FORT MACON RAMPARTS

a newsletter of the Friends of Fort Macon Spring 1995

HOT SHOT FURNACE

To Become Reality

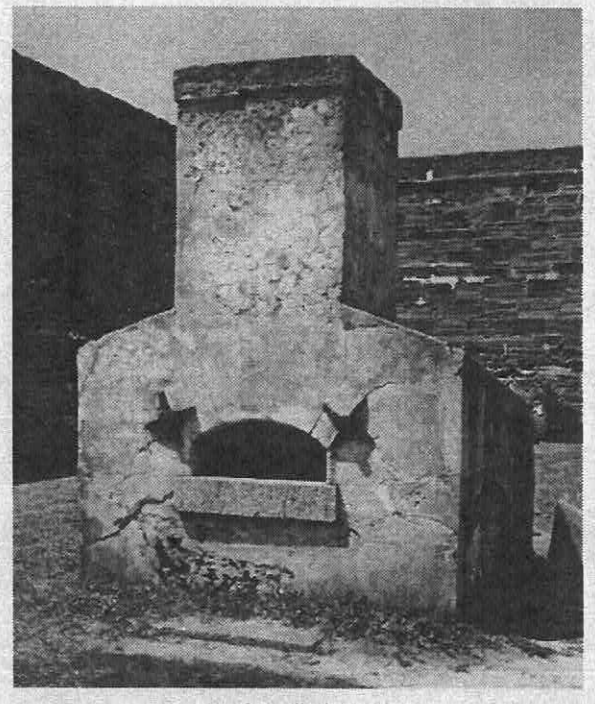
By Paul Branch, Fort Macon Historian

. . . So, What's a Hot Shot Furnace?

Hot Shot Furnaces are structures included in the typical defenses of any fort which were used to heat non-explosive cannonballs red hot for the purpose of setting fire to enemy warships, buildings or equipment. The use of hot shot goes back centuries and only ceased when modern armored warships appeared in the world's navies. Fort Macon's furnaces were removed long ago by the Army once their usefulness declined. Although the original furnaces were built at a cost of about $300 in the early 1800's, the modern cost of replicating one is high due to the fact they are free-standing brick masonry structures with special iron racks, grates and braces. However, through the interest and generosity of the Atlantic Beach Merchant's and Professional Association, a sum of $15,000 has already been donated toward the project.

The Use of Hot Shot

The use of hot shot represents one of the most unusual and effective defenses possessed by a fort such as Fort Macon in the eras predating modern armored warships. However, the idea of setting fire to enemy ships and equipment can actually be traced back in antiquity where flaming arrows and incendiary compositions such as "Greek Fire" were used in warfare hundreds of years before Christ. Similarly in 54 B.C., heated clay balls were used by the Britons to burn Roman tents and camps. In Classical and Medieval siege warfare, catapults and similar devices commonly hurled fire balls and incendiaries into besieged castles and towns. Then with the invention of gunpowder, cannons came into general use during the Hundred Years War (1337-1453). It was only a matter of time and logical thought that efforts would thus be made to modify cannon projectiles to cause fires. Perhaps the first successful use of hot shot was by King Stephen Bathory of Poland against the Russians in 1579 at Polotsk. Thereafter the use of heated projectiles became increasingly important over the next 200 years, especially against ships. During the Revolutionary War in this country, for instance, American and French artillerymen burned the 44-gun British warship *Charon* with hot shot during the battle of Yorktown in 1781. Perhaps the most famous use of hot shot took place in 1782 during the Second Siege of Gibraltar when French and Spanish forces attempted to use ten large floating batteries in a bombardment against British defenders. The floating batteries had been made of heavy construction and were thought to be invincible. However, British artillery in Gibraltar used hot shot to destroy nine of the ten batteries, and inflict a loss of 1500 crewmen.



Furnace of Castillo de San Marcos, St. Augustine, FL., today.

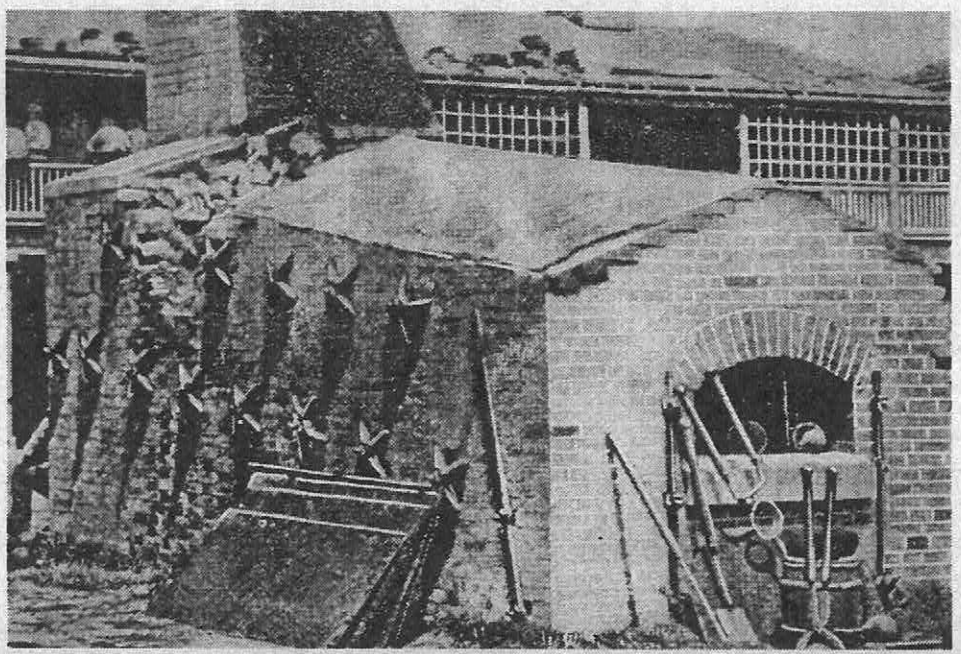
During all these instances the usual method of heating cannonballs was by covering them in the coals of a large wood fire, or heating them on metal grates placed over a fire pit dug into the earth. A significant improvement over this time-consuming method was soon developed by the French, who employed the use of air furnaces to heat shot in their batteries on the Mediterranean at the mouth of the Rhône River in 1794. Little wonder that when master French engineer General Simon Bernard came to the United States in 1816 to head the Board of Fortifications for the construction of permanent forts to defend the U.S. coast, the idea of Hot Shot Furnaces based on the French pattern came with him. The chain of U. S. seacoast forts built between 1817 and the Civil War, of which Fort Macon was a part, thus had one or more Hot Shot Furnaces built as part of their standard defenses.

The Friends Salute **The Atlantic Beach Merchants and Professional Association**
They recently presented **The Friends of Fort Macon** with a check for **$15,000.00**
toward building of the Forts' **Hot Shot Furnace**

Ladle for Hot Shot.

How the Furnace Works

Hot Shot Furnaces are brick structures varying in size as to the number of shot they are to hold and the number of guns they are to serve. They are about six to eight feet wide, and from eight to over 30 feet in length. A brick chimney is situated at one end with a firebox located in the front or side of the opposite end. The interior of the furnace is lined with fire brick and contains a set of sloping iron rails to hold rows of cannonballs. Rows of iron rods pass through the furnace from one side to the other and are fitted on each end with bolts and "star" braces to support the weight of the shot rails and roof. Cold cannonballs are placed in the furnace and allowed to roll down the inclined rails in rows. The first balls are directly over the firebox at the low end and are heated "cherry red." As they are removed, the next balls roll down into their place and are likewise heated. A large furnace might hold 60 or more cannonballs.



Battle-damaged Furnace at Fort Moultrie, SC, (war time view). Notice tools and ladles at right and lead sheathing on the roof.

Three men are required to manage a furnace. One maintains the fire and adds cold cannonballs. A second man removes heated cannonballs from the furnace and the third man cleans them. As might be imagined, special tools are required to handle hot shot. An iron fork is used to remove the heated shot from the furnace. The shot is placed on a stand and cleaned by rubbing off any loose surface scales with a rasp. A pair of tongs with circular jaws are used to pick up and handle the shot at the furnace. To carry the shot up to the cannons, hot shot ladles are used. The ladle has an iron cup for the cannonball which is fitted with one or three handles. Cannonballs under 24-pounder size are carried by one man with the single-handle ladle. Cannonballs of 24-pounder size and up require the three-handle ladle, carried between two men like a stretcher.

Fork for Hot Shot

Firing Hot Shot

The process of loading hot shot into a cannon is a ticklish operation, as one might imagine. Care is taken in order that the red hot cannonball does not somehow ignite the cannon's powder charge prematurely and thereby kill the cannoneers who are trying to load it. The powder charge, contained in a cartridge bag, is always loaded first, as normal. The cartridge bag is usually double-bagged when using hot shot to ensure that no powder grains are able to leak out into the cannon's bore as it is rammed down the cannon. Once the cartridge bag is in place in the bore, something obviously has to be placed between the bag and the red hot cannonball to prevent an unwanted explosion. For this purpose wads of moistened clay or more commonly, wet hay are used. The wad is rammed down the cannon bore against the cartridge bag, shielding it from the red hot cannonball which follows. The cannonball is next and is unable to burn through the wet wadding to reach the cartridge bag. If the cannon is to be fired at a downward angle, yet another wet wad is rammed down against the ball to secure it against rolling forward. Thus the cannon has been loaded in complete safety.

A couple of questions might come to mind at this point. First, does the red hot ball eventually burn through the wadding if the cannon is not fired? No. There is little oxygen available way down in the cannon's bore to aid combustion and the ball does not burn through. In fact it can completely cool down to normal without ever igniting the cartridge bag. However, the ordnance manuals of the period do specify firing the hot shot with little delay because considerable steam is produced which would eventually dampen and ruin the gunpowder charge. Second, does the cool air tend to reduce the temperature of the cannonball as it flies through the air to the target after it is fired? No. In fact the air friction caused by the cannonball speeding through the air adds to the temperature. The cannonball can even be made to ricochet upon the surface of the water several times without losing enough heat to ignite wood.

Another trick of the trade with hot shot is to fire it with a reduced powder charge, usually amounting to 1/4 to 1/6 of the weight of the cannonball. With a full service charge of powder the ball would burst completely through the hull planking of a ship or penetrate so deep into the planking as to be deprived of air as the wood fibers closed up around the hole. The reduced powder charge allows the ball to lodge only within the first 10 or 12 inches of the hull planking where it

A FRIEND IN NEED
ATLANTIC VENEER
Donated a beautiful
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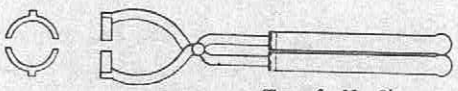
can still get sufficient air for combustion. Another advantage of the reduced charge is that a lower velocity is produced on the ball which causes a greater splitting and splintering of the wood for burning.



Tongs for Hot Shot

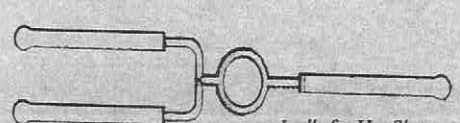
Fort Macon's Hot Shot Furnaces

The original engineer specifications for Fort Macon called for three Hot Shot Furnaces to be built. However, when the fort was completed in 1834, none of the three had been built, nor were there even any cannons sent to arm the fort until the following year. On January 17, 1836, Engineer Lieutenant Alexander J. Swift was authorized to build one Hot Shot Furnace at the fort. The furnace was commenced later that month and probably was not completed until March, 1836, due to delays in obtaining lime, cement, fire brick and metal work from New York. Its location is in the parade ground beside the Southeast Stairs where easy access is available to the guns above bearing on the sea.

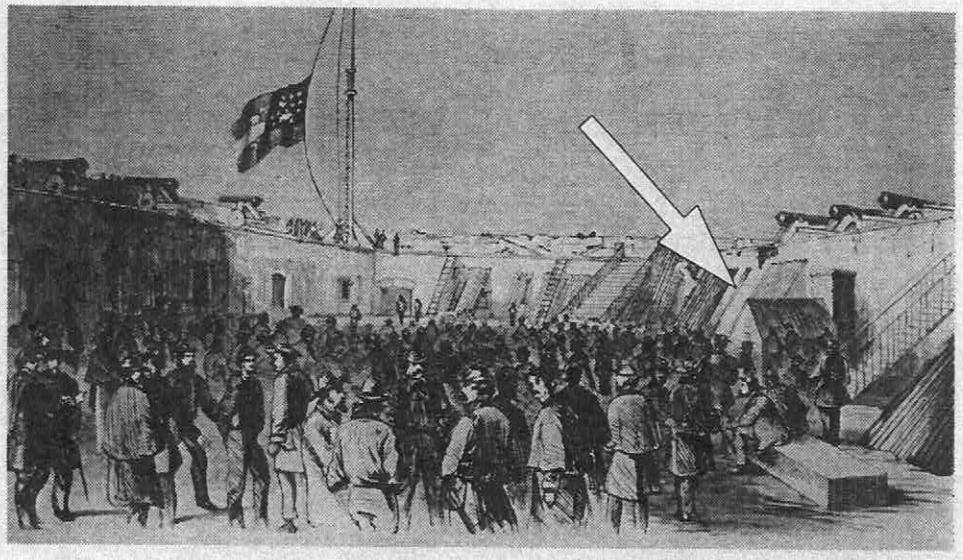
At the end of 1840, Engineer Captain Robert E. Lee inspected Fort Macon and decided a second Hot Shot Furnace was needed to serve the seaward guns on the outer wall, or Covertway. He estimated its cost would be $300. Accordingly, the addition of a second furnace was one of many changes made to the fort by the Engineers during 1841-46. Unfortunately, little is known about this second furnace. It probably was similar in size to the first furnace and was built in the ditch probably close to the south angle of the fort where stairs gave access to the guns above. The furnace was scheduled for construction during October, 1843, but no mention has been found exactly when it was built

Today the foundation of the old 1836 furnace is still visible on the parade ground as the only tangible reminder of their existence. The foundation is a brick rectangle measuring about 6 1/2 by 10 1/2 feet. The outline of the firebox/ash pit can still be made out at the front end of the foundation. Currently, it is planned to rebuild a replica furnace on this original site. Although no plans for either of the fort's original furnaces exist, plans of furnaces at other forts can still be obtained from the National Archives. Original furnaces even still exist at Forts Jefferson, Massachusetts, Pike, Morgan, Knox, Niagara, and the Castillo de San Marcos for comparison.

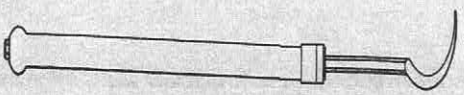
In rebuilding the 1836 Hot Shot Furnace, the Friends of Fort Macon have the opportunity to do something unique and remarkable. They will be building a structure which has not been built in this country by anyone since the Civil War and they will be replacing one of the most unusual weapons which Fort Macon, or any fort, typically had in its arsenal of defense.



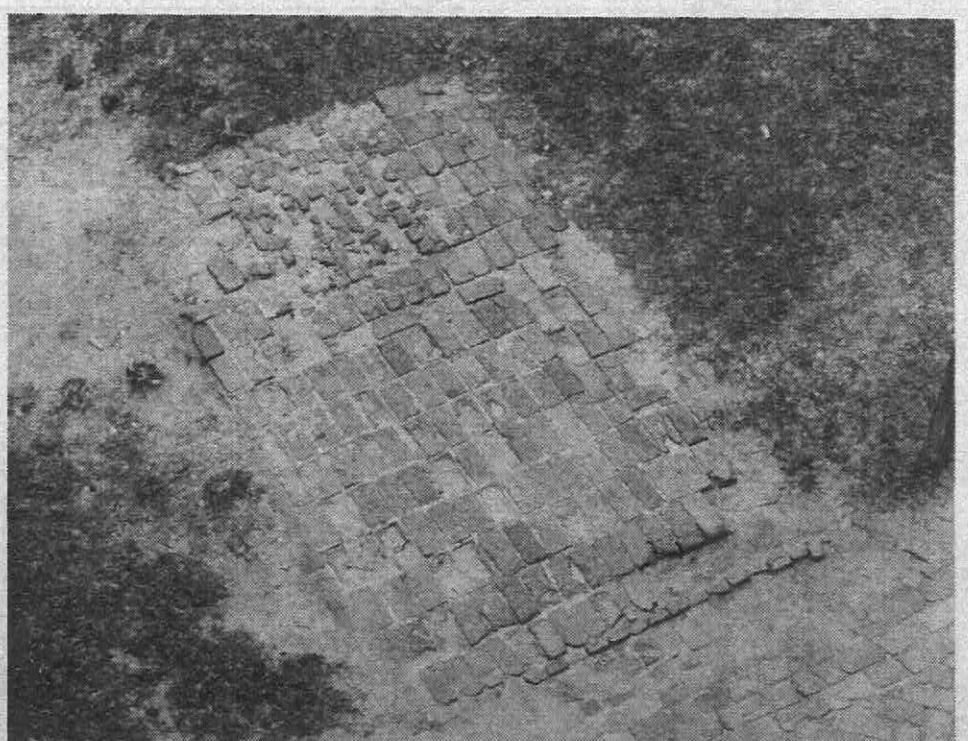
Ladle for Hot Shot



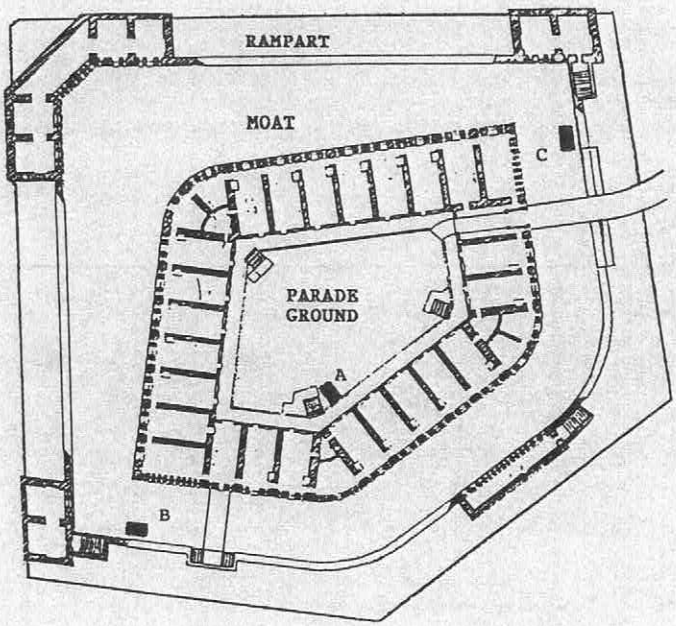
Only known view of Fort Macon's 1836 Furnace, at right.



Fork for Hot Shot



Foundation of Fort Macon's 1836 Furnace today.



A - First hot shot furnace, built 1836. foundation only remains.
B - Second hot shot furnace, built in 1845. Probable location.
C - Probable site of proposed third furnace. Never Built.

Friends of Ft. Macon Board Members

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	Jody Merritt	726-3775

We need 2000 names of potential members for our fall mailing. Have you any lists laying around the house? Clubs, church members, lists of business or what have you. Please send them to Andy Anderson, at 811 Ann Street, Beaufort!

Superintendent's Message

New Records Set In 1994

1994 brought a new record for attendance (1,462,055) and the beginning of new projects in the Park. One of the most exciting projects is the reconstruction of a Hot Shot Furnace in the Fort Parade Ground, which is now in the planning stage. This project is being made possible by a generous gift of $15,000 from the Atlantic Beach Merchants and Professional Association. The past president of this association, Sandy Dolgas, and the current president, Jim Marks, have been great to work with and deserve our heartfelt gratitude. Also, a special thanks should go to Senator Beverly Perdue for securing a $2500 grant from Cultural Resources to help in the construction of the Hot Shot Furnace. As she has done in the past, Senator Perdue continues to support the Park, and has been a great supporter of the State Park System. We hope to begin construction of the Hot Shot Furnace this Spring, now that an archaeological study has been completed on the footing of the Fort's original Hot Shot Furnace.

A new bike path has just been constructed along the main road going through the Park. This project represents a significant safety improvement over the previous situation along the Park road. Also, the Friends Of Fort Macon, with the help of the County Commissioners, paid for a new security system in the fort. The new system gives us added security, and helps to protect the valuable artifacts in the Fort's collection.

The Park staff looks forward to an exciting 1995. We will be working on plans for the first phase of restoration work on the Fort, and on designs for the Coastal Education Center. With the Friends help, many new and exciting things can take place in the Park. Thank you for your support, and I look forward to working with the Friends in 1995.

Jody Merritt

Upcomming Programs

May 3rd
"Beaufort in 1942 - Looking good from the air" Captain Dick Collins

June 7th
"Ft. Fisher - The Changing Landscape" Gehrig Spencer, Site Manager of Ft. Fisher State Historic Site

July 5th
"Nineteenth Century Maps including Carteret County"
John and Virginia Costlow

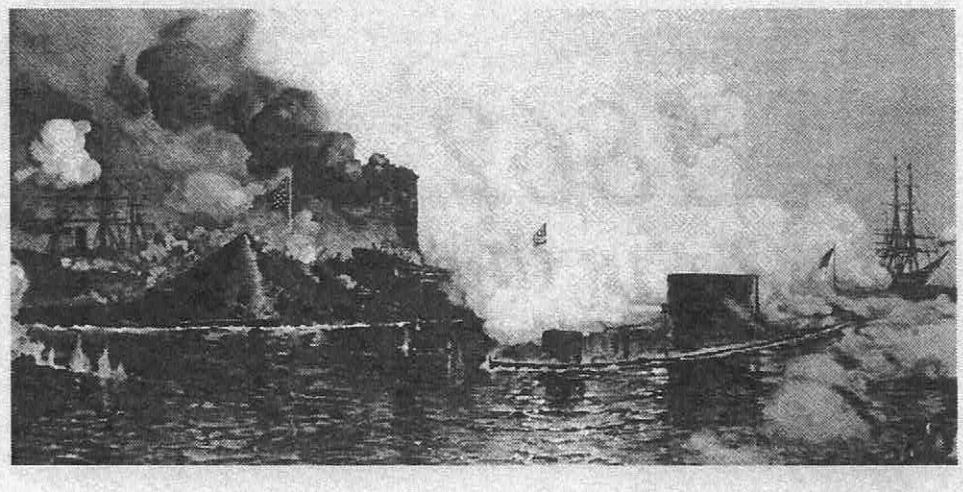
Naval Superiority Considered Fundamental . . .

George Washingtons' strategy

During the American Revolution, George Washington stated a basic tenet of military strategy: *"In any operation, and under all circumstances, a decisive naval superiority is to be considered as a fundamental principle, and the basis upon which every hope of success must ultimately depend."* This axiom applied pointedly to the Civil War, for Union naval power in the 1860's proved so important that its effects on the defeat of the Confederacy can hardly be exaggerated.

The U.S. Navy faced an awesome dilemma at war's outset, when Lincoln proclaimed a blockade of the South. The Navy had but a handful of ships available to isolate the 3,500 miles of Confederate seacoast. Both sides realized how absolutely dependent the Southern nation was on European sources of supplies. For the North to win the war, an effective blockade was imperative. The Navy was also needed for military operations along the coast and in the rivers, as well as for the protection of American commercial vessels at sea.

The very presence of the Navy in the war's first weeks had a substantial effect on the outcome. Federal cruisers in the Potomac River and Chesapeake Bay in 1861 probably saved Washington, D.C. and Maryland from falling into the hands of the Confederacy, and there can be little doubt that Federal naval control of the upper Mississippi and Ohio Rivers helped to keep Kentucky and Missouri in the Union.



The battle that decided the fate of wooden warships. The Monitor *and the* Merrimack, *re-christened the* Virginia.

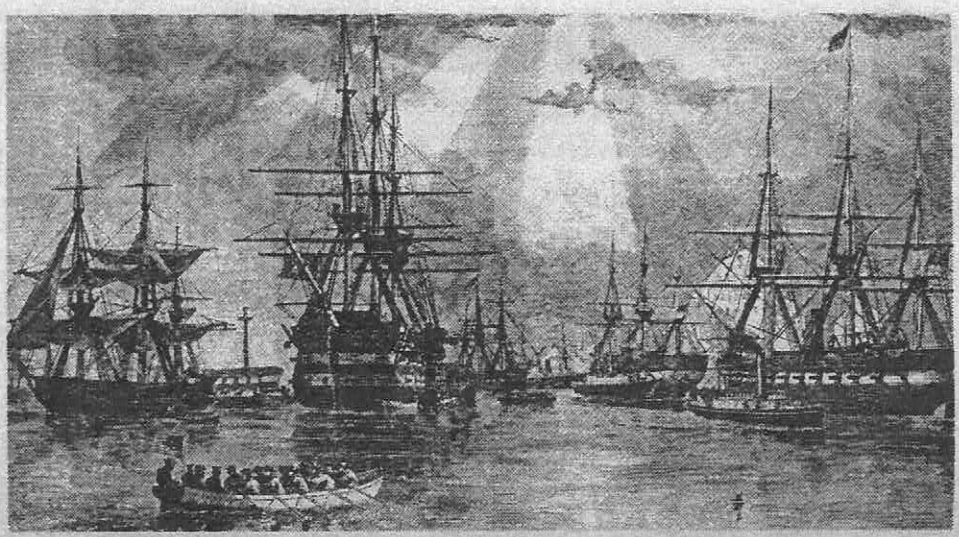
Naval forces meanwhile would sweep up the James to guard McClellan's other flank. Joseph E. Johnston's Confederate army, entrenched at Manassas and outnumbered more than two to one, would hardly present serious opposition.

The Peninsular Campaign began with the most famous naval duel of the war—if not of the century. Confederate naval officials had converted the captured Federal warship, *Merrimack*, into an ironclad vessel rechristened the *Virginia*. Packing ten guns and a battering ram, this revolutionary ship early in March gained momentary supremacy in Hampton Roads. Yet the Federals also had been perfecting an ironclad. The *Monitor* resembled "a tin can on a shingle"; and while it lacked the *Virginia's* firepower, it surpassed the Confederate ship in maneuverability.

On March 9, the two vessels came face to face in Hampton Roads. For three hours each ironclad tried futilely to sink the other. This seemingly inconclusive engagement had three major results: The duel marked the birth of steel navies; had the *Virginia* won, the North would have lost control of the Chesapeake Bay and its many waterways; and the *Monitor's* neutralization of the Confederate ironclad enabled McClellan to put his grand scheme into motion.

The Southern Confederacy had no real navy and never acquired the facilities for building one. Stephen R. Mallory, the Confederate naval secretary, was unable to surmount the additional obstacles of obtaining enough funds for sufficient foreign purchases and of overcoming the North's superior overseas diplomacy. Confederate naval efforts were thus restricted to privateering, blockade-running, menacing Union commercial ships on the high seas, and to a series of revolutionary counter-weapons such as mines, torpedoes, and tactical submarines.

What glory the Confederacy achieved at sea came from a score of cruisers that, under adventuresome crews, preyed singly on Federal naval and maritime vessels. This had the dual effect of drawing Federal warships from blockade duty (thereby increasing the odds for blockade-runners) and of denting Northern commercial interests. The first of such sleek raiders was the 500-ton steamer *Sumter*. Her commander was Raphael Semmes, the Confederacy's most brilliant sailor. A native of Alabama, Semmes had a quarter-century's naval experience behind him when civil war



Federal Fleet at Hampton Roads, Va.

Naval Superiority

began. He captained the *Sumter* for only six months, yet during that period the cruiser captured eighteen Federal ships in the Atlantic and Caribbean.

On August 24, 1862, Semmes took command of the South's premier cruiser, the *Alabama.* This 1000-ton steamer was equipped with eight guns and two 300-horsepower engines. Its crew of 144 men included more English sympathizers than Confederate seamen. During its two-year reign of terror on the high seas, the *Alabama* came to be regarded as a ghost ship. It ranged from Newfoundland to Singapore, always appearing as if from nowhere to assail its victims. The *Alabama's* sixty-nine prizes included the USS *Hatteras,* which she sank after capture.

Rear Admiral Raphael Semmes CSN

The Confederate cruiser destroyed more than $10,000,000 worth of Federal shipping and literally drove the American merchant marine to cover. But on June 19, 1864, the *Alabama* was cornered off the coast of France by the USS *Kearsarge.* For an hour, the two vessels exchanged broadsides at a range of 900 yards. The *Alabama* sank with twenty-six hands; the remainder were picked from the sea by the *Kearsarge* and nearby European vessels that had witnessed the classic battle.

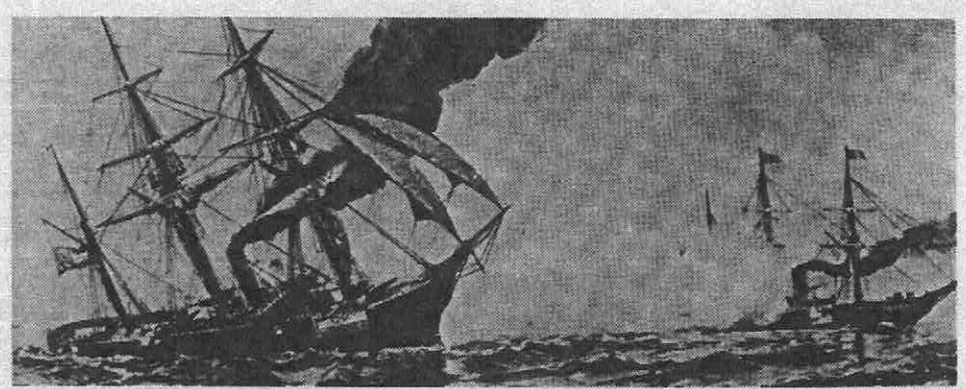
The CSS *Florida*, under Captain John Newland Maffitt, was a privateer that seized thirty-seven prizes during eighteen months of cruising in the Caribbean and South Atlantic. Her capture in a Brazilian seaport by the USS *Wachusetts* was a violation of neutral rights that the United States later disavowed. The *Tallahassee,* a former blockade-runner operating out of Wilmington, took thirty-nine prizes during her 1864 saga. Last of the Confederate cruisers was the fabled *Shenandoah,* a sailing steamer under Captain James I. Waddell. The raider sailed from England in October 1864 to disrupt the Northern whaling fleet in the Bering Sea. Among the *Shenandoah's* forty-eight captures were eight whalers burned collectively two months after Appomattox. When Captain Waddell learned of the war's termination, he returned to Liverpool. There, on November 6, 1865, the last Confederate naval ensign was furled.

Confederate blockade-runners provided some of the highest drama in the Civil War. A typical blockade-runner was a lean, low, paddle-wheel steamer, painted a dull gray and burning almost smokeless anthracite coal. Having telescope smokestacks and other streamlined features, these sleek vessels were capable of speeds up to fifteen knots. Their usual tactic, when approaching the Southern coast with a full cargo, was to keep out of sight until nightfall. Then the vessel would make a dash for port in the darkness. Confederate coastal guns would lay down a heavy bombardment on Federal blockaders while the vessel was making its run for safety. If the ship were severely damaged by Federal gunfire, it was deliberately run ashore so that at least part of its cargo could be salvaged.

The Confederacy devised several novel weapons for use in coastal defense. Various types of water mines were developed but never proved highly effective. In January 1863, Texas soldiers fortified some merchant steamers with bales of cotton on the decks and launched attacks on blockading squadrons. At Galveston the "cotton-clad" fleet captured the USS *Harriet Lane* and routed half a dozen other blockaders. The strange-looking flotilla moved on Sabine Pass and seized two other Union warships before Federal naval reinforcements arrived.

Experimentation by the South with "torpedo boats" centered around the *David,* constructed at Charleston in the autumn of 1863. The *David* was a small, cigar-shaped vessel, propelled by steam. It cruised almost submerged and attacked by means of a torpedo attached to a long spar projecting from the bow. Thus armed, the David did extensive damage to the blockader *New Ironsides* before running aground at Charleston.

"History of the Civil War"
Acorn Press



The Kearsarge *(right) meets the* Alabama. *Painting by J.O. Davidson.*

FRIENDS OF FORT MACON

Annual Meeting and Ice Cream Social

To observe the 133rd Anniversary of the Battle of Fort Macon

Sunday, April 23rd at 2:30 pm at the Fort Macon Barracks building opposite the Coast Guard Station

Bring a prospective member or two!

We are honored to have as our special guest

Dr. Philip McKnelly, *Director of the Division of Parks and Recreation*

Fort Macon Memorabilia will be on display

Music by Connie Mason

Friends 1994 Financial Results

Although no major contributions were received in 1994, the Friends of Fort Macon continued to record substantial growth in operating income while carefully controlling expenses. As you know, none of the Officers or Directors receive any compensation for their efforts in the organization's behalf.

Following is an abbreviated summary of 1994's operating results, compared with the previous year:

	1994	1993
Income		
Member Dues	$10,065.	$470.
Donation Box	6,731.	5,984.
Other Donations	1,850.	275.
Bank Interest	180.	169.
Total Income	18,826.	6,898.
Expenses		
Fort Improvements	$4,903.	$10,761.
Operating & Admin.	4,660.	1,594.
Total Expenses	9,563.	12,355.
Net Income	$9,263.	$-5,457.
Balance In Bank		
Beginning of Year	$4,961.	$10,418.
End of Year	14,224.	4,961.
Increase or Decrease	9,263.	-5,457.

Membership Form

Check One: ☐ New Member(s) ☐ Renewal ☐ Gift Membership

Fee Enclosed $ _____ Date _____

Members Name(s) _____

Street Address _____

City _____ State _____ Zip _____

Name of Donor, if gift _____

Membership Categories and Fees

Individual - $5.00 Family - $10.00

Individual Lifetime (ea.) - $100.00

Business or Organization - $25.00

Friends of Fort Macon, P.O. Box 651
Beaufort, NC 28516

Andy Anderson, *Membership Chairman*
728-3988

MEMBERSHIP

Membership in The Friends is both a privilege and a pleasure. Whether you only attend an occasional monthly luncheon meeting to enjoy a stimulating presentation by a guest speaker, or get more deeply involved by participating in one of the several committees that give direction to our organization, you are bound to take considerable satisfaction in knowing that you are contributing to the preservation of an important part of our national heritage through your membership.

Regardless of your current level of participation, your help is needed on the Membership Committee. New members are essential if we are to grow and accomplish our goals of preserving, improving and sharing the Fort and its history with friends, family and the public, far and near. Privilege and responsibility go hand in hand, and every member of the Friends of Fort Macon must be considered to be a member of the Membership Committee. If each of us recruits just one new member, we will easily exceed our goal of 1500 members this year. Our membership stood at 914 at our March first meeting. But until our numbers top 1000, our political influence will be less than what it takes to get the funding that the Fort so desperately needs. Please help. Recruit someone or give a membership to a friend or family member today. Your grandchildren would love having a membership card and receiving their own personal mail with interesting information on Fort Macon and our history. Do it today! Send in a new membership application! We had over 50 new members last month, and with a little extra push we can reach that magic number of 1000. Keep up the great work!

MARK YOUR CALENDAR
for Sunday, April 23
2:30 pm
Annual meeting of the
Friends of Fort Macon
&
ICE CREAM SOCIAL

PRESERVATION IS THE ULTIMATE RECYCLING!