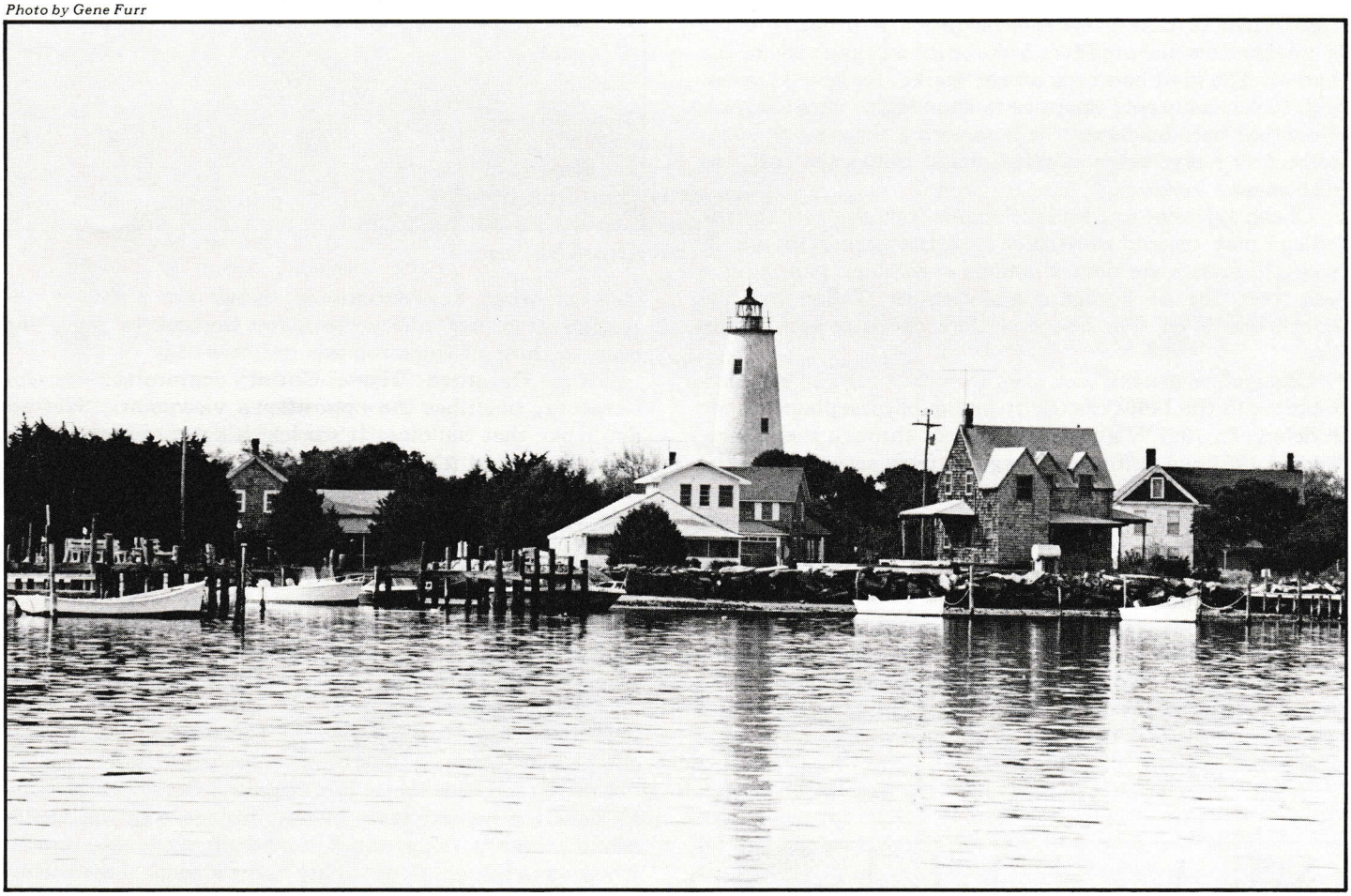
UNC Sea Grant

May, 1985

COASTWATCH

Photo by Gene Furr



A view across Silver Lake, Ocracoke's picturesque harbor

Change sweeps Ocracoke Village

It's happened almost everywhere else on the North Carolina coast. A quiet stretch of sand attracted only the heartiest settlers. They made a living by fishing and depended on their neighbors for help when times got rough.

But then folks began to find out about the secluded coastline and the village. A retreat, they called it. Mostly they came to unwind, to be soothed by the sea. When they went home, they told their friends about the beautiful place. And before the natives knew it, their quiet home had turned into a tourist spot.

So it is with Ocracoke, perhaps the state's last frontier. This month, Coastwatch *takes a look at Ocracoke Island and its village. Against the backdrop of a rich history and fishing heritage, Ocracoke is changing. And change is not always welcome.*

What kind of image to present?

In 1975, a businessman from Daytona Beach, Fla., flew over Ocracoke Island. "From the air, it looked like something out of a storybook," remembers Scott Cottrell. "I thought it was one of the most picturesque places I had ever seen."

Cottrell landed on the island, took a look around and bought a piece of property. Four years later, he moved there for good, with the intention of taking it easy.

But he opened a gift shop, and the businessman in Cottrell began to take over. Another piece of property came available, this one on Silver Lake, with a prime view of the harbor. The land had been on the market for several years, but "Everybody said the price was too high," says Cottrell. Now that he's developed the land with a three-story, soon-to-be-four-story, brick motel, Cottrell thinks the cost was dirt cheap.

Cheap for him, say some islanders, but the cost for the village may be immeasurable. In a town where hundred-year-old houses are nestled among even older, gnarled live oak trees, the Anchorage is a skyscraper. Taller than the lighthouse, even. The image of Ocracoke is at stake, they say.

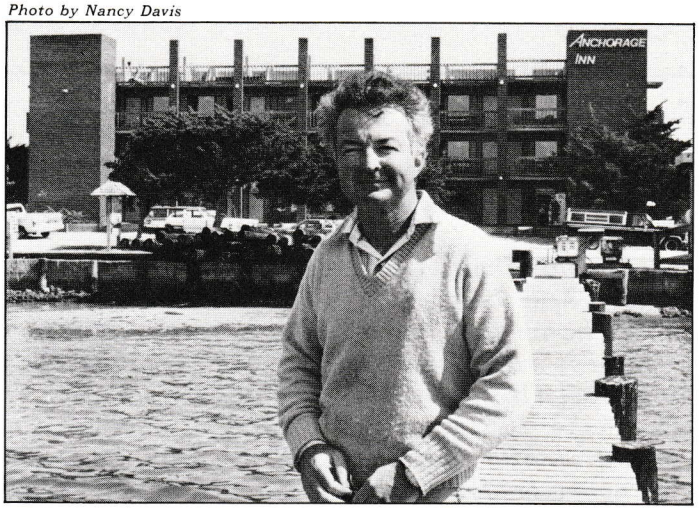
Change has always been slow to come to the island community. In the 1940s electricity and public telephones made a debut. In 1957 Highway 12 was cut through the village, and in 1961 the state began regular ferry service from the mainland.

Today, the unincorporated village is a permanent home to over 650 people, most of them with roots several generations deep. Here, the mass exodus from the country to the city doesn't apply. Ocracoke's children grow up there, some go off to school, and more often than not, they return.

When Cottrell constructed the Anchorage, his actions were not illegal. The only guidelines he was required to follow are those set out by Hyde County building codes and septic regulations. The motel is equipped with its own septic treatment system.

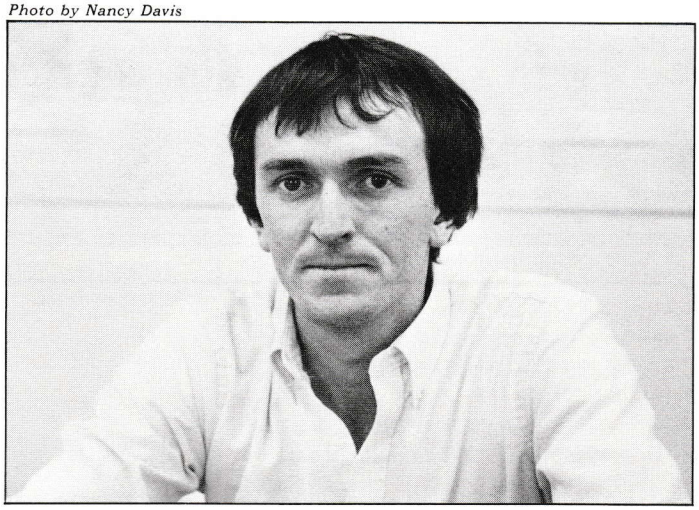
What Cottrell didn't do was follow the natives' unwritten code of what was acceptable. Now, the sight of the Anchorage brings a scowl to many Ocracokers' faces and even to those of some tourists.

Photo by Nancy Davis



Scott Cottrell

Photo by Nancy Davis



Alton Ballance

Alton Ballance, Hyde County commissioner for Ocracoke, describes the opposition's viewpoint: "Natives don't like that building. It's brick, it's out of character to the village, and it's high-density for such a small lot. The Anchorage sets a precedent—if he can build that, I'll build this. If he builds four stories, I'll build five."

(Scott Cottrell and Alton Ballance reflect the extreme points of view and do not necessarily represent the opinions of other Ocracokers.)

Cottrell defends his motel. When completed, a pitched roof and gables will give the building a more traditional look, he says. "I think it will be the most imposing building on the island when it's finished," says Cottrell.

Is that good? "It is if it's your's. But it isn't if you have to compete against it," he replies.

Cottrell feels his motel has benefited Ocracoke. He says he pays the highest taxes of any business venture on the island, employs a substantial number of people, and tourists who stay in his motel contribute to the income of the island.

But the Anchorage is only the focal point of a broader conflict. Ballance says this is a story about natives losing ground.

He creates a common scenario. Two neighbors have lived on Ocracoke all their lives. When one of the homeowners dies, the relatives decide to sell the property.

Here's where the trouble begins, says Ballance. A retired couple from the North buys the house. Then they want to buy an adjacent vacant field. The natives see the land as an old field where their children played. To the newcomers, the property is a way to make money, says Ballance. They buy the land and build a motel.

Now the natives have to deal with commercial property next door. They rebel; their home isn't a nice place anymore, says Ballance.

A zoning plan might have helped in a situation like this,

says Ballance. But on Ocracoke, where fierce independence and individualism runs as deep as the distrust for government, residents opposed a 1981 zoning referendum 424 to 238. Some say the referendum didn't pass because it was too complicated and wasn't explained clearly. Others say natives were afraid the ordinance would backfire on them, that they wouldn't be allowed to do what they wanted with their land, that they couldn't keep boats and crab pots in their yards.

Irvin Scott Garrish, Ballance's uncle, was a county commissioner at the time the zoning ordinance came up for a vote. He was in favor of the law, but he accepts the fact that residents defeated it.

Now, another new motel blocks his view of Silver Lake. "I'm selfish. I didn't want that in front of me," he says as he points to the motel. "But I couldn't help it. People were afraid they would lose some of the freedom they have on the island. The freedom to do what they wanted to with their land."

Ballance and Garrish believe problems of overdevelopment are just beginning. Already, the water and electrical utilities feel the added burden. In the summer, it's not unusual to be without water for two to three hours, and brownouts and blackouts are common, says Garrish.

Further north, officials in Nags Head and Kill Devil Hills have established temporary moratoriums on new water connections as a result of the building boom.

Ballance says, "We're on the brink of a very unorganized pattern of development that would be detrimental to those utilities but also to the image and atmosphere of the village environment."

Cottrell says he voted in favor of the zoning ordinance. "I believe orderly, controlled growth is preferable to random growth," he says.

But there is a double standard at work on the island, says Cottrell. "The feeling of the natives is, 'Don't do this with your property, but don't tell me what I can do with mine.' "

Cottrell doesn't think overdevelopment will be a problem on Ocracoke because the amount of land available for purchase is limited. The 775-acre village lies at the southern tip of the island. The remaining land on the 17-mile strip of beach is owned by the National Park Service.

Ballance disagrees. "Every piece of land is available on this island. If you've got the money, you can buy it."

Garrish says some natives are selling their land. He's not among them. "I have my land and my daughters have their's. I'm holding a piece for my grandson. If I didn't, it would be almost impossible for him to have land here."

Natives and newcomers alike agree that land prices increase with each day. Mary J. Everhart, a transplant from Illinois, is building an eight-unit motel. She paid $70,000 for less than a quarter of an acre on Silver Lake. Half of that land must be set aside for the septic system. Everhart figures that means she spent $70,000 for an eighth of an acre.

Ballance isn't sure whether he'll recommend another zoning ordinance. He's concerned that random development may destroy what people come to Ocracoke for in the first place. "I'm beginning to get the message that people are taking a second look at the advantages of big construction in a village-type atmosphere like Ocracoke. They're waking up and going, 'Oh, my God, I had no idea it was going to turn out like this.' "

—Nancy Davis

Photo by Gene Furr

The Ocracoke Lighthouse

The ties that bind

It's said Ocracoke's solitary nature and watery surroundings breed a special people—people who draw strength from the sea and enjoyment from the simple life. They show a fierce independence and a strong community spirit borne from isolation and hardy living. Their roots reach deep into the island's history, holding neighbor to neighbor and generation to generation. The ties that bind—the island, the water, the heritage—make these people Ocracokers and everyone else an outsider.

Their history began with a brush from Sir Walter Raleigh's 1585 expedition. The expedition's flagship, the *Tyger*, ran aground in what was believed to be Ocracoke Inlet, then called Wococon Inlet. The island itself also bore the name of Wococon, an Indian word meaning fort.

The name gradually evolved to its current form—Wococon, Woccocock, Occocock, Oceacock, Ocracoke. Legends say the infamous pirate, Blackbeard, is responsible for its present-day name. Impatient for dawn and his ensuing battle with a British sloop, he cried, "O crow cock!" "O crow cock!" Less glamourous, but more likely, the name changed because of speech variations.

Even if Blackbeard did not christen Ocracoke with its name, he did fire its history to a dazzling start. Blackbeard, more correctly Edward Drummond, used North Carolina as the base for his pirating operations prior to 1718. His favorite refuge? Ocracoke.

But Virginia's royal governor, tired of Blackbeard's embargo on Chesapeake trade, sent two sloops to stop him. Finding the pirate at

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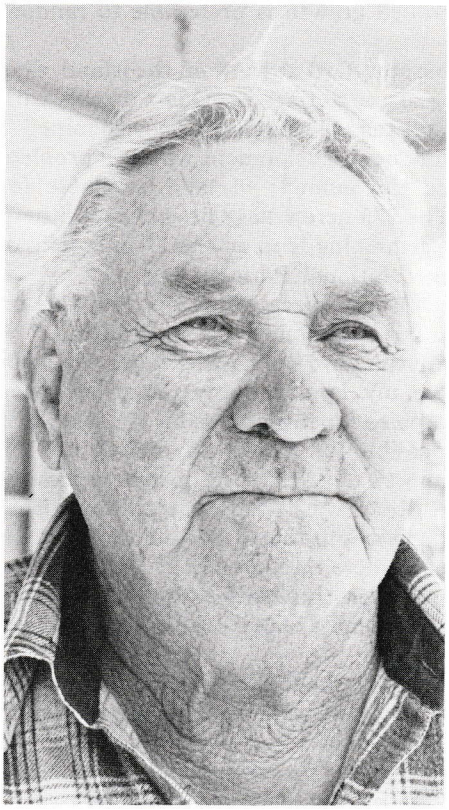
Photo by Kathy Hart



Chris Gaskill

Ocracoke, the sloops attacked. During the ensuing fight, Blackbeard received 25 wounds before dying. His head, severed from his body, was hung from the ship's bowsprit, and his body thrown overboard, where legend says it swam around the sloop seven times before sinking.

In Blackbeard's day Ocracoke stretched to a length of eight miles. During the 1700s it joined Hatteras Island for a union that was ended by an 1846 hurricane. From the breakup Ocracoke would gain eight additional miles of soil.

In 1715, the Colonial Assembly recognized a settlement of ships' pilots on the island and later appointed the settlement a town. The pilots guided ships through Ocracoke Inlet, making it the primary trade entrance for North Carolina. During the Revolutionary War the pilots helped patriots channel needed supply ships through the passage.

After the war two entrepreneurs bought a small nearby island—a massive bed of oyster shells—that stood adjacent to the channel leading from Ocracoke Inlet to the sound. The men used the island, named Shell Castle, to offload supplies from seafaring vessels to smaller craft for shipment inland.

Between 1798 and 1803, Congress authorized the construction of a 55-foot, wooden-frame beacon on Shell Castle Island. It stood for about 15 years before it burned down.

To replace the Shell Castle beacon, Congress appropriated a new lighthouse on Ocracoke Island. Built at a cost of $11,359.35 in 1823, the Ocracoke Lighthouse stood 75 feet tall and included a one-bedroom keeper's quarters. The tower, which still cautions mariners today, is the second oldest operating lighthouse in the United States.

Even a lighthouse could not save all ships from the storms and shoals. About 40 vessels were reported lost near Ocracoke's shores. But many crew members were rescued by the heroic efforts of the villagers.

What the sea so readily took from these seafaring schooners, it often returned to its island neighbors. Ocracokers found the cargoes—lumber, shoes and china—washed ashore or available for easy pickings in the surf. Elizabeth Howard, a 75-year-old native, says her house was constructed from the lumber carried by the *Noamis*.

Christopher "Chris" Gaskill, another Ocracoke native, recalls a vessel known as "the banana boat." The ship, laden with hundreds of bunches of green bananas, ran aground. "They wanted to lighten up the ship to pull her off so they gave us all the bananas we wanted," Gaskill says. "I must've taken 200 to 300 bunches. I carried 'em to Washington and sold about 100 for 50 cents a bunch to a wholesaler." Older residents like Gaskill and Howard still shake their heads over the banana boat because of the island-wide sickness that occurred after villagers gorged on green bananas.

For Gaskill, another story of wreckage carried a special message. On a March morning in 1941, Gaskill was driving along the beach. He spotted some wreckage—not unusual for Ocracoke. But something drew Gaskill to take a closer look. He found the wreckage to be the door from a pilothouse. On the back of the door was the master's license of his cousin, James Gaskill. The freighter his cousin captained had been torpedoed by the Germans offshore.

A board bearing the freighter's name, *Carib Sea*, also washed up in front of the young man's Ocracoke home that day, Gaskill says. Several weeks later, the family was officially notified of James Gaskill's death. The sea delivered its message faster.

German torpedoes also sunk the *HMS Bedfordshire*, a British trawler, off of Ocracoke in 1942. Gaskill found one of the four bodies that

Photo by Clay Nolen

The lighthouse stands guard over an island steeped in tradition

washed ashore. The villagers, knowing of no way to transport the bodies back to Britain, buried the men in a small cemetery on Ocracoke, Gaskill says. In 1976 North Carolina leased the cemetery to Great Britain, and today it is a famous landmark on the island.

Every coastal village has a story about the "worst hurricane," and Ocracoke is no exception. Howard and Gaskill say the worst storm of their lifetimes came in 1944, the hurricane Howard calls "The Great Atlantic." "I was shelling shrimp when I noticed the water coming in the yard," she says. "It kept coming and coming. Finally the sound and the sea met. There was 12 inches of water in this house. Fish washed into some houses and trawlers were pushed onto land."

Howard's recommendation for weathering a hurricane, "go to bed and sleep. I haven't ever worried about a hurricane."

But if hurricanes didn't stir excitement among the natives, some of the island's famous visitors did. Ernest Hemingway was said to have visited Ocracoke. And Charles Lindbergh made an overnight stay. "My father cooked dinner for Lindbergh," Gaskill says. "His plane lit down. He said he had been flying right much that day and was wondering if he could spend the night." And Gaskill himself met Lady Bird Johnson, whose visit to Ocracoke was such a well-kept secret that Gaskill had to produce a photograph to prove to his wife he had indeed luncheoned with the first lady.

But the famous and not-so-famous have long sought Ocracoke's quiet shores, Howard says. She remembers tourists arriving by steamer from Washington and New Bern. But then, "They stayed all summer," she says. With the tourists came night after night of dances at the Pamlico Inn and blocks of ice cream on Sunday.

Then, sheep, cows, ponies and hogs ran wild on the island; there was no sheriff; and you could walk across the entrance to Silver Lake (then called Cockle Creek) with your pants legs rolled up, Gaskill says. "Things have changed plenty—too much," he says.

—Kathy Hart

School days on Ocracoke

Ocracoke School has no football team, no cafeteria and no school bus. What it does have is 93 students in kindergarten to 12th grade, a school newspaper that reaches beyond the island to over 40 states and the support of all 650 or so of the island's permanent residents.

It's a unique school. A handful of teachers instruct students at 13 levels of education. Brothers and sisters sit side-by-side in classrooms. And every student, from the kindergartener to the twelfth grader, gets a vote in choosing this school's homecoming queen.

Most of the island natives attended the school. For the first quarter of the century, the school housed only eight grades. For more education, students were sent to a boarding school in Washington. But in 1931, Ocracoke School graduated its first senior class.

Principal Ernest Cutler says the school's size fluctuates. When he came to the school nine years ago, 82 children studied there. Then the number gradually rose to 121. But lately it has dropped again.

Cutler says three of this year's eight graduating seniors have spent all of their schooling years here. "In a school this small you learn the students' weaknesses and they learn mine," he says. Although he can't offer students a wide selection of electives, he says the school does offer a lot of personal attention.

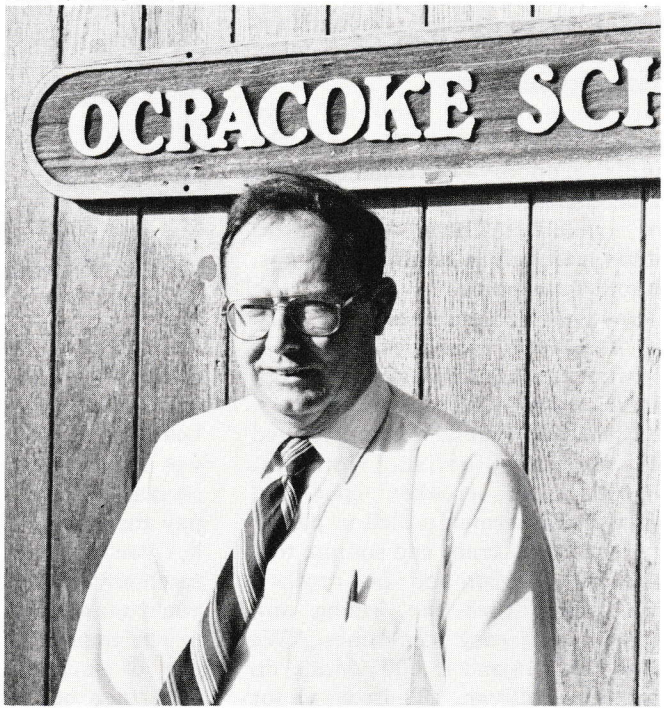
Each year a driving teacher comes to the school to provide one month of classroom instruction and practical road experience. He allows each student to make a trip to Manteo, where they will encounter stop lights and turn lanes for the first time. And, of course, they learn the all-important practice of boarding a ferry.

Athletics take on a different focus on Ocracoke. There are not enough boys in the high school to field a football team. Consequently Ocracoke "is a basketball town," says Kevin Cutler, the principal's son and a graduate of the school.

But even basketball presents problems. Only a few other schools will travel to the island to play. To provide additional opposition, local men and women form teams to play the high schoolers, Kevin says. And it's during the height of basketball season, not football season, when the Ocracoke School selects its homecoming queen.

Ernest Cutler says most of the graduating seniors stay on the island or, if they do go away, they eventually come back. His son puts it like this: "Once you've lived here for any length of time you can't get it out of your system. In your mind you always want to go back to Ocracoke."

Photo by Kathy Hart



Ernest Cutler

A heritage founded on fishing

There's not much Charlie Williams likes more than putting his nets off Ocracoke Island—unless it's talking about it. Charlie, 71, and his brother James, 76, have been fishing and guiding around those parts for most of their lives. It's a way of life for them and a heritage they want to keep.

"I tell everybody today that I am a fisherman," says Charlie. "I'm proud to tell it... that I'm a commercial fisherman. What I've got now, I've got because I was a fisherman."

People like Charlie and James preserve the traditions of hard work and good fishing in the quaint village off North Carolina's Outer Banks. For centuries, the sun and sea have directed the lives of Ocracokers, providing food for the table and money for their pockets. Unlike trade and tourism, fishing persisted through the years, tying together the past and present like a strong piece of rope.

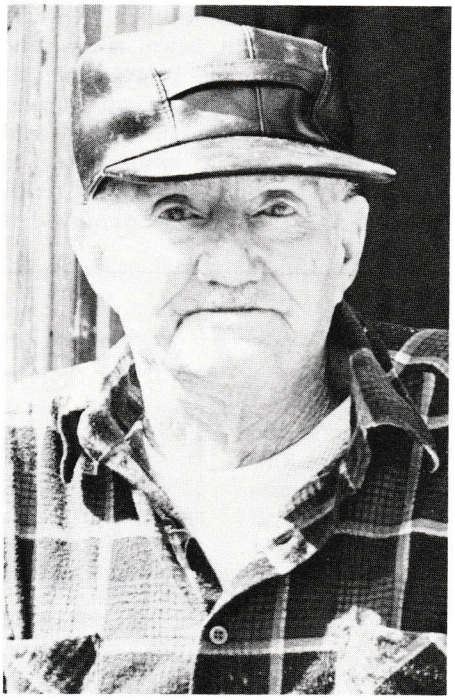
"It was a way of survival," says Charlie. Until World War II, the island's economy centered around commercial fishing. Few other jobs were available. There were no industries and only a handful of shops, inns and restaurants.

Ocracoke's size and location proved to be assets for the fisheries. Because it was out of the way, few outsiders dropped their nets in surrounding waters. The ocean and Pamlico Sound teemed with mullet, bluefish, flounder, mackerel, trout, croaker, spot and other fish. Fishermen pulled in plenty of oysters, clams, crabs and shrimp, too.

Sullivan Garrish and his brother, Uriah, admit that the fishing and bragging came easy sometimes. "We used to catch 14 and 15,000 pounds" in a day, says Sullivan. "There was a lot of times when we couldn't bring them all in in our boats." He recalls one trip in particular when they had to get another boat's crew to help them pull 10,000 pounds of bluefish out of their gill net.

The old-timers agree commercial fishing is not easy work. Sullivan said he and Uriah were out before sunrise every morning, weather permitting, from May to October. After netting all the fish they could catch, the crew took several hours to cull, clean, salt and pack the fish in barrels for shipping. Not much fresh fish was sent from the island then. And occasionally instead of shipping their catch, the islanders would swap the fish for a load of vegetables from the mainland.

Photo by Sarah Friday



Sullivan Garrish

"We had to catch a lot of fish then to make any money," says Sullivan. Now and then, they'd come to shore with a boatload of fish, only to discover there was no market. "Me and Uriah ... several times we didn't make enough to pay the fuel bill." But, "You can't let it lick you. Sometimes we'd go out and not catch anything. Next thing you'd know, you'd make a hit."

The unpredictability of catches was one of several factors forcing most fishermen out of the industry in the 1960s and 1970s. Fish houses closed. And the lack of profit forced the young islanders to look elsewhere for employment.

Wayne Teeter, 40, was one of those young people. "No young ones were getting in it. It was the thing not to do." At 17, Teeter knew if he wanted a job he'd have to leave the island. He enlisted in the Coast Guard for 10 years.

Ocracokers who once turned to the sea for employment began working in the island's growing tourist industry. Today the small village opens its doors to thousands of visitors from around the world. To accommodate them, gift shops, motels, restaurants, water sport rentals, park and ferry services keep the locals busy most of the year.

"Right now when you speak of the economy of the Outer Banks, it's tourism," says one fisherman. "There's still some commercial fishing, but not like the old days."

The opening of a new fish house, South Point Fish and Crab Co., in 1976 is credited for reviving Ocracoke's fishing industry and the job market. About 120 people fish commercially now, says Teeter, but less than a fourth of them work full-time.

"You can still whack a living out of it," says Teeter, who took up fishing part-time after returning to the island. Most of the commercial fishermen crab now because it brings more money—30 cents a pound. A thousand pounds is a good day's catch. But to be a successful commercial fisherman these days, "You've got to do different things different times of the year," says one fisherman. In the winter, trout and croaker are good catches, and in the summer, crabs, clams and flounder sell well.

"You can make as much as you want," says full-timer Tom Leonard. Financially, the fisheries are better off than in years past. What you pocket depends on how much time and effort you want to put into it, he says.

Freedom is one of the reasons Teeter continues to fish commercially. "There's nobody to bother you when you're doing it." He also fishes because it's something he knows. He taught himself the art, getting a few tips from his grandfather. For Teeter and many other Ocracoke fishermen, the traditions tied to fishing are as much a part of their lives as fish stew and cornmeal dumplings.

"Fishing hasn't changed a lot here with the Ocracoke fishermen," says Charlie Williams. Certain things draw the young ones to the sea, just like it has the old. "It's just like something with a string on you," he says. "You just have that urge to be out on the water."

—Sarah Friday

THE BACK PAGE

"The Back Page" is an update on Sea Grant activities — on research, marine education and advisory services. It's also a good place to find out about meetings, workshops and new publications. For more information on any of the projects described, contact the Sea Grant offices in Raleigh (919/737-2454). For copies of publications, write UNC Sea Grant, NCSU, Box 8605, Raleigh, N.C. 27695-8605.

The North Carolina Maritime Museum in Beaufort opened the hatches of its new home and set sail May 18. The all-wooden building, which cost $1.5 million, will be a showcase for the museum's displays of maritime and coastal natural history.

With 18,000 square feet, the new facility on Front Street has four times the space of the old museum. There's an auditorium now, and more exhibit and storage space, says Charles McNeill, museum curator. Larger exhibits will be displayed, such as a 15-foot scale model of a fully-rigged menhaden boat, typical of those once found at Beaufort's docks.

The new building is a "culmination of a lot of dreaming," says McNeill. "We don't expect to change things that much in terms of the scope of the museum. It's still going to be about 50-50 natural history - maritime history. We'd like to keep it that way."

This unique blend of history enables the museum to offer exhibits and field programs that interpret numerous themes. Present displays include marine artifacts, ship models, photographs, sea- and shore-bird mounts, shells and marine fossils. Field trips and special programs take visitors to coastal habitats such as salt marshes, tidal flats and rock jetties.

The museum is open year-round, seven days a week. Hours are: weekdays, 9 a.m. to 5 p.m.; Saturday, 10 a.m. to 5 p.m. and Sunday, 2 p.m. to 4:30 p.m.

For more information about the museum and its programs, write N. C. Maritime Museum, 315 Front St., Beaufort, N.C. 28516.

Can a breakwater withstand the forces of nature—high winds and strong currents? That's what Spencer Rogers, UNC Sea Grant's coastal engineering specialist, will find out when he constructs a 48-foot breakwater along the sound at the N.C. Marine Resources Center in Manteo.

The project, which will be supported by the Sea Grant Marine Advisory Service, will test a wooden breakwater's ability to endure severe estuarine conditions. Rogers will build the breakwater, using the best design available, then let Mother Nature go to work.

Watch the Back Page to see how the breakwater fares. If successful, the breakwater will become a public demonstration site. Homeowners and builders can see firsthand what materials and methods were used.

If mosquitoes bug you in the summer, you may want to build a bird house for purple martins in your backyard. The migratory songbird has long been known for its ability to devour insects, especially mosquitoes.

Purple martins flock to North Carolina from South America during the warmer months. They make their homes throughout the state, including at the coast and on the barrier islands where mosquitoes are numerous, says James Parnell, a biologist at the University of North Carolina at Wilmington.

Since purple martins nest in small colonies, multi-compartment houses or hanging gourds make suitable homes. But the N.C. Wildlife Resources Commission has another idea. An 8-foot piece of PVC (polyvinyl chloride) pipe can be made into an attractive, durable home for 10 to 12 pairs of purple martins at a reasonable cost.

To construct such a bird house, divide the 6-inch diameter PVC pipe into sections by inserting round wooden discs at 6-inch intervals. Drill a 2-inch-wide entrance hole into each compartment, attach perches (small pipes or dowels) and cap the top end of the pipe. All materials can be purchased for about $30.

For complete plans of the PVC pipe house for purple martins, write the Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

If you want to take an underwater view of the latest shrimp trawling systems and techniques, call your local marine advisory agent. He can arrange a viewing of a film on shrimp trawls. Produced by marine advisory services from the southeast, in cooperation with the National Marine Fisheries Service, the film provides shrimpers with information that will help them decide which system is best for their operation.

The film shows how trawl and door designs and shrimping techniques have changed since 1958. It also describes common rigging adjustments and how they affect trawl performance and how gear selection and fishing techniques affect fuel efficiency.

If you would like to see the film, contact your local Sea Grant agent to make the arrangements (northern coast: Wayne Wescott, 919/473-3937; central coast: Bob Hines, 919/247-4007; and southern coast: Jim Bahen, 919/458-5498).

Jim Murray, director of Sea Grant's Marine Advisory Service, has been elected president of the N.C. Wreck Divers' Association. In addition to its goal of education about diving safety, the organization holds monthly meetings, publishes a monthly news-

Continued on next page

letter and entitles members to reduced rates on diving trips.

Membership is open to anyone in the state, but most of the approximately 75 members are Research Triangle area residents. The fee is $15 per year. For information about joining the Wreck Divers' Association, write Murray at Sea Grant, Box 8605, NCSU, Raleigh, N.C. 27695-8605, or call 919/737-2454.

Shape up for summer with seafood. Joyce Taylor, Sea Grant's seafood agent at the NCSU Seafood Laboratory in Morehead City, reports that seafood is not only high in protein, vitamins and minerals; it's also low in calories, fat and cholesterol.

For example, an average portion of fish generally provides about half the recommended daily allowance of protein for adults. And shrimp contains about 20 percent protein—more than in hamburger, sirloin steak or pork.

The percentage of fat and calories found in most fish is low when compared to other meats. A 3½-ounce hamburger contains about 21 percent fat and 268 calories. The same portion of some fish may contain less than a percent of fat and only about 75 calories. (Values will differ for each species of fish.)

Compared to other protein sources, fish contain small amounts of cholesterol and the saturated fats that have been linked to heart disease, says Taylor. Most fish contain healthy concentrations of trace elements, minerals and amino acids.

The N. C. National Estuarine Sanctuary is accepting proposals for federally funded research in the four components of the state's sanctuary system—Zeke's Island, Rachel Carson (Carrot Island, Bird Shoals), Currituck Banks and Masonboro Island. Awards will be made to projects that enhance scientific understanding of sanctuary ecosystems and provide information for coastal management decision makers.

All proposals must be received by June 15. For a copy of the guidelines and the necessary forms, write: Sanctuary Analyst, N.C. National Estuarine Sanctuary, Division of Natural Resources and Community Development, Coastal Management, Raleigh, N.C. 27611-7687.

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