BYRNE

A cedar bluebird house, with tennis-ball cans on post to foil raccoons and snakes.

Have they hatched yet?

Photos by Harry Grosch



Promethea Moths copulating

Cocoon Spinning

ing on atmospheric conditions.

It is the cocoon which is responsible for the common family name and for the interest in these moths. Their cocoons are woven from silk and this is the source of natural silk for the industry. However, none of the native species spins silk suitable for the market. In the latter part of the 19th century silkworms were imported from Asia, but attempts to produce silk in the United States had all failed by the end of that century. The favored silkworm of Asia, *Bombyx mori,* was brought in first but silk production was unsatisfactory. This moth was unable to survive in the wild even though its favorite food tree, the mulberry, did grow readily and is now quite common in New Jersey. The *Cynthia* moth was imported along with its favorite food, the ailanthus or Tree of Heaven, and after the industry failed both the moth and the tree adapted to the new country.

Today the Cynthia moth is found in the cities of the East because that is where the ailanthus grows best. The Report of the New Jersey State Museum for 1909 states that the Cynthia was common near Jersey City and "also taken at Paterson, at Trenton, and near Philadelphia."

The most striking silkworm moth is the *Cecropia,* which is the largest of the family in New Jersey. It may attain a six-inch wingspread. The Cecropia is fairly common and its larvae feed readily on wild cherry, willow, alder, lilac, and others. They attach their cocoons to small stems or twigs of the trees.

The most common of the silkworm moths throughout New Jersey is the *Promethea.* The caterpillars feed on spicebush, sassafras, and wild cherry, but will accept several other species. This moth is notable because the male and female do not resemble each other.

The *Luna* moth is the one readily recognized by most people because of its large size, green color, and long-tailed wings. The caterpillars feed on walnut, sweet gum, and birch among forest trees. The Luna is usually considered to be the most beautiful of the native moths.

The *Polyphemus* moth is another larger one having a wingspan approaching five inches. The larvae feed on a variety of forest and shade trees. The cocoons are to be found on the ground under the food trees.

The smallest of our silkworm moths is the *Io.* The larvae feed on a variety of plants, probably most commonly on wild cherry. The female is much larger and more reddish than her male companion. The Io caterpillar is the only silkworm larva which can cause irritation to human skin if handled. It can be recognized by a pink line along the sides and its back covering of thick clumps of green spines.

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Cecropia Moth

PHOTOS BY AUTHOR

CAN THEY COME BACK?

BY J. A. STARKEY

New Jersey's woodlands, and its inhabited areas as well, are the home of seven members of the Saturniidae family of giant silkworm moths. Six of them are natives, whereas the seventh is an import from Asia. From May to August the adult moths are occasionally seen in the waning light of evening or in the glow of street lamps. The larvae are sometimes found in home shrubbery and, unfortunately, are usually destroyed immediately. Actually they are never so numerous as to cause injury to the trees.

The moth is the adult phase of a four-stage life cycle which begins with eggs deposited on favorite food trees. The larvae, commonly called caterpillars, which soon emerge from the eggs, grow rapidly and in a few weeks are ready to metamorphose into pupae which will live through the winter in their cocoons. In May or June of the next year the adults will emerge from their cocoons, and after mating will deposit eggs for the next generation. A few species will have two generations per year.

Among the silkworm moths the female is always larger than the male and may also be identified by her more slender antennae. The male has large feathery antennae to be more receptive to the pheromones of the female. The pheromones are odorous substances exuded by the females to attract the males. Their effect may be noted up to three miles or more depend-

CO'S CORNER

By Conservation Officer Bruce Young

a first

A "first" was established for the Bureau of Law Enforcement and Coordination in 1977 when this bureau received federal aid assistance to participate in a game management program.

This aid was provided to conduct a law compliance study in the steel shot only area of Atlantic County. A tactical enforcement unit was assigned to the area to conduct the survey and enforce the regulations.

The events leading to this situation began during the 1976 waterfowl season. That year, regulations required that waterfowl hunters in a prescribed area of Atlantic County using 12-gauge shotguns must hunt only with steel shot. Game management was using the Atlantic County area to study the problem of lead poisoning in waterfowl. Conservation officers assigned to the Southern District, on their own initiative, conducted a survey of waterfowl hunters in the Atlantic County steel shot area. Based on this survey, it was determined that approximately 40 percent of the hunters were not in compliance with the steel shot regulation. This high violation rate interfered with a proper study by division biologists.

This 40 percent figure applies only to a small portion of Atlantic County, and the hunters surveyed represent a small fraction of the waterfowl hunters using steel shot.

During the first week of the 1977 waterfowl season a 22 percent non-compliance rate for the steel shot only regulation was recorded. Using intensified enforcement procedures this rate was upgraded to 100 percent compliance. In the other steel shot areas of New Jersey, this survey recorded a 24 percent non-compliance rate later in the season. This was the same time period when 100 percent compliance had been achieved in Atlantic County.

This operation was a success in several ways:

1. It helped to provide a proper study area for our biologists
2. The positive effects of intensified enforcement were established and documented
3. This was a cooperative venture between law enforcement and game management personnel aimed at benefitting a highly valued resource. □

we got 'em

There is in Cape May/Cumberland County, a long straight road that travels through a portion of the Peaslee Wildlife Management Area. On most late fall nights only an occasional vehicle passes through this area. But on the night of Sunday, December 4, 1977 approximately eighty-five vehicles converged from as far away as Pennsylvania to congest a short section of this road. The occasion was a drag race. This is not only a violation of state law but it can be a hazard to participants, spectators and legitimate travelers.

CO Kenneth Arnold set up a cooperative operation with the State Police at the Port Norris Station and the State Police Tac Pack to roundup the violators. Deputy Conservation Officer Thomas Kulig and the station commander of Port Norris located themselves, in a private vehicle, among the racers to establish the fact of racing. Conservation Officers Kenneth Arnold, John Hedden, Hershal Beebe, Linwood Veach, Lieutenant Bruce Young, Deputy Conservation Officers Frank Warfle, Edward Clark and Nick Reale had blocked off escape routes on woods roads adjacent to the blacktop road.

When the station commander gave the signal, State Police Tac Pack vehicles, three abreast, raced in from each end of the road. Conservation officers and deputies had escape routes blocked and two motorcyles attempting escape were stopped by CO Arnold and Lieutenant Young. Approximately seventy-three vehicles were captured, and they were escorted in a convoy by Conservation Officers and State Police to the court clerk at Tuckahoe for booking. Approximately seventy-five individuals were charged for violations of New Jersey Law. □

all in a day's work

Would you believe a patrol car trailering a boat pursuing duck hunting violators in a Boston Whaler boat and catching same? Well, it happened this past Thanksgiving in Ocean County! CO Robert Klaus and Lt. Bruce Young planned their arrival at a dock to coincide with the violators arrival at the same dock in a Boston Whaler. Or so they thought. A lookout at the dock saw the law approaching and flagged the suspects off . . . and spoiled everything. The chase was on as the Whaler sped out into the bay and down the shoreline. Deputy CO Dave Harrison at his observation post kept the pursuing officers informed of the Whaler's route. The chase led across lagoons in a housing development. Once CO Klaus found himself standing on a bridge waving wildly for the suspects to stop. Young supported him with the patrol car siren. The Whaler sped on and under a four lane highway narrow water underpass. The officers then realized that the Whaler was headed by another route back to the dock where the chase had started. The patrol car crossed the four lane highway and this time the Whaler, with fifteen ducks over the legal limit, and the patrol car arrived at the dock simultaneously! Just the way the law planned? Oh yes, the boat the officers were trailering was launched and samples of corn, used to attract the slain ducks, was collected as evidence. The law won again.

* * *

There is very little humor in some situations our Conservation Officers encounter. Upon hearing a shot at dark, CO Walter Mabey stopped a vehicle with three male occupants under the influence of alcohol.

Continued on page 27

News Capsules

ALL NEW PARKS/FORESTS RECREATION GUIDE READY

A completely revised brochure packed with information about recreational opportunities at New Jersey's many state-owned facilities is available. Prepared and published by DEP, the glove-compartment size, color brochure contains descriptive text plus 12 charts, and a map which shows the locations of the facilities. This brochure replaces the old "Year Round Guide" booklet.

The brochure, *"New Jersey Invites You to Enjoy Its—State Forests, Parks, Natural Areas, Marinas, Historic Sites, Wildlife Management Areas,"* is bound to be a great help in planning your summer vacation. To receive a copy of the publication, write to DEP, Bureau of Parks, P.O. Box 1420, Trenton 08625, and request the *"New Jersey Invites You"* brochure. □

FLOOD INSURANCE IS A GOOD BUY IN SPRINGTIME

Property owners in flood-prone areas can help minimize their losses by purchasing low cost federally subsidized flood insurance protection. DEP urges owners of homes and businesses not presently insured to obtain this coverage. Since flooding potential is greatest in the spring, it is important that interested residents buy their insurance policies early. In most communities. flood insurance coverage is not in effect until 15 days after the policy is purchased. During 1977, more than 6,600 such policies were in effect in New Jersey providing more than $2.2 billion in coverage for residential and commercial properties.

Flood insurance is available through any licensed insurance agent or broker at nominal cost. For $25 per year, the owner of a single-family home can obtain up to $9,000 in combined structural and contents coverage. Additional coverage up to $185,000 for single-family homes and $250,000 for most businesses may also be purchased. □

DISPLAY THAT FISHING LICENSE!

DEP's Division of Fish, Game and Shellfisheries reminds New Jersey anglers that they must display their fishing licenses in a conspicuous place on their outer clothing while fishing. □

SPLIT SCHEDULE FOR ROUND VALLEY AND SPRUCE RUN

A reminder to day trip planners: Round Valley and Spruce Run state parks (Hunterdon County) operate on a split week schedule. Both recreation areas (located only eight miles from each other) are open on Saturdays, Sundays and Wednesdays—the highest day use days. Spruce Run is closed for day use on Mondays and Tuesdays. Round Valley is closed for day use on Thursdays and Fridays. □

Continued from page 16C

DAM INSPECTIONS UNDERWAY

mechanical engineer, geologist and a DEP staff engineer found the dam structurally stable.

Before severe winter weather conditions set in, three other dams in New Jersey were inspected and the results are being reviewed. These were Packanack Lake Dam (Wayne Township, Passaic County), Pompton Lake Dam (Pompton Lake Boro, Passaic County) and East Lake Dam (Bridgeton, Cumberland County). The Round Valley and Boonton Dams were scheduled for inspection as soon as weather permitted. The Corps' present plan is for one dam check a week. Personnel shortages present a problem, but DEP's long range plans call for outside consultants to inspect the high hazard dams, with the state playing a supportive role, and the Corps providing the funds. When this program begins, the number of dam inspections per week will increase.

John O'Dowd, acting chief of DEP's Bureau of Flood Plain Management, who is coordinating the inspection program, said that the vast majority of the dams in New Jersey are at least 30 years old, with a few more than 80 years old. The largest number of them were built to create recreational lakes. Most of the other rivers were dammed to provide drinking water.

So far, nothing alarming has been found in any of the field inspections. □

WETLANDS PERMIT DENIED

DEP recently denied an application to construct 108 single-family dwellings on 46 acres of wetlands fronting on Barnegat Bay in the Loveladies section of Long Branch Township (Ocean County). The proposed project involved the creation of lagoons and would impair the natural contour of the wetlands and disturb their vegetation.

Donald T. Graham, director of DEP's Division of Marine Services, said, "This project would drastically change the pattern of natural tidal flow, would entail extensive dredging, filling, sod banking and bulkheading, and would have an adverse impact on water quality." He noted that the loss of some 46 acres of these valuable lands "cannot be considered lightly—the contributing value of the wetlands nutrients and their importance as a natural flood buffer have been overlooked by the applicant." □

TRACKING HAZARDOUS WASTES

In an effort to control the illegal dumping of hazardous wastes in New Jersey, the department recently adopted regulations under which every shipment of hazardous wastes in the state will be tracked by a DEP manifest system. Each manifest form will be signed by the producer of the waste, the hauler, and the operator of the disposal facility. Copies of the form must be sent to DEP by the producer and disposer, and will then be matched by computer. The regulations became effective on May 1. Copies of the regulations are available from DEP's Bureau of Hazardous and Chemical Wastes, P.O. Box 1390, Trenton 08625. □

Continued from page 16A

RUTGERS STUDY

The Rutgers Center for Coastal and Environmental Studies, which prepared the report, concluded that the other four locations studies—Point Pleasant, Absecon Inlet, Maurice River and Camden—are not suited to the support of offshore activities. The often-mentioned Absecon Inlet location was found unacceptable mainly because of environmentally sensitive coastal wetlands and an incompatibility of offshore activities with the resort industry.

The 234-page study, entitled "Onshore Support Bases for OCS Oil and Gas Development: Implications for New Jersey," will be considered by DEP's Office of Coastal Zone Management (OCZM) in the development of energy facility siting policies required by the state's Coastal Area Facility Review Act (CAFRA) and the federal Coastal Zone Management Act. The study has been issued by DEP as a working paper to provide opportunity for comment on the issues.

David N. Kinsey, chief of OCZM, said, "The Rutgers findings are compatible with DEP's published *Coastal Management Strategy* policies for New Jersey which specify that OCS onshore support bases be encouraged to locate in built-up urban areas of the coast, preferably in urban waterfront locations not dependent on tourism and the resort industry."

Kinsey said the report details the physical, environmental, social, economic and institutional impacts of siting onshore support facilities on New Jersey's coast. The Rutgers team, directed by Dr. Norbert Psuty, noted that the impacts of offshore oil and gas exploration on New Jersey would be light. The report recommends that the Atlantic coastal areas (Sandy Hook to Cape May) and Delaware Bay be conserved for resorts, recreation and fishing.

Copies of the report may be obtained from the Center for Coastal and Environmental Studies, Rutgers University, Doolittle-Hall—Busch Campus, New Brunswick, 08903. □

Atlantic City

CAFRA PERMIT APPROVED FOR PLAYBOY CASINO-HOTEL

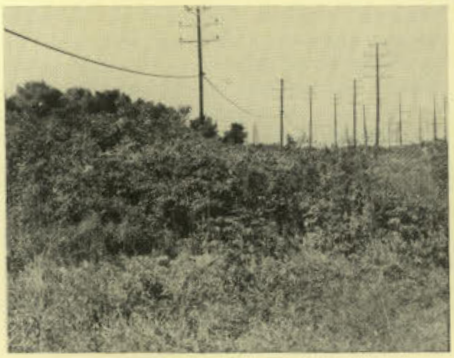
The department conditionally approved a Coastal Area Facility Review Act (CAFRA) permit for construction of a Playboy Hotel-Casino on the boardwalk in Atlantic City. The 632-room hotel, proposed by Convention Center Hotel Associates, would be located on a narrow strip of vacant land adjacent to the Atlantic City Convention Hall and Florida Avenue.

The hotel is presently proposed as a 33-story building which would exceed the height limitations of the Federal Aviation Administration (FAA). The applicant must obtain certification from the FAA before DEP will issue a construction permit.

Other conditions of the permit require the applicant to monitor traffic flow during casino operation and present parking plans to DEP for review until a city-wide parking scheme is established. □

What the Green Acres Program is all about . . .

John F. Kennedy (JFK) Park in Burlington is a prime example of what is being accomplished with the melding of state and local funds through the Green Acres program to provide outdoor recreation areas serving all age groups in communities throughout New Jersey. The program is administered by DEP.



JFK PARK BEFORE DEVELOPMENT. The park site, a 13-acre area south of the Burlington-Bristol Bridge, was purchased with the aid of a land acquisition grant under the initial 1961 Green Acres bond issue. Development of the park was completed with the aid of a development grant under the 1974 Green Acres Local Assistance Program. In each case, the state paid 50 percent of the cost and the city paid the other half.

JFK PARK TODAY. John F. Kennedy Park today contains an eight-acre lake with ducks, a bike and jogging trail around the lake, playground equipment, courts for active sports—basketball and tennis; and a senior citizens area with bocce, shuffleboard and horseshoe courts. The park is in an established neighborhood which is isolated from other recreational facilities by major highways. The park provides flood control while supplying wildlife refuge. This type of multipurpose development is particularly desirable for Green Acres projects.

FLOODWAY REGULATIONS NOW ALLOW REBUILDING

The department recently adopted state floodway regulations to allow rebuilding of flood-damaged dwellings that are more than 50 percent destroyed providing they don't increase the flood hazard. The revised regulations require floodproofing of these buildings. The revision resulted from recommendations from citizens, concerned groups and the Water Policy and Supply Council during meetings and public hearings held by DEP.

The regulations apply only to delineated floodway of the state which now cover about 650 miles primarily in the Raritan and Delaware River basins. Approximately 1,500 additional miles will be included within the next two years. The major part of the flood plain mapping will be in northern New Jersey river basins, particularly the Passaic River Basin, the state's most hazardous floodway.

Homeowners whose dwellings are *more than 50 percent* destroyed by flooding will be required to submit reconstruction plans to DEP to see that rebuilding does not increase the flood hazard and to ensure adequate floodproofing. Structures that are destroyed by *50 percent or less* may be rebuilt if they are adequately floodproofed and if they don't increase the flood damage potential. DEP permit requirements for flood-damaged structures will be satisfied if the municipality adopts and enforces a flood plain ordinance in keeping with the Federal Flood Insurance Program.

Copies of the regulations are available by writing to Charles Forman, DEP Commissioner's Office, Box 1390, Trenton 08625. □

NASA model project

Sun's Energy Will Power Hot Water/Heating Units At Allaire Facility

The ranger's residence on Farmingdale Road at Allaire State Park in Monmouth County will be the first state-owned building to have solar heating and hot water systems. The National Aeronautics and Space Administration (NASA) selected the single-family house as an "Operational Test Site" and will supply, install and pay for close to $20,000 worth of solar energy equipment. Work on the project is expected to begin this spring.

Under terms of the contract entered into by DEP's Division of Parks and Forestry and NASA, the federal agency will provide the following equipment: 800 feet of solar collectors ($11,000); 1,000-gallon water storage tank ($750); heat pump unit ($3,000); auxiliary water preheater ($200); and associated hardware ($5,000). (Estimated total cost: $19,950)

Title to the equipment passes to DEP upon proper installation, but NASA and the federal Energy Research and Development Administration (ERDA) have the unqualified right to observe and monitor the equipment for a period of five years from the installation date. During this test period maintenance and repair of the solar energy system will be the federal government's responsibility.

DEP's part involves site preparation inside and outside of the dwelling, carpentry and electrical work. (Estimated cost: $1,000) □

Initial results

DEP STUDY OF TOXIC SUBSTANCES IN WATER

The initial results of a major statewide groundwater testing project which is examining 500 wells for selected toxic and cancer-causing chemicals have been released. The results from the first 250 wells tested in 12 counties show that water quality, in most cases, was found to be far better than federal drinking water standards. No wells were found to pose an immediate danger to human health.

Twenty violations of the federal standards were found—none of the contaminated wells are sources of drinking water—and DEP is conducting followup testing at these sites to identify the sources of pollution.

A total of 50 chemicals, divided into organic compounds, pesticides and metals, are being checked in public and private drinking water supplies in wells located near industrial sites and landfills. The results so far indicate that almost all of the wells tested contained traces of some of the chemicals under investigation; the majority of wells contaminated by organic chemicals are located in heavily populated industrial areas; and the presence of low levels of pesticides is more prevalent in agricultural areas.

Dr. Peter Preuss, the commissioner's special assistant on cancer and toxic substances, said the groundwater testing project is one phase of a multiyear effort to identify and eliminate toxic substances which are contaminating the environment. DEP will soon initiate similar statewide testing of air, surface water and additional drinking water supplies. □

So far, so good

DAM INSPECTIONS UNDERWAY

There are approximately 9,000 "high hazard" dams identified in the United States, with 413 of these located in New Jersey. In view of the recent problems encountered throughout the country involving dam failure, particularly the November 1977 collapse of a dam in Taccoa Falls, Georgia which killed 38 people, President Carter ordered an immediate program for checking "high hazard" dams nationwide. The program will be conducted over a four-year period at a cost of $70 million, funded through Congressional appropriations. The U.S. Army Corps of Engineers will administer the program in cooperation with state officials (in New Jersey, DEP).

The "high hazard" category does not indicate any structural deficiencies; it merely classifies a dam as having a potential for loss of life and great economic, community and structural damage and losses downstream should a failure occur.

The first dam inspection in the nation to be carried out by state and federal authorities under President Carter's executive order took place at New Jersey's Spruce Run Reservoir in Hunterdon County this past December. The inspection was performed by representatives of the Corps and DEP's Division of Water Resources. A team of experts including a hydrologist, structural engineer, soils expert,

Continued on page 16D

SUMMER START PLANNED FOR NEW TROUT HATCHERY

DEP has authorized the construction of a modern $5 million trout hatchery at Pequest in Warren County to replace an antiquated facility at Hackettstown where trout have been raised for stream and river stocking since 1912. The hatchery will be located on a 2,200-acre site along the Pequest River, off State Route 46 near Buttzville. Half of the $5 million funding will come from the state portion of the Green Acres program and half from the federal Bureau of Outdoor Recreation.

The first phase of the two-year project is expected to begin this summer with the construction of raceways and other trout-rearing facilities. Trout production is expected to be well underway by 1980. (The present facility at Hackettstown, known as the Charles O. Hayford fish hatchery, will continue in use for the production of fish such as bass, bluegills, and channel catfish for the stocking of the state's warmwater ponds, many of which are in urban areas.) The second phase, which includes construction of buildings, along with an education center, will start in early 1979.

The facility not only will provide the most modern methods of rearing trout (it is designed to produce a half-million trout annually), but also will be an installation that can be developed and used for many outdoor and educational purposes. The authorization dedicates money for construction, provides for the acquisition of land for a buffer zone to protect high quality water required by the hatchery, and provides for the development of recreational facilities such as hiking trails and natural wildlife areas.

Feasibility and site selection studies were carried out over the past six years by DEP's Division of Fish, Game and Shellfisheries, Division of Water Resources, and the State Fish and Game Council. □

THINK SUMMER! It's time to get the swimsuits ready — Memorial Day, which traditionally starts the summer season, is just around the corner. Bathing areas in publicly owned inland recreation facilities open on May 27 and in the two oceanfront parks on June 17 (List given below). The beach scene was snapped on a hot August day last summer at Round Valley State Park near Clinton in Hunterdon County. The summer of 1977 marked the first full season of operation for the new recreation area and more than 77,000 people used the swimming, picnicking, fishing, boating and camping facilities.

Here's a list, by county, of the state-operated facilities with swimming areas. Inland facilities: BURLINGTON — Bass River State Forest (SF), Lebanon SF; CAPE MAY — Belleplain SF; HUNTERDON — Round Valley State Park (SP), Spruce Run SP; MIDDLESEX — Cheesequake SP; MONMOUTH — Prospertown Recreation Area; MORRIS — Hopatcong SP; PASSAIC — Shepherd Lake in Ringwood SP; SALEM — Parvin SP; SUSSEX — Stokes SF, High Point SP, Swartswood SP and Wawayanda SP.

All of the above listed areas are served by qualified lifeguards who have to pass a difficult series of performance tests and who must participate in a summer-long organized program of physical conditioning, first aid and water safety.

DEP ISSUES COASTAL EROSION STUDY

A study of New Jersey's shoreline which outlines coastal erosion problems and recommends various management strategies to prevent further deterioriation of the state's beaches was issued by DEP in mid March. The report, prepared by Rutgers University, suggests structural as well as nonstructural measures, such as land use planning, to minimize coastal erosion hazards and make full use of beaches and dune areas for protection.

This past winter's coastal storms have focused attention on the fragility of New Jersey's barrier islands, from Sandy Hook to Cape May. Data from the Rutgers study will help DEP to develop wise management programs and coastal land use policies. The study also will be used to implement the 1977 Shore Protection Bond Issue.

The two-volume, 160-page report is entitled "Coastal Geomorphology of New Jersey." Copies of the report are available from the Center for Coastal and Environmental Studies, Rutgers University, Doolittle Hall — Busch Campus, New Brunswick, 08903. Supply is limited. □

DELAWARE OIL SPILL COSTS SHIPPING COMPANY $8,600

Legal action taken by DEP against the Red Bank Shipping Company of Panama for spillage of over 100,000 gallons of crude oil into the Delaware River polluting New Jersey waters was ended in March when the company agreed to pay $8,600 in penalties and cleanup costs. The oil spill occurred when the company's tanker, Olympic Games, ran aground on December 27, 1976 while attempting to dock at a refinery at Marcus Hook, Pa. The company failed to notify DEP of the spill. The suit was instituted in Superior Court, Gloucester County, this past December.

Deputy Attorney General Keith A. Onsdorff, who represented DEP in the suit, said the shipowner agreed to pay the $8,600 to settle without prejudice all of the state's claim for statutory penalties, cleanup costs and losses of wildlife resulting from the oil spill. □

GET HOOKED ON FISHING IN '78

Regional facility

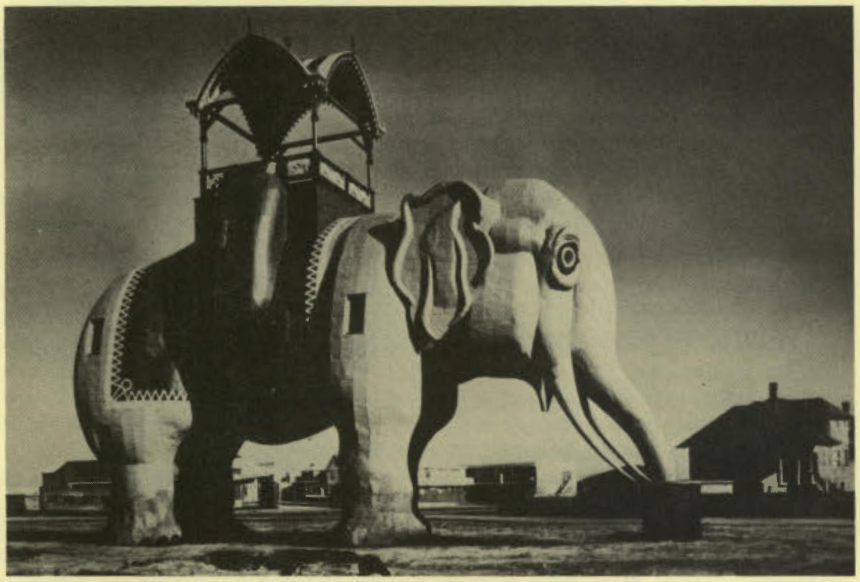
$3 MILLION STATE GRANT FOR NEW SEWERAGE PLANT

A $3 million state sewerage construction grant was recently awarded to the Pequannock, Lincoln Park and Fairfield Sewerage Authority (Essex and Morris counties) from the Clean Waters Bond Issue of 1976. The grant program is administered by DEP.

The funds will be used for regional pollution control facilities including a 7.5 million-gallon-per-day wastewater treatment plant to be built in the Borough of Lincoln Park. The project, which will cost $37 million in total, also includes interceptor sewers, pumping stations, force mains and an outfall.

Construction of the regional sewerage system will eliminate several package treatment plants and will reduce pollution of the Passaic and Pomption rivers. The three communities are now largerly dependent upon individual disposal systems. (The municipalities are located near the confluence of the Passaic and Pompton rivers. The Passaic Valley Water Commission's treatment plant is located about four miles downstream.) □

Environmental News



NOW THERE'S A GOOD LOOKING GIRL! Lucy, the Margate Elephant, is wearing a pleased expression these days—and well she might, for she has had a complete exterior beauty treatment—from the top of her howdah to her toes. She sure doesn't look 97 years old now. Yet in 1969, Lucy was condemned as unsafe and faced demolition. A citizens "Save Lucy Committee" formed to raise funds for rehabilitation of this sole surviving elephant structure, one of three such "architectural follies" built almost 100 years ago. Through the efforts of the committee, headed by Mrs. Josephine Herron, and thousands of Lucy's "friends" who donated time, expertise and money, restoration work began. Lucy qualified for and was placed on both the state and national registers of historic places, thereby becoming eligible for public funds for restoration. Federal grants totalling $124,600, administered by DEP's Office of Historic Preservation, made the massive external renovations possible. Another honor was bestowed on Lucy in recent months—she has been designated a "National Historic Landmark" by the U.S. Department of the Interior.

The Margate elephant stands 65 feet high, is 80 feet around, 38 feet long, and weighs 90 tons. Lucy, no longer an eyesore, again is open and welcomes visitors to see her, and walk through her leg upstairs to a room containing New Jersey memorablia. Admittance fee. Lucy is located on Atlantic and Decatur Avenues in Margate (near Atlantic City).

RUTGERS STUDY SUGGESTS NO ONSHORE SUPPORT BASES ALONG JERSEY SHORE

Major onshore bases in New Jersey to support the exploration and development of oil and gas from the Outer Continental Shelf (OCS) should be located on an urban industrialized waterfront, preferably in the port districts of the north, according to a report recently completed by Rutgers University.

The study, prepared for DEP, analyzed six areas which had been suggested for onshore support facilities such as bases for platform and pipeline installation, and maintenance and repair yards. Perth Amboy, situated on the highly industrialized Arthur Kill, was found to be most suitable for such activities. The area north of Cold Spring Inlet (Cape May County) was deemed acceptable for limited development.

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Winds carry oxidants

ELIMINATING SMOG IS A NATIONAL PROBLEM . . . POLLUTION KNOWS NO BOUNDARIES

New Jersey and other northeastern states must develop ways to meet oxidant standards by the end of this year or face sanctions imposed by the U.S. Clean Air Act, such as being stopped from issuing new construction permits and the curtailment of federal highway funds. It has been New Jersey's long standing position that eastern states cannot, by themselves, control an air pollution problem caused by a combination of sources located throughout a broad multi-state region.

Commissioner Ricci has called on the federal Environmental Protection Agency (EPA) to establish national emission standards for hydrocarbon air pollution. In a letter to EPA Administrator Douglas M. Costle, Ricci said that a national strategy to eliminate smog was vital to the nation's economic and environmental health. Unless federal health standards for oxidants are met, enforcement of the federal Clean Air Act will prevent new factories from being constructed. This would be devastating to New Jersey's economy, and manifestly unfair since one state alone is helpless to correct the problem.

Because of prevailing winds, northeastern states generally suffer from higher levels of oxidant air pollution than the rest of the nation. Emissions from sources throughout the west, the midwest and northeast combine to produce extremely high levels of oxidants (smog) in the air in this region.

Ricci criticized the federal government's past failure to establish national emission standards, noting that piecemeal approaches to the problem will not work. He urged that EPA "take the initiative in the development of a sound control program that does not accept state boundaries as a stopping point for regulation." □

DEP 1977 ANNUAL REPORT AVAILABLE

The Annual Report of the New Jersey Department of Environmental Protection for fiscal year 1977 has been published.

To obtain a copy, please write to DEP Documents Distribution Center, Box 1390, Trenton 08625. □

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DEP'S new cleanup:

up area described in the plan encompasses the entire 1500 square mile area of the Port district within the States of New York and New Jersey. For all work done under the project, the federal government provides two-thirds funding costs for removal with the local communities providing the remaining one-third of the cost.

The project is based on the premise that harbor drift is best controlled by removing its source rather than collecting and disposing of drift in piecemeal efforts. The estimated current and continuous sources of drift in the harbor total 23.6 million cubic feet of material generated from 2,230 derelict vessels and 100 deteriorated piers.

The New Jersey Department of Environmental Protection has supported this project since its inception. Cleanup activity began along the southern edge of Liberty State Park in August 1976. Deteriorating piers and bulkheads, sunken and abandoned ships and floating debris are being removed along five miles of shoreline. The fifth and last phase of this cleanup is due for completion next year. The Liberty State Park cleanup is only the first stage of a continuing program which should ultimately restore much of New Jersey's waterfront to a higher level of economic and aesthetic vitality.

In the spring of 1977, the New Jersey Commission on Capital Budgeting and Planning, recognizing the need for continuation of the Waterfront Cleanup Project and the inability of the local communities to fund their share, proposed a $10 million bond issue to provide needed funds. The Legislature enacted legislation and on November 8, 1977 the voters approved the Beaches and Harbors Bond Act. This act includes $10 million in bond funds for harbor cleanup; it will enable New Jersey to pay its share of the work. Two-thirds of the cost of the work will be funded by the federal government and one-third by the State. The total investment for drift removal will equal at least $30 million. Work performed with bond monies will be completed within three years. All of the funds will be dedicated to the removal and disposal of sources of drift and debris. No bond monies will be used for repair of shore structures, this will require local funding.

The Jersey City waterfront area, where cleanup activity has been in progress, used to be the focal point of some of the most powerful financial interests in the U.S. In the early 1900's, major railroad companies vied competitively, developing extensive marine freight facilities and harbor terminals. These facilities dominated the waterfront area, with railroad companies owning over 98 percent of the Jersey City waterfront. The city's economic health was tied directly to the marine facilities on the waterfront; the decline of the railroads, changing technology and the resulting obsolescence had a devastating effect on the city's waterfront area. Much of the existing deterioration and debris in the Jersey City area of the harbor is a result of this decline.

Since the work at Liberty State Park began, many stories behind the waterfront's history have become known. For example, several rounds of live ammunition have been found and removed, believed to date back to World War I when ammunition bound for France was transported by ship. The wartime activity culminated in the tragic "Black Tom" explosion in 1916, which some believe may have been due to sabotage.

A longtime resident of the Harbor area, "Captain" Jack Robbins knows all about the history of the waterfront. Robbins, a Scotch Irish Indian originally from Rockland, Maine, has lived on the water all his life. Several years ago he and his wife bought a 70 year old barge and moored it at one of the abandoned piers near Liberty State Park. Although the success of the cleanup project has eliminated most of his docking piers, authorities are making every effort to ensure his safety without having to displace him.

Several procedures are being used to eliminate the sources of drift. Generally, the derelict vessels are cut at the site by a heavy bucket on a crane or, if underwater, by wire cable. Deteriorated shore structures are being removed by first demolishing the superstructure and then decking or removing the piles. Drift-source material is being snaked out with cables. The material to be discarded is then loaded on disposal barges by a bulldozer, or a crane with clamshell bucket.

The most feasible, economical and environmentally suitable method of disposal of this debris is burning-at-sea. Burning-at-sea is carried out by allowing the debris to partially dry out on collection barges. After the timber has dried, the material is transferred to a "burn barge". This barge, especially constructed to withstand high combustion temperatures, proceeds off-shore at least 20 miles from the nearest land mass where the load is ignited. Wind direction and velocity standards are carefully observed to ensure that this procedure conforms with federal EPA environmental regulations. Water samples are tested after the burn to ensure compliance. Timber pilings and steel which can be re-used are recycled. Other materials which cannot be burned are trucked to authorized landfill areas.

This Waterfront Cleanup Project will substantially reduce drift damage to commercial and recreational vessels and reduce other fire, health and safety hazards. It will also contribute to the elimination of pollution of harbor waters. The project offers the prospect of land reuse and an enhancement of the environmental and aesthetic quality of the area.

Through the Waterfront Cleanup Project, the State of New Jersey is making a major effort to restore and protect the harbor area. It stands as perhaps the major, if not only, hope for ending blight on the bi-state Port waterfront. These improvements, well suited to an era of recycling and renewal, will help preserve and rehabilitate this beautiful natural resource. □

Remains of pier #14 being removed at Liberty State Park.

Photos by Harry Grosch

Remains of pile supported warehouse destroyed by fire—Jersey City.

Piles remaining from pier destroyed by fire off Jersey City.

Remains of warehouse destroyed by fire off Jersey City. These facilities served the railroads in years past.

Deteriorated pier off Jersey City to be removed.

Remains of piers being removed in vicinity of wildlife habitat – Liberty State Park. (Note Statue of Liberty in background.)

DEP'S new cleanup: *on the waterfront*

BY CAROL NEUMAN TOMSON

A massive federal and state cleanup effort is underway to eliminate the drift and debris that litters the Port of New Jersey and New York Harbor. The Waterfront Cleanup Project, officially known as the New York Harbor Collection and Removal of Drift Project, is reducing hazards to navigation and helping to restore the New Jersey waterfront area to full use.

To most people, drift is material aged and shaped by the sea, worth collecting for its artistic potential. The accumulation of drift and debris, however, is a problem of growing concern to New Jersey state officials and boaters because it creates serious health, fire, safety and environmental hazards.

Technological advances in cargo handling have transformed harbor usage over the years. The resulting disuse and deterioration of facilities has resulted in increased quantities of floating drift and debris entering the harbor waters. This material endangers commercial and recreational boating, detracts from the harbor environment, and retards development and use of the waterfront area.

The Waterfront Cleanup Project is a U.S. Army Corps of Engineers' water resources development project. The Corps first proposed a comprehensive cleanup plan of the N.Y. Harbor in 1968. The clean-

Continued on page 16

Col. McCabe, Chief, Bureau of Capital Improvements, and project coordinator for the harbor clean-up talking with "Captain" Robbins about relocating his barge from pier #11 which is being torn down. Carol Tomson looks on. Capt. Robbins has lived on a barge since he was 5 years old, making Liberty State Park his home for the past 16 years.

Work taking place near pier 18 Liberty State Park. (Note remains of trestle for famous coal operation.)

Occasionally, a garter snake without stripes is found as are entirely black snakes. Albino (white) garter snakes with pink eyes have also been reported. When turned over, a garter snake reveals a greenish or yellow belly.

Of all the northeastern snakes, the Eastern garter snake is considered the most abundant. Its abundance is due in part to the fact that it is not fussy about where it lives (its habitat). Garter snakes are likely to turn up almost anywhere including your yard, garden or basement. They are capable of living in man-made environments of city lots, dumps and "improved areas" where other reptiles have disappeared.

In more natural terrain, garter snakes occur in our salt marshes and along inland fresh-water ponds, bogs, marshes, streams and drainage ditches. While good swimmers, they are not confined to wet areas. You can just as easily find one on a sunny hillside rock ledge, in pasture, field, orchard, or woodland.

Like all cold-blooded animals, garter snakes must protect themselves from cold winter weather. This they do by hibernating underground, often in groups with other snakes. They disappear about mid-October and reappear on warm, sunny March days.

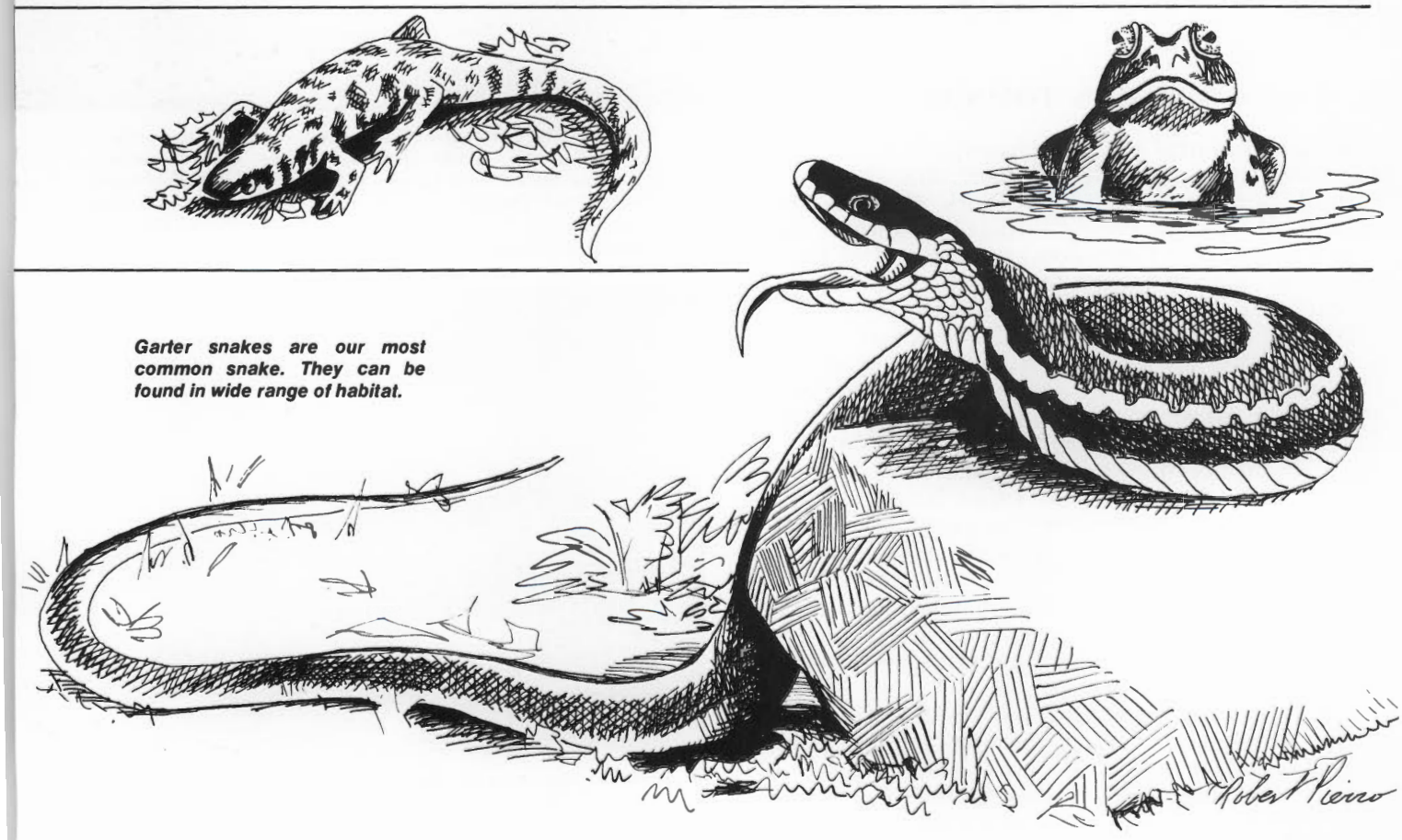
Eastern garter snakes usually mate in April and May. The garter snake does not lay eggs. The young, as many as 80, are born alive. Four to nine inches long at birth, the young are immediately able to care for themselves. Not having to sit around in an egg for weeks is an advantage (skunks and opossums will eat snake eggs) and an additional reason why garter snakes are so abundant.

The young feed primarily on earthworms. Adults vary their diet with frogs, toads, insects, salamanders, snails, grubs, fish, small mammals and an occasional bird. In turn, garter snakes may be fed upon by other snakes, skunks, weasel and perhaps otter. Birds such as herons, egrets, and red-tailed hawks may also feed on garter snakes. According to one expert, the snakes' ability to survive only on earthworms is a third factor in their abundance, particularly in areas altered by man's activities. They grow to a maximum length of four feet, although usually they reach no more than a yard in length.

Economically, garter snakes are not as important as other snakes which feed primarily on rodents. While not directly beneficial to man, neither are they harmful. A newly captured snake may bite, but they rapidly tame.

Not particularly secretive, garter snakes are easily spotted when sunning themselves on a rock wall or patio. Because of their abundance and wide-ranging habitats, garter snakes are the most commonly encountered snake in New Jersey. Unfortunately, it then follows that they are also the most commonly killed snake, usually under the mistaken idea that they are poisonous.

New Jersey is home to only two poisonous snakes, the Timber Rattlesnake and the Copperhead. Neither of these snakes has lengthwise stripes. So, when next you see your grandfather's striped "garter" lying on the ground, consider the third alternative and pass it by unharmed. It will do the same for you. □



Garter snakes are our most common snake. They can be found in wide range of habitat.

Wildlife in New Jersey—

The Eastern Garter Snake

BY JOAN GALLI
ILLUSTRATIONS BY ROBERT PIERRO

There is no member of the animal kingdom more likely than a snake to elicit an instant response from everyone it meets. I have seen people in the streets of Boston pass a mountain lion on a leash without batting an eye. Walk into a room with a large snake in your hands, however, and you are sure to cause a commotion. The response of others to the snake may be either positive or negative, but rarely will you encounter anyone honestly neutral on the subject of snakes, their appearance, habits, and value.

For the snake, this ability to create an immediate and direct reaction to its presence usually results either in a bash on the head or imprisonment in a cage. From our point of view, the first, "kill it" reaction is based on fear and misinformation. The second reaction, "collect it" results from a fascination with snakes, their unique appearance and habits. There is, however, a third alternative in the traditional snake vs. human encounter. This is known simply as the "do nothing" approach.

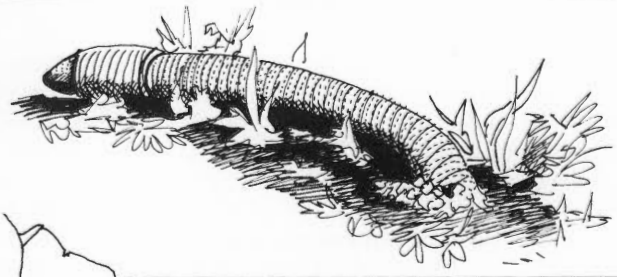
While a snake fancier may easily understand our basic mistrust of snakes, it is often difficult to share his appreciation and enthusiasm. A closer look at the snake you are most likely to encounter in New Jersey is presented here to encourage an understanding and acceptance of snakes.

The Eastern Garter Snake (*Thamnophis sirtalis sirtalis*) ranges from southeastern Canada across the eastern United States, south to the Gulf of Mexico and west as far as Minnesota. Inhabiting the entire state of New Jersey, it is a member of the most commonly occuring snake genus of North America.

Over its range, the Eastern Garter Snake is locally referred to by 34 different common names. Particularly in the east, they are often called "garden" snakes, reflecting a location where they are often encountered. The correct name "garter snake", resulted from the snakes' lengthwise stripes which reminded people of the fancy elastic garters once worn by fashionable gentlemen to hold up their socks.

The one similarity in appearance of all eastern garter snakes is their two side (lateral) stripes which *always* occur on the 2nd and 3rd row of scales (counting from the belly side). A third stripe runs down the middle of the back. Otherwise, Eastern Garter Snakes vary greatly in color and pattern. The body color may be black, dark brown, green, or olive. Usually, the stripes are yellow, but may be brown, green or bluish. The snakes are further decorated by double rows of dark spots on the scales between the stripes. Sometimes the scale spots are very prominent. If the snake is angry and flattens its body, a checkerboard pattern of light spots becomes visible on the skin between the separated scales.

Garter snakes eat earthworms, frogs, snails, salamanders, fish, and other small mammals



Garter snakes hibernate underground in winter, usually in groups.

Only a film of water identified this flat land as a swamp. Small yellow flowers of bladderwort pointed up deeper places. Here the purse-like bladders on the roots snapped open to suck in minute insects and crustaceans such as cyclops and daphnia, or water fleas. Sometimes the water surface had been blotted out by enough scum from iron salts to make it nearly opaque, difficult to judge for depth. To be really sure of footing you had to take a route that led across white pebbles. These were not made of marl, as has so often been claimed. Marl in this area was created more than 65 million years ago during the Cretaceous Period and was laid down underneath or outside the visible Pine Barrens land. Being alkaline, it supports earthworms and would fit few of these cedar swamp plants. Most of this surface land comes from Quaternary Period sources, our period, and so is of relatively recent origin. I was choosing pebbles and hard-packed sand to cross. The darker sand, more oiled by organic debris, sank like a trap.

Deeper in the ground strata, marl or "greensands" *do* support the Barrens. And in them lies water-soluble iron. When the underground water, saturated with organic ooze, flows through this marl, the marl attracts the iron, which it eventually heaves to the surface. We see it, now oxidized, as a golden sludge that loads down filamentous algae. The banks and beds of streams and bogs become coated with a hard ore. In the past these surface veins were mined for the product, which became known as "bog iron." It proved to be a weak industry, however. That iron took so long to build up that it could be mined only once every 20 years!

Except for that organic ooze which I habitually avoided stepping on, however, no one would ever have thought of this skim of a swamp or bog as being depressing or forbidding in the way that untramped wetlands have often been pictured. Actually the swamp remains in my mind as a land of orchids. Here stood sprays of grass pinks, each a stalk with but a single leaf and topped by a crest of magenta-pink blossoms. Snake mouth blooms, in tones of white and pink, each stuck out a fringed tongue, useful to insects which attempt to land on the flower. Botanists have treated this shape as being a lip with hair, and so the second part of the scientific name of *Pogonia ophioglossoides* means bearded. Bumblebees fit naturally into its curves, just as they do into those of the splotched magenta blossom of cedar bog arethusa which also lives here. Both flowers not only offer but actually pour pollen onto the departing bee's head in nature's scheme to fertilize the next of these flowers visited.

Natural plant groupings stood out. On one tuft of muck clung a single rose pogonia or snake mouth, a yellow bog asphodel, a six-inch-tall Atlantic white cedar, and several wiry thread-leaved sundews. In several places, like survivors of an antiquated buddy system, little curly grass fern and Carolina club moss stood side by side. There, soaring to a few inches above the coiled springs of the sterile fronds, fertile stalks of the fern lifted up their minute spore cases that so closely resemble toothbrushes.

A third grouping of cedar bog plants came more to my mind than eye, namely the oddities. Here were mop-like blossoms of orange milkwort, which you have to come to the Barrens to see. Like all milkworts, these are pollinated primarily by bees. Then there was bog aster, unusual in that it blossoms during spring. Very wooly gold cress reminded me of two other furry inhabitants of harsh windy places—dusty miller of our sandy seashores and lead plant of midwestern prairies. Yellow-blossomed bog asphodel, which was first described for the world from Pine Barrens specimens, reaches its northern limits here, as do many plants. For all that, a toad, Fowler's toad, is itself virtually replaced by the American toad north of Trenton, New Jersey, just a quick drive above the Barrens. Finally, among the plant curiosities here, golden club, which has horizontally spread-eagled leaves that shed water, stood out like green stars here and there. Many of the leaf blades still

Continued on page 30

Bracken Fern PHOTOS BY AUTHOR

Sheep Laurel in Bloom

not so barren a path

By Millard C. Davis

You have to like the metaphor of "The Pine Barrens." It implies that nothing is there. Well, I have eaten well in the Barrens at nature's expense (partially by beating squirrels to chestnut oak acorns), listened to choruses under the moonlight (frogs calling from trees and waters), and sped a canoe faster under branches than ever I plan to do again (during one floodtime the bough of a white cedar even flipped a friend overboard). So, I come here for adventure.

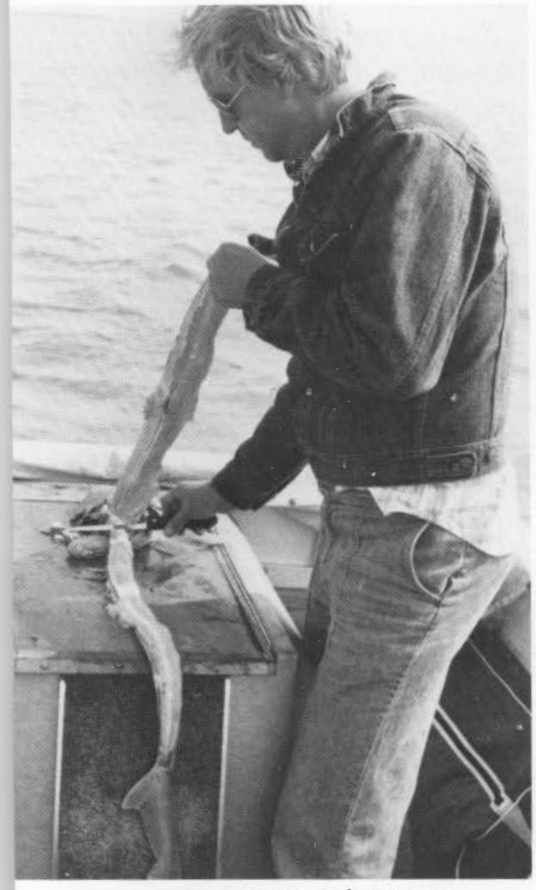
On the seventeenth of June one spring, a season that arrives a little later for plants in the wetland part of the Barrens because of the cooling effect of the water, I pressed aside typically stocky boughs of Atlantic white cedars and entered a swamp that was just coming into full bloom. Sweet fragance of swamp azalea hung along the spongy shore. I could see from the long tubular blossoms why azaleas had for years been thought to be a kind of honeysuckle. Actually the latter are even in another family, the Caprifoliaceae, one of those few groups of plants whose members have opposite leaves—the leaves arise in pairs, those of a pair being opposite each other on the stem. Azaleas, on the other hand, belong to the family Ericaceae. Like rhododendron, mountain laurel, leatherleaf, cranberry, and others of the family, these shrubs prefer acid soils. And so acid are the Barrens soils in general that they are not only high in such plants but low in earthworms! Possibly it is not only acids that restrict the worms. A number of plants, such as the staggerbush which was on that day shaking its white, bell blossoms as I passed—produce poisons which can not only stagger but knock down cattle.

Pine Barrens, Oswego Creek

cool), the decomposition of urea will impart an ammoniacal taste to the flesh. Skinning and filleting are easily accomplished. Although the tough skin of sharks is legendary, this makes it very hard to pierce but easy to strip. The skin is sliced down the belly and down the back on both sides of the dorsal fin. It can then be pulled off the flesh in two sections with a pair of pliers. Since sharks have cartilaginous (not bony) skeletons, filleting is also easily done by inserting a sharp fillet knife into the fish at the tail and cutting forwards.

As a longtime seafood enthusiast, the writer is convinced that, properly prepared, many species of shark (including the ones above) are the equal of winter flounder and red snapper. Shark can be cooked in any of the traditional methods for fish: fried, baked, or broiled, as steaks or fillets. For example, the smaller smooth dogfish, scorned as pests by many fishermen, can be skinned, cut into 1/2-inch sections, floured and fried, or deep fried. The result looks and tastes somewhat liked fried scallops. The pectoral fins (wings) of skates and rays also make for excellent eating.

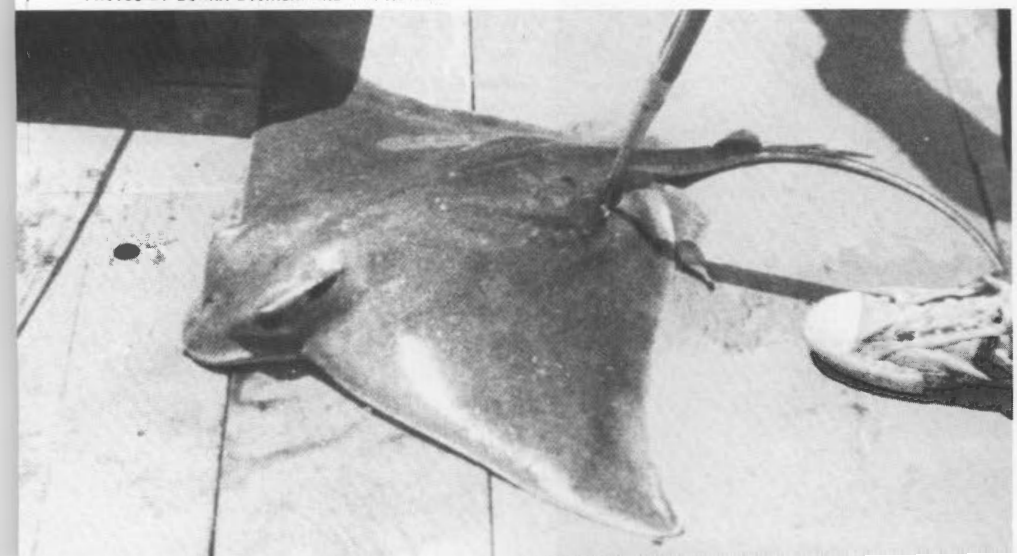
On the day of our field trip, as expected, as the sun reached higher into the sky and slack tide approached, strikes became less frequent. In anticipation of this, we had brought drag seines along for collection of smaller fishes on the Bay side of Little Beach. Pulling the boats up behind the barrier beach, we were immediately assaulted by swarms of "greenies," or greenhead flies. These are large flies, very common in the salt marshes, whose bites are actually capable of drawing blood. The point here, of course, is that insect repellent is a necessity if one is contemplating going ashore near a salt marsh in summer. A hat, long pants, and a long-sleeved shirt also help. Even though we had taken plenty of repellent along, the flies appeared to have mistaken it for gravy. Our beach seining effort came to ruin as we hastily re-embarked and headed back out to Bay center pursued by swarms of ravenous greenies. The remainder of the day was lovely but not particularly eventful and so we headed back to Capt. Mike's at about 3:00 pm.



Sharks are easily filleted — most of the fish is firm, white flesh

PHOTOS BY DONNA DUJINSKI AND THE AUTHOR

A-16 pound eagle ray

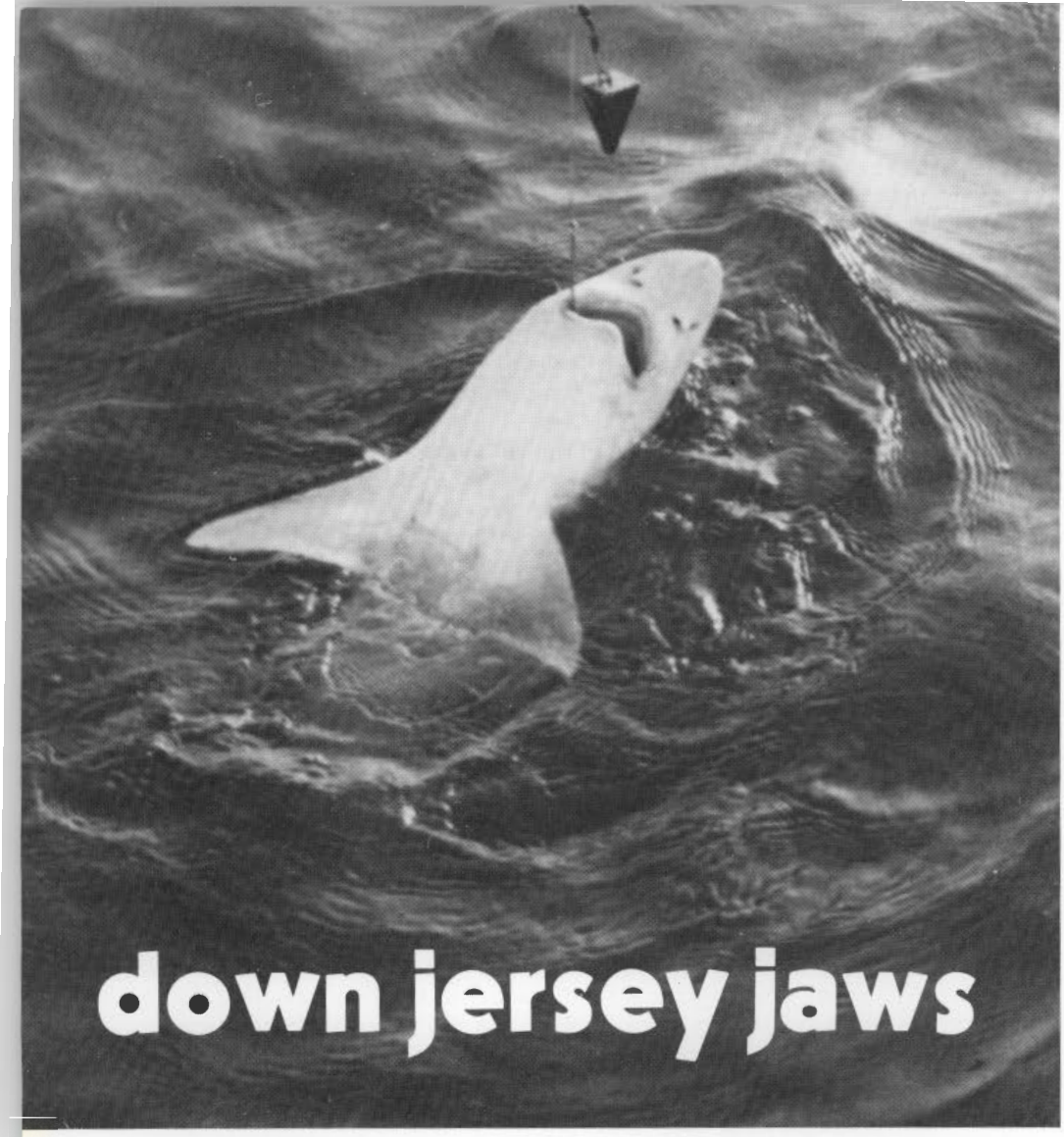


Before winding up, a word or two of caution may be in order. As is fairly common knowledge, all sharks should be very carefully handled, and one should be properly equipped before setting out on a sharking trip. To begin with, unless one has a good deal of experience, he should not attempt to take a large shark aboard a small boat. Just getting the fish alongside should suffice. The line can then be cut and the shark released. Contrary to implications in the movie *Jaws,* sharks have no revenge motivations, play an essential role in marine ecology, and should not be wantonly destroyed. Hooks left in the fish's mouth will oxidize and be removed naturally. A true sportsman will take only what he intends as food, releasing the remainder of his catch.

If it is decided to take a shark on board, a gaff, tail rope, and club can be used. Due to the extreme toughness of the hide, the fish should be brought alongside and the gaff set in the gills. A looped rope is then slipped over the tail to guarantee good control at both ends of the animal. A club can be well used to stun the shark before it is brought aboard. Leather gloves will also help. The abrasiveness of the skin can cause an uncomfortable scrape to a handler. An excellent rule of thumb for a beginner would be, "If in doubt cut it loose."

As we carried our catch to the waiting cars some dock fishermen remarked that although the sharks were impressive it was too bad they weren't edible. Although we spoke with them for a few minutes they departed unconvinced. Ah well, some of us know.

IF YOU GO — Take the Garden State Parkway South to Exit 58 (Tuckerton). In Tuckerton take Great Bay Boulevard to one of the boat rental services on Great Bay Peninsula. Angling for shark is best during the warmer months (June-September). □



down jersey jaws

A very large smooth dogfish breaks water

DR. OLIVER DONOVAN

Ever since the movie *Jaws* was released there has been a renewed interest in sharks on the part of fishermen. This, in New Jersey, often leads to the chartering of ocean-going boats for the capture of blue and mako sharks. These are large, pelagic species which give an excellent fight on hook and line. As an added dividend, both species make excellent eating. Often forgotten, though, is that New Jersey's inshore waters also provide abundant opportunity for low-cost, exciting angling for shark. Large numbers of sharks, of a variety of species, can be found behind the barrier beaches and in the back bays of our state. All of these make for excellent sport, and some make excellent eating if properly prepared.

The Ichthyology course offered by the Biology Department at Jersey City State College was last given in the summer of 1977. As in many courses of this type we began with a discussion of evolution of modern fish and of the more primitive fishes, including sharks, skates, and rays. Since the course is a field course, it was decided to make a collection trip "down Jersey" to Great Bay at the mouth of the Mullica River. The writer had heard previously from local fishermen that smaller sharks abounded in the Bay. Deeper water areas are best, and these include Grassy Channel, located behind Little Beach. As an aside, Little Beach is an example of an absolutely unspoiled barrier island and is always worth a trip ashore.

A solo trip confirmed that the shark fishing was great in this area and so the entire class met at Capt. Mike's boat rentals on Great Bay Boulevard in South Tuckerton on a lovely morning in early July. After buying bait and chum, we left Mike's in five rented boats and were anchored behind Little Beach on the beginning of the incoming tide.

From the standpoint of fishing technique, it might be well to first say a word or two about the feeding habits of sharks. Essentially, they are nocturnal feeders with a very highly developed olfactory sense (sense of smell). Consequently, it is best to be on the water at night or very early in the morning, on the incoming tide, with an attractant to concentrate sharks in the area of the boat. Menhaden, an inshore spawning member of the herring family, is well used as an attractant. This is so because the flesh of this fish is very oily. It is ground or finely chopped and released into the water in handfuls to form a "chum slick" which will gather sharks. These can then be caught by baits of menhaden chunks or cut squid floated or bottom fished in the slick. The incoming tide appears best for inshore shark fishing because of the shallowness of New Jersey's coastal bays. Larger sharks will enter to feed in the highly productive estuaries on the incoming tide and depart on the ebb.

On that fine July morn, after we set out chum slicks and baits, action began almost immediately. This was evidenced by a gleeful shout from one of the boats followed by a (obviously more timorous) student clambering up onto the cabin roof. A 16-pound eagle ray (see photo) was the result of this first contact. Following this, a very large fish, probably a sand tiger shark, took Bart DeMartino's bait and very nonchalantly stripped all the line from his reel despite all efforts to slow it down. The remainer of the morning saw landings of considerable numbers of smooth dogfish (a bottom feeding shark), brown shark, eagle rays, and little skate.

All of these are delicious if properly prepared. The secret to preparation of shark is to gut and bleed the animal as quickly as safely possible. This is so because shark blood contains high levels of urea. If not bled and quickly iced (or at least kept

Lake Trout Poster

them, for as pleasant a job that this would be for us, it would not be an accurate representation of the lake trout population as fishing could be selective. The answer to our problem was gill netting. With a gill net the trout would swim into it but would not fit all the way through. When they try to back out they cannot because their gills get caught in the net's meshing; hence, the name "gill net." The size of the mesh is all important: if the mesh size is too small, the trout cannot get its head into it far enough for the gills to get hung-up, and if the mesh is too large, the trout would swim right through the net. We chose to use experimental gill nets which have several sections of differing mesh sizes. Also, since we weren't quite sure where the lakers were, we had to put out several nets at different locations and at different depths.

Our gill netting operation took place during the first week in November and the results were very dramatic. The first thing we found was that there are more trout in Round Valley Reservoir than most people think. When you look at the pictures of the trout taken during this sampling, remember that they are only a very small sample of what is there. Some of the people that might bemoan the loss of these fish will probably be the same ones that swore the lake was fished out because they couldn't catch any. When I look at these results, I do not see lost opportunities; I see proof that the lake is full of big trout! Remember these nets were only covering a very small portion of the lake. Add to that the fact that all but the two biggest trout will be replaced within a year by stocking. Those 14 to 16 inch browns and rainbows were fish we stocked last spring. There is no natural reproduction of browns and rainbows at Round Valley so the loss of these fish doesn't have any significant effect on the future population.

Two other interesting notes before we get back to the lakers: (1) there are a lot of smallmouth bass left (even if you can't catch them) and (2) the survey crew reported seeing trout "too big to fit into the nets" (and when you look at the size of what we took you can imagine the size fish they are talking about). So c'mon anglers, the fish are making you look bad.

Only one laker was taken at the depth they were supposed to be at this time of year (according to the book), which was at 10 to 20 feet, and this was where most of the browns and rainbows were. But when we pulled up the net set at about 65 feet down, we had 5 lakers in it. These lakers ranged from 8 to 10 inches in length (not quite up to the sizes we had heard about). However, this did indicate good growth for this species of trout and more importantly it indicated excellent survival. Stomach analysis revealed that the lakers were feeding entirely on Gammarus, which is a little freshwater crustacean. When these lakers get a little larger, they should begin feeding on alewife and grow a bit faster. This is something we hope to find in next year's sampling.

Where do we go from here? We'll continue to stock lakers and each stocking will have a different fin clipped so we can recognize them in the future. We'll also be able to see if we get natural reproduction. Lake trout, as the name indicates, spawn in lakes and if we pick up small lakers without fin clips we'll know it's a wild trout. When we get this and further growth data we'll be able to determine size limits and creel limits for this species. At this time, my diagnosis of the program is "so far; so good." □

The object of our search and proof of the success of the program—five lakers ranging between 8 and 10 inches.

The day's sampling—3 browns below, 5 rainbows above and 5 lakers to the rear. If the lake trout reach their full potential, they may make even those 20+ inchers look small!

see how they grow

A Status Report on Round Valley Reservoir's Lake Trout

BY ROBERT H. SOLDWEDEL

Crew hauling in gill net in the morning fog at Round Valley. PHOTOS BY AUTHOR

Back in March, 1977, Round Valley Reservoir was stocked with 6,300 yearling lake trout that ranged from 4 to 7 inches in length. This was the initial introduction in our attempt to establish a fishery for lake trout in New Jersey.

Why Round Valley? Well, Round Valley Reservoir is one of the few lakes in New Jersey that is genuinely suited for trout and it is the only one that is completely open to the general public. The thing is that with Round Valley the summer water temperature is too cold for brown trout and rainbow trout throughout the lower two thirds of the water column in that portion of the lake below the thermocline known as the hypolimnion. While this condition is true in all deep N.J. lakes, the big difference is that in Round Valley there is plenty of dissolved oxygen at all depths. Dissolved oxygen is that vital ingredient needed for trout survival that goes hand in hand with cold water temperatures. So what we have at Round Valley is a bunch of "happy" browns and rainbows swimming around between 15 and 35 feet below the surface, and a barren stretch of water below that to the bottom. Round Valley Reservoir is well over 100 feet deep throughout much of its area, and it has been in the Division's interest to put it to use to provide added fishing for New Jersey anglers. This is where the lake trout come in.

Lake trout adore water temperatures in the forties, while brown trout and rainbow trout will only stay in it when they absolutely have to. Ergo, lake trout are a natural for Round Valley. Well, maybe they are and maybe they aren't! For one thing, where are we going to get them? And when and if we get them, can we hold them at the hatchery till they're big enough to stock? And what will happen to them after we stock them? "Book-learning" doesn't always tell you everything, and what looks good on paper doesn't always work out in real life.

The first two hurdles were cleared with nary a fault. Lake trout eggs were graciously supplied to us by the nice folks at the state fish hatchery in Marquette, Michigan, and with extra helpings of tender love and care, they thrived at our own Charles O. Hayford hatchery in Hackettstown. Judging the success or failure of these two ventures was easy compared to evaluating the third; i.e. how the yearling lakers would take to Round Valley's waters.

In order to determine how the lake trout were making out we would have to recapture a few of them. In other words, we had to sample the population. We had heard reports that anglers had taken a number of the lakers and that they were running between 11 and 14 inches in length. If this were actually the case, it would be phenomenal growth for this notoriously slow growing species of trout. We could not rely on these unconfirmed reports (the anglers had to release all lake trout—it's the law), we would have to hold the fish in our hands before making a judgment. How then would we accomplish this? Since they are a deep water fish we could not electrofish or seine them. We could not fish for

Big male rainbow and brown. These are *typical* of what holdover trout can be produced in Round Valley.

Prospertown Lake

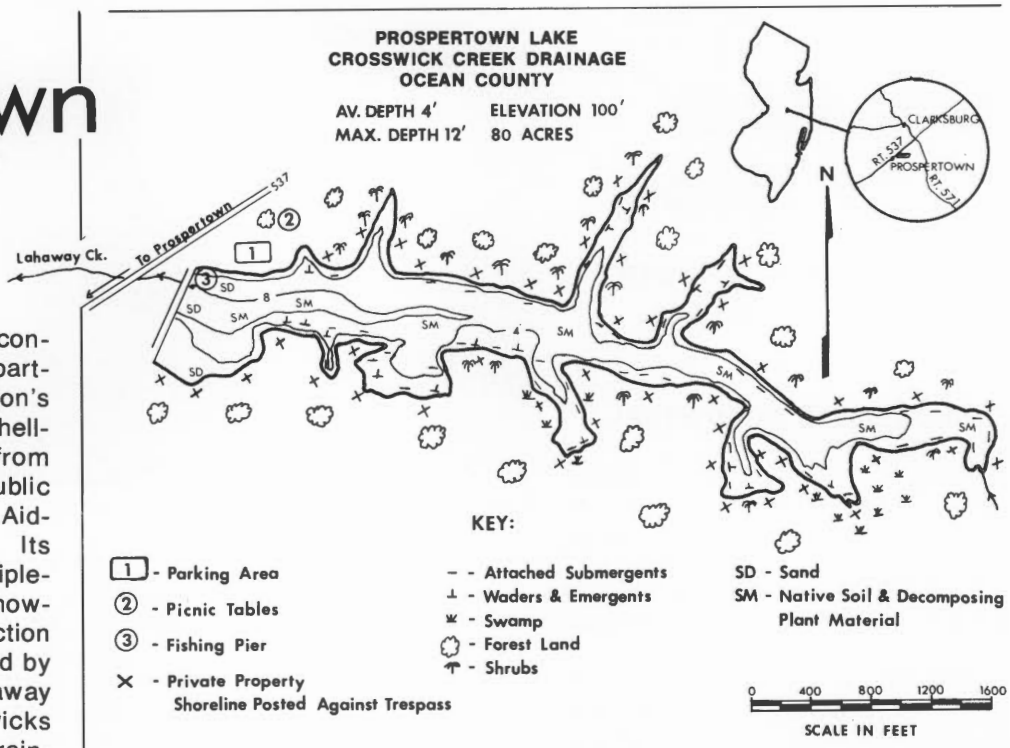
OCEAN COUNTY

Prospertown Lake was constructed in 1965 by the N.J. Department of Environmental Protection's Division of Fish, Game and Shellfisheries with the aid of funds from the Federal Accelerated Public Works Program and the Federal Aid-in-Fish Restoration Program. Its purpose was to serve as a multiple-use recreation area. Hunting, however, was disallowed by a restriction in the deed. The lake was formed by impounding the waters of Lahaway Creek, a tributary of Crosswicks Creek in the Delaware River drainage.

The Division of Fish, Game and Shellfisheries has been monitoring the physical and chemical characteristics of the lake and the fish population since 1965. This information has provided the basis for a sound fisheries management program. Presently, largemouth bass (introduced by the Division in 1968) and chain pickerel (native species) are the principal game fish and management objectives that have been oriented toward these highly desirable species. In addition, brook trout are stocked on an annual basis in order to provide for a spring fishery.

In addition to the aforementioned species, this lake contains various other warmwater fishes. Those which are sufficiently numerous so as to provide a fishery include: black crappie, pumpkinseed sunfish, bluegill sunfish and brown bullhead. The growth rate of all these panfish species is considered to be satisfactory with most reaching harvestable size (crappie and sunfish >5" and catfish >7") by their third summer.

The immediate margin of the lake is approximately 70% forest and 20% swampland with the remaining 10% being taken up by the beach area and earthen dam.



Location:

Approximately one-half mile northeast of Prospertown, New Jersey, on County Road 537.

Facilities:

Fishing pier (accessible by wheel chair), cartop boat launching (all types of outboard motors prohibted), and picnic tables.

Physical Features:

Area: 80 acres
Maximum depth: 12 feet
Elevation: 100 feet
Mean depth: 4 feet

Chemical Features:

Oxygen: Sufficient to a depth of at least six feet at all times of year.
pH: Slightly acid.

Biological Features:

Aquatic Vegetation: Abundant to a depth of approximately 3 feet along most of the shoreline.
Water Color: Amber

Fish and Fishing:

Brook Trout: Good stocking period during April through mid-May. Survival not anticipated through the summer months.

Largemouth bass: Very good. Growth rate is good by New Jersey standards. Best fishing during the spring and late fall.

Chain pickerel: Fair. Fishing is spotty. However, a number of large pickerel (>20") are caught each year.

Black crappie: Very good. Best fishing in early spring.

Sunfish: Good numbers available. However, the majority of fish present are less than 5 inches in length.

Brown bullhead: Excellent, very abundant.

The 14 species of fish present are as follows:

Brook trout	Pumpkinseed	Yellow bullhead
Largemouth bass	Mud sunfish	Golden shiner
Chain pickerel	Banded sunfish	Creek chubsucker
Black crappie	Yellow perch	Swamp darter
Bluegill	Brown bullhead	