The Ingram Vessel 38CT204: Intensive Survey & Excavation of an Upland Rivercraft at Cheraw, South Carolina

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Description
In 1993 and 1994 the Underwater Archaeology Division of the South Carolina Institute of Archaeology and Anthropology conducted an intensive survey of the remains of a small, wooden hulled craft in the Great Pee Dee River near Cheraw, South Carolina. The project was sponsored in part by the Cheraw Historical Society and partially funded by a grant from the South Carolina Humanities Council. The Ingram Vessel (38CT204), named after its discoverer Miller Ingram, lay overturned and largely buried beneath the river sediments and protected by a large mushroom-shaped rock just upstream of the site. The site was partially excavated and the hull remains mapped in situ. The investigation revealed a shallow draught, keeled vessel, built entirely of Southern Yellow Pine. The site is tentatively dated to the late 18th-early 19th century. Overall dimensions are estimated to have been approximately 15.5m (50ft, 10 in) in length, with a maximum beam of 4.6m (15ft, 1in). This report details the research on the site and places the vessel within a regional maritime historical context. The vessel is, to date, the only ship-built hull excavated in an uplands context near the head of navigation of a South Carolina river.

Keywords
Excavations, Vessels, Great Pee Dee River, Cheraw Historical Society, Cheraw, South Carolina, Archeology

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The Ingram Vessel
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of an Upland Rivercraft
at Cheraw, South Carolina

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Abstract

In 1993 and 1994 the Underwater Archaeology Division of the South Carolina Institute of Archaeology and Anthropology conducted an intensive survey of the remains of a small, wooden hulled craft in the Great Pee Dee River near Cheraw, South Carolina. The project was sponsored in part by the Cheraw Historical Society and partially funded by a grant from the South Carolina Humanities Council. The Ingram Vessel (38CT204), named after its discoverer Miller Ingram, lay overturned and largely buried beneath the river sediments and protected by a large mushroom-shaped rock just upstream of the site.

The site was partially excavated and the hull remains mapped in situ. The investigation revealed a shallow draught, keeled vessel, built entirely of Southern Yellow Pine. The site is tentatively dated to the late 18th-early 19th century. Overall dimensions are estimated to have been approximately 15.5m (50ft, 10in) in length, with a maximum beam of 4.6m (15ft, 1in). This report details the research on the site and places the vessel within a regional maritime historical context. The vessel is, to date, the only ship-built hull excavated in an uplands context near the head of navigation of a South Carolina river.
Acknowledgements

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Special thanks must be given Mr. Miller Ingram. His responsible actions in reporting the site and showing it to SCIAA constitute a fine example of how the State's Sport Diver Archaeology Management Program can contribute to the study and protection of important underwater cultural resources. Miller also devoted much of his time to assisting in the excavation and recording of the site. Of equally great importance to the SCIAA crew on this project was the generous hospitality of Gale Ingram - possibly the only person in Cheraw capable of creating a meal that could offset the energy expended by the crew in the currents generated by the hydropower facility above the city.

The importance of volunteers on most underwater archaeology projects in the state cannot be overstated. Britt Nickels, of Augusta, Georgia, is one of those volunteer divers. Britt greatly assisted the project by providing technical assistance with the underwater cameras and video camera and reproducing the fine underwater photography so important to the analysis of the site. Dr. Frank Barnes, of the University of North Carolina at Charlotte, lent several days of his expertise to assist us.

University of South Carolina Anthropology Department graduate assistant William Barr also freely gave of his time to provide diving and recording services and assisted the investigators in the planning and implementation of various phases of the project.

The staff of the Underwater Archaeology Division Joe Beatty, Carl Naylor, and Mark Newell gave their usual sterling support to the investigators. Of special importance was the control of safety during diving operations which were conducted under less than ideal conditions.
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Introduction

The Underwater Archaeology Division of the South Carolina Institute of Archaeology and Anthropology at the University of South Carolina operates as both a cultural resource management and a research operation. Cultural resource management functions include assessing commercial development impacts to known and possible sites, protecting endangered submerged cultural resources from destruction by natural forces or vandalism and managing and providing education for the nearly 500 hobby divers licensed under the South Carolina Underwater Antiquities Act of 1991. This latter function falls under the purview of the Underwater Archaeology Division's Sport Diver Archaeology Management Program (SDAMP). Archaeological research follows a planned data gathering strategy in the form of a regional research design still under development and designed to begin filling in the blank pages of our State’s history.

The Ingram Vessel preliminary survey contributed to both of these missions. The site is located in a river whose dynamics range from low flow/low volume to high flow/high volume in a short period of time and are controlled by a hydroelectric dam located upstream. These dynamics subject the site to periodic scouring alternating with periods of accretion. The site has the potential of making a major contribution to our knowledge of small craft design, construction and usage in the uplands region the State. The vessel is, at present, the only ship-built hull in the state located in an uplands context near the head of navigation of a South Carolina river, which has been archaeologically investigated. Formal study of small craft in the State began in 1983 and continues as a major research interest of the Division. The report that follows details an important contribution to an area of South Carolina history about which little is known and for which special recognition is due to Miller Ingram (after whom the site is named) for reporting the find and for his significant contribution to the research.
Historical Background

General Context

Throughout most of the eighteenth and nineteenth centuries, a reliable bulk transportation system to and from the State's plantations was vital to the success of South Carolina's agrarian economy. The rivers were used as primary highways of trade; roads were often crude and barely usable in bad weather. Noted cartographer Robert Mills stated that "there is no viable agricultural enterprise that is further than five miles from a navigable waterway." (Mills 1825:89). Two of the most common crops of the early nineteenth century were rice, sometimes packed in tierces and tobacco which was pressed into hogsheads (Tatham 1800:45). These were specialized wooden barrels which were the most common bulk container of the eighteenth and nineteenth centuries. Another major crop, cotton, was packed in long bags and later, pressed bales (Jones & Dutcher 1890:220). The bulk transportation of these cargoes was facilitated by use of wagons as well as watercraft. However, roads remained fairly primitive until well into the nineteenth century.

As trade expanded inland up South Carolina's waterways, the plantations developed specialized water craft to meet the needs of their operating environments and the types of cargoes they needed to transport. This was especially true of both the tidal rice plantations of the lower coastal plain and tobacco and cotton plantations of the fall zone. Tidally irrigated rice plantations were introduced into South Carolina in the early to mid eighteenth century. They utilized a wide range of specialized craft from canal flats and dugout pleasure craft to log hulled pettuageters and traditionally ship-built coasting schooners. Larger plantation owners even purchased or built their own ocean going craft to trade along the Atlantic coast and as far afield as Bermuda and the Caribbean (Coker 1987:49). In contrast, tobacco and cotton planters developed fewer types of craft as typified by the mountain boat which needed to be shallow, narrow - and extremely long to carry an economical cargo on upland rivers (Newell 1993:44).

In most cases, the small fleet of craft used by plantations in both areas was built by carpenters under the direction of a master carpenter (Joyner 1977:117). The knowledge employed to build the craft came from a variety of traditional sources. The mix of traditions used in the construction of these craft mirrored the origins of Colonial era settlers and their slaves and included West African, French, Baltic and English influences. Some work on plantation craft was done by contract carpenters hired by
factors (Kemble 1984:89) and much was the result of the training of Africans by English shipwrights (Joyner 1977:117) These vessels can be loosely categorized as plantation work craft, local transportation craft and cargo vessels.

Local Historical context

A small spring in the Blue Ridge Mountains near Blowing Rock, North Carolina, feeds a stream which becomes the Yadkin River. Following its junction with the Uwharrie River near Badin, North Carolina, the waterway becomes known as the Pee Dee. After absorbing many tributaries, it flows approximately 435 miles from its source to Winyah Bay on the Atlantic Ocean at Georgetown, South Carolina. Second only to the Susquehanna in drainage area on the Atlantic seaboard, the Yadkin-Pee Dee Basin covers more than 18,000 square miles in the Carolinas and a small portion of Virginia (US Water Resources Council 1979:1, 4).

Throughout history, the Yadkin-Pee Dee River system has exerted a powerful influence on the culture of the region. Before European settlement, Native Americans gravitated to the river, moving up and down its course to hunt and fish in season. The river bottom land offered fertile ground for growing crops. With abundant resources for sustaining life, the river supported stability in Native American culture so that there was a slower degree of change along the Pee Dee than in lower South Carolina (Ferguson n.d.).

In some ways the river was a cultural boundary. People living on the lower Pee Dee formed long-term associations with other Native Americans living in the Yadkin region, especially with regard to types of pottery and raw materials used for spear points or arrow heads. The river also marked the northern limits of the Mississippian occupation. (Ferguson n.d.)

After Europeans arrived, Native American culture declined rapidly. European visitors in the seventeenth century found a local population already weakened by epidemic diseases probably introduced by the Spanish in the 1500s. Spanish expeditions from the settlement at Santa Elena reached as far north as the Trading Fords of the Yadkin (Smith, M. 1987:7, 143).

In the eighteenth century, potential profits from the deerskin trade led to exploration of both the Pee Dee and Yadkin portions of the river. Settlers soon followed the traders. The lucrative naval stores industry combined with rice production to prompt rapid settlement of the coastal region. Planters imported Africans who provided not only labor but knowledge, skill, and experience in growing rice. Africans also offered boating
expertise, and planters often depended on skilled slaves to operate water craft (Wood 1979:56, 123).

The increasing demand for slave labor resulted in a population with about twice as many slaves as whites by 1730 (Clowse 1971:252). To encourage white immigration, the provincial government established a number of inland townships and offered inducements to immigrants. In the Pee Dee Basin, Kingston on the Waccamaw, Williamsburg on the Black River, and Queensboro on the Pee Dee were a part of the township plan (Meriwether 1940:19-22).

Because the topography at Kingston was not uniformly suitable for agriculture, the Waccamaw township was slow in developing. In the 1730s, however, hearty Scots-Irish immigrants settled at Williamsburg and soon had a flourishing community. They grew some rice, hemp, and flax, but indigo became the main money crop (Bodie 1923:42, 89-90).

Queensboro was not very successful. One problem was that speculators bought large tracts of land there and failed to develop it. The area upriver from Queensboro did prosper when a group of Welsh Baptists from Pennsylvania acquired land there through the township system. They moved up the Pee Dee north of Queensboro and established a settlement at the Welsh Neck in present-day Marlboro County. In the 1740s, they expanded across the river (Meriwether 1940:189-91).

Permanent white settlers reached the Yadkin Valley in large numbers in the 1750s. They were predominantly Scots-Irish and Germans who traveled down the Great Wagon Road from Pennsylvania to western North Carolina. They were experienced frontiersmen who were principally farmers, but their settlements included skilled artisans from the beginnings. The many tributaries of the Yadkin provided attractive homesites. The clear, cool waters of branches and creeks supplied water for families and domesticated animals as well as abundant wild game. Many of the creeks were suitable for water-powered grist mills or sawmills (Brawley 1974:2,12-13).

By 1800, settlers had claimed most land in the Yadkin/Pee Dee basin. After the invention of the cotton gin, growing cotton became profitable, and the need for transportation of heavy bales created a demand for internal improvements. Advances in technology helped to bring about the systematic clearing of the Pee Dee portion of the river under the direction of a state engineer. Residents of the Yadkin region attempted to make their portion of the river navigable as well, but successful results proved too difficult and expensive (Linder 1993:205-209).

Yadkin residents did ship some goods by a combination of water and land transportation to Cheraw, the head of navigation on the Pee Dee. From the earliest days
of settlement, boats were an important means of carrying agricultural products to market and returning with manufactured goods.

The river had a significant impact on the culture of the back country by providing economical transportation for passengers, agricultural products, and supplies. An efficient means of transporting cotton made it more profitable, which in turn created a demand for more slaves. The slavery system contributed to the modern ethnic diversity of the region which includes African Americans as a substantial segment of the population in addition to whites and Native Americans.

The river also contributed to a regional identity so that at present the northeast portion of South Carolina is known geographically and politically as "The Pee Dee". Pee Dee counties include Chesterfield, Marlboro, Darlington, Dillon, Marion, Florence, Horry, and Georgetown.

The Yadkin portion of the river also had a profound effect on the development of North Carolina. Its fertile valleys and many creeks attracted settlers and provided resources for agriculture as well as water power for later development of hydroelectric plants and power for manufacturing. Today the Yadkin-Pee Dee River system provides vast quantities of electricity and water for industry, especially textile and paper plants. Thus it remains a determining factor in the development of the region (Linder 1993:214).

Inland Boat Building on the Pee Dee

In 1791, Evander McIver, a Society Hill planter, recorded in his diary that he had gathered wood from his plantation for building a flat. He hired a "Mr. Booth" to construct the flat, but Jeff, a skilled slave, caulked the vessel (McIver 1791: April 11, 12, 16; May 30-31; June 1). Undoubtedly, many boats for local use were built by plantation carpenters.

David Gregg McIntosh, also of Society Hill, recalled that his father had a pole boat built chiefly by his slaves. A plantation carpenter, Cap'n Sam, was the primary builder, and he served as coxswain of the boat with a crew of about 15 other slaves. He navigated the pole boat to Georgetown and back. McIntosh recalled, "My Father had the utmost confidence in him and he well deserved it. He had in his control on these trips cargoes, worth thousands of dollars, and I never heard that he was ever in the slightest degree unfaithful to his trust" (McIntosh 1985:5-6).

In addition to the plantation carpenters, there were some professional boatwrights on the upper Pee Dee. Archival records indicate that Stephen Parker operated a boatyard as well as a tavern, ferry, and mill on Marks Creek which empties into the Pee Dee just
south of the North Carolina line (Figure 1). In 1776, Parker contracted with Thomas Deen, James Hayes, and Charles Mason to build a boat for the cost of £700. The purchasers evidently failed to make payment because in 1780 Parker sued them for refusing payment and not returning the boat. Other boats listed in personal estate inventories in the Pee Dee region range from £20 to £200 (Linder 1993:136).

An example of the kind of trade which might have utilized Parker's boats is the business of Ely Kershaw, Cheraw merchant. Kershaw shipped heavy barrels of flour and hogsheads of tobacco to Charleston by boat in January of 1770. Additional exports included hemp, indigo, and deerskins, and in March, 1771, his ledger mentions five boats belonging to his company. Kershaw imported tools, rum, salt, and extensive luxury items such as fine china, eating utensils, buckles, buttons, snuffboxes, gilt looking glasses, and gold rings. Kershaw and Company not only serviced South Carolina planters, but customers also included North Carolina residents (Kershaw 1770:23, 32-33, 35, 106, 158).

Achilles Knight, who married Stephen Parker's daughter Elizabeth, was also a boatwright. He bought land on Marks Creek adjoining Parker in 1801. Knight died in 1809, and his estate papers list a number of tools useful in boat building such as 1 iron square, 1 drawing knife, 1 gouge, 2 hammers, 1 pair compasses, 4 caulking irons, 1 smoothing plain, 1 foot adze, 3 screw augers, 2 barrel augers, 1 carrying knife, 1 broad axe and 1 narrow axe (Knight 1810:np).

When Stephen Parker died in 1821, he gave the use of the boatyard for fifteen years to another son-in-law, Cannon Weaver. Weaver, however, moved in 1828 to Mississippi where he earned his living as a wagon-maker (Parker 1821:np).

Between Cheraw and the location of the boatyard at Marks Creek are located the "falls" of the Pee Dee, actually shelves of shale which extend across the river at a depth of one to two feet. The stagecoach route crossed the river at Marks Creek, and at times the river was shallow enough to ford. A large rock still visible today in the middle of the river acted as a measure to determine if the stagecoach could use the ford or would have to employ Parker's ferry. The shallow water and the rapids raise the question of what type of boat the Marks Creek boatwrights were building. Was it a specialized type designed for use on the upper part of the Pee Dee?

Although Cheraw was generally acknowledged as head of navigation, there is evidence that a few boats made the trip from above the falls. On April 3, 1819, the Winyah Intelligencer noted that Knox and McKenzie's boat from Sneed'sboro, North Carolina, had arrived in Georgetown with a cargo of cotton, flour, and bacon.
Archibald Murphey, a North Carolina legislator, advocated the development of Sneedsborough as a port. He wrote to a friend, “It will be the great Town of the Pedee, and a little encouragement would give it a Cotton and Tobacco Trade... Our Navigation Company, will make improvements there in Canaling and in a Bason, which will attract the Attention of all Persons, who see them” (Hoyt 1914:1, 130-132). Plans for the development of Sneedsborough never materialized, and by the turn of the twentieth century it was largely a ghost town. (Linder 1993:204-205).

In Stephen Parker's day, however, it would not have been unreasonable to assume that there might be a market for boats not only in Cheraw but also in Sneedsborough. The Ingram Vessel, located within 13 kilometers (eight miles) of Parker's boatyard, is providing information on at least one type of water craft used in the area. The fact that the Ingram Vessel was built entirely of Southern Yellow Pine increases the possibility that it was the product of local boatwrights.

The American Revolution and Pee Dee Boat Building

In December 1780, General Nathaniel Greene, ranking officer of the patriot army in the South, moved his army to a “camp of repose” in Marlboro County within 8 kilometers (five miles) from the wreck site. On December 15, 1780, Greene wrote to Colonel Nicholas Long, one of his officers, that boats were to be built on the Pee Dee River. Greene's camp was in the vicinity of Hicks Creek, just south of Marks Creek. On January 16, 1781, he requested a party of fifty men to report to Parker's landing “about seven miles above camp” to take the orders of Morgan Brown, a local patriot in charge, and “man the boats” (Showman 1991:IV, 578).

Greene stated his intention to construct boats “of a peculiar kind... that will carry Forty or Fifty Barrels and yet draw little more Water than a common Canoe half loaded.” He indicated his intention to get supplies, especially forage for the horses by boat (Showman 1991:IV, 513).

Greene also planned to build portable boats. He wrote to General Daniel Morgan, “I am preparing boats to move always with the army. Would one or two be of use to you? They will be put upon four wheels and may be moved with little more difficulty than a loaded waggon[sic]” (Greene 1781, np).

These portable boats became very significant after the battle of Cowpens when British General Charles, Lord Cornwallis moved towards Virginia in an attempt to join another part of the British army under Benedict Arnold. Nathaniel Greene successfully blocked Cornwallis, and in this effort, Greene's reconnaissance of the rivers and the
terrain as well as his arrangements for boats to take his army across proved decisive. The American army was able to cross both the Yadkin and the Dan Rivers by boat, whereas Cornwallis lost time by having to detour to a ford on the Yadkin, and was unable to cross the Dan (Thane 1964:204-208).

Greene's correspondence reinforces the evidence that there were local boat builders at work on the upper Pee Dee in the late eighteenth century. While there were no major battles on the Pee Dee, there were numerous engagements between Whigs and Tories. The evidence of catastrophe in the sinking of the Ingram Vessel leads to questions of possible involvement in the War for Independence.

Project History

The remains of the craft later to be named the Ingram vessel were found by Cheraw lawyer and sport diver Miller Ingram in 1990. Mr. Ingram had spent time exploring the remains of a nineteenth century steamboat wrecked by an explosion at Cheraw Landing. In expanding his search, he encountered the remains of a wooden craft partially buried by sand downstream of the steamboat site.

The Underwater Archaeology Division of SCIAA was notified and a reconnaissance dive was conducted by Division archaeologists and Mr. Ingram that year. The importance of the vessel was recognized at that time and data was gathered to support development of a grant application for further work.

Efforts to raise funds for an excavation of the site were then commenced. A funding proposal was written by Dr. Suzanne C. Linder with the assistance of Division staffer Mr. Mark Newell who provided a research design, methodology and budget for archaeological investigation of the site. Dr. Linder submitted the proposal to the South Carolina Humanities Council on behalf of the Historic Cheraw Foundation. The application was funded in July of 1993, and the first phase of an intensive survey of the site began in the Fall of that year.

Information gathered on-site during the initial phase of the survey was used to develop drawings of the exposed hull of the wreck and to devise a strategy for further work. During the second phase of the survey, the team attempted to reveal the stern of the vessel and investigated the interior of the upturned hull to ascertain if any remains of cargo or other artifacts were present that could aid in the interpretation of the site. This work was delayed by extreme river conditions and a return to the site was made in the Spring of 1994.
SCIAA: Ingram Vessel

The grant project was completed with partial excavation of the stern area of the wreck, a .50m square test excavation into the interior of the hull and a general up and downstream reconnaissance to locate any additional sections of wreckage. A final phase of the survey was conducted in June of 1994 with a reconnaissance level survey of submerged archaeological sites along the river channel for half a kilometer upstream.

Project Environment

The four general physiographic regions of the State are formed of Upper and Middle Eocene Age deposits (mountain region) and Miocene, Pliocene and Holocene age deposits (Piedmont and coastal plan) overlaying major beds of Late Cretaceous and Early Cretaceous deposits under which are found Pre-Triassic Age bedrocks (Barry 1980:16). The Ingram Vessel is located in upper reaches of the Great Pee Dee River near Cheraw, South Carolina, in the Sandhills region (Figure 2). The Sandhills form a narrow, discontinuous area of transition between the unconsolidated sedimentary deposits of the coastal plain and the igneous and metamorphic rocks of the Piedmont. Trending northeast-southwest and mostly comprised of gently rolling hills, the Sandhills defines the Midlands of the state. The Fall Zone, which runs through, and parallel to, the Sandhills is produced where the resistant crystalline rocks of the Piedmont abut the more easily eroded sedimentary rocks of the Coastal Plain. Rivers flowing swiftly out of the Piedmont over the Carolina Slate Belt, a layer of slate running from Virginia to Georgia, differentially erode rocks in the Fall Zone to form a series of rapids often in excess of a mile (Kovacik and Winberry 1989:18) - a factor that would have influenced vessel design in this region.

The Great Pee Dee River, part of the Yadkin/Pee Dee system, is the boundary between Chesterfield and Marlboro Counties, both of which border North Carolina. The exact location of the wreck is given as United States Geodetic Survey Quadrangle: Wallace, Scale 7.5, Zone 1F, Easting 603160, Northing 3839840 and is designated in the South Carolina State Site Files as 38CT204. Situated within the Fall Zone of the Pee Dee River the site location is significant because it marks the usual upper limits of navigation on the Pee Dee.

The environmental setting within the Sandhills region during the period of Colonial occupation included stands of hardwoods, mostly turkey oak (*Quercus laevis*) and long leaf pine (*Pinus palustris*). Loblolly pine (*Pinus taeda*) and slash pine (*Pinus elliottii*) were introduced into both the Piedmont and Sandhills from the lower coastal
plain later in the nineteenth century. The vegetation of this region is uniquely adapted to the dry conditions which result from the excessive internal drainage of the sandy soils. Much of the vegetation seen today is a result of frequent slash and burn activities of the area by humans, an activity which selected pyrophilous species like long leaf pine to predominate (Kovacik and Winberry 1989:42-44).
When first viewed by the Underwater Archaeology Division it was evident that
the Ingram Vessel represented an important find - a riverine craft in an upland context.
Until the discovery of this site, study of upland craft relied upon archival data and
experimental research (Newell 1993). Consequently the research design centers around
certain questions basic to our understanding of vessels operating in such an environment.

Most important was the nature of the origin of the vessel. Historical data
indicates the presence of a local boatyard and also details extensive boat building activity
by American military forces in the area during the War for Independence. Could
sufficient data be recovered from the wreckage to determine if it was locally designed and
built? Also, in what way did the design and the construction differ from the construction
of lower coastal plain vessels? If the vessel proved to be of local manufacture - who were
the owners and operators? Were they members of the frontier and trading community, or
were they attached to military units of American forces during the War for
Independence?

The preliminary reconnaissance showed that the vessel had capsized and lay on
the river bottom hull up. This posed important possibilities concerning the contents of
the vessel and the manner of its deposition. Did the site represent the remains of an
empty and discarded vessel? Did the site represent the remains of an in-transit craft
carrying cargo which sank as the result of a catastrophic event? If cargo and artifacts
were present within the hull, could they shed further light on the lifeways and social
status of the ship's crew and the communities they served?

More specific questions of the site were reserved for possible future excavation at
which time a greater understanding of the vessel, and possibly other craft in the region,
could guide further scientific inquiry.
Methodology

A preliminary reconnaissance of the Ingram Vessel site was conducted in 1990 to determine the general nature of the site and the physical and logistical elements to be considered in subsequent data gathering operations. On a return visit in the Fall of 1993 a pre-disturbance survey was conducted to ascertain the parameters of the site by examination of the site area around the vessel and the areas up and downstream of the wreckage.

The survey revealed three specific problems to be dealt with during subsequent operations. A hydroelectric dam in North Carolina upstream of the City of Cheraw released water upon demand from a statewide power grid system. This meant that at any time the placid waters of the Pee Dee which normally run over the site at a comfortable one-half to one and one-half knots could rise to a speed of six knots within the space of some forty-five minutes. This rate of flow made diving operations unsafe and the operation of recording and excavation equipment impossible. The dam also released water immediately after any appreciable amount of rainfall in the Piedmont area of South and North Carolina. The unpredictability of this change of diving conditions created special logistical problems. Secondly, two trees were found to be lodged athwart the wreckage at the approximate mid-section. The profile of the trees was such that their presence would diminish the usefulness of a grid or other vertical and horizontal control structures over the site. Thirdly, probing of the site revealed that the wreckage was lying at a 7.5 degree angle sloping into the river bottom and that the unexposed portion of the site was therefore beneath a considerable amount of overburden from a sandbar which consisted of loose coarse gravel and fine sand.

It was decided to approach the site in two phases, first excavation and documentation of the vessel to the west of the trees where overburden was minimal and ease of movement facilitated recording work. The integral structure of the vessel itself was used to map the site. A datum line was affixed along the exposed length of the keel and lined up with numbered tags placed along the centerline of the keel. Additional numbered tags were affixed to frames and planks on the extant hull. These tags identified individual hull components and became triangulation points used during the mapping process. Once the control points were set up all visible portions of wreckage were measured and drawn (Figure 3). This consisted of the more intact portion of the hull, comprised of bottom strakes and frames, on the upstream side of the keel, believed to be
the port side, and the fragmented and eroded remains of frames and planks on the starboard side. Hull timbers not attached to the hull were recorded in situ, raised, photographed and drawn to scale on the surface.

A water induction dredge was then used to excavate the sandy overburden. Previous examination of the overburden determined that it consisted of essentially sterile alluvial deposits. Artifacts were detected by the excavator at the dredge head and, located with reference to existing hull structure and recovered for analysis. One factor facilitating excavation and recording work was the unusual degree of visibility - excellent clarity within two meters and reasonable visibility within four meters. These conditions are seldom encountered on submerged sites in the lower reaches of the State’s waters.

Upon completion of the excavation of the western end of the wreckage, exposure of the hull to the east of the trees commenced. Probing had revealed the presence of a significant amount of wooden structure beneath the overburden. The purpose of this strategy was twofold. First, to locate the eastern end of the keel, believed to be the stern, to determine length of the vessel, and characteristics of the hull. The intervening hull structure would then be mapped to aid in reconstructing the overall characteristics of the hull. Secondly, it was decided that the best opportunity for recovery of materials and artifacts not contaminated by current borne materials outside the site would be in this particular area, covered as it was with copious amounts of overburden. Consideration was also given to the possible presence of cargo beneath the capsized hull. This area would present conditions conducive to artifact survival and allow recovery of artifacts in known close association with the hull.

The decision was made to enter the hull by cutting and removing a small section of hull planking at frame 14 (Figure 3) and excavating down into the interior of the vessel. This strategy provided the most direct access to the interior as well as affording the greatest safety factor as the hull would have become increasingly unstable in the variable dynamics of the river as excavation under the sides of the upturned hull progressed. This strategy was changed during the second phase of the survey in the Spring of 1994 when it was discovered that the fabric of the hull at frame 15 had suffered severe damage, and that there was no likelihood of discovering uncontaminated contents. Furthermore, excavation had to be curtailed before the east end of the keel could be located due to severe slumping of the sandy overburden.

An area was then selected over the undamaged hull on the north side of the site between frames 9 and 10. A .46 m section of the garboard and second hull plank (timber tags 11 and 12) was cut out and removed between the two frames to create a test pit approximately .50 m square. The bilge was then excavated, the material being screened
for artifacts. The ceiling planking beneath was then cut out and the area interior to the hull excavated to a depth of approximately one meter until sterile marl was encountered. The material excavated was also screened for artifacts. After interior excavation was completed the hole was back filled, the plank sections replaced and a layer of sterile sand pumped over the planks. Back filling of the wreck was facilitated largely by the river itself, which re-deposited sand onto the site in short order.

Each phase of the work was drawn and photo documented to take full advantage of the clarity of the water. An underwater video camera was also used to document recording activities. All data was compiled and analyzed and a set of drawings produced illustrating graphically the site (Figure 3).
Field Data

Construction

There is little doubt that the Ingram Vessel was the subject of a violent event which tore the fabric of the hull and sent it to the bottom of the Great Pee Dee River. The hull may have hit a submerged obstruction such as the submerged mushroom-shaped rock mesa which lies some 10 meters upstream from the site and may have sunk quickly. Or it may have suffered a different fate and been abandoned upstream and left to drift downstream until finally sinking. Evidence points to the west end of the hull (thought to be the bow) having been torn away (Figure 3), while farther aft the garboard and other hull planks on the port side of the hull have been breached and significantly displaced.

After the hull of the Ingram Vessel came to rest on the bottom of the Great Pee Dee River both mechanical and biological activity continued to whittle away at the vessel’s fabric. Those areas of the hull which were not covered over by fluvial sediments in short order succumbed early on in the process. Although the hull lies upside down, bilge up, virtually no evidence from above the turn of the bilge has survived. It is to be expected that those parts of the hull buried lower down in the site would have a greater chance of survivability than those areas exposed to the elements. The fact that only one fragmentary timber survived from high on the hull suggests that those timbers disintegrated or were otherwise removed prior to the vessel turning over and coming to rest in its final orientation.

The condition of the timbers and planks indicates that mechanical activity associated with periodic high fluvial velocities has had a great effect on the site. All exposed surfaces and edges exhibit abrasion and erosion. There is a paucity of cultural material at the west end of the site where river currents have scoured the channel to bedrock. Only a few timbers that are protected by the wreck or natural rock formations survive. These include a fragmentary section of gunwale or rub rail, the only evidence for the upper part of the hull of the vessel.

The description of hull components is presented in approximate sequence of construction. The system of measurement under which the Ingram Vessel was built was most likely using feet, inches and eighths. However, since erosion and damage were extensive, all timber dimensions are presented in metric measurements for clarity.
Keel

The keel is the uppermost preserved timber on the site due to the hull lying overturned. This timber was also the first component observed during the 1990 reconnaissance of the area when divers noted several meters of the keel protruding from the river sand. During the 1993-94 intensive survey of the site the keel was excavated exposing approximately 10.5m of its length. The eastern extent of the keel (thought to be the stern) was not found due to extensive slumping of the overlying sand which threatened to bury the water dredge and operators. However, a distinct tapering and deepening of the keel at its furthest excavated extent suggests that excavators were within approximately two meters of the end of the timber.

The keel of the Ingram Vessel is characteristic of much of her construction, in that there is evident a high degree of craftsmanship and attention to detail. The keel is made up of two lengths of straight-cut Southern Yellow Pine (*Pinus spp.*) (Appendix C) timbers scarphed into a single length. The west most section is 5.78m in length and terminates in a heavily eroded break (Figure 4) while the terminus of the second section remains buried. The keel was finished to a molded dimension of approximately .15m. Between frame 3 and the scarph the sided dimension of the keel remains a constant .34m. Beyond the scarph the sided dimension of the keel tapers uniformly to .19m where that timber disappears into the sand 10.5m from the west end of the wreck.

The keel’s inboard surface was dubbed flat except at frame locations where an additional .15m of wood was left to seat the floor timbers (Figure 5). Throughout all of its observed length no rabbet is evident to accept the garboard strakes. The bottom of the keel was not fitted with a protective shoe timber hence allowing that timber to succumb to biological and mechanical action. However, the lower outboard edges were beveled giving the keel a roughly U-shaped section and also reducing the likelihood of splitting.

A hook scarph is located approximately half way along the keel (Figure 6). The scarph has .56m long tables and .02m to .03m nibs. It is fastened with six .025m wedged treenails driven vertically through the joint. A .025m stopwater which bisects the tables serves to lock the joint to prevent the components from becoming loose and shifting. The stopwater’s other role was to deflect water traveling along the seam, thereby preventing it from entering the hull. Unlike the treenails used to fasten the planks and other major structural components of the hull, wedges were not driven in the ends of the stopwater. Evidently the shipwright was confident that the dowel would swell and thereby stay tightly in position.
Framing

Eighteen frames or frame locations were recorded on the hull (Figure 3). All frames observed were square frames, that is, frames that are fastened perpendicularly to the run of the keel. Evidence indicates that each frame was made up of a floor timber and at least two futtocks per side.

Eight floor timbers were recorded in situ (timber tags 3 through 10). Floor timbers were set along the keel at intervals varying from .50m to .70m but averaged approximately .60m. Cut from stocks of Southern Yellow Pine these timbers were finished to approximately .085m on a side and spanned the vessel's bottom to the turns of the bilge. Each floor timber is fastened to the keel and keelson with two treenails placed to either side of the keel's centerline.

Watercourses were cut into the bottoms of each frame approximately .22m to either side of the centerline of the keel (Figure 7). The holes average .06m wide at the timber's surface and are .02m deep. Each hole was formed by parallel, and slightly angled, adze or axe cuts, the wood between being removed with a chisel or similar tool.

Much of the evidence for the vessel's futtocks comes from the treenail fastening pattern on the hull planks and floor timbers. One disarticulated frame, which lay beneath the broken ends of the hull planks near the west end of the site, showed fragmentary remains of a floor timber as well as a first and second futtock (Figure 8).

Futtocks were cut from Southern Yellow Pine stocks and were finished to the same approximate dimensions as the floor timbers. Throughout the section of the hull studied, first futtocks were placed consistently on the aft side of floor timbers with their heels fastened approximately one meter from the keel. Evidence from the disarticulated frame indicates that the heel of the second futtock butts the head of first futtock and that both the first and second futtock were fastened to the floor timber with .025m treenails. This frame is a "mold frame" and would have been erected completely assembled at an early stage of construction of the vessel. A similar fore and aft fastening pattern could not be verified elsewhere on the wreck. Although no evidence exists, it is probable that the hull would have been framed up to the gunwale with a third level of futtocks.

Planks

Ten strakes, or runs of planks, were recorded on the hull - eight on the port side and two on the starboard side. The eight port strakes span the distance from the keel to the turn of the bilge and define the bottom of the hull. The garboard strakes were cut
from Southern Yellow Pine stocks and are .226m wide and .027m thick. The garboard planks were plain sawn with heartwood central to the plank (Figure 9). Their inboard edges were cut to fit precisely against the keel and maintain approximately a 90 degree angle along the area accessible to study (between timber tags 1 and 2). A rabbet was not provided for fitting the garboard strakes to the keel.

The remaining hull planks are also of straight-grained Southern Yellow Pine and sawn to widths from .18m to .22m, except near the turn of the bilge where one plank (timber tag 18) narrows to .115m. Hull planks were plain sawn and are consistently .02m thick. Planks are fastened at each frame location with two .025m wedged treenails (Figure 10). Two .008m square wrought iron nails were used to fasten the plank ends. Seams between planks were caulked with a fibrous material, probably hemp. Analysis of the caulking is not complete at this time.

Strakes observed on the Ingram Vessel are not continuous, but are made up of a number of planks. Two complete planks measured 4.6m in length. However several fractured planks of varying lengths suggest that there was not a standard plank length. Planks are butt joined beneath frames and fastened with two iron nails each (Figure 11). The shipwright chose to stagger the plank butts, thereby avoiding setting up lines of weakness in the hull.

A single, disarticulated plank buried on edge near the west end of the site appears to have originated high on the hull. Its orientation and shape suggests a possible terminus for the bow of the hull (Figure 3).

Keelson

The keelson, like the keel, is broken at the west end of the wreck with an undetermined length missing (Figure 4). River dynamics and lack of structural integrity have caused the keelson to distort away from the keel widening the space between the two timbers from .085m at extant frames to over .14m at the break. The keelson was accessible only as far as the keel scarph where depth of sediments prevented further observation. Therefore it could not be determined if the keelson was a single timber or made up of two or more pieces scarphed together. A scarph, would likely be shifted from the keel scarph to avoid creating a weak point in the hull.

The keelson is a Southern Yellow Pine (Appendix C) timber of indeterminate length, .15m sided and molded .08m. Its inboard edges were chamfered while its outboard surface was dubbed flat to seat against the floor timbers to which it was fastened by treenails.
SCIAA: Ingram Vessel

Ceiling

A total of four ceiling planks or fragments of planks were observed on the site - two port side ceiling planks *in situ* and two loose planks just upstream from the hull. Cut from Southern Yellow Pine (Appendix C), ceiling planks were plain sawn to varying widths ranging from .24m to .30m. Ceiling planks observed were approximately .015m thick. Planks were fastened to the frames with one or two .005m iron nails and fitted without caulking in the seams.

Both the interior and exterior surfaces of the ceiling planks had been coated with a light, greasy substance, possibly designed to waterproof the planks. Numerous impressions and gouges on the inboard surfaces of the port limber board and second ceiling plank hint at the cargoes the vessel may have once carried (Figure 12).

Gunwale

An incomplete length of gunwale or rub rail was recorded wedged beneath a rock approximately 3m west of the hull. The 1.7m-long fragment is .04m on a side with one edge rounded. Cut from Southern Yellow Pine (Appendix C) this timber evidently is all that remains of the bow of the vessel to which it would have been affixed with .005m iron nails and .025m treenails.
Analysis & Interpretation

Not enough structure survives to attempt an complete reconstruction of the vessel, or to accurately determine the length and major dimensions of the hull. The bow (west end of the site) is completely missing, evidently the subject of an impact trauma to that region of the hull. Massive plank displacement farther aft and the overturned orientation of the hull further suggest a violent end. No evidence for construction in the stern area was found as that area could not be accessed during the survey. While the beam of the craft can be estimated based on evidence from the sections of the hull measured (Figure 13) and location of the turn of the bilge at frame (timber tag) 7, there is not enough evidence from other regions of the hull to determine the original shape and form of the vessel. Furthermore, as no other examples of vessels used in headwater navigation contexts have been discovered and scientifically examined in the State, there is nothing against which to compare data. Few contemporary descriptions of upcountry craft have been found.

Based on the available data, the length of the Ingram Vessel can be estimated as approximately 15.5m (50ft, 10in), while the vessel’s beam was approximately 4.6m (15ft, 1in). The keel provided longitudinal support for a broad, flat hull. There is very little rise to the floor timbers throughout the hull and the bilges appear to have been slack providing a soft chine. The greatest breadth or beam of the hull appears to be approximately at frame 7. During the eighteenth and nineteenth centuries shipwrights often placed the greatest beam of a vessel within the forward one-third of the hull (Amer 1981). The placement of the midship beam and the almost flat floor timbers and planking throughout the exposed hull section provide us with the only clues about the amount of hull missing in the bow. The evidence suggests that the Ingram Vessel had a broad, bluff bow such as one would expect to find on craft designed to navigate shallow waters and carry heavy, bulky cargoes.

It is suggested that not more than three meters of the bow is missing from the hull. A large rock located some three to four meters west of the site (Figure 3) may have supported the already weakened remains of the bow components, thus preventing them from being covered by a protective layer of sediments and causing the longitudinal incline of the hull that we see today.

An estimation of the construction of the stern of the craft would be premature at this point without further excavation. However, it would not be inconsistent with Carolina boat building practices on the coast during the 18th and 19th centuries for the
vessel to have been fitted with a transom. The majority of the excavated craft in the Carolinas and Georgia have produced clear evidence of transom sterns, in contrast to New England, where as many double-ended fishing boats were produced as transom-sterned merchant craft.

The frame dimensions, configuration and spacing are consistent with boat building practices in evidence in the state throughout the 18th and 19th centuries, as are many other construction and design features on the vessel. The boat was built evidently exclusively using Southern Yellow Pine. Shipwrights who built water craft in the coastal region of the state during the colonial period, while often utilizing pine for planking and some structural components in the upper hull, tended to use live oak (*Quercus virginiana*) and white oak (*Quercus alba*) for framing and other major structural components such as the stem and knees, taking advantage of the strength and ready availability of the naturally curved ‘compass timber’ (see Wood 1981). The use of pine in the Ingram Vessel possibly reflects the convenient use of an indigenous upcountry natural resource rather than merely a selective choice of that material.

No evidence for the use of cypress (*Taxodium distichum*) to fashion the large structural timbers of the vessel was found on the site which may suggest a late date for the craft. In the coastal region of the colony cypress appears extensively in water craft built early in the colonial period, with pine predominating later.

The keelson was fitted flat over the frames, a method used in other South Carolina built vessels designed for use on the rivers and shallow bays of the state. A flat, plank-like keelson, like that exhibited on the Brown’s Ferry Vessel (Steffy 1978) and Little Landing Wreck 1 (Amer and Thompson 1989) taken in concert with the other construction features exhibited on the vessel provided a strong yet flexible hull, ideal for navigating the often shallow and shifting waterways of the state. However, a flat keelson did not provide as strong a structure as one that would have been notched over frames, a method found on many ship-built vessels studied in the coastal region of the state, and on contemporary British-built vessels (Amer 1986; Cohn 1984:63).

Construction Order

The hull was evidently built using pre-erected or ‘mold frames’ which implies that the builder had a preconceived knowledge of the exact shape of the vessel prior to putting blade to wood. The sequence in which the Ingram Vessel was constructed can be approximated from the preliminary analysis of the preserved remains and with reference to standard ship-built vessel construction. The construction of the hull would have
commenced with the laying of the keel. The stem was then scarphed to the forward end of the keel and the stern post mortised into its aft end. The planking rabbet/bevel was then worked in the sides of the posts; a rabbet was not provided along the keel, garboard strakes being seated against the existing molded surface of the keel.

The midship frame, would have the first ‘mold frame’ to be erected in the hull. This frame, made up of a floor timber, first, second and possibly third futtocks, was erected approximately one-third of the vessel’s length from the bow at the hull’s widest point. The shape of the midship frame would have been pre-determined by the shipwright, being taken off a half-model, lofted or shaped by eye. When the best shape was found, the floor timbers and futtocks were fastened together and the frame erected and treenailed to the keel. The other mold frames, whose shapes governed the final form of the vessel, were assembled in the same manner as the midship frame and fastened along the keel. The exact number of mold frames used to construct the vessel is not known.

The garboards, wales and possibly the planks at the turn of the bilge could then be fastened, the remaining floor timbers set along the keel and the keelson installed. Once the hull was ‘framed up’, deck beams which carried decking fore and aft and provided transverse strength, were fastened to the hull. The first two beams to go in would have been those at each end of the main hatchway as the length and location of these beams determined the size of the largest object that could be carried as cargo (Greenhill 1988:134). Finally, the remaining frames were finished off, the hull planked up and caulked and the boat completed.

Although investigators could locate no evidence to indicate the presence of a deck, it is likely that the vessel was at least partially decked and contained a large hold open over most of the boat’s length.

No evidence was found as to the rig or a means of propulsion for the vessel. Access to much of the keelson was not possible during the survey so the presence of a mast step or steps could not be verified. The upper portions of the hull, where evidence of rigging, thole pins or towing bitts would be found, are missing. Towards the east end, or stern, of the wreck the keel appears to project farther below (upward in this case as the hull is overturned) the planking than elsewhere on the hull suggesting a drag to that timber often found in sailing vessels (Kemp 1979). The estimated hull shape also suggests that the vessel was self propelled as the soft-chined, slightly rounded hull would not tow well. Investigators could located no ballast beneath or around the hull. This further suggests that the hull drifted after overturning and spilling its contents or that the hull was empty when the sinking occurred.

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The Ingram Vessel was not old when it sank. There is little abrasion evident on the lower surfaces of the keel and hull planks. Furthermore, no grivel damage was detected on the wood, nor was there any evidence of repairs to the hull. That the vessel did not venture into a brackish or salt water environment is suggested by the lack of evidence for shipworms (*Teredo navalis*) on the hull. Watercraft operating on the coast needed to be periodically repaired due to damage from shipworms. A method for repairing such damage, commonly used during the 18th century in South Carolina, was to sheath over the damaged region of the hull with thin planks, as was ordered by Henry Laurens for his schooner *Betsey* towards the end of that century (Hamer et al 1972:117, 524). Other methods included sheathing the submerged part of the hull in metal. Lead was commonly used until the early 18th century when copper sheathing was introduced. A variety of experiments were carried out by the Royal Navy which then adopted the process for all navy vessels in 1782 (Goodwin 1987:226-227). However, the expense of this method generally precluded its use for merchant craft.
SCIAA: Ingram Vessel

Dating the Ingram Vessel

No reliable evidence was found on the site from which a date for the vessel could be determined. A test excavation into the interior of the overturned hull revealed a distinct paucity of diagnostic artifacts that could be linked to the boat. Likewise, artifacts recovered from around the site did nothing towards aiding in the dating process. Artifacts recovered include ceramics and glass bottle fragments all of which date to the late 19th century with the exception of one fragmentary blue shell-edged pearlware plate which suggests an early 19th century provenance. Several submerged sites have been identified within a kilometer upstream that could have been the source of these artifacts. These include the wreck of a 19th century steamboat (Harris 1991:95-97), a discrete pile of bricks, and the remains of a bridge demolished during the Civil War. The remains of a tramway, once used to transport steamboat cargoes to and from Cheraw, lie partially submerged near the present day boat landing and park, which are themselves built on one of the town's landfills (Miller Ingram pers. comm. 1993). It is likely that the artifacts recovered in and around the site of the Ingram Vessel represent secondary deposition from the aforementioned sites due to fluvial re-deposition.

Historical documents have established that there were local boat builders at work on the upper Pee Dee in the late eighteenth century. General Nathaniel Greene, in December 1780, mentions boats being built to move his army and to gather supplies and to forage for his horses. Historical documents also tell us that both Stephen Parker and his son-in-law, Achilles Knight, built boats locally during the late 18th century at Mark's Creek, some 13 kilometers (8 miles) upstream from the Ingram Wreck and that Parker contracted to build a boat for £700 in 1776 (See Local Historical Context, above). However, these general references to "boats" provide little useful information to aid in the reconstruction process or to place the vessel in a good temporal context.

The presence of wrought iron nails on the hull suggests a date prior to the mid 19th century. Cut nails (nails that were sliced from sheet iron by a machine) were first produced around 1790; however wrought nails continued to be used well into the following century (Noel Hume 1969:252-253). Treenails appear on most wooden hulled water craft excavated in South Carolina and appear to have been a long enduring method of fastening the various components of locally built craft.

To be successful as a ship or boat vessel must fulfill three criteria. A vessel must float, it must move by some means of propulsion, and it must have the ability to carry. For the Ingram Vessel the former two requirements have been addressed. Another way...
of attempting to ascertain the possible appearance of the vessel is to look at what the craft may have carried and the environment in which the vessel must have operated. Appendix D provides general background on the products shipped in the state and the standard containers in which they were transported, both of which had a bearing on certain elements of vessel design. The principal products of the Cheraw area during the colonial period were lumber, hemp, indigo and deerskins. After the Revolution bacon, flour, tobacco and cotton became more significant. To transship these heavy, bulky products through the often shallow headwaters of navigation on the Great Pee Dee River a shallow draft craft would be required. Such a requirement could be met by the long, narrow east coast mountain boat (Newell 1993:145) or with a shorter, but beamier craft like the Brown's Ferry Vessel (Steffy 1979). The Ingram Vessel, as representative of the latter vessel type, would have fulfilled this requirement.

The shipwright who designed and built the Ingram Vessel appears to have combined many of the best features of two distinct types of water craft. The hull shows a very flat bottom with virtually no rise to the floor timbers suggesting a shallow draught vessel like the Brown's Ferry Vessel. Also like the Brown's Ferry Vessel, the garboard strakes were butted against the keel, rather than being seated in a rabbet - a further suggestion that the intended use for the boat was in protected waters. However, unlike the Brown's Ferry Vessel, which lacked a keel and, according to one researcher, was probably representative of a developed form of periauger (Hocker 1992), the hull in the Great Pee Dee River was designed and built around a keel and shows distinct evidence of a European-influenced shipwright using a ship-built design.

Cheraw, located just below the falls [small rapids] of the Great Pee Dee River, became a center for trade with the back country because of this strategic location. There are numerous documentary sources indicating that boats carried agricultural products to market and returned with goods which could not be produced locally. The hull of the Ingram Vessel certainly had the capability of negotiating the rivers of the state and possibly even conducting short hauls within the protective confines of the coast's barrier islands. However, there is no evidence that the craft ventured anywhere near the coast; it may well have operated strictly in the upper reaches of the river system.

Unfortunately, without direct evidence as to who built the Ingram Vessel, where the boat was used and operated, what cargo was carried in its hold and the circumstances of the vessel's obviously untimely demise, we are reduced to speculation about the life of this small vessel.
Conclusions

Numerous references from newspapers, diaries, and wills mention "boats" used to transport trade goods on the Great Pee Dee River inland as far as Society Hill and Cheraw. (Pugh 1788, McIver 1791, Kershaw 1771). Thus far, no detailed descriptions or drawings of these vessels have surfaced. The Ingram Vessel is the only ship-built hull which has been found in a South Carolina inland context. Boats built in the lower coastal plain of the state usually used a combination of bald cypress, pine, and live oak in their construction. The fact that the Ingram Vessel is built entirely of Southern Yellow Pine lends credence to the premise that it was built in the upcountry. Without further information, it would be impossible to state that it was typical, only that it may well be an example of what an inland trading vessel was like.

The specific genus of pine used in the construction could not be ascertained from the wood samples taken from the hull. Pines common to the area in colonial times were of both the short and long leaf leaf variety. However, Loblolly pine (Pinus taeda) was artificially introduced into the area later in the nineteenth century. If the specific genus of Pinus can be established, an indication of date of earliest construction of the vessel may be arrived at.

During the months devoted to fieldwork and research the major goals of the project were accomplished. Excavation of a portion of the hull allowed archaeologists to recover much of the architecture of the lower hull and thereby develop an understanding of the vessel itself. But more importantly, the project afforded the opportunity to glimpse a vignette of colonial times in the uplands of the state where water craft represented the most economical and reliable method of transporting goods until the advent of rail and other efficient land-based modes of transportation.

Lastly, the project benefited greatly from public interaction - from the eager volunteers who assisted us in accomplishing the research goals to the audiences who engaged us with copious informed questions during the public presentations of the results of the project in Cheraw, Bennettsville and Charleston.
Recommendations

The study of water craft in upland environments is still in its infancy in South Carolina. Archival and experimental research has developed much information about mountain boats, and one ferry craft has been recently the subject of a pre-disturbance survey. Prior to the study of the Ingram Vessel, this represented the full extent of research in this area of the state.

Clearly, additional resources need to be allocated to the discovery and study of upland sites in the State. Resources should also be made available to support archival research to develop information of the type already found in support of the Ingram Vessel study.

On a regional level, the Pee Dee river system is one of the least studied systems in the State, and efforts should be made to focus the interest of the scientific community upon the resources of the system. The Ingram Vessel is a fine model inasmuch as it was made possible by the combined interests of a responsible sport diver, an independent historian, and SCIAA, supported in part by the South Carolina Humanities Council.

Recommendations specific to the site should certainly include further work. The extent and integrity of the vessel remains have yet to be determined. This can only be done with a sizable investment in large scale excavation. The level of importance of the site - and therefore the priority that should be set for further work - is problematic. With little information available about upland craft, no determination can be made as to its uniqueness. Such a determination should follow a survey of the immediate area, which, as determined by our own preliminary survey, appears to contain numerous sites. Only with an understanding of the extent and quality of such sites, can further qualified recommendations be made concerning the Ingram Vessel.
Figure 1. Map of project area from Marks Creek to Society Hill on the Great Pee Dee River (SCIAA).
Figure 2. USGS 7.5 Minute Topographic Map (Wallace and Cheraw Quadrangles) showing the location of the Ingram Vessel site (38CT204) (SCIAA).
Figure 3. Plan, backbone elevation and section views of the excavated portion of the Ingram Vessel site (Christopher F. Amer, SCIAA).
Figure 4. View of the broken and badly eroded west end of the keel and keelson (Christopher F. Amer, SCIAA).

Figure 5. View of the starboard side of the keel at frame 5 (Scale is in decameters) (Christopher F. Amer, SCIAA).
Figure 6. Starboard side of keel scarph. Note the hole for a stopwater and hook, both of which serve to lock the scarph (Scale is in decameters) (Christopher F. Amer, SCIAA).

Figure 7. Illustration of frame 5 on starboard side showing location of watercourse (Mark M. Newell, SCIAA).
Figure 8. Scale drawing of disarticulated frame components recovered near the bow of the boat (Mark M. Newell, SCIAA).

Figure 9. View of the end grain of a section of the port garboard strake (Christopher F. Amer, SCIAA).
Figure 10. Close-up of wedged treenails and wrought iron nails fastening hull planks (Christopher F. Amer, SCIAA).
Figure 11. View of hull planks butted at frame 7, the ends fastened with two wrought iron nails each (Christopher F. Amer, SCIAA).
Figure 12. View of inboard surface of a section of ceiling plank (Christopher F. Amer, SCIAA).
Figure 13. Hull sections taken at frames 5, 7, 10 and 14, corrected for upright orientation (Christopher F. Amer, SCIAA).
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Greenhill, Basil

Hamer, Philip M and George C. Rogers Jr. (editors)

Harris, Lynn


Heywood, Duncan Clinch

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Hoyt, William Henry (editor)

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Wood, Peter H

Wood, Virginia Steele
Appendices

Appendix A: Principal Dimensions and Scantlings

Length Overall ...................................................(est) 15.50m (50ft, 10in)
Breadth (Beam) at midship beam ......................(est) 4.60m (15ft, 11in)
Depth of hold ..................................................unknown
Tonnage ..........................................................unknown
Length-to-beam ratio ......................................(est) 3.4:1
Keel - of Southern Yellow Pine
            sided .34m (13-3/8in) to .19m (7-1/2in) aft
            molded .15m (6in)
            Hook scarph - .56m (22in) table; .02m to .03m (3/4in to 1-1/8in) nibs
Frames - of Southern Yellow Pine
            Floor timbers and futtocks sided and molded c. .085 (3-3/8)
            Room and Space - .50m to .70m (19-5/8in to 27-1/2in); ave .60m (23-5/8in)
Hull Planking - Southern Yellow Pine
            Garboards .027m (1-1/16in) thick; .226m (9in) wide
            Planks .020m (c.3/4in) thick; .18 to .22m (7in to 8-5/8in) wide
Keelson - of Southern Yellow Pine
            sided .15m (6in)
            molded .08m (3-1/8in)
Ceiling Planking - of Southern Yellow Pine, .015m (5/8in) thick; .24m to .30m (9-1/2in to 11-7/8in) wide
Appendix B: Glossary of Ships Terms

Aft  Toward the stern of a vessel.
Amidships The middle of a vessel.
Apron A piece of curved timber fixed behind the lower part of the stem, immediately above the foremost end of the keel.
Ballast Heavy material such as iron or stone, carried in a vessel's hold for the purposes of lowering her center of gravity and increasing stability.
Beam (1) The breadth or width of a vessel at its widest point. (2) One of the transverse members of a ship's frames on which the decks are laid.
Block A wooden device used to increase the mechanical power applied to ropes or to lead the running ropes to convenient positions for handling.
Bolt Cylindrical pin of iron for fastening and securing the different parts of the vessel.
Burthen The payload or cargo-carrying capacity of a vessel; the tonnage volume of the hold.
Butt The squared end of any plank in a vessel's side which unites with the end of another, continuing its length.
Camber A slight curve of a hull timber.
Cant Frames The frames at the ends of a vessel which are not perpendicular to the keel; those at the stem slant forward, while those at the stern slant aft.
Carvel The method of construction whereby the strake edges are flush with one another, thus presenting a smooth surface.
Caulking The insertion of oakum into the seams and butts of planking to render them watertight.
Ceiling The inside planks of a vessel.
Chainplates Metal fastenings for attaching mast shrouds to the sides of the hull.
Chamfer The flat surface created by slicing the square corners or edges of a timber.
Deadrise The angle between the bottom of a hull and a horizontal plane.
Deadweight The carrying capacity of a vessel beyond its own weight.
Deck beam An athwartship timber that supports a deck.
Depth of Hold The centerline distance between the top of the floor timbers and the top of the midship beam.
Draft The depth of a hull below the waterline.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Drag</td>
<td>The amount by which a vessel floats lower aft than forward. Drag gives the</td>
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<td></td>
<td>rudder slightly greater immersion and thus more effect in turning the</td>
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<td></td>
<td>craft.</td>
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<tr>
<td>Drift bolt</td>
<td>An iron fastening which is driven into a hole drilled slightly smaller</td>
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<td>than the bolt diameter, thus gripping the wood by pressure alone.</td>
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<tr>
<td>Floor timber</td>
<td>The lowest, central timber of a frame, which crosses the keel and is</td>
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<tr>
<td></td>
<td>bolted to it.</td>
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<tr>
<td>Forward</td>
<td>Toward the bow of the vessel.</td>
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<tr>
<td>Frames</td>
<td>Single or composite structures mounted perpendicularly to the keel to</td>
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<td></td>
<td>strengthen and give shape to the hull. Comprised of floor timbers and</td>
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<td></td>
<td>futtocks.</td>
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<tr>
<td>Futtocks</td>
<td>The lowest, central timber of a frame, which crosses the keel and is</td>
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<tr>
<td></td>
<td>bolted to it.</td>
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<tr>
<td>Garboard</td>
<td>The external planking strake that is closest to the keel on each side.</td>
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<tr>
<td>Gudgeon</td>
<td>A metal bracket attached to the sternpost on which the rudder is hung by</td>
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<td>means of a pintle.</td>
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<tr>
<td>Gunwale</td>
<td>The uppermost wale or strake on a vessel's side.</td>
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<tr>
<td>Half Frame</td>
<td>A frame that does not cross the keel, but rises up from either side of it.</td>
</tr>
<tr>
<td>Heel</td>
<td>The after end of the keel and the lower end of the sternpost.</td>
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<tr>
<td>Hull lines</td>
<td>A set of three drawings showing lines which describe the shape of a vessel.</td>
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<tr>
<td>Keel</td>
<td>The backbone of a vessel, to which the stem, stern, frames, and garboards</td>
</tr>
<tr>
<td></td>
<td>are attached.</td>
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<tr>
<td>Keelson</td>
<td>An internal longitudinal timber, set atop the floor timbers directly over</td>
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<td></td>
<td>and parallel to the keel.</td>
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<tr>
<td>Knee</td>
<td>A timber or metal bar fashioned into a right angle to provide strengthening</td>
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<td>and support at points of intersection of ship's timbers.</td>
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<tr>
<td>Limber Holes</td>
<td>Holes or notches cut in the floor timbers on either side of the keel to</td>
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<td>permit free passage of bilgewater to the lowest point in the vessel.</td>
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<tr>
<td>Leeboards</td>
<td>An early type of drop keel, usually made of wood, and pivoted at its</td>
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<td></td>
<td>forward end on each side of a flat-bottomed or shallow draught sailing</td>
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<tr>
<td></td>
<td>vessel.</td>
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<tr>
<td>Lodging knee</td>
<td>A knee which is fixed horizontally between the forward, or aft, side of a</td>
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<tr>
<td></td>
<td>beam and the ship's side.</td>
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<tr>
<td>Maststep</td>
<td>A structure into which the foot of the mast is fitted, its purpose being</td>
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<tr>
<td></td>
<td>to distribute the weight of the mast over the keelson.</td>
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<tr>
<td>Midship frame</td>
<td>The frame which determines the extreme breadth of a vessel, indicated by</td>
</tr>
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<td></td>
<td>the symbol $\mathcal{O}$.</td>
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<tr>
<td>Mortice</td>
<td>A cavity, usually rectangular, cut in the surface of one piece of timber</td>
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<tr>
<td></td>
<td>to receive the shaped end of another piece and so form a joint.</td>
</tr>
</tbody>
</table>
Molded  The measurement of height or width as seen in the body plan of a vessel. The molded breadth of a vessel is the measurement athwartship to the outer face of the frames.

Plank  An individual longitudinal timber attached to the outer frame faces.

Plain sawing  Consists of cutting completely through a log after it has been squared up; in respect to labor and waste is the cheapest way to cut logs.

Port  The left side of the vessel when one is facing forward.

Rabbet  A groove cut into the keel, stem, or sternpost into which the external planking is seated.

Scantlings  The dimensions of any piece of timber with regard to its breadth and thickness in shipbuilding.

Scarf(Scarph)  A lapped joint connecting two timbers or planks together.

Sheave  The wheel or pulley in the mortice of a tackle block over which the rope runs.

Sheer  The sweep or longitudinal curvature of a hull as seen from the side.

Sided  The measurement across the outer frame faces or tops of longitudinal timbers.

Square Frame  A frame that is perpendicular to the keel and extends across both sides of the hull.

Stanchion  An upright supporting post.

Starboard  The right hand side of the vessel when one is facing forward.

Stempost  An upward-curving timber attached to the forward end of the keel, and into which the two sides of a vessel's bow are united.

Stern knee  A knee which reinforces the join between the keel and sternpost.

Sternpost  A perpendicular timber secured at its lower end to the after end of the keel; its upper end supports the transom.

Stopwater  A wooden dowel driven across the seam of a scarf to deflect water traveling along the seam and to prevent the timbers from shifting.

Strake  A continuous line of planks extending from the stem to the stern.

Tonnage  (See Burthen).

Transom  The transverse timbers at the stern of a vessel which give shape to the quarters and form the stern.

Treenail  (Trunnel)  A wooden fastening used to join hull timbers.

Trim  The way in which a vessel floats on the water in relation to her fore-and-aft line.

Turn of the Bilge  The area of the hull where the bottom curves to the side.

Wale  A thick planking strake which strengthens the side of a vessel.

Water Courses  (See limber holes).
Appendix C: Wood Identification

Dr. Frank H. Tainter, Forestry Department
Clemson University, Clemson, South Carolina

1. Keel - Southern Yellow Pine (*Pinus spp.*)
2. Floor timber - Southern Yellow Pine (*Pinus spp.*)
3. First futtock - Southern Yellow Pine (*Pinus spp.*)
4. Second futtock - Southern Yellow Pine (*Pinus spp.*)
5. Garboard (port) - Southern Yellow Pine (*Pinus spp.*)
6. Hull plank - Southern Yellow Pine (*Pinus spp.*)
7. Gunwale - Southern Yellow Pine (*Pinus spp.*)
8. Keelson - Southern Yellow Pine (*Pinus spp.*)
9. Ceiling plank - Southern Yellow Pine (*Pinus spp.*)
10. Treenail - Southern Yellow Pine (*Pinus spp.*)
Appendix D: Products and Containers


A number of broad general chronologies of South Carolina have been written, some of which appear in the reference section of this work, and the reader is directed to these studies for a general historical background of the State. The purpose of this appendix is to synthesize data from a variety of sources in order to provide an overview of one the primary factors driving vessel design and function in the study area.

This factor is container form. The principal products of the area during the colonial and ante-bellum periods were naval stores, rice, indigo and cotton. The nature of these products, and the containers required to transport them, became one of the factors which dictated certain elements of vessel design.

Naval stores and pelts were among the earliest recorded export products of the State. There is little evidence within the state on how these items were shipped from their point of origin to local ports. Few records have been found during this study of any special manner in which animal pelts may have been packed for shipping. Hogsheads and bundles have both been suggested as a means of transporting these commodities. Certainly by the nineteenth century, when large volumes of rosin and pitch were being shipped down rivers such as the Waccamaw, the barrel was the primary container (Newell 1992:16). The early importance of coopers to the colonists would suggest that this had always been the case. The size, dimensions and capacity of these tar barrels does not appear to be recorded in local sources reviewed for this study. A general standard for the time is given by Falconer in a discussion on the effects of expansion of tar in barrels. Falconer states that the standard British Admiralty tar barrel of the time (1815) had a capacity of 154.56l (34 gals) and that the circumference of this size barrel was 1.54m (60in) (Falconer 1970:531). A later, and more authoritative work (Kilby 1971:64), gives the capacity of an early twentieth century tar barrel as 120.47l (26.5gals).

Rice, South Carolina’s richest and most enduring ante-bellum export product, was shipped to port from producing plantations primarily in a large barrel called a ‘tierce’. Although several different capacities are given for the tierce, the most commonly mentioned is 272.155kg (600lbs). The local dimensions of a tierce are not given in the records reviewed for this study. Kilby, describing a tierce as a standard provision cask
for ships of the eighteenth and nineteenth centuries, gives dimensions of length 0.80m (31.5in), head diameter 0.52m (20.7in) and pitch diameter as 0.64m (25.5in). This would appear to be smaller than a 500-600lb barrel, however (Kilby 1971:52). If local dimensions differed from Kilby or not, they were apparently well known enough at the time to be used as a common measure of size for ships. Lawson, for example, describes early canoes as carrying 30 barrels and pirogues as capable of carrying 80 to 100 barrels. Later advertisements in the *South Carolina Gazette* also indicate that barrels were a standard of measure for ships, numerous advertisements for vessels for sale indicating size by barrel capacity as well as more standard conventions. Some typical statements taken from advertisements include:

**Measurement:**

```
"...Carries 120 barrels of pitch..."
"...Large wood pettiauger...will carry 80 barrels of rice..."
"...Large Pettyauger for sale, 70 barrels..."
```

**Date**

```
Jan. 22, 1737
Sept. 10 1737
Feb. 27, 1742
```

There are indications that the tierce was not the sole method of transportation. An illustration on file at the South Caroliniana Library shows “sacks of rice” being loaded onto a schooner and author Duncan Heywood describes rice as being shipped in 300lb (136kg) barrels, 100lb (45.35kg) sacks. He also describes loose rice being loaded directly into the holds of the schooner *Sallie Bissell* by children with baskets (Heywood 1937:105, 218).

Indigo was also shipped in barrels of two sizes. A 1747 pamphlet, reprinted by H. Roy Merrens in 1977, states:

"...As there is so many customary allowances in tare, draft, etc., and charges on every cask needless here to mention, which is almost the same on a large or small cask, I can demonstrate that there is a real difference of £4 sterling on 2,000lb [906kg], of indigo, being sent for sale in four large, or in ten small casks, and therefore advise the sending none in casks smaller than a rice-barrel, the best size casks is to hold about 450lb to 500lb [205 to 226kg] of neat indigo; and, if larger, to be the size of pipes or puncheons told hold from 7 to 800lb [317 to 363kg]..." (Merrens 1977:150).
An inset illustration on a map by Henry Mouzon, shows the process of indigo manufacture, the final product being bricks or cakes of dye being packed in a tierce sized barrel. An important diagnostic feature of the barrel would the air holes drilled in the heads to facilitate drying during shipment (Leland 1976:13).

Tobacco was a later crop in South Carolina as upland regions of the state came under cultivation. The crop only achieved major prominence in the state late in the nineteenth century (Newell 1992:15). It was being brought through the Santee Canal during the early years of the nineteenth century and was clearly a factor in vessel design as demonstrated by mountain boats and canoes in text below.

The standard container for Tobacco was the hogshead, a type of barrel known in Medieval times in Europe (Kilby 1976:135). According to Tatham's study of the American tobacco trade in 1800, the hogshead “...is regulated by law to the standard of four feet six inches, in length if my recollection is right, but the shape and bilge of the cask generally varies according to the fancy of the cooper...”(Tatham 1800:47-48).

Tatham notes that most plantations of any size had at least two cooperers engaged in making hogsheads. Leslie's Illustrated Magazine shows a good example of scale in a mid nineteenth century view. There had been several efforts to regulate the size of the tobacco hogshead by 1850, the name being given to barrels which ranged over time from 300lbs to 1600lbs, these last probably being the type pulled by horses in rolling loads (Terrell 1988:80). In traditional English cooperage, the hogshead was a cask designed as a container for liquids - usually wine. Its dimensions were length .95m (37.5in), head diameter .58m (22.8in) and pitch diameter .72m (28.4in) and its capacity is given as 245.51 (54 gals) (Kilby 1971:61). The measurements varied slightly depending upon the type of fluid the cask was intended to contain.

Cotton was an early crop, grown on coastal regions of South Carolina during the eighteenth century (Merrens 1977:152). This was sea island cotton or long staple cotton, a type from which the seed could be separated by hand or with simple roller gins (Rosengarten 1986:72). It was not until the development of Whitney's gin for separating seed from short staple cotton at the end of the eighteenth century that the product assumed major proportions (Jones & Dutcher 1890:387).

There was a major difference in the forms of cotton bales between the eighteenth and nineteenth centuries. This was due to improved methods for packing the ginned lint. The early type of bag is pictured in an illustration in Diderot showing the process on a Caribbean plantation. Jones & Dutcher give a description of the process on Georgia Plantations:
“...the staple at that time [1828] being packed only in round bales. To make, the bales, the planter would cut off a piece of bagging about ten feet long. The edges were then joined and sewed together, and one end sewed up. This made a bag ten feet long and from twenty-two to twenty-three inches wide. Into this the cotton was tightly packed and rammed. When full, the mouth of the bag was closed. At each of the four corners an ear, or lug, commonly filled with cotton seed, was made. This round bale ordinarily weighed 200 pounds [90.7kg], sometimes running to 300 pounds [136kg]”... (Jones & Dutcher, 1890:395).

Merrens, cited above, gives 200lbs as a standard weight in 1747. Later in the nineteenth century mule driven screw presses, followed by steam driven presses, enabled greater compacting of the lint into square bales. Early bales weighed approximately 300lbs, the later ones closer to 500lbs (227kg). The heavier bales were .137m (5in) long, .68m (27in) wide and .40m (16in) thick (Anon. 1916:12).
Appendix E: Preliminary Typology of South Carolina Watercraft

**Prehistoric Dugout Canoe - 4,500 B.P. - A.D. 1690**

The earliest form of water transportation was the Native American dugout. It was constructed by the burn and scrape method with a crudely formed bow and stern, usually wedge shaped.

**Historic Dugout - 1690 - present**

After 1690, "Europeanized" canoes appeared, distinguishable from prehistoric craft by use of metal tools, and designs including carving of European shell forms with shaped bow, transom sterns, wash strakes, and keel (Newell 1992).

African Americans may also have influenced changes in dugout construction since the dugout was frequently used in the riverine environment of West Africa (Smith 1970).

**Raft - ca. 1745-1900**

Simple rafts were made by lashing logs together, and sometimes boards were placed over the logs. It was not unusual to transport lumber by raft. The Charleston Gazette of May 5, 1778 stated, "Timber may be rafted from pier head of lowest mill in small Rafts to the River...where the rafts are joined to carry down to Georgetown, and has generally been done in Rafts containing from 30 to 40,000 feet in 5 days, the distance from Georgetown by land is 90 miles." Rafts were also used for transporting goods on plantations. A planter recorded in his diary that he had materials for making indigo vats sawed at the mill and the slaves rafted the indigo and lumber (McIver 1791, as cited in Linder 1993:136).

**Pirogue - 1690-1860**

A flat-bottomed, transom-sterned ship hull of conventional appearance, it was built up from a keel and garboard strake carved from a single log. The keel was usually of cypress, planking of pine, and frames of live oak. The approximate average pirogue dimensions were: length 20m (65.7ft), beam 5m (16.4ft), depth of hold 1 to 1.5m (3.28 to 4.9ft). A similar type of vessel was used in the rice fields of the Niger River Delta. (Newell 1992). A variation on the same design may have been the periauger [also peraugua, pettiauger], a cypress dugout which had been enlarged by splitting down the middle and installing boards for added width. Various models included a rudder, oars, sails, a tarpaulin, or even an awning to shade passengers. A load of 700 deerskins in a periauger rowed by four Native Americans was not unusual. A large periauger could
carry as much as one hundred barrels of pitch or tar and was useful in transporting horses, cattle, and goods from one plantation to another (Linder 1993:61-62, 64).

**Ferry Craft** - 1690-1970

Ferries were of a basic flat design typically 20m (65.7ft) in length and about 5m (16.4ft) in beam. Earlier craft were often constructed with cypress chine-girder sides while later boats were planked with 2-3 strakes. With a low ramp angle and two stanchions on one side containing pulleys to hold a rope which ran across the river, craft were built of cypress, pine, and live oak (Newell 1992).

**Flat** - ca.1750-1860

The basic flat design was adapted for use in wide and narrow rice field canals. In the ante-bellum period, flats were usually constructed with chine-girder sides. Scow-like profiles characterized earlier vessels while later craft had angled ramps. Pine, cypress, and live oak were used, and construction featured transverse planking (with one or two exceptions), heavy header logs, internal stringers, and rake timbers. Size was a beam of 4 m (13.1ft) and a length of 15m (49.3ft) (Newell 1992).

Flats could make down river trips, but due to their barge-like shape were often unable to return against the current. In 1819, former Governor David Rogerson Williams said of the Pee Dee, “An immense amount of produce has heretofore been annually carried down in large flats, constructed only for the voyage, always very hazardous, and resorted to in consequence of the previous high freights and scarcity of boats” (Kohn 1938:9, as cited in Linder 1993:198).

**Coasting Schooner** - 1690 - ca.1870

Of conventional European design and construction, the coasting schooner had a flat-bottomed, transom-sterned ship hull. Earlier types used king planks while later models used shallow keels. Shell form designs featured extended maximum beam fore and aft of center of vessel to maximize cargo capacity. Built of pine and live oak, these vessels operated in riverine areas and coastal regions, possibly with leeboards (Newell 1992).

Today a schooner is defined by the rigging of the sails, fore-and-aft as opposed to square-rigged. However, until the middle of the nineteenth century, rig had little if any connection with the designation of the boat (Baker 1962:xi, as cited in Linder nd:17).

**Pole Boat** - ca. 1800-1840

Pole boats sometimes had a small keel for better balancing and steering with a pointed or rounded bow and stern for the sake of reduced resistance in the water. Plank ways along each gunwale provided walking space for the crew, divided into gangs for starboard and port, and perhaps into shifts alternating work and rest. Each poleman in the
gang would in turn walk to the bow, secure his pole against the bottom of the stream, bear against its upper end with his shoulder, and walk from bow to stern, thus forcing the boat forward. The captain or coxswain would guide the boat with the rudder. A crew of fifteen or twenty men could pole a boat with several tons of cargo upstream at the rate of about ten miles a day by hard labor (Phillips 1908:71-71, as cited in Linder, 1993:198-199). About thirty pole boats were operating regularly on the Pee Dee in 1819 (Kohn 1938:9 as cited in Linder, 1993:202).

**Teamboat - ca. 1816-1824**

The teamboat was a specialized craft, similar to a steamboat in paddle-wheel type construction, but it utilized mules as motive power. David Gregg, a merchant of Society Hill, adapted a team ferry prototype for use on the Pee Dee. Eight mules provided power for the teamboat which five men navigated. The mules, walking in a circle on deck, turned a gear system which turned the paddle wheels. The boat could carry three hundred bales of cotton and complete a trip from Society Hill to Georgetown in fifteen days at a cost of 75 cents per bale (Kohn 1938 as cited in Linder 1993:203-204)

**Steamboat - 1819-ca.1920**

The first steamboat on the Pee Dee began operation in December, 1819, following clearing of the river in a massive internal improvements program directed by the state engineer. It used two boats as lighters to provide the shallow draft necessary to navigate the river. It was equipped for both freight and passengers. A stylized drawing in a contemporary newspaper shows a sidewheeler (Georgetown Winyaw Intelligencer, December 18, 1819).