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A PUBLICATION OF THE NORTH CAROLINA MARITIME HISTORY COUNCIL

Tributaries

OCTOBER 1992

VOLUME 2, No. 1



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About the Maritime History Council

THE NORTH CAROLINA MARITIME HISTORY COUNCIL came together in 1988 when a group of individuals professionally involved in maritime history programs began meeting informally to share information and to discuss issues of mutual concern.

Aware that the sheer size of the state's coastal area, increasingly rapid development, and the variety of coastal waters have tended to fragment efforts to preserve the state's maritime history, the group began to explore ways to pool the resources of disparate state and federal agencies.

The North Carolina Maritime History Council was incorporated in 1990 with the mission to:

identify and encourage historical and educational projects that have as their purpose the enhancement and preservation of the state's maritime history and culture, and that create public awareness of that heritage.

The council views this heritage in broad perspective, noting that its influence extends to the heads of navigation of the state's rivers.

Among its recent accomplishments is the purchase of the Edwin Champney drawings, a collection of fifty-nine sketches of coastal scenes from the Civil War period that were obtained by the Council in 1990 using funds donated by the Frank Stick Trust and other non-profit groups. They are now part of the permanent collections of the North Carolina Division of Archives and History and are administered by The Outer Banks History Center. The drawings are available for exhibit to accredited museums throughout the state.

Council membership is limited to non-profit organizations and institutions directly involved in the study and teaching of the state's maritime culture and to selected individuals recognized for outstanding contributions in the field.

Rodney Barfield



Turpentine distillery.



**J.L. Autry's distillery,
Sampson County, 1889.**

Turpentine on the Move

..... by Lawrence S. Earley

WITH THE DISTILLERY CAP REMOVED, the men bent over the opening and stirred the rosin in the kettle below. They were dressed in nineteenth-century period clothing, yet I could barely see their figures through the billowing mists of steam. The smell of turpentine was in the air and so was turpentine itself, for the steam had crisped my bare arms with a thin layer that I could feel as I moved about.

Several hours before, interpreter Buster Cole had explained to us what we were going to see. "I'm going to give you a demonstration of turpentine stilling," he said and then added quickly, "It's a lost art." That was an understatement. It was the first time I had ever seen turpentine distilled, and I'm sure it was the first time for most of the 100 or more onlookers watching with me in Tifton, Georgia, where the Georgia Agrirama fires up its backwoods distillery once a year. Yet until the early twentieth century, turpentin- ing was about as common in the pine forests of the Southeast Coastal Plain as pumping gas at a service station is today. Then the great piney woods bustled with men who bled the longleaf pines of their gum and trundled it to a distillery very much like the one I was viewing. From there the distilled turpentine was rafted in barrels to ports like Wilmington or Savannah where it was loaded onto ships bound for Paris, Antwerp, London and other world centers.

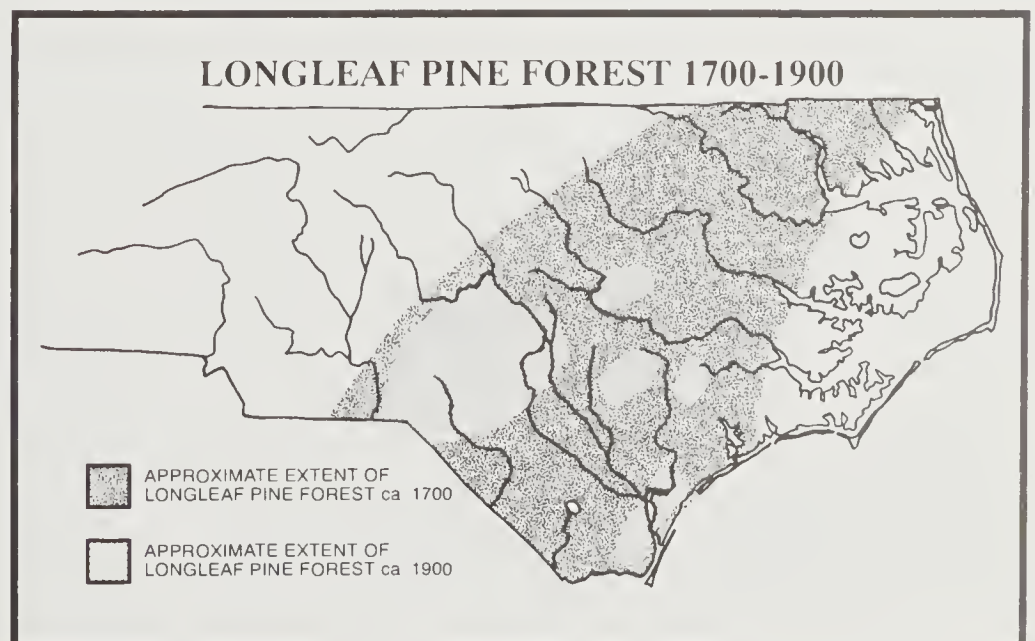
Yet by the late twentieth century, the powerful naval stores industry, once of such vital economic importance to the South and especially to North Carolina, had become a historical curiosity, if anyone was curious about it at all. Lost art, indeed.

FOR THOUSANDS OF YEARS, THE MAKING OF naval stores was considered less of an art form and more of an economic necessity. These

products — chiefly tar, pitch, spirits of turpentine and rosin — were the glue that held the great wooden ships of the world together. Carrying their tar buckets with them, sailors — called *tars* for good reason — climbed the masts and daubed the sticky stuff over the standing rigging to preserve it from corrosive salt air. Boat builders used pitch to caulk seams between planks and turpentine to thin their paint. Bottoms of small vessels were often tarred to prevent damage from shipworms.

In time these products lost their association with the maritime trade, especially as the day of the wooden ship ended. But by the mid-nineteenth century, naval stores were assuming a more diverse role as the "petrochemicals" of their day. Farmers used tar as axle grease. Applied to fence posts, tar was a preservative; added to tree trunks, tar protected them from insects. Turpentine thinned paints and varnishes; it cleansed cuts and preserved wood and leather goods. It was burned in lamps as an illuminant and administered to barnyard animals both internally and externally. Rosin, a by-product of the distillation process, had many uses, such as in soaps and candles, as a waterproofing for boots, as an ingredient in printing inks and shoe polish.

**"...turpentin-
ing was
about as
common...
as pumping
gas at a
service
station is
today."**



As a paper sizing it enabled paper to accept ink. And farmers knew that if you added a bit of rosin to a vat of boiling water during hog-killing time, it would coat the skin of the animal and make it easier to remove its hair. Powdered rosin in a bag has been long used on the mound by baseball pitchers to combat sweaty palms, and ballerinas still rosin the toes of their shoes to prevent slipping.¹

The source of these excellent products was the great pine forests that grew throughout the southeastern coastal plain and that were dominated by a single species—the longleaf pine tree (*Pinus palustris*). Mile upon mile of these pines spread from southeastern Virginia to eastern Texas, perhaps as much as ninety million acres at the time of settlement. The forests were vast, the growing season was long and the trees were rich in the resinous gum that produced naval stores. No wonder the North Carolinians soon after settlement began to exploit the riches that lay within their forests.

Early on, tar and pitch were the products of chief commercial importance. They were easy to produce. Tar makers cut dead trees into short lengths and piled them into a pit. The mound of wood could rise as much as thirteen or fourteen feet high. Dirt and grasses covered the tar kiln so that once lit the fire burned slowly over the course of nine or ten days. During that time, tar would sweat out of the logs and flow to barrels a short distance away by means of a wooden pipe or other conveyance laid at the bottom of the pit. A cord of wood burned in one of these kilns might produce a barrel of tar. Pitch was a concentrated form of tar produced by boiling it in a kettle.

Spirits of turpentine and rosin, on the other hand, came from the living longleaf pine tree and were more difficult to produce than tar or pitch. Beginning in March and running through October, men roamed the forest chipping three-quarter-inch deep streaks into the tree with special tools called *hacks*. These cuts caused a gummy resin to run from the wounds and collect in a hole, called a *box*, chopped into the living tree. The *chippers* hacked a fresh streak above the box every week, each one angled so the gum would run into the box. As the streaks grew in number, one atop the other, they created what was called a *face*. Each face extended about two feet above the box each year. Once every week or two, a worker dipped the gum from the boxes and collected it in a barrel. Eventually the barrel of gum or crude turpentine would be taken to the turpentine distillery where the spirits of turpentine and the rosin were made.

Of all the jobs involved in turpentine, distilling required the most skill. Careless distilling often caused stills to blow up or burn down, endangering life and property. Stillers created spirits of turpentine and the by-product rosin by pouring the barrels of raw gum into a large kettle and

heating it over a fire, much as alcohol is distilled. The vaporized gum passed through the copper cap of the still and into the worm or coil in an adjacent water tub where it cooled and condensed into a liquid consisting of turpentine and water. The lighter turpentine was easily separated from the water by means of a series of separator barrels. After all the turpentine had been separated into barrels, the stiller discharged the rosin into long, flat trays. Rosin, the residue left over in the kettle after distillation, hardened after about forty-eight hours.

For over a century, North Carolina's tar and pitch exports greatly outnumbered its exports of turpentine and rosin. But as the nineteenth century progressed, the demand grew for turpentine and rosin, and North Carolina's turpentiners were in a position to supply the market. One reason was that in 1834, Scottish liquor makers had introduced the copper still to the state's piney woods. This meant that gum didn't have to be shipped north or abroad to England to be distilled. Using the new technology, naval stores operators built distilleries just about anywhere in the piney woods. By 1850, hundreds of distilleries were operating in North Carolina, most of them along rivers and

streams with access to Wilmington, the greatest naval stores port of its day. By 1860, North Carolina was producing ninety-seven percent of the United States' naval stores.²

This level of activity was easy to see in the pine forests of the East. Travelers in North Carolina had often remarked on the making of tar and pitch and other naval stores activities in the piney woods, and in the nineteenth-century were often amazed by the pervasiveness of turpentine and the marks it left on the forest. One traveler in Sampson County in 1854 was haunted by the turpented faces on the trees he passed: "[Pines] show their white faces around you on every side a great way up, and at night as you ride along they look for all the world like a great army of spectres ready to pounce upon you at every step and bear you away." In 1865, riding from Raleigh to Fayetteville, another traveler found himself immersed in a vast turpentine forest: "Almost the only large tree to be seen was the long-leaved pine, and of these nearly every one was disfigured by the axe."³

BUSTER COLE HELD HIS HEAD CLOSE TO THE WATER TUB and listened. He was "sounding the still," he said, a critical process for the old-time stillers when there were no temperature gauges and he had to know how hot the fire was burning. He did it by listening to the sound the fire made as it resonated through the water tub. A roar probably meant the gum was boiling and that the turpentine and rosin were in danger of being spoiled. Water was added to dampen the

**"The forests
were rich in the
resinous gum
that produced
naval stores."**

blaze. A lower-pitched sound might mean the fire needed to be hotter.

As I watched the stiller move back and forth between the tub and the fire, it was easy to see the amount of skill and knowledge involved in the process. Indeed, the entire industry had adopted procedures that were more or less standard by mid-century, whether or not they were followed. According to the task system of organizing slave labor, some slaves did nothing but box trees, others chipped them, still others dipped the gum. Workers were instructed to follow certain methods of doing each task—a box had to be cornered precisely, a groove was cut to a specific depth. Coopers made barrels and mule drivers transported barrels to the rivers. Distillers poured the gum into the kettle in a certain way, sounded the still in another way. There was a method in the way they stirred the rosin, the way they drew it out and filled the barrels with the rich brown liquid.

Indeed, distillery architecture seemed to have been standardized as well. In photographs taken in Sampson County, North Carolina, in 1890, the features of distilleries were virtually identical with those of the distillery in Tifton, Georgia. Surely there were local or regional variations, but in the main, turpentiners in North Carolina seemed to make turpentine in the same way and with the same tools as turpentiners in Georgia and other southern states.

There was good reason: in many cases the producers in these states were North Carolinians. During North Carolina's boom years in the 1840s and 1850s, some forward-thinking turpentine operators had begun to buy land in the virgin forests of Georgia and Alabama. In the years after the Civil War, the trickle of North Carolinians southward became a wave as turpentine operators and their skilled labor began to abandon the state. They had seen the writing on the wall: North Carolina's "inexhaustible" forests were playing out. Census records from South Georgia between 1890 and 1900 show many people who were born in North and South Carolina and identified themselves as a chipper, dipper, distiller, or other occupations of the turpentine trade. The geographical transformation of the industry can be captured in two statistics: in 1840, North Carolina was responsible for ninety-six percent of the naval stores produced in the United

States, and Wilmington was the chief port for exports. By 1880, Savannah was the chief naval stores port, and Georgia had replaced North Carolina as the country's naval stores leader.⁴

Until then, turpentine was an industry that had been especially associated with North Carolinians in the minds of many contemporaries, as is only partially indicated by their immortal sobriquet, Tar Heels. As early as 1846, for example, the *Southern Cultivator* was advising those who were thinking of starting up turpentine operations in other states to hire North Carolinians to oversee the work: "[If] you have any idea of going into the business [of turpentine production], you had better employ a young man from North Carolina to superintend for you the first year." And even as late as 1890, naval stores operators in the Deep South were traveling to North Carolina to find skilled labor for their orchards.⁵

Yet, the techniques of turpentine that North Carolina producers passed on were some of the most destructive and wasteful methods of the day.

Why was turpentine so wasteful? The main problem was the boxing method by which the gum was collected in cavities cut into the living tree. Boxing remained the primary method of collecting the gum for at least 200 years despite its enormous waste. As the chippers added streak after streak and the faces climbed higher on the tree, much of the sticky resin congealed on the tree and never reached the box. The first year's gum, called *virgin dip*, was always the most valuable; it made the most turpentine and the lightest-colored rosin because it had less distance to go to the box and thus was less

exposed to the air. The second year's gum was called *yellow dip*, and produced a lower-quality turpentine and darker rosin; and the third year's gum, and that produced in all subsequent years, was called *scrape*, for obvious reasons. It made an inferior turpentine and rosin. Many long-dead pines in North Carolina today have been boxed as many as four or five times and have faces that rise fifteen to twenty feet high. Much of the turpentine and rosin produced from these trees, at least in their later years, must have brought a very low return.



“...the long-leaved pine...and of these nearly every one was disfigured by the axe.”

Boxing also weakened the tree, especially if multiple boxes were cut into it. And with so much flammable gum congealed on the tree, the forests, though adapted to low-intensity fires, were often engulfed in destructive conflagrations.

Despite the evidence that such methods were destructive, producers found little incentive to develop more conservative methods. Forest lands were cheap and plentiful, at least for a while.

Increasingly in the nineteenth century, the critics pointed out the wastefulness of the boxing method, but it wasn't until 1901 that Charles Herty found a workable alternative. He showed that by placing a clay cup (eventually a metal cup) at the bottom of the face and hiking it up each year, most of the gum flowed into the cup instead of congealing on the tree. The quality of the turpentine improved and the tree was healthier. It wasn't until years later and after much persuasion by foresters that producers began to adopt the new methods. It was a little late in the game.⁶

By then, turpentiners had been hopscotching from site to site throughout the Southeast, from the Carolinas to Georgia, then into Alabama and Florida, Mississippi, Louisiana and Texas. Characteristically they leased land rather than buying it and moved on after a few years of intense turpentine. They were succeeded by loggers who felled the forest. It was a tandem that contributed to the decline of the longleaf pine forest in just a few decades.

The complaints about the boxing method grew in volume by the end of the century. Local citizens in Georgia watched in horror as the turpentiners moved into their precincts and began to scar the trees in their forests. Complained the editor of the *Savannah Morning News* in 1881: "We are informed that much of the land on which the turpentine orchards are located is leased on short terms, that the owners are anxious to obtain ready cash, sell the privilege for a small sum to the turpentine gatherers, who after boxing the trees for a year or two, abandon them for other fields. Under such a system the naval stores trade in this section will be a thing of the past, and millions of dollars of the

products of our fine forest will be lost to our people." He called for a "more economical system."⁷

This plea and others like it fell on deaf ears. For over 150 years, North Carolina had led the nation in naval stores production, followed by Georgia in 1880. But in only twenty-five years, Florida had become the new leader, and by the 1920s the last virgin forests had been turpentine and logged. That is how fast the forests were being exploited.

In 1902, the governor of Florida spoke at the Turpentine Operators' Association meeting in Florida. He began by



Removing the cup to collect the resin.

painting a picture of the longleaf pine forest that he and many others had known just a few years earlier. "I recall mile upon mile of lofty pine stretching away on all sides, standing like lofty brown columns, supporting arches of living green, through which the breezes, as they passed, made sweet music . . ." The operators must have shifted uneasily in their seats as the governor described what had happened to that idyllic landscape: "The hand of desecration rests heavily on the bosom of the earth, blackened stumps alone pathetically tell of the monarchs that once made the land beautiful and valuable, and I am told that the ancient order of turpentine men wrought all this desolation. . . . In the track of the naval stores and lumber men there are only blackened stumps to piti-

fully tell the story of the past, of a beautiful land left a ruin [by] ruthless, wasteful extravagance."

Governor Jennings was wrong in one respect. Turpentiners weren't the only agents of destruction afoot in the longleaf pine forests of the Southeast. Rooting by open-range hogs destroyed countless numbers of seedling longleaf pines, and the advent of steam technology meant that railroads could penetrate into hitherto untouched areas of the forest. In the twentieth century, perhaps the worst scourge the forest endured was U.S. Forest Service instructions to suppress fires in the piney woods under the misguided notion that fires were dangerous to the forests. In fact, the longleaf pine ecosystem is supremely adapted to fire and requires it for its very survival.⁸

Yet, without a doubt, turpentine and then logging had major effects, like those of so many exploitive industries of their day and ours. There was no thought to regeneration of the forest, and fire-suppression doctrines then in vogue stacked the deck against regeneration. As the supply of tur-

pentine and rosin sank, synthetic products began to offer serious competition. At the moment, only a handful of producers are left.

Like many other extractive industries, turpentiners never aspired to a level of production that could be sustained over time. Born in the needs of maritime occupations of another age, the story of turpentine foreshadowed many of the conservation issues of our own day. ❖

Lawrence S. Early is Associate Editor of Wildlife in North Carolina. He graduated from Holy Cross in Worcester, Massachusetts, and holds a Ph.D. from the University of North Carolina and has taught English at UNC and the University of Tunis, in Tunisia as a Fulbright Professor.

NOTES

1. Percival Perry, "The Naval Stores Industry in the Ante-Bellum South, 1789-1861" (Ph.D. dissertation., Duke University, 1947), pp.212-215 and 225.

2. Robert Boone Outland III. "Servants of the Turpentine Orchards": Laborers in the Southeastern North Carolina Naval Stores Industry, 1835-1860" (M.A. thesis, Appalachian State University, 1991), p. 23.

3. Percival Perry, "The Naval Stores Industry in the Old South, 1790-1860" (Paper reprinted by the School of Forest Resources, N.C. State University. North Carolina Forest History Series, [1967 ?]), p. 18; John Dennett. *The South as it Is: 1865-1866* (Athens: University of Georgia Press, 1965, 1982) p. 170.

4. Martha Green Hayes. "A General History of the Turpentine Industry, 1892 (Manuscript in the Georgia Agrirama Collection), p. 6.

5. Outland, "Servants of the Turpentine Orchards," p. 64; Hayes, "A General History . . ." p. 104.

6. Gerry Reed, "Saving the Naval Stores Industry: Charles Holmes Herty's Cup-and-Gutter Experiment," *Journal of Forest History* (October 1982), p. 170.

7. Hayes, "A General History of the Turpentine Industry," p. 9.

8. Cecil Frost, personal communication.

Note: General information on turpentine and naval stores production comes from a variety of primary and secondary sources, especially Thomas Gamble (ed.), *Naval Stores: History, Production, Distribution, and Consumption* (Savannah: Review Publishing and Printing Company, 1921). Percival Perry, "Naval Stores Industry in the Ante-Bellum South, 1789-1861" (Ph.D. dissertation, Duke University, 1947).

Illustrations provided by the North Carolina Division of Archives and History. ❖



A twentieth century turpentine operation.

A View of History:

Life in the Piney Woods

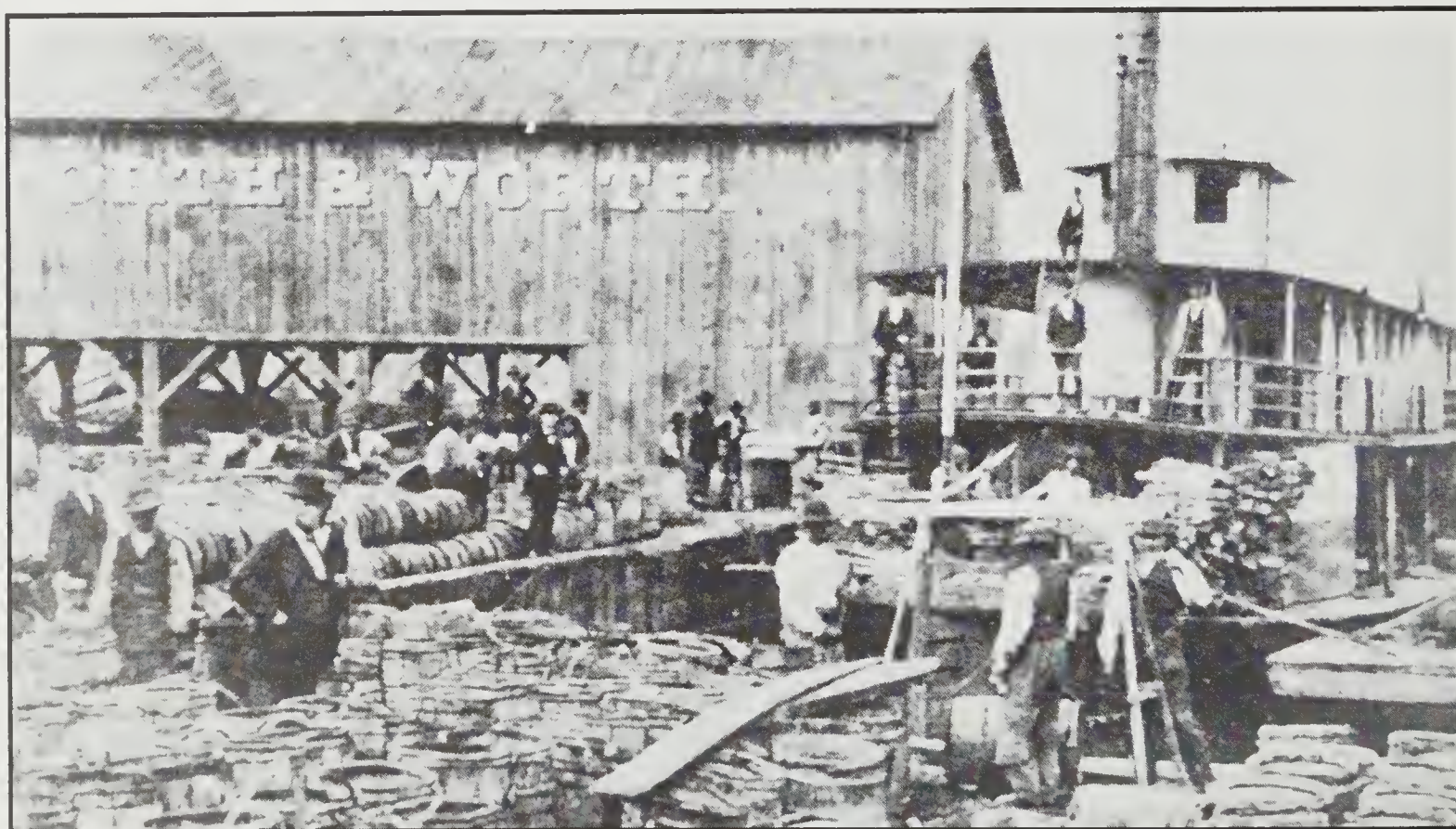
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**Illustrations
provided by
the N.C.
Division of
Archives &
History**



Barrels of turpentine for shipment, Cape Fear River.

Water Street,
Wilmington.





Still yard, H.B.
Culbreth & Bros.,
1889.



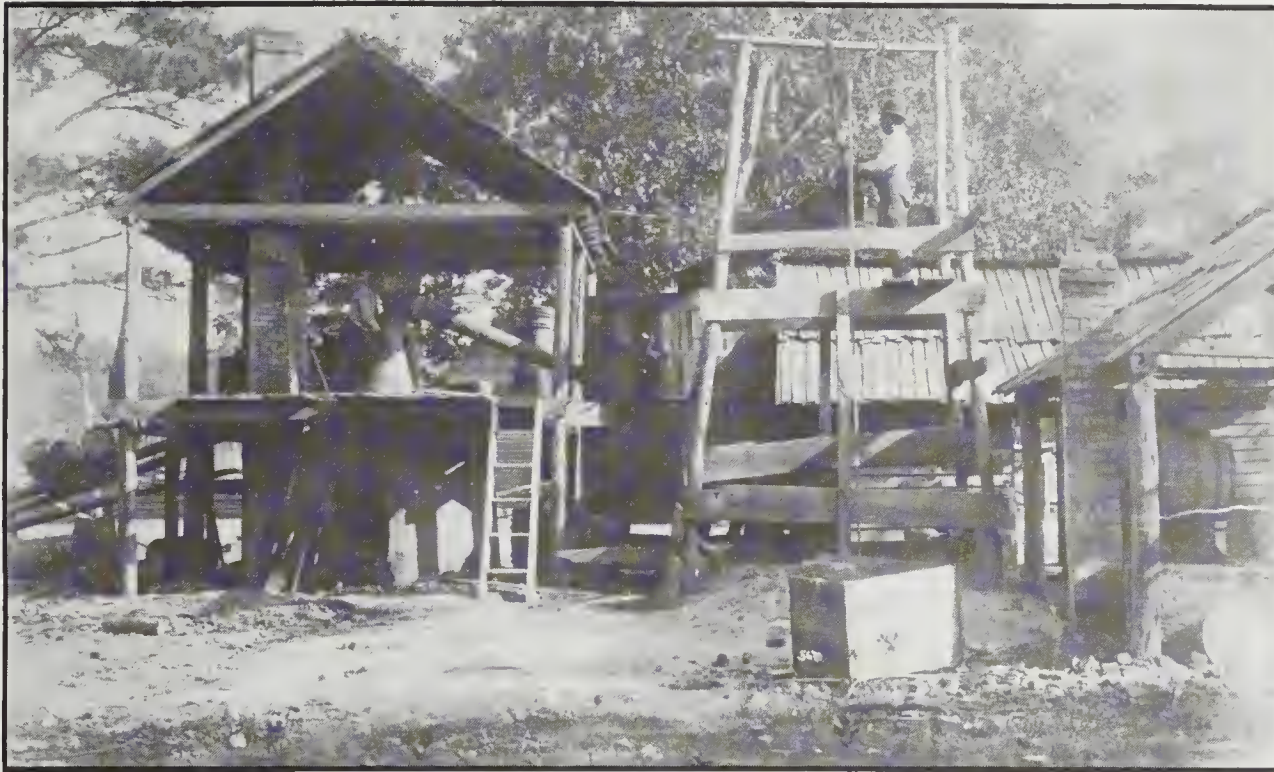
A TURPENTINE DISTILLERY, WILMINGTON, N. C.

**“Dipping” turpentine,
1890.**



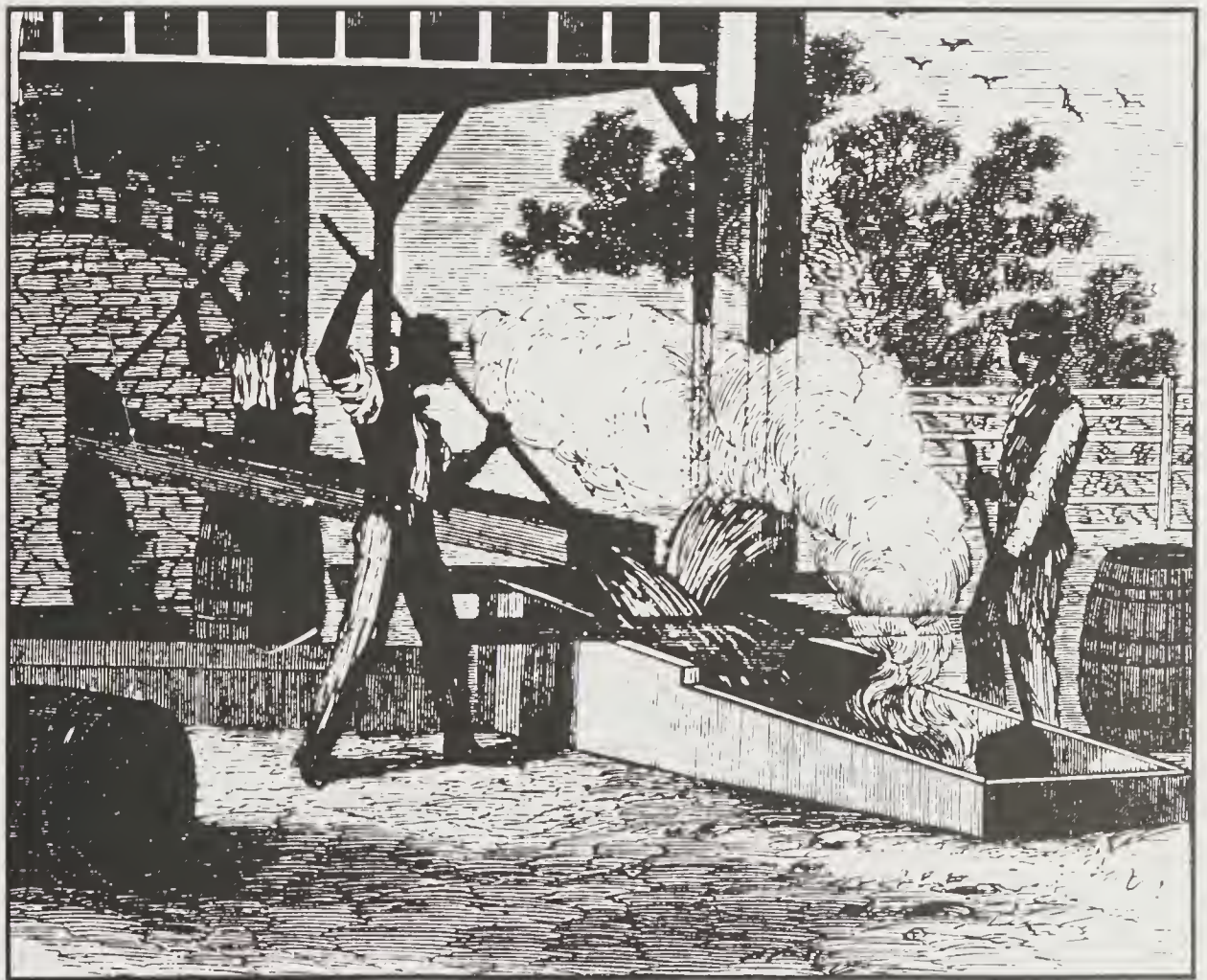
Six Runs Place, Sampson County.





J.R. Beamas' still,
Clinton, 1890.

Collecting turpentine.



Spanish Raids

on the coast of North Carolina 1741-1748

.....by William J. Green

IN 1739 ENGLAND'S TROUBLES WITH Spain boiled over in disputes regarding the boundary between Oglethorpe's Georgia and Spanish Florida, and British slave-trading rights that had been guaranteed by the Treaty of Utrecht twenty-six years earlier. British indignation rose in response to the Spanish treatment of her seamen on the high seas. On October 19, 1739, King George II declared war against Spain in a conflict known as the War of Jenkins' Ear. In time this would evolve into a larger conflict known as King George's War (or the War of Austrian Succession).¹

The Province of North Carolina was no stranger to conflict, having been through the war with the Tuscarora Indian nation a quarter-century earlier, but the danger posed by Spanish forces in the Caribbean and St. Augustine had not been properly addressed by the authorities. Little thought was given to defense, and, as Governor Gabriel Johnston told his Executive Council, there were "no forts in the country." Rather, in 1740, in a show of overconfidence and cooperative zeal, the North Carolina Assembly passed an act permitting its militia to go to the assistance of South Carolina and Virginia, and military planners considered how they might best strike the Spanish enemy. Meanwhile, the British government reacted by financing military expeditions in the early 1740s against the Spanish possessions of St. Augustine, Cartagena, and Cuba.²

Each expedition failed in turn. The British colonial contingent sent against Cartagena included four North Carolina companies of 100 men each.³ One company from the Cape Fear region returned from the disastrous expedition with a strength of only twenty-five men.⁴ The losses, and Spanish raids of the following year, sobered the offensive spirit of the Carolina government and people, and created an

atmosphere of concern leading eventually to alarm.

In 1741 the growing war developed a pattern that was to characterize it for the duration. While major battles were confined to the European continent and the waters around Europe and the West Indies, the American theater was the scene of lesser actions such as border skirmishes and the raiding of ports and shipping lanes in search of prizes and booty. The taking of a prize (capture of an enemy merchantman) was the activity of privateers carrying letters of marque from their sovereigns or colonial governors.

This activity was not limited to Britain's enemies; Governor Johnston was urged to issue letters of marque to North Carolina merchantmen.⁵ This legitimized form of piracy enriched the successful privateer and his government at the expense of the enemy, and was the accepted form of economic warfare in this age of colonization and mercantilism. So prolific was privateering by Britain, Spain and, after 1744, France, that the newspapers of Boston, Charleston, and other coastal cities regularly featured reports of captures and losses on the seas.⁶

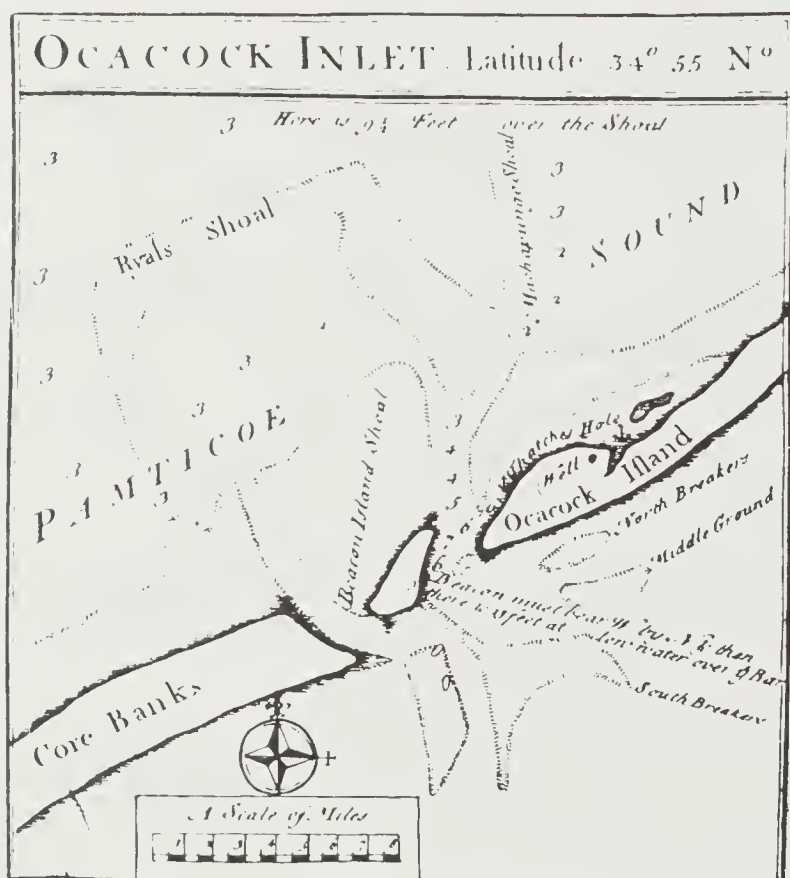
All of this had a very depressing effect on the colonies' commerce, for which purpose they were established and on which their livelihood depended. The shipping lanes between the American mainland and the West Indies saw the bulk of privateering by swift, shallow-draft ships designed for entry into the undeveloped channels and harbors of the New World. Half the tonnage of Cape Fear shipping was from the West Indies, and the Cape Fear's major export, naval stores, was highly prized by the Spanish.⁷ Well-placed enemy forces in St. Augustine and Havana were eager to effect great injury on the commerce of the region.⁸ In 1747 Governor Johnston ac-

"So prolific was privateering... that the newspapers of...coastal cities regularly featured reports of captures and losses on the seas."

knowledge to the Assembly in New Bern that the colonies trade was sorely "distressed."⁹

A Cape Fear gentleman, lamenting these losses, wrote in 1741, "many other Vessels bound for this Place are supposed to have been taken by the Spanish Privateers which infest our coast."¹⁰ While war raged overseas and in the sea lanes, the Cape Fear was nearly visited early in the conflict by a Spanish Man-of-War carrying two Irishmen, who "persuaded the Spaniards to land in the Night, and surprise the House of Roger Moore, Esq. where they assumed they might get a considerable Booty; But the Man-of-War's {hyphens added} Station off Cape Fear being expired, prevented the execution of their proposal."¹¹

Thus, Brunswick, North Carolina's port of entry on the Cape Fear, narrowly escaped attack. Founded in 1726, Brunswick had quickly reached a position of importance in the overall economy of the province. The export of forest products such as tar, pitch, lumber, and shingles was sup-



plemented by corn, wheat, tobacco, and rice.¹² The combined tonnage of Brunswick/Wilmington shipping soon surpassed that of the other four North Carolina ports (Currituck, Roanoke, Bath, and Beaufort) to make the Cape Fear River the leading point of entry into the colony and "one of the strategic harbors of the British American colonies."¹³

In June and July of 1741, however, Spanish privateers crossed the bar at Ocracoke Inlet where they established a base from which they raided the sea lanes as well as nearby villages, destroying property and carrying off livestock.¹⁴ So extensive was their plunder that the inhabitants of the area had to be sustained at public expense of 10,000 pounds sterling.¹⁵

At the same time there was a growing concern over the deterioration of relations with France.¹⁶ And, in March

1742, came news from Lt. Governor William Bull of South Carolina that 3,000 Spaniards had left Cuba for St. Augustine, possibly as part of a design to attack South Carolina.¹⁷

In March of 1743, Governor Johnston and his council discussed the report of enemy troop movements and the request for assistance from Lt. Governor Bull.¹⁸ The decision was made to send a regiment commanded by North Carolina (rather than South Carolina) gentlemen, but no companies from New Hanover, Onslow or Bladen counties could be spared as those areas lay "Exposed to any Attempt of the Enemy."¹⁹ However, it never became necessary to assist South Carolina during the conflict, and no troops were sent.

The British Admiralty responded to North Carolina's exposure with a letter to British naval officer Ashley Utting, in which the main concern of the Mother Country was clearly expressed: Whereas the "Coast of North Carolina is very much infested with Spanish Privateers," Utting was to extend his cruise to Cape Hatteras "for the better protection of the trade of His Majesty's Subjects in those parts."²⁰

In April of 1744, France officially entered the war against Great Britain.²¹ Three months later, on July 4, 1744, Governor Johnston convened his council in New Bern to ask advice on "how to put His Majesty's Province into the best posture of Defense on the Late Declaration of War made by His Majesty against France." Believing the Cape Fear to be the "most likely of any place in this Province to be attacked," council members in the Cape Fear region were empowered "to take all proper Methods for the Defense and Security of those Parts of his Majesty's Province," including specifically to "discover the most convenient place to Erect Fortifications and Battery."²²

The council convened in Brunswick on July 13 and agreed that such a fort and battery should be constructed on a small island near present-day Southport. It was further agreed that Governor Glen of South Carolina should be solicited for ordinance and ammunition, which he agreed to supply in the form of a loan of ten cannon and twenty rounds of shot.²³

In 1745 the General Assembly assented to Governor Johnston's request that such a fort should be built allowing for twenty-four (rather than ten) cannon, with funding to come from the revenues of Port Brunswick.²⁴ In June of 1746, the Assembly took another step by passing "An Act for Better regulating the Militia of the Government," which imposed the possibility of duty on all freemen between sixteen and sixty years of age with the exception of ministers, public officials, and various others.²⁵

Although the war with France never touched the North Carolina coast, a force of Spanish privateers established a base on Cape Lookout, near Beaufort, in the summer of 1747.²⁶ On June 14, they landed in Beaufort's harbor and took several vessels. Encouraged by their easy success, the Spaniards returned to Beaufort on the 26th of August and



held the town for three days before being driven off by Colonel Thomas Lovick's regiment of militia.²⁷

There were other landings by the Spaniards in 1747. According to a letter from Governor Johnston to the Board of Trade, "several small Sloops and Barcalonjos came creeping along the shore from St. Augustine full of armed men" and landed at "Ocacoke, Core sound, Bear Inlet, Cape Fear, where they killed several of His Majesty's subjects, burned some ships and several small vessels."²⁸ Following the landings and depredations in Beaufort, the General Assembly, with the assent of the governor, appropriated 6000 pounds sterling for the construction of fortifications at "Ocacock, Cape Fear, Core Sound, and Bear Inlet."²⁹

Although news from Europe gave some cause to hope that war might pass over the Cape Fear region, the militia, under Major John Swann, was maintained in readiness.³⁰ His command consisted of four companies: William Dry, III's sixty-seven-man Brunswick company, Samuel Cobrin's seventy-eight-man unit, John Sheppard's force of sixty-seven men, and John Sampson's 104-man company of Wilmingtonians.³¹

Dry would one day be contracted to repair and expand the new fort.³² His mother was the sister of Roger Moore, known locally as "King Roger Moore."³³ Moore was also the founder of Orton Plantation and Major Swann's father-in-law.³⁴ These prominent members of the local gentry were key figures in the following drama.

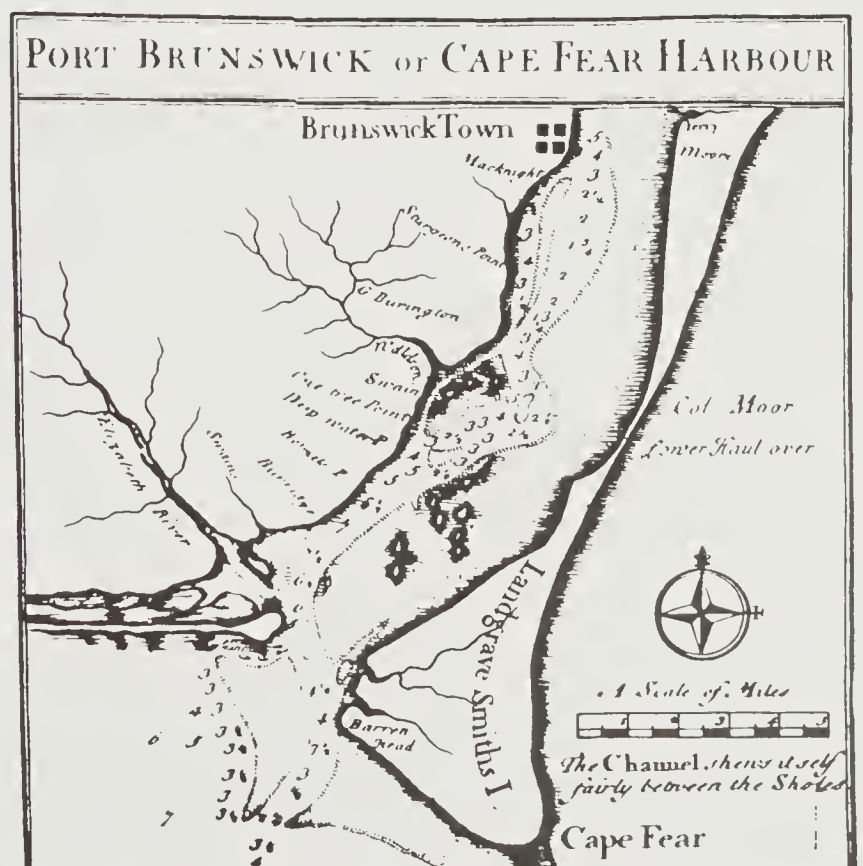
Construction of the new fort, named for Governor Johnston, was underway in July 1748, when the militia was called to oppose the threat of a Spanish ship sighted in the river.³⁵ Although this was a false alarm, the ship may well have been a scout for what was to follow.

On Saturday, September 3, three sloops appeared near the mouth of the Cape Fear. The following story of their activity is told in two letters published in Boston and South Carolina papers at the time.³⁶

Two of the three ships were Spanish privateers, the *Fortuna*, a 130-ton, 24-gun sloop commanded by Vincent Lopez, and the *Loretta*, a smaller sloop of twenty guns, under Joseph Leon Muños. The third ship was a small South Carolina vessel that had been seized as a prize. Not revealing their nationality or their purpose, the Spanish induced local pilots to guide them through the inlet and shallows. The next day, the then hostage pilots reluctantly guided the privateers to the site of Fort Johnston where, "It seems their design was to take the negroes that were at work on our fort." As it was Sunday, there were no laborers present, and the Spaniards, disappointed in their intent, proceeded up the river toward Brunswick.

Downstream from Brunswick, they landed a party, which burst upon the startled community at the same time the two privateers appeared and opened fire on vessels hastening to escape. In the panic that followed, the townsfolk fled. The Spanish took two or three citizens, the ship *Nancy*, the snow *Litchfield* (out of Boston, Captain Wakefield, master), a brig, a sloop and "several small craft." The ship *Hannah* escaped up the river. The Spaniards then proceeded to plunder the town at their leisure.

The surrounding country was quickly alerted, and messengers were dispatched to Charleston "to get the assistance of the king's ships." The following morning "about 25 or 30 men" gathered at a rendezvous appointed by Captain Dry, but, whereas the town had been evacuated in haste, they were without sufficient arms and no attempt was made to recover Brunswick that day. Meanwhile, the *Loretta* pursued



the *Hannah* for several miles upstream, finally overtaking her after she went aground.

The next morning, Tuesday, about eighty men, including blacks and whites, gathered under Captain Dry's command. Dry assembled his force and selected twelve men to enter the town ahead of the main body. The Spaniards in Brunswick thought themselves secure and were busy looting and enjoying the spoils of supposed victory when Dry's advance party sprang the attack. Quickly reinforced by the main body of militia and citizenry, many of the invaders were killed or captured.

Those Spaniards who were able, retreated hastily to the *Fortuna*, which still lay anchored at the Brunswick dock. Pursuing Brunswickers were stopped short when the large ship opened "a very hot fire" forcing the colonists to take cover. This stand-off was abruptly ended when the *Fortuna*, according to Wakefield, "took fire and blew up." The cause of the fire, which must have reached the powder magazine, is unknown. Captain Lopez and all his officers and crew, perhaps eighty in all, perished.

Meanwhile, the crew of the captured *Litchfield* overpowered their captors and ran the ship aground. The *Nancy*, held by twenty Spaniards, proceeded to fire on the town with two guns that had been transferred from the *Loretta*. On hearing the sound of battle, the *Loretta* abandoned its attempt to capture the *Hannah*, "hoisted bloody colors," and returned to Brunswick, firing upon Roger Moore's house as she passed, and joining the *Nancy* in firing on the Brunswickers.

Neither the townspeople, behind an earthen embankment, nor the Spaniards, safe aboard their ship, were inflicting damage to the other. The Spanish, under a flag of truce, proposed that they be allowed to leave peacefully with all of their booty. Dry countered that they might leave peacefully, but without the spoils. However, he was in no position to enforce his demand, having no vessels with which to pursue. Captain Muños made ready to sail with the *Loretta*, and the captured *Nancy* and South Carolina sloop.

The following morning, Wednesday, Major Swann arrived with substantial reinforcements from Wilmington and pursued the Spanish along the shore. Muños, however, had passed the partially completed Fort Johnston ahead of them and was anchored under Bald Head Island.

Captain Wakefield and three other Englishmen were sent ashore to discuss an exchange of prisoners. Swann agreed to exchange on an equal basis, but the Spanish prisoners, having been sent to Wilmington, could not be quickly brought to Bald Head. Muños waited until about three o'clock Thursday afternoon and then sailed, giving chase to another merchantman that had appeared.

The ill-fated attack had cost the Spanish an estimated 140 out of 260 men.³⁷ The colonists lost one dead, possibly when their one gun blew up.³⁸ The *Fortuna*, which burned and sank in shallow water, yielded enough booty to



help finance the construction of St. Philips Church in Brunswick and St. James Church in Wilmington.³⁹ The painting, *Ecce Homo*, a picture of Christ that was saved from the vessel, still hangs in the St. James Church.

The painting, *Ecce Homo*, taken from the *Fortuna*.

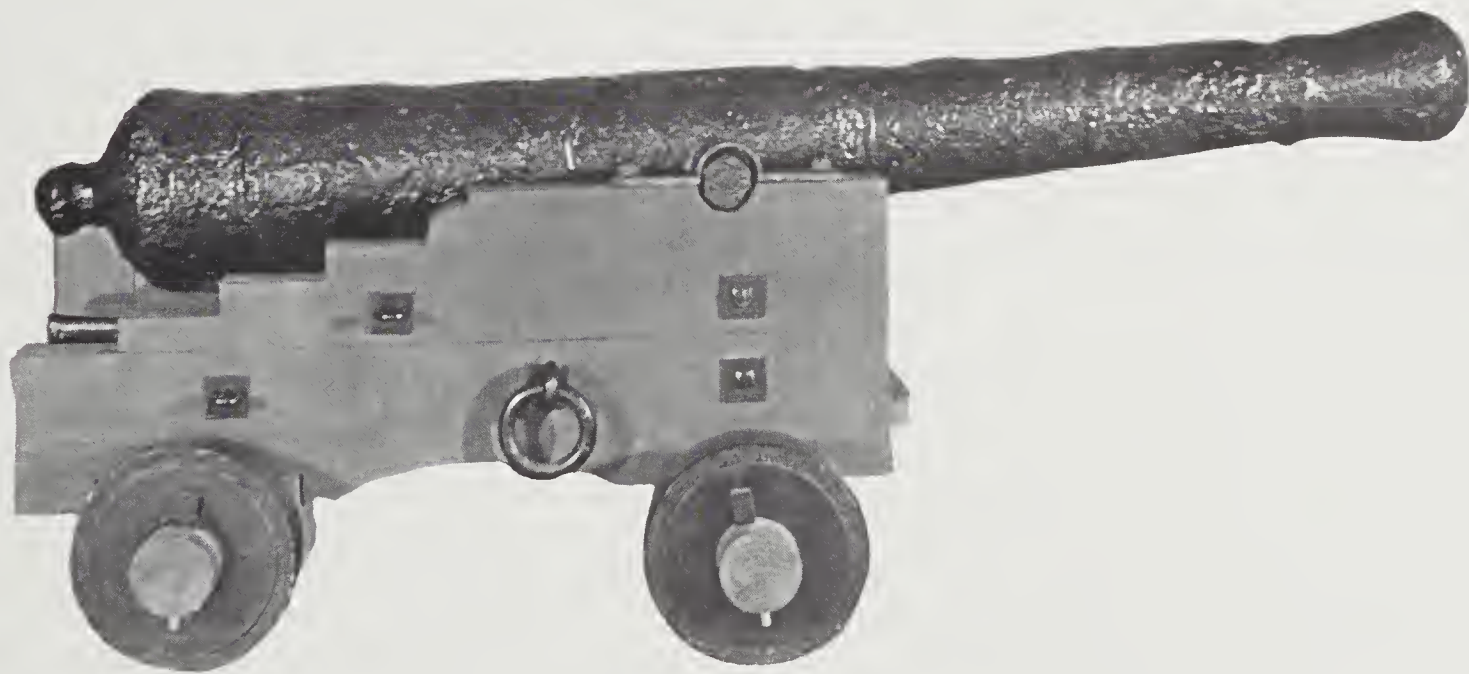
On October 18, 1748, a treaty was signed at Aix-la-Chapelle in France, bringing a cessation to hostilities. King George's War was over. Stout-hearted colonists, without the aid of their distracted sovereign, had defended their homes and driven away the invaders. ❖

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NOTES

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2. Robert J. Cain (ed.), *Records of the Executive Council, 1735-1754*, Vol. VIII of *The Colonial Records of North Carolina* [Second Series], edited by Mattie Erma Edwards Parker and others (Raleigh: North Carolina Division of Archives and History, 1988), lviii and 64.
3. *Ibid*, lviii.
4. Hugh T. Lefler and William S. Powell, *Colonial North Carolina: A History* (New York: Charles Scribner's Sons, 1973), p.132.
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9. William L. Saunders (ed.), *The Colonial Records of North Carolina*, Vol. IV (Raleigh: State of North Carolina, 1886), p. 863.
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11. Ibid.
12. Bartley, "A Comparative Summary," pp. 4 and 8.
13. E. Lawrence Lee, Jr., "Old Brunswick, the Story of a Colonial Town," *North Carolina Historical Review*, Vol. XXIX, No. 2 (April 1952), p. 235.
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16. *South Carolina Gazette*, April 2, 1741.
17. Cain, *Records of the Executive Council*, p. 387.
18. Ibid, p. 388.
19. Ibid, pp. 139-140 and 393-394.
20. Ibid, p. 402.
21. Dupuy and Dupuy, *Encyclopedia of Military History*, p. 633.
22. Saunders, *Colonial Records of North Carolina*, IV, pp. 700-701.
23. Ibid, pp. 701-702.
24. Walter Clark (ed.), *The State Records of North Carolina*, Vol. XXIII (Goldsboro: State of North Carolina, 1904), p. 230.
25. Lefler and Powell, *Colonial North Carolina*, p. 134.
26. Cain, *Records of the Executive Council*, lix.
27. Clark, *State Records of North Carolina*, XXIII, pp. 263.
28. Saunders, *Colonial Records of North Carolina*, IV, p. 929. Ibid; and Ashe, *History of North Carolina*, p. 271.
30. *Boston Gazette*, April 19, 1748.
31. Walter Clark (ed.), *State Records of North Carolina*, Vol. XXII (Goldsboro: State of North Carolina, 1907), pp. 280-286.
32. Donald R. Lennon and Ida Brooks Kellam, *The Wilmington Town Book, 1743-1748* (Raleigh: North Carolina Division of Archives and History, 1973), p. 78.
33. Alan D. Watson, "William Dry: Passive Patriot," *Lower Cape Fear Historical Society Bulletin*, Vol. XVII, No. 1 (October 1973), n.p.; and "Plantation Ownership Has Changed . . .," *Wilmington Sunday Star News*, March 28, 1982, Section 11B, p. 1.
34. Swann family vertical file, Genealogy Branch, North Carolina State Library.
35. Ashe, *History of North Carolina*, p. 270.
36. *South Carolina Gazette* of October 31, 1748; and the *Boston News Letter* of October 20, 1748.
37. *Boston News Letter*, October 20, 1748.
38. Clark, *State Records of North Carolina*, XXII, p. 277.
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Cannon recovered from the Cape Fear River near Brunswick Town in May 1985. Archaeologists believe it to be a 4-pounder of Spanish manufacture dating to the early eighteenth century, possibly from the wreck of the *Fortuna*. It is currently on display at Brunswick Town State Historic Site. Photograph by Julep Gillman-Bryan.

Raleigh's Virginian Sea

..... by Paul A. Smith, Jr.

**Numerous
travelers
and
explorers lie
buried
beneath the
sea. What
can we learn
from them?**

VIRGINIA WAS NAMED BY SIR Walter Raleigh to honor England's virgin Queen, Elizabeth I. In Raleigh's day Virginia covered the entire coast from Spanish Florida to French Canada. Today, we know much about Elizabeth's Virginian Sea: its climactic conditions, its currents, its abundant fish and wildlife, even the gentle underwater contours of its broad continental shelf.¹

There is one thing we do not know much about. How many of the Europeans who sailed over it now lie under it, buried in the sand and silt beneath a few hundred feet of sea water? There must be many of them, namely English, Spanish, and French. Behind the barrier islands there could be many from the Indian peoples, such as Carolina Algonquians and Florida Timucuans. Somewhere, there are probably even some Africans from this period.²

What traces of these coastal and seafaring peoples can we find today? Can magnetometers, sonar, sub-bottom profilers, aerial photos, and other equipment locate objects for us? Can computers help us pick the best places to look?

How long do things last on the ocean bottom? Quite a long time, it seems. A good part of the continental shelf is marine silt, which is a fine natural preservative. Objects dropped on it are quickly engulfed. Silt excludes almost all oxygen; without oxygen decay is very slow. Silt can keep things very close to their original state for centuries.³

The big question is, how much is down there? For two hundred years, from 1492 until the late 1600s, sea-faring nations regularly sailed from the Caribbean to Europe by riding the Gulf Stream along the North American coast and through the Florida Straits. Depending on local wind and sea conditions, and fear of attack, they would gradually veer away from the coast when they picked up the westerly winds. Other things being equal, the most

advantageous turning point was around thirty-seven degrees latitude off Cape Hatteras.⁴

The Gulf Stream route was vitally important to Spain. The empire depended upon military power to survive. It had the best army in Europe, but the army had to be paid or it revolted. The silver to pay Spanish armies came from mines in Peru. It was regularly shipped in silver ingots to Panama where it was put on armed convoys for shipment on the Gulf Stream route to Seville. Spanish convoys were protected by squadrons based at Havana. Individual ships might make landfalls in Virginia for trading or in search of shelter from storms, but the convoys did not stop if they could avoid it.

There could be from two to twenty ship-killing storms a year. The average was probably around seven, mostly in late summer and fall.⁵ The Spanish nonetheless sent at least one major and several minor convoys on the Virginian Sea route each year. On this busy route, there were numerous wrecks. Some were recorded; many were not.

England, France, and Holland were at war with the Empire of Spain for the last half of the sixteenth century. All three countries used the Virginian Sea as hunting grounds for Spanish convoys. A French group, for a brief interval in 1562, planted a privateer base at the northern end of the Florida Straits. It was promptly destroyed by the energetic Captain General of Florida, Pedro Menendes de Aviles.

To prevent other attacks, Captain Menendes installed a Spanish base at the same site, naming it Fort Augustine. For good measure he added an outpost at Port Royal in present-day South Carolina and looked at other sites to the north. The Florida Straits, a dangerous choke point for Spanish convoys moving between New Spain and the Iberian homeland, were secure, but the rest of the coastal route to the north was not.

For many years the English had sent only single ships or small, loosely coordinated groups against the Spanish convoys. They were called privateers because they were owned by private merchants seeking recompense for ships confiscated by Spain. To escape Menendes' squadrons operating from Havana and St. Augustine, privateers sometimes hid in the shifting tidal inlets of the Outer Banks, and, further north, in the splendid harbors of the Chesapeake. The Chesapeake, however, could be a trap for English privateers as long as Menendes' warships outgunned them.

By the 1580s Dutch and English shipbuilders began to produce a new "race-built" ship that could outsail the larger Spanish galleons. Race-built ships were developed by privateers, but were soon adopted as the standard warship for the Queen's navy. They were armed with iron cannons, an English innovation that, although no more accurate or longer-ranged than traditional bronze cannons, were certainly cheaper to build. Thus England could afford to put more guns in service. English gunners also began to overtake the Spanish in speed of reloading and accuracy of aiming their weapons.⁶

Portugal and Spain had long led the world in developing the skills needed for blue-water sailing. In ship design, navigation, mapping, and weapons, their navies were far ahead of the English. By the mid-1500s the English began to surpass the Spanish in naval warfare and in other areas as well. An intellectual revolution occurred for reasons we do not fully understand. Some think it was due to changes in society, others say it was a new religious spirit, and some suggest that it was driven by economic competition (and later for military advantage). Whatever the cause, the result for the English was a remarkable search for knowledge and new, more efficient, ways to get things done.⁷

The search inspired people in all walks of life, among whom were the men who made cannon for the navy, ship designers, navigators, and physicians who sought new medicines to keep crews healthy during long voyages. The quality of the metal used in casting cannon was a critical problem. Weak castings, bronze or iron, shattered when loaded with higher and higher powder charges. Did they experiment with new metals that could take the higher pressure?

An iron cannon of English manufacture, fully loaded and primed, was found off the Virginia Capes almost a decade ago. It was only recently restored and identified as very likely coming from the period of Sir Francis Drake or not long thereafter. It is being studied by historians and underwater archaeologists at East Carolina University under the care of conservator Brad Rodgers.⁸ How many more like it are resting elsewhere along the coast? What can their de-

sign, and the metal in them, tell us about this pivotal period in European naval history?

When English guns and warships improved in the last quarter of the sixteenth century, the English began to think of placing a base on the Chesapeake. War with Spain was coming. In 1585-86 the English launched their first large naval strike against Spanish ports and shipping in the Caribbean. The fleet of twenty ships and a landing force of 800 men were commanded by a former privateer, now an English admiral, named Sir Francis Drake.⁹

At the same time, the Queen instructed one of her guard officers to form an expedition to explore the area between Hatteras and the entrance to the Chesapeake. The officer, Sir Walter Raleigh, was prevented by the Queen from leading the expedition, but he planned it and instructed his men who carried it out. Their first purpose was to explore the site for a base at the north end of the Gulf Stream route, strategically similar to the base the French had attempted to place on the Florida Straits twenty years earlier. Raleigh's men completed the exploration, and after a year at Roanoke Island and on the Chesapeake, they were picked up by

Drake's fleet following the Gulf Stream route home after the Caribbean raid.¹⁰

Raleigh also had another purpose that grew out of the intellectual revolution taking place in English society. For at least a decade, a few wealthy men close to the Queen had supported young scholars at English universities.¹¹ These were scholars who were interested in the new astronomy sweeping Europe, who were curious about the new metals being discovered by Bohemian miners, and who wanted to know more about the languages and beliefs of other peoples, including those living in Virginia.

Raleigh brought a number of these young scientists from their universities to his London home where they worked on new ways to navigate by the stars, invented new ways to chart the oceans, and compiled dictionaries of Indian languages, especially Algonquian. They were among those who searched for new metals for wartime uses, and peaceful industrial processes to help sell English products abroad. Raleigh's young scholars were not all English. One was a Hungarian student from Budapest, and another was a Bohemian metallurgist. They all worked closely with Raleigh's senior scientist, Thomas Hariot, an astronomer scarcely older than they.

Throughout this time, sailors continued to throw things overboard on their route home from America. Sea craft were lost to storms, sea battles, and simple bad luck. The annual accretion might be relatively small, but over the years the accumulation would be significant. Instruments developed by scholars like Raleigh's, and evidence of other Eliza-

***"...privateers
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Banks..."***

bethan skills surely lie entombed in the silt of the Virginian Sea. Evidence of this kind exists for the Spaniards who went to New Spain, but very little has been discovered for the Elizabethan English in Virginia.

At the same time, we can learn about the other nations with whom the English had contact in Virginia. The little we know about the eastern Algonquians comes from accounts written by the English at Roanoke. More direct evidence would be very helpful in understanding the native inhabitants. Because the Indians had no written records, archaeology is our source of evidence that could tell us what really happened when the Indians and the English began to live on the same continent.

Even bones can provide evidence of the impact of endemic diseases on entire cultures. We know from a few English accounts that the two nations swapped diseases, often with disastrous effects exceeding any damage resulting from warfare. We should enlist help from the field of paleopathology, a branch of science that studies the historical effects of disease on whole societies. Systematic comparison of English and Indian bones may tell us which diseases were exchanged, and what effect they had on each group.¹²

The eastern Algonquians had lived along the coast that we call the Virginian Sea for thousands of years. They were not seafaring nations in the way of the Europeans, but they depended upon the coastal waters for a significant part of their food supply. They hunted and fished from log canoes, which they poled or paddled in the great sounds behind the barrier islands.

The Indians also exercised their natural right to throw things overboard, things that eventually ended up in the silt, together with their log dugouts, their weapons, stone tools, earthenware pots, and elegantly crafted copper ornaments. More than two dozen of these early log canoes have been found and are being studied by Leslie Bright and other scholars at the Underwater Archaeology Laboratory of the North Carolina Division of Archives and History, East Carolina University, and the North Carolina Maritime Museum.¹³

The Indians living along the shores of the Virginian Sea had been in contact with Europeans long before the arrival of the English at Roanoke. In 1562, the French discovered Spanish castaways living among the Indians in Florida and what is today southern Georgia. A French artist portrayed some of these Indians with blond, curly hair and fair skin.¹⁴ In 1584, two of Raleigh's captains, sent to reconnoiter the Virginia coast, noted among the Indians of the Roanoke area "... children that had very fine auburn and chestnut colour hairs."¹⁵ The same Indians, Raleigh's captains reported, "... have no edge tooles to make them [canoes] withall: if they have any, they are very fewe, and those it seemes they

had twentie yeares since, which as those two men declared, was out of a wracke which happened upon their coast of some Christian shippe, or some part of her, being cast upon the sande, out of whose sides they drew the nailes, and spikes, and with those they made their best instruments.¹⁶

The English also lost ships, men and equipment in the Virginian Sea. Caught in a destructive storm at Roanoke on June 18, 1586, Raleigh's men saw many valuable charts and equipment "... by the saylors cast overboard, the greater number of the Fleete being much agrieved, recorded, ... put all our Fleete in great daunger, to be driven from their anking upon the coast. For we broke manie Cables and lost manie Ankers ... Manie also of our small Pinnaces and boates were lost in this storm."¹⁷

We can find evidence of this kind scattered throughout the documents from English, Spanish, and French sources. Many are in the carefully researched volumes of the Hakluyt Society, published over the past century in London. These books have been a rich source for many historians. They have not been systematically sifted and the results collated and published for the needs of the underwater archaeologist. Computers could be used to sort, search, and organize this remarkable collection of documents quickly and cheaply. Many of these absorbing original stories are long out of print. When put into machine readable format they can be easily used for research or pleasure.

Would we be more curious about the Elizabethans if we knew about them from tangible objects like ships, shoes, and sealing wax, not just from documents? Perhaps the things they left behind, beneath the Virginian Sea, will help us understand the motives behind their ardent thirst for knowledge.

For us almost any evidence of the Elizabethan period, however small, that might be found in Raleigh's Virginian Sea will be significant. It was the time of a new beginning in European history and a tragic ending in Indian history. Have we the interest to look for it, the wisdom to understand it, and the values to treat it with respect when we find it? ❖

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***“Sea craft were
lost to storms,
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NOTES

1. For a technical description of a key sector, see J.O. Blanton, J.G. Newton, and O.H. Pilkey, *An Oceanographic Atlas of the Carolina Continental Margin* (Beaufort: Duke University Marine Laboratory, 1971).
2. The Africans could be some of the free Black insurgents reportedly brought from their communities in the mountains of Panama to the Carolinas by Sir Francis Drake after his raid on the West Indies and Central America over 1585-6. See E.G.R. Taylor (ed.), *The Original Writings and Correspondence of the Two Richard Hakluyts* (London: Hakluyt Society, 1935), pp. 142-143.
3. For an overview, see *A Cultural Resource Survey of the Continental Shelf from Cape Hatteras to Key West*, Final Report, June 1981, Volume III, "Shipwreck Archaeology, Remote Sensing Technology", submitted to the Bureau of Land Management, 500 Camp St., New Orleans, LA, by Science Applications, Inc., 1710 Goodridge Dr., McLean, VA. The sixteenth and seventeenth centuries are discussed in general terms on pp. 20-35. The report locates the few known settlement sites, and identifies the Gulf Stream as the main sea lane, but offers little specific information for the area north of Florida beyond the general statement that shipping losses were considerable due to war and hurricanes. Shipwreck lists and other details for later periods, particularly the US Civil War, are nonetheless useful as an indication of what can be done with modern technical aids.
4. For a lively, non-technical description see William H. MacLeish, *The Gulf Stream: Encounters with the Blue God* (London: Hamish Hamilton, 1989), pp. 60-66. As the author notes (p. 75), modern sailors still throw things overboard when in difficulty.
5. The figures, for 1887-1936, are from Nathaniel Bowditch, *American Practical Navigator*, as revised by the US Navy Hydrographic Office, Washington, DC, USGPO, 1943. An attempt to estimate earlier averages would pose an interesting exercise in historical meteorology.
6. See Chapter 7, "The Guns, the Gunner and the Crew", in Peter Padfield, *Armada: A celebration of the four hundredth anniversary of the defeat of the Spanish Armada 1588-1988* (Annapolis: US Naval Institute Press, 1988). A detailed reconstruction of a race-built English warship can be seen on pp. 86-87.
7. See the Introduction to Christopher Hill, *Intellectual Origins of the English Revolution* (London, Oxford University Press, 1980).
8. See *Stem to Stern*, published annually by the Department of History, Program in Maritime History and Underwater Research, East Carolina University, Greenville, NC, vol. 5, 1989, pp. 3-4.
9. See Mary Freer Keeler (ed.), *Sir Francis Drake's West Indian Voyage 1585-86* (London: Hakluyt Society, 1981).
10. For an overview and an introduction to other volumes containing the many original documents, see David Beers Quinn, *Set Fair for Roanoke: Voyages and Colonies, 1584-1606* (Chapel Hill: University of North Carolina Press, 1985).
11. Particularly Sir Thomas Gresham, founder of Gresham College, Robert Dudley, Earl of Leicester; and Henry Percy, Earl of Northumberland. On Gresham, see chapter II, "London Science and Medicine" in Christopher Hill, *Intellectual Origins of the English Revolution*, pp. 14-84. On Leicester, Northumberland, and Raleigh's relations with Harriot and other scientists, see *ibid*, chapter IV, "Raleigh—Science, History and Politics", pp. 131-224. On the Queen's interest in education see Eleanor Rosenberg, *Leicester: Patron of Letters* (New York: Octagon Books, 1976), pp. 121-128.
12. See Donald J. Ortner et. al. (eds), *Human Paleopathology: Current Synthesis and Future Options: Proceedings of the 1988 Smithsonian Symposium* (Washington: Smithsonian Institution Press, 1991). Also, William H. McNeill, *Plagues and Peoples* (New York: Doubleday, 1977), Chapter V, "Transoceanic Exchanges, 1500-1700."
13. Leslie S. Bright, "Candied Canoes of North Carolina" Paper presented at the Eighteenth Annual Conference in Underwater Archaeology, Savannah, Georgia, 1987. "Candied" refers to the sugar solution used to preserve the canoes, which would otherwise crumble to dust when exposed to air after centuries in the silt.
14. See illustrations in Paul Hulton (ed.), *The Works of Jacques Le Moyne de Morques, a Huguenot Artist in France, Florida and England* (London, 1977), vol. 1, p. 127.
15. "Arthur Barlowe's Discourse of the First Voyage, 1584-85," in Quinn, *Roanoke Voyages 1584-1590*, 2 vols. (London: Hakluyt Society, 1955), I, p. 102.
16. *ibid*, p. 104
17. "Ralph Lane's Discourse on the First Colony, 17 August 1585," in Quinn, *Roanoke Voyages*, I, pp. 293 and 302. ❖

DENDROCHRONOLOGY:

A New Tool for Dating Historic Structures

.....by Peter B. Sandbeck

A process long used by foresters and the timber industry lends a hand to historical researchers.

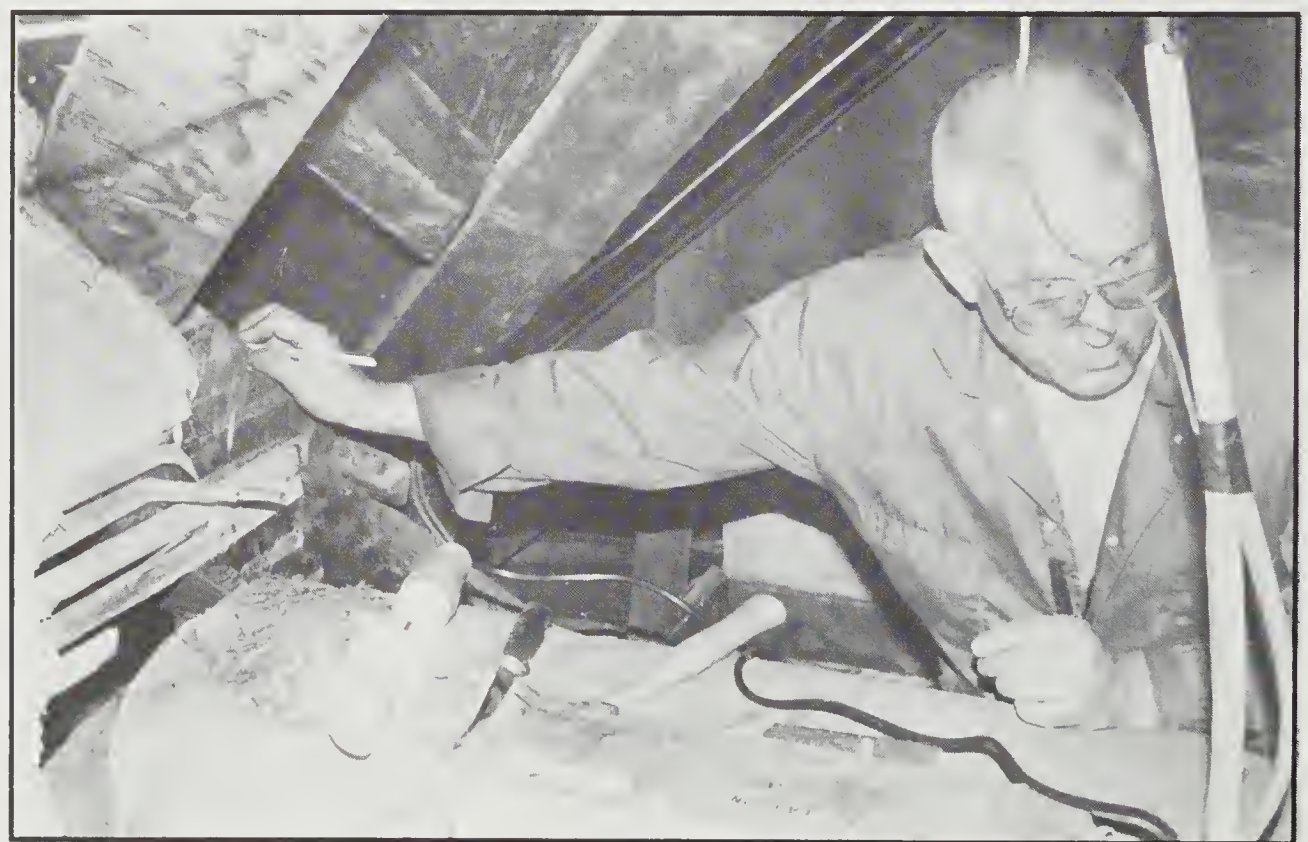
THOSE OF US WHO DEVOTE OUR time to the study of North Carolina's coastal architecture have grappled for years with the thorny problem of establishing accurate, precisely documented dates for the construction of some of our outstanding historic buildings. Despite years of exhaustive research and lengthy physical investigations, we still know remarkably little about when our earliest, most significant landmarks were constructed. Many of the structures with questionable dates are open to the public as historic house museums, leaving countless docents on uncomfortable, often shaky, ground when asked, "when was this house built?" or "how do you know it was built in 1685?"

At last, help has arrived in the form of a scientific discipline, known as dendrochronology, that can be used to determine the date of a building's construction with precise accuracy. Based on the principle that tree growth ring patterns can yield reliable information on the age of all timbers, this process has been

used for decades by foresters and the timber industry to establish the age and growth rates of commercial timber, both standing and cut.

With more recent developments and refinements in the practice and analysis of dendrochronology, it is now possible for architectural historians, and perhaps maritime historians, to use the process to obtain accurate dates for construction timbers where historical research and physical analysis have failed to produce conclusive results.¹

In a pilot project undertaken jointly in 1991 by the N.C. Division of Archives and History, Preservation/North Carolina, Inc., and the Cupola House Association, three of eastern North Carolina's most important eighteenth-century structures were studied using dendrochronological analysis to resolve long-standing questions about their respective dates of construction. The Cupola House and the Chowan County Courthouse, both in Edenton, and the Palmer-Marsh House in Bath—all major landmarks of the Albemarle and Pamlico regions—have been the subject of



Dr. Herman J. Heikkinen preparing to take a core sample from a rafter in the Cupola House.

decades of scholarly historical research and physical analysis. Yet, to date, no authoritative documentation has been found to provide firm dates for their construction. All three are also open to the public and interpreted on a daily basis.

To resolve this somewhat embarrassing state of affairs, one of the nation's leading dendrochronology experts, Herman J. (Jack) Heikkenen, Principal Investigator of Dendrochronology, Inc. of Blacksburg, Virginia, was contracted with to study the three structures. The staff historians of the Colonial Williamsburg Foundation's Department of Architectural Research generously provided expert technical guidance in the field, drawing on their own successful experience with Dr. Heikkenen's work on some of their most puzzling structures. Funding for the initial phase was provided by the Weyerhaeuser Company Foundation.

The Cupola House, Edenton, front elevation.



Methods and Techniques

THIS NEW SCIENCE RELIES ON THE PAINSTAKING MICROSCOPIC and computer-assisted analysis of tree rings to determine growth patterns. Samples are usually obtained by taking small core borings from structural timbers that have been determined to be original to the subject buildings. Great care is taken to ensure that drilling is done in areas that will not be seen or cause structural damage. Given the nature of tree growth, sampling must be done only on trees and house-timbers that were grown and felled within an identifiable geographic\climatic region, like the Albemarle Sound region and Tidewater Virginia.

The tree ring growth patterns revealed in the core samples from a given building are first compared with all other samples from that same building to verify that all of the framing members were indeed cut from the same woodlot at about the same time. This is to screen for those rare instances when some timbers may have been brought from elsewhere or were re-used. Often, twenty or more different timbers are sampled within one structure.²

The core borings are then compared to reference patterns obtained from trees or timbers of a known age — either from old-growth trees or from a firmly dated structure — and always of the same species. Through a process called *cross-dating* the samples can be matched to certain sequences

found in the known or reference ring patterns, enabling us to learn the precise year that the building's timbers were cut in the forest. In most instances, it must be presumed that the house carpenters began hewing, sawing, and shaping the framing timbers within the same year that they were felled.³

A comparison of tree rings from different timbers is possible because trees produce annual growth rings which we recognize as the alternating light and dark concentric bands seen in any cross section of a tree trunk. The width and color of each ring varies with the weather conditions found during the annual growing cycle in a given tree's climatic region. Spring growth, normally rapid due to ample rainfall and moderate temperatures, produces wide, light-colored, porous bands. In summer and early fall, slower growth produces contrasting narrower dark bands.⁴

Severe climate changes, such as lengthy summer droughts or unusually wet springs, produce growth ring patterns that are exaggerated versions of the normal rings, either extremely wide and light, or narrow and dark. These extraordinary rings, which occur with the same randomness associated with weather patterns, are the ones that can be used most readily in dendrochronology.⁵ Practitioners in the field have found the drought and heavy rainfall years to be consistently reflected by changes in tree ring patterns within a climatic region.

The common patterns formed by the unusual tree rings can be used to establish a correlation between very old living, or recently harvested, trees and timbers of the same species found in historic structures. Using the same principles, scientists can establish a tree-ring *time line* for a given species in any region where weather patterns, such as rainfall, length of growing season, and mean temperatures, are very similar. This forms the basis of the *key-year* theory employed by Dr. Heikkenen in his studies in Maryland, Williamsburg, and northeastern North Carolina.⁶

The concept of determining key years is crucial to eliminating the influence of the growth variations that might be caused by tree spacing and density, and hence, competition — or the lack thereof — for light, nutrients, and ground water. Mark R. Edwards of the Maryland Historical Trust has written a concise description of this theory:

“Dr. Heikkenen has devised a simplified means of tree-ring dating that relies not on the growth patterns of individual trees but on area patterns. The growth patterns of timbers from a woodlot or structure are measured, and those years that were exceptionally good or bad for a statistically significant percentage of the group are coded as positive or negative key years. The resulting patterns of plus, minus, and average years are then cross-correlated with progressively older groups of timber.”⁷

To give a simplified example, it is possible to count tree rings using core boring samples from several living yellow pines in a given stand to establish that the oldest tree in that stand began growing in 1717 and is now 275 years old. The living-tree rings can then be compared with the ones found in a core sample taken from a large (dead) yellow pine timber found in a historic house standing in that same geographic/climatic region. By finding overlapping significant alignments or correlations of the major drought and wet years (key years) in both samples, one can determine what year the house timber was cut in relation to the known age of the standing tree.



Taking a core boring from the Cupola House.

The North Carolina Dendrochronology Project

IN THE PILOT NORTH CAROLINA DENDROCHRONOLOGY study, Dr. Heikkenen produced results that were remarkably consistent with his projects in Maryland and at Williamsburg, both initiated in the early 1980s. Prior to taking samples from the three subject buildings, Heikkenen prepared a regional database by taking thirty-three samples from recently cut oaks and yellow pines in the Edenton area. He observed significant alignments in the key years between the new samples and his large database from his earlier work in the Chesapeake Bay region, making it possible for him to use the Virginia key year patterns to assist in arriving at the conclusions on construction dates for the three northeastern North Carolina structures.⁸

Samples are usually taken from house timbers in two relatively non-destructive forms: core borings, using a hollow cutting tube on an electric drill to yield core samples ap-

proximately .04 inches in diameter, and full wood samples obtained by sawing a .05 inch thick cross section from the exposed ends of timbers. It is ideal to find timbers within a structure that still possess traces of the wane edge or bark-covered outer layer of growth that provide an indisputable final growth ring for the subject sample. Customarily, anywhere from five to fifty samples from different framing members of each structure are taken.

Below are summary results of the findings from the North Carolina Dendrochronology Project:

Cupola House, Edenton, Chowan County: This National Historic Landmark has been dated by long tradition at 1758, yet extensive research never revealed any confirming documentation. Architectural historians have debated the date for the past fifty years, ever since Thomas T. Waterman suggested a Jacobean influence due to the presence of the jettied or overhanging second story. Various experts had maintained that a date range of 1730-1740, or perhaps even the 1720s, seemed possible.⁹

Through dendrochronology, Dr. Heikkenen established that the southern yellow pine timbers used to build the Cupola House frame were fashioned from trees cut in the winter of 1757. He was able to further conclude that the house timbers were hewed and cut almost immediately, due to a lack of any traces of the insect and fungi activity that occurs within a year after the felling of the trees.¹⁰

Chowan County Courthouse, Edenton, Chowan County: An outstanding Georgian-style brick public building, the courthouse is likewise a National Historic Landmark. It has been the subject of extensive documentary research without any date ever being verified. All available evidence has consistently suggested a construction date of 1767-68, without a single shred of confirming proof. The traditionally accepted date was widely held to be correct by architectural historians, making this study something of an informal “control” for the project. A total of twenty samples were taken from the many attic truss framing members and lower floor joists, which are predominantly yellow pine with an occasional bald cypress member.

Results of the dendrochronology showed that the framing members from all levels were cut from trees felled in the

fall or winter of 1767, confirming the traditional date of construction.

Palmer-Marsh House, Bath, Beaufort County: This very large framed Georgian townhouse was traditionally thought to have been built in the 1740s, again without conclusive documentary research to back up that assumption. After suffering from a roof fire in the winter of 1990, the house underwent extensive study and analysis in preparation for a thorough restoration now just starting. Many original framing members were exposed and accessible due to the fire damage and subsequent removals of finish fabric.

Final results revealed that the Palmer-Marsh House was built in 1751, utilizing timbers sawed from trees felled at the end of the growing season of 1750.

Conclusions

The scientific construction dates produced by the project are supported in each case by earlier research findings and assumptions made by architectural historians. The accuracy of the findings are reinforced by Dr. Heikkinen's earlier work for the Colonial Williamsburg Foundation, where he was able to confirm the dates for such buildings as Bruton Parish Church (1711-1714) and the Public Records Office (1747). As part of the Williamsburg project, Dr. Heikkinen's accuracy was confirmed by the procedure of "blind study" of certain buildings known to have firm construction dates that had been independently established through research.¹¹

Based on the results, the sponsors have applied for a second grant from the Weyerhaeuser Company Foundation to pursue additional study on other significant structures in the state's coastal region. Future subject buildings for the next phase will be selected from the Albemarle Sound region, including the Old Brick House in Pasquotank County (ca. 1750s), the Newbold-White House (ca. 1690-1710?) and Sutton-Newby House (ca. 1720?) in Perquimans County, and Milford (ca. 1743?) in Camden County.

Later, the study will focus on the early buildings of the Pamlico Sound region, including Clear Springs (1760s?) and Bellair (1770s?) in Craven County, and the Coor-Gaston (1760-1770?) and the John Wright Stanly House (1780s) in New Bern. The sponsors hope to be able to move in a southerly direction down the coast into Pender and New Hanover counties in order to determine the date of construction for enigmatic houses like Sloop Point (1760s?) in Pender County and the Smith-Anderson House (1740s?) in Wilmington. ❖

Peter B. Sandbeck is Regional Supervisor of the Eastern Office, North Carolina Division of Archives and History. He holds a degree in Architectural History from the University of Virginia and is author of The Historical Architecture of New Bern and Craven County. In the course of his work Mr. Sandbeck has examined the structures of hundreds of houses along the coast of North Carolina.

NOTES

1. It is the hope of the author that this article may point out potential for applications for dendrochronology in the various fields encompassed by the heading of Maritime History. For instance, log canoes found in isolated settings, such as Lake Phelps in Washington County, were almost certainly built of trees found in and around the home body of water. It should be possible to develop a tree-ring time line using samples from living and dead old-growth cypress trees to determine if it would be feasible to approach dating such canoes or other strictly regional artifacts through this process.
2. Edward R. Cook and William Callahan, "The Development of a Tree-Ring Chronology for Dating Historic Structures in the Greater Philadelphia Area," pp. 3-4, unpublished report for Independence National Historical Park, Philadelphia, January 1992.
3. Herman J. Heikkinen and Mark R. Edwards, "The Key-Year Dendrochronology Technique and Its Application in Dating Historic Structures in Maryland," Bulletin, Association for Preservation Technology, XV, No. 3, 1983, pp. 4-5; hereinafter cited as Heikkinen and Edwards.
4. Marshall S. White, *Wood Identification Handbook: Commercial Woods of the Eastern United States* (Falls Church: Colonial Hardwoods, Inc., 1980), pp. 15-16.
5. Mark R. Edwards, "Dating Historic Buildings in Lower Southern Maryland with Dendrochronology," Camille Wells, ed., *Perspectives in Vernacular Architecture* (Annapolis: Vernacular Architecture Forum, 1982), pp. 153-155. Hereinafter cited as Edwards, Dating Historic Buildings.
6. Heikkinen and Edwards, p. 4.
7. Edwards, Dating Historic Buildings, p. 154.
8. Herman J. Heikkinen and Peter J. J. Egan, "The Last Year of Tree Growth for Selected Timbers Within the Chowan County Courthouse and The Cupola House, Edenton, North Carolina, As Derived by Key-Year Dendrochronology," unpublished final report, January 1992. Hereinafter cited as Heikkinen and Egan, Final Report.
9. John Bivens, James Melchor, Marilyn Melchor, Richard Parsons, "The Cupola House: An Anachronism of Style and Technology," *Journal of Early Southern Decorative Arts*, Vol. XV, Number 1, May 1989, pp. 129-130.
10. Heikkinen and Egan, Final Report.
11. Carl R. Lounsbury, Architectural Historian, Colonial Williamsburg Foundation, Letter to Catherine Bishir, dated June 5, 1991.

Note: This project was conceived of several years ago by Catherine Bishir of the State Historic Preservation Office and Myrick Howard of Preservation/North Carolina, Inc. as a way to provide the missing dates for several buildings that were to be featured in Bishir's new book, North Carolina Architecture. With help from Bill McCrea of the State Historical Sites Section and the author, Bishir and Howard obtained a generous grant from the Weyerhaeuser Company Foundation to fund the initial phase. Special thanks are due to Cary Carson, Carl Lounsbury, and Willie Graham of the Colonial Williamsburg Foundation for encouraging us to undertake the project and for their many hours of on-site technical assistance. ❖

BOOK REVIEWS

“the
lighthouse
continues
to be a
romantic
draw but...”

THE CAPE HATTERAS LIGHTHOUSE: SENTINEL OF THE SHOALS. By Dawson Carr. Chapel Hill: The University of North Carolina Press, 1991. (143 pages. Soft cover. Includes bibliographical references and index.)

DAWSON CARR HAS JOINED THE RECENT resurgence of interest in North Carolina's coastal and maritime history and written about a powerful coastal symbol—the Cape Hatteras light. His piece is typical of many works of popular history, capturing the public's imagination with romantic images of our state's maritime past—lighthouses and life-saving stations and pirates—offering very readable entertainment.

The book itself is attractively designed, with a shape that mimics the tall proportions of a lighthouse, and in it the author tells a chatty history through prose that is clear and crisp. Carr provides a complete history of the lighthouse, including the most recent controversial efforts to protect the structure from the sea's erosion at its base and the public and private forces at odds over the relative merits of each option. In his research, the author has drawn not only on the standard secondary sources but also on newspapers and oral history sources rarely used. In his conclusion, Carr asserts that the lighthouse continues to be a romantic draw but has long since lost its significance as a navigational device in the face of modern navigational aids like LORAN. That someone has finally pointed this out is important; that he has pointed it out to the public is to be commended.

Unfortunately, in this work, the faults outweigh the saving graces. Despite the clarity of the writing, it is at times full of dried-out romantic peons to sea, sky, and sand. The author relates many salient but not directly pertinent events to the history of this lighthouse, such as the detailed account of the Chicamacamico races during the Civil War, and he often overloads his story with anecdotes, like the nam-

ing of Bodie Island, a poor substitute for historical narrative. Further hindering this work are his clumsy attempts at providing historical context, such as regional geology and the rise of navigational aids from the age of Greeks and Romans to eighteenth-century America. Sacrificing a substantive interpretive framework and in-depth historical research, the author rehashes old history, telling the same old story from the same old sources without uncovering much that has not been told before in other books. The author does not call on original documents, public and private, and furthermore, his reliance on secondary sources and newspaper reports without primary source backup makes some of his facts and assertions suspect.

Books like Carr's are important, for they entertain the reading public, at the same time educating it. Yet there is no substitute for writing popular history well, getting the facts straight, and using a variety of acceptable sources. Many historians have proved that one can write well and tell an engaging story, do it accurately, and use many high quality sources, all at the same time. Without all three, historians, whether professional or amateur, risk recasting history over and over again, only to continue the misperceptions and superstitions of the past. ❖

by:

John Lee Bumgarner, Managing Editor, N.C. Museum of History, Division of Archives and History

THE TOOL BAG

Periauger, Pettiagua, Petty Puzzler:

Kunner, Cooner, Colloquial Conundrum

WHAT'S IN A NAME? "HANDLES" by which we know things are important in conjuring up images to fit the named. A query appearing in the *Council News* (Summer, 1992) calls our attention to a term often used in eighteenth and early nineteenth century sources to describe a type of boat found in North Carolina waters. What does a *periauger* look like? This puzzler is of such widespread interest and is so much fun to kick around, we thought we ought to devote some space to it and see what we generate.

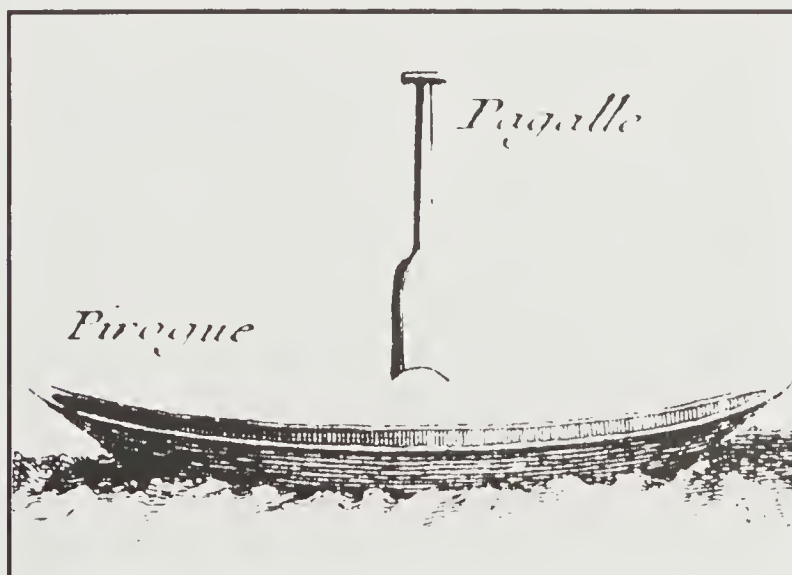
The problem, at least in part, is that the term *periauger* (or any of its many spelling variations, such as: *perriaugua*, *periaugoes*, *periaugoes*, *peeryaugoes*, *perry-auger*, *periaugua*, *piragua*, *pettiagua*, *pettiagua*, *pettyager*, *petty augre*, and *petty-ager*) fails to call up a distinct image in the minds of many readers. Unlike *sloop* and *schooner*, for instance, the term *periauger* doesn't get much help in most maritime dictionaries, and often the reference is to a boat from some other part of the world. But, like the vessels known as sloops and schooners, we can expect that there are a number of configurations to which the term applies. Before we get to these interesting craft, though, we should look at an associated type.

In going through the archives, we also see numerous references to *canoes*, along with *periaugers*, in this same period. Canoe is the term used most consistently in the English language to denote a boat made from a log and typically propelled by paddles. Thus, canoes were found wherever the English went, just as wherever the French went, they found *pirogues*. If *pirogue* seems to resemble any of the variations of *periauger* in the above listing, it may not be coincidence, as we shall see.

Howard Chapelle, the noted marine historian, coined the phrase *boat-canoes* to differentiate between the log boats that the Colonials built and the native Indian canoe. John Lawson describes the process of building Colonial "canoes" and "pereaugers" in the Carolinas as early as 1700-1708. An inventory of an estate in Carteret County, dated 1745, lists both a "canoe" and a "Petty Augre" and states their values at eight and twenty pounds, respectively. Newspaper advertisements from the 1780s and 1790s describe lost or stolen "canoes" in Edenton, and as late as 1868, a "canoe" is named in a bill of sale registered at Beaufort, N.C.

The term *kunner*, and its variants (*kunnah*, *cooner*) derive from the verbal rendering of canoe in the local dialects of eastern North Carolina communities. I first heard the term from oral sources, and eventually settled on *kunner* as the best phonetic spelling (In James City on the Roanoke River, the name sounds more like *ke-nuh*, and refers to a river dugout that ranges up to twenty feet in length and has a beam of two, to two-and-a-half feet.) Photographs made around the turn of the century and earlier show boats made from logs, but of course aren't labeled for easy identification. They show a wide range in shape and size, so what did a *kunner* look like?

Every profession has its special tools and expertise requirements, and each professional has his or her own "tool kit." With this issue of *TRIBUTARIES*, we are inaugurating a new department, in which we hope to share with our readers some of the special tools and knowledge peculiar to maritime historical studies. We welcome inquiries, suggestions, comments, and discussion that might be used in future installments.



Once when I asked an old boatman from Carteret County what a kunner was, he said simply, and without hesitation, that they were “the boats folks used before they had skiffs and sharpies.” Others have said simply that they were logboats, or once in a while, “three-log-boats.” OK, but what did one look like?

In a number of the photographs, which date from the late 1800s and early 1900s, we see logboats that are very boat-like in form, not narrow and pointed on both ends like canoes or dugouts of woodland waters. At least three boats of this type are preserved in North Carolina today. One, a split-dugout in the Museum of the Cape Fear, is fourteen feet long; two others, a fourteen-foot single-log, and a three-log twenty-footer, are in the collection at the North Carolina Maritime Museum. Interviews with old boatmen have confirmed that these boats are properly called kunners.

Periauger has been applied to many different boats around the world. The name probably stems from the same roots as pirogue. Some authorities say that pirogue is the French version of the Spanish *piragua*, which is supposed to have come from the Carib word, *piraguas*. Whether or not this is so, the forms do tend to show the association of the terms, pirogue, perriagua, periauger, etc.

In the United States, the use of the terms pirogue and periauger settles into two distinctive boats. Pirogue seems mostly limited to canoe-like craft — and their plank-built derivatives — of the lower Mississippi drainage area, especially the Louisiana bayou country. Periauger seems now limited to historical usage, in reference to an extinct type of boat in the U.S. Both the term and the boat, perhaps, had dropped out of use by the Civil War. Muriel Parry, who is writing a dictionary of vessel types, says they disappeared about 1800. Rusty Fleetwood reports the term in use as “pettyager” as late as the 1920s in Georgia.

The term periauger has a long-standing application to a type of rig characterized by two unstayed masts and having no headsails. The rig — and its name — has been used for yachts as late as the middle 1900s in New England. For years I was unable to make a connection between this rig

and the southern vessels, until I came across a watercolor and ink drawing of Charleston harbor, made between 1735-39, in which two craft are shown rigged in a manner very similar to the periaugers of the northeast.

In yet another eyewitness drawing of a periauger, a traveler on the Savannah River in 1736 sketched a boat similar to the Charleston vessels except that it looks to be larger and is fitted with a bowsprit and headsail. This is an adaptation that could be made quickly and would require no major changes to the basic structure of the boat.

Adaptability would have been an essential ingredient for a vessel type, were it to be very successful during this early period in the colonies’ development. The wilderness was not a proper place to build sophisticated ships to accepted European standards.

A very interesting boat was recovered from the Black River, near the site of Brown’s Ferry in South Carolina, that seems to bear out that premise. It has steps for two masts, the locations of which match those of a periauger’s. From artifacts associated with the boat, archaeologists dated it to around 1730. Although the hull is not made from logs, its construction is all the more remarkable. The workmanship appears crude at first glance, yet upon closer study an economy of design emerges that speaks volumes about the builder’s knowledge of his craft and the conditions prevailing during construction.

A widely publicized model depicting the reconstructed vessel is largely speculative, but enough of the original hull is preserved to delineate a construction scheme that is clearly adapted to the realities of the remote, undeveloped colonies. The vessel is large, nearly sixty feet overall, but might well have been called a periauger by the people of its day.

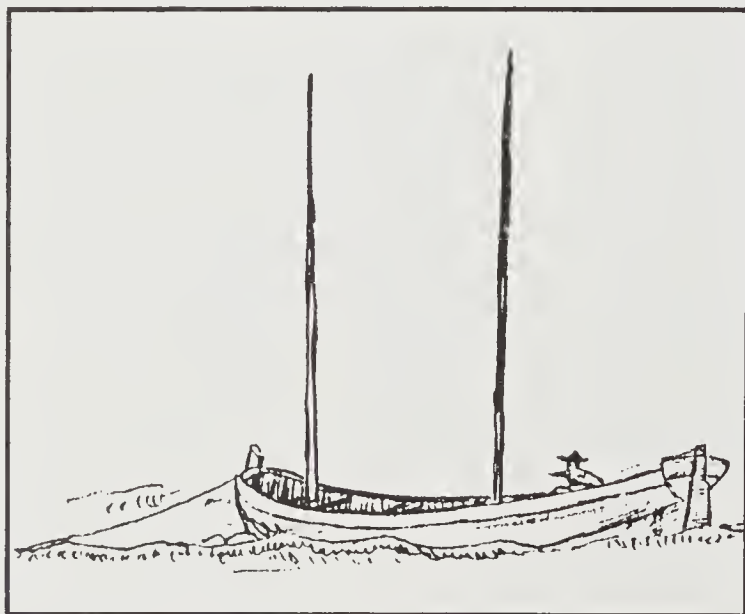
While the name periauger may be French or Spanish in its derivation, configuration of the rig itself appears to be Dutch. Peri-

augers in North and South Carolina owe nothing to the Dutch rig except in the most indirect way. It may be very significant that John Lawson prominently links periaugers, canoes, and the French settlers to the same type of boat construction. However, in New York and New Jersey there were large scows, called “pereaugers,” used for ferrying on the Hudson. The Dutch settlers in New Amsterdam may have had something to with naming this rig. A similar vessel was



redrawn from a 1739
view of Charleston

redrawn from a 1739
view of Charleston



the New Jersey pirogue, without any apparent French associations.

The evidence generally suggests that periaugers were larger than canoes but smaller than coasting vessels such as sloops and schooners. John Lawson's account, in addition to the descriptions of how "periaugers" were made, also says that they were for use on the rivers, creeks, and bays.

That gives us an idea of their size and configuration. F. W. Clonts, writing in 1926 on travel in Colonial North Carolina, says that, "In size the perriauger seems to have been a vessel between the large canoe and a small sloop . . ." and that compares well with our data. Such a vessel would be about three to five tons burthen, or a minimum of twenty-seven to thirty feet in length.

In *The State Gazette of North Carolina* for Thursday, March 19, 1789, there is an advertisement for the return of a stolen canoe that supports this deduction. In addition to learning the kind of wood the canoe was made of, we read that it was a "large canoe," {emphasis mine} twenty-six feet long," and that it worked six oars.

The few references to canoe rigs usually give it a single mast, although Lawson says the canoes on the Santee had two masts with Bermuda sails. A canoe in the Charleston Museum, said to have been built on the Santee River about 1855, is just short of thirty feet long and is fitted with a step for a single mast. Periaugers are almost always two-masted, and they all could be rowed, evidently. A drawing from the Civil War period labeled, "lighthouse keeper's boat," shows what appears to be a canoe-sized dugout with a two-masted, jibless rig — essentially the rig of a periauger. Is it a canoe or a periauger? Taking into account the needs a lighthouse keeper would have for a boat, we should probably call the vessel in the drawing a large canoe. We should expect that boats of these proportions would be single masted up to about twenty-two feet in length. Anything much over that would handle better with two masts.

The significance of canoes and periaugers — and the secret of their success and popularity — is that they could be built almost anywhere and in a short time. All a builder

needed, besides the knowledge and skill, was suitable logs (one to three, depending on type and size of boat) an axe, and no more than a couple of adzes — all basic hand tools. This was a critical factor in the development stages of the young, struggling colonies that were the Carolinas: far-flung, remote settlements without sawmills; settlers, without sophisticated skills and having only simple tools; and

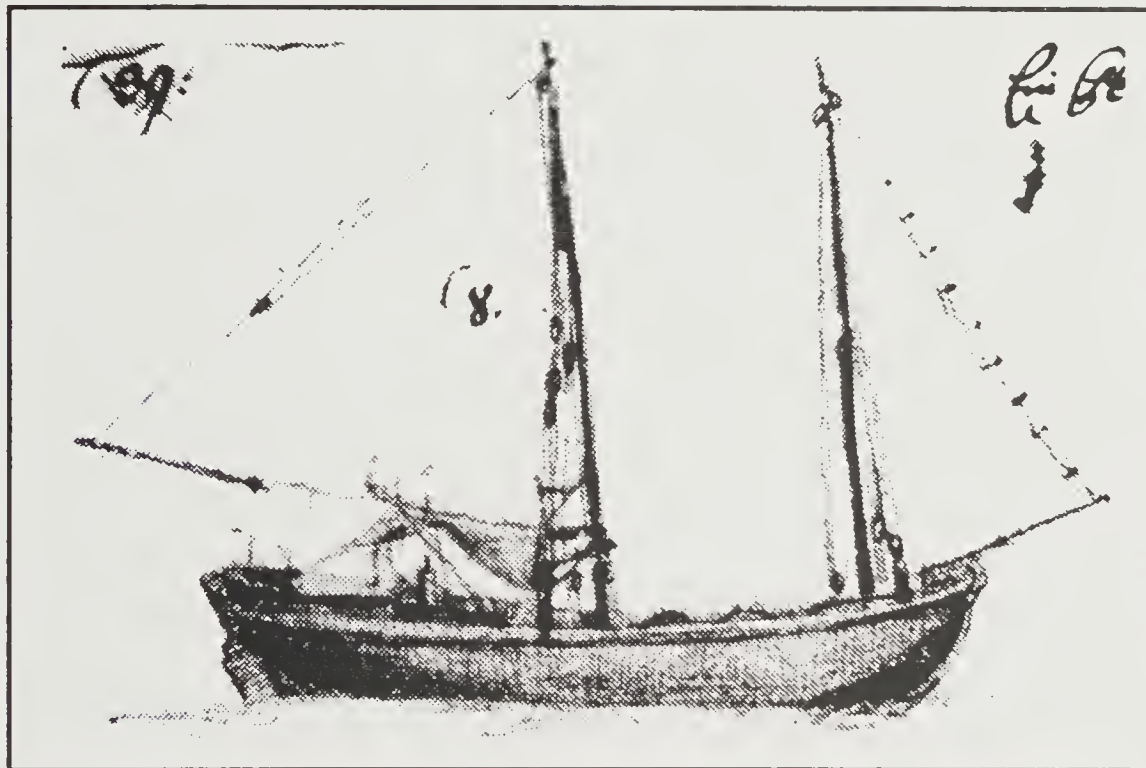
miles of river banks flourishing with raw materials.

This brings us down to a couple of critical points. First, folks who study vessels and how they develop probably place too much emphasis on type-names and thereby attribute exaggerated significance to the name. We come to expect that there is a name for every-

thing, and that everything has a special name. We do, after all, need labels, but we also need to remember how these watercraft were used and what they represented to those who built and used them. If you go down to Harkers Island today, and go around to the boat harbors with an old waterman, you will see a wide variety of boats up to about twenty-two feet long and fitted with a wide range of gear and propulsive units, all arranged in a plethora of configurations. If you ask the old timer what each is, he will probably say, "It's just a skiff." And if you press him, he might say, "Well, it's a work skiff. Just one of the work skiffs."

C.C. Crittenden wrote in 1937 that, in South Carolina and Georgia, "pettiauger" seems to have been a generic term for boats that could be sailed or oared, but in North Carolina, "[periauger] . . . was used . . . to designate a boat of a specific type." In those terms I would have to disagree. There was no need to be so specific. It is unreasonable to think that a designation would be so narrow, or that it should refer to anything different than in South Carolina.

So where have we gotten with all this? If we put it all together and stay within our context, we can say with reasonable confidence that a periauger was a type of vessel used in the Carolinas in the nineteenth century and had the following characteristics: it was an open, or partially decked craft of three to five tons burthen; it was built of one or more logs, or with techniques either derived from logboat building methods, or with plank-and-frame methods adapted to undeveloped regions; it generally carried two masts, and some-



von Reck's 1736 sketch of a periauger on the Savannah River.

REPORTS *from the* FIELD

Otter Creek schooner and Rose Hill sailing vessel investigated.

Underwater Archaeology

Underwater archaeological reports on two important North Carolina submerged sites have recently been completed. The reports, which detail exploratory excavations of the Otter Creek and Rose Hill sites, are described below:

Claude V. Jackson III.

HISTORICAL AND ARCHAEOLOGICAL INVESTIGATIONS OF A SUNKEN FEDERAL PERIOD VESSEL NEAR ORIENTAL, NORTH CAROLINA. East Carolina University, Department of History, November 1991.

THE PURPOSE OF THIS STUDY IS TO PRESENT the results of archaeological and historical investigations of a shipwreck located near Oriental, North Carolina. The discovery and subsequent excavation of a shipwreck determined to be of federal-period-age provided the author with a rare opportunity to document a vessel used in the commerce of the lower Neuse River during this period.

Excavation of the site, which was conducted during a two-week period in August 1988, revealed the remains of a 58-foot schooner buried in the mud of Otter Creek. Much of the vessel, which was constructed of white oak, remained in an excellent state of preservation. International high school students from an organization known as Operation Raleigh, staff of the state Underwater Archaeology Unit, and a representative from the North Carolina Maritime Museum assisted the author in excavating two trenches, one athwartship and the other longitudinal, to expose the ship for analysis. Additional excavations were conducted in the stern area and starboard side of the ship.

Sections of the vessel's architecture that were documented include the keel, apron, two breasthooks, floors and futtocks, sternpost, stern knee, ceiling, and keelson. The presence

of pine hull sheathing, which was a measure taken to protect vessels that were used extensively in warm waters from teredo (shipworms) damage, confirmed its use in southern or tropical waters. Structural components of the Otter Creek wreck were compared to similar components of other documented ships of the same period that have been found on the east coast, and were determined to be similar to those of Chesapeake Bay. The two mast steps of the Otter Creek wreck are placed directly over keelson scarfs, which is thought to be an unusual arrangement. Moreover, the scarf under the forward mast step, which is placed on the extreme end of the keelson, is unusual in that it is a vertical scarf.

Artifactual materials obtained from the wreck include bottle and pane glass, stoneware, creamware, pearlware, and what may be whiteware. Four pipe stems and a bowl were also recovered. Wooden artifacts found on the wreck included several cask components and a mallet. A terminus ante quem date of 1772 was provided by an unusual metal button impressed from a Spanish coin. Analysis of faunal and botanical specimens showed a wide variety of domestic food resources and some that indicate trading links with tropical ports. The relatively few artifacts from the wreck tend to indicate that the vessel was scuttled or abandoned in the shallow water of Otter Creek.

Historical documentation suggests that the wreck may be associated with the Farnifold Green family. Farnifold Green and his descendants owned the property where the ship was discovered and have played a key role in the development of the lower Neuse River area, known as the "cradle of Neuse colonization," and in the subsequent growth of New Bern. ❖

Mark U. Wilde-Ramsing, editor.

HISTORICAL AND ARCHAEOLOGICAL INVESTIGATIONS OF AN EIGHTEENTH CENTURY VESSEL AT A COLONIAL PERIOD RIVER LANDING NEAR WILMINGTON, NORTH CAROLINA. *Underwater Archaeology Unit, Department of Cultural Resources, June 1992.*

THE ROSE HILL LANDING WAS ONCE THE SITE OF A colonial plantation on the Northeast Cape Fear River, six miles above Wilmington. The discovery of eighteenth-century wine bottles in association with a large wooden wreck at the landing was reported to the UAU facility at Fort Fisher by local divers in 1987. UAU archaeologists confirmed the site during several brief visits shortly thereafter.

A major underwater investigation was organized and conducted May 9-13, 1988, at the Rose Hill site. The 62-foot by 12-foot shipwreck was found exposed on the east channel shoulder of the river bottom with a thin layer of fine sandy sediment covering it. Detailed mapping of the river site was difficult because of the murky water and swift tidal currents. Working at a depth averaging 18 feet below the surface, divers installed a reference baseline above the keel of the vessel.

In order to make the necessary measurements, divers cleared ballast rock and tree limbs from the interior of the hull by hand and used a fire pump dredge system to vacuum sediments from key structural features. Small artifacts were captured in a screening box attached to the dredge exhaust. Divers also visually inspected the river bottom surrounding the vessel, searching for associated structural components. This controlled-line survey located the rudder and several dislodged frames.

Based on field research, projected measurements for the Rose Hill vessel are an overall length of 67 feet, with a 22-foot beam, and a displacement of approximately 103 tons. It appears to have been a single-masted sailing vessel (a large sloop or cutter) built in a northeastern colony early in the eighteenth century. The vessel was outfitted to operate in southern waters, but no evidence of cargo was found. Charring, observed on recovered artifacts such as the bilge pump tube and a detached plank, as well as on the submerged hull itself, showed that the vessel has suffered extensive fire damage, which probably caused its sinking.

Small artifacts, including Indian ceramic sherds, colonial wine bottles, nineteenth-century crockery fragments, and World War II U.S. Army Medical Department plates, revealed man's long and continuous use of this area of the river. However, the mix of objects deposited at the landing was so thorough that it has been extremely difficult to tie datable artifacts exclusively to the wreck.

Upon completion of the five-day field session, laboratory analysis and conservation began and continued for several years. Specialized analysis was sought for the wood, ballast rock, and caulking samples, and inquiries were made con-

cerning possible identification of a cookstove. Documentary research focused on the construction of eighteenth-century vessels and on riverine activities taking place near Rose Hill, particularly during the Revolutionary War.

Few entries for vessels lost in the Northeast Cape Fear River exist in the UAU shipwreck files, and none could be found to identify the Rose Hill vessel positively. Reference to an American schooner and sloop that burned in the river during the British occupation of Wilmington in 1781 has been found (Andrew Barkley in the State Records of North Carolina, XV:XVI:IX). Although the sloop is an inviting candidate, efforts to place it at Rose Hill have failed: the vessel's demise appears to have taken place well upstream. It is likely to have been a vessel that accidentally burned at its mooring at Rose Hill.

Construction details date the Rose Hill wreck to the eighteenth century. Its physical remains represent vestiges of the colonial period in North Carolina, which are extremely rare. The potential that the wreck site holds for information can significantly supplement written records relating to shipbuilding and commerce of that period. The information derived from the May 1988 expedition has provided a thorough understanding of the Rose Hill wreck's archaeological significance, present condition, and surrounding environment which will guide future management decisions at the site. ❖

Contributed by Mark Wilde-Ramsing, Underwater Archaeology Unit. For information on the availability of these reports contact the Underwater Archaeology Unit, P.O. Box 58, Kure Beach, N.C. 28449.

NORTH CAROLINA MARITIME MUSEUM

THE MUSEUM WELCOMED ROGER B. ALLEN TO THE STAFF in June. Roger, whose title is Curator of Boatbuilding Technology, will head up the activities in the Harvey W. Smith Watercraft Center. These programs include boatbuilding, historic small craft conservation, and educational maritime technology programs. Roger joins the museum staff with thirteen years of experience at the Philadelphia Maritime Museum where he developed and ran a similar program and was small craft curator.

Since Roger arrived on the job, the Watercraft Center has completed restoration of a North Carolina shad boat, which will be displayed in Hertford, built cradles for two recently acquired boats, re-furbished two boats for resale, and has been getting the boat shop in shape for a variety of up-coming programs. Roger and technician William Prentice are organizing a volunteer group that will be very instrumental in the success of future activities at the center.

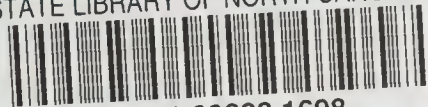
Historical Small Craft Collection: In addition to three recently acquired flatbottom skiffs, the museum was very fortunate to receive a three-log canoe, or kunner, known to have been built in Hyde County prior to 1880, and probably

before the Civil War. The twenty-foot vessel makes a significant contribution to the museum's effort to collect craft that exemplify the unique types of boats that have been developed within the state's boundaries.

The North Carolina method of three-log construction is different from the three-log canoes of Chesapeake Bay. The Bay boats are built with nineteenth century techniques based on logs of relatively small diameter. The Carolina construction can be traced to the split-dugout canoes and periaugers described by John Lawson in 1700. The technique was facilitated by the abundance of huge cypress trees along the rivers of the coastal region.

The museum's kunner was donated by Luther Sawyer of Edenton, whose great-grandfather built it at the head of the Alligator River, near Lake Mattamuskeet. The Sawyers were able to provide information about the boat's peregrinations in its long life, including a period in which the boat served as a cattle trough. From that ignominious fate, it was resurrected to once again earn an honest living as a working boat, and finally to retire with dignity in the 1970s. ❖

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