



BITS & PIECES NEWSLETTER
APRIL 2014

SPECIAL SUPPLEMENT!

THE U.S.S. CAIRO



16 exposure composite of the USS Cairo

A LONG TIME AGO, IN A GALAXY FAR FAR AWAY, THERE WERE WARRING STATES THAT CREATED MONSTROUS BEASTS OF WOOD & STEEL WITH WHICH TO FIGHT GREAT AND TERRIBLE BATTLES AGAINST EACH OTHER,

IT WAS ON A BET THAT ONE OF THOSE WOOD AND METAL BEASTS WAS RECOVERED FROM THE DEPTHS OF A GREAT RIVER AFTER HAVING LAIN DORMANT AND FORGOTTEN FOR MANY DECADES.

THIS IS THE STORY OF THAT GREAT BEAST, THE USS CAIRO. (HISTORY EXCERPTED FROM:

http://www.ieeeighn.org/wiki/index.php/Electronic_Detonation_of_Mines_and_Torpedoes_in_the_U.S._Civil_War
http://www.militaryfactory.com/ships/detail.asp?ship_id=USS-Cairo-1861 <http://www.nps.gov/vick/u-s-s-cairo-gunboat.htm> <http://www.nps.gov/vick/u-s-s-cairo-gunboat.htm>

The U.S.S. Cairo was one of seven ironclad gunboats named in honor of towns along the upper Mississippi and Ohio rivers. These powerful ironclads were formidable vessels, each mounting thirteen big guns (cannon). On them rested in large part, Northern hopes to regain control of the lower Mississippi River and split the Confederacy in two as part of the overall Anaconda Plan, the naval blockade designed to deny the Confederacy economic sustenance from abroad.



Vicksburg National Military Park

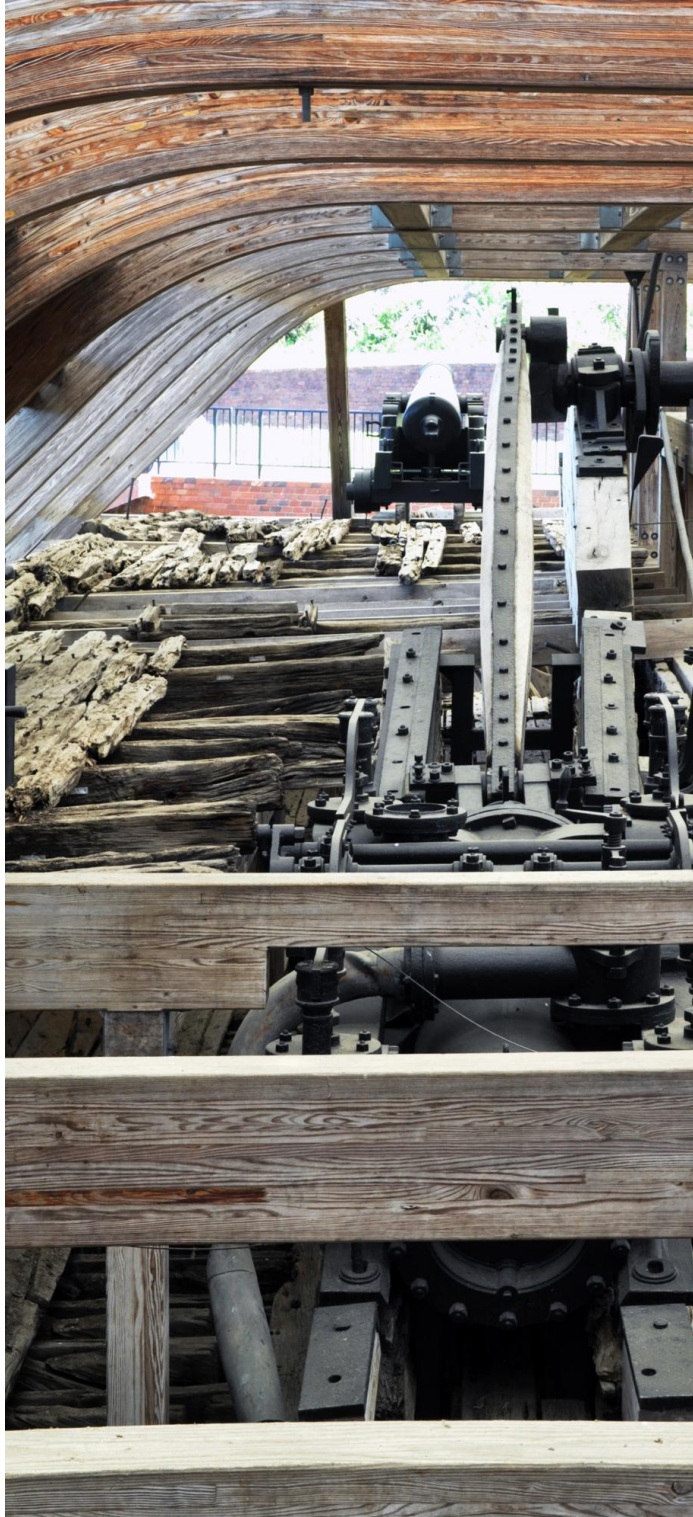
National Park Service
U.S. Department of the Interior

Chimneys

The tall wooden stacks you see towering above the boat are skeletal reproductions of the original chimneys. When *Cairo* sank, its smoke stacks were visible above the surface of the water. A sister boat, the *Pittsburg*, knocked down *Cairo's* chimneys to hide the location of the sunken vessel.

"City Class" gunboats looked so much alike that bands of different colors were painted on their chimneys to tell them apart. *Cairo* had gray bands.

A diagram of the USS Cairo showing the location of the chimneys. The diagram is a cross-section of the boat, showing the hull, the deck, and the internal structure. A tall, thin chimney is shown rising from the deck, labeled "Chimney". The chimney is highlighted in green. The diagram also shows the masts and rigging of the boat.



The "city class" gunboats were designed by Samuel M. Pook and built by river engineer James B. Eads. Cairo was constructed at Mound City, Illinois, and commissioned in January 1862. The Cairo was destined to see only limited action in the engagement at Plum Point in May and in the battle of Memphis in June. Her most significant action came six months later when she kept a rendezvous with destiny. The Cairo's skipper, Lt. Commander Thomas O. Selfridge, Jr., was rash and ambitious, a stern disciplinarian, but an aggressive and promising young officer. On the cold morning of December 12, 1862, Selfridge led a small flotilla up the Yazoo River, north of Vicksburg, to



destroy Confederate batteries and clear the channel of torpedoes (underwater mines). As the Cairo reached a point seven miles north of Vicksburg the flotilla came under fire and Selfridge ordered the guns to ready. As the gunboat turned towards shore disaster struck. Cairo was rocked by two explosions in quick succession which tore gaping holes in the ship's hull. Within twelve minutes the ironclad sank into six (6) fathoms (36 feet) of water without any loss of life. Cairo became the first ship in history to be sunk by an electrically detonated torpedo.

[http://www.ieeeeghn.org/wiki/index.php/Electronic Detonation of Mines and Torpedoes in the U.S. Civil War](http://www.ieeeeghn.org/wiki/index.php/Electronic_Detonation_of_Mines_and_Torpedoes_in_the_U.S._Civil_War)

The first real enhancement and development of torpedoes took place during the American Civil War, namely with Matthew Fontaine Maury. Maury, who was a native Virginian, charted the ocean currents and wrote several books about the geography of the sea. When the outbreak of the Civil War occurred, he resigned his commission in the U.S. Navy and joined the Confederacy, being placed on the advisory



council for recommendations for the protection of the Confederate waterways. He was a major advocate in

defending the southern waterways from the Federal Navy.

Maury assisted Lieutenant Isaac N. Brown and Major General Leonidas Polk in defending the Mississippi

Recovered and restored Boiler Tubes

River. He proposed that setting electric torpedoes along the river would be the best defense. They planned to place the electric mines on the bluffs of Columbus, Kentucky, to defend the Mississippi from “Cairo to New Orleans”. This was the first combat electric mine station in America and probably the world. Maury designed 50 pound, 3-foot long cylindrical containers that could be buoyed across the river. Insulated wire connected them to galvanic batteries and “telegraph key contacts hidden in caves along the thickly wooded bluffs”. Other mines were planted on land to prevent

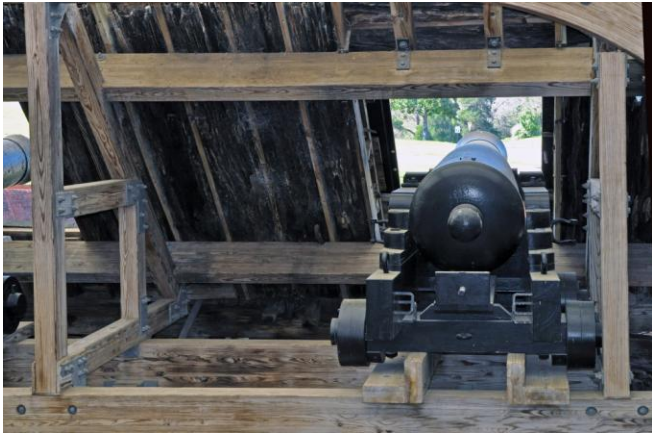


Federal troops from coming ashore. Although land and water mines were both electrical, the land mines were laid with squat iron castings with lids that had handles. The lids were fastened by eight bolts, beneath them smaller wooden boxes were placed in order to protect the holes through which the wires from the batteries passed. 4-pound artillery shells filled with canister, grapeshot, and two bushels of gunpowder were placed

inside of the cylindrical containers. Six wires then ran from the clusters of mines to a nearby cave or hill. Maury experimented with tiny cans of powder and a large washtub filled with water. He

A section of the gun deck. All of the gun tubes are original to the Cairo and were recovered from the Yazoo River

decided to detonate the mines using a percussion trigger connected with a rope lanyard. This was successful, however he wanted something better- an electric torpedo fired by a spark passing through a long, insulated cable. Despite his desire, the cables were not to be had. He dispatched a Southern agent to go to New York, the closest source, to buy telegraph wire from the enemy. This attempt proved to be unsuccessful. It is believed that the agent was picked up by the Union Secret Service in Philadelphia. Moreover, the Confederates made an effort to ask for donations of Indian rubber coats and overshoes from its citizens in order to waterproof the

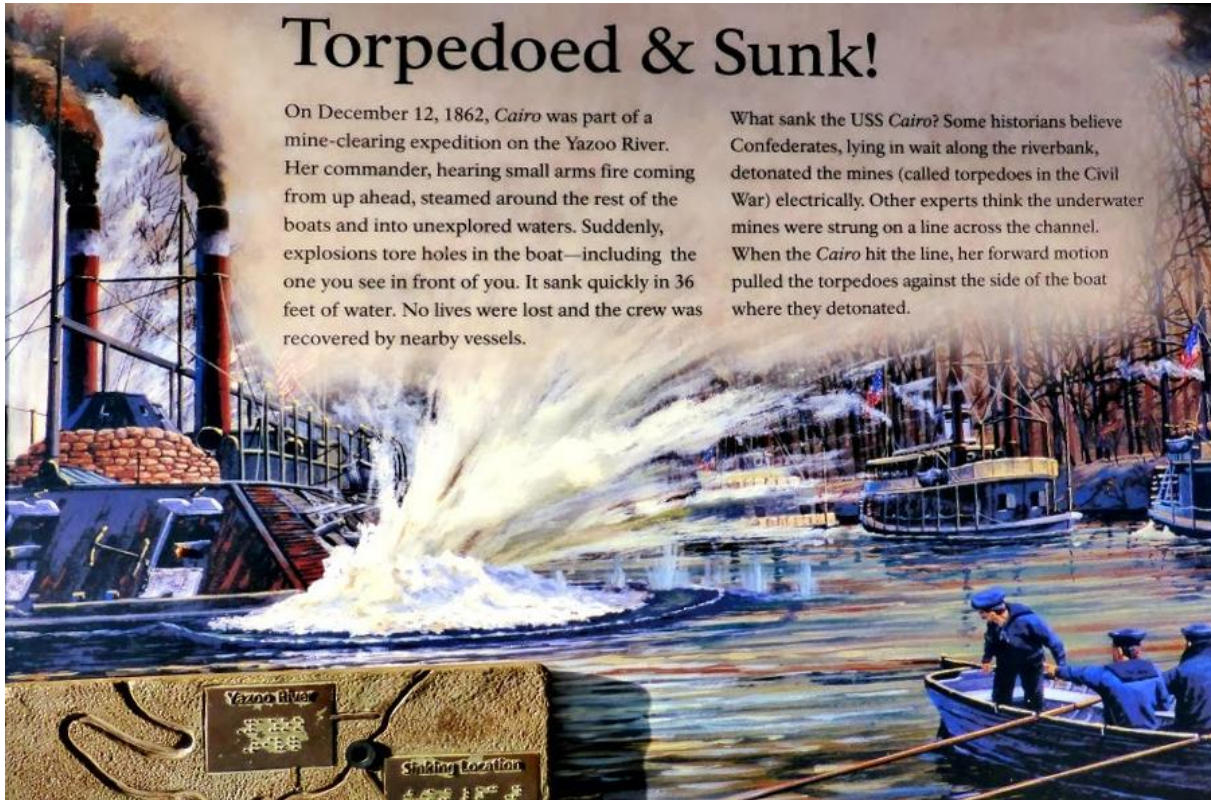


wire. Many answered the call. Despite the generous donations, not enough was received to wrap more than a few hundred feet of cable, when many thousands would be needed for extensive mine laying. Being that electrical science was still in its infancy; Maury combined efforts with the South's leading expert, Dr. (Major) William Norris, chief signal officer. Norris was originally opposed to the idea, but eventually provided advice and additionally a supply of Federal telegraph cable to Maury. The cable had been washed ashore by a storm and retrieved by the Confederates on Virginia's coast. Despite the wire being frayed and broken from the Atlantic floor, the wire

proved to be a "God-send". Being backed by Jefferson Davis and the Confederate Navy Secretary Mallory, Maury began some experiments with the electric mines. For waterproof tanks, or "magazines", several old iron locomotive and steamboat boilers were collected, cleaned, and repaired. The boilers were then filled with gunpowder. A Wollaston battery was used because it was the only one available. It consisted of "banks of cells in which were eighteen pairs of 10 by 12 inch zinc plates immersed in thirty-six gallons of sulphuric acid; it could generate enough current to explode a single charge only a few hundred feet away." Because this method worked poorly, a second system of torpedoes were better accommodated for this primitive equipment. They employed "iron magazines of 70 to 160 pounds each, anchored in clusters, or as Maury designated them, "ranges".



This is the bow section that was destroyed by the "torpedo"





The following two views show to great effect the overlapping, staggered 2" x 8" iron armor plate

Over the years the gunboat was soon forgotten and her watery grave was slowly covered by a shroud of silt and sand. Impacted in mud, Cairo became a time capsule in which her priceless artifacts were preserved. Her whereabouts became a matter of speculation as members of the crew had died and local residents were unsure of the location.

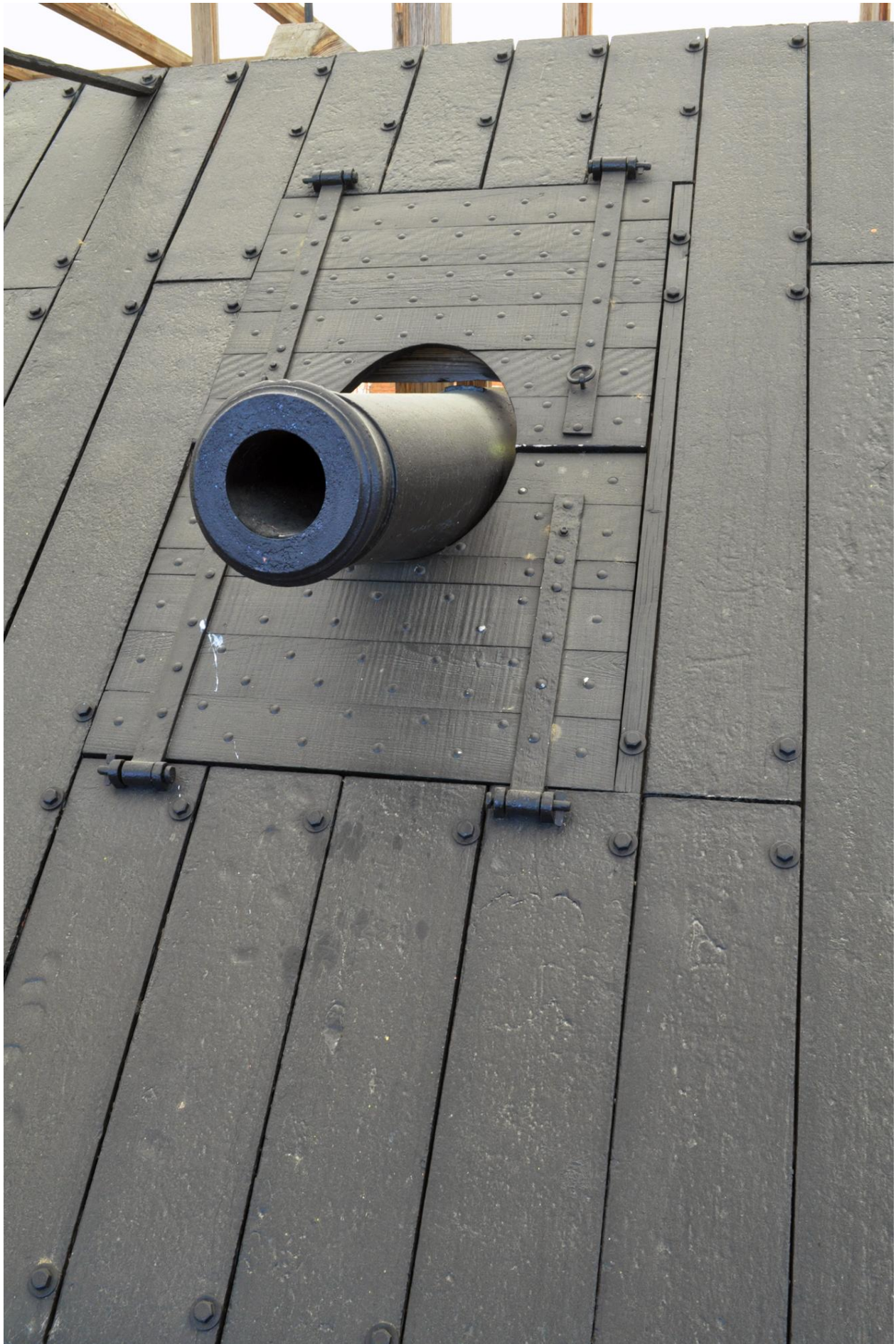


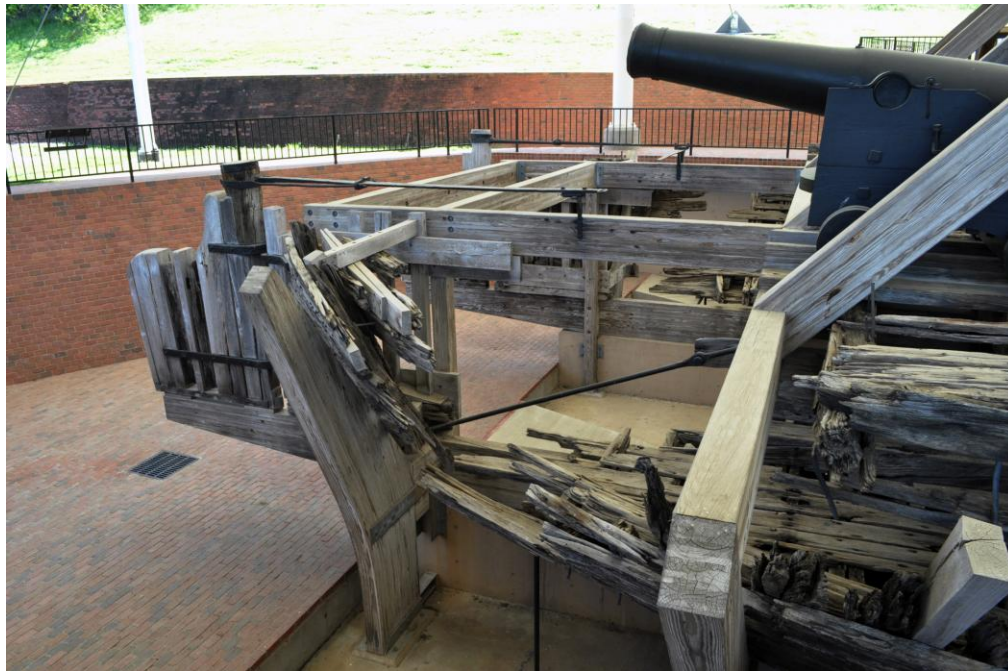
Today, Cairo's armor plate is supported by construction grade 4" x 4" lumber and pine laminate. Back, "in the day," her armor was backed by 12" of oak timber!



By studying contemporary documents and maps, Edwin C. Bearss, Historian at Vicksburg National Military Park, was able to plot the approximate site of the wreck. With the help of a

pocket compass and iron bar probes, Bearss and two companions, Don Jacks and Warren Grabau, set out to discover the grave of the Cairo in 1956. The three searchers were reasonably convinced they had found the Cairo, but three years lapsed before divers brought up armored port covers to positively confirm the find. A heavy accumulation of silt, swift current, and the ever-muddy river deterred the divers as they explored the gunboat. Local enthusiasm and interest began to grow in 1960 with the recovery of the pilothouse, an 8-inch smoothbore cannon, its white oak carriage and other artifacts well preserved by the Yazoo mud. With financial support from the State of Mississippi, the Warren County Board of Supervisors and funds raised locally, efforts to salvage the gunboat began in earnest.





Hopes of lifting the ironclad and her cargo of artifacts intact were crushed in October of 1964 when the three inch cables being used to lift the Cairo cut deeply into its wooden hull. It then became a question of saving as much of the vessel as possible. A decision was made to cut the Cairo into three sections. By the end of December the battered remains were put on barges and towed to Vicksburg. In the summer of 1965 the barges carrying the Cairo were towed to Ingalls Shipyard on the Gulf Coast in Pascagula, Mississippi. There the armor was removed, cleaned and stored. The two engines were taken apart, cleaned and reassembled. Sections of the hull were braced internally and a sprinkler system was operated continually to keep the white oak structural timbers from warping and checking.

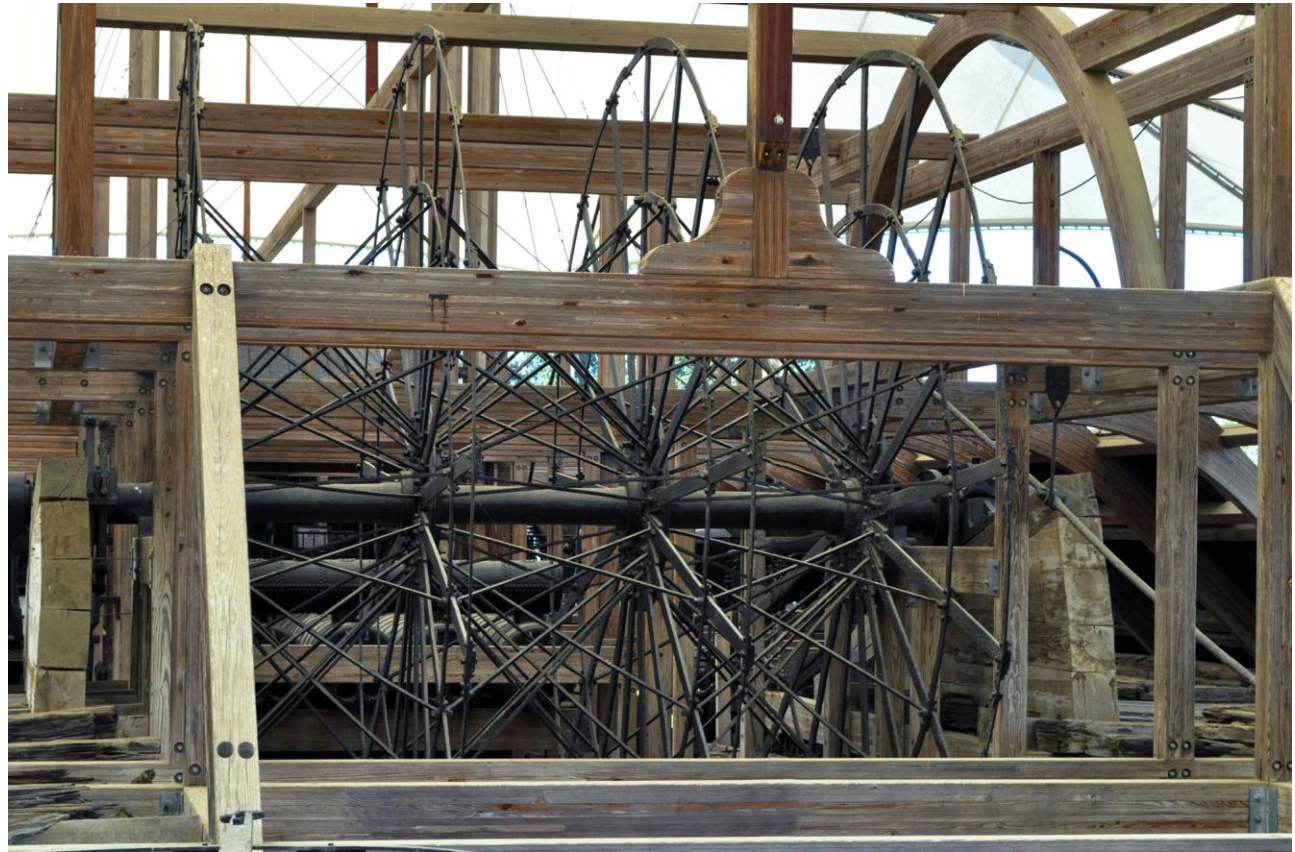


The need for iron armored ships like Cairo became necessary with the invention of the exploding shell in 1822 by Henri Paixhans. With this new technology naval warfare entered a new artillery era with exploding shells being fired on a horizontal trajectory so the exploding shell could break through the wooden ship and explode inside killing crew members and destroying the gun platforms. The rifled cannon was a relatively new development in naval artillery at the time of the Civil War. This new weapon using exploding shells made the wooden ship of the line obsolete. Vessels like the USS Cairo became the premier naval fighting craft of the Civil War.



This view highlights the construction of the massive connecting rods.

Gunnery tests conducted by both sides early in the war demonstrated that armor thicknesses of two inches or less were insufficient to shield against naval exploding gunfire. However the technology of the day of the day only allowed the production of two inch iron plate, so most ironclads employed multiple layers, called plate layering. Two layers of two-inch plate was generally the standard for ironclads with some having a third layer. Plates were usually rolled or cast in oblong blocks and rolled to their desired dimensions. But, on some vessels, the plates were actually hammered out from the forge. This hammering method was time consuming but accounted for the armor's increased strength (due to work hardening).



Engineers experimented with various forms of iron plating, including coating the armor with lard or grease to deflect the incoming rounds. The results did not justify the effort, and the smell of the lubricant in the hot sun was a major problem for the crew! The weakest point of the ironclad was the hull. Not only was the wooden hull easily breached, the lack of watertight compartments made it impossible to isolate damage making them especially vulnerable to mines (then called torpedoes). In addition, the deck and stern were not armor plated which made the vessel vulnerable to plunging fire.



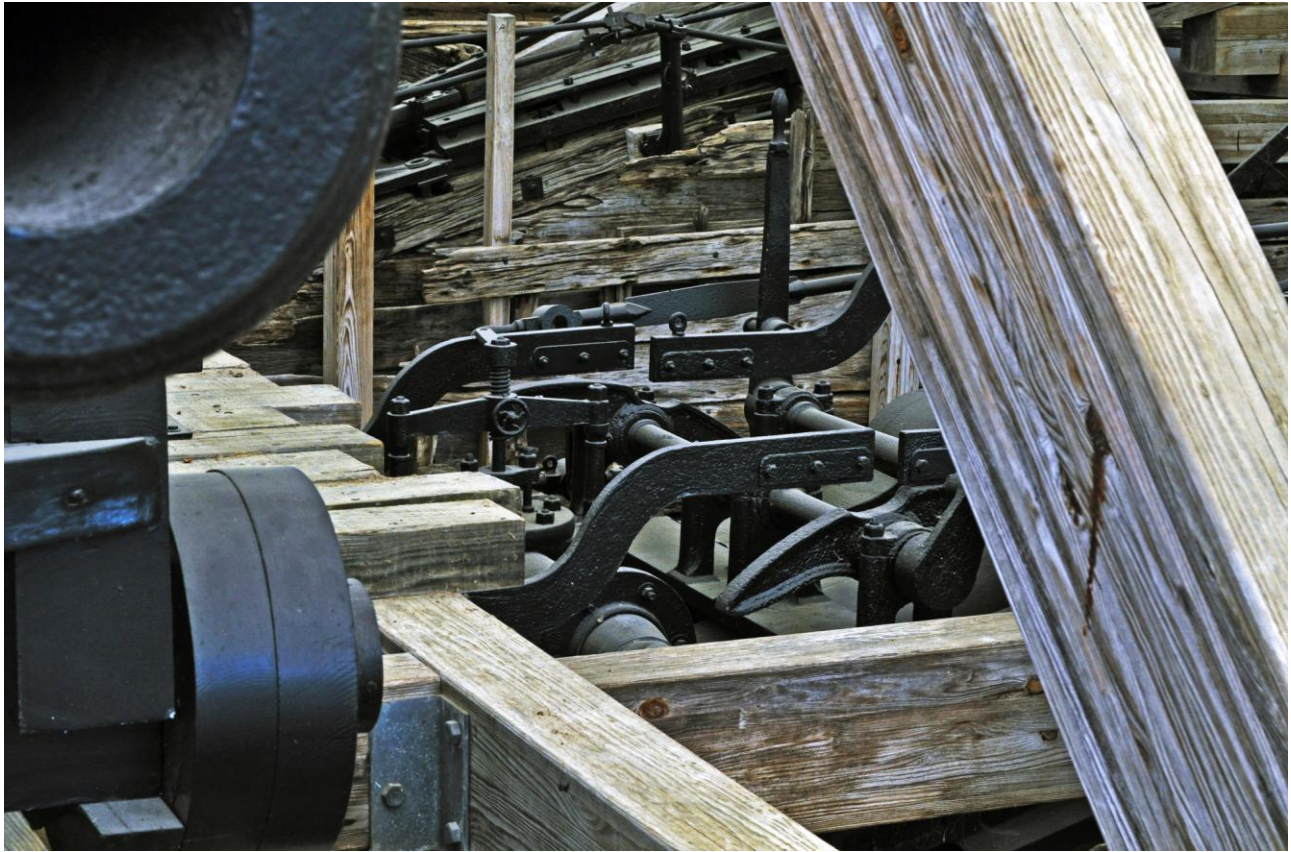
The best armor configuration during the Civil War was actually the forerunner of today's composite armor. Several layers of iron plate were laid over a solid wooden base. Of course, the North had the resources and facilities for making iron plate, a condition that was lacking in the South.



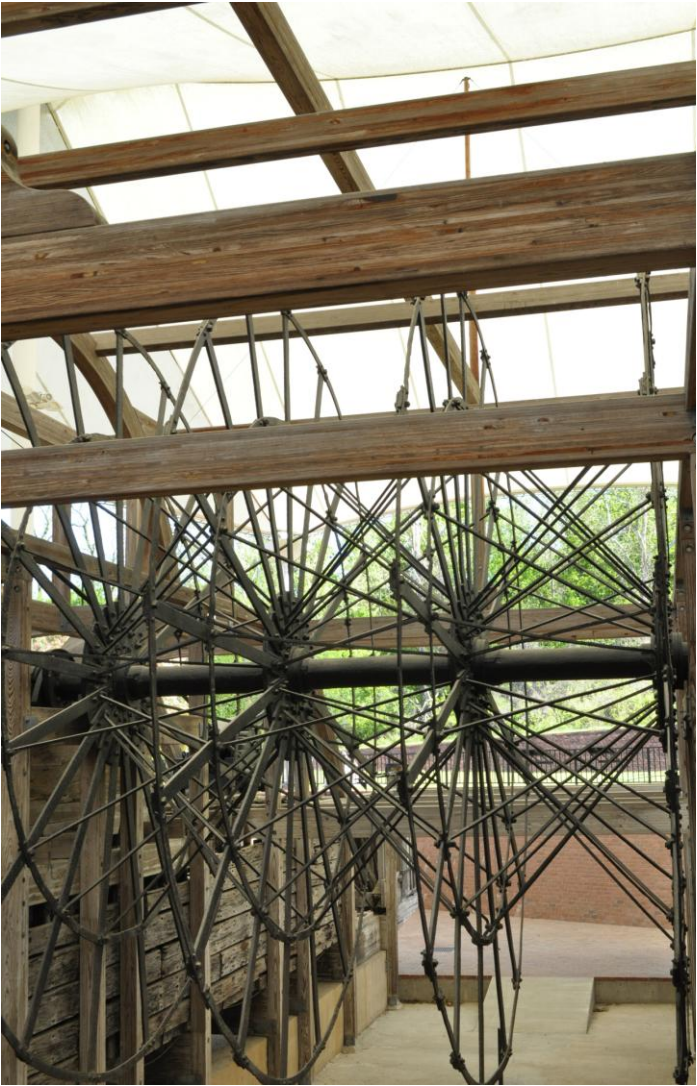


The river ironclad engines were similar to steamboats making them cheap to build, easy to maintain and could be fired with wood if coal was not available. Steam engines of the day were generally described in terms of the number of boilers, the bore and stroke (diameter and length of travel) of the piston, and the horsepower needed to power the ship. Most ironclads were driven by screw propellers, but some used internal paddle wheels like the Cairo. (When recovered, Cairo's stern wheel was a mangled mess.) Her steam engine was powered by five fire-tube boilers with two 22 inch bore and 6 foot stroke pistons producing 140 psi.

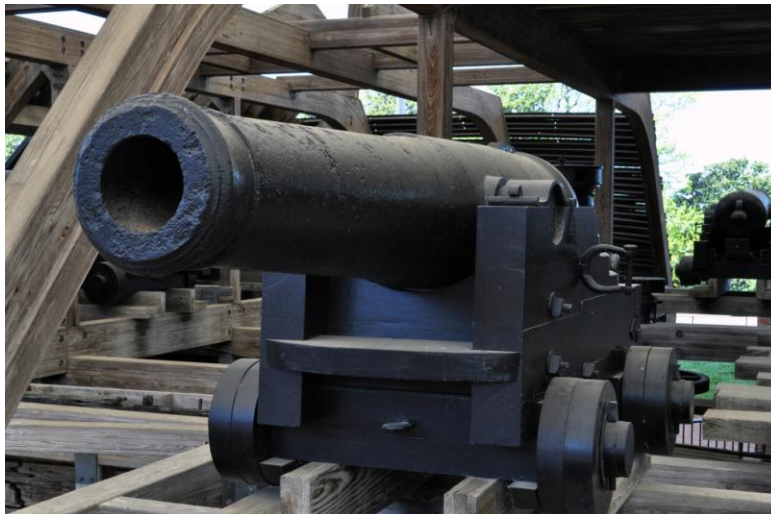








The stern wheel is a masterpiece of the restorer's art. When recovered from the Yazoo River, it was a tangled mass of rusted and mud encrusted steel.



All of the gun tubes on the Cairo are original, recovered from the Yazoo. There seemed to be an ad hoc assemblage of Parrot and Napoleon tubes. The carriages are reproduction.



This original gun carriage has been preserved.

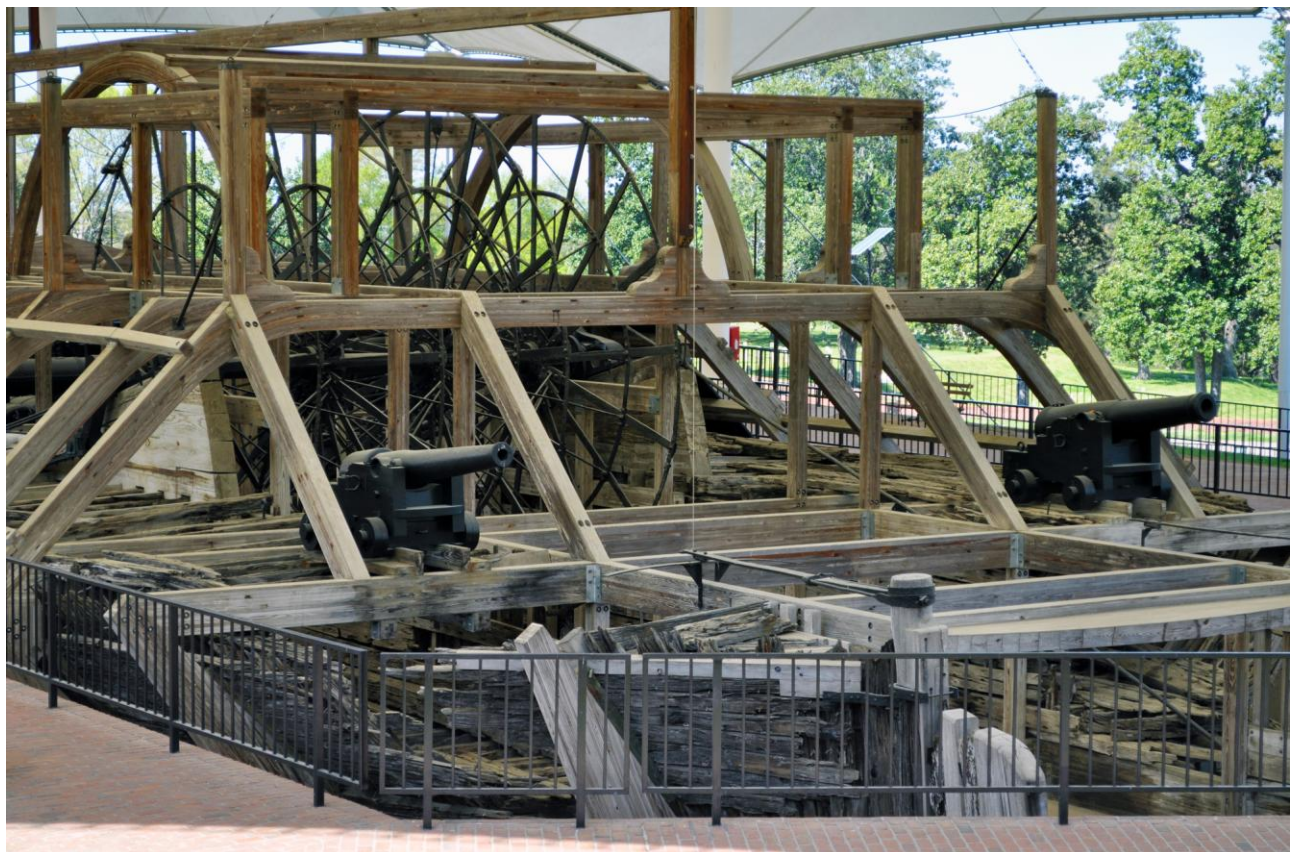




The recovery of artifacts from *Cairo* revealed a treasure trove of weapons, ammunitions, naval stores, and personal gear of the sailors who served on board. The gunboat and its artifacts can now be seen along the tour road at the USS *Cairo* Museum. These even include a sailor's rope knife in very good condition, as reported in *Knives and their Values*, 4th edition by Bernard Levine.









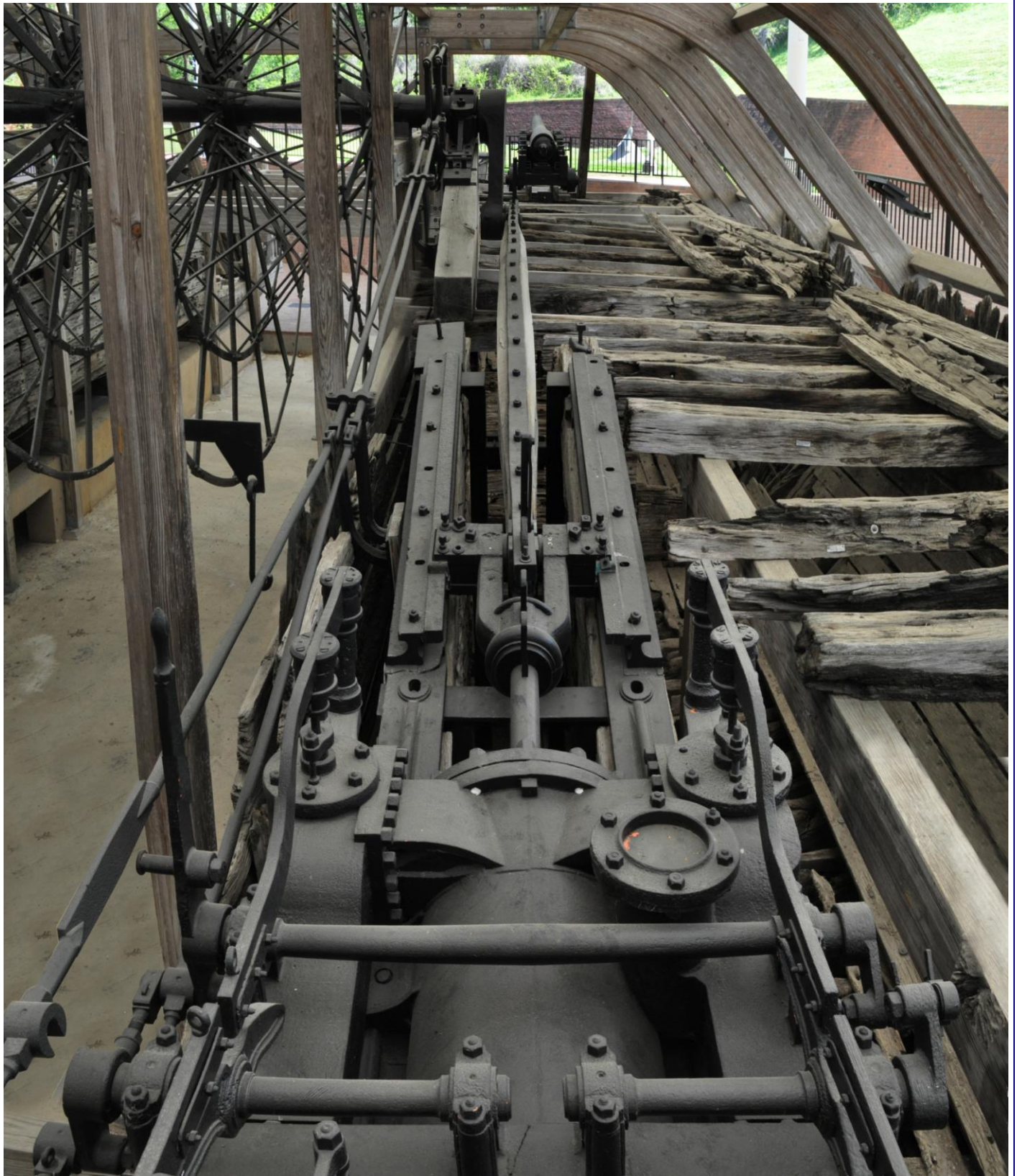




Interior of the armored pilothouse



This three-shot composite photo shows the immense size of the boilers which are flanked on both sides by the pistons and huge connecting rods. In the distance, center, is the axle and steel arms of the paddle wheel.



This four-shot composite highlights the details of the piston and connecting rod. You can clearly see the paddle wheel upper left.



"That's all Folks!"