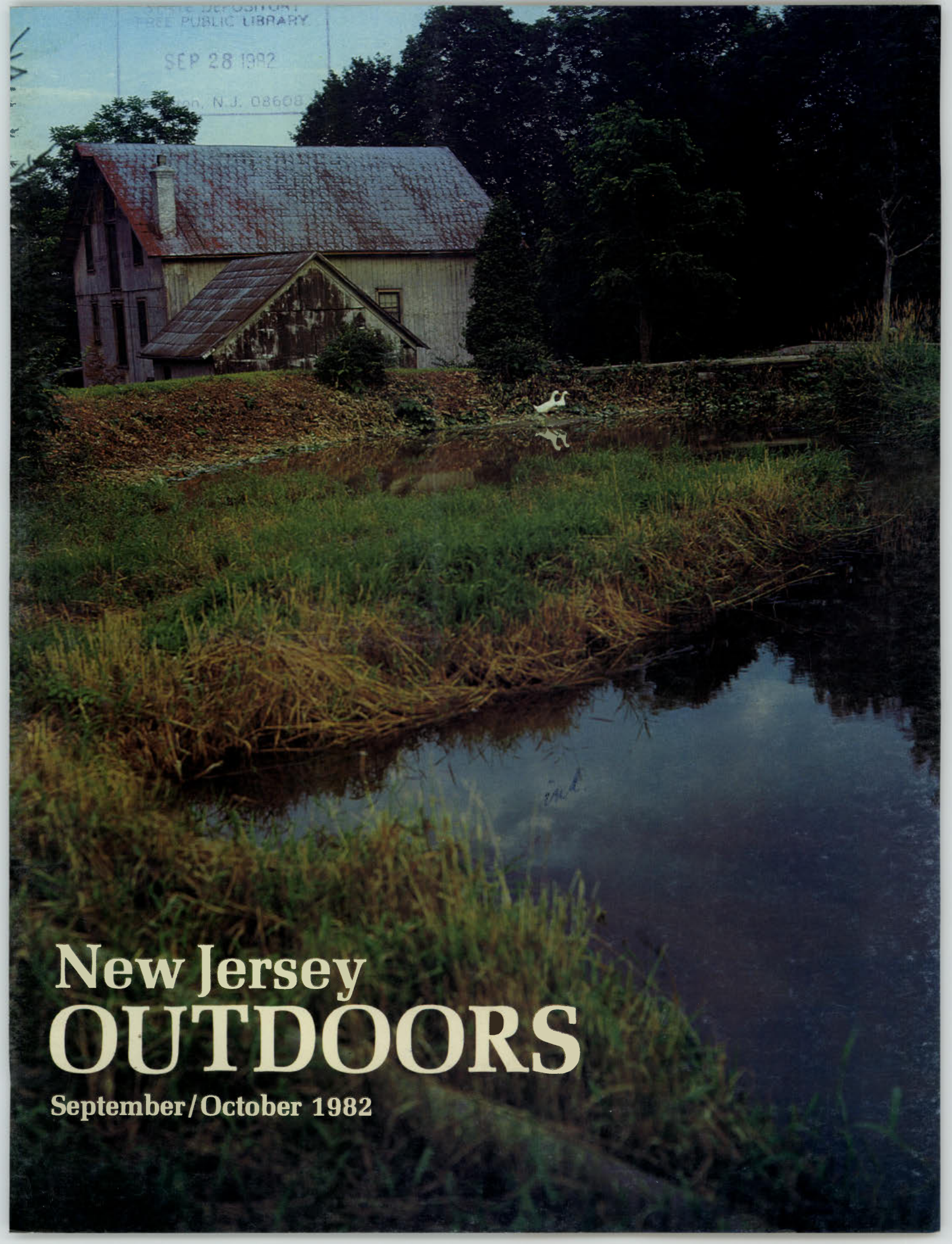

New Jersey OUTDOORS

September/October 1982

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September/October 1982
VOL. 9 NO. 5

New Jersey OUTDOORS

From The Editor

What Do You Think?

I'm writing this editorial in July. We just celebrated the 4th and summer is upon us. Summertime is travel time for the editor of an outdoor magazine like ours, and it's an enjoyable time in the field in the various regions of our state. It's a time to research and photograph for articles to be used in future issues. It's a time to participate in some of the recreational activities available in a state that has mountains and Pine Barren trails for hiking; parks and forests for camping; many lakes and streams for canoeing, fishing, and swimming; an unmatched coastline of beaches for sunning, bathing, and beachwatching; a fine freshwater fishery and a fantastic saltwater fishery in the many bays, rivers, and offshore.

But this Eden of ours also has its own serpent—in the form of hundreds and thousands of throwaway cans and bottles that offend the eyes on public lands, on the sides of roads, lakesides, at the beaches, in the bays, in the woods, everywhere—even in the most secluded glens and sparkling streams.

What to do about them? We have published several pieces on recycling—a comprehensive article titled "Wandering Through Recycling in New Jersey" in July/August 1980, and we've published two articles on "Bottle Bills" or the more formal name, Mandatory Deposit Legislation, the first in 1974 about the success of the Oregon Bottle Bill and an editorial and a short piece in 1978 on bottle bill legislation.

Now we would like to read some of your opinions and suggestions on litter, recycling, and bottle bills.

In this issue

The opening article, *Into the Breach,* explores a dramatic example of beach erosion along the Jersey coast. "One thing is certain," says author Hannah L. Johnson. "Sandy Hook will be breached and become an island once again." Photographer Cornelius Hogenbirk submitted the photographs.

Wild Mushrooms in New Jersey is the first half of a two-part series by Rod Tulloss. In Part I, he explains how to become a "mycophile, or lover of fungi," and how to identify various types of mushrooms. Part II in the November/December issue will feature delicious ways of preparing the edible varieties. The photos are from the Tulloss' collection.

Writer William Cahill takes us on a year-round tour in his article, *Birds at Menlo Park.* Photos are by Leonard Lee Rue IV, Leonard Lee Rue III, Irene Vandermolen, William Griffin, and the author.

New to NJO, author/photographer Betty Moschella writes about *Scuba Diving.* "Sightseeing, underwater photography, probing old shipwrecks, spearfishing, ice diving, lobstering, and even diving for bottles are becoming popular with New Jersey divers," says Moschella.

The Hackensack River: From Indians to Industry is an historical account of a river that has "played a central role in the Revolutionary War and in the development of the metropolitan area since the mid-1600s," according to author Mary-Ann Foote. Edward T. Kemly Jr. took the photographs that accompany this article.

Lisa Stern Lubow of the Green Acres Program describes several environmental education centers that make Green Acres areas more than just average parks.

On an opposing page, writer Joan R. Huber expands on one of the Green Acres areas Lubow mentions, *Cattus Island Park.*

Come September, jellyfish are generally abundant at the Jersey shore. But have you ever seen a freshwater jellyfish? They occur here in New Jersey, says Richard E. McKeeby, Union College biology professor and author of *Freshwater Jellyfish.* If you've seen any, McKeeby is interested in the location of your sighting.

In time for the start of the school year, Inge Buenning presents *Ice Cubes As Teaching Aids.* " . . . the spectrum of teaching uses for resin castings is as diverse as the materials embedded," says Buenning.

Back with his second *N.J. in Focus* article is Robert J. McDonnell. This time he answers the question "What makes a good picture?" by pointing out some common mistakes and how to avoid them. The photograph, of course, is his and it demonstrates some techniques discussed in his article.

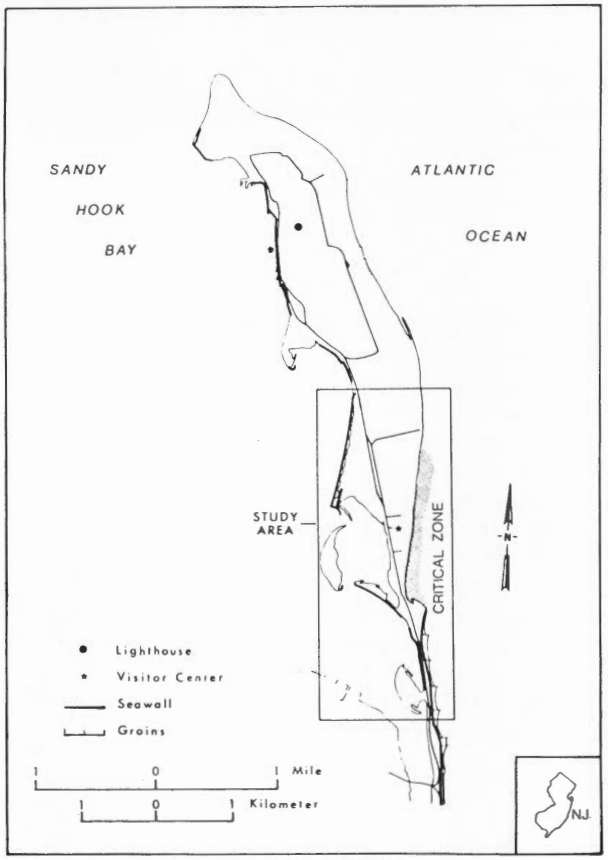
Our *Wildlife in New Jersey* series is introduced by Carol Decker's illustration, *Beaver At Work,* on the inside back cover. Patti McConnell, a wildlife biologist with the N.J. Division of Fish, Game, and Wildlife, wrote the article about "our largest North American rodent." The photos were provided by Leonard Lee Rue III.

Donald DiMarzio follows with a humorous article, *All About Stripers,* in which he pokes fun at the surf-fisherman's vocabulary and habits. Illustrations are by Tony Hillman.

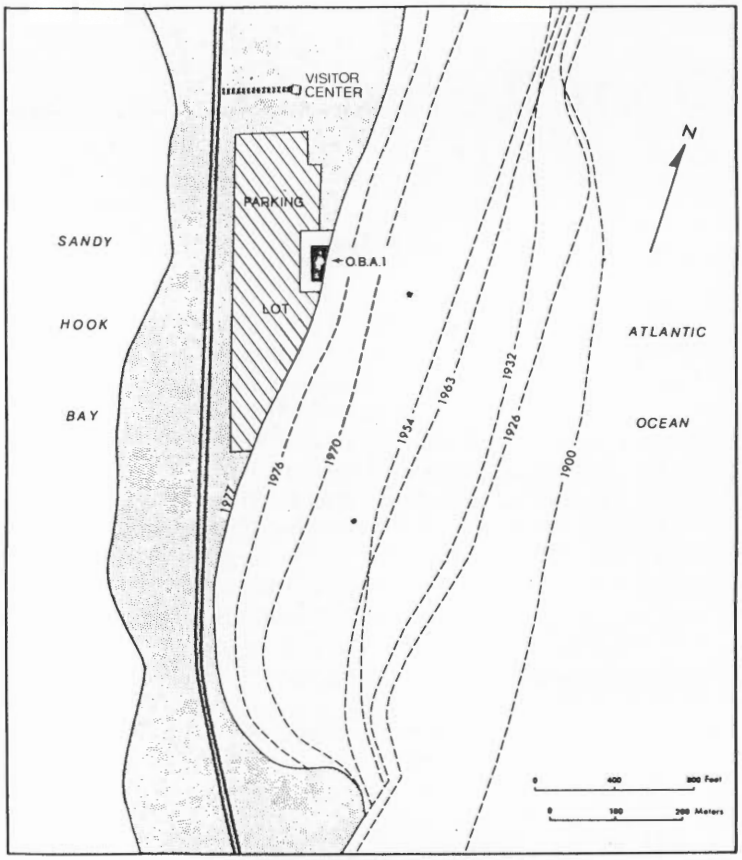
In *Bull's-Eye!,* writer Deborah A. Boerner tells of a "winning outdoor event" which is held annually and should be of special interest to the archers in the state. Debbie is an editorial assistant at the NJO office this summer as well as last summer when she attended the shoot. Photographer Harry Grosch put himself in some rather dangerous positions to capture the excellent shots that accompany this article.

This time of year, our eyes—and noses—tell us it's a *Goldenrod World* outside. Writer/photographer Paul E. Taylor tells us what a diverse world it really is—the different kinds of goldenrod that exist and the insects that visit them. This article is introduced by the girl in a field of goldenrod on the back cover.

Steve Perrone



SANDY HOOK



SHORELINE CHANGES

From *Beach Restoration & Maintenance: Assessment of Long Range Alternatives for Restoration and Maintenance of South Beach Area, Sandy Hook Unit, Gateway National Recreation Area.* Provided by North Atlantic Region, National Park Service, Dept. of the Interior, April 1978.

INTO THE BREACH

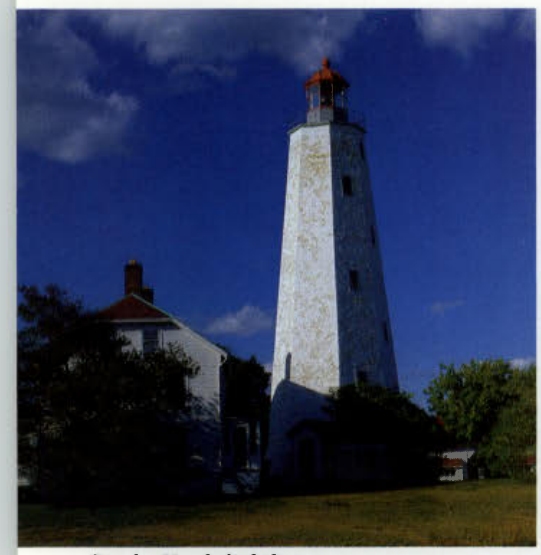
By Hannah L. Johnson

Sandy Hook, now part of Gateway National Park, is a natural resource affording a glimpse of what New Jersey beach areas used to look like before they fell prey to the needs of a growing population. Especially in the low human use months of November through April, the Hook is a study in tranquility. You can walk along the beaches, dunes, and salt marshes observing a variety of plant life as well as both land and shore birds. It's a place well suited to musing and quiet reflection.

Sandy Hook was taken over by the National Park Service in the mid-1970s. Today the park provides recreational facilities and activities for two million visitors a year. The park also provides a protective environment for a varied flora and fauna including some endangered species such as the osprey and the caudate wormwood. Actually, Sandy Hook itself just might be an "endangered species," at least in terms of human access.

Experts feel that the Sandy Hook spit is in the process of becoming an island. What can and should be done to prevent this is a gritty problem for the Park Service people. Being an island is nothing new in terms of Sandy Hook's geological history. The Hook was an island in 1778-1810, in 1837-1850, and again in 1896-1900. It has also periodically been attached to Atlantic Highlands in 1756-1777 and again in 1830-1832. Until 1900 Sandy Hook did what can best be described as "doing what comes naturally," in that it was able to build back or reattach to the mainland. But in 1900 people intervened, altering the processes of nature. In that year a seawall was constructed, extending from Monmouth Beach into the southern end of Sandy Hook. The seawall was supposed to protect property in Monmouth Beach and Sea Bright from storm damage and natural beach erosion. Over the years, groins, erroneously called "jetties," have also been constructed out from the coast to protect the beaches from the same storm damage and erosion. The combined effect of the seawall and groins has been to upset the natural beach-building process and cause instead beach "starvation" at certain critical points.

The natural beach-building process is complex and dependent on several factors. It starts with the drift of the coastal or littoral currents. In the



Sandy Hook lighthouse.

Ocean sand washed across road.

Critical zone.

PHOTOS BY CORNELIUS HOGENBIRK

Sandy Hook area the littoral drift is from south to north. Beach-nourishing sand and sediments are carried along the drift by the currents and wave action. The beaches at the Hook's northern tip are increasing while the ones to the south are decreasing. When the Sandy Hook lighthouse was built in 1764 it stood near the northern tip; now it is a mile and a half south of the tip.

It is now known that the seawall and groins interfere with the natural beach-building process. Sand is trapped by the groins, impeding the natural northward transport of beach enrichment materials and thus causing a scalloping effect. The beaches to the south of the structures increase while the ones to the north decrease dramatically. Natural beach erosion occurs as it always has but deposition of new replacement sand and sediment along the critical beaches has diminished.

The south beach area of Sandy Hook, just north of the seawall, has suffered from extreme scalloping and is experiencing severe sediment starvation. This area has been identified as a critical zone. The shoreline here is retreating westward at a rate of about 75 to 80 feet a year. The sediment that should have built back the beach during calm periods just isn't available anymore—it is trapped south of the Hook by the groins. It is at this critical zone that Sandy Hook will surely be breached and the road over it destroyed. A good three-day Nor'easter would speed up the breaching process. Already the combined effects of high tides and strong winds cause almost weekly overwashing of this area. This closes off the access road leading to beach parking areas, the Visitor's Center, Fort Hancock, the Marine Lab, and the Coast Guard Station.

A 1978 study of the problem by the North Atlantic Region of the National Park Service presented several alternative solutions, most of which involve building permanent structures on or near the critical zone. The Sandy Hook Rangers have thus far favored a study solution which does not utilize the building of permanent structures.

They have been engaged in a crisis management program of simple beach enrichment or sand replacement. In 1977 200,000 cubic yards of sand was trucked from the north to the south end of the park. Again in 1979 sand dredged up from Sandy Hook Bay by the Army Corps of Engineers was dumped on South Beach. A sandbag wall or dike made with nylon filter cloth was laid down at the critical zone in 1978 and again in 1980 to protect the road. Grasses have also been planted to stabilize nearby dunes. But an average of five severe storms a year since 1978, erosion along the bay side, and lack of funds have limited the success of these

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A cluster of the scaly *Pholiota squarrosoides* on a fallen log, August, 1980.

Entoloma abortivum.

PHOTOS BY AUTHOR

The ringless cousin of the honey mushroom. *Armillariella tabescens* near the base of an oak, Hopewell, September, 1981.

This brightly colored group are specimens of a *Hygrophorus* species.

Wild Mushrooms in New Jersey

By Rod Tulloss

The bark is falling away from the tree, and what looks like a network of black shoelaces appears in the openings.

You turn over a compost heap or pile of old leaves or lawn clippings and find, nested in moist layers, radiating clusters of white filaments.

Surely not as remarkable as the yellow, green, brown, red or violet toadstools you see on forest walks, but what you have found are, in fact, the plants from which grow the intriguing, frequently beautiful, and sometimes edible fruits we call mushrooms. "Mushroom" and "toadstool" are, of course, not scientific terms. We use these words to refer to visible fruiting bodies of certain fungi—normally those which have the general appearance of an umbrella. In this article, I'll use "mushroom" to mean a fungus having a fleshy, woody, leathery fruiting body—which is consistent with the usage of most field guides meant for amateur mycologists.

Many readers will be interested in eating wild mushrooms; others may want to identify fungi that attack commercial or shade trees; others may have a purely "scientific" bent or be fascinated by nature photography. In this space, I can satisfy none of these folk; but I will sketch my own learning experiences and indicate books in which further study can be pursued.

How do you become a mycophile, or lover of fungi? In my case it was curiosity and my general inclination as a writer to want to know the names of things. A rather large orange mushroom appeared by my back porch years ago. I wanted to know its name. I bought a guidebook, but the mushroom disappeared before I could discover its identity. The frustration led me to begin attempting identification of every mushroom I saw which, in turn, led to the procurement of a still growing library of field guides, monographs, keys, etc. At some point the amateur mycologist emerges from mycophile embryo; and one buys a microscope, a macro lens for one's spouse's camera, and begins to search about for a supplier of the chemical reagents used to

distinguish some species. Or the mycophage may emerge, with cookbooks and tastebuds instead of, or as well as, science driving one onto mushroom-hunting forays.

New Jersey's variety of habitats make it a wonderful place for the development of your mushroom knowledge. In the Atlantic dunes you can find earth stars and a rather large mushroom, *Laccaria trullisata,* about the edibility of which it is pointless to debate, for it is completely impregnated with sand. In my lawn, surrounded by sweetgums and maples, I have several large crops each year of *Psathyrella velutina*—a hairy, brown-capped species with spotted gills which are trimmed with a white edge and, in damp weather, bedecked with tiny water drops. Under the oaks, behind the place where I work, I find many red-capped species of the genus *Russula;* an edible, green-topped relative, *Russula virescens;* a number of mushrooms of the genera *Tylopilus, Boletus,* and *Suillus* that produce their spores not on gills (as you find on the underside of a store-bought mushroom), but on the inner surface of down-pointing tubes. Nearby appear the yellowish, rough-skinned puffball, *Scleroderma aurantium;* and one of the most deadly poisonous of American mushrooms, a pure white stately species of the *Amanita bisporigea-verna-virosa* group.

The classic *champignon, Agaricus campestris;* edible puffballs; the shaggymane, *Coprinus comatus,* will be found in the Garden State's open places. There are a number of pine groves in which I will be sure to find the elegant, but poisonous, *Amanita muscaria* every summer. And I don't often reveal the low places in certain oak and beech forests in which I collect the chanterelle, *Cantherellus lateritius,* in sufficient quantity so that freezing for later use is necessary. New Jersey is a fine mushrooming state.

Let's go back, for a moment, to what a mushroom is. The fungi that produce mushrooms have a vegetative part called the mycelium. This is what grows from an initial spore in some friendly environment. The mushroom lacks chlorophyll, and, therefore, must draw its food from its surroundings. It may parasitize a living host (for example, those fungi that cause heart-rot in trees). A mushroom may live off dead matter (be a saprophyte), promoting decay and helping to create the rich forest loam. Or a mushroom may live in a mutually beneficial arrangement with its hosting, evolutionary higher, plant. Some fungi may fill all three roles with the same host at different times.

When conditions of temperature, moisture, and maturity are appropriate, little knots of tissue occur in the mycelium. These buds take up moisture and expand—sometimes very rapidly—to form the fruiting bodies we have all seen. There it is waiting for you or a deer or a squirrel or a slug or, in some cases, another fungus! Now that you see it, how do you tell what it is?

David Tulloss with bouquets of the chanterelle *Cantherellus lateritius;* the recipe by which they were prepared is one of the author's favorites.

The copious white latex and widely separated gills are two of the distinguishing characters of the edible *Lactarius hydrophoroides.*

A delicious dinner *Boletus edulis.*

To recognize a mushroom in the field with absolute certainty is frequently impossible for the inexperienced amateur and sometimes equally so for the professional mycologist. Absolutely certain identifications by the absolutely inexperienced can lead to absolutely upset stomachs and, in a few cases, to absolute death. So, how does one identify one's finds? We proceed to the naming of parts.

In the agarics or gilled mushrooms, there is a cap on the underside of which there are more or less radially arranged gills. The gills extend from at or near the stem (if there is one) to the margin of the cap. There may be little gills near the cap edge, not reaching the stem, in between the longer gills. Some of the larger gills may fork on their way from stem to edge. The gills may touch the stem or not. The gills may descend along the stem for a considerable distance. In one genus the gill edge is split along its length so that if you make a cross-section of the gill, you see a curly-topped "y". The structure of the gills is important in mushroom identification.

The spores by which the mushroom seeds itself are produced on the gills of agarics, on the ends of branches of coral fungi, on the "teeth" of tooth fungi, and in the tubes of polypores and boletes at the ends of little spines on cells called basidia. In other fungi the spores are produced like a row of railroad cars in a long tube-shaped cell called an ascus.

In most gilled fungi, the gills have a wedge-shaped cross-section, and the spores fall easily from the sides of the gills. In the genus *Coprinus,* the gills are close together and not so well tapered. These mushrooms have evolved the capability of producing an enzyme by which they self-digest! The result is a black "ink" in which the spores are carried off to the neighboring plants and soil from which they can continue to be spread about by rain and surface water.

For many taxonomic keys, spore color is one of the first facts one must ascertain in order to proceed to an identification. The spores from any fungi can be gathered by placing a specimen with the spore bearing surfaces down on a sheet of white paper and covering the whole with a cup or bowl. In order to be sure of detecting white spores, some authors suggest that a strip of black paper also be laid under the specimen; however, some white paper is required in order to distinguish colors that are "off-white" or pale yellow. The paper and the spore bearing area should be in close proximity and protected from drafts by the covering bowl. Be sure to cut the stems from those mushrooms in which the stem is in the way. After awhile (the time varies greatly with the age and condition of the

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Birds At Menlo Park

By William Cahill

Twenty years ago, people drove out here on Saturdays to park in the shade alongside Thornall Road and wash and wax their cars. There was plenty of water from the spring and the deep green shade was cool and refreshing. The sounds of Wood Thrush and Flicker and the flow of little creeks through the wooded environs would have been very pleasant. They might have listened to the New York baseball games on their car radios and talked all afternoon, while relatively few other cars passed by.

Today, modern office buildings and apartment complexes have replaced much of the natural environment here. Shopping centers lure the traffic like magnets along the old road cutting through the remaining woods, and the roadsides are gray with automobile exhaust and littered with beer cans, fading papers, and old tires. The natural fabric has worn thin and the sounds of the highways penetrate.

There are, however, more than 50 acres of woodland remaining. They follow the course of a brook (the south branch of the Rahway River) and are well watered with smaller tributary streams. There are well developed hickories growing close to the water, and a few large tulip trees. Parts of the woodland consist of tall groves of oak. There is ash and basswood and silver maple, honeysuckle and grapevine, bramble and open edge spaces where dozens of weed species grow. Small cattail and reed-grass marshes profuse with willows are seen along the open edge in places and along the high bank of the one-track railroad that cuts through here grows a linear bosk of sassafras and sumac and stunted pin oak. Ragged and threatened as this woodland is, it still offers shelter to thousands of birds. In the past two years, I have observed more than 60 avian species here, summering, wintering, and migrating. They color the seasons with their plumage and song in ways reminiscent of a more balanced natural state than the one which exists there now.

In spring, Red-winged Blackbirds and Grackles nest in the trees that rim the marsh areas. Their stiff, harsh songs blend in a loud chorus. In the new, chartreuse leaves of the taller trees, pairs of Rose-breasted Grosbeaks sing for a few days before moving northward. The green shoots of cattail and *Phragmites* lance upward through the chaos of last year's broken reeds and make a fresh environment for the newly arrived Common Yellowthroat to nest in. By then the Yellow Warbler arrives and sings in the oaks where it feeds on their golden catkins, and summer begins.

Mockingbirds in open places and Cardinals in the oak groves offer sweet and elaborate melodies as they prepare to mate. The foliage develops and Gray Catbirds locate nesting sites in the thickest parts of the woods and in the bosk along the railroad track. The catbird is one of the most abundant species to be found here.

The blossoming viburnum along the railroad track shakes with the activity of the American Robins; Brown Thrashers, Blue Jays, and Common Flickers build their nests.

Blue flag shoots upward at the water's edge and blooms where the brook's artificial bank of heavy gravel is held in place by a sheath of green hurricane-fencing material. Blue-eyed grass shows up and in one place where the water currents through a tunnel under the railroad the wild geranium appears among the trash and chaotic growth as a minor note of lavender splendor. There are fireflies and bees; green, turquoise, and blue dragonflies and melodious crickets. In summer the shade within the woods deepens to a sheltering green and blocks out the sight of traffic that one sees in winter. The Eastern Kingbird and Wood Thrush are elusive but present, and the Northern Orioles and rarer Orchard

WILLIAM GRIFFIN

Song Sparrow & Young—6 days.

WILLIAM CAHILL

Railroad trestle over S. Branch Rahway river.

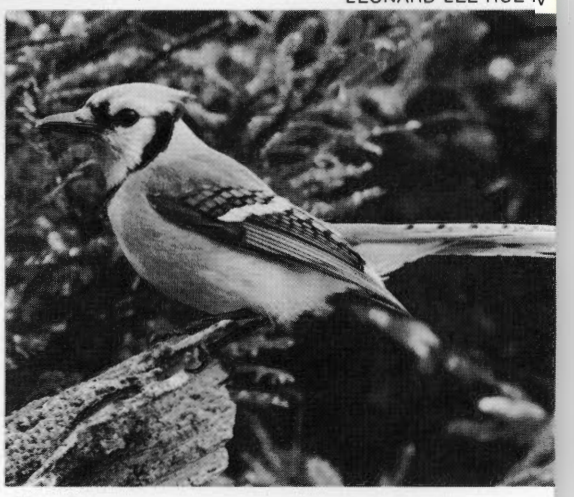
IRENE VANDERMOLEN

Mocking bird

LEONARD LEE RUE III

White-Throated Sparrow

LEONARD LEE RUE IV



Blue Jay

Orioles appear like gorgeous fruits in the broad summer foliage. Mourning Doves can be observed drinking at the rocky area of the brook where it flows under the railroad trestle, and Chimney Swifts and Barn Swallows chasing insects in the open-air spaces. House Wrens and American Goldfinches are among the nesting species here, too.

Two summers ago, I unexpectedly flushed a young Green Heron from the weeds along the brook's edge. This occured a distance of only 30 yards or so from the flow of traffic to the air-conditioned shopping mall nearby. The heron could be recognized as an immature by the brown and white streaking on its neck, and it had probably wandered here from its nest site in a more favorable location; this wandering behavior is typical of herons in their first summer. It stayed the entire summer fishing in the stream as its counterparts of years ago undoubtedly would have done when they nested here. Another heron observed that summer was the Black-crowned Night Heron, again an immature. The following summer I saw the Green Heron, in this case a mature bird seen early in the season. The Green Heron was seen only once and the Black-crowned not at all. Perhaps they had found places deeper in the woods. This stream in its natural condition should be a suitable habitat for herons, and for freshwater mussels, terrapin, and many other species which are absent today. This is an indication of the degradation in this environment that the spring and summer songs of the Yellow Warbler and the orioles conceal.

Fall is the time for sudden and short-lived appearances. There are American Redstarts, Yellow-rumped Warblers and Black-and-White Warblers and Ruby-crowned Kinglets. The Rose-breasted Grosbeaks return, along with Purple Finches, and Yellow-billed and Black-billed Cuckoos heading for South America. I have seen Hermit Thrushes occupying the railroad thicket and the grassy path beneath it in October, replacing the robins that were so common there in the summer. Surprising, occasional sightings here have included the Cedar Waxwing, Chestnut-sided Warbler, Least Flycatcher, Yellow-bellied Flycatcher, Northern Waterthrush and Solitary Sandpiper.

In late summer and early autumn, too, the Eastern Phoebes are quite apparent. A pair of Belted Kingfishers, which stay on well after the first snow and freeze-over of the brook, also arrived in the fall of both years I have been observing here.

The weedy areas alongside the brook and railroad provide nest sites for scores of Song Sparrows, a species that I never fail to see here at any time of the year. On a bitter cold day in winter, when I was looking at empty milkweed pods and the tracks of a cat and a Ring-necked Pheasant in the snow over the hard gray ice on the marsh—standing on ice as dry and tough as plastic dusted over with a few inches of snow, where in summer there are bullhead lilies and dragonflies—the only bird sighting I could make was of two Song Sparrows flitting about nervously on fallen branches near the ground.

Winter begins with the arrival of the Dark-eyed Juncos and White-throated Sparrows. The juncos stay together and feed on the ground, especially in the wide grassy path alongside one stretch of the railroad, in the early part of the cold season, and then disperse among the scrawny trees along the tracks and farther afield near houses later on. The White-throated Sparrows love the thickets, mingling with the Song Sparrows that stay in winter. A Field Sparrow or two may appear among the white-throats, but these will not stay.

The woods have a fair number of Black-capped Chickadees, their loose flock mixed with a few Tufted Titmice and White-breasted Nutnatches. The resident Downy Woodpeckers are never far from the chickadees, either. In this way, the woods here retain a natural winter characteristic, for mixed flocks of these little songbirds and Woodpeckers are a common feature of northeastern woodlands in winter. These winter birds cohabit with goldfinches staying over from the summer in small numbers, northern Blue Jays and Mourning Doves.

The most conspicuous birds in winter, though, are the Common Crows. They fly through the gray branches of the woods and up over the bare canopy, and post themselves as sentries, calling to one another frequently, usually in search of intruding hawks and owls. The Red-tailed Hawk, the largest bird to be seen here, visits in midwinter, and I have often seen them,

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SCUBA DIVING

By Betty Moschella

For over a hundred years, the Jersey shore has drawn lovers of the outdoors. They come to lie on its sandy beaches, splash in its surf, loll in boats with fishing rods in hand, and in more recent years, to skim the surface of its waters in motor boats.

But many sportsmen now are adding the underwater world off the Jersey coast to their domain. Divers are invading the ocean's depths off New Jersey with as much enthusiasm as they enter the warmer waters of the Caribbean.

Sightseeing, underwater photography, probing old shipwrecks, spearfishing, ice diving, lobstering, and even diving for bottles are becoming popular with New Jersey divers.

Some of today's avid divers first became fascinated with the sport by films like "The Silent World," or the television series, "Sea Hunt." "The Undersea World of Jacques Cousteau" played in the living rooms of millions.

Cousteau, incidentally, along with French engineer, Emile Gagnan, in 1943 invented the first Aqua-Lung, a Self-Contained Underwater Breathing Apparatus (SCUBA) which made it possible for divers to remain underwater for comparatively long periods of time without air hoses to the surface. Before the Aqua-Lung, skin divers (divers who do not use SCUBA equipment) could stay underwater for only as long as they could hold their breath.

Modern technology and greatly improved diving equipment have taken much of the mystery out of diving and made it safer. As a result, interest in the sport is now so high that diving instruction is in demand all year.

Diving instructor Tom Maddox of East Coast Diving Supply in Northfield, says that until recently, a typical diver was male, aged 18-35, middle-income, and with such other interests as motorcycling, flying, or skiing—the adventurous type. But now, although many still fit that description, more women and teenagers are taking up the sport.

Today, diving students in Maddox's classes range from ages 12 to 65. And last year, out of a total of about 250, one-third were women.

A diver's equipment includes: either a "wet" or "dry" suit (mandatory in New Jersey) to protect from the cold, an air tank, backpack, air flow regulator, mask, fins, snorkle, knife, weight belt, buoyancy compensator, depth gauge, timing device, and a light.

Diving is taught by a combination of classroom instruction and indoor pool work. Maddox's diving classes run 8 to 10 weeks, one night per week. After completing classroom instruction, students receive open water checkout dives, with and without SCUBA equipment, before becoming certified.

Once they qualify, divers receive a plastic certification card, like a credit card, that is their "license" to dive. They must show this card when renting life support equipment or when signing on a diving yacht.

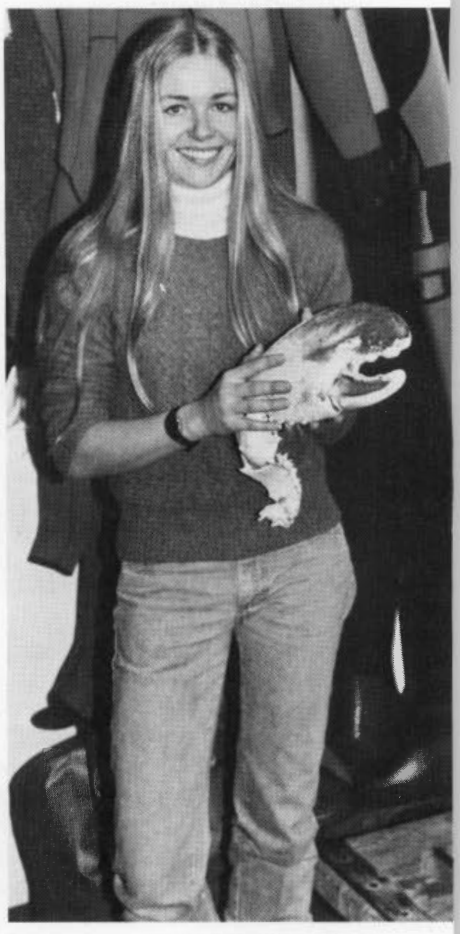
Off New Jersey, SCUBA divers usually begin diving about 3½ miles offshore. Closer in, the ocean is fairly shallow (about 40-ft. deep) and murky. A little further out, it clears up and visibility generally ranges from 10-60 ft.—more on good days, according to Maddox who adds, "You can have a very enjoyable dive at 30- to 40-ft. visibility."

The water is darker and cooler, but New Jersey has something the Caribbean doesn't have—shipwrecks. Maddox claims there are more shipwrecks between Montauk Point, Long Island, and Cape May, N.J., than just about anywhere in the world.

Ships to be found off New Jersey range from sailing schooners of 1800 vintage to tankers torpedoed during World War II. Divers explore sunken personal cruisers, yachts, and even airplanes.

Sightseeing and artifact hunting at the wrecks are favorite diving pas-

Maddox displays the rim of a porthole retrieved during a dive to one of the many sunken ships off the coast of New Jersey.



Marine biologist Joan Murray of Somers Point, N.J., holds the claw of a lobster caught by a diver at a shipwreck off the Jersey coast. Murray, a former student of Maddox's, has been diving for almost two years.

times. However, it is a good idea to have a current knowledge of state laws before removing objects from territorial waters.

The wrecks also are good hunting grounds for lobsters.

According to Maddox, the best way to catch a lobster is to have a quick hand.

"A light comes in handy to look in holes," he says. "Once you spot a lobster, you just reach in the hole and grab it. Once in a while you might get a nipped finger, but I've seen divers try all sorts of hooks and other methods, and I haven't seen anything work as well as a quick hand."

Lobsters average 8 to 12 pounds, but Maddox has found them as large as 22 pounds.

Sea bass also are common around the wrecks, giving divers a chance to do some spearfishing.

Sea anemones, hermit crabs, yellow sponge and a type of coral that grows on wrecks can also be found around sunken vessels. And, in late summer and early fall, some of the same tropical fish found in the Caribbean Islands can be found off New Jersey.

"You might even see a shark if you're lucky," says Maddox.

"The danger of sharks is really minimal," he explains. "Unprovoked attacks on divers are extremely rare. If a diver provokes a shark, it will turn like a dog and snap at him. But if you leave a shark alone, chances are, it will leave you alone.

"Sharks go for objects on the surface," Maddox adds, "a surfer or someone swimming. Only rarely will they attack anything underwater."

Maddox has encountered only one shark underwater, although he has spotted many on the surface. It was about five or six feet long, and it took off as soon as it saw him.

The greatest danger of diving is panic which can result from stress.

"Anytime you do something unknown—when you push your body to its limit, stress can result," says Maddox. "Whether a new diver is going further into the ocean for the first time, or an experienced diver is going under ice for the first time, there is a certain amount of stress that can cause irrational thinking and panic."

Education in diving is important to eliminate stress. Knowing what to expect reduces the level of stress and allows the diver to perform the way he or she should.

Three students in an ice diving class take notes. PHOTOS BY BETTY MOSCHELLA

"An uneducated or unprepared diver can really get into trouble," says Maddox.

The claustrophobic effect in cave or ice diving is an example of the kind of situation that could lead to stress and panic in an untrained diver.

Another diving hazard is a lowering of the body's core temperature, or hypothermia. A wet or dry suit will slow the process, but the diver's time in the water remains limited. Because of hypothermia and other physiological handicaps imposed on the body at greater depths, it is important divers be trained and that they never dive alone.

The deeper the dive, the less time under is the rule. Divers use involved tables to gauge their dives. For example: at 60 feet, it is possible to remain down for an hour. But at 130 feet, which is considered a limit for safe diving, a dive must not exceed 10 minutes.

If diving 3½ miles out from shore at 100-ft. depths doesn't appeal to you, you might prefer diving in New Jersey's lakes and rivers. Even seasoned divers like Maddox enjoy the diversion of diving for old bottles and other artifacts.

There are a number of good bottle-diving spots in New Jersey. The Shrewsbury River is a favorite with Maddox. At the turn of the century, the water often was used for dumping. So wherever there was a tavern or hotel located on the water, there are usually old bottles and artifacts.

Another aspect of diving is salvage diving. Divers are often needed to retrieve such objects as an outboard motor or clamming equipment or to pull up a sunken boat.

And, for the really brave at heart, there is ice diving. Maddox takes students to Barnegat Bay for this. Life lines are used for ice dives. Lines never are used during normal dives because of the danger of becoming tangled in them.

Ice divers go under the ice for about the same reason a mountain climber climbs a higher mountain—because it is there.

"As divers become more involved in the sport, they often want to expand their horizons. There is an element of danger that is a challenge to some," says Maddox. And he adds, there is a tranquility under the ice that can be found nowhere else.

"The sunlight filters down through the ice. Visibility is generally three times better than normal because there is no silt or algae buildup. It is serene and peaceful."

While SCUBA diving is not yet on everyone's list of things to do in New Jersey, it is obvious that more and more people are adding the vast, exciting underwater realm to their world, whether they choose diving as a hobby, sport, or occupation.

The Hackensack River: From

By MaryAnn Foote

The Hackensack River is much maligned, and unjustly so. To those who know the river's every gentle bend, it is a beautiful tapestry, whose woof and warp contain Indians, shad fishing, settlers, soldiers, and industries. The upper stretch of the river, in Bergen County, played a central role in the Revolutionary War and in the development of the metropolitan area since the mid-1600's.

The Hackensack River basin lies mainly in Hudson and Bergen counties, but the headwaters begin in West Haverstraw, New York. The Hackensack River is a typical coastal-plain estuary formed when rising ocean levels flooded a former glacial lake bed and the river that fed it. The Hackensack River is shallow for its width in the upstream segments and the river depth increases slowly in the direction of Newark Bay. The average tidal velocity in the vicinity of the City of Hackensack is 0.9 knots during the flood tide and 0.8 knots during ebb tide. Coles Brook, whose lower reaches are also tidal, joins the Hackensack River near the Ackerman-Zabriskie-Steuben house and forms the border between the Borough of River Edge and the City of Hackensack. This part of the river, and especially this bridge position, was the site of many decisive battles during the American Revolution. In November, 1776, Washington led his ragged troops across the bridge to safety in Hackensack while General Greene held Cornwallis pursuing Hessians in check by destroying a part of the bridge. History rarely records the fact that the Delaware Crossing was made possible by the earlier crossing of the Hackensack. The house, built on the river bank in 1737, was presented to Baron Von Steuben by the State of New Jersey in recognition of his service to the Colonial Army. Guests to the house included George Washington, Light Horse Harry Lee, and Mad Anthony Wayne.

In the 1880s, dams were constructed on the western shore of the Hackensack River to prevent the entrance of brackish water from the river at high tide, thus enabling the land to be used for agriculture. Tidal gates in Hudson and Bergen counties were operated to allow water from the hills to drain out at low tide. About 1910, these dikes were reinforced, marking the inception of the present-day increased pollution from sewer outlets and industrial wastes. In the same year, in an effort to make the meadowlands more habitable, the Bergen County Mosquito Commission began ditching the swamps to dry them out. The mosquito population dwindled but so did the native *Spartina* grass. Ditching changed the drainage patterns, affected the distribution of salt and fresh waters, and thus destroyed the cedar bogs in the Secaucus area. Many old maps of the area show the position of cedar bottoms, stumps of trees that once populated the area.

Prior to 1610, northern New Jersey was inhabited only by an independent tribe of Algonquin-speaking Delaware Indians. By reason of their laying claim to an ancestry more ancient than that of any other Indian tribe, they called themselves "Lenni Lenape," or "original people." Some believe that "Lenape" means "male of our kind." When emphasis was desired, the term "Lenni Lenape" was used, simply a repetition of the first syllable with a syllable added for euphony.

The Lenni Lenape were divided into three main subdivisions: Minsi ("people of the stony country") was one. The Minsi were further subdivided into the Raritans, the Hackensacks, the Pomptons and the Tappans. The Minsi were a warlike tribe acting as a buffer between the Iroquois to the north and the rest of the Delawares to the south. Their domain covered the area from their hunting grounds in the Watchung Mountains to the Hudson River and extended as far south as Staten Island, where they harvested clams. On the flood tide, the trip from State Island through Kill van Kull into Newark Bay, and thence up the Hackensack River to their villages, was quick and effortless. A powerful civic group of the Minsi were the Ackkinkashacky (Hackensacks). Some believe "Hackensack" to be a condensed English version of the Lenape words "Hackinkhican-saki" meaning "tidal river" or "mouth of a river." Another suggestion is that "Hackensack" is derived from the Lenape "Hacquoansauk" meaning "the river of many bends." In 1643 there were 1000 of this tribe, 300 of them warriors. Their notable and respected chieftain was Oratani (Oratamin, Oratam, Oratum). A powerful but peaceful man, it was through his forceful personality that the Hackensacks achieved so prominent a place historically. The Lenapes were noted to be tall and handsome people with black hair, brown eyes and coppery-hued skin. The men usually wore their hair long or burned it off with the exception of a scalplock. They commonly tatooed their bodies with images of snakes, wolves, eagles, turtles, and turkeys. On special occasions, they would paint their faces. Bear, elk, raccoon or wolf skins were used as clothing, fur side out in the summer and inside in the winter. The women, their hair in long braids, wore skirts of turkey feathers. Shell beads banded about the neck and waist and rings in the ears and nose completed their dress.

These Indians lived in "long houses" and not the tepees of the plains Indian. Their foods were simple:

Indians To Industry

River at City of Hackensack.

River at Oradell.

PHOTOS BY EDWARD T. KEMLY, JR.

water, broiled or boiled meat, fish, oysters, clams, and mussels. Corn, beans, squash, pumpkin, and melon were cultivated. In times of famine, snake, eagle, frog, and skunk were eaten. Shellfish were strung, dried, and smoked and used to season meats or combined with corn and beans. Besides these staples, various roots and barks were eaten as well as green plants: dock, purslane, poke, mint, and watercress. Walnuts, butternuts, acorns, chestnuts, hazelnuts, grapes, wild plums, apples, and berries were relished by the early inhabitants of the Hackensack Valley. The Lenni Lenape used the Hackensack River for transportation and as a source of food. At this time, the river was clear, with a clean sandy bottom. Six campsites are known in or near the banks of the river. Red clay was mined from the riverbed at low tide and used by both the Indians and the early settlers. Many a bride in the late 1800s set up housekeeping with clayware and red pie dishes made by George Wolfkill from Hackensack River clay. The river was also a source of shells for wampum. The last wampum factory was located at the Borough of New Milford until the mid-1800s. The Campbell family of Park Ridge operated it and supplied Indian traders, including John Jacob Astor. The Campbells dealt directly with the Indian Agents of the Department of the Interior of the federal government. This family monopolized the wampum industry primarily because of their inventions: the water power of the Hackensack River was used to operate drills and grindstones, a distinct advantage over hand work.

The first white settlers in the Hackensack Valley were the Dutch, who migrated here from a large population on Manhattan Island. These settlers liked the valley because it reminded them of the flat fertile conditions of Holland. In 1641, Patroon Nederhurst built a trading post and fort on the west bank of the river, in the vicinity of the present-day City of Hackensack, which the Indians promptly burnt down. In 1681, David Des Marests built a mill on the Hackensack River at the site of the River Edge Bridge, the structure credited with altering the course of the Revolutionary War. Demarest's mill (anglicized and now the name of the nearby borough), powered by the rise and fall of the tides, ground wheat and buckwheat into flour. The Hackensack was heavily used for water power for several centuries but the fall of the stream was quite moderate although very steady during dry weather. Larger industries overlooked the Hackensack in favor of her more powerful sister river, the Passaic. However, a small sawmill located on Van Bushkirk's Island (now the site of the Hackensack Water Company's pumping station and filtration plant) was in operation prior to the Revolutionary War. After the war, it was converted into a tannery and bleaching mill and then into a woolen mill. In 1837, it became a grist mill of considerable

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NATURE'S CLASSROOMS

Green Acres Program Helps People and the Environment

Fossil hunting at Poricy Park. GREEN ACRES PHOTO

by Lisa Stern Lubow

A child reaching for the sky on a playground swing or a batter stroking a hit past a fielder's glove may have something in common. The area where they play may have been made possible through the funds from New Jersey's Green Acres Program. These areas, designated by a Green Acres sign, have proven to be extremely popular.

Yet there are other Green Acres areas which combine environmental aspects with land management techniques, solar technology, and historic flavor. Found throughout the state, these environmental education centers are no longer satisfied with offering just the traditional nature walk. The centers now encourage the public to be not merely visitors but participants in nature.

Poricy Park, located on Oak Hill Road in Middletown, is a 250-acre nature preserve in the midst of suburban Monmouth County. Its attractions include a 65 million-year-old fossil bed and a colonial homestead built in 1704. Joseph Murray, one of Monmouth County's boldest and most active patriots, bought the farm in 1767 and was later killed in his fields during the American Revolution.

Today, four miles of trails wind around the fields, forests, marsh, stream, and a 20-acre pond. A $500,000 Green Acres grant assisted in the acquisition and development of Poricy Park. Visitors can pick up a trail map and wander on their own or they may register for programs ranging from fossil hunts and wild food sampling to in-depth nature studies. Programs are provided for all age groups, and the staff is happy to tailor a program to a group's particular needs.

The Poricy Park Nature Center is staffed by a small group of professional naturalists and teachers and a large number of volunteers. Their main goal is to make local residents aware of the open space "in their backyards." For more information about the park and its programs, call 201-842-5966 or write to Poricy Park, Box 36, Middletown, N.J. 07748.

The Cooper Environmental Center at Cattus Island (see article on opposite page) is the newest completed facility in the state. Green Acres funded 50% of the $2.8 million park and almost 50% of the $900,000 environmental center. The center consists of a lecture hall, exhibit areas, and a barrier-free all-weather deck which wraps around the building. Passive solar heating and cooling by panels on the roof provides over two-thirds of the center's energy needs. Sensitively developed, the parking lot was constructed with porous pavement to minimize stormwater runoff.

Programs, run by Ocean County Parks & Recreation, include shell identification, birdwalks, and teacher workshops. Slide shows, lectures, and other walks are also scheduled. Topics of upcoming seminars include windmill power and solar energy. The center is staffed on weekends by volunteers from the Ocean Nature and Conservation Society. School groups are welcome by appointment.

Cooper Environmental Center is located off Cattus Boulevard on Cattus Island. For further information, call 201-270-6960 or write to Ocean County Parks & Recreation, 659 Ocean Avenue, Lakewood, N.J. 08701.

Located just four miles from the George Washington Bridge, Flat Rock Brook Center in Englewood encompasses 150 acres of woodland in an otherwise densely populated area. Wetlands, ponds, a stream, meadows, a stone quarry, and 180 million-year-old volcanic bedrock formations comprise the 75 acres purchased with the help of a $250,000 Green Acres grant. The remaining 75 acres, known as Allison Park, are preserved and held by a private trust for public use. Allison Park has been granted tax exempt status by Green Acres.

The two-year-old nature center is

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Sweet Pepper Bush.

PHOTOS BY AUTHOR

CATTUS ISLAND PARK

By Joan R. Huber

On the New Jersey shore just north of Toms River, there is a park which includes a great variety of ecosystems, unspoiled and still partly unexplored. These 497 acres, known as Cattus Island Park, include salt marshes, maple-gum lowland, pine-oak upland forest, whitecedar swamp, and a mature pitch pine stand. Each of these distinct habitats contains rare and common plants, keeping some hidden waiting for nature lovers with a 'seeing eye' to find and identify.

Let the reader come with me on a tour of this natural area. You can start along a sandy path through the open, flat salt marsh directly from the Center. There you will see shimmering greens of different hues from pistachio to emerald. Grasses flow out across many acres showing patches of these various shades of green, each patch indicating a separate species of grass since each type prefers its own amount of water to grow in. *Spartina patens,* saltmarsh hay, waves like a living carpet of long fur, brushed helter skelter by the wind. Three-colored rushes, which can be woven into chair seats, stand taller in higher, drier areas rustling against each other. Sturdy *Phragmites*—plumes with tan seedheads—outline the whole area since they need to stand in even drier land near the upland forests. Tough shrubs, groundsel and elder, march in straight rows being the only vegetation of any height to rise out of the soft *Spartina.* The straight rows mark the man-made mosquito ditches and the shrubs grow on the spoil from digging these ditches. The six inches of elevation above the marsh make the difference to enable these lovely bushes to exist here.

The serenity of the golden-green vista is deceiving. The place is extremely prolific. A chain of life exists with each link thriving and decaying endlessly to provide nourishment for the next in line. The moving green grasses and algae throw off oxygen by the ton cleaning the air while, in decay, they feed the myriad creatures who live there. This salt water environment provides a nursery for salt water fish from which they go forth to populate the oceans. Voles & mice nest here, and become, in death, food for large birds—hawks, ospreys, owls. Others thrive in this lush environment such as crabs, wading birds and muskrats. It is a very busy place.

As you walk on, you pass through a deciduous forest indicating higher ground. The storm high tide comes in along the mosquito ditches and fingers of the

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Upland Forest.

FRESH WATER JELLYFISH

RICHARD E. McKEEBY

Two freshwater jellyfish from an East Brunswick sand pit where "blooms" were observed in 1978 and 1980. The cardboard match is included as a size reference.

PHOTO BY AUTHOR

Have you ever seen a freshwater jellyfish in New Jersey? Most people haven't, but they *are* present, usually in smaller lakes, ponds, quarries, or sand pits.

My first sighting of these small but beautiful organisms was in 1978 in a sand pit pond in East Brunswick. We call the place Dallenbach's (named after the previous sand company owners). The property is now owned by East Brunswick Township and one of the three pond areas is now the Municipal Pool Recreational Site. Two other larger ponds locally referred to as the "front" and "back" ponds are open to fishing.

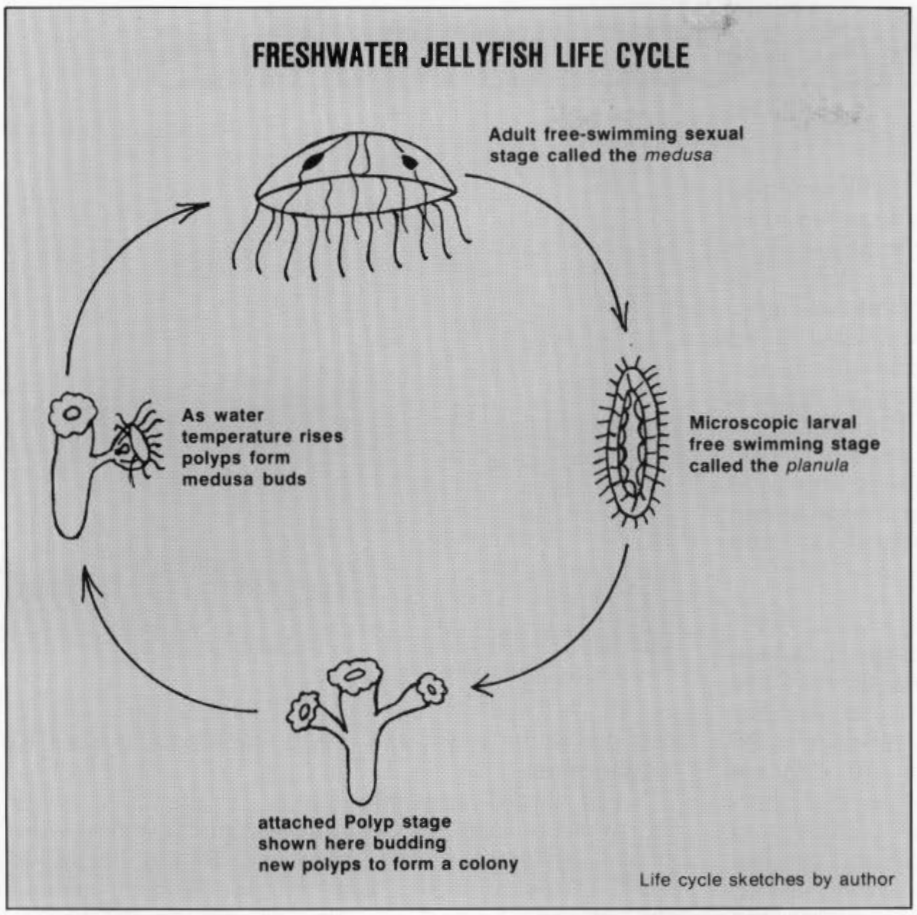
I was perch-fishing with my two daughters in a 12-foot aluminum boat in the "front" pond. It was a beautiful sunny day in early October and we were slowly drifting along when one of my daughters said, "Hey, Dad, what are these pretty little specks in the water?" All around us were hundreds of specimens of the freshwater jellyfish *(Craspedacusta sowerbii).* They ranged in size from about ¼ inch in diameter to the size of a quarter. They glistened blue and green as they slowly pulsed along in the clear water with the sun's rays striking them. We scooped up six specimens one by one in a paper cup and transferred them to a bucket with fresh water. At home we placed them in a small aquarium with an aerator. I photographed some in a large culture dish using outside sunlight from above and also reflected light from beneath the dish. These are the specimens you see in the accompanying photo. I later took them to Union College in Cranford to share with my colleagues and students. They lived about 1½ weeks in capitivity, but don't feel bad—their adult stage is short-lived anyway, as I will now explain. Let's examine their life cycle: (also see the diagram).

The free-swimming stage you see in the photo is called a *medusa.* It is the sexual stage and these individuals are separate sexes, either males or females. They discharge sperm or eggs into the water, where external fertilization occurs. Then a microscopic larval stage called a *planula* develops and freely swims about. The planula eventually settles to the bottom and develops into a *hydroid animal,* or *polyp.* This small stage (average size 1/16" to ⅛") is attached to the bottom. It is a saclike animal with a mouth opening at its upper end. Freshwater polyps may or may not have tentacles and stinging cells around their mouth to capture prey. They secrete a sticky mucus over their body which helps attach them to stones or shells. Polyps are usually found in running water, which helps prevent them from becoming covered with silt. Some polyps are single, some are double, and some form colonies of up to seven or eight individuals. Colonies form by an asexual process of reproduction called *budding* (an outgrowth from the parent body wall). Sometimes bud polyps separate from the parent and form new, separate individuals. The polyps feed on tiny aquatic segmented worms and threadworms swept toward their mouths by underwater currents.

In certain years, but not every year, the polyps asexually produce *medusa buds.* These break free of the polyp body wall and are the *free-swimming sexual stage* of the life cycle. (This is the stage my daughters and I collected and that you see in the color photo. We saw them in October 1978 and 1980). Young medusas are only a fraction of an inch in diameter and have eight tentacles. As they grow the number of tentacles increases (as many as 614 have been observed) and may reach the size of a quarter, which is about the maximum size range.

The adult, bell-shaped medusas are sexually mature when about half an inch in diameter. They swim at the surface, turn upside down, and with relaxed bell and widely spread tentacles, sink slowly to the bottom. This behavior helps them "strain" a larger area of water in their search for food.

Rising water temperature seems to be a major factor determining when medusas are produced. If you are



lucky, you might witness one of these "blooms," as they are called. "Blooms" of medusas usually occur anywhere from July to October and sometimes thousands of individuals give the clear water a milky or opaque appearance. Some "blooms" last only eight days. They may occur two or three years in a row and then not be seen for a year or two. This sporadic appearance is one of the reasons why I consider their sighting a "special New Jersey treat." You simply have to be in the right place at the right time to see these interesting animals.

Several New Jersey lakes and ponds have been reported as "homes" of the freshwater jellyfish. These include: Westons Mills, Middlesex County; Bear Pond, Sussex County; Lackawanna Lake, Sussex County; Cedar Lake, Warren County; Deer Lake, Morris County; Shongun Lake, Morris County; and Dallenbach's Sand Pit, Middlesex County.

Perhaps someday soon you will look into the water of a New Jersey lake or pond and see one for yourself. If you do, I'd be interested in knowing about it. Please drop a postcard to me with your place and date of sighting to: Prof. Richard E. McKeeby, Biology Dept., Union College, Cranford, N.J. 07016.

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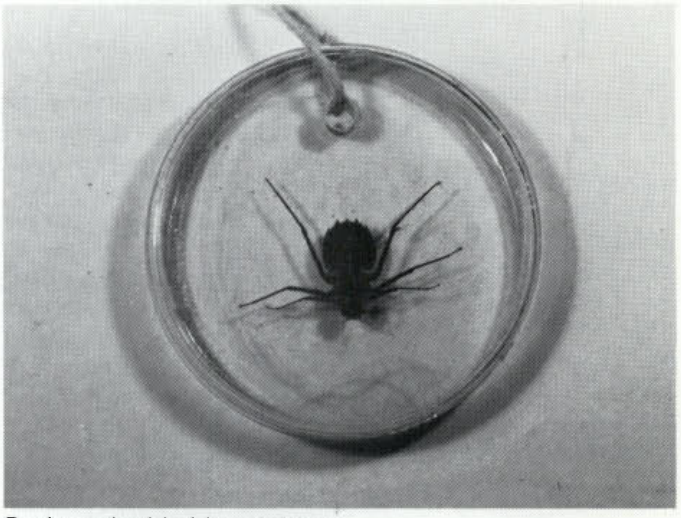
Ice Cubes As Teaching Aids

By Inge Buenning

PHOTOS BY AUTHOR



Resin embedded invertebrate

Recent studies have shown that visual illustrations can serve as a more effective aid to learning than verbal communication alone. Therefore the use of pictures, models, or other visual aides along with verbal illustrations is encouraged to facilitate learning.

For the past year, we, at Linwood-MacDonald Environmental Education Center, have been using resin-embedded invertebrates (Fig. 1) during all aspects of our Aquatic Ecology session: floral and faunal sampling, identification, and analysis. These casts are inexpensive and easy to make. Their durability and wide range of applications make them an appropriate teaching vehicle in many field, laboratory, and classroom situations.

MATERIALS AND METHODS

All specimens are fixed in a weak formaldehyde solution (10% Formalin), and allowed to air dry prior to the actual embedding. Commercially available clear casting resin and catalyst (Chemco Castin Resin, $6.35 a quart; Chemco Liquid Hardener, 89¢ a fl. oz.) are used, and directions for the casting followed as outlined by the manufacturer. The basic procedure is as follows: (1) A small amount of mixed resin and catalyst is poured into a mold and allowed to harden slightly. (2) The specimen to be embedded is placed with the desired side face down into the mold. (3) Finally, the specimen is covered with more resin-catalyst mixture and allowed to cure completely. Care should be taken to throughly mix the catalyst and resin and to prevent the formation of bubbles, which could distort and detract from the embedded specimen. Also, prolonged breathing of vapors and contact with skin and eyes should be avoided as described by the manufacturer.

Plastic ice cube trays were found to be most suitable molds for casting smaller organisms (e.g., dragonfly and stonefly nymphs, caddisfly larvae, and riffle beetles). After hardening, the "ice cubes" readily pop out of the trays, and can be labeled and used by the students.

Equipment necessary for embedding procedure.

For larger specimens (e.g., dragonflies, water scorpions, or giant water bugs) petri dish bottoms were most successful. The plastic, left on the hardened resin, offers both structural support and protection against excess handling. (Fig. 2 illustrates the equipment necessary for the embedding procedure).

Although excellent resin casts are available commercially (e.g., from Carolina Biological Supply, Fischer), "home-made" casts offer the advantages of using local materials, which are readily available, and of allowing the student to observe the specimen both inside and outside the classroom.

As part of the Aquatic Ecology session, students are asked to survey a pond and/or stream for the fauna and flora present. Additionally they are asked to ascertain adaptations to lentic (standing water) vs. lotic (running water) environments. This can be a formidable task for someone with little or no experience and a limited amount of time (our class is generally 1½ to 3 hours long). The embedded specimen can be shown prior to sampling and in this way illustrate the type of benthos, neuston, and nekton the students should be seeking. Once sampling is completed the "ice cubes" are a tremendous help in the subsequent analysis portion of our lesson. They can be used to verify identifications or, if you are severely limited in time, can be substituted for keys in the identification process. Thus they allow for detailed and specific analysis of diversity. Additionally, food webs could be constructed to elucidate the trophic structure within an ecosystem. Finally, anatomical examinations would be facilitated by use of the cubes. In this way students could readily discern adaptations to specific habitats. The examples given deal with a specific topic, aquatic ecology; however, the spectrum of teaching uses for resin castings is as diverse as the materials embedded.

Environmental News

Photo by James Staples

Over $3 million in federal and state funds will be spent in corrective activities at two of New Jersey's worst toxic waste dumps (Lone Pine Landfill in Freehold Township and Kin-Buc in Edison) under terms of contracts signed by U.S. Environmental Protection Agency Administrator Anne M. Gorsuch and Governor Thomas H. Kean on July 7 in Freehold. Congressman Matthew J. Rinaldo (seated left), in whose district both landfills lie, and DEP Commissioner Robert E. Hughey (speaking) participated in the ceremony. Hughey noted that the state's 10 percent share of the cost will be provided by funds from the $100 million Hazardous Waste Discharge bond issue approved by New Jersey voters in November, 1981. The federal government will provide 90 percent of the money for the projects.

FACT SHEET

HAZARDOUS WASTES IN NEW JERSEY

New Jersey has more than 300 identified sites where hazardous chemicals endanger the environment. Some of these known sites resulted from illegal disposal, while others accumulated before adoption of laws prohibiting such unwise disposal. In many cases legal efforts are underway to establish responsibility for such sites and to force cleanup actions by those found responsible. In other cases it has been impossible to establish responsibility. The result is that the state must perform the cleanups and pay for them.

IDENTIFICATION OF CLEANUP SITES

The Department of Environmental Protection (DEP) and the federal Environmental Protection Agency (EPA) maintain lists of these sites, with cleanup priorities based on immediacy of perils to health and the environment, including both air and water supplies. Nationally, EPA has a list of 160 priority sites, 17 are in New Jersey. The DEP action list totals over 300, including those listed by the EPA. Since the begining of 1980, New Jersey has spent over $33 million on cleanups.

FUNDING FOR TOXIC CLEANUPS

There are currently four sources of funding for waste site cleanups:

1. The Spill Compensation Fund came into being in 1977 and was enlarged and its uses liberalized in 1980. It produces slightly over $1 million per month from a tax payed by manufacturers of hazardous substances, petroleum or petroleum products.

2. The Hazardous Waste Discharge Bond Issue was approved by New Jersey voters in November 1981. Money from the bond issue is available for cleanup and removal of hazardous wastes.

3. The Sanitary Landfill Closure Act, which became effective in January 1982, deals with improperly closed landfills. Monies available under this act are to be used to monitor abandoned landfills and for cleanups of those landfills.

4. Superfund was created by the federal Comprehensive Environmental Response, Compensation and Liability Act of 1980 to clean up hazardous waste sites throughout the country. It is a $1.6 billion, five-year federal program. The Superfund law required EPA to identify 400 national priority "response targets."

States must contribute at least 10 percent of the actual remedial costs of cleanup at any site. Superfund monies may come to a state in either of two ways: A Cooperative agreement can be reached under which EPA will contribute 90 percent of cleanup cost to the state, which then handles all cleanup work and the remaining costs; or, the alternate method is a Contractual agreement in which the state contributes its 10 percent share to EPA, which contracts out the cleanup work using the combined federal and state funds.

KIN-BUC, LONE PINE GET FEDERAL AND STATE FUNDS FOR CLEANUP

Lone Pine: The contracts call for $300,000 to be used for a long-term feasibility study to determine the best method of cleaning up the site. (Lone Pine is an inactive 85-acre landfill that was operated from 1959-1979 adjacent to the headwaters of the Manasquan River. Leachate from the site flows into the river. It's alleged that 50,000 drums of chemical wastes were illegally disposed of at the site within the last three years.)

Kin-Buc: $2.5 million will be used to continue measures to separate oily substances from groundwater; and $300,000 will be spent for a feasibility study for a more extensive cleanup. EPA has already spent $2 million on cleanup activities at the site. (Kin-Buc is an inactive 220-acre landfill that was operated from 1971-1976. A wide variety of industrial chemicals, including more than 70 million gallons of industrial process, chemical and municipal liquid and solid wastes were accepted at the site. Investigation indicates the migration of polychlorinated bipheny [PCB]-oily leachate on the site toward a tributary of the Raritan River.)

For more information about Hazardous Wastes in New Jersey, see the FACT SHEET that appears above.

APPROACH TO ENVIRONMENTAL REGULATION

by Commissioner Robert E. Hughey

What is the proper approach for the control of environmental degradation in a relatively small, socially complex and densely populated state like New Jersey? There have been many suggested directions and all have merit. More important is the collective feeling that sound environmental controls are vital to New Jersey. Our state has an abundance of natural resources, a factor which is being utilized with increasing frequency to sell New Jersey as the place for relocation.

This year's State Chamber of Commerce promotional film, for example, concentrated on a beautiful photographic display of New Jerseyans enjoying their environment; whether it be trout fishing on the Wallkill, deep sea fishing off the coast, or backpacking in an exceptional park system. As most of us realize, the line between enjoyment of and damage to the environment is a fine one. While such dividing lines for action often seem clearer from a broad policy perspective, they are many times lost in the individual day to day decisions, where relatively minor adjustments to our environment are overlooked and the additive consequences from many such activities are ignored or forgotten.

We have shown a tendency in our society to learn by experience, and, unfortunately in many cases, we react to problems only after they reach a point where avoidance is no longer possible. For instance, the discussions of interconnections between water companies may break down for a number of reasons, one of which is that there are over 600 companies in our state making agreement difficult, with quick agreement on solutions only possible in the face of a drought.

There are many other examples, whether they be wastewater discharges into our streams which overload their capacity to deal with effluent; too many stack emissions into our air that overburden the atmosphere and make it unhealthful to breathe; the proliferation of small amounts of toxic chemicals in our environment through hundreds of associated uses, the accumulation of which we are just beginning to understand; the list goes on and on. Unfortunately, if we are content to react rather than anticipate, solutions will continue to be associated only with crisis.

We cannot and should not be content to deal with environmental problems on a case by case basis. We need a coordinated game plan which supplies a blueprint for action to achieve the long-term goal. Sometimes that blueprint will result in regulations that may not make sense to an individual, but do make sense when cumulative activities are reviewed in context.

One of our success stories in New Jersey has been our ability to control many forms of air pollution to achieve federal health standards throughout our state. This program, begun in the late 1960's, has produced enormous benefits for our citizens, and it was done based on a long-term strategy showing our goals could be achieved if strict standards were adhered to. Those standards, enforced for over a decade, have produced the desired results in a number of areas. The game plan also showed that our state, alone, could not control the total air pollution problem due to the long-range transport of contaminants into the state. That resulted in the push for an aggressive national control program to minimize emissions uniformly wherever possible and cut interstate drift—an effort which has not yet produced the desired results for our state.

Our Coastal Zone Management Plan supplies the context for the individual permit decisions that must be made on an everyday basis. The lack of this game plan would provide us with no overall direction for our efforts. Our State Outdoor Recreational Plan also provides a blueprint for land acquisition and parks development in our counties, mating our activities with those of local government to provide the best recreational resources we can offer, in addition to assuring the long-term protection of our important natural areas. The state's recently adopted Water Supply Master Plan again provides an environmental blueprint for action on the coordinated front of conservation, new projects, regulation, and resource management to assure that our individual actions in these areas knit together to provide a safe and secure supply of good quality water for our citizens now and in the future.

continued on 16D

RIPARIAN ISSUE SLATED FOR NOVEMBER BALLOT

The State Legislature in July approved a concurrent resolution calling for a referendum in which New Jersey voters would be asked to amend the State Constitution and empower the legislature to set the amount homeowners would pay to obtain clear title to coastal land once washed by the tide. Under current law, the land or the rights to it cannot be conveyed to any private owner at less than state-appraised market value.

Given below is the Riparian Lands question as it will appear on the November 2 general elections ballot.

Photo by Jorgi Rosky

Supervising Engineer Larry Waldman of DEP's Bureau of Tidelands, displays the tidelands claims map of Atlantic City. This is one of more than 700 such maps (delineating coastal lands now or formerly flowed by mean high tide waters) adopted by the state Tidelands Resource Council on May 27. The council expects to adopt an additional 107 maps by November. (See these pages, NJO July/August.)

RIPARIAN LANDS

Do you approve the amendment to Article VIII, Section V, of the Constitution, which adds a new paragraph 2 which authorizes the Legislature to enact laws *[providing for a total or partial exemption of land where a residence has been constructed from the assertion of a riparian claim by the State]* *(1) to establish the criteria by which consideration shall be fixed for a grant or lease of any land subject to the assertion of a riparian claim by the State, which consideration may be less than the fair market value of the State's interest, or nominal; and (2) to differentiate, in establishing these criteria, between properties which are being utilized for different purposes*?

INTERPRETIVE STATEMENT

The approval of this amendment would allow the Legislature to *[provide, by law, that land on which a private residence is located would be totally or partially exempt from the assertion of a riparian claim by the State]* *establish the basis for setting the prices at which the State may convey its interest in land it claims as riparian. These prices may be less than the fair market value of the State's interest, or nominal, and may be different for land used for different purposes in recognition of the burdens which may be imposed on certain classes of landowners affected by State riparian claims*.

ANOTHER "FIRST" FOR NEW JERSEY

Photo by Ken Oravsky

New Jersey is the first of the 14 states containing parts of the 2,050-mile Appalachian Trail to protect the entire length of the path within its borders. Hikers along the 70-mile Garden State segment of the trail will enjoy a true "wilderness experience"—all of the trail is now located on protected public land of natural beauty. About 25 miles of the trail, including some paths along trafficked roads and through private property, have been relocated to return the corridor to a "hill and dale" trail. Public meetings were held before the relocations were made. Volunteers from the New York-New Jersey Trail Conference are building and marking the relocated parts of the trail. The management and maintenance of the entire 70-mile segment will be accomplished through a unique cooperative agreement between state and federal agencies and Trails clubs, thereby achieving both public and private participation.*

A 1968 federal law designated the Appalachian Trail as a National Scenic Trail. DEP's Division of Parks and Forestry has been involved in the project to protect the 70-mile New Jersey segment since the early 1970's. A 1978 federal law provided the means for states to receive funding aid for needed land purchases. The New Jersey Appalachian Trail project cost approximately $4.5 million, with federal grants from the Interior Department augmenting state Green Acres funds. In addition, the National Park Service, which worked with DEP from the beginning, contributed appraisal and related services which saved the state about $200,000.

The Appalachian Trail enters New Jersey along its northwestern edge from Bearfort Mountain overlooking Greenwood Lake, near the New York border. It continues west through Wawayanda State Park and over the Pochuck mountains to High Point. There, at the state's highest spot, the trail turns sharply south and follows the Kittatiny Ridge down to the Delaware Water Gap, passing through High Point State Park, Stokes State Forest, the Delaware Water Gap National Recreation Area and Worthington State Forest.

*Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, Tennessee and Georgia.

DIVING SYMPOSIUM SCHEDULED

The sixth annual "Dive New Jersey" Symposium, sponsored by the New Jersey Council of Diving Clubs, will be held on November 6.

The New Jersey Council of Diving Clubs is a nonprofit organization dedicated to the promotion of safe and enjoyable diving in New Jersey and the surrounding area. Approximately 300 divers attended the half-day meeting last year.

The symposium is hosted by the Rutgers University Scuba Club, Rutgers University, New Brunswick. For more information, contact John Brauner, Dept. of Biol. Sci., Rutgers University, New Brunswick, N.J. 08903 (201) 932-3983.

EAGLET TAKES WING

On June 21—just a day after the country celebrated National Bald Eagle Day as proclaimed by President Reagan—"Check-Off," the bald eagle chick "adopted" by the state's only pair of nesting bald eagles, left its nest in Cumberland County for its maiden flight. It was the first time in six years that an eaglet had been raised and fledged in New Jersey. The Bald Eagle Reintroduction Program is administered by DEP's Division of Fish, Game and Wildlife.

Unique to Pinelands

SWAMP MICROORGANISM BASIS OF NEW DRUGS

A swamp microorganism, *Chromobacterium violaceum,* believed to be unique to the Pinelands, gave scientists from E. R. Squibb and Sons the basis for the creation of a whole new family of antibiotics called monobactams. The first such compound to be developed, trade-named "Azactam," is currently being tested in hospitals around the world to treat hospital-generated infections which have been resistant to more traditional drugs, such as penicillin and tetracycline. Scientists and technicians from Squibb screened soil samples from lands around the globe before finding the microorganism, in 1978, at the Wading River in the New Jersey Pinelands. Dr. Richard B. Sykes, chief of microbiology for Squibb, said the bacterium had been found nowhere else and credited the acidity of the Pinelands soil and the absence of pesticides in the area with spurring their growth. "Azactam" is slated for marketing within the next two years.

Photo by Mildred Raffelt, Boundbrook Chronicle.

Over 100 Girl Scouts and 30 adults, representing 13 troops (Brownie, Junior and Cadette) from Bound Brook and South Bound Brook (Middlesex County), recently participated in a "water's edge" cleanup of the Delaware and Raritan (D&R) Canal towpath area from the Queen's Bridge to Rte. 287. The program, which is to continue through next spring, is the scouts' "Gift of Water" project to their communities in honor of the 70th birthday of the National Girl Scout (GS) organization. The public service project was organized by Mrs. Dorothy Moskowitz of Neighborhood 10, Rolling Hills GS Council with the help of Mrs. Pam Haverland, GS Field Manager; James Amon, executive director of the D&R Canal Commission; and D&R State Park Superintendent Paul Stern. (DEP's Division of Parks and Forestry administers the 66-mile linear park.) Above, sensibly dressed in protective clothing as they work, are scouts Shannon Markey, Amy Baumann, Kellyanne Driscoll and Barbara Hills of Junior Troop 167.

NEW 'HOW-TO' BOOKLETS AID PERSONS APPLYING FOR COASTAL PERMITS

Three booklets, prepared and published by DEP's Division of Coastal Resources in June 1982, are designed to aid coastal permit applicants. The publications, described below, are available free of charge.

The ***New Jersey Coastal Development Handbook*** is intended to help potential applicants for Coastal Area Facility Review Act (CAFRA), Wetlands and Waterfront Development permits, and to aid members of the public interested in the coastal permit process understand how they can participate in these permit decisions.

The ***Docks, Piers, Bulkheads and Moorings Handbook*** describes the permit application process with emphasis on applying for a Waterfront Development Permit and/or tidelands license for the construction of a dock, pier, bulkhead or mooring.

The ***Coastal Energy Conservation Guidelines*** is a handbook containing suggested energy conservation techniques for coastal development. The guidelines are not new regulations but are, rather, intended to aid developers and government officials in complying with the Energy Conservation Policy of the New Jersey Coastal Management Program.

To obtain the booklets write to DEP's Coastal Information Center, CN 401, Trenton 08625, or phone 609-292-9762.

ATTENTION: HUNTERS

As the fall hunting season nears, DEP's Divison of Fish, Game and Wildlife (FG&W) reminds hunters that for their protection state law requires that a *"daylight fluorescent orange color" cap or an outer garment containing 200 square inches of orange fluorescent color material* must be worn in New Jersey by persons hunting deer, rabbit, hare, squirrel, fox, railbirds, or game birds (other than waterfowl and wild turkey) with firearms.

Also, FG&W reminds New Jersey hunters to keep their old firearm or bow hunting licenses to avoid being required to take, or repeat, a hunter education course. State law mandates that both adults and juveniles applying for firearm or bow and arrow hunting licenses must present their previous licenses (any state, any year) or a properly signed certificate showing that the applicant has satisfactorily completed the appropriate hunter education course.

RESULTS OF THE NONGAME INCOME TAX CHECK-OFF

The results from the first year of the Nongame Income Tax Check-off are in. Nearly 100,000 taxpayers in the state donated a portion of their income tax refund to this fund dedicated for the protection of New Jersey's nongame wildlife.

"We have received nearly $400,000 from people who care about preserving wildlife in our state. This will allow us to hire the two regional biologists and an education specialist that we need to provide better information to the public and better protection for populations of endangered species," said JoAnn Frier, Project Leader for the Endangered and Nongame Species Program.

There are presently 11 other states receiving income from a similar tax check-off. There is only one state that did better than New Jersey in raising money during the first year of the check-off. "This shows that in the most densely populated state in the nation, there are a lot of people who care about wildlife," says Paul D. McLain, Deputy Director of the Division of Fish, Game and Wildlife.

Again this year taxpayers will be able to donate a portion of their income tax refund to the Endangered and Nongame Species Program. In addition, a provision has been added whereby taxpayers not receiving a refund can check off a $2, $5, or $10 donation on their state income tax form.

For more information on New Jersey's endangered and threatened wildlife or a copy of the Nongame News write: Nongame Program, Division of Fish, Game, and Wildlife. CN 400, Trenton, NJ 08625.

RUSSELL W. MYERS HEADS PARKS/FORESTRY DIVISION

Russell W. Myers, of Far Hills, joined DEP on August 23 as director of the Division of Parks and Forestry. He will be responsible for overseeing planning, maintenance and operations of the state's parks, forests, recreation areas, natural areas, historic sites and marinas.

Before assuming his new post, Myers had been director of the Morris County Park Commission since its inception in 1957. In the 25 years of his leadership, the county park system grew from 275 acres to its present 7,200 acres. It is the largest county park system in New Jersey, with 165 permanent employees and an annual budget in excess of $5 million.

Myers, who received his bachelors degree in horticulture from Rutgers University, earned his masters degree in landscape architecture from the Harvard University Graduate School of Design. He is a founder, trustee and former Secretary of the New Jersey Conservation Foundation. In this connection he played a leading role in acquiring land donations for Great Swamp National Wildlife Refuge in Morris County, and winning its designation as such by the U.S. Department of the Interior. Myers is an active member of several professional and civic organizations.

CAMERAS READY? OCTOBER IS LEAF-TURNING TIME!

In October, the annual spectacle of fall foliage unfolds in New Jersey drawing thousands of people to see and photograph the brilliance of leaves turning yellow, gold, red, orange and purple.

Far to the north in the High Point-Stokes Forest area, as the days grow shorter and the nights grow colder, the trees change quickly, with gold, red and orange leaves usually approaching maximum intensity early in the month.

Farther south the color change—the yellow of the ash trees, the reddish purple of the sumac, the bright red of the swamp maple—usually peaks in mid October.

A word of caution to foliage followers: Because location and weather conditions play an important role in nature's leaf-turning timetable, DEP's state park and forest rangers recommend that a phone call be placed to a nature area in the vicinity of choice before taking to the road with family and camera. Given below are four such beauty spots representative of their regions.

NORTHWEST REGION: Stokes State Forest, Phone: 201-948-3820

NORTHEAST REGION: Ringwood State Park, Phone: 201-962-7031

CENTRAL REGION: Washington Crossing State Park, Phone: 609-737-0623

SOUTHERN REGION: Wharton State Forest, Phone: 609-561-0024

TRAILS CONFERENCE SET

An all-day Statewide Trails Planning Conference is scheduled for Saturday, November 20 at Douglass College in New Brunswick. The attendance will be limited to 500 persons. For fee and other registration information, write to Trails Conference, Office of Green Acres, CN 404, Trenton 08625.

ENVIRONMENTAL REGS.

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These blueprints require the maximum involvement of people in their development to insure that the direction is proper and the proposals sound; but, in addition, they require active monitoring. The readers of this magazine understand what environmental protection means to us all. The decade of the 70's saw a number of blueprints put in place, and a number of very serious problems identified. The decade of the 80's presents us with the challenge of implementation, refinement, and progress. We can accomplish very little without coordinated effort and mutual understanding. With your help, the next few years can be very productive ones. If DEP can help you . . . or if you wish to help us, let us know. Thanks.

N.J. In Focus:

What Makes A Good Picture?

By Robert J. McDonnell

If you ask a professional "What makes a good picture?", you've opened a Pandora's box. Every professional has developed criteria to classify pictures as good or bad. Asking this seemingly simple question often results in a long, complex answer loaded with technical jargon. I'll guarantee that 15 minutes after you ask, you'd like to bang the photographer's two heads together or stuff cotton in his mouth.

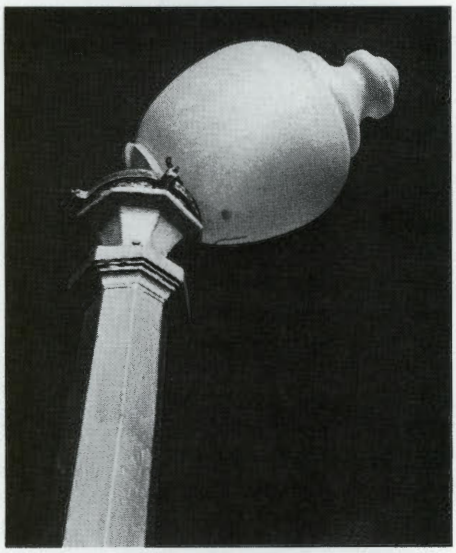
Therefore, I will narrow the scope of my answer. A good friend and fellow photographer once gave me his definition of photography. To me, his definition also defines what makes a good picture. His definition: Photography = Art + Craft.

Craft refers to technical aspects of photography such as proper exposure, correct processing, and good printing techniques. These are all necessary elements to the picture-taking process.

Art, or photographic composition, is an equally important component of photography. I define composition as the way a photographer arranges elements of subject matter within the rectangular frame we call a picture. Composition can separate a good picture from an average one.

Many casual photographers become absorbed in their subject and blind to everything else which will be part of that magic rectangular frame. Mistakes take the form of distracting elements in the finished photo—telephone poles, fences, or trees growing from atop peoples' heads; colors that distract instead of modify; unwanted reflections from lakes, rivers, and ocean, ad infinitum. So, a casual photographer must first understand a basic fact of photographic life; namely, a subject seen in three dimensions by human eyes before and during the taking of a picture, becomes a subject seen in two dimensions in the final product—a picture.

Cameras, lenses, and film compress space, changing three dimensions into two. There are no magic glasses a viewer can wear to change two



dimensions into three. A tree behind a subject's head in real life will be a tree growing from atop the person's head in a picture!

The first rule, then, is easy to say, difficult to implement. Make certain everything you see in your camera's viewfinder belongs there. If something doesn't fit, get rid of it either by moving to a better vantage point or by changing lenses.

Nothing irritates a viewer more than having to search a picture for its subject. If you need to supply your audience with magnifying glasses to find your subject in the picture, you've violated the second rule—FILL THE FRAME. Yes—a picture should show but one subject. Everything else should, in the best case, enhance that subject and, in the worst case, not distract from it.

A common mistake made by casual photographers is one unintentionally fostered by camera manufacturers. In your camera's viewfinder is a circle that helps you focus and meter properly. Most times, a neophyte photographer places subject matter in that circle—in the picture's center. I call it the "Dead Center Syndrome." Be aware, *that* circle holds no magic power and it's not a gunsight either! Your subject CAN be elsewhere within the frame. Do you suffer from "Dead Center Syndrome?" Look through your pictures and note where you've placed your subject. If your subject is a speck in the center, you're afflicted!

You can cure this syndrome by being aware of, and using the various forms of compositions. Compositions by harmony, for example, means placing elements that belong together in a picture. Including a horse in a picture of a barn is harmonious. Composition by repetition makes an interesting picture, especially if there's a break in the repetition. In a picture of a fence with a bird perched atop it on one end, the fence is the repetitive pattern and the bird is the break in the pattern.

To demonstrate four other forms of composition, you'll need two pieces of 8" x 11" paper. On the first, draw four horizontal rectangles about 1" high by 1¼" long. These should look like the viewfinder in your camera. Divide the first rectangle into thirds both horizontally and vertically. You should have four lines that cross at four points. Place a dot at each of the four points where the lines intersect. This illustrates the Law of Thirds, in which you can place your subject at any of the four dots!

In the second rectangle, draw a letter S; a letter L in the third; and an oval in the fourth. Each shape should completely fill its rectangle. These figures illustrate S, L, and oval composition respectively.

Repeat the exercise on the second piece of paper, but this time draw the rectangles vertically—as if you turned your camera so that its viewfinder were vertical. (Yes, you *can* take a vertical picture!)

If you follow the rules above, your pictures will improve, but let me add a caution. The old expression, "There's an exception to every rule," applies to photography as well. Sometimes the only logical place to position a subject is in the picture's center and, if this is the case, do it. Don't let rules dictate your photography forever. They help get you started, but they can also bring you to an abrupt halt if you continue to blindly follow them!

Happy Shooting!

Wildlife in New Jersey

BEAVERS

By Patti McConnell

It is difficult to imagine that our largest North American rodent, the beaver, has played so important a role in our state's past history. Yet, the pelts from this one animal provided much of the economic base for the trade and eventual growth of many of New Jersey's earlier settlements, especially those along the banks of the Delaware River.

Beaver skins and wampum (shell beads) were the currency in the early years of settlement by the Swedish people along the River. Beaver were a plentiful commodity at that time, when over 4,000,000 acres of New Jersey were forested. Kalm, a naturalist in the 1700's reported that the Swedes "saw one bank after another raised in the rivers by beavers." The settlers purchased the beaver pelts from the Indians, paying for them with wampum. The settlers then used the pelts to purchase the supplies and services that the settlements required. Trade in the period of the mid-1600's was reported to be 9,000 to 10,000 pelts per season in the areas of the Delaware near the New Sweden settlements alone.

The pelts at that time were worth about seven florins or two dollars each. Loaded with a supply of pelts, members of the New Sweden settlement made a trip by sea to Manhattan in 1643 to purchase animals to work the fields. In Manhattan, the leader of the expedition purchased seven oxen for 124 pelts, one cow for 22 pelts, and 75 bushels of rye for 32 pelts. He then paid five skins for part of the oxen to be led back to New Sweden and another five pelts for the remaining livestock to be taken by sloop. (Although a beaver pelt is worth far more today, $22-$25 on the average, inflation has greatly eroded its purchasing power over those early days!)

Trade continued into the 1700's; New Jersey also had a flourishing beaver-hat trade with Portugal and the West Indies. It apparently died out just prior to the Revolutionary War period even though an effort was made to revive it.

Beaver about to cut down a tree.

PHOTOS BY LEONARD LEE RUE III

The combination of the earlier high and unregulated demand for beaver pelts, the extensive deforestation and cultivation of the land, and the expansion of the human population caused the beaver resource in New Jersey to be greatly reduced as the eighteenth century drew to a close. These were the same factors that led to the extirpation of the beaver in most of the country. However, the process was accelerated in the northeastern states because the human population was greatest in these areas. By the late 1800's the beaver had virtually disappeared from Atlantic, Camden, Cape May, Mercer, Burlington, Ocean, Salem, and Warren counties. Some of the last sites noted to be active were in the Great Egg Harbor Machesautuxen, Nescochaque, Big Timber Creek, Wading River, Sluice Creek, Toms River, Raccoon Creek and the Assunpink waterways.

A J. Van Lengerke described beaver activity in 1902 in Sussex County around the towns of Roseville and Two Bridges. He indicated that those sites represented almost all the activity in the state at that time. He felt that these sites were the results of escaped beaver from the Rutherford-Stuyvesant game preserve in Allamuchy, Warren County. Apparently, these escaped beavers were able to establish a foothold and spread across the Delaware from Sussex County to Monroe Co. in Pennsylvania.

Van Lengerke reported that a bill was before the legislature that year (1902) which would give total protection to beaver. In fact, the beaver was afforded complete protection in 1903.

New Jersey, as well as other northeastern states, began augmenting their few remaining beaver colonies with beaver obtained from private preserves and states such as Wisconsin, Michigan, Wyoming, and Minnesota. Restocking and protection enabled the

beaver to re-establish itself so successfully that by 1947, New Jersey instituted a trapping season on the animals. Today New Jersey has nearly 200 active beaver colonies statewide.

The beaver is known by several names: flat-tail, chisel-tooth, and swamp engineer, to name just a few. Its former range prior to colonization was throughout the forested areas of all North America from Alaska to Canada and south to Mexico.

It is a muscular animal often exceeding 60 pounds at maturity; the only rodent that is larger is the capybara of Panama and South America. The forefeet are equipped with claws that enable the animal to dig burrows and hold food. The hind feet are webbed for swimming. The second toe of each hind foot has a split double toenail which allows the beaver to remove parasites, groom and oil its fur. Its tail is large and muscular serving for balance, support, and as a rudder while swimming. The tail also helps in temperature regulation and fat storage.

The pelage (or fur) consists of two layers: a dense, soft, waterproof undercoat and a sparse, guard hair layer. Color is variable but usually ranges from brownish-black to yellowish-brown.

The beaver makes its home in rivers, lakes, ponds, marshes and streams that are adjacent to wooded areas. It is in this type of habitat that it constructs its dams and lodges or burrows. The dam enables the beaver to raise the water to the level necessary for the animal to ferry building materials and food supplies to the lodge or burrow. All the members of the colony, except the youngest, keep the dam in good repair.

The lodge may be constructed by the beaver laying down layers of mud and sticks over a bank burrow entrance or in a shallow section of waterway where the bottom is already elevated. The beaver forms a roughly conical structure as it lays down additional material, leaving the center, or chamber, hollow.

Tunnels lead from the chamber and open underwater. The entire lodge may be 6-8 feet high when completed. The bottom is thicker than the top; the thin, loose top allows for ventilation. A food cache is constructed near the lodge in the fall so that the colony has access to food in the winter. Food caches are not always constructed in some of the southern counties, apparently because some of the streams rarely freeze and the animals have access to food year-round.

The beaver eats approximately 1½-2 pounds of food each day, utilizing the bark of birch, oak, maple, hemlock, pine, willow, poplar, hazelnut, cherry, viburnum, alder, beech, ash, and dogwood. Aspen is eagerly taken when available and a beaver prefers the tender more succulent twigs of all species. Grasses, sedge and roots are also utilized in the spring and summer.

Breeding occurs in January and February of each year. Apparently the male and female form a pair bond for life; however, the male will service other females if he has access to them. The young, usually three to five, depending on the quality of the food, are born approximately 3½ months later. The kits weigh 1-1½ pounds, are fully furred and have been known to enter the water within the first week. They begin eating vegetation at two to three weeks and are weaned at six weeks of age. The kits stay with the colony until they are 1½ to 2 years of age and sexually mature. They then are either driven off by the parents or disperse on their own and attempt to establish themselves in another area.

The activities of beaver are often a point of controversy among its human neighbors. There are those that see their activities as beneficial and others that see them as detrimental. Certainly the beaver does alter its environment and in a dramatic way. The construction of dams can cause flooding of roads and property in some developed areas and it does make habitat once supportive of deer, rabbit, squirrels and some other land dwelling animals unsuitable for those particular species. However, the area is then more attractive to muskrat, nesting waterfowl, otter, amphibians and a myriad of other life-forms more suited to an aquatic environment and the food sources found there. Stream flow is stabilized, water levels are maintained and soil erosion controlled by the creation of the dams.

The beaver has been a colorful and important part of New Jersey's past. With proper management, protection of its habitat, and tolerance by its human neighbors, it will also be a part of New Jersey's future.

Beaver lodge.

ALL ABOUT STRIPERS

By Donald Di Marzio

With saltwater angling achieving new heights in popularity, it's a sure thing that more and more first-time anglers will set out in pursuit of the ultimate coastal gamefish—the striped bass. The mere mention of this glorious fish's name conjures up visions of Cape Cod and its outer islands, the coast of Rhode Island, the jetty country of New Jersey, casting into a raging surf, matching brains and brawn with a beautiful and hard-fighting quarry. The novice surf-fisherman may become discouraged, however; for there aren't as many linesiders finning around off our coast as there used to be, and more attention must be paid to the vagaries of wind and tide, the season of the year, the type of baitfish present and the habits and preferences of the quarry if success is to be ensured. As I have always felt compassion for the beginning angler (I've chased stripers for many years and sometimes I think I'm still only a rank amateur), I'm obligated to present the following gems of knowledge in the hope that much frustration can be avoided and the glories of the sport made known to all those who care to know.

First some definitions, given in no particular or logical order:

Beach Buggy—a four-wheel-drive vehicle used to carry fishermen and equipment along the beach while surf-fishing. Also describes a stressed emotional state resulting from a week's worth of fishing the night tides without catching a single bass.

Teaser Rig—polite way of describing a brand-new, hopped-up, fully-equipped beach buggy which you longingly stare at through the cracked windshield of your 1956 Willys Jeep.

Atlantic Ocean—the stock answer given to the question, "Gee where did you catch that nice bass?"

Double—catching two bass on the same cast, whether on the same plug or on a teaser rig. Also refers to what the angler has been drinking prior to his describing his many angling exploits.

Jetty—a long pile of rocks extending from shore into and past the surf zone. Jetties attract all kinds of baitfish and furnish attractive cover; stripers just love them. They're typically wet and slippery; fishermen just hate them.

Three-way Swivel—a piece of terminal tackle used in bottom fishing. Also describes the motion of your body as you stiffly and tiredly try to walk off a jetty after fishing all night.

Swimmer—a type of plug that swims along when retrieved. Also what an angler turns into when he slips off a jetty in a howling northeaster.

Plug—a lure made of plastic or wood simulating baitfish by action and design. Also refers to portions of chewing tobacco, essential to many anglers.

Ungodly Hour—if you're truly serious about striper fishing, any time between sun-up and sunset, when you may have to go to work, run errands, and try to appear normal to the rest of society.

The Rest of Society—anyone who is not a striper fisherman.

Luck—something no successful striper fisherman admits to relying on.

Bad Luck—something every striper fisherman swears to having too much of.

"I'm pretty handy with a gaff"—statement made by an angling companion who doesn't really know how to use a gaff all that well; usually said prior to his attempting to gaff a really large fish—not his own, of course.

Leader—made of either monofilament or wire. Also the status of the local hotshot angler who can catch stripers with both hands tied behind his back.

Line—the stuff you fill your reel spools with, the link between fish and fisherman. Also what another fisherman will

hand you if you ask him where all his best fishing spots are.

Eels—unholy concoctions of green, wriggling slime which tangle themselves in your line, take nips out of your finger, are abundant only when no bass are around, and have the same effect on stripers as candy has on a 5-year-old kid.

Sand Spike—device for holding a fishing rod upright in the sand. Also a quaint term for the spirited throwing of any object within grabbing distance as the angler 20 feet away hooks bass after bass, and you hook shark after shark.

Major Northeast Storm—decidedly bad weather, involving high winds, rough seas, and heavy precipitation. Sane people stay home in such weather. Oddly enough, striper fishermen love to be fishing in a raging northeaster.

"Good fishing weather"—anything from a major storm watch to a full-force gale—preferably from the northeast.

"The ocean's kicking up a bit"—the jetty you plan to fish is under three feet of white water.

"Refreshing weather"—anything up to and including severe thunderstorms.

Shady Character—anyone who enjoys catching bluefish or other trash fish.

Trash Fish—usually refers to bluefish, but can mean any fish not having stripes on its sides which hits a lure or bait intended for stripers.

Prime Fishing Time—March through December, generally 24 hours a day for best results.

"Fishing's been a tad slow"—you haven't caught any bass in four weeks.

"Fishing's really picking up now"—for the first time in four weeks a fish swipes at your surface lure; it was probably a bluefish but what the hell, "It sure *looked* like a striper!"

Major Medical—the type of expenses many striper fishermen incur after slipping off jetties, falling down into a cold, rough surf, or removing plugs from their person.

Fun—what striper fishermen swear they are having as they slip off jetties, fall down into a cold, wet surf, or remove plugs from their person.

Tern—bird which dips and dives into the water to catch baitfish, thereby furnishing a clue to the presence of feeding stripers. They are very social birds, being generally friendly to one another and often gathering in small groups to enjoy each other's company; this has given rise to the expression "One good tern deserves another." (Also someone who throws rocks at every bird he sees along the beach can be said to leave no tern unstoned.)

"Hard to please"—phrase used to describe the often finicky and temperamental striper. Also can be applied to wives or girlfriends, who expect you to take them out to dinner, visit your in-laws, spend time with them and/or your children, and make other unreasonable demands on your time.

Now that you have a feeling for the vernacular of saltwater striper fishing, you would do well to carefully peruse the following points of etiquette:

DO grow a beard, buy lots of plaid wool shirts, and wear long-billed fishing caps (in the summer) and black or blue watch caps (during fall and spring). Even if the only bass you've ever seen were in the form of fillets at a local fish market, you must look the part of the rugged, crusty, weatherworn surf-fisherman.

DO strive for a good job and financial security. This will allow you to afford

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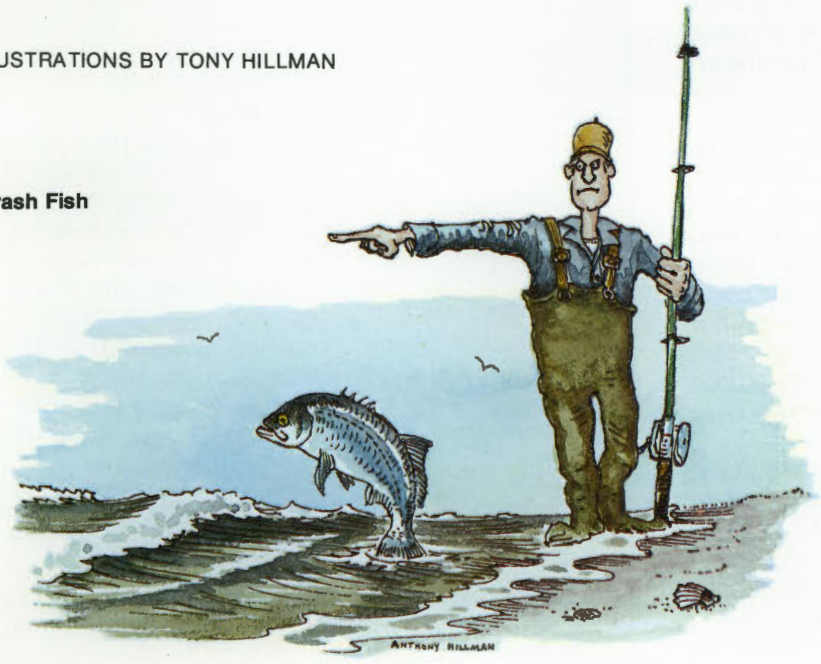
ILLUSTRATIONS BY TONY HILLMAN

Trash Fish



HACKENSACK RIVER

Continued from page 11

flour-making capacity, for it was equipped with three runs of stones which ground rye, wheat, buckwheat and feed. This mill operated until 1882, when the Hackensack Water Company purchased the property and dismantled the mill.

An anonymous author in the late 19th century wrote about the river: "Here on both sides of the Hackensack were broad stretches of meadow and pasture for cattle; here were fresh water and fine mill sites (and) thick forests where abounded fowl, game and timber of great value." Immense numbers of trees were felled in Bergen County and taken by schooners to New York City. "Windjammer" was the collective term for all sailing vessels on the Hackensack and included scows, schooners, piragus, sloops, and tugs. These boats were known to have navigated the river as far north as the Borough of New Milford. If a scow couldn't be towed further up the narrow and winding Hackensack, the crew would wait for the incoming tide and pole it to the docks above New Bridge. The river would freeze solid in the winter and when it thawed, tugs would be used. In the early colonial days, the Hackensack River was an important commercial stream, second only to the lower Raritan River in the volume of freight carried on it. Records from the late 19th century indicate that the Hackensack River had become a great tourist attraction for New York City dwellers. The water was still clear enough to see the bottom and fishing was ideal. Herring and shad were packed in barrels and sent by train to the Fulton Fish Market. A rowboat-full of herring could be collected in two hours.

The Hackensack *Republican* in 1908 called the Hackensack River "a stream of great beauty, especially from the town northward, where its banks are shaded by heavy growths of timber. . . . In summer its groves are merry with the life of camping parties." These conditions do not exist on the Hackensack River today. Construction by the Hackensack Water Company disturbed the shad spawning pattern and these fish disappeared. However, fishing did continue until sewage from Camp Merritt during World War I polluted the Hackensack. Swimming, then boating, stopped. Prior to the construction of the Oradell Reservoir, the Kinderkamac Canoe Club had a house on the banks of the river. Nearly everyone who lived in the river communities owned a canoe. Old-time residents remember what amounted to a parade of paddlers on pleasant Sundays. A number of boat clubs have reorganized since the 1960s as a result of the efforts of the river towns to halt the pollution of the river.

The Hackensack River area, so rich in history, offers an array of activities besides canoeing. The Bergen Community Museum in Paramus (265-1248) is an excellent place to start exploring this region. Museum displays combine entertainment and education. And what other New Jersey river can claim its own submarine? The U.S.S. *Ling* is permanently anchored in the Hackensack (488-9493, 342-3268). The French

River near French Brook.

Hugenot cemetery, near the river in New Milford, is the oldest burial area in New Jersey. The Ackerman-Zabriskie-Steuben House, River Edge (487-1739), is open for tours. However, there is no finer way to pass a spring afternoon than with a picnic lunch enjoyed under the ancient hickories at the Von Steuben House or sprawled on the cool lawn of Johnson Park, watching the ebb and flow of the beautiful Hackensack River.

Bergen Community Museum of Art and Science
Ridgewood Avenue
Paramus, New Jersey 07652
The Museum is open from 10 AM to 5 PM, Tuesday through Saturday and 1 to 5 on Sunday. Group and scout leaders or teachers should give Mrs. Joan Kuyper ample notice so a tour guide may be available.

Submarine Memorial Association
150 River Street
Hackensack, New Jersey 07601
There is an admission charge of $2 (half price for children under 12 years old) but groups of 15 or more can receive a 25% discount. The submarine and museum are open 10:15 AM to 4 PM seven days a week in the winter. From approximately May to September, the hours are expanded. It is probably best to call first. Children's birthday parties are held in the museum, Monday through Friday only. Each child receives a captain's hat, along with other surprises.

Ackerman-Zabriskie-Steuben House
River Edge, New Jersey 07661
Formerly known as the Von Steuben House, this complex of restored Dutch houses is open Wednesday through Saturday from 10 to 12 and again 1 to 5. The Sunday hours are 2 PM to 5 PM.

STRIPERS

Continued from page 21

custom fishing rods, insulated waders, solid-wood plugs, and a four-wheel-drive truck.

DO NOT indulge in golf, tennis, bowling, or trout fishing. There is no room in the rugged world of striper fishing for the practitioners of such paltry pursuits.

DO NOT take wives or girlfriends fishing with you. They often catch more bass than you do, thereby destroying the mystique of the sport and dangerously raising your blood pressure.

DO NOT plan marriage or serious courtship during the autumn months. You should not be trivially distracted during the action-packed fall run.

DO acquire a taste for coffee. Coffee is the universal bargaining lever you need to befriend a crusty old salt whose foul-weather gear is covered with fish scales. Pump enough caffeine into him and he may get careless and let loose a hot tip.

DO NOT, if you are fishing in the Chesapeake Bay or nearby barrier islands and you snag an immovable object with your lure or bait, say jokingly that it feels like you've hooked a rock. "Rock" is the local name for stripers, and local anglers within earshot will not appreciate your humor.

DO NOT lose your composure when the guy next to you on the jetty hooks and lands a 40-pound-plus striper and you hook and land a 2-pound bluefish. Just glance his way, nod, and say, distractedly, "Nice fish," and go back to fishing. Save your destructive urges and fits of weeping until you get home.

DO NOT ask a fisherman you meet on a remote beach at 2:00 A.M. if he has caught any bass. The odds are approximately 10 billion to one against his telling you the truth; and if he *has* caught anything, it's a sure thing he'll let you in on the secret locale three miles down the beach where he happened to murder the fish only a few hours before.

DO plan to fish an area for several days following a planned striper tournament. This will ensure that you'll have a good shot at the bass that mysteriously stopped feeding during the tournament.

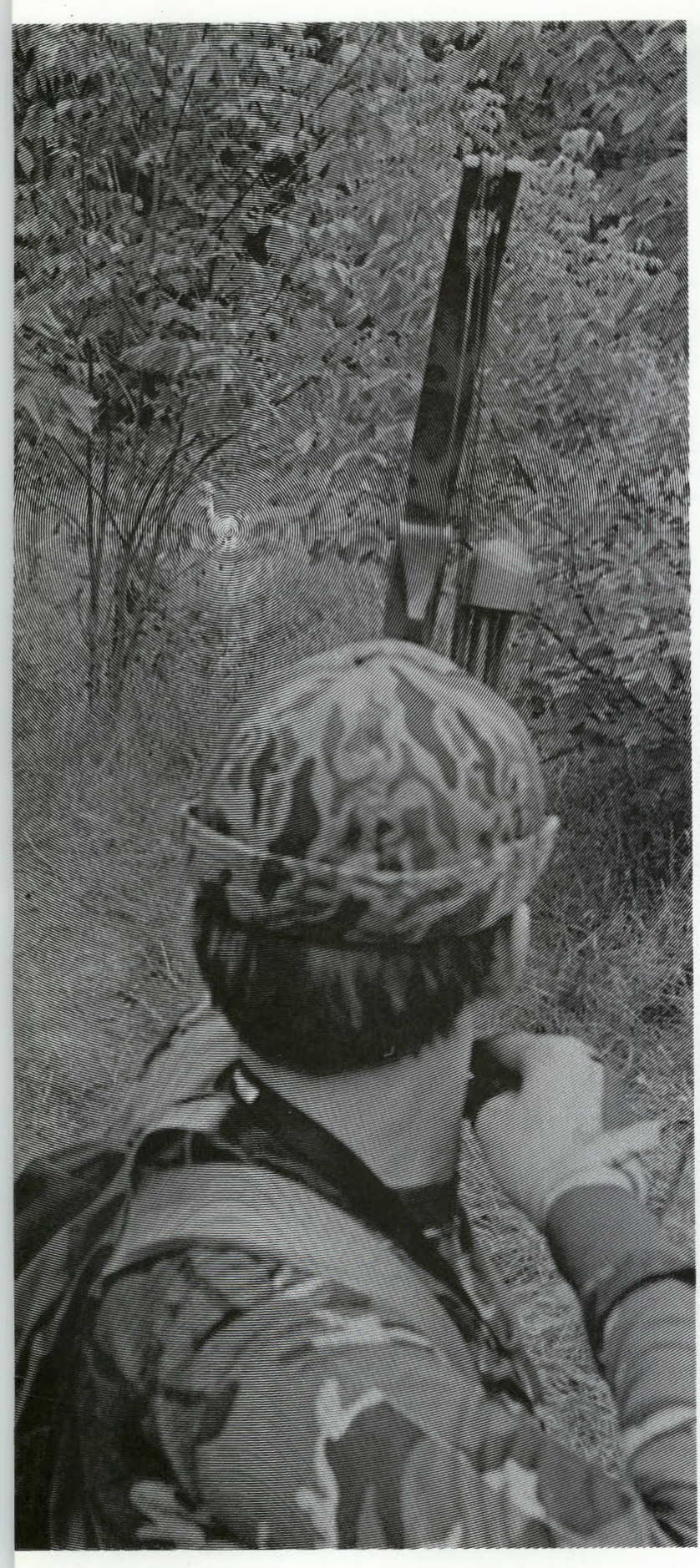
DO NOT show emotion when you land your first big bass. Simply put him (or her) on your stringer, remain stone-faced and unflinching, and casually make another cast. After all, this happens to you so often that it can get a tad boring. But what the hell, the big bass are out there so you'll inconveience yourself again to catch another one, right?

DO impress on your wife that you're all for equal rights. This means that you feel that it's only fair that she be the one to attend father-son banquets, scouting functions, and PTA meetings. Also tell her you definitely approve of her having a job—she'll feel great by contributing monetary support to the family. This frees more of your monetary funds, enabling you to buy plugs by the case (which is after all more economical than buying them individually).

DO be suspicious of a hot tip given to you by any fisherman you haven't known well for at least five years. Chances are the tip was hot last fall in Massachusetts, and you're fishing this spring in New Jersey.

Well, there you have it, striper fans! I know that you now feel more confident in your ability to successfully fish the beaches and jetties for bass. And if you ever need more advice, and you see me on a remote beach at 2:00 A.M., rest assured I'll steer you straight!

ILLUSTRATION BY TONY HILLMAN



BULL'S-

By Deborah A. Boerner

The Appalachian Bowmen set their sights toward some high targets every year. On August 22nd and 23rd, 1981, the Sussex County club came up with a bull's-eye when it held its first broadhead shoot at the Whittingham Wildlife Management Area near Newton. With 56 three-dimensional styrofoam targets in the shape of animals a bowhunter might see out in the woods, the course was designed to simulate actual bowhunting conditions. Following the course, the hunter was required to make shots over open fields, through dense woods, and down into ravines. There was an occasional tree stand to shoot from and a "50-50 running deer" at which a shot might be taken. The event was open to anyone who had a bow and arrows to shoot as well as to those who just wanted to come along and watch or join in the festivities planned for Saturday night.

President of the Appalachian Bowmen, Dave Morris, spoke of this, the club's first shoot which he hoped would become an annual event, as "an opportunity the club was providing for bowhunters to tune-up their shooting skills in time for the upcoming bow seasons. Our major goal here," he explained, "is to improve the skills and knowledge of bowhunters. But it's a fun shoot," he added, "as opposed to the competitive shoots held elsewhere. We want people to get out there and enjoy themselves."

And enjoy they did! Over two days, 310 people registered to shoot. Friends, families, men, women, dressed colorfully or in camouflage, with longbow or compound bow. Scorecards were provided for those who wanted to keep score, but as Morris pointed out, the only competitive prize was a cash award given by Ben Pearson, Inc. to the person shooting the highest score with Pearson equipment. However, door prizes were awarded and raffle tickets were sold with bowhunting equipment as prizes.

After the shoot on Saturday, bowhunters came off the range to enjoy a delicious chicken barbeque. Bluegrass music was provided that evening by the Moonshine Mountain Boys. Chief of the Bureau of Wildlife Management, George Howard, was there to welcome the crowd. Then Dave Person, a wildlife biologist working on the New Jersey Deer Project, gave a slide presentation relating bowhunting to deer management.

The shoot had been planned for almost a year. It was two years ago that the club began a 5-year lease on the dilapidated barn in Whittingham from the Division of Fish, Game, and Wildlife. Since then, the club members have worked on the barn, replacing shot-out windows, installing electrical wiring, and putting up lights. They converted a neglected room upstairs into a classroom for the hunter-education program; the

PHOTOS BY HARRY GROSCH

classes had previously been held in a stuffy trailer parked nearby. In return for renovating the old barn and creating a hunter-education classroom and range facilities for the Division, the Appalachian Bowmen use the barn as a clubhouse (where they hold their meetings). They also have access to the indoor range they created for the hunter-education program and land on which to hold their shoot. The profits from the shoot will, in turn, be used to make additional improvements on the building and the grounds.

Thus, it's a relationship that's been advantageous to both the Bowmen and the Division, and also to the bowhunters of New Jersey. Club members said that the Whittingham project and planning for the shoot has drawn them together as a club as probably nothing else has done in the club's fifteen-year history. I could see this was true as I watched club members and their families working together those two days, knowing only vaguely how much teamwork must have already gone into planning and setting up the activities. There was a feeling of accomplishment in the air, like aiming for the bull's-eye and then shooting right through the middle of it, that extended to everyone attending this winning outdoor event.

The 1982 broadhead shoot was held on August 28th and 29th.

Pete Dragotta & family of Wayne, N.J. came out to the Appalachian Bowmen's first annual broadhead shoot.

Karen Lund shoots from a tree stand.

The "50-50 running deer" target offers a realistic challenge.

CATTUS ISLAND PARK

Continued from page 13.

Barnegat Bay spreading over the salt marsh you have just crossed thus cutting off this higher area completely to make an island. It is here, in 1895, John V.A. Cattus had a mansion as a retreat for his family and New York buddies to hunt and fish. A hugh post oak stands near the mansion site with many thick branches forming a great canopy of shade. Other shade is provided by the towering Spanish oaks with lacy leaves growing at its northern limit. But, you won't see the mansion. It, and its nearby antique barns, was destroyed by fire set by vandals nearly 10 years ago.

However, you will see a spooky pine tree which lightning had hit—the force of which burst the trunk and killed the tree. Its corpse still stands, naked and dark, reaching with crooked fingers towards the sky. Another sight is a large stand of pitch pine offering a shady and clean atmosphere for a stroller who wishes to really get away from civilization. It is disturbed only by ocean breezes and the scent of salty air mixed with pine is delightful.

Now, we go back to the Cooper Center which is named for Betty and A. Morton Cooper who struggled for 10 years to help preserve this section of the shore for the public. From here, another spoke in the wheel of paths leads over a boardwalk built by the Ocean County Park System as they expand this park. Several inches above a dank, acid bog, the boardwalk protects you from getting muddy feet as you enjoy this unusual habitat of forest and swamp. There is a mattress-like, soft ground with dark green shrubs crowded close to the walk under tall, lush trees which keep the sun from reaching all the way down. The air feels heavy with humidity, still, with little breeze. Sunlight struggles to send shafts of golden light through the thick leaves. The top canopy is formed by maples and sour gum trees. Magnolia, blueberry, and holly bushes form the dense middle layer. Water-loving plants hug the acid, damp earth under curving fronds of Royal ferns and under them, if you look carefully, you will see the tiny sundews and delicate green forest orchids. You are aware of the heavy sweetpepper bush perfume hanging in the air if you go in August. Four kinds of holly grow there and at one certain spot, you can look around and see all four at once. My favorite is the shiny, prickly American holly of Christmas fame. In the midst of this green profusion, you will see an isolated symbol of death. A tall pine has lost its needles and is dying. This process creates a veritable apartment house for insects as first the bark falls off; and, when the tree topples with finality, bacteria and insects will reduce it until it blends into the rich dark earth to nourish a whole new cycle of energy and matter.

The boardwalk ends and you enter a drier, more open forest; another different eco-system in this complex of eco-systems. The Atlantic white cedar is less evident, probably due to a lowering of the ground water from some construction which might be a half mile away. When the water drains off, the cedars die. The aftermath of deadly fire is seen here as you walk along this open area of tall trees. Life persists in the pitch pine struggling to survive by sending out bunches of buds and new green needles as food factories after losing their chlorophyll-laden upper branches to fire. Tough, thick plates of bark help resist the heat of flames but only if the roots are healthy can the pine renew itself. You can see all around the entire trunk the new bunches of needles sticking out in tufts.

You will see another adaptation in the determined scrub oak, which, after being charred by fire, will send multiple new branches with fat, rich-green leaves from the root system. These new branches will surround the dead original trunk until it is nearly hidden.

The understory is more open here and you can hear the song of many birds. The chickadee follows your progress with his usual curiosity and boldness, warblers and catbirds all comment on your passing, some with cheer and some scolding.

Suddenly, there is a dark, strange, heavy branch hanging out from a pitch pine tree. It makes the whole tree look off balance. It is a Witch's Broom. Formed by a parasite (mistletoe), this wierd, dense tangle of branches grows and grows as the roots of the mistletoe irritate the tree and it sends out more and more sap to try and restore natural balance. However, the mass just becomes heavier and looks just like something you don't want to be near in moonlight on Halloween.

You can go further at this point, or return to the hub of the paths at Cooper Center. If you return, though, you will miss walking through a swamp cathedral. In this area the only trees which are tall, sticking above the rustling reeds, are Atlantic white cedars. They have been burned and their roots drowned but the tough cedar heart keeps them standing tall and dark against the peaceful sky. Possibly down in the wet swamp some ancient cedar logs still lie undecayed because of their toughness and the acidity of the soil. In a typical Pine Barrnes bog, buried logs such as this were dug up and used for shingles since they weathered so beautifully.

Immediately following this stately scene is a dense shrub area. Again you follow a well marked path through magnolia, holly, bayberry, blueberry, sassafras, and swamp maple. The mingled scents of these and especially sweet pepperbush and cedar may remind you of camping in peaceful woods.

As you return home, you will carry strong images of nature surviving, thrusting bright green growth out of the black waste of fire's path. Or tall, stark trees towering over lush, low undergrowth will have entered your daydreams. Energetic new leaves from blackened trunks; wet, wavy grasses springing up from floods; these scenes of the resiliancy of nature will probably draw you to return for more exploring of Cattus Island Park.

GREEN ACRES

Continued from page 12.

situated between the old quarry and a marsh. Four solar systems, two active and two passive, contribute about 50% of the building's heat. Heavy insulation further reduces heating costs. The south face of the center has earned the first national award given for solar design of a commercial area. Large windows let in sunlight, and concrete floors absorb its warmth. Twenty aqua plastic columns, eight feet high and filled with 48 gallons of water store heat for the "sun space"/greenhouse. Half the cost of the center came from a $179,000 Green Acres grant.

Flat Rock Brook is supported by members and staffed primarily by volunteers. A major function of the center is weekday outdoor education programs coordinated with local schools. Weekend programs range from hiking the Palisades and climbing the Shawangunk Mountains to walking across the George Washington Bridge for a lesson in urban ecology. Visitors can take a guided tour of the building or wander about the grounds.

Flat Rock Brook Center is located at the east end of Van Nostrand Avenue. It can be reached via Jones Road off Highway 4 in Englewood. For more information, call 201-567-1800 or write to Flat Rock Brook Center, P.O. Box 571, Englewood, N.J. 07631.

Lord Stirling Park in Somerset County is 400 acres of freshwater marsh, swamp, bogs, streams, rivers, fields, and woods adjacent to the Great Swamp National Wilflife Refuge. The park was named for former landowner Lord Stirling, a general and quartermaster in George Washington's Continental Army. Stirling's manor house is long gone, but the slave quarters remain as a National Historic site.

The environmental education center at the park was the first federal solar energy demonstration building, and frequent tours are scheduled. Solar heating and cooling supplies 70% of the center's total energy needs and 95% of its hot water. Interesting features of the building include a windmill-powered greenhouse, which was driving an aquaculture system on my last visit. A weather station and geodesic dome greenhouse are located nearby.

Nine miles of six-foot wide trails leading from the center to wildlife observation blinds and towers were funded in part by grants from Green Acres and the federal Land and Water Conservation Fund. Special facilities include trails for the blind and for individuals confined to wheelchairs, a toddler trail for small children and their parents, an animal care facility, and an insect house.

Programs, conducted by full-time naturalists and part-time volunteers, include maple sugaring, astronomy, meteorology, teacher education, and career guidance in the natural sciences. Some activities require advanced registration. Groups of eight or more require advanced notification. Programs may also be scheduled away from the center. Special events include the annual energy fair, folk concerts, and natural history art contests and exhibitions.

The center is located on Lord Stirling Road in Basking Ridge. For more information, call 201-766-2489 or write to Lord Stirling Park, 190 Lord Stirling Road, Basking Ridge, N.J. 07920.

Some of the newest facilities in the state are not yet in operation. The design for the Wildlife Interpretative Center at Liberty State Park is complete, and the $1.2 million building will be constructed on the north edge of the existing 100-acre wildlife area. The center will include display areas and an auditorium. A boardwalk/trail system will encircle the wildlife area.

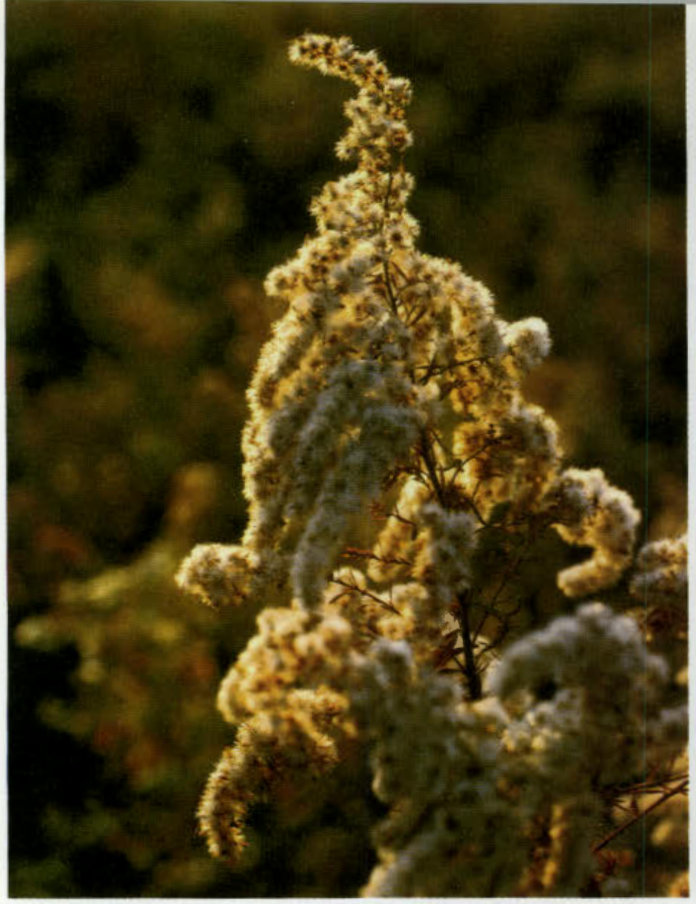
Also under construction is a nature education center at Atlantic County's Estell Manor Park. The center will be passively solar-heated and will include exhibits on historical sites within the park.

DaKorte State Park is 2000 acres of salt marsh in urban Hudson and Bergen Counties, within 100 miles of 10 million people. Year-round, the marsh supports a wide variety of plants and animals and is a major stopover on the Atlantic Flyway. As part of the proposal to build the nearby New Jersey Sports Complex, the Hackensack Meadowlands Development Commission (HMDC), with help from Green Acres and the Sports Authority, agreed to build an environmental education center in the park.

Currently under construction, the environmental center will be connected to a HMDC administration building and a visitor center via passive solar walkways. Methane gas from the surrounding swamps may be captured to help heat the building, which will consist of laboratories, meeting rooms, classrooms, a museum, a shop for making exhibits, and an extensive library on estuarine ecosystems throughout the United States—especially research done in the Meadowlands. The professional staff will include a resident scientist and a librarian.

The Visitor Center will be an octagonal structure perched on stilts in the bay. Totally solar-heated, this will be the major observation and display area. The entire park will be visible from the center. Boardwalks and trails will fan out from the center and are scheduled for completion when the center opens in December 1982.

South side of Flat Rock Brook Center. PHOTO BY G. MESSINA



Goldenrod gone to seed.

Monarch butterfly on seaside goldenrod.

Goldenrod World

By Paul E. Taylor

Few people realize what an interesting world there is in a patch of goldenrod. As a boy I thought all goldenrod was the same. To me it was just goldenrod. Later I began to notice differences. From wildflower guides I learned that botanists recognize many species of goldenrod, some differing only slightly from one another, others very greatly.

Not only did I discover that there are different kinds of goldenrod, I also discovered that goldenrod patches are frequented by many kinds of creatures. As I began to explore patches of goldenrod, I became aware of the variety, specialization, and interdependence which exist there.

Goldenrods are often grouped according to the shape of the flower clusters. Several species are shaped like plumes. A great many are spike-shaped. In some the flower heads are spread out and flat on top. A few are elm-shaped. The different species have such names as Early Goldenrod, Sweet Goldenrod, Lance-leaved Goldenrod, Erect Goldenrod, and Seaside Goldenrod.

No matter what kind of goldenrod it is, however, butterflies, bees, wasps, flies, beetles, crab spiders, jumping spiders, and other creatures are attracted to it. Some come for nectar. Others feed on the pollen. A few are predators which capture and feed on some of the other creatures.

At about the time goldenrod flowering reaches its peak, monarch butterflies are in abundance. Goldenrod nectar is an important source of food during the southward migration of these attractive creatures. Common Hairstreaks and Buckeyes are other butterflies often seen flitting about a goldenrod patch.

A few times I have seen the orange, black, and white ermine moth feeding on goldenrod; other small moths also come to feed or to rest.

Bees and wasps are among the most common visitors to the goldenrod world. Honeybees, as I have discovered while trying to photograph them, really keep busy. They go from blossom to blossom sipping nectar, and at the same time, pollinating the flowers. Both pollen and nectar are used as food.

Goldenrod seems to be a favorite food plant of the paper wasp, *Polistes*. In common with other wasps this species has large compound eyes and seems quite aware of any nearby movements. I have found that getting in close to photograph one is a challenge.

During my excursions into the goldenrod world I have often seen the spider wasp, a solitary species, which feeds its young on spiders. A bright yellow section on its abdomen is in marked contrast to the deep bluish-black of the body.

Many smaller species of wasps, including mason wasps and potter wasps, also feed on goldenrod. Yellowjackets,

PHOTOGRAPHS BY THE AUTHOR

A patch of goldenrod is an interesting world.

Yellow crab spider waits for prey.

Yellowjacket on goldenrod.

black-and-yellow-striped, usually visit goldenrod late in the season.

Many kinds of flies are found on goldenrod: green bottleflies, syrphid flies, bee flies, and others. Many flies are as important as bees and wasps in their help with pollination.

Surprisingly, a number of beetles are attracted to goldenrod. The black-and-tan soldier beetle is certainly one of the most abundant inhabitants of the goldenrod world. Soldier beetles feed on pollen grains, and goldenrod pollen is also an important source of food for the black blister beetle.

The locust borer, a kind of long-horned beetle, is one of my favorites, with narrow yellow zig-zag lines on a velvety-black background which create a striking effect.

I am always fascinated whenever I find an ambush bug hiding among goldenrod blossoms, simply because I never know what one may have in tow. Ambush bugs have been created with long tubelike structures which are injected into other insects for sucking out the body juices. Although only ¼" to ⅜" long, they are strong and well protected, reminding me of miniature armored vehicles. They lie in wait among the blossoms and grab unsuspecting victims. I have seen them catch small moths, small wasps, and even honeybees.

Several species of flower and crab spiders and a few jumping spiders are inhabitants of the goldenrod world. Some small ones conceal webs and egg sacs among the blossoms.

For me, the yellow crab spider is one of the most interesting goldenrod dwellers. Although it resembles a miniature crab it is yellow—just like the goldenrod, a wonderful example of camouflage coloration. This creature is able to wait motionless among the blossoms until an insect comes within range. Then the spider's front legs reach out suddenly and the creature is caught; the fangs are inserted and any struggle is soon over. Flies, small moths, and butterflies are the usual fare. I have even seem them capture and overpower honeybees.

Late in the fall, goldenrod clusters go to seed and their heads turn wooly and gray. Tiny parachutelike seed holders carry the seeds to other areas so that next year there will be more of their kind.

Round or oblong swollen sections now show prominently in many of the dried stalks. These are galls which contain the larvae of certain small moths, flies, and wasps. Sometimes on cold winter days while tramping through a snow-covered field, I have seen Downy Woodpeckers hammering away on these galls to get at the larvae inside.

Each year it is the same; the drama continues. If you will take the time to explore the goldenrod world, you will find, as I have, it's a fascinating world indeed.

MUSHROOMS

Continued from page 5

mushroom as well as with the species), the spores will be deposited on the paper and you can see their color.

The "wheel spokes" of spore prints from gilled fungi can be quite beautiful for their own sakes: white, yellow, salmon, rust, cigar brown, purple, black, and the suitably poisonous green of *Chlorophyllum molybdites*.

Without going into similar detail, I will note that the color, structure, consistency, size of the cap is important; the stem's structure, surface, consistency, and whether or not it is ringed or skirted or has a bulbous or sacked base will count in your process of finding the name of a specimen. Habitat, the sort of trees that are nearby, the nature of the soil, all are important.

The boletes, polypores, puffballs, and many other types of fungi each have their own important architectural features that must be learned by the student of mushrooms in order to correlate what he or she sees with the descriptions found in texts. Perhaps a gilled mushroom exudes a colored, white, or clear latex when cut. The gills of one mushroom bruise red; the pores of a bolete bruise blue-green; the entire surface of another mushroom turns black if you handle it; a puffball bruises wine red on the underside. These are all useful details in naming a specimen.

For fine points of identification, the microscopic examination of cells of the cap skin and flesh, of the gills, of the spores, or other parts may be necessary. Reactions of the flesh or spores of the mushroom to certain chemical reagents also serves to distinguish species.

But you don't want to become a chemist, eh? You just want to eat a few wild mushrooms. There are several which you can learn to identify with the aid of one or more of the excellent field guides now on the market. At any rate, the field guides form a good starting point. Here are some recommendations:

Mushrooms of North America by Orson K. Miller, Jr. is available in pocket- and library-size editions. It contains a wide variety of species, has good keys and a fine set of color photograph illustrations.

The Canada (not "Canadian") Department of Agriculture has issued a book that works quite well for Northeastern mycophiles—*Edible and Poisonous Mushrooms of Canada* by J. Walton Groves. Groves' keys to the species of several genera of gilled mushrooms are more detailed than Miller's. Groves includes more species of some genera than Miller, less of others. The books complement each other well. However, the photographs in the Canadian book are much too small, and the color is poor.

Lying on a piece of birch bark to indicate one of the trees with which they associate are two elegant specimens of *Amanita muscaria* var. *formosa*. Don't eat.

PHOTOS BY AUTHOR

A fungus growing on a fungus: *Hypomyces lactifluorum* has turned a normally white and inedible species of *Lactarius* or *Russula* into a treat that is sought after by cattle and deer as well as humans.

A classic *Amanita muscaria* graces the cover of Alexander H. Smith's *The Mushroom Hunter's Field Guide*. Smith's book is good for some nongilled fungi, which other authors may slight.

For a good key at the genus level (Groves has one also) and for an abundance of inedible species left out of the other guides, I recommend a British book by Morten Lange and F. Bayard Hora, *Collins Guide to Mushrooms and Toadstools*. Lange and Hora also give a brief account of microscope techniques.

David L. Largent's four volume set *How to Identify Mushrooms to Genus* contains a wealth of technical detail for the amateur mycologist. This set and a number of other fine texts are available from the New Jersey Mycological Association (c/o Ray Fatto, President, 1187 Millstone River Rd., Somerville, NJ 08876).

The beautifully illustrated Audobon Society *Field Guide to North American Mushrooms* by Gary Lincoff of the New York Botanical Garden just recently became available. If you read French you will find René Pomerleau's *Flore des champignons au Québec* chock full of information although very poor in its color reproduction.

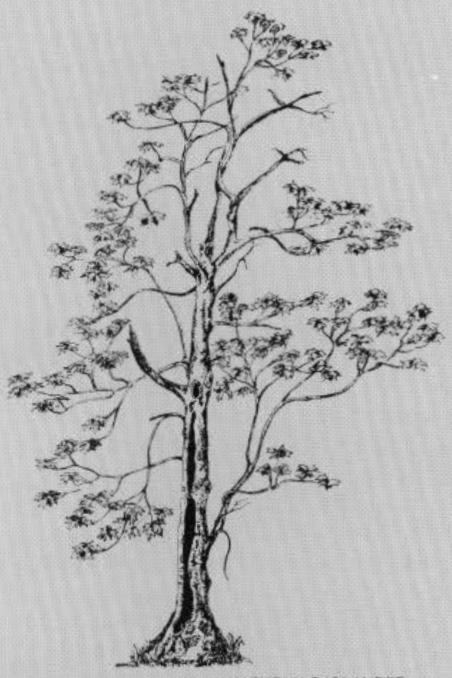
A few mushrooms of New York and New Jersey which are not in the other books are named in William S. Thomas' *Field Book of Common Mushrooms*, but the book lacks a key—preferring a tabular approach that would be difficult to use even if G. P. Putnam's Sons had *not* reversed the order of a number of pages in the tables. Thomas and Smith give useful pronunciation guides for the formal two-part names of the fungi.

Regional guides are useful because they may give a few additional species that guides aimed at the nationwide public would chose to leave out. Two good regional books for amateurs are the 1971 reprint of Kauffman's *The Gilled Mushrooms of Michigan & the Great Lakes* and Verne Ovid Graham's *Mushrooms of the Great Lakes Region*.

It is only fair to point out that there are some texts which give either incorrect or incomplete information that makes them a dangerous source for the novice. One book that has been so criticized in recent years is Antoine Devignes' *How to Recognize 30 Edible Mushrooms*. M. Devignes neglects to mention poisonous species that might be confused with some of the species he so highly recommends. John W. Dawson, Jr. of the North American Mycological Association (NAMA) has written a highly critical review of the book and points out that the author does not distinguish between old wives' tales and rules of thumb "designed to err on the side of caution—both are debunked." One should not assume that European books in translation give an accurate account of American fungi.

Amateurs contribute to the mycological literature as well as professionals. A member of the new Jersey Mycological Association (NJMA), David Patterson, has prepared a key to the confusing genus *Russula*. This labor of love is a lucid piece of scholarship tempered by experience and is used as a field key by many who know of it. The *NJMA News*, in its October 1979 issue, includes a completely revised version of Patterson's key.

Here you have a library in outline that it took me six years of wandering in the dark to discover. Another good way to rapidly build up your mycological knowledge is to join NAMA or NJMA or both and participate in their forays which are led by professionals and experienced amateurs. With effort you will begin to find an answer to the question "What is it?"



KATHRYN SJOLANDER

in praise of trees half dead

KATHRYN SJOLANDER

"Why don't you cut down that old rotten tree? It might fall on the house some day." We have been asked this question many times about the red maple on our front lawn. True, it is a somewhat unsightly tree because it happens to be only half alive. But on the other hand, it also happens to be only half dead. Here are some of the reasons why I don't want to destroy it.

The first year of my acquaintance with the tree it was bustling with battling birds. That spring a pair of flickers pecked out a home 15 feet from the ground on the dead side and took up residence. No sooner had these dapper members of the woodpecker family settled in than a pair of starlings, with their eye on this made-to-order dwelling, set about evicting their rivals. Although the starling is only a little more than half the size of the flicker, what it lacks in inches, it makes up for in ferocity. With their strong rapier bills the birds stabbed at their more timid adversaries again and again, in the air and on the ground. But in spite of my rooting for the original homeowners, the less aggressive flickers were the losers in this short but fierce fight, and the obnoxious starlings raised their noisy brood therein.

As I watch a pair of bluebirds inspect one of the cavities in the maple the following spring, I had great hopes of their becoming our new neighbors. They fluttered about the entrance and spent some time examining the interior. But much to my disappointment, they eventually turned down the apartment.

No bird inhabited the tree that season, but instead, a pair of flying squirrels used it as a home. Now and again on late summer evenings I was aware of a small bit of blurred movement on the tree trunk. The tiny squirrel was quick and silent when it left the tree to forage for food. I never really got a good look at it, but I could definitely sense its presence.

Through the years large portions of the maple's interior have rotted away, leaving the bottom half with a hollow trunk. A large hole at ground level on one side and a smaller hole on the opposite side provide the chipmunk with a bit of diversion on his daily rounds. I am sure this quick and alert little rodent runs through the tunnel just for fun. Since the tree is surrounded by lawn, it would offer the chippie welcome shelter should he be pursued by hawk or cat. But I have never seen him linger; he always darts right through the tree as though this runway created too exciting a game to pass up. A person viewing the tree from its solid side would certainly believe this clever animal to have magic powers that enable it to whiz right through the tree.

The nesting site in the maple tree attracted a pair of gray squirrels one year. They stuffed leaves into the largest hole and set up housekeeping. We were rewarded with the antics of their three young circus performers in the spring as they chased one another up and down the tree. One baby in particular showed early gymnastic prowess by sliding round and round a small branch. Like a young child who has just discovered he can walk, the squirrel performed this newest accomplishment repeatedly. These very new furry babies were most appealing to watch those first days out of the nest. They continued to entertain us later in the year with their aerial acrobatics while acorn hunting high up in the oaks.

One winter morning I was aroused by the clamoring of many birds outside. I dashed out the door and followed the hubbub to the dead side of the maple. What could be the center of their attention on this cold, cold day? There in the old squirrel hole was the source of the birds' agitation and excitement. A sleepyeyed screech owl raised its head in annoyance when a titmouse dove toward the opening. As blue jays, downy woodpeckers, chickadees, nuthatchers, juncos, cardinals, and a mockingbird continued their vociferous complaints around the hole, the owl slunk down lower into the cavity so that all I could see were its "ears." The ears, of course, are not ears at all. They are merely tufts of feathers. An owl's ears are hidden beneath the feathers on its face. This arrangement is a decided asset to the bird, for on its nocturnal quest for food, both eyes and ears face the ground. As a result, very little movement or sound below escapes notice. The diet of the screech owl includes a variety of food, and topping the list are mice and rats. However, these noisy songbirds, undoubtedly were objecting to the owl's presence because it is a nest robber as well. Seldom does all this ruckus rout the bird from its daytime roost. It seems to know that if it ignores all the fuss, the smaller birds will soon lose interest and move on. And after a half hour of owl-heckling, that is exactly what they did.

A pileated woodpecker that lives in our neighborhood likes our old maple too. The male has enlarged one hole many times, sending woodchips flying as he probes for the carpenter ants that live deep inside the wood. This large crow-sized bird has also feasted upon the suet we have fastened to a nearby tree trunk. It is always an exciting event to watch the undulating flight of this majestic bird as it flaps through the woods uttering a loud, penetrating "kuk-kuk-kuk-kuk." I marvel that a bird with such a broad wingspan can weave gracefully between the trees without ever colliding with them.

Early one morning I watched the pileated woodpecker having a leisurely breakfast that lasted 40 minutes. A ray of sunlight sought out the bird's brilliant, dashing red crest as he pounded and drummed on the maple with such force that if he had been born with teeth, they would have been rattled loose. The sound reverberated throughout the woods and occasionally, between courses, he let loose a wild piercing whinny that was answered by another woodpecker from far off. I assumed it was the bird's mate, but she did not accept his invitation to dine with him.

Cut down our half-dead, very-much-alive maple? Miss all this free entertainment? Not on your life! □

INTO THE BREACH

Continued from page 3

efforts. The road has deteriorated from four lanes to two. It is estimated that from three to four *billion* cubic yards of sand would be required to restore the beach to its 1940 contours. The Park Service's valiant efforts to stablize the area have been stopgap measures that bear witness to the old adage, "Time and tide wait for no man."

The following proposed long-range options involve permanent structures. 1. The seawall could be extended past the critical zone and the point of focused wave energies. The area behind the seawall would have to be filled in with sand. 2. A series of 10 groins could be built within a filled-in area. Beach erosion, of course, would occur north of the groin area, requiring annual beach nourishment. 3. An armored causeway one mile in length with an elevation of 12 feet above mean sea level is another alternative that would also require beach nourishment. Acquiring and distributing all the required fill sand is becoming increasingly more expensive and many of the local sand sources are polluted. 4. A bridge could be built over the critical zone, and perhaps a permanent inlet should be established at a chosen point. However, the effect on wildlife habitats on both the bay and ocean sides of the Hook must be carefully studied and evaluated in considering this plan. 5. Ferry service similar to the Staten Island service could be set up to carry people across the breach point. Bus service would have to be set up to move people around the Hook. 6. An offshore breakwater could be constructed from a variety of materials such as old tires, rocks, and concrete. There is no doubt that any sort of construction will have effects on the Hook and surrounding areas. The favored program of simple beach enrichment seems to be the one causing the least amount of ecological upheaval.

The bottom line for Sandy Hook, as with everything else these days, is funding. Programs are more easily figured out than they are financed. Any further action will be costly. Will Congress be willing to augment the National Park Service Sandy Hook budget of $2,000,000 a year? Perhaps money will be forthcoming only when the breaching crisis occurs. The National Park Service does keep some funds in reserve for emergency use. One thing is certain. Sandy Hook will be breached and become an island once again. How humans intervene and what the long-range effects of that intervention will be are clearly critical issues for the caretakers and recreational users of Sandy Hook.

MENLO PARK BIRDS

Continued from page 7

singly or in pairs, rowing up into the air from the leafless treetops and then spiraling slowly higher and higher on thermal currents. Often enough they are harrassed by the crows as they row upward from the tops of the trees, the crows, which cannot fly as powerfully as the red-tail, gaining a little altitude and then diving downward toward the hawk. Other raptors present here include the American Kestrel, seen in any season although not frequently, and the Sharp-shinned Hawk, which I have seen only once, dashing over the narrow open space of the railroad track and disappearing among the upper branches of the trees.

The park adjacent to these woods lures interesting species, too, such as the Ruddy Duck, Pied-billed Grebe, Great Egret, Spotted Sandpiper, and the Swainson's Thrush, which I once saw in large numbers both in the park and in the woods in the fall. And a few pairs of the park's wild Mallards have been seen each spring wading in the marsh and the narrow brooks that cut through the woods. (Once I flushed a female trailing 11 ducklings through the grass from the brook toward a thicket.) But the crews of Ring-billed Gulls and Herring Gulls curvetting and sailing over the woods and the park in winter, and the whistling Starlings present all year round are common and particularly contemporary phenomena. The park also provides a habitat for Rock Doves and a hardy flock of Canada Geese, two common suburban residents.

In conclusion, it is important to consider the species which must have permanently occupied niches here in the past and could continue to thrive here with less pressure from the encroaching artificial environment. There are holes drilled by a Yellow-bellied Sapsucker ringing a thick oak near the brook, but they appear to be quite old and I have never seen the sapsucker here. The Indigo Bunting I have seen only once in this area, each sighting occuring in high summer, and the possibility exists that it has been nesting here. The Solitary Sandpiper peeping in the little green-frosted rill of spring water in a warm September dusk was, considering the fact that the spring has since been bulldozed and others like it have long since been disturbed, perhaps one of the last in a long succession of Solitary Sandpipers that would have stopped here in the past. The Common Nighthawks that cavorted in the evening heat of that same September week, in the open space between tall oaks and the brook, were probably showing their respect for a past acquaintance. Other species that once touched this area regularly in passing and even nested here are now absent altogether and the balance is not what it was.

FRONT COVER

"The Old Glenwood Mills"—Photographed by David A. Bast

INSIDE BACK COVER

Beaver at work—Illustration by Carol Decker (See article on page 18.)

BACK COVER

Girl in a Field of Goldenrod—Photographed by Paul E. Taylor (See article on page 28.)