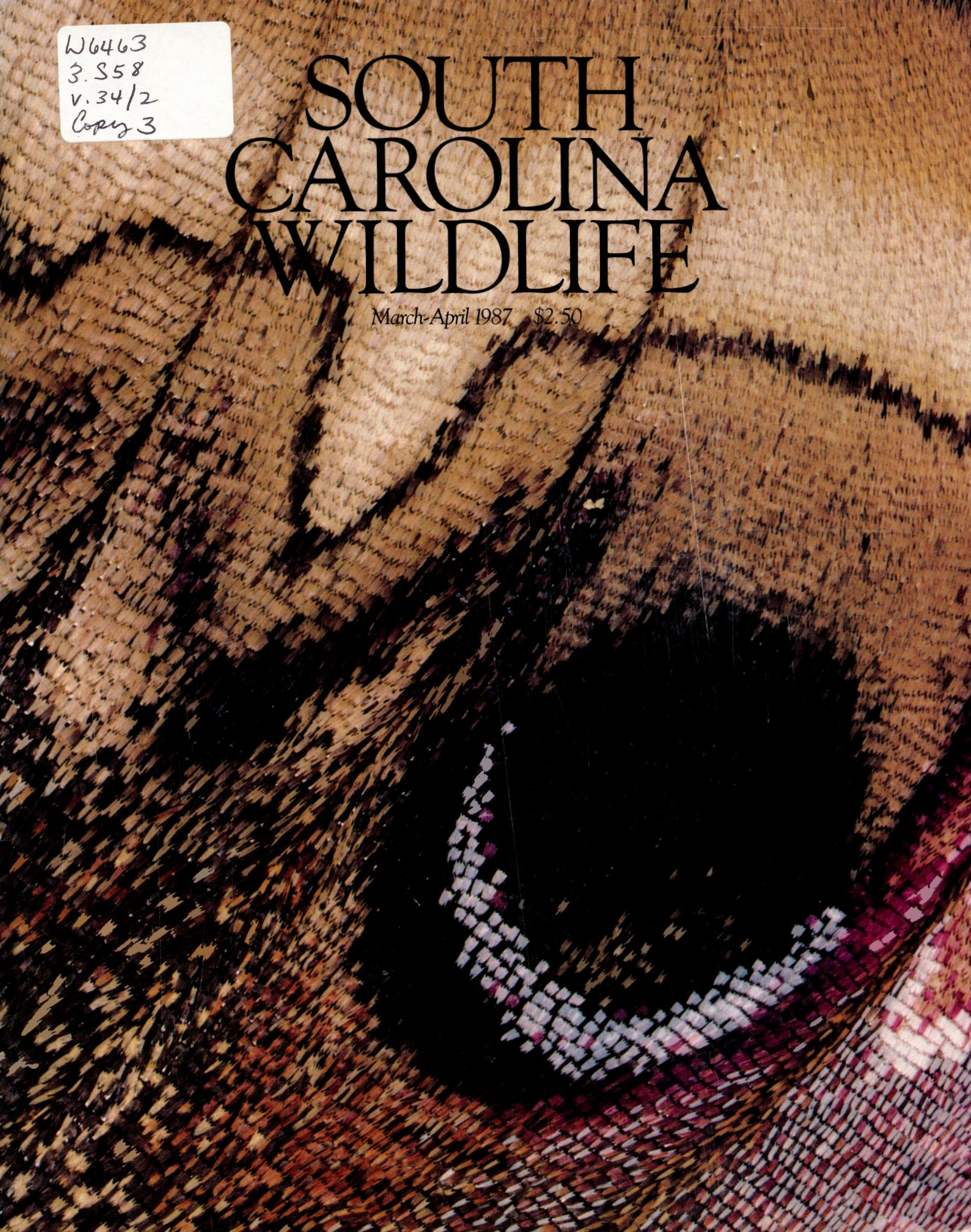


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SOUTH CAROLINA WILDLIFE

MARCH-APRIL 1987, VOL. 34, NO. 2

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Wildlife, And to the Education of
Our People to the Value
of Our Resources.

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The Cover *by Phillip Jones*

Resembling computer-generated graphics, a detail of the fore wing of a cecropia moth clearly shows its powdery scales. (See page 24.)

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BIOSPHERE



We discovered quite a stash of items . . . the incident is under official wildlife department investigation.

"WE COULD USE SOME MORE SHOTS for 'Crappie Fever,'" said Linda Laffitte, our art director. "Could you and Ted cover it?"

Fresh-caught crappie fried on the bank and a tranquil night in Broadwater swamp—the assignment definitely had potential. I completely forgot about the perils of an overnight outing with our chief photographer, Ted Borg.

We caught a good mess of fish before dark forced us to make camp. Ted offered to bring up our gear while I gathered wood and started the fire. I had a good bed of coals by the time he finally shuffled up from the water's edge.

"Like they say, Ted, 'it doesn't get any better than this.'" I poured a half-gallon of oil into the pot. Ted responded by volunteering that the outboard ignition key, the fillet knife, the can opener and the rest of my tacklebox contents had to be "somewhere between the boat and the tent." It was then that the memories of other trips with Ted flooded back, but I was determined to remain calm. "'S okay. We can fire-bake the fish and find my stuff in the morning."

I REALIZE NOW that this reply was totally inappropriate for the moment, even insane. I should have insisted that we return to the landing immediately. Paddling through total darkness against a swift current for six miles would have been but a moment's pleasure compared to the seemingly eternal purgatory that would soon begin.

After supper, as I basked in the glow of stars, firelight and burned fish, strange sounds began to come from the tent. I threw back the tent flap and cringed. Ted was rummaging through a grocery bag full of nabs, chips, sardines and candy.

Neither civilization nor Christianity adequately equips man to share a pup tent with Ted Borg's stomach.

For the next several hours, no matter how deeply I burrowed into my mummy bag, the soft crinkly sound of nabs and candy being stealthily withdrawn from cellophane packs and a muffled crumbling, munching sought me out. The luminous hands of my watch pointed at 2 a.m.

"You still awake, John?" Ted can be fairly perceptive if one groans loudly enough. "Sorry, just having a little snack." I zipped the bag over my head and swallowed a scream.

Relief arrived at 3:15 a.m. when he crawled over me and out of the tent. "Sorry, buddy, but I gotta go. Don't know what's wrong with my stomach." At last! A chance to sleep.

Bo Derrick and I were mere seconds from establishing a meaningful relationship when the rustling tore me from her arms.

"Arrrguuuugh!" The scream exploded from my throat. Ripping one arm free of the mummy bag I pounced, a giant quilted caterpillar gone berserk. "Give me that ¢*&% candy bag!"

"Futt! Futt! Futt!" Gross! He was actually spitting at me. I whopped him a good one, but he slapped me off like a gator swatting turtles. His head grazed my chin and I latched onto an ear.

"Weeee!" He let out a horrendous yowl but ceased thrashing about.

At just that moment the tent flap flew

open. It was Ted—outside, gawking in, camera in hand. "Oh, my gosh! Hang onto it, buddy, while I get a shot!" (Editor's note for camera buffs: Ted carries a Nikon F3 at all times except when deliberately engaged in serious bathing. He recommends a Nikonos under conditions of dense spray and in the tub.)

I squinted at the flash of Ted's camera. The creature definitely was not Ted, and the ear definitely was a toe. "Phtooo!" I flopped backward as the beast scuttled out and hopped on one foot into the woods with Ted snapping photos in hot pursuit. Only later did we discover that his lens cap was still on.

I rolled out of the tent and followed the flashes and yells through the swamp while attempting to metamorphose from the mummy bag.

"Yo, John. This way!"

"Weefutt, weefutt, futt, futt, futt!"

"Yo, John!"

Ted finally treed the rascal, and we discovered quite a stash of items, including my missing gear, but that's about all I'm allowed to say for now. The whole incident, you see, is under official wildlife department investigation. It seems this creature is the missing link or some such and could prove extremely important to the future of wildlife conservation.

I can tell you that it's apparently cooperating with the authorities—assisted law enforcement in the arrest of several big-time game violators and is aiding game biologists in a statewide wildlife habitat inventory. Rumor has it that the thing's also agreed to appear at the state fairgrounds in Columbia for this year's Palmetto Sportsmen's Classic, March 20-22.

In retrospect, I'll always wonder how I missed its ear. They're big and floppy like an old doe's. As for the rest of it, I'd say part gator, part coon, and a whole heap of who knows what?

You can see for yourself at the Classic. Just in case you don't make that, I promise to personally remove the lens cover from Ted's camera.

John Davis

Carroll A. Campbell Jr.
Governor of South Carolina

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TROUT ON A FLY

By Lee Wulff. Published by Nick Lyons Books, 31 West 21 Street, New York, New York 10010, black and white illustrations, 175 pages, copyright 1986.

For the fisherman to be skillful and successful, he must understand his quarry intimately, and *Trout on a Fly* thrusts the reader into the fish's world.

Lee Wulff draws on nearly three-quarters of a century of serious angling to explain what a trout will do under various circumstances, why it takes up a particular position in a river, why and when it feeds, and what you must do to bring it to your fly. He examines many factors—temperature, stream flow, conservation of the species, presentation, tactics, and flies and their structures.

Wulff's book is for serious trout fishermen; it may change the way anglers see and approach the trout and its world.

BUTTERFLIES AND MOTHS

By Jo Brewer and Dave Winter. Published by PHalarope Books, Prentice Hall Press, Gulf + Western Building, One Gulf + Western Plaza, New York, New York 10023, paperback, drawings and photographs, 194 pages, copyright 1986.

A companion to your field guide, this book introduces the genuine pleasures to be derived from butterflies and moths: observing them, raising them (from egg to adult), collecting them and preserving them.

Many unanticipated satisfactions await those who become "hooked" on butterflies and moths, such as the fun of discoveries outdoors in weed or wilderness, vacations made

interesting and unique, and the challenge of creating one's own gadgets and equipment.

Illustrations in the book are primarily black and white, with four pages of color photos. (See "Jewels of the Night," page 24.)

POISONOUS PLANTS OF EASTERN NORTH AMERICA

By Randy G. Westbrooks and James W. Preacher. Published by the University of South Carolina Press, Columbia, South Carolina 29208, 226 pages, copyright 1986.

Except for poison ivy, most people can identify very few poisonous plants. Written to aid the general public as well as professionals, this guide includes all plants, both native and cultivated, that are poisonous to humans either by ingestion or by skin contact.

Vivid color photographs accompany concise descriptions of 150 species, and useful information on toxicity and symptoms are included along with entertaining folklore about plants' uses in herbal medicine. The book also contains notes for an additional 43 species as well as a master list of all species with complete literature references.

THE WAY OF THE HUMMINGBIRD—In Legend, History & Today's Gardens

By Virginia C. Holmgren. Published by Capra Press, Post Office Box 2068, Santa Barbara, California 93120, paperback, illustrations, 176 pages, copyright 1986.

Author Virginia Holmgren takes a fresh approach to discussing this delightful and popular little bird. She relates

ancient stories and legends from Native American folklore, then delves beneath the surface to find the core of scientific truth hidden in each tale. Holmgren also cites historical mention of the hummer in accounts of New World explorers and includes in her book reproductions of early graphic renderings by European artists.

The book concludes with hummingbird-watching tips and a listing of North American species, rarities with variant names, field markings and range information.

ERODING SOILS: THE OFF FARM IMPACTS

By Edwin H. Clark II, Jennifer A. Haverkamp and William Chapman. Published by The Conservation Foundation, 1255 23rd Street, N.W., Washington, D.C. 20037, illustrated with figures, 252 pages, copyright 1985.

This volume offers the first comprehensive analysis of what experts know about how soil erosion affects water quality and causes off-site problems. After reviewing the chemical, physical, hydrological and ecological principles essential to understanding how eroding soils cause these impacts, the book assesses the magnitude of the problems and provides the most thorough tally and analysis yet prepared of their estimated economic impacts—about \$6 billion a year.

Eroding Soils also summarizes what is known about the effectiveness of current techniques for controlling runoff from agricultural lands. It is the best source of information yet for understanding nonpoint-source pollution. 🐾

READERS' FORUM

Drayton Hall Readers

Your faithful subscribers on the staff of Drayton Hall were delighted to see the very romantic photograph of our lovely old mansion in your latest subscription flyer. Our only regret is that you did not identify Drayton Hall for those who might like to visit South Carolina's finest authentic pre-Revolutionary plantation home.

We would like to advise *South Carolina Wildlife* readers that Drayton Hall in Charleston is open to the public daily, with hourly guided tours. Information about the tours, hours of operation and special events may be obtained by calling (803) 766-0188.

*Letitia Galbraith, Director
Drayton Hall, Charleston*

John's Island Memories

Thank you, Charles "Trap" Seabrook, for your article on John's Island. It really came close to home. About 400 yards down the creek from our house, in fact. The weathered old home and dock scenes on Church Creek are part of "Frisco," once a cotton plantation owned by my wife's grandfather, William T. Hart. He built the home around 1893 for his young bride, Mary Frances LaRoche Hart, who lived there until she died at the age of 97.

I have been receiving your magazine for several years, and I'm sure that many hours of dedicated work go into each publication. As I read the articles and look at the beautiful pictures, it helps me continue to grow in respect and appreciation

for the God-given land with its woods, marshes, creeks and abundant wildlife. I hope we realize, before it's too late, that the gift is much too precious to be abused.

The next time you see Mr. Seabrook, tell him the tunnel at Fenwick Hall really exists. We dug into it a few years ago while digging the hole for a septic tank. And tell him, too, that on a real dark and still night, you can go down by that old house on Church Creek and hear the hags and boodaddies.
*Charles M. Waters
John's Island*

Appearances Can Deceive

I read with great interest Trap Seabrook's nostalgic article on John's Island (September-October 1986), but cannot help pointing out a painful irony in the selection of Robert Clark's beautiful photograph for the opening spread. Oh, how appearances can deceive!

The stretch of Church and Bohicket creeks that Mr. Clark has captured has been polluted for more than fifteen years and posted by S.C. Department of Health and Environmental Control as "dangerous and unfit for the gathering of shellfish." In fact, Mr. Clark stood, obviously unwittingly, within a few feet of an outfall of raw sewage when he made this photograph. This outfall is near the dock in the center of the photo.

This pollution has ruined shellfish beds on both sides of more than seven miles of the creeks. It has deprived residents of the privileges and pleasures of shellfishing; it has presented a threat to their health and has

decreased the value of their property.

The greatest irony of all is that during September and October of this year, at the very time your readers were enjoying the article and photograph, there were several consecutive days when solid human waste was found in this section of the creek to such an extent that residents up and down the banks reported the condition to state authorities.

The point is this: As Mr. Seabrook says, things aren't what they used to be on the islands, but there is still a great deal worth preserving and protecting. However, it is not enough to "appreciate" our natural resources and clean environment. We must understand them, work at preserving them, and, yes, even pay to correct our mistakes. If we do not get busy, we will fool ourselves into living on the banks of a cesspool, just as this photograph inadvertently fools your readers into thinking all is well in Church and Bohicket creeks.

Thanks for your attention and for your efforts to make *South Carolina Wildlife* the quality publication that it is.
*Lewis Hay
Wadmalaw Island*

High Hills of Wateree?

Would you be interested in knowing why the High Hills (Cook Mountain, etc.) are called the High Hills of Santee when it is plain they're on the Wateree? (See "Columbia, Capital of Three Rivers," November-December 1986.)

We were told on an

expedition with the Audubon Society that the name has been corrupted: they were named the High Hills of Santé (French: santé, meaning "health").

As everyone knows our forefathers knew it was healthier in the hills even if they didn't know why. They didn't know malaria came from the mosquito but they, or some of them, knew French.

*Kaby Lewis
Sumter*

The Forest Floor

Having earned a Master's Degree in Natural Science from Arizona State, I have a special place in my heart for bugs, snakes, and other of God's smaller creations. I read and re-read the article "The Forest Floor" (September-October 1986), and I am now forced to relinquish the magazine to my daughter, Jody, so she may show it to her biology teacher.

You compare most favorably with our *Arizona Highways* magazine.

*Sue McLean
Glendale, Arizona*

A Touching Soliloquy

I have often enjoyed and appreciated your sensitive comments and editorials in *South Carolina Wildlife*. However, nothing had touched me as did your beautiful soliloquy on your long-ago canine friend: thanks for printing such a touching tribute to man's—and woman's—"Best Friend" (September-October 1986).

I had a wonderful friend for ten years: she was part-shepherd, part-lab, and part-human. She landed in my lap one night with



huge black "airplane ears" and left me with her eyes proudly shining. In between, she was my friend, companion, and protector. Being with her allowed me to be myself, by myself, without fear.

The closest she came to hunting was when she ran like black lightning on Folly Beach chasing after seagulls, or digging sand crabs out of their holes, her tail turning like a windmill.

She would sing when I drove into the driveway from a long work day—my own welcoming committee, rain or shine. And we would talk, or communicate in shared silence or laughter or looks. She shared her humor, protectiveness, dignity, patience, and "joie de vivre" with me; I have been blessed.

There will be another puppy, but there will never be another Katie.

Thank you again for encouraging your readers to remember each of our best friends, who still romp and run in our minds.

*Kate Stockman
Yonges Island*

Mr. Davis' beautiful tribute is one that can be enjoyed by all dog lovers.

We enjoy *South Carolina Wildlife* and have adjusted to the change as new editors stress different interests over the years. We are both Pennsylvanians who have lived here for over 25 years. And we still have two homes, in our hearts—South Carolina and Pennsylvania—although we seldom get back to Pennsylvania any more.

South Carolina is blessed with abundant wildlife. We

have a family of four grey foxes living in our neighborhood, wild, although we are within the city limits of Charleston. Please, let us keep the wild in all our lives.

*Ruthe S. Berendsen
Charleston*

Commendations to Photographers

Your magazine is very beautiful and interesting. The photography is outstanding. Thank you for letting us share the beauty of South Carolina with you.

*Mrs. M.J. Newman
North Augusta*

I must commend you on the excellent job done on the magazine. You depict South Carolina's beauty in a way no other magazine can.

Special praises to the photographers! The Palmetto Portraits calendars are wonderful! I should know—I've gotten four to use as gifts! You must work the photographers 24 hours a day. Keep up the beautiful work.

*Laura Craven
Charleston*

How Old?

I hunted quail and dove from the time I was twelve. No sign of deer or turkey in Barnwell or Bamberg counties. Maybe I was too busy trying to be good at hunting quail and dove and didn't notice.

I moved to Florida in 1939 but still call South Carolina home. My first hunting license was a Barnwell County license \$1.10. A state license was out of my range, \$3.10. Might

be fun to guess what year I was born.

One hint, a box of Shur Shot shells cost \$.75.

*Carl Quattlebaum
Fernandina Beach, Florida*

Note from Abroad

I would like to say how much pleasure your most excellent publication gives to my wife and me in England—we receive it through the kind subscription of a friend I have yet to meet, Ronnie Vehorn of Georgetown.

To your publication—as I write this they are neatly stacked on my desk...the quality of photography and content are just not matched by anything over here. I teach in a school in Nottinghamshire. My hobbies are shooting game and wildfowl, fishing, taxidermy and painting all when I have time. Shooting takes up the greater part of the autumn and winter, with fishing the summer months. I also have a part-time gamekeeper job where we rear about 250 pheasants on 400 acres. I have two golden labradors—Tess in her prime with Honey now in retirement and a springer of rather uncertain origins, having been found one Christmas four years ago by my wife.

I visit Scotland as often as possible for the geese shooting on the Solway Firth, also the Wash in Lincolnshire, where I am a member of a Wildfowling Club.

Well, that is a smattering of me and should you want to know more of the country scene over here I would be happy to oblige.

So here's all the best to your staff and a wonderful publication

which I hope to have for many years to come.

*John J. Parfremment
Farnfield Notts, England*

Readers Praise "A Carolina Trilogy"

Please send to me one additional copy of "A Carolina Trilogy" (January-February 1987). It is absolutely "out of this world" even if it is in South Carolina. The photography is the best you have ever printed.

*Louie Lawrimore
Florence*

I want to take this opportunity to express to you my appreciation for your work in producing "A Carolina Trilogy." This is the finest work of its kind that I have ever seen. The photography is outstanding, the narration is clearly done with great skill and is the result of extensive research.

As one keenly interested in this subject matter I think that I have full appreciation for the work that has gone into this publication which will be cherished by not only South Carolinians but by many others who appreciate the beauty of our countryside and the importance of the wise use of our natural resources.

*Julian E. Brown
Monroe, Georgia*

I would like one extra copy of "A Carolina Trilogy." We look forward to receiving each issue of our magazine. My husband enjoys the articles on fishing and hunting and I especially enjoy the beautiful artwork.

*Sandra Hayden
Lyman*

BRONZE BIRD OF THE SOUTHLAND

Wildlife management has enabled the elusive Eastern wild turkey to stage a remarkable comeback from near extinction to reign as South Carolina's official game bird.

by David Baumann

illustration by Ellen Fishburne Seats

Eastern light sweeps over a forest clad in springtime greenery, a fresh land awakening to the calls and stirrings of wildlife. The crescendo of calls builds. The forest is very much alive. In an instant a shattering gobble overpowers all sounds, and the woods fall quiet momentarily. A wild gobbler has stated his intention to mate a hen, a resolve that means fighting competing gobblers if necessary.

During the early days of settlement, native wildlife was abundant and turkeys were common over this country's untamed wilderness. The turkey was reported throughout the land that would become South Carolina, and millions of birds covered a territory that today represents a 39-state range.

The Indians found turkeys easy targets to hunt; they were plentiful and showed little fear of humans. Evidently the absence of challenge made turkey hunting beneath the dignity of the tribes' adults, so the task of harvesting wild turkeys fell to children. Things would change, however. The cunning turkey learned to view man as a dangerous predator. The ultimate result of this wariness is the elusive game bird that challenges today's hunter.

This country's original vast turkey population was devastated by habitat destruction and alteration, baiting and uncontrolled hunting. By the 1930s, the booming gobble of the wild turkey could only be heard in 21 states, and some of those populations were very low. Estimates indicated that only about 30,000 wild turkeys remained nationwide from 1930 to 1950.

Turkeys were eliminated from large portions of their original range; the few that remained clung to the large swamps of the South and certain mountainous areas. South Carolina's wild turkeys shared this fate, and remnant flocks existed only in a few areas of the coastal plain along major river drainages.

Things would improve, however. By 1960 the turkey had repopulated many of the states from which it had been extirpated, thanks to restoration programs, protection and habitat management. Today, approximately two million birds inhabit forests throughout North America with Alaska being an exception.

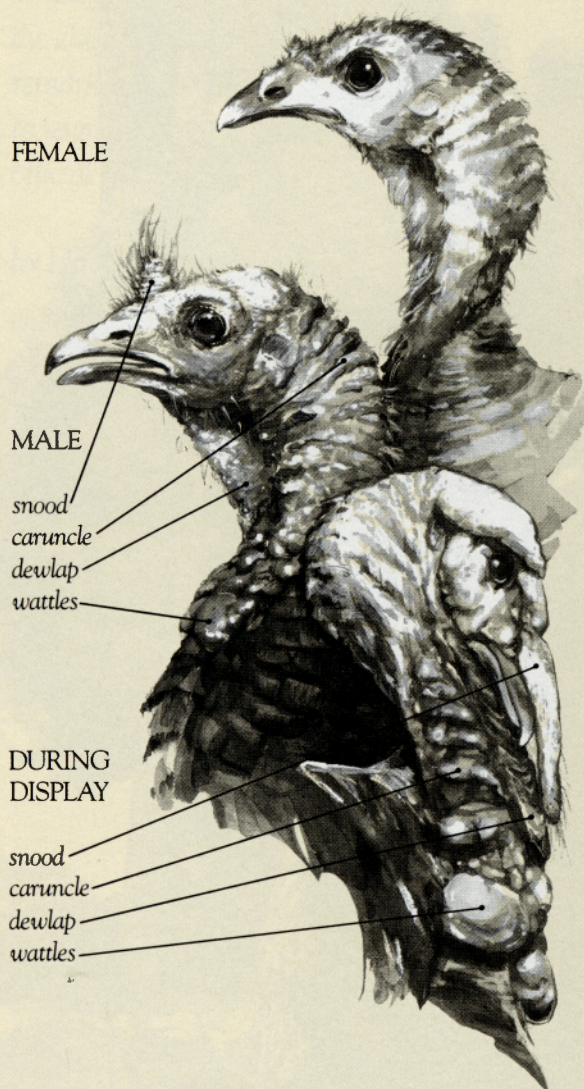
South Carolina turkeys' success story started in the 1950s when state wildlife biologists trapped and removed 318 wild birds from the Waterhorn Hunt Unit of the Francis Marion Wildlife Management Area. The turkeys were successfully restocked into the central and western piedmont, and the result is the widely distributed turkey population found in these areas today.

The increase in turkey numbers has provided the opportunity to conduct in-depth studies on the bird's life history and needs. Research reveals that the events in an adult wild turkey's year are cyclic, with no clear beginning or end. The most complex period is that time surrounding its reproductive cycle which in South Carolina is normally from early March to mid-July.

Gobbling during the first warm days of early spring heralds the approach of mating season. Mature toms gobble several times before leaving the roost at daylight. On the ground they spend brief periods gobbling and strutting with their tails raised and body feathers puffed out, making them appear larger than normal. Gobbling helps establish dominance, which is further established by challenges to other toms resulting in brief fights with the victor becoming the dominant bird.



Depending upon the bird's sex, prominent anatomical features of a turkey's head include a snood, dewlap, caruncles and wattles. Wattles actually are specific caruncles (fleshy areas). The male's snood elongates during periods of sexual excitement. Top is an adult female, middle is a non-courting male, and bottom is a male in courting display. Though the female's head has more feathers, vivid colors distinguish the male's head, especially during courtship when head and neck coloration is red, white and blue.



As spring progresses, the male's gobbling indicates he is receptive to hens who locate him through his gobbling. If a hen is ready for mating she will present herself in front of the tom in a crouched position at which time breeding occurs. Since turkeys are sexually promiscuous, the hen may breed with several different gobblers during the season.

Soon after mating, the hen begins to lay her clutch averaging 11 to 14 eggs. At first, egg laying is irregular with the hen laying one egg every other day. As the laying cycle progresses, the hen lays an egg a day until the clutch is complete. Laying generally occurs a few minutes later each day, and more time is spent on the nest each time. When the last egg is laid, the hen remains on the nest day and night, only leaving the nest for brief periods to feed and drink.

Turkey nests are not elaborate compared to those of other birds. The hen simply scratches out a shallow spot on the ground to deposit her first egg. After laying it she places a few dry leaves over the egg before leaving. On each successive visit to lay, more debris is placed over the eggs with the final nest consisting of a gradual accumulation of leaves rather than a deliberate arrangement of nest materials.

Should a hen lose her nest, the tendency to reneest is influenced by the stage of incubation at the time of nest loss. A hen losing a nest early in the spring after only a short incubation period will usually reneest.

Most hens in South Carolina begin incubation during mid-April. Young poults have been observed in early April and as late as early September. The spring gobbler hunting season is timed to coincide with this period of peak egg laying and incubation to reduce the accidental harvest of hens.

The incubation period for wild turkeys is approximately 28 days with all fertile eggs normally hatching within a 30-hour period. If the first poults that hatch attempt to leave the nest, the hen uses her head and neck to retrieve them and to push them back into the nest. Shortly after the last egg is hatched the hen leaves the nest with her poults.

Natal down covers the four- to five-inch high poults. During the first two weeks after hatching the hen and poults will roost on the ground with the young resting under her spread wings and tail.

With the young poults following her closely, the hen cautiously leads them through cover, her sharp eyes scanning the area for danger since the poults are especially vulnerable until they learn to fly. If confronted by a predator, the hen attempts to lure it away from the brood. If that fails, the hen feigns an attack. If necessary, the hen may in fact attack.

During the early part of their lives, poults require a diet high in protein. Grasshoppers, beetles, crickets and other insects help them meet their need for protein. Water is an almost daily requirement, and the poults are seldom found over one-fourth mile from water. The young poults grow very rapidly, and by the time they are ten days old their wings have feathered out and they are able to fly short distances. At 12 to 14 days of age the brood along with the hen will begin roosting in trees.

About the time the brood begins to roost in trees, other broods may join it to form a flock. The flock forages field edges, regenerated areas and logging roads that provide large quantities of protein-rich insects, succulent vegetation and ripening seed heads. Growth is rapid, and by mid-November in South Carolina, young males weigh from 6 to 10 pounds and hens 5 to 7.

Summer flocks remain together into the fall. By winter, many of the jakes split off from the flock and form immature gobbler flocks. Adult gobblers travel singly or in small groups, only occasionally associating with other turkeys. Through the fall and winter, wild turkeys spend much of their time in hardwood stands where mast such as acorns, dogwood berries and beechnuts are available.

Turkeys also utilize fields where corn, soybeans and other grains are available,



Until they can fly, poults are extremely vulnerable to predators. A 14-day-old poult has feathered out enough to roost in trees with the hen and enjoys a greater degree of security.

The turkey's sturdy foot provides its principal method of travel. Toenails leave unmistakable traces of feeding as the bird scratches for acorns and seeds. The spur, a secondary trait, reaches full development in adult gobblers and sharpens as the bird ages. Spurs rarely exceed 1½ inches in length. To many hunters, long, curved spurs are more highly prized trophies than beards as they are better indicators of a bird's age.



Eastern Wild turkey, *Meleagris gallopavo silvestris*

Description: Similar to the domestic turkey but slimmer with a rusty, not white, tail tip. Distinguished by a naked head, bluish with red wattles that intensify during the male's display. Bronze, iridescent plumage covers the body, and the wings are barred. Adult males are up to 50 inches in length, have a wing length of 19 to 22 inches and weigh on the average of 14 to 18 pounds. Females are smaller, up to 45 inches long with a wing length of 15 to 17 inches, and weigh 7 to 11 pounds.

Habitat: Best areas for nesting cover are woodland margins, old fields, unmowed pastures and regeneration areas. Mature timber stands are preferred roosting sites. Aside from the various vegetative types found in their range, turkeys seem to prefer natural land contours that allow them to avoid detection.

Feeding Habits: Wild turkeys consume a wide variety of foods such as acorns, grasses, seeds, insects and wild fruits. During the spring, green grasses are preferred items. Summer to fall, the birds pick and strip ripened seeds. Scratching for acorns and berries is a principal feeding method from late fall through early spring.

Wild turkeys possess quite a vocabulary. Six types of calls, the chuck, alarm putt, yelp, whistle or kee kee, the guttural roost call and the gobble, permit wild turkeys to enjoy a wide range of communication.

A gobbler's beard is a prominent secondary sex characteristic, a bristle-like appendage growing from the breast. Though not common, beards are found on hens. The precise function of this appendage has never been determined.

scratching up waste seed left after combining. It is not uncommon to see congregations of up to 100 birds in some of these areas.

Turkeys feed heavily in late winter to accumulate reserves to help them through the upcoming breeding season. Adult gobblers then find little time to feed and rely on the breast sponge of fat developed during the fall and winter as an energy reservoir. Their weight generally peaks at this time, gaining up to four additional pounds.

In the spring, as the "green-up" occurs, turkeys seek out the new leaves of grasses and sedges and other succulent vegetation. Whenever available, acorns and other hard mast continue to comprise a major portion of the diet.

Despite its large size, the wild turkey is capable of extremely rapid flight. The bird is built for speed, and biologists have clocked it at 38 to 42 miles per hour, a speed often attained by the red-tailed hawk. On the ground a wild gobbler can quickly outpace all but the best human runners.

People who surprise wild turkeys are amazed at the speed with which these large birds take off. Unlike their overweight shorter-legged cousins that we dine on during the holidays, wild turkeys are capable of instant vertical takeoff despite weights of up to 25 pounds. Most people are accustomed to the ungainly running and flapping domestic turkeys go through to overcome gravity.

In 1975, a comprehensive biological plan was developed to restore the wild turkey to South Carolina's coastal plains region which formerly supported good turkey populations. The first step was to identify the best potential restoration sites. Sites were evaluated to determine the quantity and quality of the habitat and its longevity based on local land-use practices.

Through this restoration program 94 sites have been restocked with 1,613 turkeys. The efforts of this program have resulted in wild turkey populations being established in all 46 counties in South Carolina. To properly recognize the importance and popularity of this great game bird, our state legislature enacted a bill in 1976 designating the wild turkey as the "State Wild Game Bird."

The creation of fields or openings planted with desirable wildlife food plants is a common turkey management practice used in forested areas of South Carolina. In many cases these planted openings provide habitat diversity as well as a supplemental food source. Some of the more popular planted crops include chufa, wheat, oats, rye, millet, corn, clover and field peas. These plantings should fit into a larger wildlife management plan designed to meet specific needs for turkeys as well as other wildlife species.

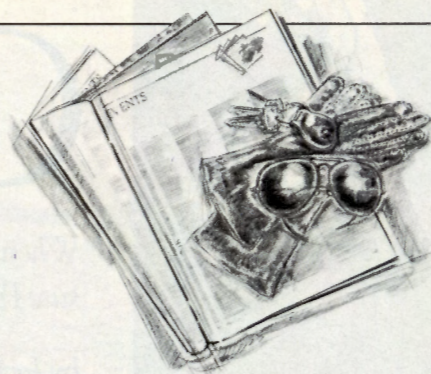
The restoration and management of the wild turkey in South Carolina and throughout the nation is truly one of the best-known success stories of the wildlife management profession. However, continued survival of this big-game bird in the face of changing land uses and increasing human populations will depend on public support for future management strategies developed by wildlife managers.

From pre-settlement times through the colonial period until today, the wild turkey has been a species of great importance to man. Benjamin Franklin is known to have lauded the merits of the turkey, calling it a "bird of courage" that "would not hesitate to attack a grenadier of the British guards who should presume to invade his farmyard with a red coat on." He once compared it to the bald eagle, praising the wild turkey as "a much more respectable bird and withal a true original native of America." These comments apparently gave rise to claims that Franklin had recommended the gobbler be named America's symbol, but there is no documentation to indicate he ever seriously suggested adoption of the turkey as the national bird.

Though its image has never adorned our stamps and currency, the Eastern wild turkey is a fitting choice for South Carolina's official game bird, a choice Franklin would have applauded. 🦃

David Baumann is the wild turkey project leader with the state wildlife department.

EVENTS



NOTE: Because of printing deadlines, dates are subject to change. Before traveling to an event, please call first for specific information.

MARCH 1-31.

Springfest. A month-long celebration of arts, food, film, music and seafood festivals, as well as special entertainment activities and sports events. Place: Hilton Head Island. For more information, contact Tom Ball, P.O. Box 5278, Hilton Head Island, S.C. 29938, (803) 842-3378.

MARCH 20-21.

S.C. Association of Taxidermists' Spring Convention-Competition. Taxidermists from across the state will be entering their mounts in a competition to win peer and public recognition, awards and prize money; six educational seminars will be taught to taxidermists. The public, including school and scout groups, can view the mounts on Saturday, March 21. Place: National Guard Armory, Newberry. For more information, contact Joey P. Holmes, Route 2, Box 280, Enoree, S.C. 29335, (803) 969-3456.

MARCH 20-22.

Palmetto Sportsmen's Classic. Three-day event for fishermen, hunters, campers and other outdoor enthusiasts of all ages. Features first-rate sporting equipment for show and sale, seminars, deer rack scoring, turkey-calling contests, game and seafood preparation demonstrations, wildlife paintings and wood carvings, bluegrass music, vehicle dealers,

games and fishing booth for kids, door prizes, auctions and raffles. Admission fee. Discount tickets for senior citizens' groups and charitable organizations available in advance only. Place: State Fairgrounds, Columbia. For more information, write Palmetto Sportsmen's Classic, P.O. Box 11710, Columbia, S.C. 29211, (803) 734-4008.

MARCH 25-28.

American Seafood Challenge. Cooking competition for professional chefs, with judging based on originality, difficulty of preparation and technique. Public is invited to attend the last day of competition when some of the country's best chefs will each prepare a dish from a mystery box of ingredients. Recipes for chefs' specialties will be available. Small admission charge. Place: Charleston. For more information, contact Donna Florio, Marine Resources Center, P.O. Box 12559, Charleston, S.C. 29412, (803) 795-6350.

APRIL 2-5.

Egg Scramble Jamboree. Parade, arts and crafts show and sale featuring over 75 exhibitors, entertainment. Place: Lamar. For more information, contact Sherrill Dorriety, P.O. Box 267, Lamar, S.C. 29069, (803) 326-5551 or 326-5552 or Fay Griffen, (803) 326-5693.

APRIL 3-5.

Flowertown Festival. Summerville and its surrounding area become an immense flower garden, and this 14th anniversary of the festival celebrates that beauty. Highlights include over 150 talented craftspersons

representing the culture of the Southeast, past and present; tours of homes set in a profusion of azaleas, wisteria and dogwoods; parades and carnivals. Place: Summerville. For more information, contact Flowertown Festival, 900 Crosscreek Drive, Summerville, S.C. 29483, (803) 871-9622 or Sharon Warren, (803) 871-7150.

APRIL 3-12.

Clarendon County Striped Bass Festival. Besides trying to snag a fiesty striped bass, visitors can enjoy arts and crafts sales, sports tournaments, clogging and a beach music show. Place: Manning. For more information, contact Buck Sprott, P.O. Box 1, Manning, S.C. 29102, (803) 435-8030.

APRIL 4-5.

Historic Pendleton Spring Jubilee. Come enjoy arts, crafts, house tours, food, entertainment and antique shows at this annual event. Place: Pendleton. For more information, contact Jo McConnell, Pendleton District Historical and Recreational Commission, 125 East Queen Street, P.O. Box 565, Pendleton, S.C. 29670, (803) 646-3782.

APRIL 11.

Murrells Inlet Seafood Festival. Delicious seafood, entertainment, arts and crafts are some of this festival's activities. Place: Murrells Inlet. For more information, contact Skeeter Nash, Pilot House Restaurant, U.S. 17, Murrells Inlet, S.C. 29576, (803) 651-2144.

APRIL 18.

Lobster Race and Oyster Parade. Tasty seafood dinners, a zany parade and a lobster race

are the perfect ingredients for a fun day. Place: Aiken. For more information, contact Chuck Martin, P.O. Box 111, Aiken, S.C. 29802, (803) 648-4981.

Governor's Frog Jump and Egg Striking Contest. Frog jumping, egg striking and sling shot competitions, arts and crafts, clogging exhibitions and musical entertainment highlight this event. Place: Springfield. For more information, contact W.H. Salley, P.O. Box 31, Springfield, S.C. 29416, (803) 258-3152.

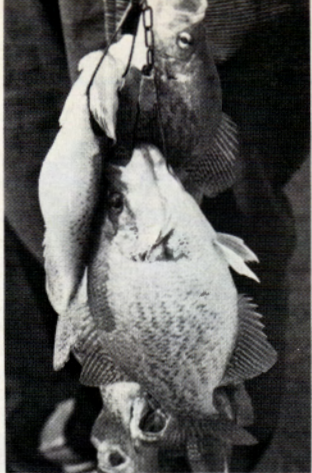
APRIL 24-25.

Crawfish Festival and Aquaculture Festival. Crawfish exhibits, art show, entertainment and succulent crawfish dishes will definitely bring the public to this event. Place: Pawleys Island. For more information, contact John H. Whitmire, P.O. Box 598, Pawleys Island, S.C. 29585, (803) 237-3032.

APRIL 24-26.

Fishy Tournament. A weekend of fishing for the entire family. On awards day, Sunday, April 26, thousands of dollars in prizes and cash will be given away to kids and adults. Place: Lake Murray, Columbia. For more information, contact Miriam Atria, Lake Murray Tourism and Recreation Association, P.O. Box 210096, Columbia, S.C. 29221, (803) 731-9990.

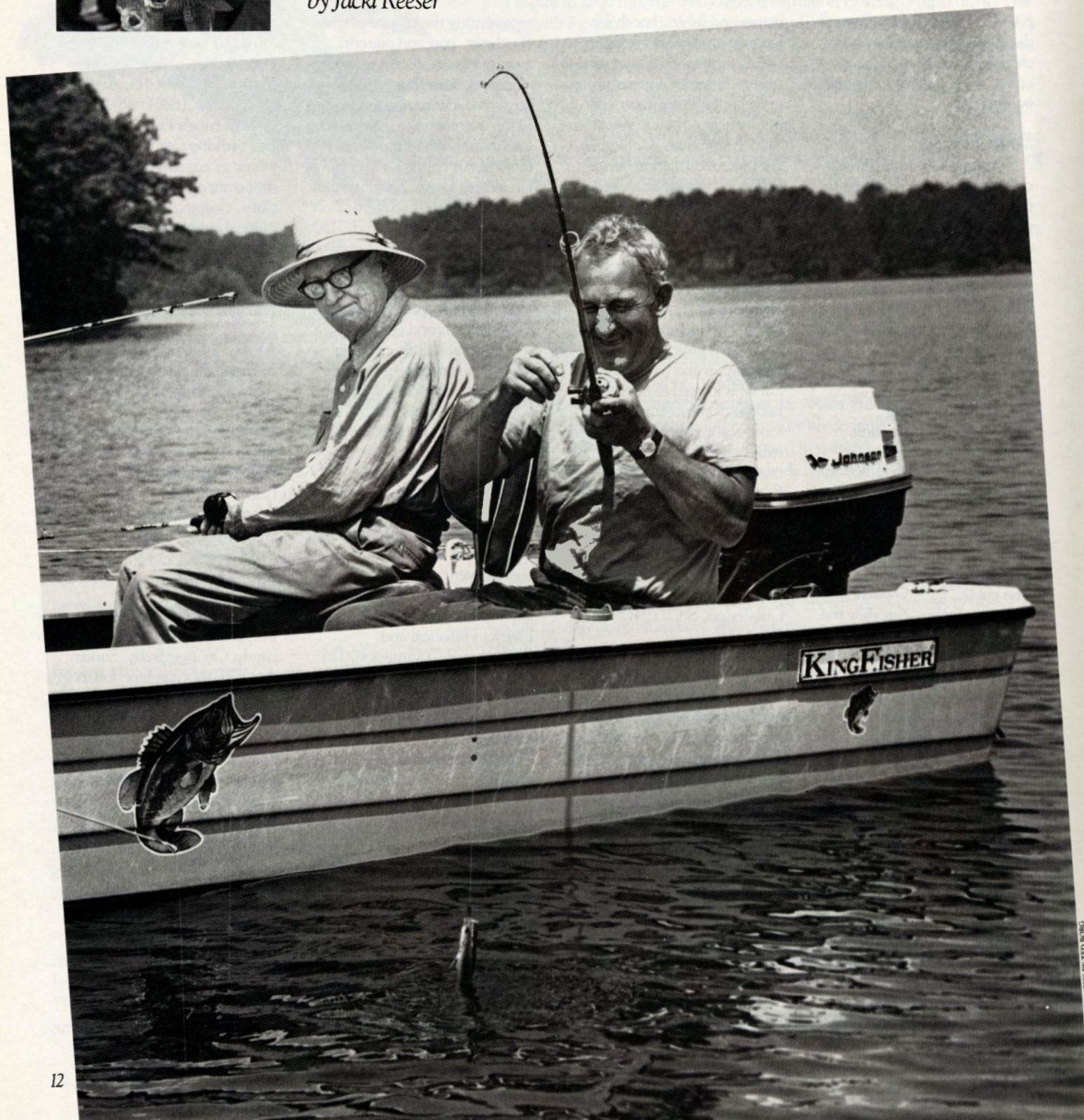
To list an event, send information three to four months in advance of publication date to Tricia Wray, South Carolina Wildlife, P.O. Box 167, Columbia, S.C. 29202, (803) 734-3972 or 734-3973.



CRAPPIE FEVER!

When the redbuds and dogwoods splash lakesides with spring color, you can be sure Palmetto waters reel beneath an armada of crappie enthusiasts.

by Jacki Reeser



When the fish are spawning, it's the duty of every red-blooded American angler to defend himself in favorite fashion, be it cane pole and bobber or flyrod and jig.

In the spring of the year, when a young man's fancy is supposed to turn to love, it often seems young and old of both sexes are thinking about crappie fishing and the sizzle of fillets turning golden in hot oil.

This member of the sunfish family probably ranks as the most popular pan fish in the nation, with more than 55 different names listed in an official publication of the U.S. Department of the Interior. Those names range from the exotic such as sac-a-lait and silver bass to the simple, speckled perch and razorbacks.

In South Carolina, the fish is best known as crappie, papermouth perch, calico bass and, reserved for the biggest of specimens, slabs. The crappie is the mainstay of multitudes of fishermen, and when the fish are on their spawn, the lakes get so crowded you'd best carry your own stump to fish beside.

Crappie are indigenous throughout the state, from the deep, clear waters of the piedmont to the shallow lakes of the coastal plain, within easy reach of anyone who cares to pursue them. And that pursuit requires little in the way of sophisticated equipment. During the spring they seem to fight over the privilege of landing in someone's cooler, attacking lures and baits intended for the capture of other species almost as hastily as those intended for their own demise. No wonder anglers love 'em with a passion.

At this time of year, the fish are coming off the cold lean winter, the females full of roe, the males waiting in the wings and both ready to eat anything in sight. Anglers, too, are coming off a cold lean winter usually spent in front of the fireplace or tube, and they are ready to catch anything that moves. Far from being a war between two armies,

it's more like a delightful game played at the best time of year for each side.

When I was a kid, springtime mornings would find me sneaking out of our lake house well before daylight to be the first at the dock, thereby staking my claim on the most productive crappie-catching spot, at least until the adults came along and edged me out. Now I'm one of the adults who stake a claim through the privilege of age, but the excitement of knowing there's a brushpile of crappie right under my feet remains the same.

The species does not discriminate in any way between the very young and the very old, the bank/pier fisherman and the bass-boat enthusiast, or between those who load the entire family in the boat and those who "sneak" off on their own in a one-man boat. When the fish are spawning, it's the duty of every red-blooded American angler to defend himself in favorite fashion, be it cane pole and bobber or flyrod and jig.

The fact that the fish are so congenial just makes the catching more fun. This species loves woody cover, and during the spring spawn it seems every stump, brush pile and treetop harbors at least one of the rascals. Piers and docks, especially those near deepwater access, hold what seems to be an inexhaustible supply, stacked in like cordwood and fighting over every edible-looking morsel in the vicinity.

Possibly the most famous "woody cover" in the Palmetto State was the old logjam on Lake Marion, the upper of the Santee-Cooper lakes. Several acres of water were covered with huge old logs that had floated to the surface and jammed against the





JOHN DAVIS

Like youth in love in the spring, crappie enthusiasts are known to do unusual things.

standing trees in the major body of the lake. Old-timers still talk about walking out on the logjam, dropping a minnow down a crack between two logs and hauling out a slab. Occasionally the fish was bigger than the crack and the line would have to be cut. A hurricane broke up the logjam in the mid-1950s, but it was crappie heaven while it existed.

There are several schools of thought on just when is the best time to catch crappie during the spring. When the "dogwoods-in-full-bloom" believers meet those from the "redbud" school of thought, a good-natured argument is sure to ensue. Actually, it seems both natural indicators can be accurate, but it's likely that the fish pay more attention to water temperature than to what's happening in the woods. It's the matter of fishing style that poses the real question.

By the time the redbuds spot the still-dormant woods with a zip of life, the crappie are well into their annual migratory spawning process. They have already left their deepest sanctuaries and are

at mid-depths, waiting for a final signal from nature. Redbuds doing what they do best—bud in a reddish color—indicate to anglers a progressive warming of air and water temperatures and crappie beginning to make their move to the shallows.

Dogwoods in full bloom herald another stage of crappie fishing, that of the actual spawn and very shallow water angling. Pursuing crappie in the shallows is more than a tradition in the Palmetto State, it's a life-support system for many crappie addicts. Regardless of how many bass, stripers or catfish I catch, seeing the bobber wiggle then silently slip under the water's surface is a unique thrill, taking me back to my fishing roots.

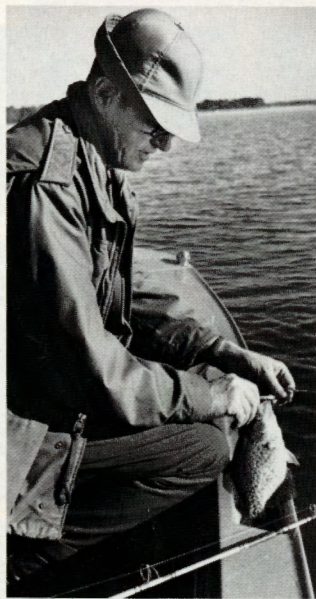
Like youth in love in the spring, crappie enthusiasts are known to do unusual things at times, ranging from throwing rocks into the water to motoring in circles for hours to thrashing at the weeds with a piece of conduit. Don't laugh or curl up your lip—if you haven't tried any of these you've probably quit and gone home too early.



TED BORG



TED BORG



JOHN DAVIS

Unlike the "fair-weather" springtime crappie purist, a die-hard, year-round crappie angler is as educated and structure-oriented as specialists in any other fishing genre.

I remember well how my dad would throw a brick into the water by our old pier whenever the action in our personal hotspot slowed.

"Gotta stir 'em up a little," he'd say with a slightly embarrassed little laugh.

It worked more often than not and extended our fishing time, allowing us to fill out our limits before we quit for the day. Since then, I've learned from some so-called experts that crappie are attracted to noise. Other, equally so-called experts have told me this idea is a mere fish tale, but I know for a fact it worked for us.

And I have seen boats circling, their motors locked in a tight turn in reverse, bobbers in the center of the concentric rings the action created. Those who don't get too dizzy to sit up claim to catch a mess of good eating from fish congregated in deeper water.

As for thrashing the weeds with conduit, the guys who came up with this method call their weapon a "Holey Rod," and they use it in thick grass beds in shallow water. After punching a hole in the grass, they drop in a jig and pull out a once-too-often-curious crappie.

If crappie anglers can't agree on technique, which seems to matter little anyway, they sure can't agree on baits. Mention jigs around the old-timers and one of them will invariably say something like "jigs are good fer crappie, but minnows are better."

The most lively arguments I've ever witnessed were over just such statements. For some reason, few anglers care to use the best of both worlds. It seems far more enjoyable to argue about the pros and cons of the two techniques.

Minnows are more natural and will get strikes when fishing is slow, but with jigs you can catch more fish faster because you don't have to change

bait every time you catch a fish. With jigs you can quickly change colors and sizes, but minnow enthusiasts will tell you of the varieties of "minnows" they use regularly including tuffies, pinks, shiners, goldfish and creek minnows.

Whether you choose to dunk a minnow or dip a jig really doesn't matter to the crappie, just so you do it.

Where and when you do it isn't really all that critical, either. Although spring is certainly the peak for angler activity, summer, fall and winter are all excellent times for taking limits of these fish, requiring only a slightly higher degree of sophistication to be consistently successful.

Unlike the "fair-weather" springtime crappie purist, a die-hard, year-round crappie angler is as educated and structure-oriented as specialists in any other fishing genre. During the so-called off-season, which lasts about 330 days each year, the fish orient to deep-water structures and congregate in large schools. Zero in on one of these hotspots, and you'll learn what the term "crappie city" really means.

Many anglers put out crappie beds consisting of almost any wooden structure—trees, brush piles or even plain sticks set in a circular or square pattern on the lake bottom. During the heat of summer, the fish love these hideouts located in deep water, but it's best to check regulations for your lake before placing such beds.

The use of an electronic "bird dog" is imperative when searching the drops, points, humps and other natural crappie-holding structures. These fish-pointers come in numerous models ranging from simple depth flasher units to ultra-modern, multi-color video graph records. The more complex the unit, the more you can fine tune your crappie locating tactics. Crappie fishing in deep water, during summer and winter, requires a little more patience than the spring melee, but it is equally rewarding in terms of fillets in the frying pan.

And that's quite a reward because, besides being cooperative and congenial, the crappie fish is the stuff of which fish fries are made—mild, tender, flaky, and oh, so delectable. 🐟

Jackie Reeser is a native South Carolinian whose work has appeared in regional and national outdoor magazines.



PHILLIP JONES

SILENT SPRING REVISITED

*Rachel Carson's prediction that pollution would cast a shadow of death over the land has been averted so far because her book *Silent Spring* launched the environmental movement and forced us to examine our use of chemicals. Now, however, development threatens the environment.*

by Mobashir Salahuddin

The scene is being repeated in many communities across America. A person develops cancer, and his anguished family discovers the disease has also struck several other neighbors.

Cancer suddenly becomes a community-wide concern. The frightened residents band together and call in the health authorities, whose first inclination often is to dismiss the cases as coincidence. Science tends to be a dispassionate calling.

Clusters of cancer cases are being reported often enough to raise uneasy doubts about the safety of our environment. In 1981, there were reports of too many colon and rectal cancers among workers at General Motors in Detroit, and in 1982, there was a cluster of lung cancers in California's Industrial Bay area. In 1983, an unusually high incidence of brain cancer was reported in parts of Texas and Louisiana. In 1984, it was documented that women in Nassau County, Long Island, had an abnormally high rate of breast cancer, and in 1985, health officials confirmed the incidence of leukemia was higher than normal in the Berea community near Greenville, South Carolina.

The list goes on and on. Something is amiss, but there's no villain in sight. Chemicals, hazardous waste and pesticides are suspected, but proof is lacking. It's as if these communities had been cast under some evil spell, bringing with it strange maladies of unknown origins.

About twenty-five years ago, a writer predicted that such would be our fate because of our unceasing quest for ever-more convenience and ever-greater productivity. Chemicals are docile servants but only for a short while, warned Rachel Carson in *Silent Spring*, the memorable book that foreknowingly voiced many of our fears about the environment.

At a time when the dangers of contamination and pollution were poorly understood, Carson asked, "Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life?"

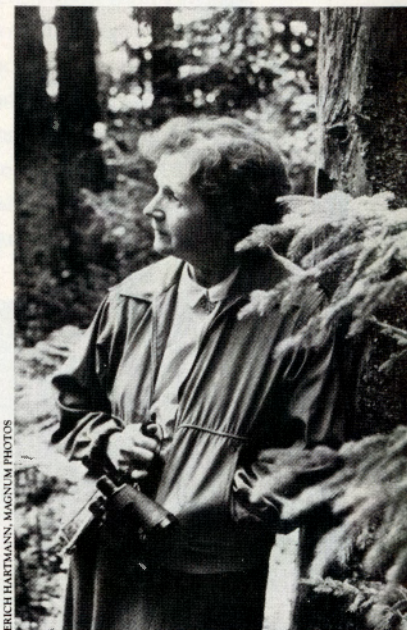
In lyrical, memorable prose, she wrote of a future poisoned by chemicals. "It was a spring without voices. On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was no sound; only silence lay over the fields and woods and marsh.

"Everywhere was a shadow of death. The farmers spoke of much illness among their families. In the towns the doctors had become more and more puzzled by new kinds of sickness among their patients. There had been several sudden and unexplained deaths, not only among adults but even among children."

A noisy turmoil quickly greeted the publication of *Silent Spring* in 1962. Critics pounced upon the scientific errors in the book, but that did little to diminish the public's enthusiasm. *Silent Spring* soon became a best-seller, went through about 25 printings and was translated into more than a dozen languages.

Above all, the book launched the modern environmental movement, bringing into the public arena concerns quietly shared by many scientists. In a eulogy delivered in the United States Senate on Carson's death, Senator Abraham Ribicoff paid tribute to "this gentle lady who aroused people everywhere to be concerned with one of the most significant problems of mid-20th century life—man's contamination of his environment."

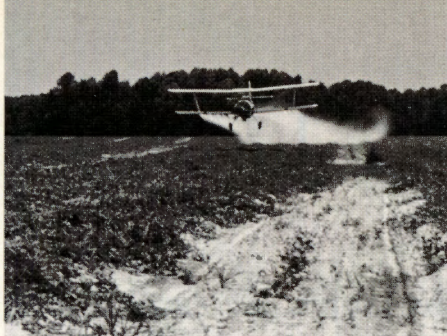
A quarter of a century is a decent interval in which to appraise a book, to measure the force of its blows. Do pesticides and other



ERIC HARTMANN, MAGNUM PHOTOS

Rachel Carson, 1907-1964, author of *Silent Spring*, Houghton Mifflin Company 1962. In the early sixties, industry daily spewed noxious plumes into the sky and dumped toxic wastes into waterways with disregard for the environment. The publishing of Carson's book ironically prevented many of her dire predictions, spurring the environmental movement before more environmental damage could be inflicted upon the land.





DICK FELDER, S.C.D.A.



S.C.D.H.C.

From pharmaceuticals to plastic, the magic of chemistry does much to improve life but often extracts a price from the environment. From rain-vulnerable, pesticide-sprayed fields to "used-up" chemicals with nowhere to go, the importance of monitoring the environment grows greater each year. Our past sins and society's continuing waste products pack the landscape with potential environmental timebombs to be dealt with by agencies such as the Department of Health and Environmental Control.

chemicals pose as great a danger to the environment as Carson decried? Have her fears largely become realities or do they remain predictions? Has the environment deteriorated under the inexorable advance of technology? Are we facing an epidemic of cancers?

Although *Silent Spring* is mostly remembered for Carson's vehement attack on pesticides and their dire effect upon plant and animal life, she also warned about the dangers to human life.

"For the first time in the history of the world," she wrote, "every human being is now subject to contact with dangerous chemicals, from the moment of conception until death."

"No longer are exposures to dangerous chemicals occupational alone; they have entered the environment of everyone—even of children as yet unborn. It is hardly surprising, therefore, that we are now aware of an alarming increase in malignant deaths."

If the threat from pesticides today isn't nearly as great as Carson feared, it is because, to a large measure, we have abandoned many of the practices she lamented.

"There has been a significant move away from the chlorinated hydrocarbons, such as DDT, which are heavily persistent in the environment," said Clemson University's Dr. Von McCaskil, a widely-respected expert on pesticides.

"It's a significant change and I think it's an appropriate one. It was time to be more concerned." Although scientists were aware that there was a dark side to DDT's miraculous powers, it wasn't until *Silent Spring* was published that the danger became clear to the lay public.

"One of the most sinister features of DDT and related chemicals," Carson wrote, "is the way they are passed from one organism to another through all the links of the food chains. For example, fields of alfalfa are dusted with DDT; meal is later prepared from the alfalfa and fed to hens; the hens lay eggs which contain DDT."

"Or the hay, containing residues of seven to eight parts per million, may be fed to cows. The DDT will turn up in the milk . . . (and) in the butter. Through such a process of transfer, what started out as a very small amount of DDT may end as a heavy concentration."

"The poison may also be passed on from mother to offspring," Carson continued. "This means that the breast-fed human infant is receiving small but regular additions to the load of toxic chemicals building up in his body."

DDT was banned from most uses in the United States in 1972. "All of the publicity was important in motivating us to change," said McCaskil, adding that since *Silent Spring*'s publication the manufacture and use of pesticides has come under tighter government control.

"It is much more difficult to get a pesticide on the market than it used to be even ten years ago," McCaskil summed up.

"I would say that there has been a significant change in the public's perception as well in the thinking of the regulatory agencies. I am very much more pleased with the current situation than what the situation was ten to 15 years ago."

University of South Carolina marine biologist Dr. Geoffrey Scott is also a lot more optimistic about the environment

than he was in his undergraduate years when he first read *Silent Spring*.

"It was certainly an eerie and scary experience," he recalled. "The book certainly painted a very pessimistic picture of things to come."

Scott said Carson deserves our lasting gratitude because she alerted the public to the hidden dangers of chemicals and forced us to re-examine their use.

"We have gone to pesticides that are less persistent in the environment. That may very well be the reason we don't see some of the chronic effects she warned about. Also, one of the biggest things that has come about is integrated pest management, which minimizes the use of pesticides."

Like others, Scott said that the greatest danger to marine life in South Carolina today comes not from pesticides or other chemicals but from rapid coastal development.

"It's competition for space by a different organism is what it amounts to," is the way Philip Wilkinson put it. As a biologist with the South Carolina Wildlife and Marine Resources Department, Wilkinson has been monitoring the health of pelicans along the coast.

Although it is unclear whether DDT and related chemicals caused any harmful effects in humans, there is strong evidence that such chemicals came close to decimating pelican populations in several parts of the United States.

In the 1960s, tests showed that DDT contamination was responsible for the thinning of pelican egg shells, which became so fragile they broke when laid or when the incubating birds sat on them. Pelicans were soon placed on the endangered species list in South Carolina, as well as across the country.

With the banning of DDT the pelicans have recovered and are once again a familiar welcome sight. "Now they are doing fine. We have what appears to be a very healthy population of pelicans," said Wilkinson. Pelicans have now been taken off the endangered species as well as the threatened species lists.

The return of the fish-eating pelicans is an important ecological accomplishment because "they represent an early warning system. They are among the first to be affected," Wilkinson said.

Along with the pelican, the quail is also making a comeback in South Carolina. Urban expansion and changes in farming practices, which all but eliminated cover for the bird in agricultural fields, had greatly reduced the numbers of quail in the state.

However, more and more South



ROBERT CLARK

VIGILANCE MUST CONTINUE

While much has been done to clean up and protect our environment since Rachel Carson sounded the alarm in *Silent Spring*, we cannot afford to fall into the trap of apathy. Real and potential dangers exist in many places in the world, including our own back yard:

Thirty tons of highly toxic herbicides, pesticides and mercury poured into the **RHINE RIVER** last fall during a fire in a Basel, Switzerland, factory, causing a chemical slick 25 miles long to drift through West German, French and Dutch territory. An estimated 500,000 fish and eels were killed, and drinking water had to be trucked into some areas. Only three weeks later, a smaller spill of a toxic herbicide leaked into the Rhine from a plant in West Germany.

LAKE ERIE, one of the Great Lakes, the world's largest freshwater system, was considered "dead" not too many years ago, but it's now swimmable and fishable again, in fact, teeming with fish thanks to direct-discharge pollution control. But polychlorinated biphenyls (PCBs) persist and more than 800 toxic chemicals, many of them pesticides airborne from far away, have been found in the lakes. Fish-eating birds have hatched with deformed bills, and large amounts of cancerous tumors have been found in fish. While the situation continues to improve, area fishermen are still issued with their licenses a list of fish that are not safe for consumption.

LOVE CANAL is an abandoned toxic chemical waste disposal site near Niagara Falls, New York. When dumping was discontinued there in 1953, houses and schools sprang up around it. But in 1978, the state of New York began investigations after residents complained of their children being burnt, of nauseous odors and black sludge. Two hundred different kinds of compounds were found there, at least 12 of them cancer-causing substances. High rates of miscarriage and birth defects were documented, as were increases in central nervous disease and urinary and respiratory disorders. Three major evacuations resulted, the last a permanent relocation of the families who lived adjacent to the canal. Houses in the first two "rings" around the

site were demolished, and those in the Emergency Declaration Area are still being closely monitored, checking soil and water samples. Monitoring wells now line the site's perimeter at 300-foot intervals. A clay cap and synthetic liner cover the forty-acre tract. Sewers in the surrounding area have been cleared of dioxin, and creeks are to have their sediment cleaned by 1988, say EPA officials in New York.

Acid rain, precipitation with high pollutant content, is causing serious foliage damage to **APPALACHIAN FORESTS**. In 1984, 78 percent of the trees had less than 10 percent defoliation. But within one year, 39 percent were up to one-half defoliated, and tree mortality went up 7 percent from less than 1 percent. Three years ago when visiting German scientists were in the Appalachians comparing European and Southeastern forests, there was little evidence of the acid precipitation damage being seen in Europe. Now at higher elevations there is widespread death of tree tops and the symptoms of malnourishment; this is particularly evident on Mt. Mitchell, the East's highest peak. Clemson University is participating in a U.S. Department of Agriculture study of effects of acid rain on trees in their experimental forest. The chief culprits in acid rain are sulfates, nitrates and ozone, with vehicle exhaust largely responsible for nitrate pollution.

Congress has reauthorized the "Superfund" providing federal funding for eliminating dangerous toxic waste dumps. The five-year program authorizes expenditures of \$8.5 billion for dump cleanup and \$500 million for stopping leaks in underground storage tanks, says the Wildlife Management Institute. Officials fear that as many as 22,000 hazardous waste sites in the country ultimately will require Superfund attention. Out of about 300 sites in South Carolina, five of the most hazardous are being cleaned up with the state's Superfund monies. While DHEC spokesmen say none of the sites poses an immediate danger to the public, they show evidence of soil and groundwater contamination.

One of the sites that receive hazardous waste from Superfund cleanups is located in Sumter County, near **PINEWOOD**. The landfill, which holds more than a billion pounds of chemical wastes, lies near the shores of Lake Marion and above major aquifers. Contaminated groundwater was discovered last year in the Black Creek Aquifer, and the owners of the dump have been ordered to identify the source of contamination and take corrective measures. (Their permit for operation will be up for approval this fall, and EPA and DHEC officials are closely monitoring the

site.) Chemicals involved are industrial solvents and degreasers, which have caused cancer in laboratory animals, and additives to gasoline, explosives and paint thinner.

Fish weighing over three pounds caught anywhere in **LAKE HARTWELL** are not safe to eat, according to officials of the state Department of Health and Environmental Control, and none of those taken from the Seneca River arm of the lake should be consumed. PCBs have been found in unacceptable levels in the tissues of these fish, and the chemicals have caused toxic effects on laboratory animals, including liver damage, cancer and massive reproductive failure. High PCB levels were first discovered in Twelve Mile Creek and the upper portions of the lake in 1975; but the substance apparently was first discharged into the waters in the 1950s by Sangamo Electric Company. Now banned by the Environmental Protection Agency, PCBs were used as a flame retardant for electrical capacitors. (Sangamo discontinued their use in 1977.)

High levels of mercury have been found in **LANGLEY POND** in Aiken County, and the public is cautioned not to eat any fish caught there. The contamination is the result of the discharge of untreated or poorly treated wastewater into Horse Creek before 1979.

Little has changed for **POCALLA** since *South Carolina Wildlife* last informed readers about the dying swamp. (See September-October 1982, "Pocalla.") While the water level is a little higher, the mosquitoes and foul smell are still there, few fish survive, and the trees still send their roots into a false bottom only to tip over when they get tall enough. Beginning in the 1950s, the swamp's natural eutrophication process was rapidly accelerated by the dumping of raw sewage into its waters, the deposit of silt as a result of urbanization, the opening up of the swamp to sunlight as timbering eliminated cover, and the drastic reduction of water flow by the construction of logging roads and two earth dikes. Industrial discharge from several companies further compounded the problem, resulting in a \$1 million lawsuit against four Sumter companies. While they now comply with government regulations and sewage is now treated, the most recent study by the U.S. Army Corps of Engineers cites deep-core sediment samples showing concentrations of heavy metals (mercury, zinc, copper, lead and titanium) three to four feet deep in the bottom of the swamp. The report also states that mercury levels found in fish tissue were among the highest in the country. While nine years ago cleanup costs were thought to be about \$10 million, estimates now run in the billions. ☐





ROBERT CLARK



ROBERT CLARK

Before the 1972 ban of DDT, its derivative, DDE, thinned the eggs of pelicans and other birds to the point that brooding parent birds crushed them. Though quail occasionally succumb to environmental contaminants, their major threat comes from habitat loss. Some environmentalists now feel that continued habitat destruction looms as the harbinger of a very real "silent spring."

Carolínians are seeking the advice of wildlife experts about ways to attract quail. Mark Hall, a wildlife biologist with the state, says his department used to receive ten requests a year but now the requests have tripled.

"We are seeing some very positive steps. But it's a long uphill battle, a constant battle. There are practically no incentives for a small landowner to manage small game," noted Hall.

Hall said that every now and then wildlife officers might find some birds poisoned by chemicals, but the most important reason behind the decline of small game is the increase in human population, which is bringing more and more of the land under asphalt and cement. "People want the good old days back. The good old days are gone. If we go back it's going to be one lick at a time."

Officials keeping a watchful eye on the quality of the state's waters are also occasionally stumped by novel problems. Although chemicals are frequently suspected in the several fish kills South Carolina experiences each year, most often nature is to blame.

"Probably 70 percent of the fish kills we see are natural. Thirty percent are man-caused," said Allen Trim, a marine biologist at the state Department of Health and Environmental Control.

To be sure, there have been a few spectacular fish kills because of chemical discharges into water, but these problems are solved almost as quickly as they occur.

"I think the point source has been addressed," Trim said. "But nobody anywhere, that I know of, has really come to grips with the nonpoint problems. It's intermittent. It's just hard to address."

For instance, Trim explained, if a

company is found to be discharging wastes improperly it can swiftly be taken to task and made to cease the practice. But what are regulatory officials to do when fish die from pesticides sprayed properly on fields only a short while before torrential rains descend and sweep the pesticides into nearby waters?

Although the proper use of pesticides remains a trying art, Trim said that on the whole, "from the pollution point I haven't seen data in South Carolina that prove we are worse now than we were.

"I think that the environment has properly improved but the diversity of stressors has increased. I think the potential for something to happen is worse now. I think that maybe the overall quality has improved but there are just more things out there that could happen now.

"The potential for the catastrophic event is still there, I think. But from the routine operation of facilities we don't see the pollution problems we used to see. I think there are better control mechanisms in place now."

Trim credits *Silent Spring* for raising the consciousness of the people. "I think what it did was generate an awareness throughout the nation to look at the impact, other than maybe the short-term. That led to the banning of DDT."

It also forced many farmers to adopt healthier practices. "It used to be they did what was called 'insurance spraying' on their fields," Trim recalled. "Every five days they'd go out and spray. Now what they do in South Carolina is hire scouts who go out and do a pest count."

If the scouts don't find too many pests, there's no need to spray. "What you've done is you've reduced the quantity of chemicals

being used—that program's helped a lot in particular areas."

There's good news also from health statisticians: Americans are healthier and living longer. In 1950, the death rate from all causes was 841.5 deaths per 100,000 residents. Latest figures show that the death rate has now declined to 547.7 deaths per 100,000 residents.

"America is not in the midst of a 'technological epidemic' caused by environmental contaminants, food additives, or anything else for that matter," wrote Elizabeth Whelan, in *Toxic Terror*.

"On the contrary, the health of Americans has never been better and continues to improve. Even though a time bomb has supposedly been ticking away for years, no evidence exists of the explosion of death and disease cited by the environmentalists."

Perhaps Carson was most mistaken in her assessment of the chemical threat to human beings. Despite numerous reports about strange illnesses and in spite of countless new chemicals in the environment, scientists haven't been able to document the much-predicted epidemic of diseases.

"You would think that would be the case, but we are more alert now and probably have more checks and balances on chemicals than we used to have," said Dr. U. Hoyt Bodie, a widely-respected cancer specialist in South Carolina.

"Certainly industry has been required to institute additional checks. More public awareness is a major difference. The public was not aware that chemicals could cause cancer."

Paradoxically, at a time when many Americans are worried about health dangers from the environment, the message from some of the world's leading experts is that occupational exposures and environmental pollution aren't nearly as dangerous as smoking or drinking or overeating.

At the same time that scientists are less alarmed about the many chemicals in use today, there's evidence from all over the country that our increased attention to the environment is paying off.

Survey after survey has shown that the air is measurably cleaner in most American cities, fish are biting in waters once declared lifeless, and in countless communities spring comes heralded by a chorus of bird calls.

Rachel Carson stirred a nation to action. We should be grateful to her that her greatest work remains somewhat of a fable. 🐾

Mobashir Salahuddin is a medical affairs writer with The State newspaper in Columbia.

Do You Fish Too Much?

Fishing in South Carolina is more than just a privilege, it's our heritage. Fishing holes are passed down from father to son as if they were old coins or fine silver buried in the backyard, something to be guarded and prized. Not that good fishing is a rarity here, just the contrary. Our fishing resource is a wealth we cherish.

With this constant temptation before us, it's no wonder that some spend every possible minute on the water, running to Murrell's Inlet to chase flounder, doubling back up to Lake Jocassee for a shot at lunker trout. In some cases, the pursuit of fishing pleasures is taken to excess, resulting in the loss of golf partners, the alienation of hunting dogs, poor car maintenance and an increase in the divorce rate. Fishaholism may be the fastest-spreading malady in the Palmetto State and is rumored to be especially rampant in the Santee area.

Hope exists, however. If you catch it early enough, fishaholism is controllable. If detected in its infancy, the effects of fishaholism can be minimized through a program of yard work and limited dining in fish camps.

Waste no time in taking the following test if you suspect you might be a fishaholic. The questions have been scientifically designed to indicate beyond a shadow of a doubt whether you suffer from fishaholism. Fishing clubs might consider using this test to monitor their current memberships and to screen new applicants to prevent a local outbreak.

For the test to be accurate you must be as honest as possible.

THE FISHAHOLIC EARLY WARNING DETECTION TEST

- When you shave, do fish scales clog your razor?
A. Yes B. No C. Sometimes
- Imagine yourself stranded on a deserted island with one wish. Would you ask for a:
A. Surf rod B. Food supply C. Mermaid
- When you pass an aquarium, do you wonder if they're biting?
A. Yes B. No C. Sometimes
- Are your reading glasses polarized?
A. Yes B. No C. Top half of the bifocals only
- Does your spouse get your attention by:
A. Yelling "I got a bite" B. Putting on something sexy C. Imitating the sound of fish feeding on the surface
- On your last anniversary, did you buy your spouse:
A. A jewelry box with lure-sized slots B. Dinner C. Nothing, you forgot it and went fishing
- Do you take your coffee break at work:
A. According to feeding periods on the solunar table B. At 10 a.m. C. Both A and B
- Have you ever considered rigging your commode tank with an aerator so you can store minnows between fishing trips?
A. Yes B. No C. Does not apply, use artificials only



ELLEN FISHERNE SEATS

Fishaholism rages throughout South Carolina in the spring. If you pass an aquarium and wonder if the fish are biting, you probably have it. The Fishaholic Early Warning Detection Test could be your only hope for controlling this malady.

by Jim Mize

- Are all your household repairs made with fishing line, anchor rope and swivels?
A. Yes B. No C. Fish too much to waste time on home repairs
- Do your kids call you:
A. Skipper B. Dad C. Don't recognize you
- Is the night light in the baby's room:
A. A Coleman lantern B. A bunny rabbit with a bulb C. The bow light from your last boat
- Can you back a boat trailer through a slalom course at thirty miles per hour, in the dark, using only mirrors, but still find yourself hitting small shrubs with your riding mower?
A. Yes B. No C. Traded the riding mower for a 6 HP outboard
- When the guys talk about basking beauties, are your first thoughts of bass in shallow water?
A. Yes B. No C. Only during spawning season
- Is your mail delivered:
A. In a box at the launching ramp B. By a mailman at home C. By carrier duck
- Which of these do you consider the greatest invention of modern history?
A. The weedless hook B. The computer C. The knotless leader
- When you first read *Moby Dick*, did you consider it:
A. The birth of tournament fishing B. A great epic C. Just another fish tale
- The last time you and your spouse went on a romantic cruise, did you troll?
A. Yes B. No C. After the first day
- Which of the following do you spend the most money on?
A. Plastic worms B. Food C. Boat payments
- The last time you sprayed on something that smelled enticing, was it:
A. Fish Formula I B. Brut C. Reel oil
- If you were in a fine restaurant and you spotted a fly in your soup, would you:
A. Save it for bait B. Alert the waiter C. Watch to see if it was a hatch

Now, calculate your score, assigning each answer "A" two points, each answer "B" no points, and each answer "C" one point. Then add up the total.

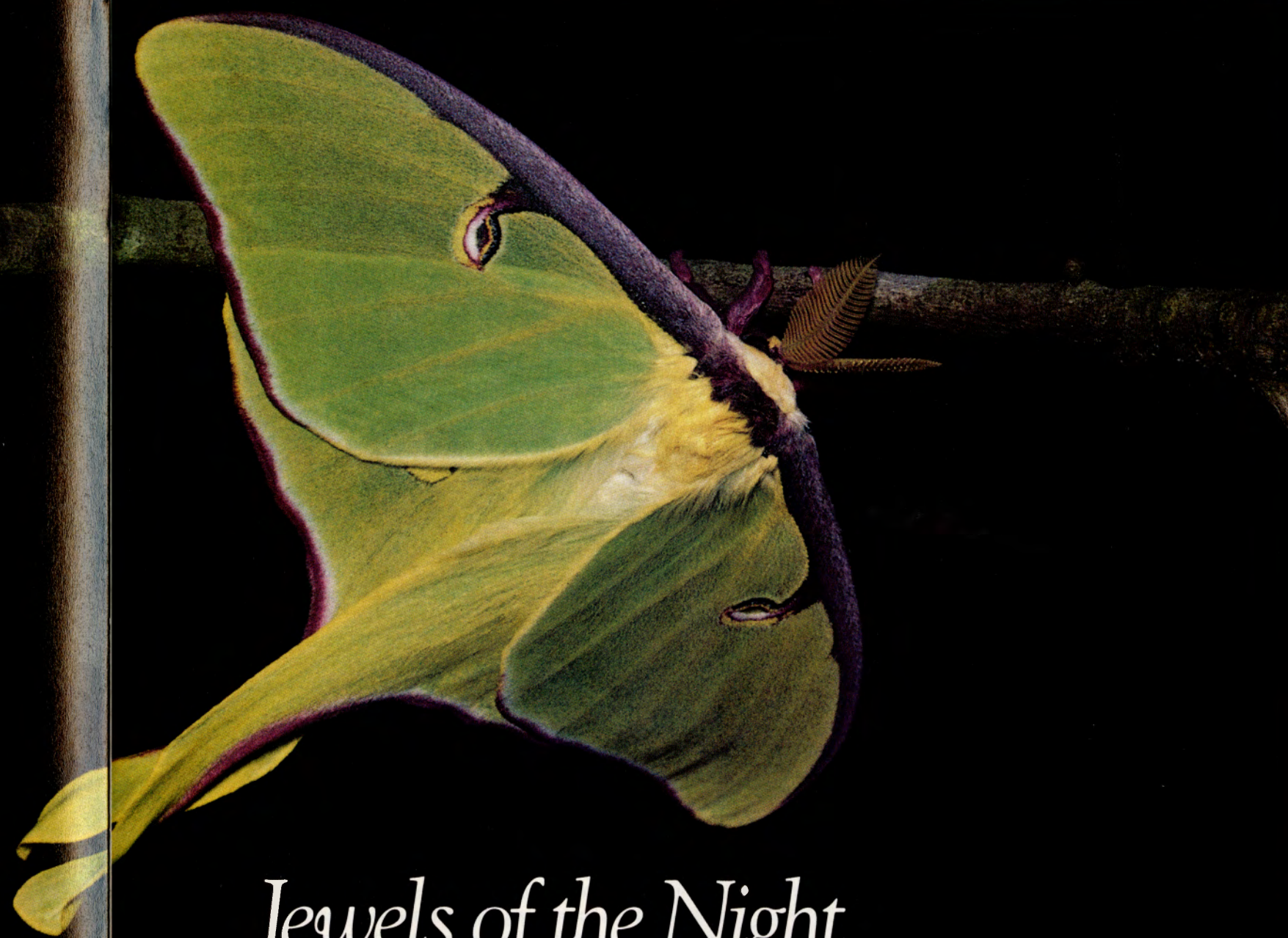
If you scored 35 to 40, check beneath your shirt collar for gills. You're spending more time in the water than "The Incredible Mr. Limpet." My suggestion is to fish all you want and not worry about it; you're already too far gone.

If you scored 25 to 34, you are in the danger zone. You should definitely seek professional help. Whether you contact a guide or a shrink is up to you.

If you scored 5 to 24, you're perfectly normal. You obviously keep fishing in its proper perspective and should lose no sleep whatsoever over this test—unless you took it while you were night fishing on Lake Murray.

Finally, if you scored under five, my guess is that you don't fish at all. You're probably sitting in a barbershop somewhere reading this magazine because you're bored to death with all the talk about politics. Perhaps you should consider taking up fishing, just so you can hang out with a better class of people.

Jim Mize is a freelance writer whose work has appeared in a number of outdoor magazines.



Jewels of the Night

by Billy McCord

photography by Phillip Jones

Sheer beauty, the magic of metamorphosis and unique survival strategies make our native silk moths some of the most captivating insects known.

When twilight departs and darkness settles over the earth, the world of nocturnal insects comes alive. Other than summer's annoying mosquitoes and delightful fireflies, the insects we encounter most often are probably the small brown moths known as "millers" that swarm around porch and street lights.

Moths, like butterflies, belong to the insect order Lepidoptera, a name borrowed from the Greek word meaning scales and wings by the eighteenth-century Swedish father of natural history, Linnaeus. On occasion large, beautiful moths of

the Saturniidae family are encountered spiraling around night lights.

Silk moths are drawn to lights because evolution has programed them to navigate by the light of the moon, planets and other heavenly bodies to avoid energy-wasting aimless flight. Silk moths are primarily attracted to ultraviolet wave lengths of light.

The lure of artificial lighting undoubtedly affects silk-moth populations since infinite numbers are sidetracked from their natural routines or killed. A summer night's drive almost always



Six years of painstaking collaboration between the author and photographer captured the singular beauty of silk moths on film for this article. Overleaf, twin jewels set against the night . . . brilliant beauty renders the luna moth female, left, and male unmistakable. The luna moth's verdant complexion and long, trailing tails make it the most easily identified silk moth in the state. Above, the spread wings of a female polyphemus moth clinging to a water oak reveal the ocelli or eyespots very much resembling an owl's face.

leaves evidence of this on our windshields.

Although most silk-moth species are active only during darkness, others are active during daylight . . . still others in late afternoon or at dusk. During periods of inactivity, they hide in vegetation to escape predation, conserve their limited energy and prevent moisture loss from the heat of sunlight.

Unlike the butterflies, their daytime counterparts, nocturnal moths must use chemical attractants to find mates since visual contact is not possible. The mating process begins after females emerge from their cocoons and emit chemicals called pheromones that lure males from as far as a mile or more away.

Although a number of males may swarm around the female, only one successfully mates with her and, after mating begins, the discharge of pheromones ceases. The mating pair remains in tandem for several hours, usually cryptically concealed in vegetation near or on the plant to which the female's cocoon was attached.

Fertile females use specialized olfactory senses to locate larval food plants, usually during the cover of darkness, and depending on the species, as many as several hundred eggs are deposited in small groups or in large clusters over several days.

The Miracle of Metamorphosis

Saturniidae, like other insects, pass through several growth stages during their development, a process called metamorphosis. No other group more spectacularly displays the miracle of metamorphosis than the Lepidoptera.

Hormones acting in combination to suppress or accelerate

maturation control the metamorphic process. Moths and butterflies exhibit four distinct developmental stages: egg, larva or caterpillar (a corruption of Old French roughly meaning "cat hair," a reference no doubt to many caterpillars' hairy appearance), pupa and adult.

After completion of the larval stage which requires a month or more, the mature caterpillar draws leaves around it with silk strands produced by glands which open through its mouth. Leaves provide a foundation for the cocoon as the caterpillar wraps layers of silk around its body to create a central cavity where pupation will occur. Caterpillars of some species bury themselves in the ground and pupate in small underground chambers. The pupal stage lasts for several weeks in the summer broods and up to six months or so in the overwintering or spring broods.

Upon emerging from the cocoon, the moth appears grotesquely deformed with an oversized body and shriveled wings, but after half an hour or so the wings reach full size as body fluids pump into them. After several more hours the wings become rigid enough for the moth to fly.

As soon as the flight muscles achieve a temperature that permits rapid contraction, the moth can fly. Members of the Lepidoptera family are cold-blooded, and the amount of heat in the air largely determines the temperature of their bodies. While butterflies bask in the sun to collect solar warmth, nocturnal moths must find another means to warm their flight muscles. In a manner akin to our own shivering, moths vibrate their wings to increase the temperature of their muscles.

Defensive Strategies

Birds, spiders and other insects prey upon caterpillars, and adult moths are eaten by bats, birds and spiders as well as by toads that await on the ground beneath night lights.

Larvae are highly susceptible to viral and bacterial diseases, especially during humid conditions. Caterpillars are also frequently parasitized by the larvae of some flies and wasps. Even the pupae, seemingly safe in the protection of the cocoons, are eaten by birds, squirrels and other rodents.

With more than forty million years of evolution behind them, however, moths have developed unique strategies for evading predators. To begin with, the sheer volume of eggs laid assures that some will survive. The adults and larvae are generally cryptically colored or camouflaged so as to go undetected in surrounding vegetation. Generally, moths are most active under the cover of darkness when fewer predators are active.

Some adults feature various shades of yellow and brown resembling dead leaves as they rest either with their wings folded together across their backs or in rooflike fashion. Some of these species drop to the ground like a dead leaf to avoid attacks when disturbed.

Species with ostentatious hind wings usually have large dual-purpose eyespots or ocelli which frighten predators when the moth quickly reveals what appear to be eyes. Eyespots can be easily mistaken for the eyes of a large predator such as an owl. Eyespots, even small ones located on the tips of the wings in many species, tend to disorient attackers perceiving ocelli to be true eyes. Since many predators focus their attack on the most vulnerable part of their prey—the head—ocelli often divert the attack away from vital areas. Evidence of such attacks is obvious, and I have seen many silk moths with well-defined bite marks where eyespots were once located.

Day-flying silk moths usually mimic other insects which are distasteful or possess the ability to inflict stings. The stinging spines of some larvae and the stout spines and tubercles of most silk-moth caterpillars make them less palatable to birds and other predators.

Palmetto Silk Moths

The southeastern United States and South Carolina in particular are home to six species of giant silk moths in the subfamily Saturniinae, two species in the subfamily Hemileucinae and nine closely related species in the subfamily Citheroniinae. The Citheroniinae do not spin cocoons but pupate in underground chambers. Since some researchers treat them as a separate family, they are not included in this article although many of them are indeed large and beautiful.

LUNA MOTH, *Actias luna*

Perhaps the most often seen and best known of our giant silk moths is the awe-inspiring luna moth. Its range extends over most of the eastern half of the United States and southern Canada, and it occurs statewide in South Carolina. Its wingspan reaches nearly five inches. The hind wings are green with two- or three-inch tails. A single ocellus is found on each wing.

The mature caterpillars are about three inches long and are emerald green with several rows of short, red-tipped tubercles. The cocoons are rather thin and papery and are usually spun among fallen leaves beneath the larval food plant, making them very difficult to find. Two broods occur over most of the state with a partial third brood near the coast. Adults emerge from overwintering cocoons primarily in April and May, and the second brood takes wing in June and July.

Adults fly only at night and are commonly attracted to lights where their light coloration and undulating flight give them a ghost-like appearance as they dance on air in the lights' periphery. They remain hidden in underbrush or the canopy of trees during daylight.

POLYPHEMUS MOTH, *Antheraea polyphemus*

This moth has a wingspan approaching six inches and ranges from coast to coast in the United States. Common throughout South Carolina, it even thrives in large cities, unlike most other species. Large eyespots on the hind wings give this species its name which is taken from Polyphemus, the cyclops or one-eyed giant in Homer's epic poem, *The Odyssey*. When the moth is disturbed it quickly opens its wings to reveal the eyespots. Along with the abdomen and rounded wings, this defensive display looks much like the face of an owl or some other vertebrate and undoubtedly frightens away some potential predators.

Mature larvae are about three inches long and are translucent green marked laterally with yellowish slashes and small red spots on each segment. The caterpillars feed on a number of trees and shrubs but seem to prefer oak, birch, maple and hickory. The

The silken cocoon of a cecropia moth has faded from the camouflaging brown of dying leaves to beige after weathering the winter firmly attached against the limbs of a wax myrtle. Following overleaf, a cecropia female resting on Lowcountry wax myrtle displays the stout body covered with dense hair so characteristic of silk moths.







A pair of promethea moths alighted upon sweet gum leaves vividly display sexual dimorphism, the phenomenon of different sexual appearances. In addition to disparate coloration, the striking male, bottom, possesses narrower wings but broader antennae than the female.

egg-shaped, tough, tan-colored cocoons are usually constructed between several leaves and often hang in pendant fashion for a year or longer.

The first adults emerge from their overwintering cocoons as early as late March in the coastal plain, but others may not be on the wing until May. The second brood takes flight June through August and produces the following year's spring brood. The polyphemus moth is active only at night and is readily attracted to lights.

CECROPIA or ROBIN MOTH, *Hyalophora cecropia*

This moth ranges east of the Rocky Mountains throughout the United States and southern Canada. It may be found anywhere in South Carolina but is more common in the coastal plain and mountains. This species does not appear to be as abundant as the previous two but is not regularly attracted to lights and is therefore not as visible.

The caterpillars feed on the foliage of a variety of woody plants. The mature larvae are often over four inches long and are a frosted bluish-green adorned with rows of mace-shaped tubercles which are larger toward the head and may be yellow, orange, red or blue depending on the caterpillar's instar, or stage of development.

The leathery, football-shaped cocoons are three to four inches long and are attached along one side to a twig or branch and fade from brown to beige after weathering. Cocoons remain attached through the winter, and the single brood emerges in late April and May. The larvae produced by the spring brood grow rather slowly and spin cocoons by late June or July but the pupae inside remain in a state of diapause until the following spring.

The remaining three species in the subfamily Saturniinae are in the same genus and are referred to as sibling species since they apparently evolved from a common ancestor. These three are the promethea moth, the tuliptree silk moth and the sweetbay silk moth. They closely resemble each other, and the females emit similar pheromones. However, they have different flight periods which function as the primary isolating mechanisms between the three species. All three moths display sexual dimorphism in the adult stage.

PROMETHEA MOTH, *Callosamia promethea*

This moth ranges over most of the eastern half of the United States and southern Canada. In South Carolina it occurs principally in the mountains and coastal plain and appears to be absent in between. Adults have wingspans approaching four inches. The females are heavy-bodied and are bright reddish to dark brown with tan bands, borders and angular spots on rather rounded wings. The males are generally deep chocolate brown to black and also have tan wing margins. Although angular spots or blotches may occur on both the fore and hind wings of the males, they are very obscure. The wings are much narrower than those of the female and the antennae are broader. Both sexes possess dark-centered eyespots on the tips of the forewings.

The larvae feed on a variety of trees and shrubs, and the mature caterpillars reach a length of about three inches. They are bluish-green with a frosted appearance and have two pairs of red tubercles on the thoracic segments with six rows of smaller black tubercles running the length of the body. A single yellow tubercle adorns the posterior end.

The cocoon is usually made on the larval food plant and is often formed with a single leaf wrapped around it with a strong silk attachment to a twig or branch. This species is double-brooded in the Southeast, and adults first appear from late March into May with the second adult flight period occurring primarily in July and August.

Male promethea moths are active during late afternoon when they fly rapidly upwind in search of pheromone-producing or "calling" females. Each moth is seemingly hellbent on reaching an awaiting female before the other would-be suitors as it flies purposefully ahead, slowing only when confronted with thickets or other obstacles in its path. Mating occurs in late afternoon, and the fertile females lay their eggs after nightfall.

TULIPTREE SILK MOTH, *Callosamia angulifera*

A close relative of the promethea moth, the tuliptree moth ranges over most of the United States east of the Mississippi River. It's most common in South Carolina in areas where the preferred food plant, tulip tree or yellow poplar, is common. Larger than the promethea moth, its wingspan may exceed four inches. Females resemble those of the preceding species but are yellowish to orange-brown with slightly larger angular spots which give this moth its specific name. Males are more brown than the females and possess wider antennae and smaller bodies. They are much lighter than male promethea moths and have obvious angular spots on both the fore and hind wings.

Caterpillars in all instars are similar to those of the promethea moth but greener. The cocoon is like that of the promethea moth and is also formed within a curled leaf of the larval host plant. Its cocoon, however, is seldom attached to a twig or branch and usually falls to the ground, especially in the overwintering brood.

Adults have two flight periods, like the promethea moth, in spring and summer and are active only at night when both mating and egg laying occur. Both sexes are frequently attracted to lights.

SWEETBAY SILK MOTH, *Callosamia securifera*

The sweetbay silk moth has been confused with the tuliptree silk moth in collections and was considered to be very rare in this country until rather recently. This insect occurs in the southeastern United States from North Carolina to central Florida and west to Louisiana and may be expected to be encountered anywhere that sweet bay commonly grows. In South Carolina it is found only in the coastal plain and seems to be common in localized populations.

It is intermediate in size between the promethea moth and tuliptree silk moth, with the female similar to those of the latter two species but paler orange to yellowish-brown with reduced angular spots, especially on the inner half of the wings. They look much like male tuliptree silk moths, but the outer halves of their wings are much paler and the underside has a purplish overtone.

Larvae are similar to those of the promethea and tuliptree silk moths but are covered with a silvery whitish frosting that camouflages them well on the underside of the sweetbay leaves. Cocoons are more inflated than those of the promethea and tuliptree silk moths and usually incorporate several leaves of the food plant. Firmly attached to a branch, the cocoons remain there throughout the year.

Adults emerge from overwintering cocoons in late March through May and produce a second brood which spins cocoons by the middle of June. These emerge as adults in July and August to produce the next spring's brood.

Males fly from mid-morning to early afternoon when females are "calling," and mating occurs during daylight. Females lay their eggs presumably from late afternoon into early evening.

A male tuliptree silk moth resting upon its namesake plant reveals the angular spots which give this moth its specific name, Callosamia angulifera (bearing an angle).





Poised upon its cocoon, a male sweetbay moth, left, prepares for its maiden flight as does the sexually dimorphic female, right. Both have just emerged from their respective cocoons and must warm their wing muscles by flexing them several minutes before successfully launching into the air. The inability to take flight quickly makes silk moths particularly vulnerable to predators.

Males are fast and evasive fliers that appear to the untrained eye as swallowtail butterflies (particularly the palamedes swallowtail) which are abundant in the same areas at the same time.

THE IO MOTH, *Automeris io*

This moth is a close relative of the giant silk moths but has a wingspan of only two and one-half to three inches. The io moth is widely distributed throughout the United States east of the Rocky Mountains and ranges over all of South Carolina.

Males are smaller than the females and have wider antennae and thinner bodies. Females have reddish-brown fore wings while those of the male are yellowish. The hind wings of both sexes are yellow with reddish submarginal bands and shading near the inner margins. A central black and blue eyespot or bull's-eye with a white center distinguishes each hind wing.

When resting, the moths hold their wings in roof-like fashion

over their bodies with the hind wings concealed. If the moth is startled by a would-be predator, the wings quickly open to flash the bright eye-like spots which may scare the intruder away.

The caterpillars are yellowish in the early instars and become green with red and white lateral stripes on their sides in later instars. The larvae in all stages bear many bristly spines capable of inflicting acute urticating stings. The poison is passively released from glands on the spines when potential enemies contact the caterpillar. The larvae, especially in the early instars, are highly gregarious or colonial and move about the food plants in follow-the-leader fashion. This behavior compounds their stinging capabilities since more than one caterpillar often make contact with the victim.

The non-selective larvae feed on a vast array of plants from grasses to trees. They seem to be particularly fond of wild black cherry. Mature larvae usually move to the ground and spin thin,

A female io moth's startling eyespots mimic the face of an owl peering out from black cherry leaves. Normally, the resting moth holds its wings folded roof-like over its body with the hind wings concealed. The wings quickly open to scare intruders away.



A bristly, foreboding buck moth caterpillar dines upon water oak leaves. While some caterpillars' defense depends only on appearing dangerous, the buck moth caterpillar is not bluffing; it possesses venomous branched spines that can sting sensitive skin.



papery, brownish cocoons in fallen leaves. Two broods take place in South Carolina with adults on the wing primarily in May and June and again in July and August.

This species flies only at night and is commonly attracted to lights. When found near a light they can easily go unnoticed by the casual observer because they have usually assumed their cryptic posture with the colorful hind wings hidden beneath the relatively drab fore wings.

BUCK MOTH, *Hemileuca maia*

So named because it appears as an adult only in the fall when deer season has just begun, the buck moth is a day flier that occurs over the eastern half of the United States. In South Carolina, it's most often encountered in the upper coastal plain or in sandhill areas typically colonized by pines and turkey oak.

The fore and hind wings are black with white median bands and black-bordered kidney-shaped spots in both sexes. Males differ from the females in having a reddish tip on the abdomen and wider antennae. Their coloration probably mimics bumblebees or other large black and white to yellow bees or wasps.

The overwintering eggs are deposited primarily on the branches of oaks in clusters that encircle the stem. The gregarious larvae hatch in spring. Black to reddish-brown with yellow flecks, they possess venomous branched spines.

Mature buck moth larvae leave the food plant and pupate in an underground chamber. Larvae are abundant enough at times to defoliate trees and can become quite a nuisance in towns and cities because of their stinging characteristics when they touch soft or sensitive skin.

The Silk Culture

Our native silk moths are closely related to the Asiatic silkworm moth in the family Bombycidae which had been used for centuries to produce silk, the fabric of kings. Our species spin silken cocoons, but the strands are too tightly woven for commercial silk production. Labor costs involved with unreeling the silk strands from the cocoons make the silk culture in South Carolina cost-prohibitive.

Closely related species of giant silk moths in Asia are used successfully in silk production but not nearly to the extent of the silkworm moth. In fact, the cynthia moth, *Samia cynthia*, was introduced from China into the northeastern United States in the 1860s as a source for a potential silk industry, but the attempt proved futile.

The cynthia moth has become naturalized and occurs in urban areas along the Atlantic coast across to Indiana where the introduced food plants (*Ailanthus*) grow. It has not, however, been reported from South Carolina or other parts of the Deep South.

A Future for Moths . . .

Fortunately, most of our silk moths range over broad areas and have high reproductive potentials enabling them to withstand localized natural and man-made disasters such as fires or floods. But we live in an era of rapid development and widespread habitat alteration.

In the future, silk moths may be less capable of withstanding the widescale destruction of habitat and insecticide applications that are prone to occur more regularly. This is particularly true of the sweetbay silk moth which occurs in restricted habitats only where sweet bay is common. Drainage of bottomlands supporting sweetbay populations and conversion to pine monoculture with frequent burnings for underbrush control could eliminate this species from large areas.

South Carolina is home to some beautiful moths. Our native silk moths are natural treasures that endow the web of life with unquestionable color and interest. Watching and studying moths, and butterflies too for that matter, offer many of the same joys as ornithology.

The next time you discover a rare and beautiful moth in the midst of the brown millers at your porch light, see if you can identify this jewel of the night that mistook your light for a heavenly body detouring it for a while from its nightly travels. 🦋

Billy McCord, an amateur lepidopterist, is a marine biologist with the Marine Resources Center.

A LOVE AFFAIR WITH WOOD

by Pete Laurie

In an age of plastic and fiberglass, wood remains the material of choice for many boatwrights who believe that the beauty of a wooden hull more than compensates for its cost and increased maintenance.



For boat owners like Rob Dunlap and Don Drost of Charleston, no other building material can match the aesthetics of wood. Dunlap purchased his 17-foot lapstrake from Norway. Drost's 52-foot ketch, Oasis, was built nearly 60 years ago.

TODAY high-tech plastics and fiberglass dominate the recreational boat market. They're cheaper to build, easier to maintain and available in a huge variety of designs only dreamed of just a few years ago when almost all boats smaller than battleships were constructed of wood. Few wooden boats remain in recreational boating except for the small makeshift plywood hulls river fishermen build to avoid the cost of a manufactured boat.

Wooden boats have gone the way of many good things that require craftsmanship, patience and time. Molded fiberglass boats can be mass-produced, like styrofoam coffee cups, at prices far below those charged for most wooden boats. Wooden boats, however, still have their fans.

Rob Dunlap of Charleston owns a 17-foot wooden sailboat made in Norway. He readily admitted he could have purchased a plastic boat of the same dimensions and just about as functional for half the price. "I just like the looks of a wooden boat," he said. "A wooden boat is unique." Dunlap's boat is lapstraked with cedar and contains no heavy frames, just lightweight ribs. The lapstrake planking makes the hull extremely strong yet flexible.

"She rides high on the water and handles better with a couple of people aboard. She's at her best in rough weather," Dunlap said.

Dunlap is not a woodworker or a boatwright, but most wooden boat lovers not only like the looks of wood, they enjoy the satisfaction of working with wood. Gilbert Maggioni of Beaufort spent most of his life in the oyster business and beginning in the 1940s built seven wooden oyster barges in the 40-foot class.

Now retired, Maggioni has had a lifelong love affair with wood. He proudly produces an album with black and white photos of the low-slung oyster boats he designed and built himself. Shallow draft with a V-hull ("diamond hull" in his parlance), each boat was basically a decked-over barge with a small pilot house toward the stern. Some photos show the barges loaded with oysters up to the windows of the pilot houses, a huge weight. "I know of no other hull design that can carry as much weight," he said.

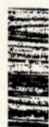


The scarcity of high-quality wood has greatly increased the cost of wooden boats.





Bright work (clear-finished wood) adorns the topside and galley of the Oasis. Maintenance of fiberglass would be considerably less, but only the rich tones of teak, mahogany and cedar will suffice for those who would go down to the sea in wooden ships.



IN THE early 1960s when the wildlife department needed a coastal research vessel, Dr. G. Robert Lunz, Director of the Bears Bluff Laboratory, turned to Maggioni. The builder designed a 50-foot round-bottomed boat that could work in shallow inshore water but still go offshore. Christened the *Anita* after Lunz's daughter, the boat remains in service, one of the most useful and versatile vessels in the department's fleet.

The *Anita* was based on the lines of the *Roy Fountain*, a Biloxi lugger the Maggionis had acquired from the Gulf coast years earlier. According to Maggioni the Biloxi lugger was a traditional Gulf hull design adapted to accommodate engine power. Other areas with long commercial fishing histories such as New England and the Chesapeake Bay area produced a variety of local designs as well.

Surprisingly, the South Carolina coast never produced a typical boat design. It was not until the 1880s when the newly invented canning process was applied to oysters that any organized fisheries developed in South Carolina waters. Thus,

Maggioni theorizes that without any local fisheries, no impetus existed to produce a local boat design.

South Carolina boatwrights adopted or adapted designs from other areas, but mostly they just repaired boats. The oyster fishery inspired the production of a few of Maggioni's barge-like boats along with many small flat-bottomed bateaux still working in the industry.

When commercial shrimping developed in the 1920s and the 1930s larger boats were needed. Emigres to the Florida coast, Greek sponge fishermen responded by building V-hull trawlers similar to their double-ended sponge boats but featuring a squared-off transom more suitable for pulling a shrimp net. To this day that basic design dominates the fishery all along the Southeastern and Gulf coasts.

Maggioni, an expert wood-carver and carpenter, views the demise of the wooden boat with sadness. One problem, he said, is the difficulty of obtaining high-quality materials. Where cypress and heart pine once could be obtained in any length, now long, straight, knot-free lumber has become all but impossible to locate. Live oak for frames, stems and other structural members also has become less available. This scarcity of high-quality wood has greatly increased the cost of wooden boats.

Building a wooden boat demands sophisticated and specialized carpentry techniques. While small flat-bottomed boats are fairly simple to construct, V-bottom and round-bottom hulls present many more problems. Most hulls contain few straight lines requiring components to bend, twist and curve to fit precisely. The boatwright also must strike a compromise between weight, strength and flexibility.

Before construction can begin, complex plans must be drawn



PHILLIP JONES

to show the dimensions and curvature of the hull at a variety of cross sections. To achieve precise dimensions on every detail, construction plans often are "lofted," i.e. drawn full-size. Boat yards have "lofts," large open areas where the boat's "lines" can be drawn full-size on a smoothly sanded floor. Amateur boatbuilders use makeshift plywood platforms or long rolls of paper for lofting. The time and effort invested in lofting saves innumerable headaches during construction. Hull models are even built to scale sometimes so the builder has a concrete concept of the boat's shape he is crafting.

After the keel is laid, the boatwright builds molds of rough lumber and fits them perpendicular to the keel to shape the hull. The molds are held in place by ribbands, usually two-inch by two-inch strips closely spaced together over the hull's more extreme curvatures, farther apart where the configuration changes only slightly. Frames are "sawn" or steam bent to fit inside the ribbands, attached to the keel and fitted into place. Generally steam-bent frames are easier to install because they can be twisted to achieve the proper bevel of the hull. The frames then are planked, with the ribbands removed one at a time to make room for the planking. Depending on the shape of the hull some planks will have to be steamed to achieve the desired twist or curvature. Once the planking is fastened to the frames the molds can be removed. Large boats are built sitting upright, but builders often find it easier to construct small boats with the top side down.

Local builders of wooden boats prefer cypress and pine for planking. Oak, especially live oak, possesses the strength and

Carl Corwin's love of wood extends beyond his ownership of Woodworks Inc., a Columbia firm specializing in custom-built circular stairs. For his own pleasure Corwin has built several boats ranging from a simple plywood hull to a tri-hull design made of 3/8-inch western cedar strips. His 18-foot canoe amply illustrates wooden boatwrights' claims of strength without weight and unmatched beauty.

flexibility needed for frames, stems and other structural members. In fact, after considerable searching, a live oak limb with the perfect curvature was selected to form the stem of the *Anita*. Today many small boats are planked with plywood. Although strong and lightweight, plywood cannot be bent in two directions simultaneously, thus limiting its use in some hull designs.

In 1955, after four years of part-time work, Alvin Veronee and his father launched the 41-foot schooner *Kiawah* into Church Creek on Johns Island. The Veronees, who had never before built a boat, still own the *Kiawah*, very much a functional craft after 31 years of use.

The younger Veronee, now in his 60s, is a man with the thick fingers of someone who works with his hands. His pride in the *Kiawah* is evident as he speaks of her trips to Bermuda, the Bahamas and the Dry Tortugas.

Wooden boats appeal to those who appreciate the traditional ways of doing things—people who want more than transportation.

Designed by the late Howard I. Chapple who wrote numerous books on boatbuilding and design, the *Kiawah* was built from plans the Veronees first saw in a magazine. "It was what we could afford, and it draws less than five feet of water so we can get in and out of the creek on any tide," he explained.

They lofted the plans on the expansive porch of an old house on the property. "There's some lumber stacked on that porch now," Veronee said with a smile. "Once in a while I still uncover part of a line."

The Veronees planked the *Kiawah* with longleaf pine heart wood and used steam-bent frames of white oak, all cut on Johns Island. The main keel member, a 25-foot heart pine 6 by 12 (inches), came from Florida. While most of the ballast rests inside the hull, the keel contains a thousand-pound cast iron "shoe." "Lead was expensive back then," Veronee said as we perched on the spare bunks in the engine compartment. An ancient Gray Marine diesel seemingly too small for the boat sat between us. "Doesn't look like much," he said, "but it's never missed a beat."

The *Kiawah's* two cypress masts, removed for minor repairs and refitting, rested on makeshift supports "on the hill" close to where Veronee said the boat was built. Adjacent, a small marine railway runs up from a slough off the creek. Veronee, with the independence typical of amateur boatwrights, built the railway himself to save the expense of using a commercial railway. Twice a year he uses it to pull the *Kiawah* from the water for painting and bottom work. Despite the constant maintenance, Veronee makes it clear he has little use for what he calls "plastic boats."



SMALL wooden boats often are strip built, a variation on standard wooden boat construction. Their hull planking consists of very narrow strips, usually less than 1½ inches wide. Strip boats are strong and easy to build because the narrow strips can be bent around the frames without steaming.

Frazier Torlay of Charleston has been building and selling Taylor Strip Boats for about five years. He keeps about 20 boats on hand in styles ranging from ten-foot sneak boats to double-ended pirogues to roomy fishing boats with live wells.

"First we start with a ¼-inch marine plywood bottom," he said, explaining the construction technique. "The bottom is cut to shape and nailed to a bench. Any rise in the bow or stern can be incorporated at that point. Then a starter strip is fastened

along the outside edge of the bottom. Next, the sawn frames, usually cypress, but sometimes of mahogany or treated pine, are fitted to the bottom."

Finally the hull is strip planked with ½-inch by ¾-inch cypress nailed horizontally to the frames and vertically to each other. A mixture of resin and sawdust is used to seal any cracks between the strips. After sanding and burning with an acetylene torch to give the light-colored cypress a little character, Torlay fiberglasses the entire boat inside and out.

The result is a boat with the beauty and stability of wood but the maintenance ease of fiberglass. If one of Torlay's strip boats is covered when not in use, it should require no maintenance for five years. Cared for properly, it should last more than twenty years.

Because they incorporate a minimum of materials and because cypress is so lightweight, Torlay's strip boats are lighter and cost less than aluminum or fiberglass boats. While he has standard models, he can custom-build a strip boat to almost any design and once built a 24-foot offshore fishing boat using the same basic strip construction techniques.

Taylor Strip Boats have no keel unless they are designed to be paddled only, not power driven. To improve maneuverability, Torlay adds turning rails at the waterline on each side of the hull. The turning rails are strips fastened to the face of the hull to reduce sliding in turns and to give better control.

Most of Torlay's customers are duck hunters and freshwater fishermen who want a small, lightweight boat with maximum stability. For their size and weight, strip boats are unexcelled for stability, Torlay claimed. "Strip boats are ideal for getting up into the swamps and backwaters where you need a small, maneuverable boat," he added.

For some boat owners the beauty of wood more than compensates for the higher cost and increased maintenance. The warm, "alive" look of wood cannot be duplicated by plastic or fiberglass. Wooden boats have a natural flexibility, almost a life of their own. They also generally feature a classic design since such modern innovations as cathedral hulls do not lend themselves to wooden construction.

Wooden boats appeal to those who appreciate the traditional ways of doing things—people who want more than transportation, people for whom a boat becomes a project and a treasure, not just another means to an end.

A fiberglass boat, of course, will get you there. But as Gilbert Maggioni observed, "Fiberglass doesn't have much personality. 🐼

ALMANACS

LOSING AN AMERICAN HERITAGE

From astrology and medicine to planting and hunting tips, almanacs dispensed immensely popular information no rural family could do without. Everyman's intimate and folksy literary gold mine, like the rural life style, is giving way to urbanization. by Jim Casada

Almanacs, with their invaluable potpourri of information, have long been standard reading material in this country. Indeed, there was a time when the *Farmer's Almanac* or one of myriad rival publications held a place of prominence in rural households second only to the family Bible. That day is fast passing, as is the life style almanacs symbolize. They were the reference library for generations of Americans who lived in harmony with the earth, but the prominence and popularity of almanacs is declining because of the urbanization of our country.

Almanacs remain an important source of information, although some are now dressed up in such "high tech" fashion that they are unrecognizable. The almanacs of bygone days were incredibly variegated compendiums of such information as year-round weather forecasts, tips on when to plant crops according to the "signs," household hints of every imaginable sort, and tidbits of trivia certain to tantalize any but the dullest of minds. "Old timey" almanacs were both a delight to peruse and a literary gold mine.

Some still survive, thanks in part to our preoccupation with nostalgia and recognition of the fact that no matter how fast-paced our lives or how "citified" we have become, much can be said for an easy-going albeit hard-working agrarian way of life. Other almanacs have passed into obsolescence, lost in our relentless pursuit of progress. Survivors or not, the basic appeal of the way of life almanacs represent remains.

A few years ago, the publishers of *The Mother Earth News* produced an almanac subtitled "A Guide Through the Seasons." The name was appropriate, for it captured much of the essence of what traditional almanacs were all about. The old almanacs were indeed guides, intimate and folksy in nature.

There was a time when many South Carolinians planned virtually every aspect of their lives in close consultation with the

wisdom and direction provided by their well-worn almanacs. In that regard, almanacs need to be looked upon as a major form of literature, because in their day far more of our forebears were influenced by their pages than any other form of secular information. As Marion Barber Stowell noted in his *Early American Almanacs*, "For all but a few American colonists, the almanac was the only secular source of useful information and literary entertainment." They were a sort of weekday Bible, distinctive and individual in character and filled with wit, whimsy and eccentricity. Of course, most of the popular almanacs also contained an ample leaven of hard facts as well.

The finest almanacs, and certainly those which garnered the most readers, were first and foremost miscellanies. They fulfilled many roles: clock, calendar, weather guide, news reporter, textbook, medical guide, atlas, doctor, agricultural advisor, navigator's aid and, most of all, a source of constant entertainment. For example, in addition to its countless practical applications, the almanac served as a resident astrologer and offered advice to the lovelorn. This aspect of almanacs should never be forgotten, for in this era before television and radio any publication worth its salt brought pleasure even as it informed.

Almanacs saw use as diaries, memorandum books and predecessors to *Reader's Digest*. In the latter capacity, most featured many types of articles, with prominent fields of coverage

Early almanacs recall a time when little books like Grier's and Palladium of Knowledge were unique sources of literary material and gardening advice, recipes, tide tables, lists of local crossroads, postage rates, first-aid hints, meeting schedules, and weather forecasts with associated astrological information. The "Man of Signs" was a fixture in many almanacs, with planting, harvesting and even tooth-pulling times dictated by moon phases and bodily indicators. So relied-upon was the little man that Titan Leeds in the 1725 American Almanac said he dare not leave him out:

"Should I omit to place this Figure here, My Book would hardly sell another Year."

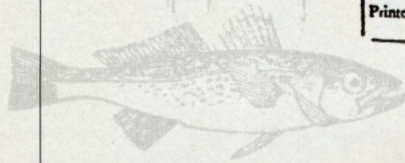






Poor Richard, 1733.
A N
Almanack
For the Year of Christ
1733,
Being the First after LEAP YEAR:
And makes five the Creation
By the Account of the E. Hem Grocks 7241
By the Latin Church, when Q. em. 7 6932
By the Computation of W. W. 5742
By the Roman Chronology 5682
By the Jewish Rabbits 5494
Wherein is contained
The Lunations, Eclipses, Judgment of
the Weather, Spring Tides, Planets Motions &
mutual Aspects, Sun and Moon's Rising and Set-
ting, Length of Days, Time of High Water,
Falls, Courts, and observable Days
Fitted to the Latitude of Forty Degrees,
and a Meridian of Five Hours West from London,
but may without sensible Error serve all the ad-
jacent Places, even from Newfoundland to South-
Carolina
By **RICHARD SAUNDERS, Philom.**
PHILADELPHIA:
Printed and sold by **B. FRANKLIN**, at the New
Printing Office near the Market

"Fish
and Visitors
stink
after three
days."



The almanac publisher was author, poet, historian, weatherman, politician and printer. One of America's most beloved almanac editors, Benjamin Franklin, interjected humor into the role, and his Poor Richard's issues featured aphorisms and sayings still quoted today. Convinced of the need to instruct the everyday reader, he "filled all the little spaces that occur'd between the remarkable days in the calendar with proverbial sentences, chiefly such as inculcated industry and frugality, as the means of procuring wealth, and thereby securing virtue."

II Mon. April hath xxx days.

Kind Katharine to her husband kiss'd these words,
' Mine own sweet Will, how dearly I love thee!
If true (quoth Will) the World no such affords.
And that its true I durst his warrant be;
For ne'er heard I of Woman good or ill,
But always loved best, her own sweet Will.

| | | | | | | | |
|----|---|----------------------|-----|----|----|---|---------------------|
| 1 | G | All Fools. | 1 | 29 | 32 | 7 | Great Talkers, |
| 2 | 2 | Wet weather, or | 2 | Y | 31 | 7 | little Doers. |
| 3 | 3 | * set 9 o | 2h | 29 | 30 | 7 | New 3 day, |
| 4 | 4 | | 3 | 8 | 29 | 7 | at 4 morn. |
| 5 | 5 | Cloudy and likely | 4 | 29 | 27 | 7 | sets 9 29 aft. |
| 6 | 6 | for rain. | 5 | 15 | 26 | 7 | A rich rogue, is |
| 7 | 7 | | 6 | 15 | 24 | 7 | like a fat hog, who |
| 8 | G | 2 Sund. p. Easter | 6h | 15 | 23 | 7 | never does good til |
| 9 | 2 | ☉ enters 8 | 7 | 16 | 22 | 7 | as dead as a log. |
| 10 | 3 | * set 8 50 | 8 | 15 | 21 | 7 | First Quarter. |
| 11 | 4 | Days 13 h. 20 m. | 9 | 25 | 20 | 7 | sets 1 46 mo. |
| 12 | 5 | Wind or Thunder, | 10 | 15 | 19 | 7 | Relation without |
| 13 | 6 | ☉ ☿ | 10h | 16 | 18 | 7 | friendship, friend- |
| 14 | 7 | ☿ ☿ | 11 | 28 | 17 | 7 | ship without pow- |
| 15 | G | 3 Sund. p. Easter | 12 | 15 | 16 | 7 | er, power without |
| 16 | 2 | * set 8 21 | 1 | 22 | 15 | 7 | sets 4 7 mor. |
| 17 | 3 | and rain. | 2 | 15 | 14 | 7 | Full ☉ at 10 at |
| 18 | 4 | Beware of meat | 2h | 16 | 13 | 7 | night. |
| 19 | 5 | twice boil'd, & an | 3 | 28 | 12 | 7 | will, will withe. |
| 20 | 6 | Gold see reconcil'd. | 4 | 1 | 11 | 7 | effett, effett with |
| 21 | 7 | | 5 | 22 | 10 | 7 | diffett, diffett |

including scientific developments, history, fashion, manners and morals, and culture in general. Rural housewives relied upon the family almanac to keep them abreast of all that was right and proper in dress and diet while men looked to it for tips which would improve their success as hunters and fishermen.

In short, almanacs were immensely popular, and much of that popularity stemmed from the universality of their appeal. Indeed, surprisingly few examples of our country's earliest almanacs survive, and the explanation for that situation is simple. Almanacs were not treated in the same fashion accorded other books which were little more than leather-bound prisoners in glass-fronted cages; almanacs were used until they wore out. As a result, almanacs from colonial days are highly prized collector's items.

Much of the almanac's early popularity lay in the fact that there was a dearth of other reading material. Traveling libraries and bookmobiles are features of only the most recent generation or two in the Palmetto State, and few hardworking South Carolina farmers could afford a substantial personal library no matter how committed they might be to literature and self-improvement. Accordingly, the almanac was a ubiquitous influence, and it should be noted that not only did most rural households not have books, they had no regular access to newspapers. In South Carolina and other areas which remained predominantly rural well into the present century this held true until recent times.

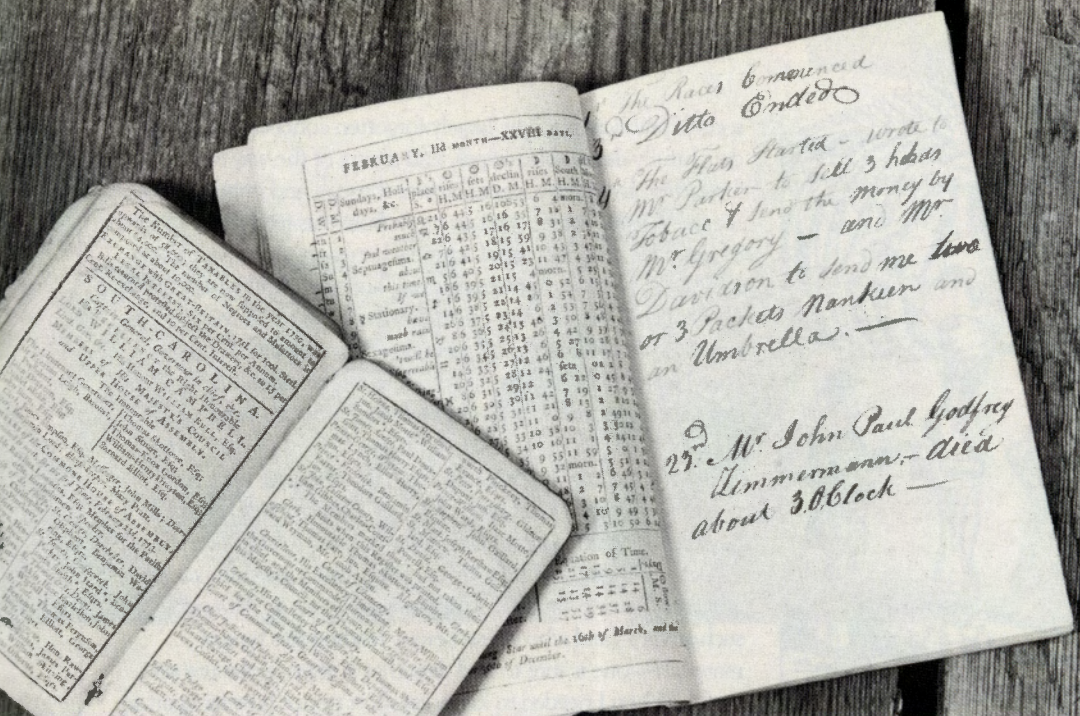
Almanacs rendered diverse services. In 1686, Samuel Atkins justified the work he was publishing by stating:

I have journied in and through several places . . . and the people generally complain that they scarcely knew how the Time passed, nor that they hardly knew the day of Rest, or Lords Day, which it was, for want of a Diary, or Day-Book, which we call, an Almanack.

By the middle of the eighteenth century many almanacs began to have political overtones, and a number played important roles in espousing the cause of independence from Great Britain in the pre-Revolutionary era.

The business of writing, publishing and selling almanacs was lucrative but highly competitive. Benjamin Franklin had many rivals in Philadelphia, and his success derived from his ingenuity as a wit, purveyor of proverbs, and humorist. He had a rare knack of blending subjects which both interested readers and aroused their awareness. His one-man operation was typical of many early almanacs, as in many cases one individual wrote, typeset, printed and eventually sold the work.

Franklin's is today perhaps the best known of all the colonial almanacs, and deservedly so. *Poor Richard's Almanack*, the catchy title he chose for his publication, became noted for its aphorisms and tidbits of wisdom. Most were carefully worded so as to be easily memorized, and all of us today use them, much as we use phrases from Shakespeare, without being aware of their origin. Hundreds of examples exist, among them: "Men meet, Mountains never;" "He that speaks ill of the Mare, will buy her;" "Fish and Visitors stink after three days;" "There are three



Close companion of many early South Carolinians, the almanac was a journal for some, such as John Carmichael, whose notes in his 1798 copy of *Palladium of Knowledge* may be read at left. The smaller book, Wells's Register of 1774, reflected the colony's ties to England, sketching brief histories of Europe's republics and listing Carolina's governor, members of His Majesty's Council and the Houses of Assembly. Illustrations like the one below were liberally sprinkled throughout 19th century booklets, with woodcuts serving as photos of the times. Some were simply to amuse; others conveyed a message. This one clearly tells the almanac enthusiast that if the weather's fair enough to plow, it's surely fine for fishing.

ROBERT CLARK

faithful friends—an old wife, an old dog, and ready money;” “To err is human, to repent divine, to persist devilish;” “A penny saved is two pence clear. A pin a-day is a groat a-year. Save and have” (we generally use this as “A penny saved is a penny earned”); “’Tis easy to see, hard to foresee;” “Little strokes fell great oaks;” “No gains without pains;” “Great talkers, little doers;” “Fools multiply folly;” “Haste makes Waste;” “For want of a Nail the Shoe is lost; for want of a Shoe the Horse is lost; for want of a Horse the Rider is lost;” “A full Belly makes a dull Brain;” and “An apple a day keeps the doctor away.”

Such sayings endeared Franklin to readers in his day, but in truth much of his fame as an almanac editor came after he rose to political prominence. Yet long before he became a national figure he was a staunch spokesman for liberty and freedom, and not surprisingly freedom of the press was one of his pet subjects.

Poor Richard's Almanack was but one of dozens of competing publications during the two decades immediately preceding the American Revolution, and at least two of these were geared specifically for South Carolina audiences. These were *The South Carolina Almanack and Register* and its rival, the *South Carolina and Georgia Almanack*. For a time regional almanacs such as these held sway, but in general they gave way to national ones early in the nineteenth century. Among the most prominent of the national publications was the *Farmer's Almanac* (its title changed in 1832 to *The Old Farmer's Almanac* in an effort to separate it from myriad imitators). It began publication in 1792, fairly late in the game, and may well be the oldest surviving periodical in America. Today it remains a favorite of many, especially in rural areas, and deservedly so.

From the beginning *The Old Farmer's Almanac*, like other long-popular rivals, directed its pages toward a particular audience. While it catered to farmers, both *Ladies Almanac* and *Ladies Birthday Almanac* were written specifically for female readers. Benjamin Banneker began his *Almanac and Ephemeris*



April, Fourth Month,
*“Awaits the sudden rising of the trout
 Down slips the feathery lure; the quivering rod
 Bends low: in vain the cheated captive strives
 To break the yielding line: exhausted soon,
 Ashore he's drawn, and, on the mossy bank,
 Weltering, he dyes the primrose with his blood.”*

late in the 1700s, and it was intended for a Negro audience. There were a good many other specialized almanacs—specialized in the sense of audience, even though there was a good deal of common ground in the contents of them all—and in general these have been the ones whose appeal and longevity have carried them to the present day.

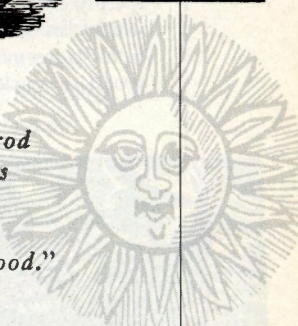
While the role of almanacs has changed much more than their contents, they still hold an important place in today's world. No self-respecting library reference shelf, for example, lacks a copy of the latest edition of *Information Please Almanac*, and many people feel lost without their favorite almanac close at hand. Among such individuals, the almanac serves as a combination of wonderful nostalgia and a compendium of hard, practical advice.

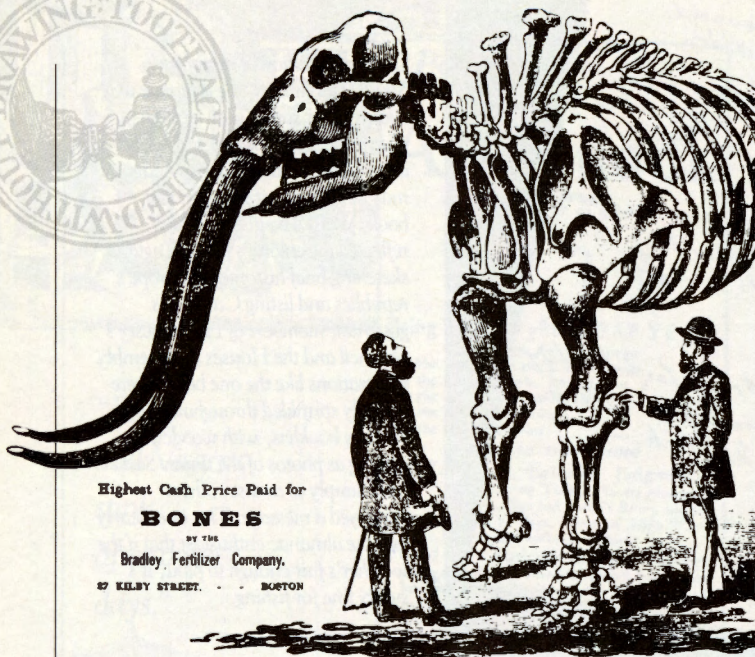
One of the great treats in reading almanacs lies in their “old timey” contents. Folk remedies, preventatives, formulas for all

Spiders make larger webs as rain approaches

Swallows fly low when rain is coming

Insects bite more severely when rain is near





Illustrations often had a mercenary tone, and most carried the agricultural and home-health advice a step beyond the almanac's general recommendations: testimonials for products from soil fertilizers to hair tonics advertised sure-fire remedies and treatments.

Industry-sponsored almanacs such as Bradley's and one published by Ford Motor Company have been around for a century, and they shared the huge success enjoyed by the so-called "health almanacs" promising cures for digestive, nervous and circulatory disorders. Dr. Jayne's 1887 medical almanac touted his "Alterative," a preparation for boils, cancer, dropsy, epilepsy, erysipelas, gout, neuralgia and rheumatism. An endorsement which followed his summary of its potential indicated the remedy also aided in the "proper missionary work" of those serving in the field in India, the good doctor modestly aspiring to treat body and soul with one swallow.



"I send you my photograph in order that you may see what Ayer's Hair Vigor has done for me."



sorts of practical but now largely forgotten concoctions, delightfully delectable recipes, and a taste of the way our forefathers lived are yours to browse through and imbibe as you see fit. What is more, you can profit from this reading in all sorts of ways, for almanacs recall a time when man was more closely attuned to his environment, nature, and the world lying outside his doorstep. Therein lies one major explanation of the timelessness of almanacs. Rather than representing our fast-paced world, they transport us back to a time when life was slower, gentler, and while undoubtedly harder, nonetheless, appealing.

It is fascinating to learn (although few will ever have any practical use for the information) how many tons of hay are in a haystack, how to measure corn in cribs, how to calculate the capacity of a silo, and how "to convert almost anything to anything" as one almanac so appropriately put it. Alongside such trivia— and who doesn't enjoy reading this type of material?—one is sure to find data that is at once obscure yet useful. When I needed to know on short notice how far apart to plant some fruit trees, my printed "county agent" supplied the necessary details. Likewise, gardeners and farmers can find the predicted dates of the first and last frost together with all sorts of recommendations on planting.

It is, in fact, crop-planting advice that endears almanacs to many modern-day users. This involves what most readers simply refer to as consultation of "the signs." Virtually all almanacs aimed at rural audiences and the majority of those catering to urban ones as well provide detailed information indicating the most propitious moment to plant root crops, leafy vegetables, those which bear on vines, and the like. Many folks absolutely swear by the signs, and to them their validity is beyond question. They would no more think of planting a prized vegetable when the signs are wrong than they would plow a muddy field.

One devoted adherent of planting according to the signs, although she admits she occasionally goes against their advice, is Rock Hill's Alma Weaver. Known throughout York County and the surrounding region as the "plant lady," this sprightly septuagenarian makes her living growing vegetable and flower plants for sale to home gardeners. Hers is, unquestionably, the most verdant of the proverbial "green thumbs" within the experience of this writer. All sorts of plants, both common and exotic, flourish in seemingly magical fashion under her loving care, and she can readily recount numerous instances when she and others unwisely planted against the signs with poor results. She readily credits a goodly measure of her horticultural success to regular and careful consultation of her almanacs. Whether she is sowing tomato seeds in flats, rooting cuttings or transplanting something into her own garden, she has found that checking to see that signs are right is the surest guarantee of success.

The almanac Alma Weaver prefers, as did her mother before her, is *The Ladies Birthday Almanac*. She also uses *Grier's* and *Blum's*, which are less complete in the information they provide on the signs. All give suggestions on when to plant above- and below-ground crops, but *The Ladies Birthday Almanac* also provides month-by-month astrological indicators of planting



ROBERT CLARK

Almanacs remain popular despite competition from other media for the information market, and South Carolina Wildlife's own Sportsman's Calendar and Almanac is annually sold out. In an attempt to meet the needs of contemporary society, the formats of many almanacs have undergone change over the years, a move resisted by some of the faithful. When an alteration was made in Farmer's calendar page, one reader's chagrin prompted him to write: "I have read The Old Farmer's Almanac for the last seventy-five years and I wish the damned fool that changed the heading of the Moon's place column had died before he done it."

days. The matter is a surprisingly complex one, but essentially two determinants are involved: the current phase of the moon (one plants below-ground crops in the dark of the moon) and the bodily location of astrological signs. The arms, heart and especially the genital areas are bad times to plant crops, although the latter, sometimes known as the "bloom," is an ideal time for flowers. The best of the signs is Cancer (in the breast), and any of the watery signs are considered good. Many old-timers consult both the phase of the moon and bodily signs and say that when they are in agreement is the best or worst of all times to plant.

Similar information is available in almanacs for harvesting. For example, root crops such as potatoes or onions should be harvested at a time and in a sign which is dry. This ensures good keeping qualities, while a wet astrological sign and an open moon (water can pour out) means high water content and a greater likelihood of early rotting. Again, as is the case with planting, there is no denying that those who harvest at the proper times have considerable success in keeping their crops over long periods.

Finally, in this regard, bad planting signs do not mean days lost to the ever-active farmer or gardener. Bad planting days are good days to kill pests, and many almanacs will include several days in each month on which they advise waging war on insects. Indeed, every single day of the year has its full complement of signs, and devoted almanac users govern their lives accordingly.

Many might scoff at such approaches as amounting to nothing but rank superstition, and I must confess that at one time I was highly skeptical even though my grandfather had been a firm adherent of "sign" farming. Yet it is difficult to argue with persistent success, and such seems invariably to be the lot of those who plant by the signs. Countless old-timers adhere faithfully to this form of farming or gardening, and like most of the other information incorporated into almanacs, the signs come from many generations of accumulated folk wisdom. With rampant technological growth making "back to the earth" attitudes ever more appealing, even the scientific community (medicine is a good example) is beginning to realize that we

would be wise to give credence to the practical knowledge our forebears applied in their everyday lives.

Along with the signs, another area covered by almanacs which many readily dismiss is the weather. To be sure, most failed to predict the great drought of 1986, but, overall, many almanacs have had considerable long-range success in this area. The best known in this regard is *The Old Farmer's Almanac*, whose Abe Weatherwise (a collective pseudonym for the publication's editors) has enjoyed an overall accuracy rate of 80 percent since 1792. Certainly this is a level of achievement which today's weather prognosticators, even with all the meteorological information at their fingertips, do not come close to matching. Robert Thomas, the almanac's first editor, developed the secret weather formula still in use, and the documents upon which it is based are still housed in the annual's offices, carefully locked away and jealously guarded.

Whatever may be your view of almanac information, whether it deals with the weather, signs or any of the literally hundreds of other pieces of data provided therein, there can be no denying their enduring place in the history of American literature. As treasured guidebooks in the colonial era, as the rural family's newspaper and general adviser early in the nineteenth century, as a salesman's advertising gift, and now as a splendid example of practical nostalgia, almanacs are even more American than apple pie.

They have been an integral part of our way of life from the founding of the first colonies onward, and their longevity offers eloquent testimony to their enduring interest and value. Many would claim that without knowledge of the past ours is a bleak future, and almanacs are survivors which can carry us back into a world which we have, to all too great a degree, lost. ☛

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Jim Casada is a professor at Winthrop College who does outdoor writing as a hobby.

PITTMAN-ROBERTSON'S GOLDEN ANNIVERSARY

A WILDLIFE SUCCESS STORY

BORN OUT OF THE
GREAT DEPRESSION,
PITTMAN-ROBERTSON
WED THE EFFORTS OF
CONSERVATIONISTS,
SPORTSMEN, ARMS
MANUFACTURERS
AND STATE AGENCIES
TO GENERATE NEARLY
\$2 BILLION TO SAVE
WILDLIFE AND ITS
HABITAT.

BY PAT ROBERTSON

BESIDES BEING HUNTERS, what do the following have in common: the piedmont deer hunter, the Lowcountry duck hunter, the public dove field shooter, the wildlife management area quail and rabbit hunter, the spring turkey hunter, and even the teenager in a hunter education class?

They all benefit from a federal program that has poured more than 18 million dollars into South Carolina in the last 50 years to restore wildlife species and protect wildlife habitat. Not only have the hunters benefited, so have non-hunters along with myriad nongame species.

1987 marks the 50th anniversary of the Pittman-Robertson (P-R) federal aid program which taxes sporting arms and ammunition and archery equipment to provide funds for wildlife restoration in all the 50 states. The Federal Aid in Wildlife Restoration Act was signed into law by President Franklin D. Roosevelt on September 2, 1937, heralding a new era in wildlife management and protection which is still going strong and reaping benefits today. Because sportsmen pay the taxes strongly supporting the program, it is assured a long and continuing life.

The Pittman-Robertson program was born out of the desperation of the Great Depression. In the 1930s, the accumulated impacts of plundered forests, heedlessly plowed grasslands and the commercialized slaughter of wildlife were brought sharply into focus by the worst drought and the worst economic depression in America's history. People realized something had to be done, and a remarkable thing happened.

With a handful of farsighted conservationists leading the way, organized sportsmen and firearms and ammunition industries joined efforts with state wildlife agencies to respond to the wildlife crisis with an ingenious long-range plan. At their urging, Congress extended the life of an

existing 10 percent tax (later increased to 11 percent) on ammunition and firearms used for sport hunting, but this time it earmarked the proceeds to be distributed to the states for wildlife restoration.

The plan called not just for restocking, which had met with mediocre success at best, but vital programs such as scientific research on habitat management to give wild species a solid chance to establish healthy populations. The result was the Federal Aid in Wildlife Restoration Act, better known as the Pittman-Robertson Act after its principal sponsors, Senator Key Pittman of Nevada and then-Representative A. Willis Robertson of Virginia.

History has already noted the many huge successes fostered by the federal aid program. The populations of numerous species have been rebuilt and their ranges extended far beyond what they were in the 1930s. Among them are the wild turkey, white-tailed deer, pronghorn antelope, wood duck, beaver, black bear, giant Canada goose, ring-necked pheasant, American elk, desert bighorn sheep, bobcat, barren-ground caribou, mountain lion, grey and fox squirrels, and several species of predatory birds.

Because improved research and good habitat also help nongame animals, species such as bald eagles, sea otters and various songbirds have benefited from activities funded by the P-R program. Wildlife science research stimulated the creation of new technology to carry out its studies, including the "cap-chur" dart gun now used by scientists throughout the world to immobilize large animals for study or therapy; solar-powered radios that permit biologists to track the movements of the most elusive animals; and even transmitters tiny enough to be attached to birds. One of the most important successes in the 50-year history of the program was the creation of the new science of wildlife management.





TED BORG

The Federal Aid in Wildlife Restoration Act sought ways to end wildlife's "Great Depression," and today whether a sportsman hunts deer or waterfowl, overleaf, he funds the management of America's wildlife and its habitat.

HUNTERS continue to breathe life into this extraordinary wildlife program, and you only have to look at the historical ledger to see positive benefits for several species very dear to the heart of the American hunter. In 1920, fewer than half a million white-tailed deer lived in the United States; today, estimates indicate more than 14 million nationwide. South Carolina is home for an estimated 250,000 to 300,000.

In 1920, wild turkeys were scarce outside isolated populations in a few southern states. South Carolina was fortunate to be one of those states, and its Francis Marion turkeys, considered to be the purest of wild turkey strains, provided the basis for one of the most successful wildlife management projects ever recorded, the restoration of the wild turkey into every available bit of habitat in the state.

In 1920, hunting the American wood duck was banned nationwide, and extinction of the colorful little waterfowl was a real possibility. The unqualified success of wood duck nest box projects across the country has made the wood duck the most common breeding waterfowl in the east and has extended its range westward and north into

Canada. Each year the woodie's the top duck in the bag of South Carolina waterfowlers.

Other success stories from the Pittman-Robertson files include the American elk which lost ground in the 1920s, dwindling to about 100,000 animals. Today half a million elk live in North America. In 1920, fewer than 25,000 pronghorn antelope were left in the world. Today they are three-quarters of a million strong.

With 1.5 billion federal excise tax dollars matched by \$400 million in state-raised funds over the last half-century, the program has provided great benefits for animals and birds. According to wildlife managers, for every success story chronicled for game species under the P-R program, an equal number exist for wildlife that isn't hunted or trapped.

Habitat has been the key. By preserving wildlife habitat, the program has restored nongame as well as game species. Waterfowl management areas that produce good hunting also provide ideal habitat for egrets, herons and other marsh birds and mammals. Shrubs planted as cover for quail and rabbits provide excellent habitat for songbirds.

Endangered species such as the Eastern

timber wolf, the red wolf, the Delmarva fox squirrel and the red-cockaded woodpecker have either found homes on lands bought with P-R dollars or have benefited from research funded by the act. Surveys show that only about 30 percent of visitor activities on wildlife areas funded by P-R programs are hunting-related. The far larger share of use comes from birdwatchers, photographers, canoeists and others who enjoy wildlife in its natural habitat.

In the book commemorating the golden anniversary of the Pittman-Robertson Act, *Restoring America's Fish and Wildlife* (published 1987, U.S. Fish and Wildlife Service), John M. Anderson writes:

"Clearly, game and nongame uses are linked within the Pittman-Robertson program, despite the misconceptions of . . . thousands of other members of the general public who incorrectly segregate the two. Yet the nation's hunters have been the ones to foot the bill for these benefits that other recreational users have enjoyed for half a century. Quietly, without fanfare, the sportsman has been paying the way. Those who carry shotguns, rifles and archery equipment in quest of game have made

opportunities available for others who raise their cameras and binoculars in equal appreciation of wildlife."

Take away the P-R program in South Carolina and where would today's deer hunter be? What would the turkey hunter hunt? The dove hunter might well be limited to private shoots. There very likely would be no public duck hunting program in the state, and state-managed waterfowl areas provide the only waterfowl hunting opportunity for some South Carolina hunters. Many of the research programs carried out by wildlife biologists with the South Carolina Wildlife and Marine Resources Department never would have been undertaken.

Without Pittman-Robertson, wildlife management in South Carolina would have existed, but very likely not at the high level it has attained with the federal funding. "The legislature has been very supportive of the South Carolina Wildlife Department," said Billy McTeer, federal aid coordinator for the department and manager of the P-R budget for the state. "So, we can't know if we were not getting the federal money just how much the legislature would have been able to fund." Although substantial, it should be noted that the state-appropriated funds for the wildlife department on an annual basis amount to less than one-half of one percent of the total state budget.

"Without Pittman-Robertson we would

have had public hunting lands, but we probably could not have managed those areas nearly as efficiently as we do today," McTeer noted.

THE STATE'S Wildlife Management Area (WMA) program provides 1.4 million acres of public hunting opportunities to the state's sportsmen. Although Pittman-Robertson does not provide any money for leasing those lands from the landowners, funds are generated through the sale of WMA permits required of everyone who hunts there. The extensive wildlife management programs carried out on those lands, however, are funded by the P-R program.

Those programs include not only research but other activities such as planting wildlife food plots, clearing and mowing areas for wildlife browse, posting WMA boundaries with metal signs, putting up wood duck nest boxes, constructing duck blinds, building and maintaining dikes on waterfowl impoundments, stocking geese and other waterfowl, surveying wildlife populations, establishing and maintaining hunter camps and firing ranges, improving roads and trails for user access, plowing firebreaks, and even routine maintenance and repairs of equipment and buildings. In addition, more than 60,000 South Carolinians have gone through hunter education classes funded by the program.

Pittman-Robertson has also provided some permanent wildlife facilities in the state. Federal funds were used in large part to finance the purchase in the 1940s of the former Belmont Plantation in Hampton County, now known as the Webb Wildlife Center. Today, this Center serves as a field laboratory for intensive deer and quail management studies, in addition to providing many hours of public hunting opportunity each year. The same is true of the state's Bear Island Waterfowl Management Area which annually provides some of the highest-quality duck hunting available in South Carolina.

The federal P-R program annually provides well over \$100 million to the various states and territories of the United States for wildlife habitat protection and management. Each state gets no less than one-half of one percent nor more than five percent of the total budget. The money is funneled to the states on a 75-to-25 matching funds ratio. That means that every dollar spent on P-R-funded programs in South Carolina contains 25 cents provided by the state.

If not for Pittman-Robertson, wildlife in South Carolina would not be where it is today. The program has allowed South Carolina to do some things in wildlife management that it would not have been able to do otherwise.

It should be noted, too, that Carolina sportsmen get back more in P-R funds than they put into it. The dollar return to the state annually is greater than the amount of excise taxes paid in the state. The 1986-87 P-R budget for the Palmetto State was almost \$1.3 million which was met with more than \$300,000 in state funds. In the history of the program, P-R has provided \$18,226,580, matched by more than \$4.5 million from South Carolina.

In a statement commemorating the 50th anniversary of Pittman-Robertson, Jay D. Hair, executive vice president of the National Wildlife Federation, wrote: "Hail the conservationists who are willing to put their time and money where their convictions are."

In South Carolina that might be stated even more simply: Hail the sportsmen who put their money where their love is—wildlife and its habitat. 🐾

Pat Robertson is a regular contributor to South Carolina Wildlife. He is outdoor editor for The State newspaper and has had numerous articles published in both regional and national magazines.



TED BORG

P-R funds support hunter education which instills firearm safety practices and outdoor ethics in emerging sportsmen. These classes also teach basic management principles such as the land's carrying capacity and how it may be increased by planting food plots, another program funded by P-R.



TED BORG

field trip

MARCH-APRIL 1987 Volume 34, Number 2

LITTER AND SOLID WASTE: AN UNWELCOME RITE OF SPRING

When March blusters in with its unpredictable weather, spring can't be far behind.

As more direct radiation from the sun warms water and earth, plants and animals—large and small—begin to renew the cycle of life. Sap flows upward through the trees, bringing a promise of buds and fresh green leaves. Yellow jessamine (the state flower), redbud and flowering dogwood bring the spring landscape to life with color.

On about March 21, spring (vernal) equinox occurs with equal periods of sunlight and darkness. Throughout the woodlands and fields animals busy themselves with courtship, nest building and young rearing. Within Carolina lakes and streams fish begin their spawning movements to the shallows and tributaries. Tomorrow may bring a warm spring day or a late-season ice storm, but people begin to plan outdoor activities. It's unfortunate that far too many, while enjoying the season, will leave Carolina's roadsides, forests and waters strewn with litter.

RESOURCE USE OR ABUSE?

Even though our nation's population is only about six percent of the world's total number of people, we use over one-third of the world's resources. How much of these resources is wasted?

Many of the products we use, particularly those made of paper, glass, metal and plastics, end up as solid waste strewn across our landscape. Some are hauled away and piled in landfills and dumps where woodlands and wetlands once provided outdoor recreation for people and habitat for squirrels, rabbits, ducks, deer, songbirds, quail and other wildlife.

Much of our consumption of natural resources and the problems brought about by solid waste disposal could be eliminated if each of us made a habit of recycling.

PAPER: HOW MUCH DO WE USE?

An estimated 97 million tons of paper were consumed in the United States in 1985. That's about 800 pounds for every man, woman and child.

Of all the paper used annually, about 15 percent goes into permanent use such as in books, files and building materials. About 19 percent is eventually recycled into new products. The remaining 66 percent becomes part of America's solid waste problem. Many cities and towns are running out of land area to use for the disposal of waste, and improper disposal methods such as open dumps and burning can cause serious air and water pollution problems.

Wood is the principal raw material for papermaking. It takes up to 15 years for a tree to

mature enough for use in making paper products.

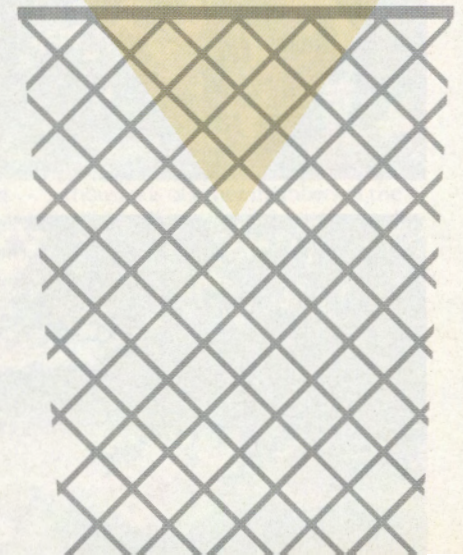
Wastepaper can be used to make new paper and paper products. For every ton of paper that is recycled, seventeen trees will not have to be cut; thus the heavy demand on our forests declines.

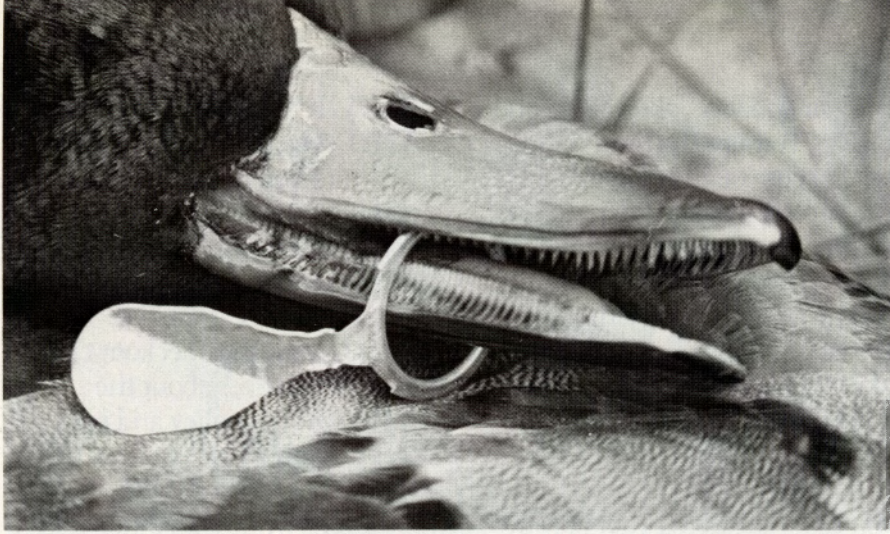
THE TROUBLE WITH TRASH

Disposing of garbage and dealing with litter is expensive for people and wildlife, especially since much of the waste we create is unnecessary.

The South Carolina Department of Highways and Public Transportation maintains over 40,000 miles of state highways. From July 1985

GOVERNOR'S TASK FORCE ON LITTER





EMILY SHORT



Litter is not just unsightly—it's dangerous for wildlife as well as people. Dispose of your trash properly, and pick up after others. Even a pop-top dropped at creekside a couple of years ago still poses a threat, as did this one caught on a duck's bill, and the plastic rings that hold soft drinks can ensnare a fish, eventually deforming and killing it.

South Carolina's governor considered litter such a problem that he formed a special task force to increase the public's awareness of the need to clean up the state's lands and waters. See page 53 to write the State Litter Coordinator if you'd like more information.

Nothing Could Be Finer Than A Cleaner Carolina



through June 1986 this agency spent \$815,853.17 for removal of litter from these roadsides. During last year's Carolina Spring Clean week, which occurs annually around the first of April, the highway department spent an estimated \$189,887 to remove litter and debris from 2,025 miles of roads. That's about \$94 per mile—money that could have gone for road repairs.

Just last year in Richland County, taxpayers spent \$577,000 for a county landfill and roadside sanitation boxes, almost \$4 million for garbage pickup and another \$124,500 for litter control. Think of the savings to the county taxpayer if only one-fifth of this trash could have been recycled.

WHO GETS THE BARGAIN?

Too often we choose groceries and other items strictly for convenience with no thought for the way these items are packaged. Some packaging is necessary, but packaging often disguises or over-sells the product. Overpackaging and throw-away containers contribute to our litter and trash problem while adding to our wasteful

consumption of natural resources.

The prices of things we buy cover hidden costs. Compare prices for disposable containers with the cost of recyclable ones. Don't forget to subtract the amount you'd get back through returning bottles and recycling aluminum cans and containers. How about some other hidden costs?

We've already examined how much it costs in tax dollars to clean up litter and deal with solid waste, but suppose that soft drink six-pack's plastic holder ends up in a lake or stream, and a fish or duck gets caught in it and dies. You could easily add an extra \$1 for restocking or nesting box construction. If you visit your favorite campsite and cut your foot on a broken bottle or rusty can, add \$25 or more for a medical bill.

Finally, what price would you place on the damage done to your enjoyment of an outing if either of the above occurred? There's no doubt about it—litter and waste are bargains for neither man nor wildlife.

WHAT'S YOUR EXCUSE?

Sometimes we throw a bit of trash on the ground or in the water, thinking that a small amount of litter won't cause any damage. Suppose everyone had that attitude?

Most people know that wasting and littering are wrong, but too often we make excuses: Everybody does it; recycling is too much trouble; one piece of litter won't make any difference; nobody will know if I toss it; I'm short on time; items in disposable containers cost less.

If we use excuses often enough, we can write obituaries for fish, birds and other animals,

and our streams, lakes, fields and forests. Perhaps the most often used excuse of all is "one person can't really make a difference." Wrong! You can make a difference!

The following activities and projects will give you a good idea of the ways you can avoid contributing to the problem. They'll also provide some ideas that can make you some extra change while doing your part in combating resource waste and litter.

RECYCLING NEWSPAPERS

How much paper does your family use? Collect the local papers for a week, weigh them and multiply that total weight by fifty-two weeks to find how much newspaper you get in a year. Now call a local paper recycler (you'll find him in the phone book under "Recycling Centers") to find out how much he would pay for one year's weight of paper. If all the pupils in your school saved their papers for one year, how much money could you make for a school project, trip or party?

RETURNABLE BOTTLES AND ALUMINUM CANS

While you're asking the recycling dealer about paper, don't forget to find out the price for aluminum. (About twenty-four 12-ounce cans make a pound.) Ask the checkout clerk or store manager about the grocery store's policy and prices on returnable bottles. Now you're ready to make some wise selections while shopping.

Ask your parents and friends about planning a local cleanup along a neighborhood road. You'll be doing a great service for your community while the dollars and cents add up.

Recycling for cents makes good sense. At the grocery store, choose items that are packaged in returnable or recyclable glass and aluminum containers, and save newspapers to turn in for extra cash.



ROBERT CLARK



ROBERT CLARK

NEW USES FOR OLD THINGS

You can cut down on your family's production of trash by finding other uses for items that you may have been throwing away.

Newspapers can be rolled, tied, soaked and dried for use as fireplace logs. (Don't burn the color sections as color inks may release harmful gases.)

Want a tote bag complete with ready-made zipper? You can make one by cutting off the legs of old jeans, sewing the leg openings shut and adding a drawstring to the belt loops. Patches just add to the fun. Next, fold the jeans' leg sections and stitch, and you'll have denim potholders for use in the kitchen or around the campfire.

Look for containers that can be reused. Some jellies, cheese spreads, dried meats and other items come in jars designed for use as juice glasses or mugs. Certain brands of peanut butter are sold in measuring-cup jars.

Other containers can be used in a variety of ways. A gallon plastic milk jug makes a good watering can for house plants. Cut out the bottom and remove the top and you've got a miniature greenhouse that can

be placed over early spring plants. Empty egg cartons make excellent containers for starting garden plants from seed. Add some potting soil, keep moist and place in a south-facing window until the plants are ready to transplant into the garden.

Use your mind! Be creative when thinking of other uses and other items that can be recycled rather than trashed.

Last, but not least, let others know how you feel. Don't hesitate to remind a friend not to litter. A sure way to get across your message is by picking up what a family member or friend tosses and properly disposing of it. When possible, check on the packaging available in your local grocery. If your favorite drink or snack doesn't come in returnable or recyclable packaging, write the manufacturer and let him know you'd prefer that option.

By showing that we care about our environment, we influence others around us. The earth and its resources are ours to share with others and with the wild creatures around us. Each of us has a part in using or abusing that privilege. In making the small choices we determine our big choices for tomorrow.

CHECK IT OUT

To discover more ways to conserve our resources and protect the environment, look at your library for these two books:

Re/Uses: 2133 Ways to Reuse and Recycle the Things You Ordinarily Throw Away by Carolyn Jabs, Crown Publishers, 1982.

Building For Tomorrow—Putting Waste to Work by Martin Pawley, Sierra Club Books, 1982.

For anti-litter leaflets and posters, write S.C. Department of Highways and Public Transportation, P.O. Box 191, Columbia, S.C. 29202. Pick up a free litter bag with the slogan "Nothing Could Be Finer Than



ROBERT CLARK

A Cleaner Carolina" at any motor vehicle license sales office of the highway department.

For more information contact your local Clemson Extension office or Chamber of Commerce, or write State Litter Coordinator, S.C. Department of Parks, Recreation and Tourism, Recreation Division, 1205 Pendleton, Columbia, S.C. 29201. 🐾

ROUNDTABLE

DIRECTIONS: A PARTNERSHIP FOR MULTIPLE-USE

Imagine South Carolina without white-tailed deer and Eastern wild turkeys in its forests...without wood ducks, otters or beavers in its swamps...without pelicans on its sea shores...without rabbits, doves and quail on its farmlands.

Fifty years ago, that's exactly the way things were heading. Wildlife's future looked bleak, with many of our state's native species barely hanging on after 300



Landowners hold the key to quality wildlife habitat availability in the future. Assuring the presence of wetlands, field-edge cover and browse areas can help meet the demands of all outdoor users.

years of American settlement.

Alarmed by the decline in game species, citizens joined together throughout the state and nation. They organized and lobbied together, then put their money behind their convictions. Through their combined efforts the conservation movement began.

A prime example of sportsmen's support of conservation is illustrated by the Federal Aid in Wildlife Restoration Program (Pittman-Robertson Program) now celebrating its 50th-year anniversary (see page 46 of this issue). Through this program and the foresight of key legislators in our state, the South Carolina Wildlife and Marine Resources Department has taken a leadership role among state wildlife agencies throughout the nation. Restoration and management programs for white-tailed deer, wild turkey, waterfowl, small game and furbearers have brought these species back to their present abundance.

What began as an agency mandated to protect and conserve game and fish has evolved into a highly sophisticated, scientific-minded

agency with responsibility for all of the wildlife and marine resources within our boundaries. The department has expanded its programs accordingly and has worked diligently to develop partnerships with hunters, fishermen, trappers and all others who utilize and enjoy this state's natural resources.

Through this partnership we can now see what will unfold in our future. On a national level, for example, we have seen continental waterfowl populations at an all-time low this past year. Within South Carolina we have seen demands for quality small game hunting lands exceed available supply in many areas, sportsmen's groups involved in major conflicts, and public hunting lands dwindle by some 200,000 acres within the past two years.

Two important factors impacting wildlife recreation in South Carolina are the loss of our land base and changes in the type and amount of recreational use desired by the public.

Our state's continued development will bring an increasing shift to more intensive land uses. As demands from urban development and industrial needs mount, the land's ability to provide recreational opportunities will be reduced through losses in the quality and quantity of wildlife habitat. As habitat values decrease in an area, so do fish and wildlife populations, diminishing the area's recreational value. Displaced users are forced to compete for remaining lands, compounding management problems and contributing to a decline in the quality of those lands.

Privately owned lands that have historically provided public use and are capable of continuing to do so are being closed to public access as landowners realize a greater profit and avoid abuse problems by leasing to private groups. Upward trends in our population will only compound these problems as sportsmen and other outdoor patrons seek lands and waters on which to enjoy photography, nature study, camping, hiking and boating.

Thus, in terms of quantity and quality of wildlife habitat, total population and resource-user demands, South Carolina is shrinking. In this sense, outdoor recreation and the enrichment it brings to our lives is threatened.

The state wildlife department, the very agency that speaks for our natural resources, cannot halt these changes, but we are working with legislators and private citizens' groups to enhance the multiple-use potential of lands under our control and to assure that sufficient wildlife lands will be available to the public.

Heretofore, this agency's traditional role of providing for hunting and fishing has not required highly developed facilities such as nature and hiking trails, interpretative centers, safe access roads and parking areas, sanitary and handicapped facilities and law enforcement patrols for visitors' protection. With adequate planning, coordination and funding we are moving toward meeting the public's diverse needs.

The future quality of wildlife habitat depends largely upon those private and corporate landowners who control the

vast majority of our state's acreage; the future also involves facing the need for a modest land acquisition program on the part of the state. While many of our sister states began moving in this direction more than fifty years ago, model legislation was drafted just this past year to allow purchase of some 120,000 acres of prime wildlife habitat over the next 20 years.

This legislation was only partially successful in implementing such a program, but it provided solid groundwork in determining authority and responsibilities of the fund, goals and objectives, criteria to be used in determining habitat types to be acquired, and constraints to be placed on expenditures for multiple-use management and development.

With a positive attitude from the public and private sector, considerable additional recreational opportunities can be provided on existing public lands, and additional lands can be assured for public recreation. The state wildlife department is committed to enhancing existing lands and programs and to examining innovative methods of land procurement for the benefit of our natural resources and the public enjoyment.

We each may look to the outdoors for different reasons, but hunters, fishermen, nature enthusiasts, campers, hikers and boaters must join together as stewards of the land. We can meet the challenges in wildlife's future as did those who began the conservation movement some 50 years ago by standing behind our convictions to assure wildlife's future. 🐾

— James A. Timmerman Jr.
Executive Director, SCWMRD

CAMP WILDWOOD DATES ANNOUNCED

High school students who enjoy being out-of-doors and are interested in conservation can increase their knowledge and experience in natural resources management at Camp Wildwood this summer. Sponsored by the Garden Club of South Carolina, the state wildlife department and the S.C. Wildlife Federation, Camp Wildwood will be in session June 13-20 at Kings Mountain State Park near Blacksburg.

Enrollment in Camp Wildwood is open to students who will be in the ninth through twelfth grades and is limited to 100 campers. The cost for the camp is \$80 per camper and includes meals, lodging and participation in all camp activities.

Young people are usually sponsored by a local affiliate of the Garden Club of South Carolina Inc. or the S.C. Wildlife Federation. Selection is based upon maturity, scholarship, leadership, and responsibility for the wise use and management of the state's natural resources.

Deadline for application and registration is May 15. For more information and an application write to Camp Wildwood, P.O. Box 167, Columbia, SC 29202, or telephone 734-3964. 🐾

National forests provide habitat for about 3,000 vertebrate species and have 83,000 miles of streams and 2.7 million acres of lakes that support a variety of fisheries, according to the Wildlife Management Institute.



Doubled in size in only two years, the Palmetto Sportsmen's Classic has gained a reputation for offering outdoor-oriented attractions and entertainment for the whole family, including special free activities planned for children during the three-day event at the State Fairgrounds.

SPORTSMEN'S CLASSIC TO BE MARCH 20-22

Exhibits, events and prizes await outdoor enthusiasts and families attending the third annual Palmetto Sportsmen's Classic to be held March 20-22 at the State Fairgrounds.

Co-sponsored by The State and The Columbia Record, the state wildlife department and the Harry Hampton Wildlife Fund, the Classic will feature hunting, fishing and camping equipment for show and sale, advice from nationally recognized professionals on sporting techniques, deer rack scoring sessions and turkey-calling contests, seminars on game and habitat management, wildlife paintings and wood carvings, exhibits, raffles, auctions and door prizes. Grand raffle prize will be a 1987 18-foot Glassmaster boat, 90-horsepower Evinrude motor and Wesco trailer.

Proceeds from each year's Classic go to the Hampton Fund for wildlife conservation and education projects.

Tickets may be ordered in advance by writing Tickets, Box 11710, Columbia, S.C. 29211. 🐾

Biologists say there are currently more than 130 whooping cranes in the wild, the Wildlife Management Institute reports. In 1941 only 15 could be found. There are two flocks of whoopers, the original group that breeds in Canada and migrates to the Texas coast for winter, and a man-made flock that travels between Idaho and New Mexico.

INVEST IN OUR
UNCOMMON
WEALTH 
A Check
For Wildlife

ROUNDTABLE



Red wolves were last found in the wild in a marsh and prairie area of Louisiana and Texas, but the animals were in such poor condition that they had to be captured in 1975 to be saved. Eight wolves like this one from a captive breeding population at Tacoma, Washington, have now been released in a North Carolina wildlife refuge.

RED WOLVES RETURN TO CAROLINAS

Red wolves, eliminated from the wild, have come once again to the Carolinas in an effort to re-establish the species which was once native to the Southeast.

Four mated pairs of wolves arrived late last fall at the Alligator River National Wildlife Refuge in Dare County, North Carolina, part of a U.S. Fish and Wildlife Service project to restore the animal to its former range. The isolated refuge offers prey and is bounded on three sides by large bodies of water. After six months in a pen adjusting to their surroundings, the animals, one of North America's most endangered mammals, will be released this spring into the coastal wilderness. Shy and secretive, red wolves do not hunt in packs as do grey wolves, and they will seldom be seen.

Ten years ago, a pair of red

wolves were released on Bulls Island, part of the Cape Romain National Wildlife Refuge in McClellanville, South Carolina, but they were never meant to become permanent residents. Rather, they were an experiment to see if such a reintroduction might be feasible. The first pair released soon had to be recaptured because they wandered farther than biologists anticipated. A second pair later released remained on the refuge barrier island and neighboring Capers Island for nearly a year.

Except for the eight animals released in North Carolina, the red wolf exists only as a captive breeding population of 75, housed at six facilities. The main group is at Point Defiance Zoo, Tacoma, Washington.

The Alligator Refuge project marks the first time in North America that an animal eliminated from the wild will be reintroduced from a captive breeding program. 🐾

CARP APPLICATION NO LONGER REQUIRED

Applications to purchase sterile grass carp are no longer required by the state wildlife department. Previously, applications had to be filed for approval prior to purchasing grass carp from dealers. The routine inspection of an applicant's pond by department biologists is also no longer mandatory.

Purchase of triploid (sterile) grass carp is still permitted in South Carolina only from approved dealers. The importing, selling or possessing of diploid (non-sterile) fish is illegal as is the purchase of any grass carp from unauthorized dealers.

Certification procedures conducted by the wildlife department, which ensure that only sterile fish are imported for sale, are unchanged.

Pond owners seeking to purchase the fish for biological weed control are urged to seek advice from wildlife department personnel on weed identification, stocking rates and other considerations to ensure the most effective utilization of the carp.

For more information and updated dealer information contact Grass Carp Coordinator, P.O. Box 167, Columbia, S.C. 29202. 🐾

Hunters enjoy their sport more than other outdoor enthusiasts enjoy theirs, according to a survey recently published by the National Park Service.

PERMITS REQUIRED FOR REGATTAS, WATER SHOWS

Any group planning to hold a water event such as a regatta, boat race, exhibition, parade or fishing tournament must first obtain a free permit from the Boating Division of the state wildlife department.

Applications for the authorization of marine events must be submitted at least 30 days prior to the scheduled date of the event. A permit is required for fishing tournaments that involve more than 20 boats.

Permits are necessary so multiple events will not be scheduled in the same area. The wildlife department also needs to schedule personnel to patrol the event to enforce boating safety regulations and to be on hand in case of emergency.

The permit application is called a "Request for Approval of Marine Events." Forms are available from the Boating Division, SCWMD, P.O. Box 12559, Charleston, S.C. 29412 or call (803) 795-6350. 🐾



OPERATION GAME THIEF

1-800-922-5431

STOP GAME AND FISH VIOLATORS

TURKEY HUNTERS: DON'T WEAR RED, WHITE AND BLUE

While red, white and blue may symbolize the spirit of America, they can spell trouble for turkey hunters headed for the woods this spring for gobbler season.

Accident statistics involving turkey hunters show, in the majority of cases, the shooter "stalked" his victim believing he was "sneaking up" on a calling turkey. In many cases the victim was wearing some sort of contrasting color, usually red, white or blue. A red bandana or white socks, for example, easily can be mistaken for the tom turkey's colorful head.

Serious turkey hunters, those who hunt in the traditional fashion by calling birds to a point where a clean kill is assured, are rarely involved in accidents.

According to the National Wild Turkey Federation, every turkey hunter should adhere to certain safety rules:

- Don't attempt to approach closer than 100 yards to a hen or gobbler;
- Never select a calling site with your back to a tree that is smaller than the width of your shoulders;
- Never jump and turn suddenly because you hear a turkey close behind you;
- Never select a calling site where you can't readily see at least 40 yards in all directions;
- Never stalk a turkey;
- Don't use a gobbler call unless it's one of those rare situations when circumstances really warrant trying something different;
- Don't think because you're

fully camouflaged that you are totally invisible;

- Never wear red, white or blue clothing, not even undergarments in these colors;
- Never presume that what you hear or what answers is a turkey;
- Finally, don't try to hide so well that you can't see what's happening. 🐾

A recycled aluminum can saves 95 percent of the materials and energy required to make a new one, according to Waste Watchers. Recycling can help eliminate litter and reduce air and water pollutants.

FLORENCE COUNTY TEEN WINS F.A.C.E. CONTEST

Debbie Matthews of Coward was the first place winner in the 1986 "F.A.C.E. (Food and Cover Establishment) for Wildlife" program sponsored jointly by the state wildlife department and the Clemson University Extension Service.

The program works through 4-H clubs to educate youth in wildlife habitat requirements and encourage the planting of wildlife food patches.

Breck Carmichael, small game biologist with the wildlife department, said Debbie's plot site was an old field close to cover and away from residences and other disturbances. She, like other participants, was given a five-pound packet of mixed seeds to plant and tend for maximum advantage to wildlife.

Second place winners were Karen Boland of Batesburg and



F.A.C.E. for Wildlife contest winner Debbie Matthews' wildlife food plot earned her a prize of \$300, presented by Rusty Foster of Quail Unlimited Inc. Also shown is Laval Oxendine, Florence County 4-H coordinator for the Clemson Extension Service.

Amy Madding of Simpsonville, who tied, and third place winner was Craig McAlister of Aiken. Cash prizes from Midlands Chapter of Quail Unlimited Inc. were presented to the winners. 🐾

"OPERATION SOCKO" BRINGS ARRESTS

Warrants for the arrest of 21 people in Georgetown, Horry and Charleston counties have resulted from a three-agency covert investigation into the illegal sale and interstate transport of clams. Wildlife department law enforcement officers joined officials from the National Marine Fisheries Service and the S.C. Department of Health and Environmental Control (DHEC) in what was code-named "Operation Socko."

W.K. Chastain, director of law enforcement for the

department, said illegal sales amounted to \$775,147.72, all from clams harvested from South Carolina waters. This is a conservative figure since no records were kept for many additional shipments bootlegged out of state, said Chastain, who has been commended by the S.C. General Assembly for last year's "Operation Wild," an undercover investigation that resulted in the arrest of 70 individuals for the illegal sale of game, fish and furs.

Covert operations are often necessitated in widespread problems such as the illegal clam-selling case. DHEC officials stressed the importance of permitting and inspecting dealers, since adequate record-keeping can aid shellfish tracing in the event of a disease outbreak.

To counter illegal activity, the wildlife department maintains an undercover unit of officers who work in coordination with the Operation Game Thief program which offers rewards of up to \$500 in cash for information leading to arrests. Information may be given anonymously, and tips may be phoned in by calling the toll-free hotline number, 1-800-922-5431, at any time. 🐾

A bow-mounted trolling motor should be mounted on the front and as close to the centerline of the boat as possible. A trolling motor pulls much better than it pushes. The reason for centering it is the performance of the clutch, although clearance and obstructions such as running lights often prevent straight centerline mounting.

ROUNDTABLE

ECO-FOCUS: WETLANDS LOSS RAISES TOUGH QUESTIONS

Imagine losing an area nearly the size of Sesquicentennial State Park...every day. It happens.

Each day we lose approximately 1,300 acres of wetlands in North America. In a year's time this adds up to a loss of nearly half a million acres of vitally important habitat.

The plight of this country's wetlands concerns not only biologists and ecologists but also engineers, consultants, businessmen, politicians, students and environmentalists.

And well it should, for

offs such as boating, swimming, fishing and other water sports. Most people don't need to be convinced that the sources of their drinking water and recreation should not be polluted, filled or otherwise harmed.

Other wetlands isolated from streams and lakes, however, don't always enjoy the same consideration. But they, too, must be protected when development is planned.

The U.S. Army Corps of Engineers recently assumed jurisdiction over dredge-fill operations in South Carolina's isolated wetlands. Combined with their existing jurisdiction over navigable waters, the Corps now has the ultimate

concerning individual permit applications, environmental as well as economic. Once again the dilemma of the environmentalist and the ecologist surfaces: comparing economic values (reasonable, well-defined and easily measured) to ecological values (not so well-defined, some downright intangible and thus difficult or impossible to measure).

As if the difficulty of evaluating natural lands such as wetlands weren't enough, it is sometimes difficult to identify or define the systems themselves. In South Carolina, isolated wetlands can be the mysterious elliptical depressions known as Carolina bays, limesinks, ponds,

aquatic plant species, you own a wetland.

Much time and effort are being spent to develop a system by which natural lands such as wetlands can be evaluated for their inherent ecosystem functions. A vital part of such a system depends on biological common sense. How many plant and animal species does a site support? Are any rare or endangered? Does the site act as a storage basin for rainwater runoff thereby reducing flooding problems in the vicinity? Is the site filtering or otherwise cleansing the water which it holds? (In many areas the biological activity of microorganisms and chemical activity of wetland sediments can remove potential pollutants if they do not exist in massive amounts.)

And what of aesthetics? How do we figure into this system the intangible benefits of a visit to a quiet tupelo-cypress pond or an acre of lavender meadow beauties stretching across a savanna?

These questions and many others are being asked about our freshwater wetlands today to ensure their future, for the significant loss of wetlands acreage remains a dire threat to the environment and the wildlife species dependent on their habitat.

The wildlife department, so far, has identified over 2,500 Carolina bays. Of these, fewer than 200 remain in sound ecological condition. It's tough to answer questions about wetlands' values, functions and importance when wetlands themselves are disappearing faster than we can study them. 🐾

—STEVE BENNETT



Wetlands are disappearing before their significance can be evaluated, their loss threatening to both man and wildlife.

freshwater wetlands provide vital benefits of which even non-environmentalists are aware. Just about everyone knows, for instance, that rivers, streams and lakes provide fresh drinking water for thousands of communities.

These same bodies of water also provide recreational spin-

responsibility for all wetlands in our state, except for the coastal zone where the Corps shares permitting authority with the Coastal Council and cannot override their permit denial.

Permitting authority carries with it the responsibility to review all pertinent facts

sloughs and other areas which either collect rainwater or are spring-fed.

The vegetation growing in these various wetlands best identifies them. If you own a wet or boggy site with red maple, tupelo, cypress, marsh grasses, cattails, water lilies or any other aquatic or semi-

The National Wildlife Refuge System was expanded last year with creation of the Bayou Sauvage National Wildlife Refuge in Louisiana, reports the Wildlife Management Institute. The 23,450 acres of prime wetlands near New Orleans are excellent migratory bird habitat.

POND-RAISED SHRIMP HARVEST PROMISING

Waddell Mariculture Center's latest shrimp harvest yielded 30,000 pounds from eight ponds with a combined surface area of about six acres. Pacific white shrimp had been stocked at the center near Hilton Head, and survival rate averaged 77 percent.

The center's level of production from one crop was almost twice as high as annual shrimp production in most tropical mariculture operations despite the shorter growing season in South Carolina, according to Dr. Paul Sandifer, director of the Marine Resources Division of the state wildlife department.

Most of the shrimp were sold with the proceeds returned to the center for application to continued mariculture work. Profits from commercial operations could range from 15 to 40 percent, demonstrating the feasibility of commercially raising shrimp in South Carolina.

Since the United States now imports 73 percent of the shrimp consumed, mariculture could provide an additional source of income to the state and would augment the natural production which is now fully utilized. 🐞



SCHWEINITZ' sunflower, an endangered species, has been found on an Iredell soil site near Rock Hill by Non-game and Heritage Trust botanists with the state wildlife department. Until this discovery, the species had been considered lost for about 60 years. The rare sunflower is restricted to dry, rocky woodlands over soil with a non-acid pH value. The protection of special Iredell soil communities such as the sunflower's is a major goal of the Heritage Trust Section and is one of the projects funded through the Check For Wildlife program. Hopes are now high to locate additional patches of the rare sunflower in the piedmont counties. 🐞

A midwest glass company once paid \$300 a month to dispose of cardboard boxes. It now earns \$800 per month selling them to local paper stock companies.

LITTER CASES, FINES INCREASE

Fines imposed on the state's litterbugs by wildlife conservation officers have increased about 24 percent over the previous year since the formation in January 1986 of the Governor's Task Force on Litter. The number of cases made is up about 8 percent.

Latest figures available showed that 182 cases had been made, and \$8,885 in fines had been collected.

Litter can be dangerous to humans and wildlife. People have been injured by stepping on rusted cans and broken bottles, and fish can swallow "pop-tops" or get plastic six-pack holders tangled in their gills. Many landowners have pulled their land out of the Wildlife Management Area program because of the problems caused by litter and other destructive activities. 🐞

FIRE ANTS RESIST MOST FOLK REMEDIES

Home remedies are being used to combat the pesky fire ant, according to Clemson University entomologists, but for the most part they are ineffective.

In studies recently conducted at the University, instant grits, epsom salts, gasoline and hot water were tested for the ability to control and kill the ferocious stinging insects. Commercially available fast-kill and slow-kill insecticides were also tested.

Of the home remedies, only leaded gasoline gave adequate control when used on single mounds, but its use is not

recommended since it is hazardous, contaminates the soil and is illegal to use this way.

Researchers emphasize the need for caution in using fast-kill treatments such as diazinon, chlorpyrifos and carbaryl. All proved effective in the Clemson tests but may be harmful to children and pets. Users should also be aware of potential effects on the environment. (See "Silent Spring," page 16.) 🐞

FILE FLOAT PLAN FOR SAFER TRIP

Before every boating trip, file a float plan. It's not complicated, and it doesn't even have to be in writing. It simply involves leaving word where you intend to go in your boat and when you plan to return. If you should become overdue because of bad weather, engine trouble or accident, your float plan will help rescue personnel to find you.

Float plan information can be left with a member of the family, a friend or an attendant at a yacht club or boat landing. If this is impossible, file your plans with the Coast Guard or the state wildlife department.

Include the following information in your float plans: your name, type of boat, color of hull, registration number and name of boat, type of propulsion, number of persons aboard, type of radio and channel you'll be listening to, home phone number, auto license number, and time and place you would like a rescue activity advised if you become overdue.

To receive a free float plan form, write Boating Division, P.O. Box 167, Columbia, SC 29202. 🐞

ROUNDTABLE



Prescott S. Baines

SETON AWARD TO CE&C AND DIRECTOR BAINES

The Conservation Education and Communications Division of the state wildlife department, which publishes *South Carolina Wildlife* magazine, was presented the prestigious Ernest Thompson Seton Award by the International Association of Fish and Wildlife Agencies. A companion award was made to Division Director Prescott Baines.

The Seton Award is presented annually to "the state, provincial or federal agency that has best promoted a public awareness of the need to support the science and practice of wildlife management." The companion award goes to the person deemed by the agency as the one most responsible for the successful support of the integrity of its professional wildlife management program.

In addition to publishing the award-winning magazine, Baines' division produces films, weekly news features, *The Resource* newspaper and several other special department publications and co-sponsors with the S.C. Wildlife Federation the conservation education program Project WILD.

The division was cited for recent efforts to promote the HELP (Habitat Enhancement and Land Protection) program among the public in a major public relations campaign. 🐾

EDISTO RIVER BLUFFS NOW PROTECTED

Formed by prehistoric ocean deposits, a series of limestone bluffs along the Edisto River at Givhans Ferry State Park is now registered through the Heritage Trust Act, a law that protects areas in South Carolina with natural or cultural significance.

The Givhans bluffs run 3,000 feet along the river, rising to 30 feet, and are made up of Cooper marl limestone. This "marl cliff community" affords habitat for a unique assemblage of lime-loving plants, including at least one threatened species, the little ebony spleenwort. Four rare species also inhabit the site: Southern maidenhair fern, Carolina scalystem, American alumroot and hop hornbean.

Givhans Ferry State Park is the fifth oldest park in the state and was the chief crossing of the Edisto for Indians and traders in early times. The 988-acre park is situated 25 miles inland from Charleston on Highway 61 between Summerville and Walterboro.

The registration agreement was signed by officials with S.C. Parks, Recreation and Tourism and the state wildlife department.

Funds contributed to the Check For Wildlife program are used to survey and develop management plans for natural areas such as the Givhans bluffs site. 🐾

S.C. MAN NAMED TO HALL OF FAME

Veteran dog handler Fred Arant Jr. of Barnwell has been named to the Field Trial Hall of Fame, the first native South Carolinian to receive the honor.

During a career that spanned nearly 40 years, Arant won a total of 21 all-age championship titles. He is the leading handler in Futurity wins, placing dogs in the American Field Futurities on 24 occasions. Some of the great pointers and setters he trained and handled were Miss Mary Doone, A Rambling Rebel, Rambling Rebel Dan, Tooth Acres Hawk and the famed Toronado.

Arant's breeding program also was praised in the nomination: "Fred's theory is, and always has been, that to get the judges' attention one must start by unleashing a dog worth looking at." Several prominent winners trace their roots to the "Rebel" bloodlines, including Buckboard and Guard Rail, the 1983 and 1986 Hall of Fame dog nominees. 🐾



Field Trial Hall of Fame honoree Fred Arant Jr. trained and handled the great setter Toronado in 1966.

State fish and wildlife agencies have received a record amount of funding under the Federal Aid in Sport Fish and Wildlife Restoration acts for fiscal year 1987, according to the Wildlife Management Institute. The total of \$188 million is the most ever because of increased collections from taxes on fishing and boating gear.

NEW SAW MAKES BOATING SAFER

Wildlife department divers are using a new underwater chainsaw to remove "hazards to navigation" from major reservoirs and rivers in the state. Working with the Boating Division, divers Ben Underwood, Skeet Mills and Francis Mitchum are cutting old pilings, stumps, logs and any other obstacles that might cause boating mishaps.

The long-term project will eventually involve all major lakes except Marion and Moultrie, according to Leonard Mishoe of the Boating Division in Charleston. The Santee-Cooper lakes have too many stumps to attempt removal.

The team has been removing pilings from Lake Murray, the Pee Dee River and Lake Greenwood. Old pilings that previously marked shoals and other hazards to boating will be replaced with buoy markers during the project. Mishoe said he hopes to get funding from the counties to support the project.

Underwood, Mills and Mitchum are members of the wildlife department's Aquatic Investigations and Recovery Team. 🐾



Teams from South Carolina and Georgia sampled tiny organisms from the Chattooga River using a four-foot, bag-shaped net in a metal frame. Kinds and numbers of specimens gathered were analyzed as part of a year-long study of the river.

CHATTOOGA RIVER STUDY BEGINS

Forty Trout Unlimited volunteers, Forest Service personnel from three national forests and fisheries biologists from two states got together this past fall to begin a survey of the biological health and trout population of the Chattooga River, which forms 40 miles of the boundary between South Carolina and Georgia.

The year-long project is one of the largest cooperative programs in the Southeast conducted to obtain detailed information concerning a river's ability to produce trout. Trout Unlimited pledged over \$3,000 and is expected to donate about 2,600 man-hours helping obtain state-of-the-art fisheries information. South Carolina's wildlife department contributed another \$3,000, and Georgia's Department of Natural Resources provided manpower and equipment valued at \$3,000.

Two major studies were begun: the first to inventory small organisms forming the base of the food chain and the second to determine number and species of fish. Specimens of organisms for analysis were collected from 24 locations, and electro-shock sampling in two 100-meter river sections yielded 20 to 35 trout from each, mostly native brown trout, in addition to suckers, chubs, shiners, sculpins, minnows and daces. Crews weighed, measured and recorded the data on each fish.

Volunteers expressed surprise at the results. Few realized just how many brown trout were present in water which they had previously fished.

The Chattooga became the South's first Wild and Scenic River in 1974 by an act of Congress. Population studies now under way by state wildlife biologists will add to knowledge of the state's most famous river and enable the recommendation of future management practices. 🐸

\$1.4 MILLION AIDS BEIDLER FOREST

Matched-grant funds totaling \$1.4 million will enable the purchase of 514 more acres to enlarge the Francis Beidler Forest sanctuary in Four Holes Swamp, according to the National Audubon Society.

Now encompassing 4,100 acres, the forest contains the finest remaining tract of blackwater bald cypress and tupelo gum trees in the world. Wildlife including wading birds, bobcat, river otters, songbirds and alligators inhabit the swamp.

A grant of \$150,000 from the Richard K. Mellon Foundation combined with contributions from other foundations, corporations and individuals permitted the Audubon Society to match a \$700,000 challenge grant from the Goodhill Foundation of New York. 🐸

"HOMEMADE" BOATS BRING REGISTRATION PROBLEMS

Don't say your boat is homemade if it's not, say officials with the Watercraft Records Section of the state wildlife department. A boat with a clouded ownership may be difficult to put in the new owner's name, but claiming it's homemade won't solve the problem.

All home-built boats are now inspected upon application for issuance of a new hull identification number, and a boater who lacks the necessary paperwork to transfer ownership may find himself in violation of the law.

Some pointers to remember before purchasing a boat or

motor are: be sure the boat matches the papers you are given with it; a simple bill of sale is not proof of ownership; all motorized watercraft must be registered in South Carolina and display their valid numbers and decals; all outboard motors five horsepower or larger must be titled separately.

If you suspect a problem, call the titling and registration office in Columbia at 734-3857. 🐸

NOVEL ENDING FOR BOOK BUGS

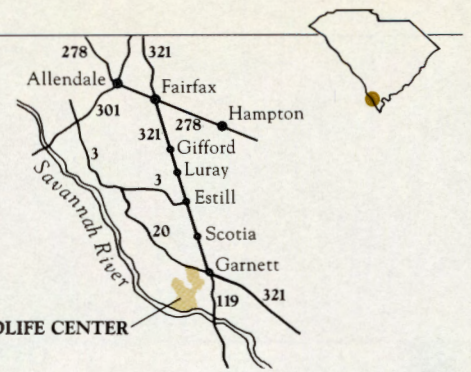
Moths, cockroaches, booklice, silverfish, termites and bookmites thrive in library books around the world, but a new process by which the documents are frozen at 40 degrees below zero debugs the books.

National Wildlife magazine said Yale University librarians turned for help to their entomology department when strange, wingless insects were found to infest medieval illuminated manuscripts that had been stored in an Italian monastery for centuries. Chemicals were out of the question since the bugs were deep inside the pages where fumes could damage the fragile paper or change the colors in the illuminations.

Acting on a hunch, the scientists tried freezing several of the grubs and, when tests proved successful, wrapped the precious volumes in plastic bags and commandeered a dining hall freezer. Three days later the embattled books were bug-free.

Yale has since installed a walkthrough freezer in the library and put its entire collection of more than 30,000 rare books and documents on ice. 🐸

RAMBLINGS



Occasional shrill cries of red-cockaded woodpecker and redtail hawk, droning insects and the sighing of breezes through tall longleaf pine—these are the sounds that provide a sense of peace and order at the **James W. Webb Wildlife Center and Management Area** in Hampton County.

The sights are varied: a whitetail stepping hesitantly into one



of the 100 openings in the area's timber, an alligator snoozing at the base of a huge cypress tree, an anhinga spreading its wings to dry on the bank of a pond. Small-acreage plantings of browntop millet, bicolor lespedeza and other grasses and shrubs for small game punctuate stands of longleaf, slash, loblolly, shortleaf and



PHOTOGRAPHS BY TED BORG

Webb Center's roomy old lodge anchors 5,866 acres of managed land including planted open areas to benefit small game like quail. Closer to the Savannah River, the dark waters of an oxbow known as Bluff Lake reflect its bald cypress and water tupelo and shelter bream, crappie and other popular game fish.



pond pine. The cypress-tupelo swamp bordering the Savannah River is home for bluegill, bass, crappie, catfish, warmouth, mudfish and other fishermen's favorites.

The impression given is of a harmonious, natural community, occurring effortlessly as if it had always been and always would be. In fact, it has taken years of hard work and diligent planning to produce and ensure the variety and quality of natural life at the Center.

Multi-use habitat is a key term at Webb Center, and visitors can hunt, fish, hike the nature trails, canoe, picnic, watch birds and photograph a variety of plant and animal subjects found there. Wild turkey, quail, dove, rabbit and squirrel abound, as well as such nongame species as osprey, several species of hawk and the endangered red-cockaded woodpecker. The first nesting in the county of the rare swallow-tailed kite

was reported at the Center, and the birds have returned for a second year.

Formerly known as Belmont Plantation, a training and rearing farm for race horses, the property was purchased by the wildlife department in 1941. In 1974 the 5,866-acre tract was renamed for the late James Webb, South Carolina's first wildlife biologist and a former executive director of the department. It serves as a research and demonstration facility emphasizing long-range, intensive management for wildlife and timber. Federal wildlife restoration funds from the Pittman-Robertson Act were used in large part to purchase Belmont, and these funds provide continuing support for the Center. (See "Pittman-Robertson's Golden Anniversary," page 46.)

Last year more than 2,200 deer hunters applied for the 20 computer-selected public hunts, with 24 drawn for each. Six quail hunts with 450 applicants were filled in the same way. Participants on deer and quail hunts are provided two meals and overnight accommodations at the spacious old lodge that was home for the Belmonts. Students from primary through university ages visit and learn at the Center on a regular basis, and teacher conferences and workshops are also held at the facility.

With so many groups and activities scheduled, it is imperative that visitors contact the Center well in advance to assure there will be no conflict. All visitors are required to check in upon arrival. Fishing is prohibited on Sundays and scheduled hunt days. For information, write the Webb Wildlife Center, Garnett, S.C. 29922, or telephone (803) 625-3569. The Center entrance is located 2.7 miles from the Garnett Post Office on Highway 20.

Prospective visitors are cautioned not to forget insect repellent or to expect expanses of green lawns and a park-like atmosphere. Instead they will find an area of widely diverse habitat, well-planned and managed for wildlife and offering the food and cover necessary for a vast natural community. 🐾

—LINDA RENSHAW

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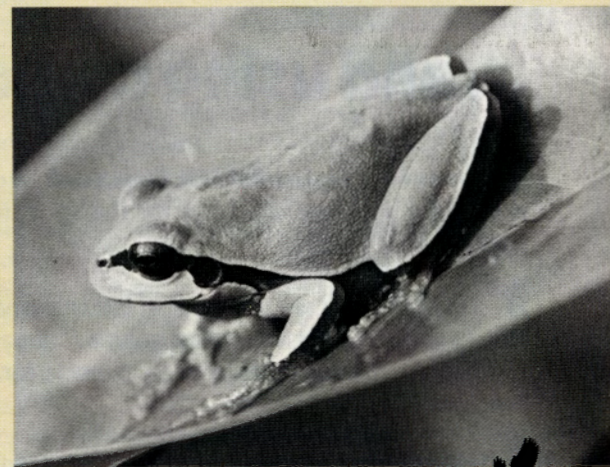
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