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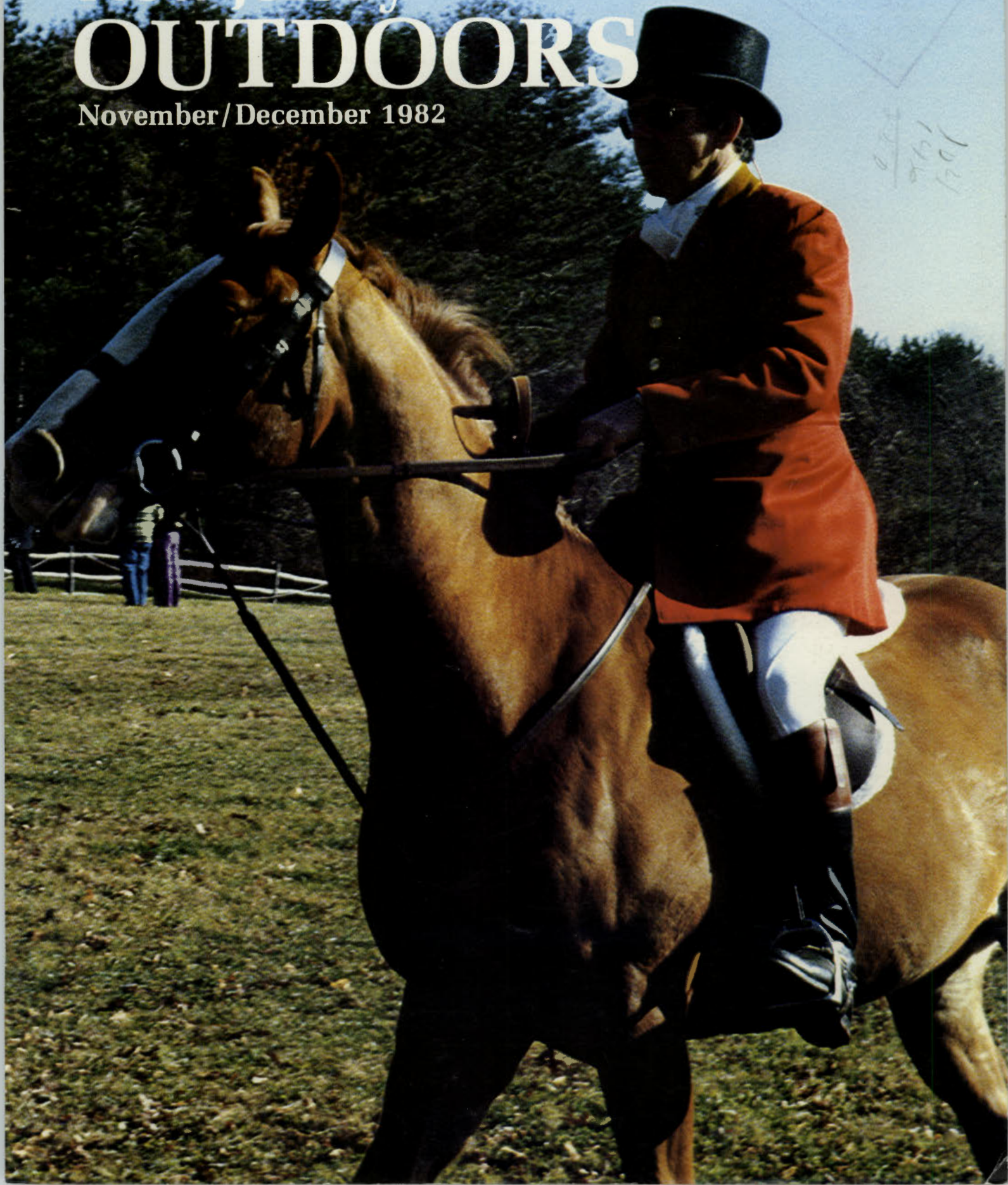
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New Jersey OUTDOORS

November/December 1982





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

(Note: Costs of publishing the magazine not covered by subscriptions are met from general revenues available to the Department of Environmental Protection.)

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From The Editor

Our Reader Survey Returns

More than 85% of those responding to our Reader Survey believe *New Jersey Outdoors* is effective in its efforts to inform and educate the people of New Jersey about our environmental problems and the conservation of our natural resources, and more than 6% said we are somewhat effective. Almost 5% do not think we are effective, and 2% did not yet know because they are new subscribers.

One of the most significant changes over past surveys is the number of female subscribers, which jumped from 15% of those responding in the 1978 survey to the current 23%. Even this does not give a true reading of our female readership. Many of the male subscribers indicated their wives also read each issue.

The outdoor interests of our subscribers is naturally an important item to us. The survey indicates 45% of you like to fish (a whopping increase of 16% over the 29% in 1978). Also, 31% like camping and hiking/canoeing, 21% are hunters, 20% like nature study and birdwatching, 10% like sailing and boating, 13% like outdoor photography, 12% are gardeners, 9% like swimming and other water sports, 5% are bikers, and 5% are skiers.

As to the total number of people that read each issue: 13% of approximately 69,000 subscriptions are read by one person, 30% by two readers, 21% by three readers, 18% by four readers, and another 18% by five or more readers. These figures indicate more subscribers are sharing their magazine than in 1978 when 17% of 43,000 subscriptions were read *only* by the subscriber. When the current figures are multiplied out, we come up with more than 205,620

people presently reading each issue of NJO. Compare this to our estimate of 132,000 readers just four years ago.

The ages of our subscribers, assuming those who answered are a representative sample, are as follows: 0.3% are 10-13 years old, 1% are 14-17 years old, 17% are 18-29, 25% are 30-40, 21% are 41-50, and 36% are over 50.

The answers to the question about educational level tell us that 71% of you have either attended college, graduated from college, or have post graduate degrees—hardly any change from the 1978 survey which posted a 70% figure for this grouping. Also, 22% of our subscribers are high school graduates and those with less than four years of high school number 6%.

Subscriber occupations include 41% professional, 17% technical and trades, 16% white collar, 15% retired, 5% homemakers, 4% students, and 2% self-employed.

Your answers to Question 3, "How did you first learn about *New Jersey Outdoors*?", tell us that word-of-mouth (30%) continues to be our best advertisement. Motor vehicle inserts come in second (23%) in helping us boost our circulation. About two-thirds of the 22% who marked the category "other" specified that hunting or fishing compendiums clued them in to NJO. As one subscriber suggested, this should have been a separate category, especially since it was our original source of publicity.

How long have you been reading our publication? Your answers are as follows: less than a year—18%, one to two years—17%, two to five years—38%, six to ten years—13%, and over ten years—14%.

What do you read first? The highest number of you (20%) checked recreational articles. Editorial and wildlife

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In this issue

Writer Deborah Boerner gets us in the holiday spirit by reporting on two December events at one of our state parks. The children won't want to miss *Christmas at Allaire* and neither will you! Photos are by the author and by Allaire State Park staff.

The front cover introduces the second article, *New Jersey Has Beautiful Country For Fox Hunting*, by Joan R. Huber. According to the author, "the excitement of a full fox hunt . . . is beyond words, and photographs can only suggest what it is like." Huber does an excellent job trying, though; the photographs, including the cover, are hers.

Maritime New Jersey: A Forgotten Legacy is the story of shipbuilding in New Jersey's earlier days. Author Donald H. Rolfs has done extensive research on the subject, has written previous articles for NJO, and has written a book called *Under Sail: The Dredgeboats of Delaware Bay*. The photos that accompany this article were provided by Rolfs.

In *Outward Bound All Year 'Round*,

writer Brian McPeak discusses the wide range of activities enjoyed by those who participate in the Outdoor Club of South Jersey. Starting 14 years ago as an informal group of less than 10 people, the club now draws as many as 300 to certain outings.

Rod Tulloss is back with Part II of *Wild Mushrooms in New Jersey*. As promised, this part deals with ways of preparing the edible varieties. Photos were provided by the author.

With deer season just a few weeks away, author/photographer Charlie Heidecker tells all hunters (and nonhunters) *Don't Shoot Until You See the Whites of Their Eyes*. The fact that this article is part of the "N.J. in Focus" series should give the reader a clue as to what kind of shooting Heidecker writes about.

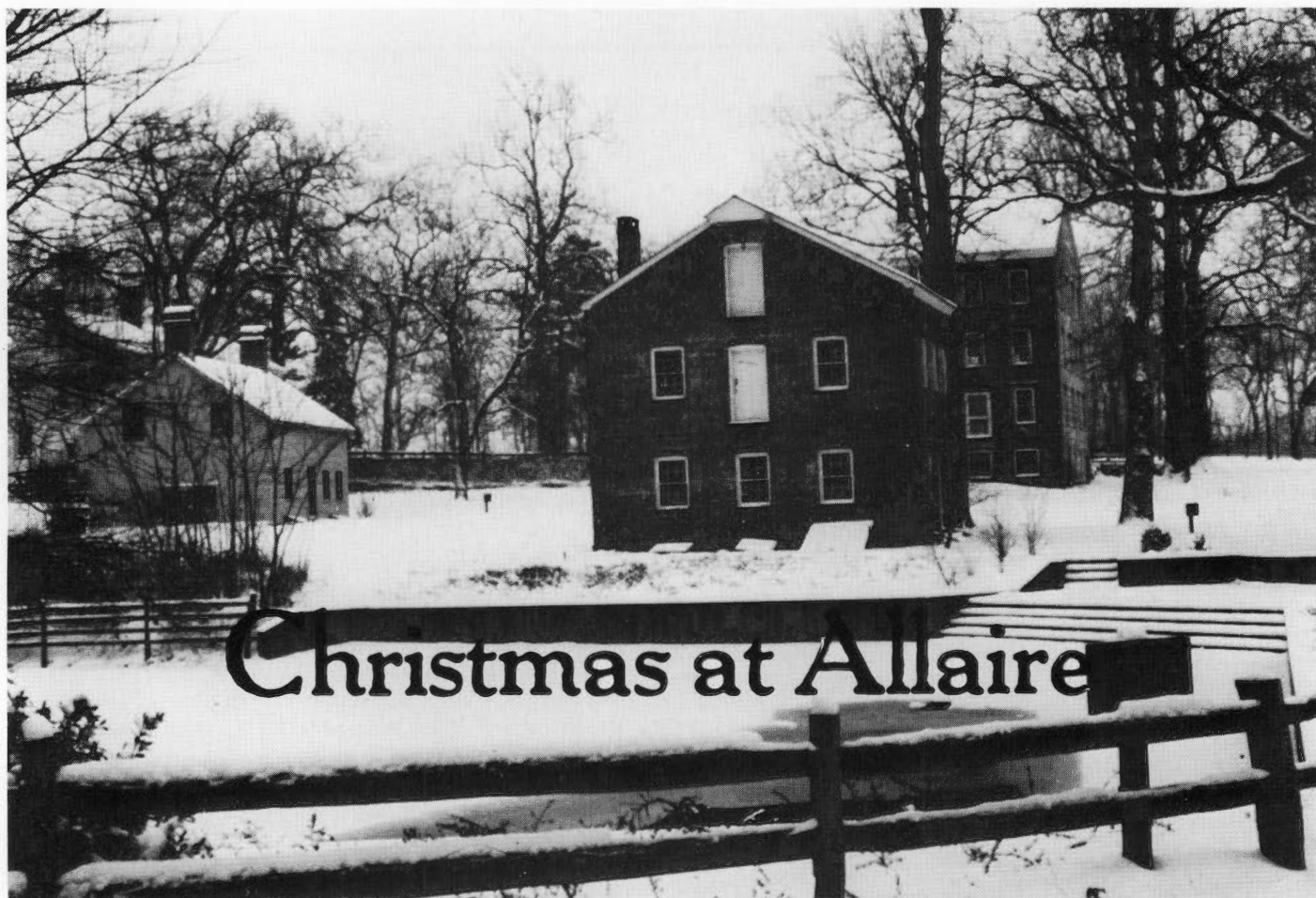
Attention all fishermen! Read Jim Meritt's article entitled *New Jersey Steelhead*. Then you won't be surprised if you catch a steelhead in New Jersey waters this winter and you'll know where to report it. Photos were provided by the author.

Just in time for the 1982-83 heating season, Assistant Forester Don Swaysland of the N.J. Bureau of Forestry writes *Firewood Consumption in New Jersey: A Million Cords A Year*. A million cords is no small amount but Swaysland says that firewood harvesting, if done properly, does not deplete the forest resource but actually improves it. Photos are by the Bureau and Deborah Boerner.

Joe De Caro writes about "the life of a remarkable man" in his article, *James Caldwell and the Five Churches*. The article includes directions to each of the five churches. Photos are by the author.

Our "Wildlife in New Jersey" article, *The White-tailed Deer*, is again introduced by Carol Decker's illustration on the inside back cover. Debra Morris, a biologist with the New Jersey deer project, wrote the article, which includes the history and ongoing goals of deer management in the state.





The Deserted Village on a snowy December day.

ALLAIRE STATE PARK

BY DEBORAH A. BOERNER

We all know the traditional tale of how Santa Claus makes his rounds in a sleigh drawn by eight flying reindeer. But have you ever seen Santa arriving at Allaire State Park via the "Christmas Express"?

If you haven't, you won't want to miss him this year. Santa Claus comes to Allaire State Park in Farmingdale every December on the Saturdays and Sundays before Christmas. He entertains and listens to children's requests in the passenger coach of an old-time steam train as it rambles along the Pine Creek Railroad through the park's woods and open terrain.

The station where the "Christmas Express" stops for passengers is part of the Deserted Village of Allaire, a restored town where more than 500 people worked making iron at the beginning of the 19th century. Today, one brick furnace, four historic buildings, and several other buildings remain standing. The General Store offers an array of

merchandise and is gaily decorated for the holiday season.

On the Sunday closest to December 6 (St. Nicklaus Day), the Deserted Village comes alive as old-time Christmas traditions are celebrated. St. Nicklaus Day, celebrated on December 6 in Holland, was brought to America by Dutch settlers. A well-known observance of this day is when the children fill their shoes with treats and place them on the doorstep or near the fireplace in anticipation of St. Nicklaus' arrival. A tree is decorated with homemade ornaments.

Men and women at the Deserted Village dress in period costume on St. Nicklaus Day, and everything is reminiscent of the era when Allaire was a thriving part of a major industry of its day.

Allaire State Park is located on Route 524, two miles west of the Garden State Parkway Exit 98 and Route 34, and one mile east of I-195 Farmingdale Exit.





Santa Claus (alias Ed Eckart) comes to town.



Santa says goodbye to a good little girl.

One of the buildings is decorated for St. Nicklaus Day.



ALLAIRE STATE PARK



This is the children's favorite St. Nicklaus Day tradition.



ALLAIRE STATE PARK



The hunt moves out.

New Jersey Has Beautiful

BY JOAN R. HUBER

Hunting the fox isn't always successful. On Thanksgiving Day, the Essex Fox Hounds went out across the spacious Somerset County countryside and in the first two hours of the hunt found and lost two foxes.

The fox will lead the baying hounds and eager riders on a chase across fields and along trails until he goes to ground in a burrow or loses the hounds by whisking through thick brambles. The fox is

completely familiar with the territory since he lives there and knows numerous holes into which he can disappear. Acres of tangled blackberry and raspberry bushes are well known also and he has little difficulty escaping when he gets serious about losing a hunt.

Only two or three foxes a year out of some 84 hunts are unlucky enough to get caught.

The excitement of a full fox hunt such as the one on Thanksgiving Day by the Essex Fox Hounds is easy to describe but the actual ex-

perience of it is beyond words, and photographs can only suggest what it is like. It involves the feel of crisp November air, the warm scent of horses' sweat rising from their steamy shoulders, the call of the horn—insistent, repeatedly echoing across the fields.

Every Thanksgiving Day the meet is held just off Holland Road, near Gladstone, for the Opening of the Formal Hunt. On this day every member wears his or her formal colors, which include the men's handsome top hats and "pink"



The total outfit, colors and derby and clipped horse



Partaking of the stirrup cup.



The Hounds are ready.



Horse and Rider are eager and in fit form.

Country For Fox Hunting

coats which are really red. The women wear their derbies and, on the collar of their black coats, the mustard color of this particular hunt.

Before this Opening Day they rode three times a week, but it is then called "cubbing" and is a form of practice for hounds, horses, and riders. All three must be in top shape because a hunt might last several hours and consist of galloping across many fields and down country dirt lanes. And, of course, they jump four-foot fences to keep up with the hounds.

At the Meet the elegant riders on their tall, powerful horses gather around the silver "stirrup cup" for a nip of brandy or sherry while waiting for the Master of Fox Hounds to arrive with the hounds. Everyone mills about, horses dancing sideways full of energy and eager to run. The hounds, gathered in a pack by the Whips and the Master, are more casual. They scratch their ears and wander about checking out the spectators standing around on the ground.

But then it's time to begin; the great horn sounds and the scarlet-

clad men crack incredibly long whips to move the hounds out. The Field (main body of riders) follows as orderly as possible on glowing horses whose chins are bowed to their chests as they strain against the bit.

In the distance, the hounds start their famous baying. Even the earth-bound listeners feel a thrill at this sign of a found fox. It seems to be an ancient sound which echoes in the human psyche.

And they're off! The hunt has begun!

NJ

New Jersey Country



MARITIME NEW JERSEY:

A FORGOTTEN LEGACY

One of the greatest maritime scenes in New Jersey taken at the turn of the century, "Dawn on the Maurice River" portrays oyster Schooners and sloops beating out to the bay.

PHOTOS BY AUTHOR

BY DONALD H. ROLFS

Although New Jersey is bordered on three sides by water, much of its maritime history has been obliterated by the suburban sprawl which is creeping over the state. This was not the case half a century ago, for even then in the so-called Garden State, men went down to the sea, down to the bays, and down to the creeks in wooden vessels. These watering men demanded a sturdy deck under their feet. For that sturdy deck the fisherman or the commercial seafarer might build his own boat or he would hire a shipwright to build it for him. The genius of the small watering communities which dotted the Jersey coasts and rivers was that they had available nearby the raw materials to sustain their existence. Oak, pine,

and cedar were plentiful and naval stores could also be produced. They were "Back Yard Boatyards" as well as small commercial shipyards that grew out of the economic development of each watering community. It seems probable that early settlers used the Indian dugout canoe to pole or paddle through the tidal marshes or to ascend and descend to little creeks and rivers found throughout the state. Early traditions suggest that Dutch farmers used large dugout canoes on the Delaware River to transport salt hay and other commodities. Archaic records indicate that the Indians, who resided in the state, were known to have built dugouts at least forty feet in length. Since fair amounts of timber were

available, an unskilled white man could easily produce a small canoe.

The vessel mentioned often in colonial times was the "shallop." Early shipbuilding accounts of the Massachusetts Bay Colony refer to the building of two shallops in the New World. The shallop is also mentioned as the long boat from which the Pilgrim fathers set foot on these shores at Plymouth Rock. Scanty historical records seem to indicate that shallops were in use in northern New Jersey in the bay areas as well as in southern New Jersey where the Delaware River meets the Delaware Bay. One of the earliest vessels built and recorded in southern New Jersey's history was the shallop "Greenwich." It was built in

the Village of Greenwich on the Cohansey River and its Captain's name was Constant Maskel. These colonial vessels were also mentioned as being built in the backwaters of many of the creeks and rivers, especially in southern New Jersey between the years of 1800 and 1830. Many of the shallops contained a small cabin or cuddy decked over and bricked up inside with a fireplace. They were probably rigged with two masts both being about the same height and usually carried two shoulder of mutton sails with a small gaff. There is much controversy about the term shallop even today and, since none of them have survived, it is difficult to really pinpoint what they looked like.

During this same period of time, and especially before and after the American Revolution, the colonial sloop was used all along the Jersey shore, in the bays and on the rivers. These small sloops were probably the forerunners of the profitable coastal trade which was carried on for almost two centuries. Here again these colonial vessels carried a single mast, a fore and aft mainsail boom and sometimes two yards for topsails. Dockyard records indicate the ocean going capacity of these colonial sloops. The dimensions of a typical large boat are forty-five feet on the keel, eighteen and one half foot beam, plus a nine foot draft. Many of

the sloops built in and around New Jersey were probably intended for localized commerce and it is not known exactly where the idea of the sloop came from although it was probably brought from Europe via Bermuda to the colonies. Both on the Delaware Bay and along coastal inlets, these craft were used to bring agricultural and wood products as well as fish and oysters to the great ports of New York and Philadelphia.

The last great work boats to be used as commercial sailing sloops were built in southern New Jersey's watering communities such as Dennisville, Cape May, Mauricetown and along the Delaware River. The sloops were used commercially until the twentieth century in the oyster fishery of Delaware Bay. They were also used to sail tomatoes to market from the truck farms of southern New Jersey up through the Delaware River to Philadelphia. This type of vessel was used to provide commerce through the canals in northern New Jersey that connected with the Delaware River and into Raritan Bay making a pathway followed by water and used by archaic sailing vessels.

My conversation with Captain Walter Campbell several years ago, who was then ninety-two years of age, indicates that his grandfather and great



Schooner Shepherd Campbell, the last great wooden Schooner launched on the Maurice River in 1930, used for the Oyster Fishery: Built at Dorchester Shipbuilding Co.

grandfather both used working sloops in the Delaware Bay oyster fishery. This would indicate that the sloop was used in the 1800's for the bay oyster fishery. Pictures and sketches show that these vessels resembled both the New York Bay Sloop without the top mast and the Bermuda type Sloop with the top mast and jib-headed top sail for use in light air. Captain Campbell recalls his father's sloop, the "Sebrina," which was used for oystering in the 1870s and 80s. Said Captain Campbell, "She was a big sloop. She used to run twenty-five tons of coal from Port Richmond to Port Norris and she was at least forty-five foot long. She had a top sail and a center board. I think some farmers built her up on the Delaware River at Riverton about ten or twenty miles from Camden. They used her to run fruit to Philly and in the winter they hired her out for oystering here in the bay." "The old gentlemen" went on to relate how he personally purchased the sailing sloop, "Mail," about 1901. "She was sixty years old when I got her" he said. "And I worked her for two years and then we run her up on the bank to die. A farmer



At The sign of the Cat . . . Some of New Jersey's most beautiful Catboats docked here in the era of nickle cigars and derby hats near Brigantine Beach in Atlantic City.

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A FORGOTTEN LEGACY

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on the Maurice River gave us fifty dollars for her. In them days the farmers along the Maurice River would buy old wrecks to strengthen their river dikes."

Perhaps the zenith of wooden shipbuilding, which we are mainly concerned with, reached its peak in New Jersey with the building of the great coastal schooners. It is inconceivable how the small villages of Mauricetown, Dennisville and even other areas along the coast built these large vessels, some of them even four masters. Between the war of 1812 and even up to the time of World War II, the schooner was perhaps the most versatile sailing vessel that was ever conceived. The schooner could be found in almost any major port in the great age of sail. They were in the words of Joseph Conrad, "Birds of the sea where swimming is like flying and resembles more a natural function than a handling of man-made appliances. The fore and aft rig in its simplicity and the beauty of its aspect from every angle of vision is, I believe, unapproachable."

The simple definition of a schooner includes the following—a boat with two gaff sails, the fore being smaller than the after sail and carrying a head sail. Open boats of this type were used in Holland in the 17th Century. After 1650 it would seem that the rig was altered by adding a jib sail, this making what is now called a schooner rig. Undoubtedly, this rig was known in England and was brought to the colonies where it was refined by American shipbuilders. It has been said that the name "schooner" originated in Gloucester, Massachusetts, in or about 1713. The most rapid development of the schooner took place after the appearance of the sharp-lined hull known as the "Baltimore Clipper." Use of the schooner spread up and down the eastern coast of the United States and each area developed its own original style. Tidewater and Chesapeake builders specialized in the sharp-bowed schooner and developed the model more rapidly than elsewhere. It was called the "Virginia or Chesapeake" type. By 1760 modifications of this type of vessel were being built by shipwrights in New Jersey watering communities. In southern New Jersey especially, the schooner was used as a vital

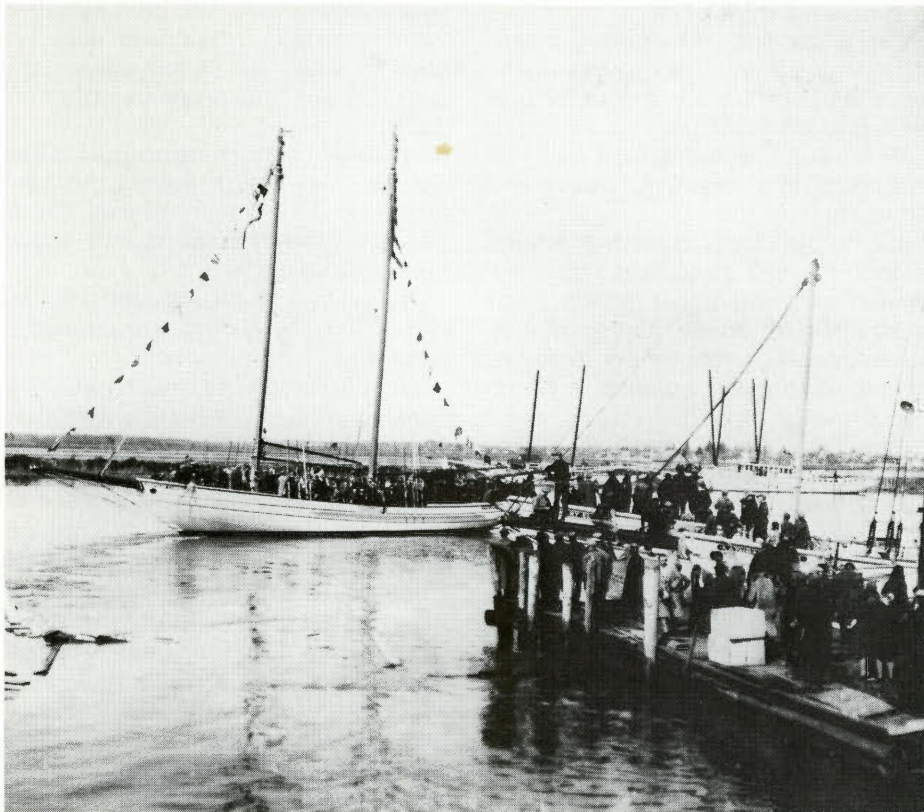
part of commerce in the fishing industry, oyster fishing and for the coasting enterprise.

In post colonial days, schooners in southern New Jersey were built as vessels of commerce. The fore and aft rig was very suitable for coastal work under varying winds and after 1800 a large proportion of the ships along the Atlantic Seaboard of North America and in the West Indies were schooners. Coasting schooners were a common sight in the bays and estuaries of New Jersey. In the census of 1838, the town of Bridgeton, New Jersey on the Cohansey River, boasted of one shipyard where two large schooners and sloops were built. It also lists 30 schooners and sloops using Bridgeton as their home port. Tonnage varied from 50 to 150 tons. By the year 1883 there were 177 ships listed in the same town and 50 were registered as coasters while the rest were engaged in the oyster fishery. A major shipyard that contributed to the commerce of this community was "Rice and Brothers" of Bridgeton. Both shipowners and captains from Cape May to Essington, Pennsylvania, held the "Rice and Brothers" shipbuilders in high esteem. One old captain declared, "Them Rice Boys built them boats to last forever. You know that was because they only used seasoned timber. Them Rice boats would last and last."

New Jersey shipbuilders often built their craft in the most unlikely places. A prime example was the unique shipyard down on Dennis Creek where large coasting schooners up to 1000 tons were built and launched sideways into the small tidewater stream. They were often kedged downstream with anchors or pulled by mule teams, waiting out several high tides before they reached the bay. These larger schooners, sometimes referred to as three or four stickers (number of masts) were also built along the Delaware River and also along the Maurice River at Leesburg, Mauricetown and Millville. Larger vessels such as brigs, brigantines and schooners were built in watering villages near Keyport, the Amboys and in and around Raritan Bay. Leesburg boasts one of the earliest shipyards in southern New Jersey near the bayshore. Founded by the "Brothers Lee" from Egg Harbor, who were ships' carpenters, they began their business as early as 1795. In Burl-



The Beautiful Jersey Top-sail Sloop. Here they are used as charter yachts off the Inlet in Atlantic City at about the turn of the century. With their centerboards up their shoal draft allows them to poke their bowsprits in close to the beach.



The Shepherd Campbell on the Day of her launching. Each launching was accompanied by a folk celebration.

ington, New Jersey, small brigs and other coasting vessels were built shortly after the ancient town of Burlington was founded.

Today, in the waning years of the 20th century, the sound of the shipwrights' tools, such as the adz and the draw knife, are not heard. The tapping

and thumping of caulking mallets and other hand tools are now stilled. There are no great spars being soaked in the briny water waiting to be stepped as new masts. Nowadays, the only sails we see are those which have been contrived not of canvas, but of synthetic materials ghosting quietly above plastic

hulls on tidewater estuaries and out at sea. Along the golden beaches which confront the Atlantic, New Jersey's historic coastline is being reshaped by a multitude of summer homes, concrete and steel casinos and all manner of tawdry and pathetic structures. It is called progress, economic development, the genius of the American dream brought to full fruition. Unfortunately the skills, the craftsmanship and the willingness to labor long hours mastering the craft, such as shipbuilding, will also soon be forgotten in this mad scramble. Still today in small hamlets and villages in the backwater eddies away from our maddening civilization, there are ancient men with gnarled hands and graying hair who have the audacity to teach their grandchildren simple principles which could well help us preserve what it means to go down to the sea in ships. With the scarcity of petroleum products and the soaring expense of plastics and fiberglass, we may once again see the day when the renewable resource of wood will be utilized in the building of vessels and sports craft. In any case, I am sure that Jack London was right when he tried to put into words the feeling of amazement being at sea and in a vessel conceived and built by the hands of man. "The marvel of it! That tiny men should live and breathe and work and drive so frail a contrivance of wood and cloth through so tremendous an elemental strife." (Quote by Jack London from the novel "The Sea Wolf.")



SURVEY RETURNS

continued from page 1

management articles received about 15% each, then nature study (14%), the Environmental News (13%), pictorial essays (10%), historical (8%), and other (5%).

The final survey question, "What are the three most pressing environmental problems in New Jersey?", elicited a large response from our subscribers. Many answered with several pages and offered suggestions as well. The top concern expressed (more than 76%) was pollution (air, land, and water). Two other primary concerns are toxic/hazardous wastes and land development (each 35%). Other more specific concerns expressed were solid waste disposal (16%), litter (10%), preservation of the Pine Barrens (10%), wetlands preservation (9%), water supply (8%), ocean dumping (7%), loss of wildlife habitat (6%), overpopulation (6%), and public awareness (6%).

We want to thank everyone who took the time to fill out and return this survey to us. Almost 2% of our circulation, more than 1350 subscribers, returned the completed survey

forms. We are also grateful for the many compliments and constructive criticisms you've given us. Most of all, we want to thank you for your continued word-of-mouth promotion of our magazine.

That was the good news. Now for the bad news. Because of rising production costs, the sharp increases in postal rates, and the inability of state government (in this economic climate) to provide funding for magazine costs not covered by subscriptions, we are forced to increase *New Jersey Outdoors* subscription rates in January 1983. The new rates are \$6.50 for one year, \$11.95 for two years, and \$15.95 for three years. A single copy will cost \$1.50. This was a very difficult decision for us. But a decision that had to be made in order that we could continue to publish the kind of quality magazine that most of you praised in the NJO Reader Survey returns.

One way to beat the price increase is to renew your subscription now. The new rates will go into effect in January 1983. While you're at it, why not order gift subscriptions for family and friends. They'll thank you all year 'round.

OUTWARD BOUND ALL YEAR 'ROUND

BY BRIAN MC PEAK

BERT NIXDORF



A small hill in the Pines—No Sweat!

Jean's having an affair.

On this particular Sunday morning, after driving her husband to work she is off for another one of her weekend rendezvous.

Sliding out of her apron and into her jeans, she leaves her house and family behind.

It's not one of your normal affairs.

Jean doesn't go to those dark secluded bars or isolated motels, common sites for those having affairs. Instead, she carries on her activities in the wide open spaces of South Jersey.

She has been spotted hiking through the Pine Barrens, canoeing the Oswego River, and even bicycling down Rt. 532 in Burlington County.

You see, Jean is having an affair—with nature.

As one of over 1500 members of the Outdoor Club of South Jersey, Jean spends her weekends attending many of the varied activities sponsored by the club all year around.

"It's kind of fun," says Jean. "You get outdoors and meet a lot of nice people. I've made a lot of friends over the past couple of years."

Love of the outdoors seems to be the major, and only, requirement of the club. The club's membership ranges from preschoolers to senior citizens, as its emphasis is on having activities interesting to all ages and groups of people.

On an excursion at Ocean Crest State Park, about twenty-five members braved the cold and rain of a November Sunday to hike five miles up the beach in search of wildlife.

Haines Fenimore, a resident of

Moorestown, N.J., and club member for five years, drove well over an hour to walk the beach on a rainy day, just because he enjoys the outdoors.

"I like bird-watching," says Haines, "and this is one of the best places to find unusual birds. On a day like today you won't find many, but just looking is fun."

Indeed, as it turned out, Haines failed to spot anything more than the usual gulls and pigeons.

Walking along the beach, the wind blowing sand in the hiker's face, and the ocean breaking so loud it was difficult to hear, Haines talked about past experiences with the club.

"You find a lot of crazy things on these outings," says Haines. "Once when we were hiking at another beach, I can't remember where, we found a cabin cruiser washed ashore. It was all torn up, and when we told the beach patrol, they said it must have washed up overnight. I don't think anybody was aboard, I don't know. I wouldn't know what happened to them if there were."

Dressed in a heavy brown hunting parka, with green hunting boots and a camera around his neck, Haines says the day's weather wasn't nearly enough to discourage him. "I remember a hike when it rained so hard my waterproof hat leaked," pointing to his bright orange hat, the vinyl worn from time spent on past outings.

Although Haines Fenimore is a typical member of the Outdoor Club of South Jersey, he is not the only type that is attracted by the club's activities.

Two young women confessed that

BERT NIXDORF



Lunch Break in Pine Barrens, near Nescochague Creek. 1981



CAROL C. NASH

they go on the club's hikes for the exercise as well as the companionship.

"The short hikes are the ones I like," says one of the women, dressed in a white ski parka and woolen hat with matching mittens. "You get the exercise you need, and it's nice getting out on a day like this. I've learned a lot about plants and wildlife," she said while resting on the grassy dunes, sifting wet sand through her fingers. "It's the only time I can get close to nature, and meet some friendly people."

Judy, the dark-haired woman hiding behind layers of clothing, mentioned that this was her first outing with the club, despite being a member for almost a year.

"I like this type of weather," she says as she lowers her head to protect herself from the blowing sand. "During the summer it's too hot, and in the winter it's too cold, but . . . well you warm up fast."

Her friend, appearing reluctant about the whole adventure, says she came along to keep her partner

company; however she did admit to the need for the exercise.

"You really can feel the difference when you get home. You're tired, but not too tired."

At the same time the two women were resting at the hike's halfway point, a father was helping his son to catch a sand crab by the water, and another family was sitting around discussing the club's upcoming events.



CAROL C. NASH

"I think that sledding thing at Valley Forge sounds interesting," says one woman. "Yea, it sure sounds cultural," replied her husband, dressed in a green parka and red-flowered hat.

The number of families the Outdoor Club draws on its outings is perhaps the greatest accomplishment of the organizers.

continued on page 24

Wild Mushrooms in

By Rod Tulloss

While you are wondering, "What is it?" some of you will also be asking, "Can I eat it?" The texts named in the first part of this article are among the best sources for obtaining an answer to both questions. Certainly I cannot do so here. And, while some photographs of mushrooms accompany this article, I do not claim that these pictures contain sufficient information for field identification purposes.

Likewise, the reader should be cautioned that the author is an amateur albeit an enthusiastic one. While I hope this two-part article will arouse your interest in mycology and while I enjoy sharing what I have learned about mushrooms with you, you should never take what I can give you in one article as sufficient information about the subject—especially the subject of eating wild mushrooms. Enthusiastic experienced amateurs can lead beginners astray with poorly couched advice; and even professionals make mistakes, as the famous American mycologist Alexander H. Smith attests ("That Genus *Amanita* Again," *McIlvainea*, Journal of American Amateur Mycology, iii, 1, 1977). A word to the wise having been given, let's look at a few of the delectable fungi of our area and some favorite recipes for preparing them.

A number of mushrooms are excellent if simply dipped in a beaten egg, then in bread crumbs (seasoned or plain) or flour or corn meal and then fried quickly in hot oil or butter. Bacon fat, light salad oil, butter, and olive oil each add their own distinctive character.

For batter frying of this variety I prefer the oyster mushroom, *Pleurotus ostreatus* or *sapidus*. The oyster mushroom can be gathered on the campus of Princeton University, for example, where it fruits on the boles of still living deciduous trees in wet weather toward the end of summer. The oyster mushroom is widespread, if not common, in New Jersey and fruits in other locales at various seasons from spring, through the cooler parts of summer, to fall. I have collected it in large whitish or grayish clusters in the northwestern part of the state in late spring. The oyster mushroom's delicate flavor does not stand up well in other recipes such as the mushroom and cheese casserole described in Miller's *Mushrooms of North America*; I have to agree with Dr. Groves who maintains that only batter frying is suitable to the tasty *Pleurotus*.

Other mushrooms do well with batter frying. Many people prefer to cook puffballs in this manner or as fritters. A large lawn puffball which, when cut in two, is pure white inside is edible. (Of course, check one of the recommended field guides.) People who enjoy puffballs say that

many times the smaller ones are more strongly flavored. I do not care for the texture myself, and have noted that the fungus will absorb a great deal of the cooking oil unless cooked rapidly. Again, hot oil is the key to success. The most common lawn puffball of any size is *Calvatia cyathiformis*; most authors describe it as a late summer and fall species; but in the very rainy Spring of 1979, I collected the "meadow puffball" in my backyard in Roosevelt. Look for this edible, as its common name suggests, in grassy places. It can appear in large troops; in October, 1976, I collected half a bushel in an hour on the West Windsor campus of the Mercer County Community College.

A number of other mushrooms are commonly served breaded and deep-fried. In fact the cultivated mushroom, *Agaricus bisporus*, of the supermarket is now being sold to restaurants ready-breaded and frozen; and, one restaurateur tells me, it is cutting into his sales of french fries'.

Salt, pepper, bacon fat are the proper fate for some mycophagic delicacies. A wild relative of the common supermarket mushroom, the champignon, is delicious when cooked this way (or in butter or oil). *Coprinus comatus* which one can collect in the fall on well-fertilized grassy places must be handled carefully and not overcooked. The shaggymane, as this *Coprinus* is called, seems to me to have an asparagus-like flavor when prepared in this manner. I regret that I have only occasionally found this widely praised edible species. The re-landscaping of the aforementioned Mercer County Community College ruined a reliable source of supply. It is time to pause for another word of caution.

Mushrooms of genus *Coprinus* are delicious, but those who eat them should be cautioned not to consume alcohol at or near the same time. Somehow the shaggymane and some of its relative interrupt the process by which the body turns ethanol into acetic acid, causing an otherwise temporary and intermediate product, acetylaldehyde, to build up in the unfortunate consumer who will be likely to experience red patches on the face, palpitations, throbbing in the head and neck, and puffiness in the body's extremities.

Kenneth W. Cochran, in a recent issue of NAMA's *McIlvainea* (iii, 2, 1978) writes: "The response can progress to include sweating, nausea, vomiting, headache, abdominal cramps, confusion, respiratory and cardiac depression. Usually a person recovers, gets drowsy and 'sleeps it off', but deaths from the reaction have been re-



The author's favorite back lawn mushroom, *Agaricus campestris*, the champignon. Note young gills are pink; they brown as they mature.

New Jersey—Part II

ported. . . . " Other mushrooms exhibiting some form of toxicity in combination with alcohol are *Clitocybe clavipes*, the morel *Morchella angusticeps*, *Pholiota squarrosa*, *Boletus luridus*, *Laetiporus* (= *Polyporus*) *sulphureus*. The *Clitocybe* and *Coprinus* species ingested with alcohol produce the flushed face symptom first which should be taken as a warning to cease the intake of alcohol.

As is not infrequently the case, what Westerners are pleased to call "primitive" cultures familiar with edible plants on a day-to-day basis have known for years what scientists are just confirming: The Yoruban name for *Coprinus africanus* is *ajeimutin* or "eat without drinking alcohol." With this caution from the opposite side of the world, we return to our local edibles.

There is disagreement between authors upon the proper preparation of the chanterelles, *Cantherellus cibarius* and *Cantherellus lateritius*. Some say it must be cooked quickly in hot butter; others say it must be cooked slowly. I hold with the latter school. I collect chanterelles in the last two weeks of July and the first three weeks of August in oak and beech woods where there is plenty of damp leaf litter. Older forests are better. For some reason, chanterelles seem to like to display themselves along paths about half the time; so they are not difficult to discover. Their chrome orange coloration and, frequently, apricot odor are also pleasing field characters. I slice chanterelles along the length of the stem in rather thin slices. The texture is somewhat tough before cooking, and this helps the slices hold together. Next they are slowly cooked in butter or margarine until they exude much of their natural moisture. I add salt, pepper, and nutmeg to taste and serve as a side vegetable, over rice flavored with orange juice, over meat, or freeze with butter from the pan for use outside the short season of plenty. Chanterelles, called *girolles* in France and *Pfifferlinge* in Germany, can also be dried. Many gourmet stores carry one ounce packages selling for four or five dollars!

The plenitude of chanterelles in wet years can be illustrated by the fact that in 1975 my sons and I sold four pounds of *cleaned* chanterelles to a Princeton market after only two hours in the woods—and we had kept all we could eat for ourselves. Again, in the wet summer of 1979, the pickings were abundant and I have a photo of my then seven-year-old, David, surrounded by our harvest of an afternoon.

After most of the chanterelles have disappeared, we come into the season in which I



The "bricktop" can be expected past the first frost. This cluster of *Naematoloma sublateritium* was found in mid-November.

PHOTOS BY AUTHOR

have collected *Laetiporus sulphureus*. This mushroom is called the sulphur polypore or the sulphur shelf and appropriately so. When it is fresh, its bulky, overlapping petal-shelves are brilliantly colored orange-red and yellow above and sulphur yellow below. I have many times found specimens of the sulphur shelf weighing several pounds on old stumps or logs in Princeton, Roosevelt, and Hopewell, and a particularly beautiful cluster in September of 1976 in Ralph Stover State Park on the Pennsylvania side of the Delaware. It is widespread and can be expected anywhere in the state. Unfortunately it is a cause of heartrot in the trees on which it grows.

The sulphur shelf may be breaded and fried in which instance it has the color and consistency of sliced chicken breast. (Preparation is enjoyable because, at least to my senses, the sulphur shelf has the odor of freshly squeezed orange juice!) I have also made the mushroom seasoning duxelles from the sulphur polypore. Recipes for duxelles can be found in the *New York Times International Cookbook* by Craig Claibourne and (with some historical background) in Jane Grigson's wonderful *The Mushroom Feast*. One can utilize these duxelles in the mushroom piroshki from the Polish section of Claibourne's book. The dish is highly recommended. (One should recall the ingestion of the sulphur shelf with

alcohol has resulted in at least one case of toxic reaction.)

You may find a shelf fungus very like the sulphur shelf, more pallid on the upper surface and creamy white below. If the fungus is in firm condition, this is not a spoiled or aging sulphur shelf, but a white-pored variety called *Laetiporus sulphureus* var. *semialbinus*. It is quite as good as to eat as its more brightly colored relative. It is said to be found at the bases of oak trees, and I have found it so located in Hightstown since 1979. (A field key to the *Polyporaceae of New England* by Frank Helwig, as well as other little pamphlets including recipe booklets, can be obtained from the Boston Mycological Club, 16 Divinity Avenue, Cambridge, Massachusetts 02138.)

While we are on the subject of polypores, we can take a look at an unappetizing fungus. You may have seen, growing from the sides of dead or dying gray birch trees, a fungus that resembles a soft sculpture" rendering of an inverted wine goblet. Its pore surface is slightly indented on its underside. When it is young, it is nearly white; but it takes on brown tones as it ages. It is obviously tough and unpalatable when old, but all authors agree that it is non-poisonous; and one suggests that it can be

Continued on page 28

N.J. in Focus:

DON'T SHOOT UNTIL YOU SEE THE WHITES OF THEIR EYES

BY CHARLIE HEIDECKER

It was cool and crisp that morning as the sun came up—the kind of morning many of us enjoy being out in a favorite woodlot. I had already been in the deep woods for well over an hour when I recognized the familiar gait of an animal coming straight up the hill toward my stand. I sat frozen as a nine-point buck crested the hill only 30 or so feet from my hiding place. Putting him in my sights, I squeezed off three quick “shots” before he was gone, almost as quickly as he had come.

This year so far I have shot more than 50 deer, several of them were fawns, a few bear, maybe a dozen owls plus another 30 or so birds on the endangered list. And I’m not afraid of game wardens. Visitors to our home are impressed by the number of animals that adorn my walls. Those who are hunters turn green with envy at so many fine specimens in one place.

Let me tell you how it’s done. Several years ago my neighbor sold me his old camera outfit because he was getting a newer setup. I spent a lot of time reading photography books about how to frame subjects correctly. Before you know it I was able to take pictures of people without cutting off their heads.

Armed with my newly learned talents, I showed up at our hunting cabin and was almost laughed right out of camp. However, after the first two days I had scored on three of the nicest bucks we had seen in that area for quite some time. I had brought along my darkroom things and after developing my film I made several prints of my “kills.” That old saying, “What you see when you don’t have a gun,” is true. And I had the pictures to prove it!

When that first hunting season ended, the score at camp was one deer hanging on the rack out back, but I had gotten five without the chore of dragging them back to camp. The one thing I did have to do was to make several extra prints for some of the other gun-



Great horned owl shortly after leaving the nest.

hunters in camp just to prove there were deer in the area.

Since that first year when I put down my model 94 Winchester in favor of a long lens, my hunting has become far more satisfying. I don't have to wait for the official hunting season to open, nor am I limited to a certain kind of game. Recently I bagged a great horned owl and a yellow-crowned heron right in the middle of a national wildlife preserve. I don't think that everyone should take up hunting with a camera, nor do I want hunting to be prohibited. But if things continue as they are going, soon the only place to hunt will be in pay-as-you-shoot preserves, for the very rich. Africa is fast becoming just that. Imagine no wildlife for our children to enjoy.

If you love the outdoors as much as my wife Betty Ann and I do, consider hunting with a camera. If you decide to give it a try you will be amazed at the satisfaction you will get as your photos improve.

Like anything else, if it's worthwhile doing, it's worthwhile learning more about. Only by practice and patience will you make any progress, no matter what you try. I now look at shots taken a few years back which I thought were great at that time. Now I see that they are not very good. The skills you've developed as a hunter with a gun will be an asset in your new hobby.

Setting up a blind is one way to get fine closeup shots. First, observe the wildlife. Do deer cross the open field? If so, set your blind along one of their trails and you may be lucky enough to come up with a great shot before they bound off. Animals are very curious. If you remain motionless when they spot you, they sometimes will even come closer to investigate. Readiness is the watchword—you must know your camera well because you might only have a few seconds to get that shot before your subject is gone.

My wife Betty Ann and I love to camera-hunt in wildlife refuges and have spent many hours over the last few years doing just that. We find that by staying in the motorhome and taking our pictures out the side windows we get more and better pictures. The animals are accustomed to thousands of cars driving by and are unafraid; but open your door, and whatever you were trying to shoot is gone. We love to see the roseate spoonbills arrive in Feb-



Young osprey flexing his wings before he leaves the nest for good.

PHOTOS BY AUTHOR



Gray fox

ruary at the Ding Darling Wildlife Refuge on Sanibel Island, Florida, or listen to the overwhelming noise from the snow geese when a flight drops in at the Brigantine Wildlife Refuge in New Jersey around Thanksgiving. Sights like this should be preserved and photography is the way to do just that.

You may find, as I have, that you can hunt on land that was off limits when you carried a gun. Then, if you're lucky enough to get a good photo, make an extra copy for the landowner. He might not put it up over the mantel, but the next time you ask him to hunt his land he might tell you where he has seen the game you're after and cut your waiting time considerably.

Another way to get good pictures is to put out a feeding station. Don't do this during legal game season as it is illegal, plus if a gun hunter finds your station he might have a field day. The sheer number of animals that stop by for a snack will amaze you. If you do put up a blind it need not be elaborate—several burlap bags and some old limbs and you can shoot to your heart's content and not scare away your game. As your photos improve, your den

walls will begin to fill with "trophies" that will drive your gun-carrying friends crazy.

The better you become, the more opportunities you will have to get unusual wildlife photos. People who find injured birds will hear about your interest and give you a call or someone who has seen your photo collection will bring an animal to your home. Situations like these allow you to be inventive. You can put a bird on an old dead branch for your photo session. Butterflies placed briefly in a refrigerator and then removed remain motionless for many minutes until they warm up again. That allows you plenty of time for taking many shots. Ask about photo possibilities at any of the animal aid stations that handle exotic birds or animals. You might be welcomed warmly because they also like to have good pictures of their animals.

The golden rule of all wildlife photography is to harm nothing and to leave everything just as you found it. Put another way, that means take nothing but pictures and leave nothing but footprints in your photographic quest.

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ALL YEAR BIRDING IN SOUTHERN NEW JERSEY

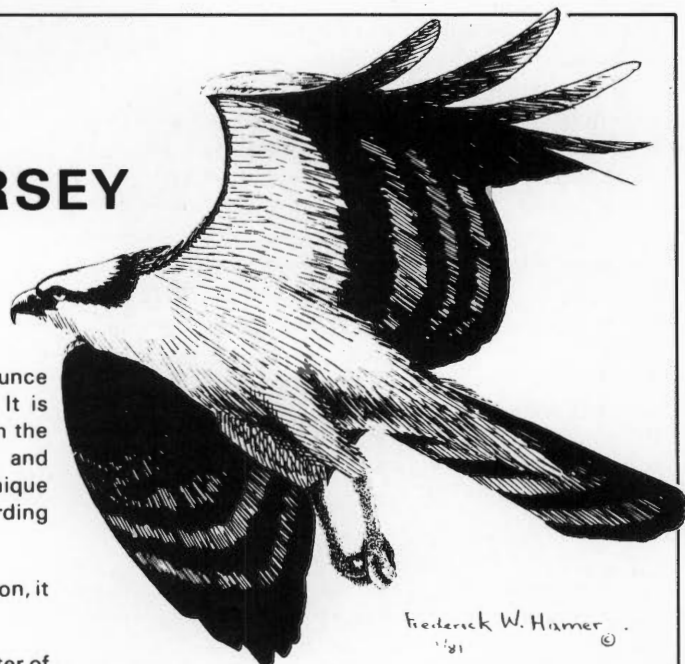
BY James F. Akers

The Stockton Center for Environmental Research is pleased to announce a new book entitled, "All Year Birding in Southern New Jersey." It is designed to acquaint birders with the birding locales and sightings in the region lying south of an imaginary line between Barnegat Light and Woodbury which exhibit high potential for yielding observation of unique avifauna. It provides detailed maps and directions for locating the birding sites described.

Written by a local naturalist who was intimately familiar with the region, it is a valuable birding guide for area residents and visitors alike.

This book is a cooperative venture with the Atlantic Audubon Chapter of the National Audubon Society.

To order your copy send \$4.00 (includes postage) to: The Center for Environmental Research, Stockton State College, Pomona, N.J. 08240.



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25 WALKS IN NEW JERSEY

Dann, Kevin. *25 Walks in New Jersey*. Rutgers University Press, New Brunswick, N.J. 193 pp.

Kevin Dann's *25 Walks in New Jersey* is a guide to walking areas in the state. Although no book of this type could be totally comprehensive, no geographical region of New Jersey goes unexplored in Dann's book. From the Kittatinny Ridge to Cape May, they are all there.

The distance of each hike is given as well as approximate walking time and a rating of easy, moderate, or difficult. This makes the book useful to avid hikers as well as those who just like to amble along. Dann's descriptions of the walks alert the reader to things that can be seen while walking along at different times of the year. Where applicable, he also points out historical significance of the walking area.

Another important feature is the author includes directions from major highways and a map of the walking area to orient the hiker/walker once he gets there.



Environmental News



Two measures which tighten control over the transportation and disposal of toxic wastes were signed into law by Governor Kean on September 1. The bedside ceremony took place at St. Barnabas Medical Center in Livingston where the governor was being treated for a back ailment. Witnessing the signing, from left: Assemblymen Raymond J. Lesniak (D-Union) and John O. Bennett (R-Monmouth), sponsors of the legislation, and DEP Commissioner Robert E. Hughey. (The governor returned to his State House office on September 8.)

U.S. SUPERFUND MONEY APPROVED FOR WORK AT SIX TOXIC DUMPS

Governor Kean on September 23 announced the receipt of \$5.2 million in federal Superfund money for corrective activities at six inactive hazardous waste dumps in New Jersey. Kean made the announcement along with U.S. Environmental Protection Agency (EPA) Administrator Anne M. Gorsuch.

Mrs. Gorsuch praised the Kean Administration for its "aggressive and effective approach to the toxic waste crisis" and said she was pleased the federal level is able to join with the state in a cooperative effort to solve the problem. (Superfund moneys cover 90 percent of a project's cost, state funds provide 10 percent. See these pages, Sept/Oct NJO.)

EPA will be the lead agency at two of the sites: Lipari Landfill near Pitman in Gloucester County and the D'Imperio Property in Hamilton Township, Atlantic

County. Superfund's 90 percent share for the two projects: \$1.9 million.

Lipari: Funds will be used for the design, construction and maintenance of an impermeable 16-acre cap and containment wall to stop migration of hazardous wastes. **D'Imperio:** The project calls for fencing the property, and a study of site geology, groundwater hydrology, contamination of aquifers, and the quality of water from nearby wells.

DEP will be the lead agency for the preliminary remedial actions at four sites: **Goose Farm** (already the scene of cleanup work), **Spence Farm**, and **Pi-jack Farm**, all in the Plumsted Township (Ocean County); and **Friedman Property** in Upper Freehold (Monmouth County). Superfund's 90 percent share of the cost for these feasibility studies, \$3.3 million.

NEW ENVIRONMENTAL LAWS

Brief descriptions of the two hazardous waste bills signed September 1 (see photo) and three appropriation bills for water projects, signed September 8, are given below.

A-889 (Chapter 122, Public Laws of 1982) amends the Spill Compensation and Control Act to give DEP the authority to close a hazardous or solid waste disposal facility while clean-up of a spill proceeds. It further allows DEP to suspend or revoke any other permits or licenses held by the owner of such a facility, including any permits for an operation at another site, if the owner fails to comply with the department's directives on a cleanup.

A-1204 (Ch. 123, P.L. '82) amends the Solid Waste Management Act. The measure makes it a criminal offense to knowingly or recklessly transport hazardous waste to any place not authorized by DEP. It makes it a crime to falsify statements on hazardous waste transportation manifests. Violators will be subject to criminal penalties of up to five years in jail for a violation of the state hazardous waste law. It sets fines of up to \$25,000 for a first offense and \$50,000 for each subsequent offense; and penalties for restitution at a maximum of \$100,000. A person who *knowingly* violates the provisions of the law and is convicted would be guilty of a crime of the third degree. One who *recklessly* violates the provisions of the law and is convicted would be guilty of a crime of the fourth degree.

On September 8 a total of \$57.9 million from bond issue funds were appropriated to DEP to finance sewage treatment projects, water supply interconnections, and water supply facilities construction and repair.

A-1516 (Ch. 131, P.L. '82) appropriates \$35,350,000 from the Water Supply Fund created by the Water Supply Bond Act of 1981. The money breakdown: \$25 million for loans to rehabilitate old water systems; \$5.7 million for watershed and aquifer protection; \$500,000 for the development of special water treatment technology; and \$3.65 million for feasibility studies for additional water supply projects.

Continued on page 16D

THE GEOLOGIC and GROUNDWATER COLUMN

The New Jersey Geological Survey (NJGS) was established as a governmental unit in 1864. Webster's Dictionary defines "geological survey" as "a systematic examination of an area to determine the character, relations, distribution and origin or mode of formation of its rock masses and mineral resources." In the 1800's the NJGS undertook investigations in many fields relative to the natural resources of the state.

Over the years as New Jersey grew in population and industry so did the need for more specialized types of data and mapping. Today the NJGS devotes its time to geologic mapping of rock formations, groundwater and environmental geology, and mineral resources investigations. The NJGS is a unit within DEP's Division of Water Resources. Frank Markewicz is acting state geologist. Ian Walker is NJGS administrator.

For further information about any of the articles below, please write to DEP, NJGS, Division of Water Resources, CN 209, Trenton 08625.

Geodetic Note: SURVEYORS FIND 'LOST' MARKER

DEP surveyors and the Professional Land Surveyors Association (PLSA) of New Jersey marked Surveyors Week (October 11-17) by searching for, locating and rehabilitating a Survey Station first established almost 150 years ago near Hightstown in Monmouth County. In 1833 a U.S. Government survey team marked the station, known as Triangulation Station Disboro, by burying an 8½ inch diameter ceramic cone 18 inches into a hill about four miles southeast of Hightstown. Maintenance of the station by the U.S. Geodetic Survey ceased in 1936. The federal agency recently requested the aid of the state unit to "recover" the survey station. The project was a success. Now marked by a brass disc set in concrete, Station Disboro, is part of a network of approximately 13,000 stations in New Jersey maintained by the National Geodetic Survey and the New Jersey Geodetic Control Survey (NJGCS), a unit within DEP. The survey marks are the basis for making maps and charts as well as for a single horizontal and vertical reference framework for all surveys in the state. This network is used daily by surveyors and engineers throughout New Jersey. The PLSA is a local chapter of the New Jersey Society of Professional Land Surveyors. Its members serve Mercer County and parts of Hunterdon, Somerset, Burlington and Monmouth counties.

Background: The alarming rate in which ships were being wrecked along

the coast between New Jersey and New York, coupled with coastal defense needs, triggered a resolution by Congress to President Thomas Jefferson in 1795 which called for an accurate mapping of the shore. Because the equipment had to be ordered, made and shipped from Europe, the actual survey did not begin until 1806. It was completed in 1843.

**—Harold Neil, chief of
survey party, NJGCS**

GLACIAL DEPOSITS/MAPPING

The Great Swamp, Hackensack Meadows, Passaic Falls and innumerable other landscape features of northern New Jersey owe their existence to Wisconsinan Ice Age glaciers, meltwater streams, and lakes which existed between 16,000 and 21,000 years ago.

There is more to these landscapes than meets the eye. Beneath many of the hills and valleys are sands, gravels and clays important in the search for water, management of waste, production of sand and gravel, and preparation of engineering plans. Protection of natural areas such as the Great Swamp also requires knowledge of subsurface conditions.

In 1980 the New Jersey Geological Survey undertook the first statewide investigation of glacial deposits since 1902. The study consists of preliminary reconnaissance to be followed by detailed treatment of aspects of particular importance to DEP, such as water supply and waste disposal.

Reconnaissance has been completed and has resulted in substantial revision of the understanding of glacial events in New Jersey. Maps and reports summarizing the new understanding are in preparation for publication in early 1983.

**—David P. Harper, supervising
geologist, NJGS**

URANIUM-THORIUM OCCURRENCES IN NEW JERSEY

A seven year moratorium on exploration for the mining and milling of uranium and "other fissionable source materials" in New Jersey was signed into law in 1981. This law states that during the first six years of the moratorium the Department of Environmental Protection (DEP) is to study the potential environmental and cultural effects of such a mining industry. Based on this study the DEP is to make recommendations concerning the "prohibition or regulation of these activities."

Uranium and thorium mineralization occurs in narrow elongate bands in the Highlands Province of New Jersey. These occurrences, from a few feet to several hundred feet wide and several thousand feet long, trend northeast-

southwest. The presence of radioactive elements in New Jersey first came to light in the 1950's when there was much interest in locating uranium deposits in the United States. Prospectors, mostly amateurs, the New Jersey Geological Survey and the U.S. Atomic Energy Commission (forerunner of U.S. Department of Energy), located occurrences near Greenwood Lake, south of Cranberry Lake, near Chester, near Oxford and on Jenny Jump Mountain, in addition to many other localities. The prospectors located deposits by walking or riding the countryside with geiger counters while the Atomic Energy Commission flew radiometric surveys over parts of northern New Jersey. Research by the New Jersey Geological Survey indicated that in many cases, such as at Hacklebarney, West Milford, and Ringwood, the radioactivity is associated with old abandoned magnetite mines. Typically, where radioactivity occurs with the magnetite, the element present is uranium in the mineral uraninite.

Uranium mining occurred in the late 1950's at two localities, one in Warwick, N.Y., near the abandoned Miles Sandish Iron Mine, and the other at the Charlotte Mine near Cranberry Lake in Sussex County, New Jersey.

**—Christy Bell, assistant
geologist, NJGS**

ASBESTOS CONTENT OF SUSSEX COUNTY CRUSHED LIMESTONES

The presence of minute amounts of asbestos in the white limestones (Franklin Formation) of Sussex County, New Jersey, was recently verified by microscopic and X-ray examinations. The results of these studies have been released by the New Jersey Geological Survey (Open File Report No. 1, \$11.00).

Asbestos is a group of naturally fibrous minerals containing magnesium and silicon. There are two basic types of asbestos—amphibole and chrysotile. Each asbestos mineral occurs in a non-fibrous and a fibrous form. Only the fibrous forms are called asbestos. In Sussex County white limestones, both nonfibrous and fibrous amphibole occur. Nonfibrous amphibole typically comprises about 0.1 to 1.0 percent of the stone, whereas fibrous amphibole is much less common, normally constituting approximately .001 to .01 percent of the stone.

When white limestone from Sussex County is crushed, individual fibers of amphibole are produced which may eventually find their way into the environment and be inhaled by humans. Investigations were therefore conducted into possible entrance of asbestos fibers into the air and water surrounding

Continued on page 16D



David M. Campione

\$2.85 MILLION IN U.S. FUNDS FOR PINELANDS

Governor Kean recently announced the approval of a \$2.85 million grant by U.S. Secretary of the Interior James Watt for the purchase of 7,000 acres in the Pinelands preservation area. The money will be provided under terms of the 1978 Park and Recreation Act which established the National Pinelands Reserve in the South Jersey Pine Barrens. The land, to be bought from various owners, is all in Bass River Township (Burlington County). The federal grant represents 75 percent of the total cost of the acquisitions with the state Green Acres program providing the remaining 25 percent.

Kean said, "With this action New Jer-

sey will have committed the total of \$14 million allocated by Congress for Pinelands purchases. It presents a vital link in the state/federal Pinelands protection program, and will connect existing public lands in Wharton and Bass River state forests. These purchases, in addition to providing a land-bridge between the two state forests, are urgently needed to guarantee the continued safety of sensitive headwater areas of the Bass River, as well as of the underlying Pinelands aquifers." He noted that these acres will also be available for hiking, nature observation and other passive forms of recreation.

WATER AUTHORITY NAMES RICCI EXECUTIVE DIRECTOR

The New Jersey Water Supply Authority named Rocco D. Ricci, of East Brunswick, as its first executive director. At the time of his appointment, Ricci, a former DEP commissioner (1977-78), was Chief Engineer for the Passaic Valley Sewerage Commissioners.

Organized in December 1981 under terms of the New Jersey Water Supply Authority Act of 1981, the Authority has been designated owner of existing water supply facilities formerly owned by the state, and of future facilities to be built by the state. Its chairman is DEP commissioner Robert E. Hughey.

EAGLE EGG CONTAINED DDE

New Jersey's only pair of nesting bald eagles failed to produce young of their own because the egg laid contained a high level of DDE, a derivative of the pesticide DDT, according to a report from the U.S. Fish and Wildlife Service, Patuxent Research Center in Laurel, Maryland. The egg taken from the nest in March (see NJO, May/June) was incubated under laboratory conditions at the federal facility but failed to hatch. Dr. Stanley Weimeyer, research biologist, in a report to DEP's Division of Fish, Game and Wildlife, said the egg had a sufficient level of DDE to cause the thinning of the egg shell (25 percent thinner than normal) and the death of the unhatched chick.

HISTORIC PRESERVATION GRANTS FOR 15 PROJECTS

The U.S. Department of the Interior this year approved 15 historic preservation grants totaling \$148,300 for state and local cultural resources survey and preservation planning projects in New Jersey. The grants, administered by DEP's Office of Historic Preservation, provide up to 50 percent of a project's cost.

The 1982 historic preservation grant recipients, projects and grant amounts: **Pinelands Cultural and Historic Preservation Association** (Atlantic County), County Survey, \$15,000; **Bergen County**, County Survey, \$30,000; **City of Burlington** (Burlington), Downtown "Main Street" Revitalization Project, \$10,000; **Southampton Township** (Burlington), Survey of Vincentown, \$8,000; **City of Cape May** (Cape May), Survey/Local Design Guidelines, \$3,500; **Junior League of Montclair/Newark, Inc.** (Essex County), National Register Multiple Resource Nomination of Montclair, \$4,000; **Delaware Township Environmental Commission** (Hunterdon), Township Survey, \$2,300; **South Brunswick Township** (Middlesex), Township Survey, \$8,000; **Monmouth County Board of Recreation Commissioners** (Monmouth), National Register Nominations/Survey Publication, \$4,500; **Ocean County Cultural and Heritage Commission** (Ocean), Watercraft Survey/Historic Architecture Program, \$8,000; **Sparta Township** (Sussex), Township Survey, \$3,000; **Warren County**, Survey of Morris Canal in Warren County/Preservation Plan, \$4,000; **New Jersey Historic Commission** (State-wide), Thematic Survey of Black Historic Sites, \$18,000; **The Pinelands Commission** (Pinelands Protection Area), Historic Preservation Planning, \$15,000; and **Preservation New Jersey** (State-wide), Public Information Program/*Preservation Perspective* newsletter and conferences, \$15,000.

DEP SCIENTIST TAPPED FOR NASA STUDY TEAM

Robert Mills, manager of the Geographic and Statistical Analysis unit of DEP's Office of Cancer and Toxic Substances Research, has been appointed to an elite study team by the National Aeronautic and Space Administration (NASA). The team is preparing conceptual design specifications for a U.S. Space Station. Mills, with his broad expertise in remote sensing and computer analysis of earth resources, was one of 25 experts nationwide chosen from industry, government and academia.

GROUNDWATER COLUMN

crushed limestone quarry and production facilities in Sussex County. Air samples were taken by the federal Mine Safety and Health Administration at the facilities involved. It was found that the concentrations of asbestos in the atmosphere were below the federal occupational standards, and that potential emissions from the facilities were within federal asbestos guidelines. In addition, water samples were taken by the federal Environmental Protection Agency of discharge from one of the two quarry sites. Asbestos levels in these samples were also within federal guidelines.

Although there were no violations of air or water quality standards, DEP took action to control potential asbestos problems by recommending specific dust control and waste disposal measures to the company which operates these facilities. The company has voluntarily complied with these measures by paving a particularly dusty quarry entrance with asphalt, by controlling dust generation, and by cleaning up potential problem areas.

These investigations were undertaken in response to a petition from a group of citizens from the boroughs of Franklin and Ogdensburg. The citizens were concerned about the possible asbestos content in dust from the limestone quarry in Franklin borough.

—**Mark Germine, assistant geologist, NJGS**

GEOHYDROLOGISTS' RESPONSE TO DROUGHT OF 1980-81

Studies carried out by the Bureau of Ground Water Management (BGWM) of the Division of Water Resources (DWR) to find alternate sources of water during a drought showed that significant quantities of ground water may be pumped from the glacially-derived sand and gravel aquifers to supplement the flow to reservoirs in northern New Jersey.

BGWM was charged in 1981 with investigating and evaluating the feasibility of pumping ground water to the streams that supply Jersey City's and Newark's reservoirs. Based upon this bureau's knowledge of the geohydrology in northern New Jersey, the quantities of water required could only be obtained from the valleys in northwestern Morris and southwestern Passaic counties.

These valleys were scoured out by glaciers that covered this area about 20,000 years ago. As the glaciers moved forward and periodically melted, clay, silt, sand and gravel were deposited and filled the valleys to depths as great as 300 feet. Where the sand and gravel deposits are thick and extensive, ground water yields today may be several

thousand gallons per minute. However, where the sediments are mostly silt or clay there frequently is not enough water available to supply an individual home.

Using geophysical methods, aerial photographs, well logs and existing reports, the geologists of the BGWM investigated northwestern Morris and southwestern Passaic counties to locate the most promising deposits of sand and gravel. A total of twelve test wells were drilled within the area under investigation and each well was pumped for eight hours to estimate its potential yield and the hydrologic properties of the aquifer (see photo). Two sites, one near Newfoundland (Morris County) and the other in the Lower Berkshire Valley between Routes 15 and I-80, were chosen for more extensive aquifer studies based upon encouraging results of the initial aquifer pumping tests.

The results of this bureau's work towards finding additional water during the drought showed that a total of at least 9½ million gallons per day (MGD) may be expected from the areas studied. Ground water yields in the Pequannock River watershed would supply the Charlotteburg Reservoir which provides water for the Newark system. About 5½ MGD of ground water could be pumped to augment the flow to the Charlotteburg Reservoir. This represents about 10 percent of the Pequannock system's yield of 48 MGD at the 100 percent reliability level.

Many other valleys in northern New Jersey will be investigated in the future

as part of the ground water package in the water supply bond referendum passed by the voters in 1981.

—**Wayne R. Hutchinson, supervising geologist, Bureau of Groundwater Management**

ACID RAIN CONFERENCE

Environmental agencies from New Jersey, New York and Pennsylvania will sponsor a day-long conference in February 1983 on the effects of Acid Rain. Further information is available from John Elston, DEP, Bureau of Air Quality Management, and Surveillance, CN 027, Trenton 08625.

Continued from page 16A

ENVIRONMENTAL LAWS

A-1513 (Ch. 129, P.L. '82) appropriates \$7.5 million from the Water Supply Fund to finance interconnection testing and loans for priority improvements to water supply facilities as recommended in the New Jersey Statewide Water Supply Plan. Most of the funds will be spent on the Great Notch and New Brunswick-South River areas.

A-1514 (Ch. 130, P.L. '82) appropriates \$15.1 million from the Natural Resources Bond Fund created by the Natural Resources Bond Act of 1981. Included in this appropriation is \$14.8 million to provide grants to local municipalities and authorities for local sewage projects.



Commissioner Robert E. Hughey received a bald eagle photograph from JoAnn Frier, Program Manager, New Jersey Endangered and Nongame Species Program. The portrait was photographed and donated by Mr. George Matson and associates of Wood-Ridge to acknowledge Commissioner Hughey's interest in preserving the last active bald eagle nest in New Jersey.

NEW JERSEY STEELHEAD

BY JIM MERRITT

Ignoring the wind and snow and the icy waters swirling around his hips, Allan Johnson ladled another bucket of fish into the swollen brown current of Pine Creek.

"This is steelhead weather!" he exclaimed as the dark, full-bodied fish slithered into the water and disappeared downstream. A bucket brigade carried more fish from the hatchery truck parked on the hill above, and when Johnson and his friends were done on that cold April day early this year, some 5,500 New Jersey steelhead trout were working their way down Pine Brook to the Swimming River, the Navesink, and the Atlantic Ocean. With subsequent stockings the total number of released fish would come to nearly 40,000. Averaging about 10 inches in length, many of these fish would be returning to the Navesink in the winter of 1983-84 three times that size.

A native of the Pacific Northwest, the steelhead is a genetic variation of the rainbow trout. Born in the upper tributaries of coastal streams, like the salmon it runs to sea, where it passes several years of voracious feeding before returning to the river of its birth to spawn. A mature steelhead (the name derives from its steel-blue color when it arrives fresh from the sea) may weigh 30 pounds or more. It was the prized quarry of such famous anglers as Zane Grey and Roderick Haig-Brown, and anyone who has thrilled to the slashing runs and explosive leaps of a steelhead rightly regards it as one of the greatest of all gamefish.

A decade ago the steelhead was successfully introduced into the Great Lakes. Now, if a group of dedicated New Jersey anglers has its way, it will become a staple for Garden State fishermen as well.

The New Jersey Chapter of Trout Unlimited, a national conservation organization, has begun an ambitious program whose ultimate aim is the establishment of a successful winter run of steelhead on the Delaware

River. "Anyone who's ever stood on the upper Delaware can see that it's perfect water for steelhead—as good as most of the rivers out West," says Johnson, who has been fishing for steelhead on Pacific Coast rivers for almost 20 years. A resident of Chatham, Johnson is the state representative to the national council of Trout Unlimited and one of the founders of the New Jersey steelhead project.

While a Delaware fishery remains Trout Unlimited's goal, its efforts to date have focused on demonstrating that steelhead can be planted in a New Jersey river and, once chemically "imprinted" to the river's smell, return there as mature fish to spawn. The group has therefore limited most of its stockings to the Navesink system, which has several important advantages. It is much shorter than the Delaware, making it easier for the fish to run to sea and return. And because its watershed lies entirely in New Jersey it avoids the political complications that would come from stocking the Delaware, whose tributaries flow through parts of Pennsylvania and New York. The program began in 1980 with a modest stocking of 1,500 fish, followed by 30,000 fish in 1981 and 40,000 in 1982. This year, a small number of fish were also stocked in the Raritan.

The father of the New Jersey steelhead project is a young water-pollution engineer named Pat Moffitt of Whitehouse, who did most of the preliminary scientific research and has raised some \$40,000 from various corporate and individual sponsors.

The rivers of the Pacific Northwest support both winter and summer runs of steelhead, but Moffitt concluded from his research that a New Jersey run would have to be limited to winter, when the water is sufficiently high and cold and carries enough oxygen for the fish to make it past the pollution blocks at Philadelphia and Trenton. He also

believed that winter steelhead would not interfere with the Delaware's April shad run and would compete less with native trout and bass, which are mainly dormant in winter.

It was also determined that a successful run must be hatchery supported. This would mean capturing a few of the fish just before spawning, stripping the eggs, then raising the fry and returning them to the waters once they had "smolted," or matured to the point where they are ready to migrate to sea. The Great Lakes steelhead fisheries are also hatchery supported, as

continued on page 18.



Allan Johnson (l.) and Pat Moffitt releasing Steelhead in the Navesink.

PHOTOS BY AUTHOR

STEELHEADS

continued from page 17

are many of the West Coast runs. "With a hatchery supported fishery," says Moffitt, "you eliminate the worry about having sufficient spawning and rearing areas."

This isn't the first attempt to establish a steelhead run in New Jersey. State fisheries biologists tried but eventually abandoned a program of stocking steelhead and sea-run brown trout here in the early 1960s. According to Moffitt, the state's program floundered due to "a real lack of technical information at the time. The creation of steelhead fisheries didn't become a real science until the late 1960s and early '70s. The successful Great Lakes programs date from that period." As a result of those programs, he adds, we understand a great deal more about the biology of steelhead than was known 20 years ago, particularly as regards the timing of releasing the fish. The state Division of Fish, Game and Wildlife has encouraged Trout Unlimited in its program, according to Moffitt, and has

provided helpful advice from the beginning.

Moffitt points to several encouraging signs suggesting that New Jersey rivers can support a steelhead fishery.

He notes, for instance, that sea-run trout already exist in several of New Jersey's coastal rivers. Trout stocked by the state in the Navesink and Raritan occasionally migrate into the brackish estuaries and are caught as mature sea-run fish by jetty fishermen. These fish may weigh up to nine pounds and have taken on the silvery color of ocean fish.

Moffitt also emphasizes that New Jersey rivers have supported salmonid runs in the past. The fish weren't steelhead, however, but Atlantic salmon. There is a largely untold story here about an important contribution made by New Jersey to fisheries science. A century ago, pioneer fish culturist Dr. J.H. Slack of Asbury established Atlantic salmon runs in the Pequest, Raritan and Delaware rivers. The fry planted by Slack in these rivers migrated to sea and were later caught as returning fish weighing up to 29 pounds. The fisheries eventually died out because the upper tributaries of these rivers were not suitable for spawning. However, Moffitt feels that Slack's experiment proved the viability of New Jersey rivers to support salmonid runs, providing that the fish are hatchery propagated.

"You hear a lot about Seth Green [of New York State] as the father of fish culture but almost nothing about Slack, who was Green's contemporary and in some ways his mentor," says Moffitt. The hatchery established by Slack in the 1870s eventually became the Musky Trout Hatchery, where today's steelhead are being raised.

The first phase of the New Jersey steelhead program will be completed successfully, in the view of Trout Unlimited, when the fish planted in the Navesink system return there to spawn. A few of the 30,000 fish planted in March 1981—the program's first big stocking—ought to be returning this winter. Trout Unlimited has alerted

**Anyone catching what he thinks could be a returning steelhead should report it immediately to Pat Moffitt at (201) 534-4916 or Allan Johnson at (201) 635-4848.*

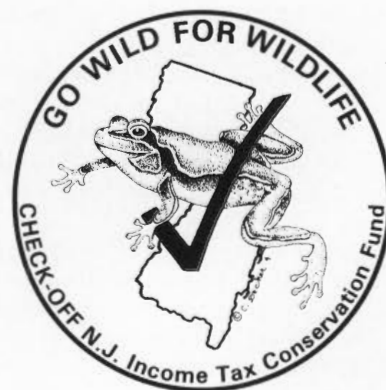


sport and commercial fishermen between Mantaloking and Sandy Hook to be on the alert for any unfamiliar large, steel-blue fish they may encounter during December through March.*

On that snowy April morning last spring, Pat Moffitt stood on the bank of Pine Creek and watched the last of the young steelhead spill from Allan Johnson's bucket and roll downriver toward the sea.

"Two years from now this pool ought to be wall-to-wall fish, and I'm going to be here with my tackle," said Johnson.

"All I want," Moffitt added, "is one fish to come back and it will prove our point."



PHOTOS BY AUTHOR



Firewood being skidded tree length at Stokes State Forest.



Woodpiles such as this one are a common sight these days.

FIREWOOD CONSUMPTION IN NEW JERSEY: A MILLION CORDS A YEAR

BY DON SWAYSLAND

Wood has long been recognized as one of the most important natural and renewable resources on earth. It has been used for cooking and heating ever since man first discovered fire. Even today, one-third of the world's population still uses wood as an exclusive energy source. In the United States, fuelwood was a major energy source until about a hundred years ago when less labor intensive fuels such as coal, gas, and oil began to lessen the demand on our forest resource. Today, in the 1980s, more and more people have been turning to wood to heat their homes. Many, with easy access to wood supplies, are heating with wood exclusively while others are supplementing their existing heating systems with wood. In New Jersey the trend is evident by the dramatic increase in the sale of woodburning stoves, numerous

newspaper ads announcing firewood for sale, an increase in wood material reported stolen, and the tremendous demand for woodcutting permits issued through the state forest and parks' Homeowner Firewood Program.

The 1981-82 Homeowner Firewood Program supplied New Jersey residents with 4,659 cords of wood. The \$10 permits, allowing New Jerseyans to cut and remove previously marked trees, are awarded on a lottery system. Each permit is good for one cord of wood. The newly instituted lottery system is relieving the problems of offering wood on a first come, first serve basis. Residents wishing to participate in this year's Homeowner Firewood Program should contact the park office in the park where they want to cut. Lottery drawings of applicants began in September.

In 1981, the N.J. Bureau of Forest Management increased the number of cords marked for firewood on private land from 4,629 to 5,176. Stacks of firewood can be seen near many houses where ten years ago they did not exist. The general feeling is that the demand for firewood has increased, but until this year that demand in New Jersey has never been quantified. In order to assess the number of cords used each year for fuel in the state, the Bureau of Forest Management conducted a survey in the summer of 1981. Besides finding the total number of cords used for fuel annually, the survey was intended to pinpoint areas of high and low fuelwood consumption, areas of differing fuelwood uses, areas of high and low marketed fuelwood volumes, and sources of wood used for fuel.

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Table 1:
Comparison of Wood Burning Statistics Between Maryland,
New York & New Jersey.

	Md./Sub. D.C.	N.Y.	N.J.
% of households burning wood	27.5	21.0	23.0
Total cords burned	942,927	3,245,415	1,001,769
Major supplemental heat source (% of those that use wood)	83.7	90.0	82.5
Avg. consumption of those that burn wood (cords)	1.65	2.56	1.61

Table 2:
Relative Firewood Worth Values (\$) Assuming Fuel Oil = \$1.25/gal.

	Firewood Heating Value Per Cord (Relative Density of Species)			
	High	Medium	Low	
green	\$27.03	\$22.71	\$18.34	Fireplace
seasoned	\$29.20	\$24.87	\$20.54	
green	\$95.15	\$80.02	\$65.96	Non-airtight stove
seasoned	\$101.64	\$86.50	\$70.28	
green	\$162.20	\$137.32	\$112.46	Airtight stove
seasoned	\$174.09	\$148.14	\$121.11	

Source: USDA Forest Service, Southeastern Area, Atlanta, GA, 1982.

FIREWOOD IN N.J.

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The survey was also used to obtain a profile of various types of burning facilities and future trends in fuelwood consumption within the state. This included the collection of such values as total number of households using wood, total number of cords used annually for fuelwood in New Jersey, and type of burning facility used most. These data were designed to aid in assessing the impact of the increased fuelwood consumption on the forest resource of New Jersey by finding the quantity of wood used in residences each year.

The survey was based on 2,518 telephone interviews conducted between May 18 and June 18, 1981. The questions and responses were all based on the 1980-81 heating season. The survey obtained such values as in what areas of the state the most wood is used, type of burning facility most used, total number of households using wood, and total number of cords cut, purchased, and used each year for fuelwood. All the information is available on a state-wide, regional (North Jersey, Central Jersey, South Jersey), and survey unit basis.

Some highlights of the survey results are:

- 23% of the households in New Jersey burn fuelwood.
- During the 1980-81 heating season, 1,001,769 cords of firewood were consumed in New Jersey.

DEBBIE BOERNER



This white oak, 14" diameter, is an example of poor firewood harvesting. Although the species has a high heating value, this particular tree would have had a far greater value as a sawlog or lumber stock and therefore should not have been cut for fuel.

DEBBIE BOERNER



Assistant Forester Dave Finley marks trees to be cut for firewood on a backyard woodland in South Jersey.

- 82% of the fuelwood volume consumed was used as a major or supplemental source of heat, as opposed to burning wood for pleasure or aesthetic appeal.
- Based on a 35% efficiency for the woodburning appliance, 75 million gallons of fuel oil were replaced with wood fuel.
- For primary residence heating, North Jersey consumed 55% of the state's total volume of firewood used, Central Jersey consumed 27% of the state total, and South Jersey 18%.
- Approximately 315,557 cords of firewood were purchased from firewood dealers and 686,212 cords were cut for private use by the individual user.
- Approximately 83% of the firewood cut by private individuals was acquired from private land.
- Of the units sampled, survey Unit 5 (Middlesex, Monmouth, and Mercer counties) used the highest volume of cordwood per year—over 173,000 cords.
- Approximately 47% of the fuelwood consumed in New Jersey is burned entirely in a regular fireplace, 35% solely in woodburning stoves, 10% in a combination of the two, and 8% in modified fireplaces and furnaces.
- Approximately 90,194 households plan on installing woodburning facilities if fuel oil prices continue to rise.
- 51% of the homeowners using firewood in New Jersey would be interested in harvesting firewood from private woodlands in their area if it were made available at a reasonable cost.

DEBBIE BOERNER



Fireplace inserts are one type of burning facility which have helped make wood-burning so popular today.

We in New Jersey are not alone in experiencing the firewood revival. The same type of survey conducted in Maryland and New York yielded comparable results. (See Table 1) The Maryland survey, which included Washington, D.C. and suburban Virginia, discovered that 27.5% of the households there burn wood for fuel compared to 21% found in New York and 23% here in New Jersey. During the 1980-81 heating season, 942,927 cords were burned in Maryland/suburban Washington; 3,245,415 cords were burned in New York State; and 1,001,769 cords were burned in New Jersey. New York had the highest per capita consumption of the three. The average woodburning household in New York burned 2.5 cords per burning season while in Maryland and New Jersey the figure came to 1.6 cords. The higher consumption rate in New York is most likely due to its colder winters.

In New Jersey, 315,517 cords, or 31.5% of the total amount of firewood burned, were purchased from firewood dealers. Firewood dealers range in size from a one-man operation with a chainsaw and a pickup to a corporation with heavy equipment and automatic firewood processors. The N.J. Bureau of Forest Management maintains a Firewood Dealers Directory where firewood dealers are listed free of charge. By law, firewood must be sold by the cord or fraction of a cord. However, it can be sold in various degrees of preparation (i.e., cut to length, split, seasoned, delivered and stacked, or at the opposite end of the spectrum, it can be retained in whole

tree lengths). Recently, it has become popular for a few neighbors to collectively purchase truckload quantities of tree length firewood, have it delivered to a central location, and then divide it among themselves. The less the degree of preparation when bought, the cheaper firewood is per cord.

Even though 92,000 households in New Jersey claim wood as their major heat source, many people still wonder if burning wood is really economically efficient. This question involves variables such as efficiency of the wood-burning appliance, its design and location within the house, whether the species of wood being burned is of high or low heating value, the moisture content of the wood, and how much one would have to pay for a fuel other than wood.

For example, if the price of fuel oil was \$1.25 per gallon, you could afford to pay \$174 for a full cord of well-seasoned oak if you burned it at 60% efficiency in an airtight stove (See Table 2). If you were to pay anything over \$174 per cord under these conditions, you would be losing money. However, you could only afford to pay \$18.34 for a cord of freshly-cut aspen burned at 10% efficiency in your fireplace.

The approximately one million cords of firewood consumed annually in New Jersey cannot escape having an impact on New Jersey's forest resource. A million of anything is substantial, and cordwood is no exception. The amount of cordwood used for firewood in a year in New Jersey is equivalent to a

solid pile of wood 504 feet on each side or enough wood to fill a square building about 42 stories tall. The N.J. Bureau of Forest Management assisted in harvesting about 20,400 cords of firewood during fiscal year 1981. This amounts to about two percent of the firewood harvested every year in our state. The question must be posed as to how well cutting practices are being carried out on the remaining 98%. Are poor formed, less desirable trees being utilized or are the best formed, most desirable oaks and hickories being removed for firewood, thereby seriously depleting the growing stock? Harvesting firewood can either be of great benefit or detriment to future forest conditions. In a forest managed for the eventual production of lumber and/or veneer, the removal of undesirable species or poorly formed individuals from a pole size (five to ten inches in diameter) stand will usually result in a growth and quality response from the remaining more desirable trees. The demand for firewood provides a good market for the removal of undesirable trees. However, many times the proper cutting practices are not followed. Often, the straightest, fastest-growing, most desirable species are cut without regard to their potential as crop trees. In this way, firewood cutting can seriously deplete the growing stock in a managed stand. The results of poor firewood cutting practices may be amplified by the increased demand for firewood in the state. Firewood properly harvested can provide the needed fuel and at the same time improve the quality and growth of New Jersey's forest resource.

Forest land is often managed for objectives other than for the production of lumber or veneer. Land is sometimes managed for wildlife habitat, watershed protection, camping or recreation, general aesthetics, or a combination of these and others. How firewood cutting affects these objectives depends on specific circumstances involved. Some areas may be able to provide substantial quantities of firewood while others may be totally incompatible with firewood cutting.

Perhaps wood will never regain its former status as our main source of fuel. But it can continue to assume its present role as an important supplementary fuel source if we plan ahead.

Table 3
Weights, heat values, and energy equivalents of other fuels for selected woods common to New Jersey

Species	Green Weight (lbs./cd.)	Dry Weight (lbs./cd.)	Heat/Green Million BTU/CD	Heat/Dry Million BTU/CD	Fuel Oil Equiv. (Gal.)	Gas Equiv. (Gal.)	Elect. Equiv. (KWH)	Coal Equiv. (Ton)
Hickory	5285	4300	21.9	25.7	183	257	7532	.95
Black Locust	4640	4190	21.1	24.8	177	248	7268	.92
White Oak	5225	4000	20.8	24.3	173	243	7122	.90
Red Oak	5345	3705	18.8	22.5	160	225	6594	.83
White Ash	4000	3570	18.2	21.5	153	215	6301	.80
Beech	4545	3720	17.9	20.5	146	205	6008	.76
Black Cherry	3600	2930	16.4	18.9	135	189	5539	.70
Sweet Gum	4400	2870	15.9	18.7	133	187	5480	.69
Sycamore	4160	2870	15.9	18.7	133	187	5480	.69
Elm	4345	2960	15.9	18.7	133	187	5480	.69
Red Maple	4200	3050	16.3	18.5	132	185	5422	.69
Pitch Pine	4530	3120	16.4	18.3	130	183	4806	.68
Tulip	3680	2455	14.3	16.3	116	163	4777	.60
White Pine	3085	2295	13.1	14.1	100	141	4103	.52
Aspen	3690	2260	11.3	13.9	99	139	4074	.51

Assumptions: Air-dried—20% moisture content
Solid wood volume per cord—80 cubic feet
1 Gal. heating oil = 140,000 BTU's
1 therm = 100,000 BTU's
1 Kilowatt hour = 3412 BTU's
1 Ton hard coal = 26,000,000 BTU's

Source: James Haase, RC&D Forester—NJ Bureau of Forest Mgmt.

Table 4
Quality characteristics of commonly burned woods

Species	Starting ease	Splitting	Heavy smoke	Sparking	Coaling qualities
Hickory	Fair	Good	No	Moderate	Excellent
White Oak	Fair	Good	No	No	Excellent
Black Locust	Poor	Fair	No	Very Few	Excellent
Black Oak	Poor	Good	No	Few	Excellent
Chestnut Oak	Fair	Good	No	No	Excellent
Black Cherry	Poor	Good	No	Few	Excellent
Red Oak	Poor	Good	No	Few	Excellent
Red Maple	Fair	Fair	No	No	Good
Beech	Poor	Fair	No	Few	Good
White Ash	Fair	Good	No	Few	Good
Sweet Gum	Fair	Poor	Moderate	No	Fair
Black Gum	Fair	Poor	Moderate	No	Fair
Sycamore	Fair	Poor	Moderate	No	Fair
Tulip	Good	Good	Moderate	No	Fair
Pitch Pine	Good	Good	Moderate	Moderate	Fair
White Pine	Good	Good	Moderate	Moderate	Poor
Sassafras	Good	Good	Slight	No	Poor
Aspen	Good	Good	Moderate	No	Poor

Source: James Haase, RC&D Forester—NJ Bureau of Forest Mgmt.



Caldwell Presbyterian Church

Painting of Caldwell in museum of Elizabeth Presbyterian Church (inset)



Connecticut Farms Church

PASTOR AND PATRIOT

JAMES CALDWELL and the Five Churches

BY JOSEPH DE CARO

A largely unnoticed historical marker on the lawn of the Presbyterian Church in Westfield informs the reader of the startling fact that this was the site of Parson Caldwell's killer's trial. A few blocks away, Gallows Hill Road winds its way by Fairview Cemetery.

Researching the history of these revelations led to an absorbing adventure and the unfolding of the life of a remarkable man.

ELIZABETHTOWN, 1667—A small stone structure was erected here for worship by one of the oldest congregations in New Jersey. A new and larger church rose on the spot in 1723. On September 17, 1760, James Caldwell, fresh out of the College of New Jersey in Princeton, was ordained a minister of the Presbyterian Church. He preached his first sermon seven days later.

On May 25, 1761, Caldwell left for the Carolinas as a circuit rider preaching in frontier towns. Less than a year later he was back at the Elizabeth church, where he was called to be its pastor. He was 27 years old. One year later, on March 14, 1763, he married Hannah Ogden of Newark. Their first child was born on January 29, 1765. They were to have nine more; one died at an early age.

Caldwell was pastor to a congregation of such well-known figures in New Jersey history as William Livingston, Stephen Crane, Herbert Ogden, Elias Boudinot, and Elias and Jonathan Dayton.

Caldwell's duties as pastor also included preaching in outlying communities. Under his inspiration and guidance new churches were established. On February 2, 1779, at a settlement called Horse Neck (now

Caldwell), documents were written and signed by James Caldwell and representatives of the congregation for the establishment of a church.

In 1775, as confrontations between the British and American troops increased, Pastor Caldwell's involvement in the struggle for freedom deepened. His commitments included the responsibilities of minister, chaplain to the armies, recruiter, courier, Assistant Commissary General, and observer of movements of the British.

The threatening presence of British and Hessian forces on Staten Island forced Caldwell to move his family late in 1778 to the parsonage at Connecticut Farms (now Union). He was considered a dangerous opponent by the British and rewards were posted for his capture. The British army carried out a surprise raid for this purpose. Frustrated in the attempt, they burned down the parsonage of the Elizabethtown Church in February of 1779. One year later, another raid left the church itself in smoldering ruins. Caldwell would return, however, to conduct services in a nearby red storehouse, preaching with pistols alongside the Bible in the lectern.

CONNECTICUT FARMS—Prior to 1749, settlers from Connecticut divided tracts of land which they had purchased at a place called Wade's Farms. They built homes and a church and renamed their settlement Connecticut Farms. It was here at the parsonage that Reverend Caldwell sheltered his family.

On June 6, 1780, 5000 British and Hessian troops crossed from Staten Island and marched for Morristown, attempting to capture the army stores there. Caldwell transferred his children to the safety of a friend's home in Bottle Hill (now Madison); he then rejoined his troops. Hannah made the fateful decision to remain with the two youngest children at the parsonage. On June 7 the enemy forces reached Springfield but were repulsed by American troops and militia, suffering heavy losses. They plundered and burned villages on their way back to Elizabethtown Point. A shot fired by a retreating British soldier passed through the window of the parsonage and killed Hannah Caldwell, who was seated on her bed. (A less accurate version of this episode appears on the official seal of Union County, and Hannah's ghost is rumored to haunt the County Courthouse, protesting the unjust depiction of her death.)

SPRINGFIELD—The church that Pastor Caldwell served here was organized and erected sometime in 1746 as a branch of the church in Connecticut Farms. A new one took its place in 1762.

Early in the morning of June 23, 1780, combined forces of Sir Henry Clinton and the Hessian General Wilhelm von Knyphausen started from Elizabeth Point for another attempt to reach Morristown. Their advance was slowed by American troops and militia, but they fought their way into Springfield for the second time. Caldwell rode among his troops, aiding and encouraging them. His heroic act of tearing pages from the church's Watt's Hymnals for use as wadding needed in the rifles of the Rhode Island Regiment rallied the troops with the battle cry "Give them Watt's, boys."

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HOW TO GET THERE:

ELIZABETH PRESBYTERIAN CHURCH, Broad St., Elizabeth.

From the turnpike: Exit 13 at Bayway, Elmora Ave. about 4 blocks to South Broad St. Turn right and proceed directly into Elizabeth. The church and graveyard are next to the Union County Courthouse.

From the Parkway: Exit 140, east on Rt. 82, Morris Ave. This also applies to the turnoff from Rt. 22 at Union. Drive about 3 miles to Broad St. where Morris Ave. ends.

CONNECTICUT FARMS CHURCH, Stuyvesant Ave., Union.

Make a turnabout and continue west on Morris Ave., under the Parkway overpass, into Union. There is no left turn at the traffic light in the center of town. This is Stuyvesant Ave. Drive 2 blocks straight to Johnson Place and turn left. This leads directly to Stuyvesant Ave. The church can be seen ahead and to the right. Turn around and go back to Johnson Place just around the circle, and drive one block. Turn left at Elmwood Ave. 3 blocks ahead is the parsonage on Caldwell Ave. where Hannah Caldwell was shot. Return to Morris Ave. and turn left.

SPRINGFIELD PRESBYTERIAN CHURCH, Morris Ave., Springfield.

The church is located in the center of town on the right about two miles from Union.

CALDWELL PRESBYTERIAN CHURCH, Bloomfield Ave., Caldwell.

Make another turnabout and drive east on Morris Ave. to the Parkway. Go north on the Parkway to exit 148, Bloomfield Ave. Go west on Bloomfield Ave., 6 miles to Caldwell. The church is on the corner of Roseland and Bloomfield Aves. in the center of town.

WESTFIELD PRESBYTERIAN CHURCH, Mountain Ave. and Broad St., Westfield.

Proceed east on Bloomfield Ave. to the Garden State Parkway. Travel south to Exit 135, the Clark/Westfield Exit. Proceed right along Central Ave. for about 3 miles to the corner of Broad St. and Mountain Ave. The church is directly ahead at this intersection.

OUTWARD BOUND

continued from page 11

Established as an informal group of outdoor enthusiasts more than 14 years ago, the club's original goals were to create a club for all ages, and particularly families.

Bert Nixdorf, the club's past president and one of its founders, says that despite its original focus on family participation, the club tries to present a schedule for all ages and types of people.

"I took over the club in May, 1967," says Bert. "At that time we would be lucky if we had six people on an outing. After we organized and became an official organization, we were drawing 15 to 20 members out to an activity." A resident of Mt. Holly, Bert has strong feelings about the club and many of its goals. "Our main purpose is to create activities with broad interests, as well as to get publicity. I believe publicity is important and you can't survive without it."

Bert's struggle to obtain recognition for the Outdoor Club of South Jersey has led him to author several articles on outdoor activities, as well as a book on bicycling in South Jersey and the Delaware Valley.

However Bert's role with the club doesn't end in some office or at a typewriter. At the head of most of the outings you will find Bert, usually bare-headed except in wind, very cold or precipitating weather, and carrying a large blue backpack, leading the members like a general leads his troops. "I like the hikes and walking tours," says Bert. "That's the beauty of our club. If you prefer bicycling to hiking, there are bike hikes every weekend; we schedule a lot of different events at the same time to please everyone."

The diverse schedule Bert so proudly speaks about can be found in the club's official catalogs, published twice a year.

Following their motto "outward bound all year 'round," the club's schedule reflects the variations in opportunities that each season brings to the outdoors.

Of all the events the club sponsors, the most popular seem to be the moonlight hikes held in the South Jersey Pine Barrens.

These hikes usually draw more

BERT NIXDORF



Scene along Quaker Bridge Road, in Wharton State Forest, "Taking a Break at a Cool Spot"

than 100 people, and there is no set pattern as to the age group or types of people participating. Held throughout the year, the more heavily attended are those scheduled in the fall months.

"I think people like the fall hikes because you don't get all hot and sweaty, or bothered by the bugs," says Kathy Pino, a regular on the outdoor walks. A business major at Stockton State College, Kathy says that she thinks the moonlight hikes are so popular because of the Jersey Devil legend that exists in the Pine Barrens.

"Everybody wants to find the Jersey Devil," she says. "When you come out here at night people are walking through the woods howling and screeching, just to scare the others, especially the kids."

The most popular activity of the club in 1977 had to be the special Halloween moonlight hike, where nearly 300 people braved the full-moon legends to get into the ghost and goblin spirit.

What made this hike memorable, especially for the organizers, was that cider, donuts and pretzels were to be served at the halfway point,

and the leaders brought only enough for an average turnout—about 125 people. As the crowds of hikers were standing around taking a break, one woman was heard to mumble, "Talk about the loaves and fishes," referring to the leaders' attempt to stretch the refreshments to accommodate the numbers.

Although the moonlight hikes draw the greatest number of participants, they are by no means the most interesting events the club sponsors.

If your tastes are for the finer things in life, the club offers a trip to one of South Jersey's most famous wineries. After a seven-mile hike along a winding stream near Stockton, N.J. the club tours the B and B Winery in Kingwood Township, where the weary walkers can refresh their spirits before the hike back.

"We try to offer each event only once a year," says Bert Nixdorf. "That way we keep offering new and different things each month."

Along with the need for exercise and the outdoor experience, the club sponsors several activities aimed at pleasing the conservationist and naturalist.



**Antuzzi Winery
Bike Ride**

Once a year the group, in conjunction with the New Jersey Forest Fire Service and Wharton Tract officials, holds a day on which after a short hike the club members help clean up a nature site in the Pine Barrens. Several years ago "Apple-Pie Hill," one of South Jersey's most historic landmarks, was chosen for the cleanup efforts. In 1981, the cleanup efforts were along the Batona Trail.

"It's really a worthwhile effort," says Peggy Heineman. "And besides doing something good, it's a lot of fun. After we finish working, everybody sits around for a weiner-roast. I don't think there's a better activity the club sponsors."

The club has also taken a particular interest in saving the Pine Barrens from future development by land speculators. "After getting approval by our procedures committee," says Bert, "our club addressed more than 800 envelopes for the New Jersey Conservation Foundation, which has been sending out fund-raising promotional material." The foundation has been working with outdoor organizations across the state to raise money to purchase much of the land that builders have

been looking into for future development.

"We want to help keep the Pine Barrens the way they are," says Bert.

The South Jersey Pine Barrens are the home of most of the Outdoor Club's activities, but frequently the group travels to other parts of New Jersey, to Pennsylvania, or to Delaware to experience the world outdoors.

Although most club members are amateur enthusiasts, the group offers special programs to help those interested in specific activities to learn the proper and safe way to participate.

The Basic Wilderness Survival Course is one of the club's most informative and practical programs, designed to prepare the beginning backpacker for the rugged trails ahead. The program teaches the individual the safe and efficient way to handle himself out in the wilderness, especially in areas of first aid, cooking, conservation, and shelter preparation.

In addition, the trainee will be expected to spend one night alone in the woods with a minimum of clothing and equipment. The

purpose of the course, as outlined in the club's official catalog, is to help the individual "act in a manner that will help preserve and perpetuate the wilderness in its most natural state." There is a fee of \$25 for this course, one of only a few programs that the club charges for.

In fact, one of the group's most unusual characteristics is the low membership fee, and the number of free events available. The fee for an individual to become a member of the Outdoor Club is only \$2.50 per year, with a family membership at \$5. The only cost to nonmembers is a nominal 50¢ for each event attended. Any fees or expenses of campgrounds, touring fees or rentals are paid by the individual participating.

Although the club continues to grow, some of the activities members look for are not available, because of a lack of leaders. "There always seem to be more followers than leaders," the club president says. "It's a shame, but some activities such as water skiing, cross country skiing, or horseback riding are not available because we don't get leaders interested. We're lucky because the leaders we have are hard working and dedicated to the club."

One of the club's problems with leaders is the limited time that members usually remain active in the organization. "After a year or so, people lose interest," says Bert. "We try to schedule our activities so nothing is repeated twice a year, but people seem to get enthusiastic only for short periods of time."

The Outdoor Club has had many unusual stories to repeat over the past 14 years, but none is so unusual as that of a young man who proposed to his girlfriend on one of the club's trips; they were married the following Saturday and honeymooned with the club by canoeing down the Oswego River.

NJ

**To join write:
The Outdoor Club of
South Jersey
1820 Jefferson St.
Marlton, NJ 08053
609-983-7981**

Wildlife in New Jersey

DEER

BY DEBRA MORRIS

The white-tailed deer is probably the most popular big game animal in North America. Its antlers are highly prized trophies and its elusiveness challenges even the most experienced hunter. Many people consider the deer aesthetically appealing, regarding it as a portrait of serenity in the woods.

For centuries, white-tailed deer have played a significant role in man's existence. Deer were a prime source of food and clothing to New Jersey's Lenapi Indians. The antlers were used for ornaments, chipping tools and headdresses. Bow strings, fishing lines and thread were made from sinews and parts of the deer brains were used in tanning and bleaching. To the early settlers, deer were a prime source of income, food and clothing. Besides being an object of recreation, deer are an important factor in today's economy. Annual deer hunting expenditures in New Jersey exceed 30 million dollars.

TAXONOMY AND DISTRIBUTION

Deer evolved from ancestors of the Miocene age, 15-20 million years ago. Deer as we know them today, developed during the Pleistocene period, one million years ago. Their hooved feet and ability to chew their cud have been important factors in the deer's survival and adaptability. Its ruminant (four-part) stomach enables the deer to gather and swallow a large quantity of food in a short period of time and then chew it later while relaxing in a safe place.

Whitetails are in the Cervidae family, which also includes elk, moose, and caribou. The whitetails range from the southern provinces of Canada through the 48 contiguous states (with minimal populations in California, Oregon, Nevada, and Utah) and down through Mexico, Central America, and into parts of South America.

The scientific name *Odocoileus virginianus* was bestowed upon the white-tailed deer by a French-American natu-

ralist, Constantine Samuel Rafinesque. While exploring caves in Virginia in 1832, he found a fossilized deer tooth, the last remains of some ancestors of the white-tailed deer in Virginian woods. From this discovery, he named the genus and species. Although Rafinesque named the genus *Odocoileus*, he probably meant the Latin name, *Odontocelus*, meaning hollow or concave tooth. This probable error was perpetuated because taxonomists honor the earliest records. Since the fossil was discovered in Virginia, the species was named *virginianus*.

There are 30 subspecies of white-tailed deer, 17 of which are found north of Mexico. New Jersey's original subspecies was the northern woodland whitetail, *Odocoileus virginianus borealis*. It is the largest and darkest colored of the 17 races. However, due to the importation and release of deer in the state, New Jersey's population is now composed of a number of different

racess. The *O. v. borealis* race also has the largest range, extending from the southern Canadian provinces of Ontario, Quebec, New Brunswick, and Nova Scotia south through Delaware and Maryland and west through Illinois, Indiana and north to Minnesota. The smallest subspecies is the Key deer, *O. v. clavium*, an endangered species of the Florida Keys.

DESCRIPTION

One of the most distinguishing characteristics of the white-tailed deer is its tail. It has inspired many of the species common names, including whitetail, flagtail, and the more commonly used white-tailed deer. The tail is 11 to 13 inches in length and the dorsal hairs are brown-tipped with black. The underside is white, extending beyond the dark hairs on top so that the tail is bordered by white. The white is often seen when a deer elevates its tail as a warning signal to other deer. Besides

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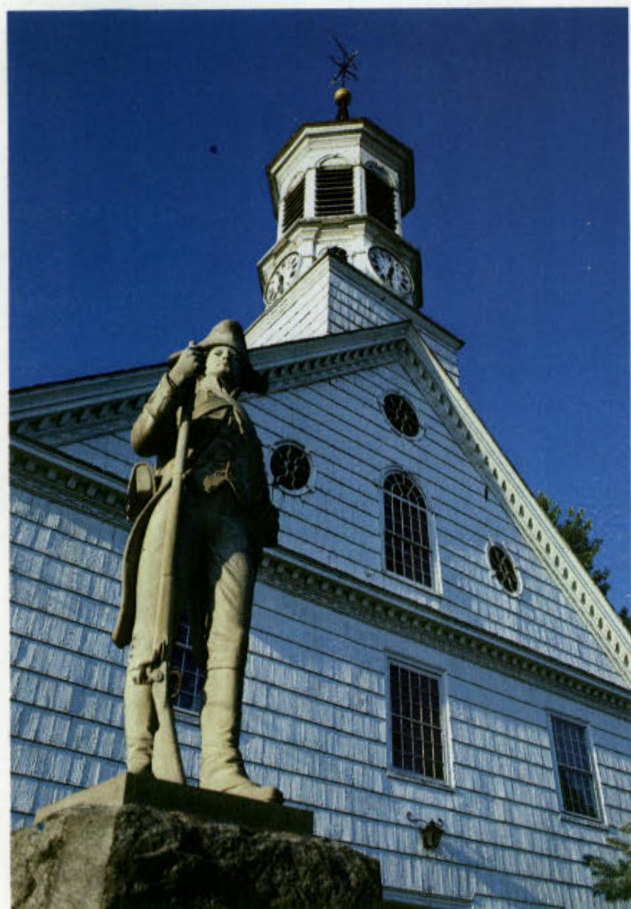


White-tailed Deer

IRENE VANDERMOLLEN

JAMES CALDWELL

continued from page 23



Springfield Presbyterian Church and militia man.

American forces under generals Greene and Dickinson held their ground, inflicting severe casualties on the enemy, who again fled in disorder back to Elizabethtown Point—but not before burning most of the town, including its church. A final act may have been the burning of the church in Connecticut Farms, although a conflict of dates in historical accounts indicates this may have already been burned at the raid of June 6. No further battles of grave importance were fought on New Jersey soil.

When the war ended with the British surrender at Yorktown in October, 1781, Caldwell's duties as minister, chaplain, preacher, trustee of the College of New Jersey, and member of the State Legislature continued to occupy him. However, more time was spent at his home in Turkey (now New Providence), caring for his children. His good deeds abounded and were manifested by his concern for a young lady who was arriving by sloop out of New York on November 24, 1781. He was to escort her to the home of relatives in the area. Whether or not the girl did arrive is not certain; conflicting accounts obscure the facts.

A package or suitcase picked up by Caldwell incited a sentry, James Morgan, to challenge the credentials of the parson. With little hesitation Morgan fired his



Westfield Presbyterian Church, site of trial



Elizabeth Presbyterian Church

musket at Caldwell and killed him instantly. Motivations for the shooting were not clearly established.

Funeral services for James Caldwell were held in the red storehouse the next day. Throngs of grieving admirers and his children gathered around the coffin in front of the Boudinot Mansion. On November 27, this beloved man was buried in the graveyard of the Elizabethtown Church. Shortly after, Hannah's body was carried from Connecticut Farms and laid next to her husband.

James Morgan professed his innocence at his trial by the Supreme Court of New Jersey at the Westfield Presbyterian church in January of 1782. Evidence indicated that he was guilty and he was so charged.

Someone passing by the cemetery north of the church on that very cold, dark day of January 29, 1782, could see on a distant hill the body of James Morgan, sentry, hanging from a gallows.



I'd like to express my gratitude to Norman F. Brydon for much of the information used here, which is included in his book, "Reverend James Caldwell, Patriot, 1734-1781," published by Caldwell Bicentennial Committee, Caldwell, NJ, 1976.

MUSHROOMS

Continued from page 13

eaten when young. My oldest son, Mark, was determined to prepare a young, white fleshed *Polyporus betulinus* in the "fried chicken" manner I described for the sulphur shelf. The skin was so tough that chewing did not reduce it. The flesh had a slightly unpleasant taste. I would not bother with it again; however, people interested in wilderness survival techniques might note that *P. betulinus* should be peeled.

Returning to a tastier relative, you may find *Polyporus frondosus* or "hen of the woods" growing at the base of a tree in the fall. From a distance, this mushroom with its many "caps" all growing from a single fleshy base gives the appearance of a broody hen fluffing out her brown and gray toned feathers over her nest. Italian-Americans in the Princeton and Trenton areas slice up this mushroom and pickle it. The *Trentonian* of October 12, 1978 printed a photograph of Luigi Matarese, "first cook at the Nassau Inn," holding a 21 pound specimen of *P. frondosus*. The caption stated that he would "pickle the mushroom for Christmas spices for family and friends." This specimen should probably have been called "emu of the woods"—it was the size of the smiling chef's torso!

Next we come to one of my favorites, the honey mushroom, *Armillariella mellea*. The honey mushroom and its close relative *Armillariella tabescens* appears in the late summer and early fall. You will certainly find one of them on a September or October wet weather walk in the woods.

The honey mushroom has a marked ring around its stem; its cousin, *A. tabescens*, is similar to the honey mushroom in every way except for the absence of this ring and, frequently, smaller stature. The caps range from a brassy yellow to honey to pinkish brown and are decorated with tiny hairs that are especially dense and noticeable in the middle above the stem. The mushrooms frequently appear in dense clusters—like bouquets. *A. tabescens* is as tasty as its more widely known cousin and occurs in plenty in New Jersey for at least a month before the honey mushroom makes its annual appearance. At least one text I own suggests that one should look for *A. tabescens* on the stumps of oak trees, but I have found it (while writing this article!) at the bases of a living maple tree in Dutch Neck and of a dying crabapple in Princeton Junction. I have most frequently collected it on my way to or from work on lawns and roadsides in Hightstown, Windsor, Princeton, Lawrenceville, and Hopewell from early August to October.

The honey mushroom makes its first showing a little later at the base of trees or on the stumps or trunks of trees it has killed



Clustered, as seen here, and found at the base of a stump or living tree, *Omphalotus olearius*, the jack-o'-lantern, has gills that glow in the dark and is mistaken by some novices for the chanterelle. Don't eat.

(early September to mid-October). This habit of growing around tree stumps gives rise to its local name in Central New Jersey—"stumpers."

My favorite recipe for the honey mushroom treats it as a dish on its own and comes from Clyde M. Christensen's *Common Edible Mushrooms* with a nod to the "medieval cookery expertise of my friend David Herrstrom. In fact, I enjoy this mode of preparation so much that I have only once prepared the honey mushroom in another way:

Lightly wash the mushrooms and cut away most of the stem, which tends to be tough. Use mostly the younger caps which have not fully expanded. Heat a covered saucepan or chafing dish with a half-inch or less of olive oil in it. Add the mushrooms with some mace, salt, and pepper. Cover and cook slowly until the mushrooms exude their juices and become tender (about 15 to 20 minutes). You may have to stir occasionally to prevent the mushrooms from sticking to the pan. Just before serving add a few dashes of lemon juice or vinegar. Excellent. "If your Lord or Lady Loves not Oyle, Stewe them with a Little Sweete Butter and a little White Wine." Sadly, some people appear to have an allergy to this mushroom; so eat a small quantity when you first try it.

Before leaving the honey mushroom, let me insert a few facts about it which I find intriguing. Many texts note that *Armillariella mellea* may appear benignly associated with the roots of a tree for many years then produce the shoestrings that give it its alias "shoestring fungus" and kill its host. The mushroom will continue to grow on the dead material. Associate, parasite, saprophyte—all in one! Under appropriate conditions, the vegetative part of *A. mellea* exhibits a faint, blue-green bioluminescence. Roy Watling of the Royal Botanic Garden (Edinburgh) has listed the strange relationship the honey fungus as

developed with other plants. It is essential for the stimulation of flowering in an Australasian orchid. It has been found associated with the wildflower called Indian Pipes in Michigan. It grows on deciduous and coniferous trees, shrubs, and crop plants. It even combines (according to Watling's studies) with another mushroom, *Entoloma abortivum*, to engender the lumpy, stemless, aborted fruiting bodies which gave the latter its name! (Watling's account from which most of the foregoing is drawn is "A Strange Alliance," *McIlvainea*, iii, 1, 1977.) And one can eat it, too!

Finally the King Bolete! His picture is on every package of Knorr's dried mushroom soup. The Germans call him *Steinpilz*; the French, *cèpe*; the Italians, *porcino*. Whatever you call *Boletus edulis*, you'll call it a lucky find and a delicious edible. In the very wet summer of 1979, the deciduous woods near Hopewell produced two fruitings in places where I had never found the King Bolete. Its firm white flesh (firm, almost like an apple or a green peach is firm), its bulbous stem (gray-white or pale brown in the specimens I've found) with a delicate white network of raised lines that, if not visible to the naked eye, are distinguishable under a magnifying glass, its gray-brown or tan cap and off-white pores are the signs of a culinary treat.

Jane Grigson gives a recipe for Cèpes à la bordelaise which I highly recommend. It is similar to the seventeenth century recipe for honey mushrooms I've already given except that shallots and chopped parsley, the latter added a minute or two before removing from the stove, replace the mace. If you have no shallots, try a small amount of garlic instead. One night while writing this article, I had this dish for dinner—and nothing else! Good hunting!

Of course there are many more good eating mushrooms; and there is much more to the study of mushrooms than the gastronomic matters just discussed. Artists

have rendered fungi in pen and ink, watercolor, and oil. The British artist Beatrix Potter and the famous French naturalist J. H. Fabre are among the many to produce large series of mushroom portraits. Indeed, the fleeting colors of mushrooms could be preserved only in watercolor before the invention of color photography; and, as a consequence, mycologists, like many in the biological sciences, had to become artists of at least passable quality. The form and texture of mushrooms offer a challenge to the artist equal to that proffered by the colors involved.

There are even fungi which obligingly provide the artist with a delicately prepared drawing surface upon which one can draw whatever one wishes with a sharp stick or something giving a more delicate line. These are the artist fungi of the genus *Ganoderma*. They are woody, perennial shelflike mushrooms that are parasitic on trees. One with a dull gray-brown top that grows to considerable size is *G. applanatum*. The drawing you make on the underside of an artist fungus is formed in the brown bruise marks made by your drawing instrument on the pallid pore surface. The mushroom can then be dried, preserving the drawing and making it permanent.

There are folks who like to draw a picture and date it as a memento of a hike or a foray. Some mushrooms of the genus *Ganoderma* that bruise conveniently for the artist have tops that appear to be shellacked. These are *G. lucidum* on broad-leaved trees and *G. tsugae* on coniferous trees. All three species mentioned are widespread in this state where the appropriate host trees appear.

Color photography makes possible detailed recording of mushroom specimens *in situ* and in the kitchen or laboratory. A macro lens allows closeup photos of small structures: the way gills connect to a stem, the raised network on the stem of a bolete, the droplets of "milk" oozing from the wound of some specimen of *Lactarius*. The North American Mycological Association sponsors an annual photographic competition and a "round robin" slide sharing



Here is a deadly mushroom that all collectors should know: The snow white "destroying angel", *Amanita bisporigera*. The yellow streak on the cap is due to this species' chemical reaction to potassium hydroxide solution. The snow white *Amanitas* with a bulbous base enclosed in a membranous sac and with a white skirt on the upper stem are deadly. Collect the whole mushroom and examine all parts carefully.

between members that photographers reading this article might find enjoyable. For NAMA membership information write to NAMA, 4245 Redinger Road, Portsmouth, Ohio 45662.

Mushrooms are important functionaries in our state's ecology, artists' subjects, objects of study of the scientifically inclined amateur, and objects subject to the tooth mark of the gastronome. The variety of these fungi in the Garden State is sufficient to provide a lifetime of fascination and education—learning to watch out for what you're stepping on.

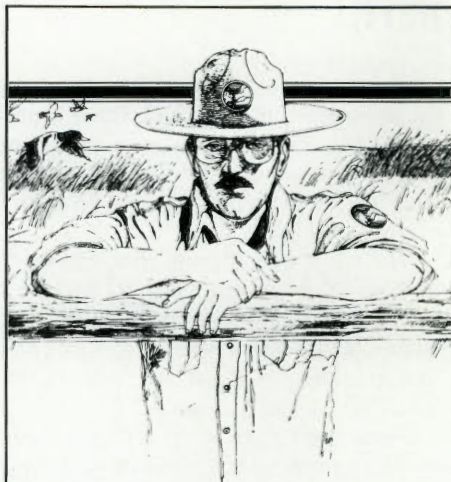
ENVIRONMENTAL HAZARDS TO CHILDREN

By Paula DiPerna

PUBLIC AFFAIRS PAMPHLETS offer much valuable information in a concise, handy format. They are timely, reliable, very readable, and deal with a wide range of social and personal concerns. Pamphlets cover social and economic problems; child development and family relations; mental and physical health; intergroup relations.

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THE MAN WHO BREAKS A GAME LAW IS GUILTY OF MORE THAN ONE OFFENSE

National Shooting Sports Foundation
1075 Post Road
Riverside, Conn. 06878

Game laws, whether they involve season dates, bag limits, shooting hours or the like, aren't just a set of paper rules and regulations. They're a vital element in overall management efforts to maintain healthy and abundant wildlife populations.

Moreover, the hunter who violates game regulations disregards not only the law but also one of the basic principles of ethical hunting.

Consider that it was turn-of-the-century sportsmen who, in order to curb the commercial exploitation of wildlife, were the driving force in establishing our nation's first game laws.

Today, leadership in wildlife conservation and a deep commitment to the principles of fair chase continue to be at the heart of our tradition of ethical hunting.

As a sportsman, this is your heritage. Don't abuse it.

DEER

continued from page 26

the white on the deer's tail, there is also white encircling the eyes, around the muzzle and chin, and inside the ear. The throat, belly, rump, and inside of each leg are also white.

The adult deer stands about 36 to 40 inches at the shoulder with its 18- to 22-inch legs making up most of its height. Bucks weigh from 100 to 250 pounds. The females, or does, average slightly less, 100 to 150 pounds.

Deer shed their coat twice a year. Winter coloration is a bluish-gray and is worn for seven to eight months compared to the summer coat which is reddish-brown and worn the remainder of the year. During spring shedding, the deer have a ragged, moth-eaten appearance due to the winter hair sloughing off in patches.

Adult deer have 32 teeth—six premolars and six molars on the upper jaw, and six incisors, two modified canines, six premolars, and six molars on the lower jaw. At birth, there are 12 premolars, six on the upper jaw and six on the lower jaw. A deer's age may be determined by the extent to which the teeth have erupted and been worn. The

maximum life span for deer is 11 to 12 years with $4\frac{1}{2}$ to $7\frac{1}{2}$ being prime. In captivity, deer have lived to be 19 years of age. In parts of northern New Jersey, few bucks live beyond $1\frac{1}{2}$ years due to hunting pressure and habitat conditions. Relatively few bucks in south Jersey live beyond $3\frac{1}{2}$ years of age.

ECOLOGY AND BEHAVIOR

The white-tailed deer is frequently described as a "browser," a consumer of woody vegetation and leaves. However, from early spring until the first killing frosts of autumn, the deer is primarily a grazer, feeding on a variety of available succulent vegetation, including grasses, herbs, and various agricultural crops.

In the fall, fruits such as apple, wild cherry, black gum, and greenbrier are readily eaten. Mast, especially acorns, is an important food source throughout the deer's range. Acorns are particularly important in areas of the Pine Barrens where the variety of food in late fall and winter is restricted. In the absence of mast, the winter diet is composed of the woody tips of hardwood shrubs, sprouts, and evergreen species such as hemlock and white cedar.

The concept "you are what you eat" can be applied to deer populations. The white-tailed deer, like all forms of wildlife, is a product of the land. The quality of the soil and the plants produced by it directly influence the quality and productivity of the deer population. Food and cover are important factors in determining the number of deer an area can support (carrying capacity). If a deer does not have enough to eat it cannot survive. On the average, an adult deer requires five to seven pounds (green weight) of forage per 100 pounds of body weight a day. However, it is not just the total amount of forage or browse consumed that must be considered, but also the nutritional value of the food.

Poor soil conditions and the associated lack of minerals and proteins in the available forage plants will significantly reduce antler growth. For example, a $2\frac{1}{2}$ year old buck inhabiting the Pine Barrens, which has poor food quality and quantity, may produce only single unbranched or "spike" antlers. In comparison, a deer from good quality habitat, such as found in Hunterdon County's agricultural

LEONARD LEE RUE III



"Eyeshine" of White-tailed Buck at night.

lands, will have well developed antlers of eight to ten points. Deer populations in habitats producing adequate supplies of high quality foods will show increased birth rates, higher fawn survival rates, heavier body weights, greater antler growth, and less mortality due to disease and other sources.

Daily movements of deer are closely associated with their feeding routines. Generally, deer feed most actively in the early morning and evening, but this pattern varies with the weather, season and available food.

The Division of Fish, Game & Wildlife's deer project has gathered home range data from telemetry studies on deer in the Pine Barrens of south Jersey. The home range of the deer monitored varied from 100 to 800 acres and averaged 360 acres, or less than one square mile. Deer ranged over the largest area during the early spring in search of food. The period of least activity was during severe winter weather when lowland areas of pitch pine or white cedar were utilized.

The breeding season, or "rut," begins in mid-October and continues into December, peaking earlier in the northern part of the state than the south. The doe is in heat for 24 hours and if mating does not occur or she fails to conceive, the doe will come into heat only once or twice again at 28-day

White-tailed Buck creating browse line.



LEONARD LEE RUE III

intervals. A buck may follow the doe two or three days before the heat period and may accompany her three to four days after mating.

The gestation period is 187 to 212 days, with the majority of the fawns born in late May and early June. Twins are the rule; however, triplets are not unusual and biologists have recorded four and even five fetuses. The ratio of males to females is nearly equal (1.06:1.00) at birth, however, bucks usually exceed does by a small margin.

The fawns have bright reddish hair with a row of 60 to 80 white spots on either side of their spine from the neck to the tail. Additionally, 100 or more irregularly white spots are randomly scattered along the sides of the body. The hairs of these spots are white only on the terminal end of the reddish brown hairs and are worn away before the fawn sheds its summer hair for its winter coat.

The spotted fawns are helpless at birth but develop quickly, gaining as much as a ½ pound per day during the first month of life. For the first few days, the fawn lies curled in a circle with its head resting on its legs or body. When the fawn lies in the field or in the forest, its spotted coat serves as excellent camouflage, giving it an appearance of dappled sunlight and shadows on the ground.

At three weeks of age, the fawns will begin to follow their mother, sampling the vegetation on these journeys. At ten weeks of age, the fawn is able to chew a cud and becomes a ruminant. The fawns accompany their mother until the next fawning season. At this time, the adult does separate to give birth to their young. In good quality habitats as many as 50% of the female fawns breed their first winter, producing a single fawn. The yearling does and their young will often regroup with their mother and her fawns to form a small family which remains together until next fawning season. The yearling males separate from their mother and do not usually rejoin her after fawning season but may group with other bucks.

At two to three months of age, bony knobs, or pedicels, form on the front of the skull of the male fawns. Antler development begins at 10 months of age, in early April. During the initial period, antler growth is rapid, as much as a ½ inch a day. The antlers are composed of bone containing calcium

and phosphorous. They are solid and do not have marrow, which is unlike most mammalian bones. During the entire period of development the antlers are covered by velvet which protects and also supplies nutrients to the growing antlers. Prime antler size is usually reached at 4½ to 7½ years of age.

The final stage in the development cycle usually begins in September with the onset of the breeding season. With the increased level of testosterone hormone in the blood, the antlers reach maturity and the velvet soon dies, and is quickly removed by the deer. A buck will continue to rub his antlers on small trees and shrubs following the loss of the velvet as a means of marking territory. It is interesting to note that the staining of antlers is caused by the bloody residue of the velvet and not by the sap of trees and shrubs upon which they are rubbed.

Although formidable weapons, antlers are primarily used in establishing dominance among males. Competition between the bucks seldom results in death; however, broken antlers and injuries are common. Once dominance has been established, several males may co-exist within overlapping territories without continued aggression. This tends to conserve energy which is needed during the mating season and to survive the winter which follows.

Late December to January is the principal time of antler loss. The antler dies as the blood vessels constrict due to the increase of bony tissue around the base of the antler. The antler is dropped as the connection between the antler and pedicel is broken. Usually both antlers are dropped within a few hours of each other. Condition and age of the males will affect antler loss as older bucks will drop their antlers before younger bucks.

Of the deer's five senses, probably the most important is the sense of smell. Deer rely on smell to locate food, danger and other deer especially their fawns. Deer have four external glands—located between the toes, on the feet, inside the hind legs, and near the corner of each eye—in which odors are emitted as a means of communication. During the rutting season, bucks paw at the ground forming a "scrape" and urinate on their hind leg gland into the scrape leaving a very pungent odor. The scrapes are made in conspicuous places within the territories of domi-



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Alarmed White-tailed Deer.

nant males and serve as a means of communication with females. Adult does will often urinate in these scrapes to attract the attention of the buck in order to increase the probability of mating.

Probably the most familiar communication signal is the flashing of the tail. Besides warning other deer of potential danger, behaviorists believe that the tail flagging is also a message to the predator that its whereabouts have been discovered. Predators that stalk their prey before attacking, will frequently abandon the hunt if they are discovered.

White-tails have a keen sense of hearing with the upper hearing range twice as high as the range of a human's ear. Like radar antennae, deer move their ears back and forth and turn, swivel and twist them to locate sounds. A startled deer will alert others in the area by stamping the ground with its forefoot and giving out an explosive, blasting snort.

A deer's vision is geared to detect motion and it can view a 310 degree arc due to the bulge and curvature of the eye. The eye placement also allows for 50 degrees of binocular vision, making 3-dimensional perception possible.

HISTORY OF DEER MANAGEMENT

Deer were an important source of food, clothing, and income to the early colonists in New Jersey. However, with the increased value of meat and hides and the lack of protective game laws,

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the settlers exploited deer to the point where the population rapidly decreased.

At the turn of the century, despite efforts to protect the deer, the population in New Jersey dwindled to less than 200 animals. The deer hunting season was closed from 1902 through 1908 by an act of the General Assembly. During this period deer were obtained from outside the state, including Pennsylvania and Michigan, and released in New Jersey to provide a nucleus population for re-establishment. Additionally, deer were released from privately owned, fenced preserves such as the Worthington Preserve in Warren County.

The re-establishment efforts were successful and the white-tailed population increased rapidly. The hunting season was re-opened in 1909 and a total of 86 bucks was harvested during the four-day season. With the exception of an either-sex hunt in 1915, the antlered bucks-only hunts continued through 1951 which allowed for a maximum population increase in the shortest period of time. The deer population reached carrying capacity in the Pine Barrens of southern New Jersey by 1935 and in much of the northern New Jersey by the late 1950's.

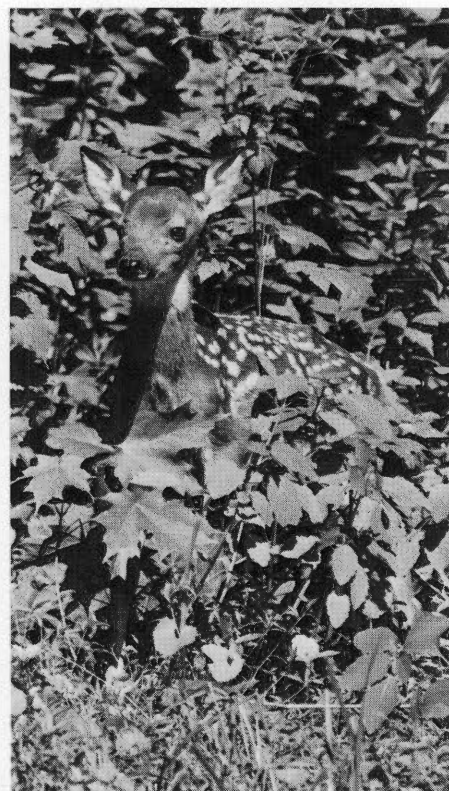
Problems arose in the 1940's as the deer population became successfully re-established. Farmers and landowners were demanding increased harvests to alleviate damage to crops and ornamentals. Between 1940 and 1949, extensive research was conducted to develop methods to reduce deer damage to agricultural crops. However, the tendency prevailed to treat the symptoms with repellents and fencing, instead of treating the causes. Recommendations were made to have a state-

wide controlled harvest of antlerless deer (does and fawns) but the "bucks only" philosophy was so deeply ingrained in the hunters that this control method was strongly opposed.

It was not until January 1951, that a two-day either-sex hunting season was permitted in certain parts of the state where deer damage pressure was the greatest. In 1959, a three-day season was held in the northern counties of New Jersey in which 3,571 deer were reported taken. The first statewide, either-sex season since 1915 was held in January 1962. Additionally, a "party permit" system was permitted in 1962 and 1963 which enabled a group of four hunters to obtain a permit to harvest an antlerless deer. This format was abandoned in 1964 in favor of the either-sex permit system.

Deer managers are concerned with keeping deer in balance with the available habitat. It is a basic fact of deer biology that deer can and do destroy their own habitat. An over-abundant deer herd can "eat-out" an area to the point where it may take years for the range to recover.

To keep the population in balance with its habitat, New Jersey has five deer hunting seasons annually which give the bow, shotgun, and muzzleloader hunters a recreational opportunity to hunt deer. The most important controlling mechanism used to balance the population is the either-sex shotgun permit season which limits the number of hunters permitted to take antlerless (does and fawns) deer in certain areas. The state is divided into 36 major zones, each area having a specific management goal to increase, decrease or stabilize the deer population. Harvest strategies are then determined by various factors such as the deer herd size and its condition, past hunter success, crop-damage complaints, nonhunting mortalities, habitat loss, and land use changes.



Four-day old White-tailed fawn.

The continuing goal of the deer management program is to develop and maintain a healthy and productive deer population at a density compatible with other land uses and to maximize the recreational and economic benefits of this renewable resource.

Since the first hunting season of 1909, New Jersey's deer program has come a long way. The State's three million acres of deer range provide for a summer population numbering over 125,000 deer. A total of 382,001 deer have been legally harvested between 1909 and 1981. As long as there are proper management programs and adequate habitat protection, New Jersey's deer population will continue to provide much recreation to the hunter as well as the non-hunter in the many years to come.

FRONT COVER

The Fox Hunt—Photographed by Joan R. Huber (See article on page 4.)

INSIDE BACK COVER

The White-tailed Deer—Illustration by Carol Decker (See article on page 26.)

BACK COVER

December Beach Moonrise—Photographed by William S. DeFreitas



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