Abstract

DEFINING EASTERN NORTH CAROLINA UPRIVER STEAMBOATS THROUGH TAR RIVER ARCHAEOLOGY AND HISTORY

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This thesis will identify the salient features of North Carolina upriver steamboats and their relationships to steamboats from a variety of regions in the United States in an effort to understand the means by which people adapted and reinvented the steamboat for an array of different environments. Upriver steamboats on the Tar River in eastern North Carolina were an amalgamation of available inland marine technology designed, borrowed, and adapted to allow steamboat service despite navigational hazards and low water. The Tar River had a commercial history that paralleled other southeastern waterways, and, therefore, it is an appropriate case study of navigation on an upriver transport zone in the southeastern United States.

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CHAPTER 1: INTRODUCTION

This thesis identifies the salient features of Tar River upriver steamboats and their relationship to steamboats from a variety of regions in the United States, in an effort to understand the innovations of steamboat design employed for different environments. The term "upriver" is noted in an article written by the former Secretary of the Navy Josephus Daniels, a Washington native whose father was a ship captain. Daniels describes the "upriver steamboat" as a known ship class on the Tar River in southeastern North Carolina.* The use of the term in context reveals upriver steamboat as a common term lacking the need of definition to North Carolinians of the 19th and early 20th centuries. Research for this thesis focuses on delineating Tar River upriver steamboats using archaeological examples as well as historical sources. This thesis also describes and analyzes a variety of regional steamboat types in an effort to compare upriver steamboats with contemporary American steamboats. Comparisons may, therefore, indicate that upriver steamboats represent an amalgamation of available technology designed, borrowed, and adapted to allow steamboat service to upriver areas despite low water levels and navigational hazards.

This is the first study to address the construction aspects of upriver steamboats by focusing on the steamboats plying the Tar River between the towns of Washington, Greenville, and Tarboro in the 19th and early 20th centuries. These steamboats are of special interest as they illustrate local builders overcoming the challenges of an exceptionally shallow depth of water and the preponderance of navigational hazards associated with this stretch of river. Carrying

*From this point forward, the term upriver steamboat will be used without quotations because the phrase was commonly used.

trade farther upriver proved especially important in the decades before reliable roads were built throughout North Carolina, where the waterways functioned as highways to the interior of the state.

East-West waterways, including the Tar River, represent swift and abundant highways allowing access to the inland areas of North Carolina. Prior to the arrival of railroads in the late 19th century, rivers functioned as the main transportation route to the interior communities of North Carolina. North Carolina rivers carried a majority of the goods and passengers trafficked across the state due to the lack of maintained plank roads, while the rivers general tendency to flow eastward opened the interior of the state to economic development. Before the arrival of steamboats, upriver merchants and farmers relied on canoes, periaugers, and flats to transport goods downriver to Washington (Sloan 1971:7). Although farmers and citizens of the Tar River could easily transfer goods downriver, they encountered substantial problems moving cargo and passengers upstream against the current.

In addition to a strong current, low water and navigational hazards plagued the Tar River. The navigational hazards faced by vessels operating on the Tar River included shoals, snags, overhanging trees, logs, and periods of low water. Many of these hazards resulted from natural causes, though logging of riverbank growth also deposited trees and large branches in the river (Sloan 1971:26). Navigational hazards, low water, and yearly freshets inhibited upriver travel in hand powered canoes, flatboats, rafts, and other small craft of varied descriptions (Sloan 1971:7; Rodgers et. al. 2008:28). Before upriver merchants began shipping via steamboats, cargo was loaded on flats and sent downriver. Merchants often found it more economical to sell the flat as lumber at the downriver location, rather than pay the crew for the labor intensive trip upriver (Merrick 2001:185). Current and navigation hazards also prevented sailboats and other vessels with deep drafts from traveling far upriver past Washington before improvements were made to river navigation.

Steamboats solved many of the problems associated with interior river highways, especially the Tar River. The unprecedented ease with which steamboats carried trade in both directions along the Tar River proved to be the largest improvement provided by upriver steamboats. The arrival of steamboats opened upriver communities to the rest of the world and expanded trade. Beginning in 1836, merchants in the interior communities of Tarboro and Greenville benefited from the ability of steamboats to carry cargo from Washington, against the current upriver. Unlike other contemporary vessels, steamboats did not require extensive exertion from a large crew fighting the current, while completing the journey in less time. Upriver steamboats were the first vessels to provide regular freight and passenger transportation from Washington, upriver against the current, to the communities located along the banks of the Tar River (Myers 1884:2). Understanding the importance of steamboat commerce to local merchants, the state and federal governments sponsored internal improvements aimed at increasing the navigability of the Tar River. Dredging, insertion of jetties, and the removal of potential snags resulted in increased upriver steamboat commerce in the postbellum era and improved the lives of upriver citizens (Watson 2002:59).

Steamboats also functioned as communication devices, quickly and efficiently transferring mail and information. The communication offered by visiting steamboats linked communities to each other and to the world. The arrival of steamboats in remote areas allowed for a flow of knowledge and information. The frequency of steamboat visitation helped interior communities, including Tarboro and Greenville, flourish (Myers 1884:2).

Despite the importance of river transportation and commerce in the east, there is little scholarly research pertaining to southeastern steamboats. In order to identify the salient features of upriver steamboats, research for this thesis relied on a combination of newspapers, enrollment records, photographs, and the archaeological surveys of two Tar River steamboats. Newspapers printed in Tarboro, Greenville, and Washington during the 19th century chronicle over three dozen steamboats that carried freight and passengers on the Tar River from 1836 until the early 20th century. Archival holdings from the Outer Banks History Center, the George H. and Laura E. Brown Library, located in Washington, and the Edgecombe County Memorial Library contain a quantity of first hand accounts of local steamboat traffic. Underwater archaeological work revealed the extant remains of two Tar River steamboats and shed invaluable light on detailed construction techniques used in upriver environments.

This project formally began with the archaeological survey of an upriver steamboat conducted by the Program in Maritime Studies at East Carolina University. In 2008, members of the Program in Maritime Studies investigated the remains of a vessel lying in the Tar River near the town of Old Sparta, located in Edgecombe County, North Carolina. The location of the wrecked vessel, directly east of the highway 42 bridge, combined with the shallow water level made the wreck visible and accessible to interested citizens during times of low water. Understanding the importance of documenting the exposed vessel remains, the Eddie and Jo Allyson Smith Foundation generously provided financial support for an archaeological survey of the vessel. Beginning in the summer of 2008, Dr. Bradley A. Rodgers led graduate students Theresa Hicks and author, Elizabeth Wyllie, in a survey of the site. A research design choreographed by multiple working hypotheses concerning form, function, and deposition of the vessel guided field and archival research. The final report produced by Rodgers, Hicks, and

Wyllie, entitled *Enigma of the Old Sparta Vessel: The Phase II Pre-disturbance Archaeological Survey of a Tar River Steamboat*, describes the remains and places them in their historical context. The lack of a definitive date of construction, use life, or loss, combined with the inability to identify the name of the vessel led to broader questions about Tar River steamboats and the communities they served (Rodgers et al. 2008: 6-15, 51-54, 78-84).

The Program in Maritime Studies at East Carolina University has actually documented the remains of two upriver steamboats: the Old Sparta Vessel and Castle Island Vessel 4. During summer field schools in 1998, 1999, and 2000, the Program in Maritime Studies documented and researched eleven vessels located in the Tar River adjacent to Castle Island in Washington, North Carolina. The remains of a small, stern-paddlewheel steamboat, designated "vessel 4," appear to have diagnostic features similar to the Old Sparta Vessel. Unfortunately, preliminary phase research is the only information now available concerning Castle Island Vessel 4. Further research on the remains of this steamboat may prove impossible as the wreck disappeared during the flooding from Hurricane Floyd in 1999 and has not been relocated. The initial fieldwork, however, resulted in a scaled drawing and site report, which is available in "The Castle Island Ships' Graveyard: The History and Archaeology of Eleven Wrecked and Abandoned Watercraft" (Rodgers and Richards 2006: 34).

This thesis utilizes all available resources concerning Tar River steamboats in an effort to understand the myriad of challenges faced by upriver merchants attempting to transport goods between Washington and Tarboro. The combination of historical primary records, photographs, and archaeological remains offers a robust narrative of upriver ingenuity. Although newspapers and enrollment records lack substantial information about the construction and appearance of Tar River steamboats, photographs offer snapshots of these vessels under construction along the Tar

River and particular views of technological information often missing from written historical sources. Archaeological examples of upriver steamboats offer insight into the technical construction aspects of the hull not readily apparent in photographs or written records.

For comparative purposes, thesis research expanded to include steamboat construction in other areas of the United States, specifically focusing on adaptations in response to environmental constraints at the intended location of use. The hulls of the Old Sparta Vessel and Castle Island Vessel 4 had both been noted for their similarities to Western River steamboats. Researchers indicate "internally, this vessel [Castle Island Vessel 4] is similar if not identical to construction demonstrated on 'Western River' or 'mountain' steamers, although of a smaller size" (Rodgers and Richards 2006:33). Similar statements made in *Enigma of the Old Sparta Vessel*, such as "this craft [Old Sparta Vessel] is designed in a fashion very reminiscent of western river Mountain Steamers," required thesis expansion and a comparison with other contemporary steamboats (Rodgers et al. 2008:82).

Comparing typical steamboat hull types across a variety of locations in the United States presents a challenge to accepted beliefs concerning typological divisions. Most steamboat historians, including Hunter, Morrison, and Chittenden, fail to mention southern steamboats, possibly due to simple lack of information. These works focus instead on the initial arrival of the steamboat in New York waters, or the fleet of western river steamboats. More recent research pertaining to steamboats operating on the Chesapeake Bay and the Delaware River illuminates regional variations of steamboat construction in other areas previously overlooked (Holly 1994). Comparative analysis of all of these regions indicates that upriver steamboats represent an amalgamation of available steamboat technology, designed to allow steamboat service despite navigational hazards and low water.

Eastern North Carolina steamboat builders applied different hull characteristics depending on a variety of factors including local water levels, freight considerations, the period when they were built, and the available technology. In addition, builders and owners were concerned with the type and volume of cargo available for transportation. Steamboats intended for use upriver in remote locations found their sizes limited by extremely shallow rivers and a small volume of freight and passengers (Myers 1884:2).

This work will define the North Carolina upriver steamboat and place it within an appropriate and important historical context. The analysis focuses on information gathered concerning Tar River steamboats, especially those techniques employed by individual builders to construct steamboats specifically for service upriver. After placing Tar River steamboats in their historic context, the thesis shifts to analyzing similar design techniques exhibited in steamboats throughout the United States. This thesis will demonstrate that a new class of steamboats has come to light: southeastern upriver steamboats, including those that operated on the Tar River. These vessels embody an amalgamation of available technology adapted to the particular environmental aspects of the inland transport zone of the southeastern United States (Westerdahl 1994:266).

CHAPTER 2: THEORY AND METHODOLOGY

This chapter describes the theoretical framework that guided the research and analysis of steamboat development. Focusing on literature regarding innovations, diffusion, and technological progress, this chapter explains steamboat expansion and diversification in terms of environmental contingency. After an explanation of appropriate theory, this chapter explores the archeological and archival research methodology used to gather information about upriver and other regional steamboats.

Theoretical Framework

Archaeological remains of Tar River steamboats offer valuable insight into the 19th century problems faced by ship owners and shipbuilders (Hocker and Ward 2004:8). Renowned maritime archaeologist, Thijs Maarleveld, notes the importance of this thesis and similar studies by stating, “the study of technical detail in shipbuilding […] provides us with an exceptional opportunity to understand past thinking, concepts, and decisions” (Maarleveld 1995:4). Research for this thesis delves deeper in an effort to understand what Hocker and Ward refer to as the “philosophy of shipbuilding”:

> The fundamental conceptual approach underlying a particular ship’s design and construction. This conceptual approach, the product of an individual shipwright’s set of assumptions, cultural and personal biases, and technical experience could be detected in the details of the ship remains and teased out to the form, dimensions, and tool marks preserved on rotten bits of wood (Hocker and Ward 2004:1).

Shipwrights living along the Tar River did not invent the steamboat; rather, they adopted and reinvented the steamboat while relying on regionally tested variations in hulls, machinery, and propulsion methods. Archaeological surveys of the physical remains of Tar River steamboats offer insight into the specific innovations adapted for local steamboats.

Hocker and Ward note that steamboats are a form of “portable (and thus transferable) technology,” therefore, shipbuilding methods do not always observe cultural or geographical boundaries (Hocker and Ward 2004:4). The variances in hull characteristics, engine design, and propulsion methods that diffused over waterways throughout the United States in the 19th century transcended boundaries. Diffusion, described by Everett Rogers, is “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 2003:474). Steamboats can be considered an innovation because they are objects that were perceived as new by an individual or other unit of adoption. Potential adopters of an innovation, in this case steamboat designers and builders, gathered information about the innovation, made subjective evaluations, and ultimately decided whether to implement the new innovation (Rogers 2003:12).

Technological innovations are typically comprised of a hardware aspect defining the physical object that embodies the tool, and a software aspect acting as an information base for the tool (Rogers 2003:12). The social system’s understanding of these aspects contributes to the rate of diffusion of a technology. For example, the software aspect, the concept of steamboats, permeated throughout Europe and the United States years before physical steamboats began arriving at ports. Knowledge and information gained about steamboats lessened potential adopters’ uncertainty about the new innovation. The more information potential adopters gather about innovations the lower their uncertainty and feelings of risk. After forming an attitude toward the innovation, based on knowledge about the innovation, potential adopters decide whether to adopt or reject the innovation (Rogers 2003:172).

Steamboats represent a technology cluster consisting of “one or more distinguishable elements of technology that are perceived as being interrelated” (Rogers 2003:249). Also referred to as technology packages, these clusters of innovations often result in faster adoption rates then if the innovations were introduced independently. In the case of steamboats, elements of the cluster or innovation package include engines, hulls, machinery, and propulsion methods. During the decision making process the individual seeks information to reduce uncertainty about the various elements and, during the decision stage, will either adopt and make full use of the package innovation or reject part or all of it (Rogers 2003:37). The individuals' perception of the compatibility of the interrelated innovations is important when considering adoption rates of technology clusters including steamboats.

Rogers states that adoption rates are controlled by individuals' perceptions of characteristics of the innovation, including relative advantage, compatibility, complexity, trailability, and observability (Rogers 2003:221). Individuals often view these characteristics through opposing perspectives. The innovation of the steamboat became observable at ports and small landings throughout the United States in the decades before the Civil War. Interested parties including shipwrights, steamboat owners, merchants, farmers, and newspaper reporters flocked to the waterfronts to marvel at steamboats arriving from around the country (Lichtenstein 1926:3). Public opinion about steamboats turned negative as individuals experienced, and the media reported, steamboat catastrophes that resulted in the loss of lives (Lloyd 1856).

Upriver steamboats did not develop autonomously along an evolutionary track, but were the result of human decisions regarding continuity or adaptations (Maarleveld 1995:4). Rogers found that innovations tend to diffuse more rapidly when they have a high potential for reinvention, "the degree to which an innovation is changed or modified by a user in the process of adoption and implementation" (Rogers 2003:17). Reinvention allowed steamboat owners to adapt the innovation of steam-powered vessels to fit a variety of natural environments.

Flexibility in the process of adopting steamboats led to increased diffusion and encouraged customization of the innovation to fit more appropriately with local conditions (Rogers 2003:185). In addition to considerations concerning hull shape and style, steamboat builders made choices relating to other parts of the innovation package including propulsion methods, steam engines, and associated machinery. Few shipyards in the southeastern United States could construct all of the equipment necessary to outfit a steamboat, leading builders to rely on other firms for necessary parts including engines, boilers, and paddlewheels (Halsey 1981:726).

The separate manufacture of the main components of a steamboat, the hull, the engine, and the propulsion elements, allowed each component to grow and develop rather rapidly along the waterways of the United States and Great Britain. During the 19th century, the machinery placed inside steamboat hulls developed from simple low pressure condensing engines to complex quadruple expansion engines. At the same time engineers became better acquainted with iron and steel technology and began creating steamboat hulls plated and eventually entirely constructed with these stronger materials (Diveley 2008:97). The improvements in hull design and steam engines encouraged improvements in propulsion technology from large bulky side paddlewheels to stern paddlewheels and propellers. Builders adopted and manipulated these steamboat elements in an effort to build steamboats to operate in specific environments. There were few original inventions relating to steamboats; change usually came from new combinations of existing features. Trial and error, and learning by doing allowed shipwrights to develop steamboats specifically for the navigational issues along an intended route (Basalla 1988:89). The fact that steamboats had such short lives, generally around five years, also increased the rate at which innovations were adapted (Corbin and Rodgers 2008:35)

While steamboat hulls, machinery, and propulsion methods improved and diversified in the first half of the 19th century, the adoption of steamboats on the Tar River lagged behind other American rivers. One possible explanation for the reluctance to accept the new vessel type along the Tar River is maritime conservatism, the traditional shipbuilding belief that experimentation with new vessel designs is dangerous and expensive, coupled with the idea that previous designs are proven to function as advertised (Hocker and Ward 2004:8). Tar River citizens observed the risks of the new technology cluster as they gathered to watch the locally constructed, experimental steamboat *Red Skull* sink in the Tar River, failing spectacularly on its maiden voyage (Rodgers et al. 2008:36). Tar River steamboat owners proved, perhaps with good cause, unwilling to rely on locally constructed steamboats in the antebellum years, instead purchasing steamboats built at northern shipyards, thereby retarding local steamboat construction (Myers 1884:2).

Efforts to determine the driving force behind innovativeness has led many economic historians to identify necessity as the catalyzing factor for technological change (Ruttan 1959:603). Economic historian George Basalla disagrees, noting, "any complexity that goes beyond the strict fulfillment of needs could be judged superfluous and must be explained on grounds other than necessity" (Basalla 1988:6-25). It becomes clear when examining the myriad of human made products, including steamboats, that many are not necessary for human survival. Sailboats carried trade and people throughout the world before the invention of steamboats and sailboats continued to appear at ports throughout the era of steamboat dominance. While steamboat builders did not construct vessels as a human necessity, the builders and owners considerably improved their economic standings if their vessel proved successful.

Believing in continuity over ingenuity, George Basalla states that novel artifacts are not unique, but rather arise from antecedent artifacts. Basalla presents a theory that any society, at any time, commands more potential for technological innovation than it can ever hope to exploit, and society selects to develop a small fraction of competing novel artifacts (Basalla 1988:viii). Disagreeing with the biological necessity-driven Darwinian evolutionary approach to technological progress, Basalla believes that the diversity of artifacts is a reflection of the "fertility of the contriving mind" and the multitudinous ways the peoples of the earth have chosen to define and pursue existence (Basalla 1988:208-218). Building upon the belief that each kind of made thing is not unique but related to what has been made before, Basalla builds a modified concept of technological progress. Two changes are made to the traditional view of the evolutionary theory of technological progress in order to stop the search for progress across technological and cultural boundaries over long periods of time. Basalla believes progress must be viewed within very restricted technological, temporal, and cultural boundaries according to a narrowly specified goal. The second change to the traditional view of technology involves the disengagement of technology from social, economic, and cultural progress. The work of George Basalla rejects the traditional theories of technological progress, substituting a workable theory of technological evolution that accepts limited progress toward a carefully selected goal within a restricted framework (Basalla 1988:210-218). This framework fits the evolution and diversity of steamboats in America during the 19th century.

Upriver steamboats developed along the Tar River following the Civil War, decades after many other regional steamboats developed into their standard forms. The diversification of steamboat hulls and machinery in the decades before the Civil War allowed builders at Washington, North Carolina to conservatively employ a mix of accepted hull forms, machinery, and modes of propulsion when building upriver steamboats (Rogers 2003:180). After the Civil War, established northern companies, including the Old Dominion Steamship Company and the Clyde Line expanded service to the Tar River and fostered the development of steamboat construction at Washington. The presence of competing steamboat firms led to an increase in steamboat traffic reaching new locations up the Tar River. Steamboats diffused from established traditions in the waterways of the northeast, the western rivers, and the eastern coast before being adopted by citizens living along the Tar River (Hunter 1949:65). In addition to considering diffusion, a careful analysis of steamboat hull characteristics supports a correlation between transport geographical zones and hull styles.

The studies in maritime transport geography by Christer Westerdahl split the landscape into geographical transport zones separated by transit points where a change of boat or reloading of cargo occurs. Transit points between transport zones often have natural obstacles that require a change of vessel type. Transport zones can be assigned for the individual rivers and waterways of the United States, including the waterfront zone of the Atlantic Ocean, the coastal zone closer to the shore including the sounds, the lake zones that include the Great Lakes, and the inland zones that include the rivers. Westerdahl reasons, and the author agrees, that the construction of ships is "intimately adapted to the natural geography of the transport zone and intended cargo" (Westerdahl 1998:2).

Traveling upriver past Washington, a transit point on the Tar-Pamlico River, required a change of vessel during normal operating conditions. With exception, sailboats, and deep draft coastal steamboats proved unable to travel far upriver past Washington, therefore, Washington acted a transit point between the inland zone and the upriver zone. The two varieties of steamboats operating on the Tar-Pamlico River can be divided in much the same way the river has two names based upon the geographic transition from the broad and relatively deep Pamlico River to the narrow and shallow Tar River (Westerdahl 1998:2; Lawrence 2003:164).

Vessels are adapted to the conditions of their intended route, and, therefore, differ depending on their intended transport zones and cargo. The theory of transport geography promotes the environment as a deciding factor in ship construction. Clearly, environmental aspects, including the depth, current, and navigational hazards along the intended route, play a large role in determining the hull type best suited for use. Historical sources and photographs depict two separate classes of steamboats appearing at Washington. Coastal steamboats designed to provide passenger and freight transportation on the lower rivers and sounds of North Carolina differed from upriver steamboats intended to carry freight on the Tar River. Local steamboat builder A. W. Styron built different vessels depending on the intended route and rebuilt several upriver steamboats because of a change in their intended route to the sounds (United States Bureau of Marine Inspection and Navigation [Bureau of Navigation] 1883a, 1892). Economic historian George Basalla notes, “a tool or contrivance that has been designed to function in one natural setting often must be altered if it is to work properly in a new environment” (Basalla 1988:8).

Research pertaining to American steamboats reveals accepted regional classifications and a focus on defining the characteristics of particular regional traditions rather than on the communication of ideas between regions (Hocker and Ward 2004:3). Tar River steamboat builders relied on technology previously tested on other waters, illustrating the communication of ideas, and the movement of builders themselves, throughout the United States. Builders chose to incorporate characteristics that proved advantageous on steamboats operating in similar waters, including the shallow Missouri River, when designing Tar River steamboats. Though no information pertaining directly to the motivations and decisions of Tar River shipbuilders exists, Westerdahl would expect these steamboats to be similar because flat-bottomed boats with shallow sides are found in inland transport zones throughout the world (Westerdahl 1998:4).

Steamboat builders found themselves confined by the transport zone and available cargo along an intended route while "their range of expression is somewhat limited or at least guided, in each case by the available material and techniques, by the cultural background of the craftsman, as much as by conscious choice" (Hocker and Ward 2004:5). Operating inside these parameters, builders modified steamboat hulls and introduced new technology to develop steamboats adapted for particular routes. For example, steamboat operators on western rivers developed a shallow, flat-bottomed hull with high-pressure engines to steam against the currents. Relying on passenger transportation, builders of western river steamboats concentrated on appealing to potential passengers with ornate woodwork, gilded saloons, and ample staterooms. The size of western river steamboats increased as the importance of the area and the population grew (Basalla 1988:89). Due to the small size of the markets and the narrowness of the rivers, Tar River steamboats and mountain steamboats of the Missouri River seldom reached the large sizes typical of western river steamboats. Builders of Tar River upriver steamboats, and mountain steamboats also devoted less space and money to passenger cabins and amenities (Myers 1884:2; Corbin 2000:54). Rather then simply stating that upriver steamboats appear "similar, if not identical to […] western river or mountain steamers" (Rodgers and Richards 2006:33), research indicates that they were an amalgamation of technological advances which diffused from a variety of locations.

Research Methodology

Research for this thesis began in 2008 with the preliminary Phase II Pre-disturbance Archaeological Survey of vessel remains located in Edgecombe County, North Carolina. Guided by multiple working hypotheses relating to vessel form, function, and deposition, Dr. Bradley Rodgers, Theresa Hicks, and Elizabeth Wyllie mapped the site and produced a report, entitled "The Enigma of the Old Sparta Vessel: The Phase II Pre-disturbance Archaeological Survey of a Tar River Steamboat" (Rodgers et al. 2008). Fieldwork consisted of offset measured sketches from a datum and baseline, as well as a transit and laser recorded area map, resulting in an integrated plan view of the site including the wreckage, bridge, and riverbanks. As fieldwork and historical research continued, the multiple working hypotheses were continually disproved and reexamined (Rodgers et al. 2008:6-53).

After careful examination of the site, researchers found a profound archaeological contradiction:

> [The vessel remains] look diagnostically like a steamboat of sophisticated shallow water design perhaps built during the later part of the 19th century, although most of the artifacts and the manner in which the craft is put together suggest a much earlier date, perhaps as early as the second quarter of the 19th century (Rodgers et al. 2008:54).

Circumstantial evidence in the form of coal, burned brick, and cinders found in the wreck along with the sheer size of the Old Sparta Vessel suggest it was a steamboat. The two cylinder timbers located on the site are the strongest evidence that the Old Sparta Vessel remains represent a steamboat as opposed to other contemporaneous vessels. Designed to support a paddle shaft and pillow block, these notched wooden support beams have no parallel in non-mechanically powered vessels (Rodgers et al. 2008:62-63).

Unfortunately, without further fieldwork, the remains of the Old Sparta Vessel elude identification. Additionally, the bow of the vessel is missing, complicating efforts to determine the dimensions of the steamboat. Dating the construction or use life of the vessel also proved difficult because an 1830 penny found on site and the reliance on treenail fastenings suggest an early 19th century construction date, while the sophisticated hull design suggests a late 19th century construction date (Rodgers et al. 2008:69). Researchers concluded that, although the vessel's date of construction and period of use remain a mystery, the Old Sparta Vessel wreck represents a unique shallow water upriver steamboat (Rodgers et al. 2008:78). Historical research concentrated on uncovering primary sources describing Tar River steamboats in an effort to identify the Old Sparta Vessel.

Several secondary and tertiary resources contain contradictory accounts of Tar River steamboats, therefore, research focused on collecting primary resources in order to build a reliable database of information relating to Tar River steamboats (see Appendix A). Primary sources pertaining to Tar River steamboats are available in several libraries serving the Tar River communities of Tarboro, Greenville, and Washington. The majority of the Tar River steamboat owners and builders lived in Washington, North Carolina, and two libraries in this city maintain archival holdings relating to steamboats. The George H. and Laura E. Brown Library preserves a quantity of first hand accounts of steamboats including the transcript of an interview with local shipbuilder T. H. B. Myers. In addition to these holdings, the Beaufort, Hyde, and Martin Counties Regional Library of Washington contains resources relating to the steamboat industry. Local newspaper records, initially perused at the Edgecombe County Memorial Library in Tarboro, offered information about the movements of Tar River steamboats.

The sources available on the East Carolina University campus at Joyner Library include a section devoted to North Carolina History, boasting a comprehensive collection of 19th century North Carolina newspapers. During grant-funded research, Theresa Hicks and Elizabeth Wyllie spent many hours reading newspaper microfilms in an effort to gather all available information concerning Tar River steamboats. One newspaper, the *Tarboro Southerner* proved especially valuable as the editors enjoyed printing advertisements, accident reports, reviews, and personal opinions about steamboats servicing Tarboro. Newspapers proved to be a rich primary source, and on many occasions were the only source to mention certain Tar River steamboats. Joyner Library also maintains a quantity of special collections in the Manuscripts and Rare Books Department that include the following primary sources about Tar River commerce and steamboats: the Richard Porson Paddison papers, the Francis Manning collection, the Tar River Oil Company records, the William Augustus Parvin papers, the William Blount Rodman papers, and the Elias Carr papers. The Tar River Oil Company records offer detailed information about a company that operated locally built steamboats on the upper Tar River during the late 19th and early 20th centuries. The Eastern North Carolina Digital Library, established by Joyner Library, offers a searchable online database containing a multitude of contemporary sources including pictures of Tar River steamboats.

Ms. Pam Edminson, librarian at the Edgecombe County Memorial Library, helped researchers locate files and photographs pertaining to Tar River steamboats. Located in Tarboro, the Edgecombe County Memorial Library offers access to a full collection of 19th and 20th century newspapers printed in Tarboro, including the *Tarboro Southerner*. Special collections pertaining to steamboats on the Tar River are located in the local history section of the Edgecombe Library, as well as online. Edgecombe County Memorial Library offers digital access to several historic collections including the Lena Martin Photograph Collection via their website. This collection contains several albums of photographs from Edgecombe County taken during the 19th and early 20th centuries, including several photographs of steamboats under construction and in operation along the Tar River.

In addition to online library databases, Google Books proved to be a useful internet search engine throughout the research process. Google offers easily searchable, digitized copies of thousands of rare books, historic documents, and governmental reports from the 19th and 20th centuries. Several reports from the Inland Waterways Commission provided information about Army Corps of Engineers internal improvement attempts on the Tar River. These online resources supplemented information from archival research, archeological survey, and photographs.

The largest collection of Tar River steamboat photographs comes from the Captain Henry Clark Bridgers Jr. Collection, located at the Outer Banks History Center at Manteo, North Carolina. While residing in Edgecombe County, local historian Captain Henry Clark Bridgers Jr. spent years gathering information and writing a manuscript entitled “Steamboats on the Tar” that remains unpublished. In addition to the manuscript, the Captain Henry Clark Bridgers Jr. collection, occupying 3.3 cubic feet, contains several hundred photographs, passenger tickets, enrollment records, and newspaper clippings relating to Tar River steamboats. After the death of Captain Bridgers in 1981, his family gave the manuscript and collection to David Stick who added additional documents before turning the information over to Lindley Butler who submitted it to the Outer Banks History Center in 2003. The enrollment records and photographs of Tar River steamboats proved to be the most valuable information in the collection.

In addition to archival research, this thesis relies on several publications from the Maritime Studies Program at East Carolina University pertaining to the Tar River. In 1989, James Cox provided an overview of the antebellum steamboat era in his thesis on Pamlico-Tar River commerce, "The Pamlico-Tar River and its Role in the Development of Eastern North Carolina." In 2003, East Carolina University excavated a coastal steamboat wreck dating to the Civil War, located in Tar River near Tarboro. Matthew Lawrence focused on the history of this steamboat, *Oregon*, for his 2003 thesis "'A Fair Specimen of a Southern River Steamer,' the *Oregon* and Tar/Pamlico River Steam Navigation." In addition, Christopher McCabe considered the commerce of the Tar River communities and settlement patterns for his 2007 thesis, "The Development and Decline of Tar-Pamlico River Maritime Commerce and its Impact upon Regional Settlement Patterns." Although all of these works by East Carolina University Program in Maritime Studies graduates reveal information about the Tar River and its commerce, they do not delve into upriver steamboat construction techniques.

During summer field schools in 1998, 1999, and 2000, the Program in Maritime Studies documented and researched 11 wrecks located in the Tar River adjacent to Castle Island in Washington, North Carolina under the direction of Principle Investigator, Dr. Bradley A. Rodgers. The Phase II pre-disturbance reconnaissance survey focused on the investigation of the Castle Island Ship's Graveyard. In addition to a variety of work vessels, the survey revealed the remains of a small, stern paddlewheel steamboat, designated "vessel 4," which appears to have diagnostic features similar to the Old Sparta Vessel (Rodgers et al. 2008:71). Unfortunately, preliminary phase research that included a detailed plan view drawing is the only information available about this Castle Island wreck. Further research on the wreckage of this steamboat cannot now be conducted because the wreck disappeared during the flooding from Hurricane

Floyd in 1999 and has not been relocated. The initial fieldwork resulted in a scaled drawing and a site report, entitled "The Castle Island Ships' Graveyard: The History and Archaeology of Eleven Wrecked and Abandoned Watercraft" (Rodgers and Richards 2006:34). Being hampered by time constraints and the disappearance of the wreck, researchers could not elaborate on the similarities between Vessel 4 and western river steamboats.

Research for this thesis expanded to include regional varieties of steamboats in an effort to assess the comparison of the Old Sparta Vessel and Castle Island Vessel 4 to western river steamboats. In 1903, John Harrison Morrison published *The History of American Steam Navigation* that details steamboat service throughout the United States. Breaking the country into regions, Morrison gives an overview of steamboat operations from the Hudson River, the Delaware River, the western rivers, the Long Island Sound, the Great Lakes, Boston and other northeastern states, and Ocean Steamship lines. Research focused on delineating regional varieties of steamboat developments and most importantly, for this research, comparisons to Tar River steamboats.

Robert Fulton and Robert Livingston controlled the first steamboat to provide economically successful service in America, the *North River Steamboat of Claremont,* launched in 1807. As steamboat builders in the New York area continued experimenting with hulls and machinery, a class of northeastern steamboats developed with a hull design similar to sailboats, powered by low-pressure engines. Designed to carry passengers, baggage and express goods, steamboats played a vital role in New York transit until World War I (Morrison 1903:46). Shortly after the first American steamboat launch in New York, steamboats with similar designs appeared on the western rivers beginning in 1811 (Hunter 1949:62).

Steamboats enabled the opening of the western frontier, carrying immigrants, explorers, citizens, and trade on the Ohio, Mississippi, and Missouri rivers and their tributaries. Reinventions of the steamboat to operate in the environment of the western rivers resulted in a transformation in hull and machinery design. Several historians have written about the western river steamboats, *Steamboats on the Western River: An Economic and Technological History* by Louis Hunter being the most comprehensive work. Adam Kane offers technological information as he describes the archaeological surveys of at least 17 western river steamboats in *The Western River Steamboat*. The large volume of information regarding western river steamboats includes *The Steamboat Montana and the Opening of the West* by Annalies Corbin and Bradley Rodgers. Building upon the archeological survey of the mountain steamboat *Montana*, Corbin and Rodgers develop the history of steamboat commerce and construction on the shallow, winding Missouri River (Corbin and Rodgers 2008). As steamboat builders developed the typical western river, and mountain steamboat designs, steam powered vessels improved navigation on waterways throughout the United States.

The following chapter discusses the harnessing of steam power and its application to navigation in the 17th, 18th, and 19th centuries. The chapter also describes the development of regional steamboats adapted to different geographical transport zones and intended cargos. Tar River steamboat builders adopted a combination of construction techniques exhibited on other waterways when designing upriver steamboats in the last quarter of the 19th century. A comparative analysis of regional steamboat hull types including upriver steamboats appears in the final chapter of this thesis.

CHAPTER 3: STEAM POWER AND ITS APPLICATION TO INLAND NAVIGATION

The development of the steam engine and the diversification of steamboats to provide service on a variety of waterways paved the way for Tar River steamboat pioneers. On waterways throughout America, steamboat hulls and machinery developed and diversified before being adopted by citizens living along the Tar River. Selective adaptation, in response to environmental considerations along an intended route and the volume and type of available cargo, inevitably resulted in the development of regional steamboat styles. The technical advances in propulsion, engines, and inland hull designs discussed in this chapter influenced the choices made by Tar River steamboat builders and owners who relied on an amalgamation of available techniques to develop an upriver steamboat style in the last quarter of the 19th century. A comparative analysis conducted in the concluding chapter of this thesis addresses the similarities between upriver steamboats and other regional steamboat styles or classes discussed below.

The history of the development of the steam engine illustrates that great inventions are never the work of any one mind but rather the aggregation of minor inventions. Although the following pages mention several inventors, history does not always preserve every invention and inventor. Steamboat historian Louis Hunter draws attention to the truly innovative, stating, "the accomplishments of a Fulton, a Shreve, an Evans, or a French would assume a quite modest position beside the collective contribution of scores of master mechanics, ship carpenters, and shop foremen in whose hands the detailed work of construction, adaptation, and innovation largely rested" (Hunter 1949:220). Unfortunately, historic records rarely include the names and careers of the lesser-known workers who fabricated these early engines.

Early Applications of Steam Power

A manuscript by Hero, entitled *Spiritalia seu Pneumatica*, found in Alexandria dating to 200 B.C. reveals that Ancient Egyptians harnessed the power of steam. Hero describes a number of contemporary contrivances including several steam-powered inventions without noting the identity of the inventors. One toy described by Hero, the *aeolipile*, utilized steam power to produce a rotary movement of a globe (Figure 1). The machines mentioned by Hero were often used in religious contexts to make objects on an altar move but did not have more practical applications. No other information about utilizing steam power for practical purposes exists until several centuries later (Thurston 1878:2-7).

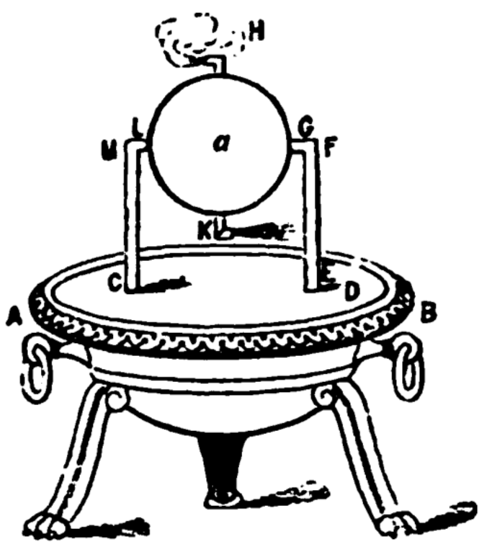

FIGURE 1. Depiction of the steam powered toy, *aeolipile*, dating to 200 B.C. mentioned in *Spiritalia seu Pneumatica* by Hero of Alexandria (Thurston 1878:8).

During the middle ages, many educated men began to value research pertaining to practical mechanics. Around the middle of the 16th century A.D., Hieronymus Cardan called attention to the fact that a vacuum could be obtained by condensing steam; however, nothing came of his suggestions until much later. Jacob Besson and Agostino Ramelli published books about applied mechanics and the power of steam in 1578 and 1588 respectively. These books served as valuable sources detailing general machinery that later experimenters consulted (Thurston 1878:10-13).

During the early 17th century, several innovators attempted to build machines to harness steam power. Each experiment arose out of a perceived flaw in available hand or animal machinery and attempted to improve upon previous experimental engine designs. These early trials allowed for increased knowledge about the properties of steam. European inventors including Florence Rivault, Giovanni Branca, Salomon de Caus, and Giovanni Batista del la Porta published books and treatises relating their trials and experiences with steam power but it remains unclear what these men actually constructed (Thurston 1878:13-17).

Initially the impetus for the practical application of steam power came from the mining industry. Managers and mine owners desired a more practical and affordable way to remove water from the mines than the typical method of hiring teams of horses to haul it. The first evidence for the construction of an engine to raise water by steam dates to 1663. That year, Edward Somerset second Marquis of Worcester received a patent for his steam engine that successfully elevated water at Vauxhall near London. Although also installed at Raglan Castle, Worcester died before he could introduce his engine to a large audience (Figure 2). Around the same time, Sir Samuel Morland, Master Mechanic residing near London, took patents for his fire engines based on a slightly improved model similar to Worcester engines. Morland did not gain acceptance and prestige although his ideas also influenced military engineer Thomas Savery who developed similar, slightly improved, machinery near the end of the 17th century (Thurston 1878:19-28).

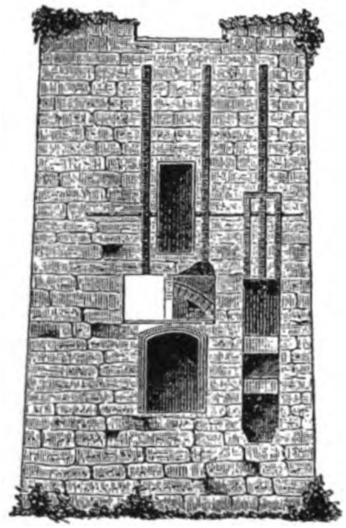

FIGURE 2. Wall of Raglan Castle, located in South East Wales, in which Edward Somerset second Marquis of Worcester installed a steam engine to lift water around 1628 (Thurston 1878:22).

Building upon the principles exhibited by Worcester engines, Thomas Savery received a patent for his steam engine, specifically designed to remove water from mines, in 1698 (Figure 3). Understanding the value of publicity, Savery advertised his engine and distributed a pamphlet describing the invention to mine proprietors and managers. While his early engine offered advances over previous models, it did not gain wide acceptance because it could not raise a large quantity of water high enough, which often resulted in boiler explosions. Savery continued investigating steam power, producing several improved steam engine designs, eventually building a "water-commanding engine." Utilizing surface condensation and a secondary boiler, this engine could work uninterruptedly for a period limited only by decay of the machinery. Although several Savery engines were constructed and installed in mines, they proved inadequate. After Savery died, Dr. Desaguliers modified a Savery engine with several important innovations. Adapting the engine in 1718, Desaguliers added safety valves and substituted the use of jets instead of surface condensation, which increased the promptness of the formation of a vacuum (Thurston 1878:32-44).

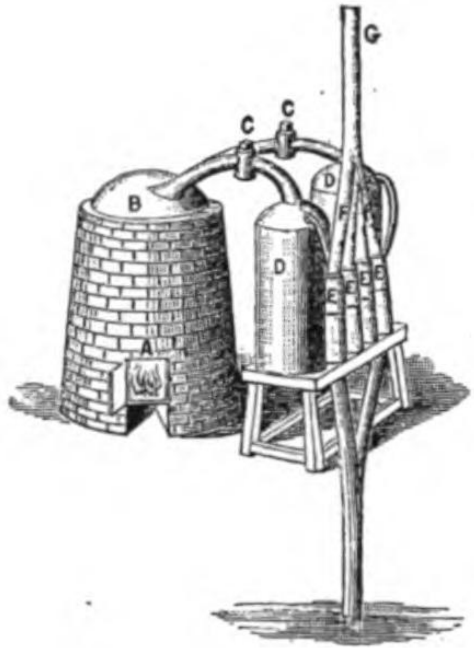

FIGURE 3. Model of the first engine designed by Thomas Savery in 1698 to pump water out of mines (Thurston 1878:34).

Meanwhile Dennys Papin, fostering an interest in steam power, moved to England in 1675 and became acquainted with Robert Boyles, founder of the Royal Society. These men worked together to invent the “Digester,” a vessel that used steam pressure to cook food in water to a desired temperature. Continuing his experiments, in 1690, Papin produced the first steam engine with a piston and in which condensation was produced to secure a vacuum. Several innovations utilized on the Papin engines found use in future engine designs, including harnessing high-pressure and installing fire boxes and flue boilers. Papin also proposed using a steam engine to drive a boat by pumping water to power a paddle wheel (Figure 4). His attempt to construct a paddlewheel steamboat in Germany in 1707 resulted in local watermen apparently taking offense to the contrivance and smashing the vessel (McCall 1984:52). Around the same time, Thomas Newcomen successfully combined experimental elements of a steam engine to build his atmospheric engine (Thurston 1878:46-52, 224).

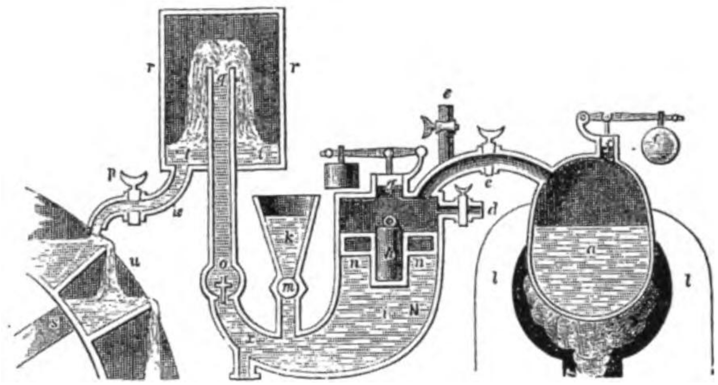

FIGURE 4. An engine built by Dennys Papin to power a waterwheel in 1707 (Thurston 1878:53).

Newcomen built upon innovations that proved successful on previous engine designs to develop the atmospheric engine. In order to build his engine, Newcomen had to cooperate with Thomas Savery who held the exclusive rights to practice surface condensation. In 1705, Thomas Newcomen, John Calley, and Thomas Savery received a patent for an engine that combined a steam cylinder, a piston, surface condensation, a separate boiler, and separate pumps (Figure 5). This engine had a cylinder, open at one end, into which steam was fed at the top and then condensed by cold water, causing the piston to move down the cylinder simply under atmospheric pressure (Thurston 1878:39-44).

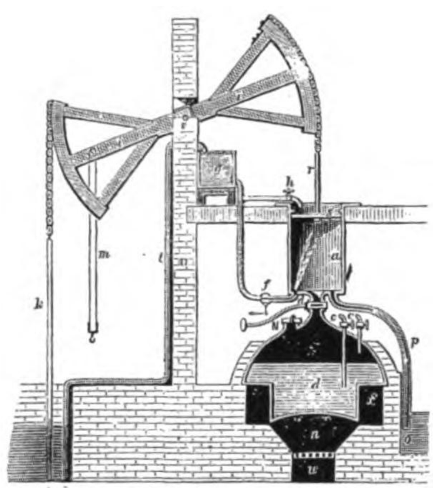

FIGURE 5. Depiction of an atmospheric engine invented by Thomas Newcomen in 1705 (Thurston 1878:50).

The atmospheric engine offered several improvements over earlier engine models, including the use of a jet of water sprayed directly into the cylinder resulting in a faster rate of condensation then previous engines. Shortly after its introduction, the atmospheric engine found use in nearly all the large mines in Great Britain. Prior to James Watt introducing his engine in 1774, mine owners relied on atmospheric engines but found them extremely inefficient since the cylinder and condenser were one unit repeatedly heated then cooled. The success of this steam engine, however, motivated people to consider the possibilities of steam power including steam navigation (Thurston 1878:50-97).

Jonathan Hulls received letters of patent from England in 1736 for his proposed steamboat that utilized a Newcomen atmospheric engine; however, historical evidence does not indicate if he had the vessel built. As engineers refined steam engines, American industrialist William Henry produced the first steamboat by installing a steam engine on a small boat with paddlewheels near Lancaster Pennsylvania in 1763, but the boat sank under the added weight. That same year, James Watt received a Newcomen engine to repair, inspiring him to experiment with engine designs (Thurston 1878:50-82).

Watt performed scientific investigations on the Newcomen engine revealing that it wasted three quarters of the heat supplied to the engine. In 1769, Watt collaborated with Matthew Boulton in order to experiment with new designs of steam engines. Boulton previously corresponded with Benjamin Franklin and constructed a model steam engine that Franklin exhibited in London. In 1774, Watt ran a successful trial of his newly constructed engine (Figure 6). Watt continued experimenting with steam power, receiving a patent for a double acting steam engine in 1782. This steam engine had a boiler, a cylinder with a reciprocating piston, and most importantly a separate condenser. Watt also built an insulated covering for the cylinder in order to keep the cylinder as hot as the steam that enters it. Steam engines built by Watt offered several improvements over atmospheric engines (Thurston 1878:86-90).

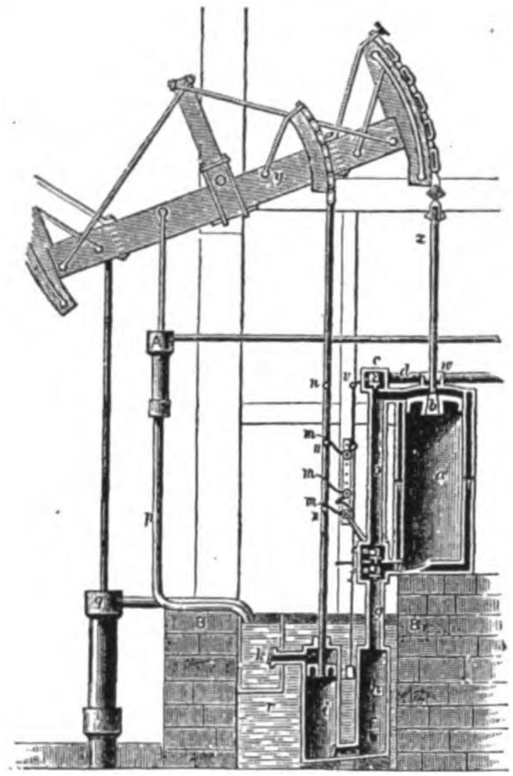

FIGURE 6. Depiction of James Watt’s 1774 engine (Thurston 1878:98).

Instead of relying on the pressure of the atmosphere, Watt used the expansive force of steam to press the piston, and allowed steam to work on the upper and lower sides of the piston alternately, doubling the power of the engine. Watt engines also improved upon Newcomen atmospheric engines by using a slide valve in the cylinder and a continuously cooled condenser. Experiments revealed to Watt that utilizing a cylinder that closed at both ends allowed for a high pressure, and the incorporation of several other innovations resulted in a double-expansion engine that had greater expansive force and accelerated power strokes (Thurston 1878:93-100).

The success of his steam engines prompted Watt to extend his patent for 24 years and join in an official partnership with Matthew Boulton. Boulton managed the business end of the firm, while Watt managed the design, construction, and erection of the engines. Boulton and Watt engines provided the power and reliability necessary for steamboat navigation and found use on several steamboats (Thurston 1878:103-125).

Steam Navigation Pioneers

While Newcomen and Watt improved steam engines, other inventors tried to apply steam power to navigation. The experiments of Frenchman Jacques-Constantin Périer proved successful and resulted in the first operational paddlewheel steamboat in 1775, but it proved too underpowered to make headway against the current of the River Seine. In France, in 1793, Count de Follenay and Count Claude de Jouffroy d'Abbans (better known as Claude Francois Dorothee, Marquis de Jouffroy) designed and built *Pyroscaphe*, a large steamboat fitted with a simple two cylinder atmospheric Newcomen steam engine. After several trials, Count de Follenay and Count Claude de Jouffroy d'Abbans installed a double acting steam engine similar to Watt engines. Although *Pyroscaphe* proved successful, incurred debt and the French Revolution disrupted further French steamboat developments (Fletcher 1910:12-14; Hilton et al. 1976:9-11).

Meanwhile, in Scotland, William Symington received a patent for steam engine use in the United Kingdom in 1786. Patrick Miller and Symington built a steamboat with two hulls and two paddlewheels located between the hulls in 1788. Miller, desiring a better engine, contacted engineer James Watt for advice, but found Watt unwilling to devote time to the application of steam power in vessels. Watt was not the only European who did not support early steam navigation attempts. In 1802, Symington built *Charlotte Dundas* with the first horizontal direct acting double expansion Watt engine ever constructed. Although the *Charlotte Dundas* proved successful, Lord Dundas could not convince other shareholders of the viability of steamboats, therefore the vessel remained docked and rotting for decades (Fletcher 1910:56-59; Hilton et al. 1976:10-14).

At the same time, industrious Americans attempted to bring steam power to their waters. After building a model steamboat in 1785, John Fitch launched a steam-powered vessel on the Delaware River at Philadelphia in 1786, and gained capital from the sale of a few shares of his stock. In 1787, Fitch built a steamboat that used upright paddles for propulsion that like many early steamboats proved unsuccessful due to its slow speed and the fact that the paddles masked the sides of the vessel to loading and unloading. That same year, James Rumsey, a Maryland native, publicly exhibited his steamboat on the Potomac River near Shepherdstown, Virginia. The next steamboat Rumsey launched on the Potomac had a novel propulsion system that pumped a stream of water from ahead of the boat and ejected it forcefully at the stern (Morrison 1903:10-12; McCall 1984:53-54; Sutcliffe 2004:1-17).

Being aware of the competition presented by Rumsey and the importance of monopolies, John Fitch secured patents for the application of steam navigation in the states of Pennsylvania, New York, New Jersey, Delaware, and Virginia by 1789. James Rumsey believed he had developed a different mode of propulsion and applied for a patent from the state of Pennsylvania. Unfortunately, for Rumsey, the government upheld the patent held by Fitch, excluding Rumsey from the right of using steamboats on any principle waterway in the state of Pennsylvania. Rumsey moved to London and installed a Boulton and Watt style engine on a steamboat but he passed away before the vessel went to trial. Although Rumsey also received patents in Great Britain, France, and Holland, he died suddenly in 1792, before he could develop his schemes (Fletcher 1910:20-21; McCall 1984:53-54; Sutcliffe 2004:143).

Meanwhile, protected from competition by his patents, John Fitch built another steamboat and operated it for more than a thousand miles at a speed of four miles per hour or better against the current in 1790. That same year Fitch inaugurated a passenger service between Philadelphia and Newton, but it did not prove successful. Desiring funding, he founded the Steamboat Company of America that elected Benjamin Franklin to serve the role of president. The company provided capital for the experiments made by Fitch involving propulsion methods including different arrangements of oars and paddles. Near the end of the 18th century, the company stopped supporting Fitch; therefore, he traveled to France to meet with a potential financial backer. Unfortunately for Fitch, the French Revolution erupted, and he left his vessel plans at the American Consul at Lorient without securing funding. Although Fitch attempted to increase vessel speed and built an experimental screw-propelled steamboat in America in 1796, he "fell short of introducing to the world a practicable mode of navigation by steam" before dying of unknown causes in July 1798 (Morrison 1903:1-11; Fletcher 1910:21; Hilton et al. 1976:17; McCall 1984:53-55; Sutcliffe 2004:159).

While Fitch experimented with propulsion methods, inventor and carpenter, Elijah Ormsbee, built a steamboat, *The Experiment,* on Rhode Island waters in 1792. After the successful trials, a mysterious man, later identified as Daniel French, spent several days examining the machinery and hull of *The Experiment.* Although Ormsbee proved his steamboat capable of carrying passengers on the waters of Rhode Island, he had difficulty securing patrons and funds, forcing him to abandoned *The Experiment* (Walton Advertising and Printing Company 1920:18).

Two years later, Samuel Morey produced a steam engine and installed it in a stern paddlewheel steamboat on the Connecticut River. The steamboat traveled from Hartford to New

York in 1794, but only reached a top speed of five miles per hour. In 1795, Morey received a patent for a steam engine in which a crank motion provided the power to propel boats of any size, and two years later launched a side paddlewheel steamboat on the Delaware River. A lack of capital disrupted the experiments of many early innovators including Morey and Ormsbee (Gould 1889:6; Fletcher 1910:24-25; McCall 1984:55).

Wealthy New York political figure Robert R. Livingston did not face capital restrictions and became involved in politics as well as the development of the steamboat. After John Fitch died in 1798, Livingston had the exclusive right to steam navigation on New York waters transferred from Fitch to himself. Desiring to have a steamboat built, Livingston contacted the only American engaged in steam engine manufacturing at that time, Nicholas J. Roosevelt. Roosevelt ran a successful steam engine manufacturing business in New Jersey and employed two men who had previously worked in the Boulton and Watt engine plant. Roosevelt agreed to construct a steamboat along plans drawn by Robert Livingston, and designed an engine similar to the Bolton and Watt engine. Although Roosevelt suggested using side paddlewheels, Livingston insisted on employing a horizontal stern paddlewheel that proved unsuccessful in 1798. Shortly after the unsuccessful trials of the Roosevelt steamboat, President Thomas Jefferson appointed Livingston minister to France and he sailed for Paris in 1801 (McCall 1984:55-56, 72-73).

While collaborating with Roosevelt, Livingston contacted John Stevens, a New Jersey native who had devoted much of his time to developing steamboats. Beginning in 1789, John Stevens experimented with steam engines but encountered difficulties finding a reliable and capable man to construct them. With support from Livingston, Stevens focused on constructing boats with steam engines and screw propellers from 1802 until 1806. Stevens constructed a vessel propelled by twin screws, which navigated the Hudson River in 1804. One of Stevens' largest difficulties was that there "were no tools nor competent workmen to properly construct the steam engines and boilers he planned" (Morrison 1903:18).

Despite Stevens' difficulty, he partnered with his son to build the paddlewheel steamboat *Phoenix* in 1807, which operated on the Delaware River for six years. The elder Stevens proposed various important innovations in steamboats, although screw propellers did not gain acceptance and use for decades after his experiments. Advances made by Stevens included the design of twin short, four blade screw propellers, the use of high-pressure steam, and the development of multi-tubular boilers. These advances became widely accepted forty years after the successful trials conducted by John Stevens (Fletcher 1910:207-210; Hilton et al. 1976:10-17).

Although John Stevens could not find reliable mechanics, Oliver Evans opened a steam engine shop in Philadelphia in the early 19th century. Evans constructed high-pressure engines for use in sawmills and other manufacturing plants. Upon request from the city of Philadelphia, Oliver Evans constructed the paddlewheel steamboat *Oruktor Amphibolis* in 1804. A high-pressure engine powered the contraption, which operated on land as well as in the Delaware River in order to dredge the slips of the city of Philadelphia (Figure 7).

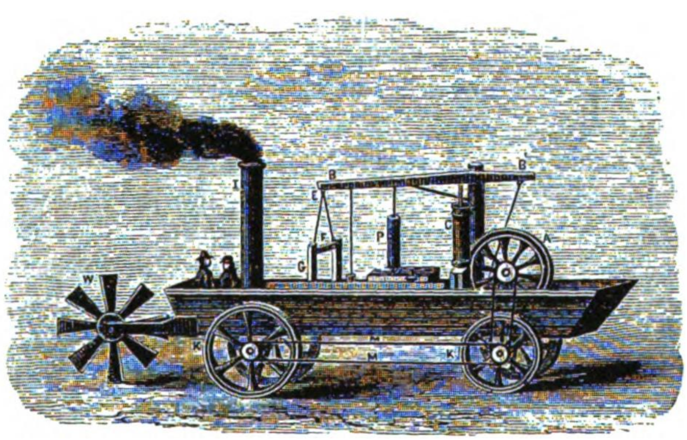

FIGURE 7. Depiction of *Oruktor Amphibolis* constructed by Oliver Evans in 1804 to dredge wharves at Philadelphia (Thurston 1878:156).

After the success of *Oruktor Amphibolis,* Evans established iron works to build engines in Philadelphia and Pittsburg. In 1805, he published *The Abortion of the Young Steam Engineer's Guide* that described his advances with steam engines while simultaneously ruining his patent protection. The Evans family became famous for building reliable and safe high-pressure engines at their iron works in Pittsburgh and Philadelphia. Despite the successful trips of several earlier steamboats mentioned above, historians often credit Robert Fulton with making the steamboat an economic success in America (Thurston 1878:155-157; Fletcher 1910:207-210; Atack, Bateman and Weiss 1980:286).

Robert Fulton adapted the discoveries and ideas of those who preceded him into successful commercial use. Fulton owned a shop only a block away from the Delaware River and he likely joined the crowds to watch the trials of the steamboats built by John Fitch. In addition, Fulton had correspondences and meetings with the rival of John Fitch, James Rumsey (McCall 1984:74). Originally a portrait painter, Robert Fulton changed his focus to technical problems while visiting London and France. Robert Livingston, acting as American minister to France, met Fulton in 1802. Livingston, realizing the mechanical aptitude of Fulton, convinced him to focus his efforts on developing steam navigation. Fulton formed a team with Joel Barlow, who handled research and public relations, and Robert Livingston, who provided capital. The responsibility of technical design and producing results rested on Fulton. Fulton studied the achievements of James Watt, Matthew Boulton, William Symington, Count Jouffroy d'Abbans, and the plans left by John Fitch at the American Counsel at Lorient (Fletcher 1910:23-29).

Fulton built a side paddlewheel steamboat in France in 1803 but the craft spilt in two under the weight of the engine. Not deterred, Fulton rebuilt the steamboat and it operated successfully but could only reach a speed of three miles per hour. While in Europe, Fulton met

Symington and took a trip on *Charlotte Dundas*, taking copious notes about the operation of the machinery and hull. Despite the advances made by Fulton and others, entrepreneurs in France and England remained hesitant to invest in the new technology, and nearly a decade elapsed before steamboats began to provide commercial service throughout Europe (Fletcher 1910:23-29; McCall 1984:77).

In 1806, Fulton returned to the United States and began constructing the first economically successful steamboat in America. In 1807, years after the experiments detailed in the preceding pages, Robert Fulton and Robert Livingston placed a Watt and Boulton steam engine from England in a newly constructed wooden hull built by Brownne in New York (Figure 8). The *North River Steamboat of Claremont* could travel at a rate of almost five miles an hour against the current, which disappointed Fulton. Regardless, Fulton and Livingston began offering passenger service between Albany and New York City (Morrison 1903:12-20; Fletcher 1910:30-35; Hilton et al. 1976:17-30; McCall 1984:75-78).

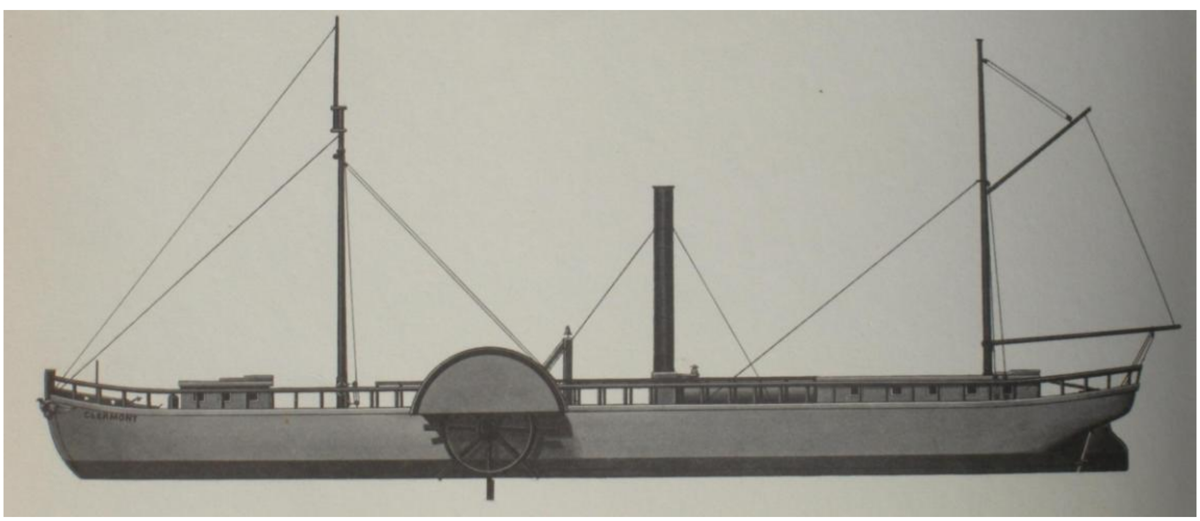

FIGURE 8. *North River Steamboat of Claremont* the first commercially successful steamboat, built by Robert Fulton and launched in 1807 (Hilton et al. 1976:84).

The success of *North River Steamboat of Claremont* and other early steamboats inspired merchants on other waterways to attempt to establish steamboat service. Lake Champlain, gateway for trade between Canada and the state of New York, received steamboat service starting in 1808 with *Vermont*. The success of this and other steamboats prompted beer magnate John Molson to construct the first Canadian steamboat *Accommodation*, built at Montreal in 1809. Steam technology diffused throughout the region, and before long British, Canadian, and American interests became involved in the steamboat industry of the Great Lakes (Figure 9). The locks and canals that connected the lakes proved to have great influence on regional steamboat design and construction. Despite the advances in steamboat construction, sail continued to compete with steam, providing cargo service on the Great Lakes throughout the 19th century (Smith 2005:1-24).

FIGURE 9. Map depicting the Great Lakes and the Great Lakes Basin (Atlas of Canada 2003).

After the success of *North River Steamboat of Claremont*, Fulton and Livingston focused on establishing steamboat service on the Midwestern rivers. The Louisiana Purchase of 1803 added a substantial amount of undeveloped land to the United States and sparked interest in inland steamboat navigation. President Thomas Jefferson realized the potential wealth of the unknown lands in the west; therefore, he assigned Captain Meriwether Lewis and Captain William Clark to explore the extent of the Missouri River and reach the Pacific Ocean. The slow journey of the Lewis and Clark expedition, beginning in 1804, exemplified the need for steamboats to open frontier lands because voyages in keelboats proved slow and arduous. The expedition traveled via keelboats west along the Missouri River, crossed over the continental divide, descended the mountains eventually reaching the Columbia River in Oregon, and continued further to the Pacific Ocean. After exploring the wilderness for two years, four months, and nine days, the Lewis and Clark expedition returned to St. Louis with abundant information about the waterways, as well as the flora, fauna and inhabitants of the western portion of the United States (Thwaites 1959:xxv-xxxiii).

The building of steamboats for western waters appealed to citizens desiring easier trade and transportation along the Mississippi, Ohio, and Missouri rivers. Robert Fulton and Robert Livingston, being aware of the open markets and desire for increased trade, originally developed the steamboat in order to provide transportation on the western rivers of the United States. The use of steamboats on the Mississippi-Ohio-Missouri river system and its multitude of navigable tributaries made a large productive land area accessible to the military and immigrants (Figure 10). Settlers, merchants, and farmers relied on comparatively slow, human powered keelboats and flats to carry cargo downriver before steamboats appeared on the western rivers. The long, arduous trip upriver against the current required a strong crew and a small volume of cargo (McCall 1984:87).

Figure 10. Map depicting the major river systems in the United States (Economic Research Service 2002).

Shortly after the launching of *North River Steamboat of Claremont*, Fulton, Livingston, and Nicholas J. Roosevelt formed the Mississippi Steamboat Navigation Company. In 1811, Livingston secured exclusive rights to navigation by steam on the waters of the Territory of Orleans, that later became the state of Louisiana. Steamboat construction along the Ohio and Mississippi rivers began with Robert Fulton and Nicholas Roosevelt building *New Orleans* at Pittsburgh in 1811 (Holly 1994:28).

The initial trial of *New Orleans* made Roosevelt aware that his low-pressure engine could not stem the current and power the steamboat upriver from New Orleans to Louisville. With this in mind, Roosevelt chose to put *New Orleans* into service only on the lower Mississippi below Natchez where the currents were less strong. The following year, Fulton and Livingston reorganized their company to exclude Nicholas Roosevelt and began building their second western river steamboat, *Vesuvius*. Before the completion of *Vesuvius,* Fulton, and Livingston began constructing its sister ship, the *Aetna*. Pittsburgh was becoming a shipbuilding center and another inventor, Daniel French, also began building a steamboat, *Comet*, on the waterfront in 1812 (McCall 1984:80-101).

Daniel French, the mysterious man who examined *The Experiment* in Rhode Island, designed steamboats by trade. In 1809, he constructed a steamboat in New York utilizing his patented oscillating engine to power the stern paddlewheel vessel. French, frustrated by the Fulton-Livingston monopoly and patents, moved to Pittsburgh in 1811 to continue constructing steamboats. His new steamboat, *Comet*, also had a stern paddlewheel and his patented steam engine design. Fulton, on the other hand, chose to continue employing Boulton and Watt style low-pressure engines on his steamboats, even though the trials of *New Orleans* proved this engine type to be underpowered (McCall 1984:96-114).

In the winter of 1813, Captain Henry Shreve, eventually referred to as the father of the western river steamboat, designed a steamboat to replace his keelboat on the trips between New Orleans and Pittsburgh. Shreve formed a company with Daniel French and three other men, and garnered funding for the construction of his first steamboat, *Enterprise*. Shreve employed keelboat builders at Bridgeport to construct *Enterprise* with a hull similar to a keelboat rather then a sailing ship (McCall 1984:115).

Shreve embarked from Pittsburgh aboard *Enterprise* on 1 December 1814 and arrived at New Orleans fourteen days later, loaded with military stores for the defense of the city necessitated by the conflict with Great Britain known as the War of 1812. General Andrew Jackson quickly commandeered the steamboat, its crew, and captain for military service. *Enterprise* proved capable of providing troop and cargo transportation throughout the lower Mississippi during the time of conflict. After the war, in the summer of 1815, *Enterprise* became the first steamboat to travel upriver from New Orleans all the way to the falls of the Ohio River at Louisville (McCall 1984:120-131).

Despite the success of *Enterprise*, Shreve did not feel satisfied with the strength and ability of the steamboat and its engine, noting that the upriver voyage would have been impossible if the river had not flooded. Shreve formed a new five-man company to fund the construction of his design for a completely different, larger steamboat. Shreve managed the construction of *Washington* at Wheeling Virginia, beginning in September 1815 (McCall 1984:132). The new design incorporated several changes from previous steamboats, including the use of a high-pressure engine similar to engines built by Evans, but with several added safety innovations. This machinery was much lighter and more powerful than low-pressure Boulton and Watt style engines and oscillating engines built by French. Shreve designed the hull to be large and shallow with the hold decked over and used for cargo storage, and added passenger accommodations in two decks built on top of the hull and machinery. The side paddlewheel steamboat *Washington* measured 148 ft. in length, 25 ft. in width, and boasted a carrying capacity of 403 tons (McCall 1984:132-140).

Unfortunately, on the first trip downriver in June 1816, one of the boilers of *Washington* exploded, killing seven passengers, along with the ship's carpenter, cook, and one deck hand. Shreve examined the machinery and determined that a faulty safety valve weight caused the explosion. Shreve fixed *Washington* and reconstructed the safety valves, making the steamboat operable again in August 1816. The hull design of *Washington* proved ideally suited to western rivers and capable of carrying a large number of passengers and a substantial volume of cargo, inspiring subsequent inland builders to adapt similar steamboat designs (McCall 1984:140-147).

Fulton and Livingston eventually expanded their steamboat monopoly to include Virginia. However, in 1813, a competitive firm built *Chesapeake*, the first steamboat on the Chesapeake Bay. Built for the Union Line, *Chesapeake* relied on a locally constructed engine similar to the Boulton and Watt model. Edward Trippe and William McDonald built and operated *Chesapeake* despite the state monopoly on navigation held by Fulton and Livingston. The appearance of *Chesapeake* prompted Fulton to build *Washington* and *Richmond* to operate on the James River and the Potomac, but he died before completing construction (Holly 1994:37).

Merchants, shipwrights, and entrepreneurs inspired by the success of early steamboats on a variety of American waterways increased steamboat construction. Unfortunately, the monopolies held by Fulton and Livingston stymied competition in several states. The Supreme Court case Gibbon v. Ogden of 1824 officially ended the steamboat monopolies by stating that rivers on which interstate traffic is carried are not subject to regulation by any state (McCall 1984:148-156). This decision opened the waterways to competition and allowed for the development and diversification of steamboats.

The Development of Regional Steamboat Designs

Steamboat pioneers often placed steam machinery in readily available sailing hulls. Many early steamboats, built using designs typical of ocean sailing vessels, had deep drafts, round hulls and masts. A class of northeastern steamboats with hull designs similar to sailing ships emerged by the 1820s. Distinguished by their low-pressure engines, fine lines, and speed, these steamboats developed on the Hudson River and the Long Island Sound. The depth of the Long Island Sound and the Hudson River allowed deep draft steamboats' easy access to markets in the New York City area. Sailing hulls equipped with steam engines proved practical because the environments encountered on the waters of New York necessitated a large amount of freeboard (Hilton et al. 1976:30).

In addition to allowing competition on northeastern waters, decisions supporting free trade allowed steamboats to flourish on the western frontier in a way previously unimaginable. Steamboats carried immigrants throughout the Midwest, traveling along the Ohio, Mississippi, and Missouri rivers. Cities along the western rivers established manufacturing plants related to steamboat construction including rolling mills, foundries, engine shops, boiler works, machinery plants, and iron works. These manufacturing plants relied on the vast array of natural recourses available in the Ohio valley including forests, coal seams, and iron ore reserves (Kane 2004:127).

The failure of the early Fulton-Livingston western river steamboats proved the need for more powerful engines. Low-pressure engines, like those used on northeastern and Fulton-Livingston steamboats, proved too heavy and had difficulty steaming against the currents of the Mississippi River. Although high-pressure engines proved considerably less efficient than low-pressure engines, they offered an increase in power and became a mainstay on western river steamboats. High-pressure engines had another advantage, they were 60% lighter than low-pressure machinery, and could be built on a much smaller scale (Corbin and Rodgers 2008:92). The use of a high-pressure engine powered by a battery of boilers became universally adopted and fully developed on the western rivers by 1835 (Hilton et al. 1976:49).

Steamboats proved successful on western rivers only after the engine and hull underwent radical changes from early Fulton-Livingston steamboats. In the early experimental phase, during the first few decades of the 19th century, western shipwrights built steamboats with hulls similar in shape to sailing ships, complete with auxiliary sails. This changed by the mid-1820s, as western shipwrights, concentrated in the cities of Cincinnati, Louisville, and Pittsburgh, produced steamboats built specifically for the western rivers. Shipwrights living along the western rivers benefited from their ability to observe the performance of other western river steamboats and employ or discard design features based on their own empirical observations. The large, unpredictable rivers of the Midwest required steamboats with unprecedented shallow drafts, high speeds, great maneuverability, impact resistant yet flexible hulls, and simple but powerful machinery that could be easily repaired and maintained on the frontier (Corbin and Rodgers 2008:60). Archaeological evidence, historic documents, and photographs detail the development of western river steamboat construction from 1811 until the hull reached its basic form around 1860 (Hunter 1949:66; Kane 2003:33).

On the Mississippi River, a typical antebellum steamboat design, derived from Henry Shreve, resulted in a steamboat around 200 tons, with a hull 200 ft. long and 30 ft. wide. Shipwrights built shallow, buoyant steamboat hulls with broad, flat-bottoms, and increased lengths for the Ohio, Mississippi, and Missouri rivers, instead of relying on typical ocean sailing hulls (Basalla 1988:89). No longer concerned with countering leeway, the rigid, exterior backbone structure of the keel disappeared from western hulls, and was replaced by a series of interior backbones known as stringers or bilge keelsons. Western river steamboat builders concentrated on saving draft, choosing to construct a flat-bottomed hull with scantlings that were considerably smaller than those used on sailing vessels. The broad, flat bottomed hull saved weight and draft, allowing these vessels to steam upriver despite low water levels (Corbin and Rodgers 2008:64). Western shipwrights responded to the decrease in cargo space in the hull, caused by the reduction in depth, by building a superstructure that averaged three decks. These changes resulted in a steamboat with an extremely low freeboard. At a distance, the hull was barely visible, therefore western river steamboats appeared to be entirely superstructure (Hunter 1949:66).

Including several innovations adapted to the western river environment, these large, triple-decked paddlewheel steamboats often featured ornate gingerbread woodwork and lavish passenger accommodations, occasionally carrying chandeliers and grand pianos. Typically, these side paddlewheel steamboats provided accommodations for around 200 persons in staterooms, and could carry an additional 100 passengers on the main deck (Figure 11). The exterior appearance and interior furnishings of western river steamboats attracted passengers and garnered public recognition that encouraged the construction of increasingly larger and more elaborate passenger steamboats (Patterson 2009:96).

FIGURE 11. Ship model of the steamboat *Buckeye State*, which plied the Ohio River from its construction in 1850 until dismantled in 1857 (Smithsonian National Museum of American History 2011).

Stevedores loaded cargo into the little space available in the hold, while the machinery, boilers, fuel, other cargo, and deck passengers occupied the lower or main deck of the steamboat. The upper deck, known as the boiler deck, had staterooms, dining rooms and other passenger accommodations. Western shipwrights added officer accommodations, in the form of an extra row of staterooms, above the boiler deck on the hurricane deck beginning around the mid 1840s. This area became known as the “texas” because it appeared on steamboats around the time the state of Texas was added to the United States. The pilothouse, containing the wheel, engine bell pulls, and speaking tubes, rested atop the boiler deck or the texas, and offered pilots an unobstructed view of the river to aid navigation (Figure 12). In addition, two large smoke stacks typically rose from the hull of a western river steamboat near amidships, making the vessel distinguishable from other regional steamboat designs (Hilton et al. 1976:46-47).

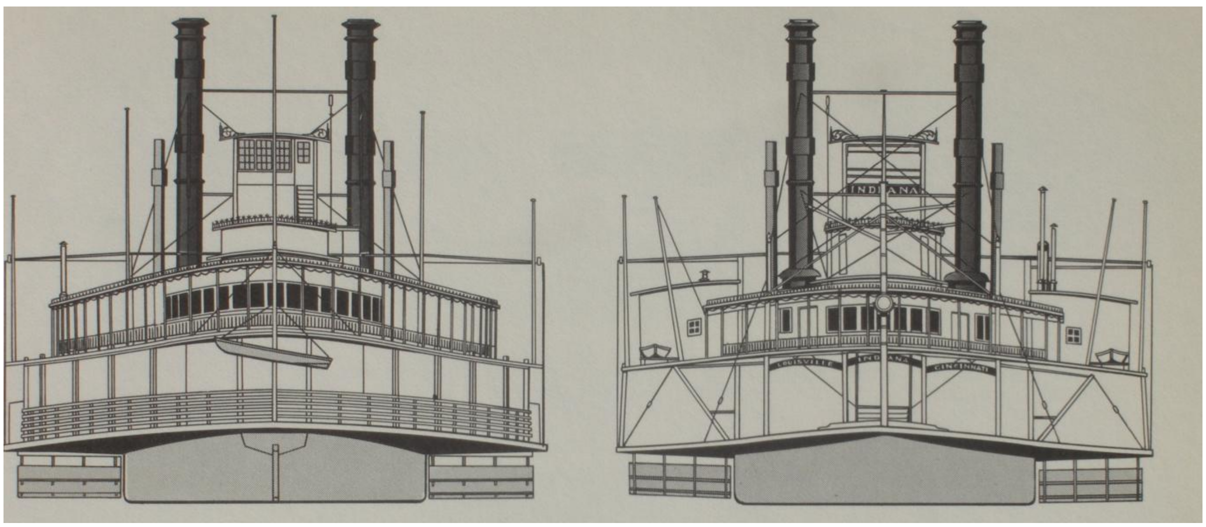

FIGURE 12. Bow (left) and stern views of typical, Ohio River side paddlewheel steamboat, *Indiana*, show the shallow, keel-less hull and impressive superstructure (Hilton et al. 1976:89).

The large but lightly built hulls of western river steamboats necessitated the adaptation of hogging chains, another innovation imperative in the building of exceptionally shallow steamboats. Hogging chains, first introduced by Robert L. Stevens, formed an arch truss system, similar to wooden hogging arches employed on northeastern steamboats in the 1830s. Arch truss systems supported the bow and stern of a vessel to resist hogging and sagging, a common problem encountered by steamboats because of their high length to beam, and length to depth ratios (Figure 13). An arch truss system involving hogging chains diffused from the Great Lakes and Chesapeake Bay regions before being installed on the western rivers in the late 1830s or early 1840s. Hogging truss systems, including iron tie rod and turnbuckle systems typical on western rivers, added a suspension bridge quality rising over the superstructure on western river steamboats. The truss actually lifted the bow and the stern of the steamboat, allowing for an increase in hull length, and made the use of stern paddlewheels more feasible (Hilton et al. 1976:50; Corbin and Rodgers 2008:78-82).

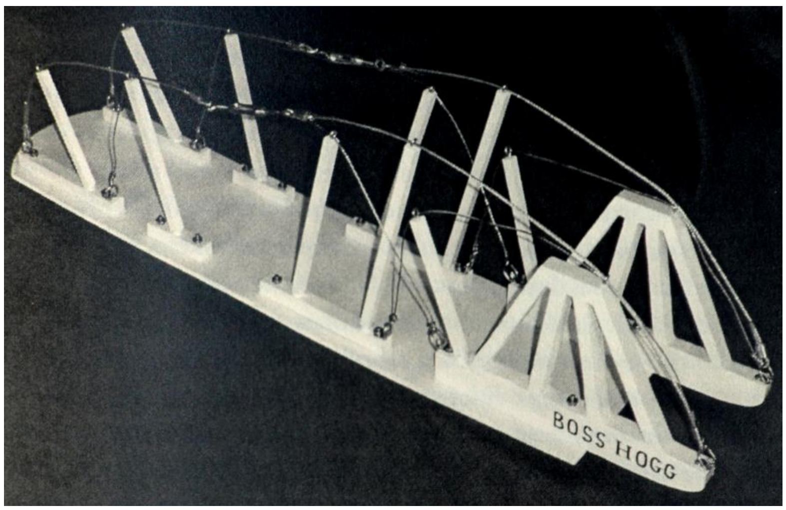

FIGURE 13. A model of the double hogging truss typically used on western river stern paddlewheel steamboats (Corbin and Rodgers 2008:81).

Hogging chains allowed the length of steamboats to increase, while athwartship chains, called cross-and-knuckle chains, allowed for beamier hulls. The light scantlings used throughout the hulls of western river steamboats could not prevent the port and starboard sides of the hulls from drooping downward under heavy loads. A system of iron ties and chains anchored to clamps and beams in the hull and running athwartships tied the two sides together providing necessary support. A typical western river steamboat had hogging chains reaching over the top, third deck on a long, narrow hull, supported by cross-and-knuckle chains that allowed the deck to be widened by paddlewheels and guards. Side paddlewheel steamboats dominated the western rivers, until the 1850s, when stern paddlewheel steamboats became popular due to the strength provided by hogging chains. Stern paddlewheel vessels offered several advantages, they drew only one half to two-thirds what comparable side paddlewheel vessels drew, and proved both easier to repair and cheaper to construct (Hilton et al. 1976:50; Corbin and Rodgers 2008:82-83).

Many western river builders constructed model bows for steamboats servicing areas with docking facilities and spoonbill bows for service on remote routes that required groundings on the riverbanks to load and unload cargo (Figure 14). Western river steamboats also carried landing stages to assist in loading and unloading along the frontier, where no facilities or docking structures existed. The common practice of planting the bow in the earth for riverbank landings, combined with the ever-prevalent risk of snags, prompted some western river steamboat builders to include a snag chamber in the bow. Snag chambers, composed of a watertight bulkhead running athwartships just aft of the bow, theoretically sealed off the bow in the case of damage, but archaeological investigations have revealed that they did not always work (Corbin and Rodgers 2008:64-82).

FIGURE 14. Model of the side paddlewheel, cotton packet *J. M. White*, built in Jeffersonville, Indiana, in 1878, for the Greenville and New Orleans Packet Company. Note the protruding stem post on the model bow and the landing stage (Smithsonian National Museum of American History 2011).

Specially designed steamboats also carried passengers and cargo up the Missouri River in the 19th century. The Missouri River stretches nearly 2,341 miles from St. Louis, Missouri to the Rocky Mountain foothills, and creates a natural highway to the western portion of the country. Few steamboats operated on the Missouri River in the 1820s and 1830s because of a lack of settlements and limited commerce along the river (Corbin and Rodgers 2008:7). Pioneers began settling along the river, and by 1836, fifteen to twenty steamboats made regular round trips on the lower Missouri River reaching Bonneville, and Glasgow, Missouri. Eventually steamboats adapted to the conditions of the Missouri River provided service to remote communities in the Dakota and Montana Territories. Upper Missouri River traffic increased dramatically after prospectors found gold in Montana in 1858. The movements of gold seekers allowed Fort Benton, located 3,000 miles from St. Louis, to become the innermost port in the world served by regularly scheduled river steamboats in 1860. Initially, any steamboat traveling to Fort Benton was known as a “mountain boat,” however, a specific mountain steamboat hull design emerged on the upper Missouri River by the last quarter of the 19th century (Corbin and Rodgers 2008: 33-34).

Steamboats designed for the exceptionally shallow, sandbar prone, Missouri River developed a characteristic style by the 1870s that differed from those on other waterways (Figure 15). Mountain steamboats were shallow draft, stern paddlewheel vessels with sturdy, flat hulls, driven by powerful high-pressure engines. Although Mountain steamboats shared several similarities with western river steamboats, they rarely reached the immense proportions typical on other western rivers as the intended route and the available cargo confined mountain steamboat builders (Hilton et al. 1976:52). Instead, Missouri River steamboat builders designed vessels that had an average carrying capacity of 300 to 400 tons and ranged from 132 to 216 ft.

in length, with 24 to 36 ft. breadths. A mountain steamboat drew, at most, 4 ft. of water when fully loaded and could pass over many navigational hazards (Hilton et al. 1976:52; Corbin 2000:7; Corbin and Rodgers 2008:5-7).

FIGURE 15. A photograph of the mountain steamers *Benton* and *Western* with the *Far West* and *Nellie Peck* unloading freight and passengers at the Bismark levee in 1877 (Schwantes 1999:321; Corbin 2000:8).

Mountain steamboat builders typically left most of the deck open for freight storage, while the stern had an enclosed room that protected the engines and housed an onboard repair shop. These steamboats often had an upper deck, supported by cast iron columns, which housed the dining room or saloon and the cabins. A pilothouse, located above the upper deck between two smokestacks, allowed for unobstructed views of the river (Hilton et al. 1976:52; Corbin and Rodgers 2008:5-7, 14).

The environment, population, and resources available on the far west reaching Missouri River differed from other western rivers; therefore, steamboat builders incorporated different techniques when constructing mountain steamboats. The Missouri River presented a variety of navigational hazards, including mud, cross winds, and sandbars. The prevalence of sandbars resulted in builders installing a pair of vertical spars hanging from tackles at the bow of mountain steamboats that assisted in the event of grounding. The crew dug the spars into a sandbar until the steamer was slightly raised then backed the vessel off or moved it forward, inching across the sandbar, giving mountain steamboats the nickname 'grasshoppers' (Hilton et al. 1976:53; Corbin and Rodgers 2008:29).

The shallow frontier environment of the upper Missouri River caused builders to adapt several innovative techniques to ensure passenger and cargo transportation. The lack of established landings on the frontier led Missouri River steamboat builders to adapt spoonbill bows instead of typical lower river model bows. Model bowed steamboats had slightly V-shaped hulls, while vessels with spoonbill bows had rounded and flat-bottomed hulls that better suited the shallow upriver environment. Mountain steamboat designers also chose to employ stern paddlewheels because they had several advantages over side paddlewheel steamboats operating on the Missouri River, including a better ability to pass over sandbars. The combination of spoonbill bows, flat-bottomed hulls, and stern paddlewheels became characteristics that helped distinguish upper Missouri River steamboats from those used on the Mississippi and Ohio rivers, and allowed mountain steamboats to nose into or alongside a sandy beach or river bank to load or unload cargo (Corbin 2000:5-7). Shipwrights in the other areas, including the Great Lakes, adapted different arrangements of hull components to construct steamboats for different inland environments and transport zones.

The variety of adaptations mentioned in the preceding pages demonstrates that the innovation of the steamboat represented a technology cluster that included the hull, engine, machinery, and propulsion elements. These elements introduced a level of flexibility in the process of adopting the innovation that increased diffusion and encouraged customization of steamboats. Steamboat builders made decisions regarding continuity or adaptations of the technology package depending on subjective observations and local conditions. The short lives of steamboats and the ease of reinvention resulted in builders developing regional steamboat designs (Maarleveld 1995:4; Basalla 1998:89; Rogers 2003:17, 37).

A consideration of regional styles of steamboat design confirms the theory espoused by Christer Westerdahl that the construction of ships "is intimately adapted to the natural geography of the transport zone and intended cargo" (Westerdahl 1998:2). As mentioned in the previous chapter, American transport zones include the waterfront zone of the Atlantic Ocean, the coastal zone including the sounds and bays, the inland zone including the rivers and the lake zones that include the Great Lakes. Transport zones are separated by transit areas, points, or zones, where a change of craft with reloading occurs such as "at rapids and entrances to other fairways upstream" (Westerdahl 1992:7). The environmental conditions of the transport zone of the intended route, including prevalence of sand bars, canal and lock sizes, depth of water, current, and navigational hazards, influenced design choices made by shipwrights. For example, builders often constructed deep hulls with high freeboard for steamboats intended to travel on the coastal zone where the environment involved deep, open waters and established docking facilities, including the Long Island Sound, the Chesapeake Bay, and the sounds of North Carolina (Hilton et al. 1976:30-34; Holly 1994:52-72). Midwestern river steamboat builders, on the other hand, adapted the hull and machinery to stem the strong current and provide year round transportation to frontier outposts, despite shallow waters (Hunter 1949:66; Westerdahl 1998:4).

The analysis of regional varieties of steamboats supports the importance of intended cargo in ship design. Regardless of location of use, steamboats relying on passenger traffic had common characteristics including a desire for speed, and accommodations often including staterooms. Palace steamboat builders relied on flashy eye-catching details including gingerbread ornamentation, gilded paddlewheel boxes, and lavish interior furnishings to attract passengers (Patterson 2009:96; Smith 2005:30). Builders designing steamboats to carry freight cargo, on the other hand, did not waste time and money on elaborate decorations and passenger accommodations. Instead, they built vessels adapted to the environment and the volume and type of cargo available. For example, Great Lake builders designed boxy steamboats with the largest carrying capacity possible to transport the constant supplies of grain and minerals (Thompson 1994:23-26; Smith 2005:50-54). On smaller waterways with less commercial activity, including the Missouri River, builders constructed steamboats for the typical frontier mix of passengers and freight. The smaller volume of passengers, freight, and river depth, resulted in mountain steamboats often being smaller then most other Midwestern rivers steamboats (Corbin and Rodgers 2008:5-7).

As regional steamboat varieties developed in the early 19th century, the innovation of the steamboat reached North Carolina. The following chapter describes the unique environmental and cargo considerations of steamboat builders located on the Tar River in eastern North Carolina. Tar River steamboat builders reinvented the steamboat while relying on regionally tested variations in hulls, propulsion methods, and machinery discussed above. The regional diversification of steamboats in the decades before the Civil War allowed Tar River builders to conservatively employ a mix of innovative techniques when constructing upriver steamboats (Rogers 2003:180).

CHAPTER 4: TAR RIVER HISTORY AND NAVIGATION

The preliminary archaeological surveys of two Tar-Pamlico River steamboats generated questions concerning the economic history of the communities located along the Tar River. Overland transportation and commerce on primitive plank roads in the 18th and 19th centuries proved arduous, prompting citizens living along the Tar River to depend on the river for transportation. However, a strong current and low water levels made carrying cargo upriver from Washington to Tarboro incredibly difficult before the arrival of steamboats on the river (Rodgers et al. 2008:20-22). This chapter provides the historical context of the Tar River communities, thereby, allowing for a more complete understanding of the way local shipwrights experiences and intimate knowledge of the Tar River culminated in the design of upriver steamboats.

Shipwrights did not leave plans for any of the steamboats that appeared on the Tar River, however, other primary sources, including enrollment records, photographs, and local newspapers do provide information about the Tar River steamboat industry (for specifics see Appendix A). These sources mention ten steamboats appearing on the antebellum Tar River, yet, none of these proved commercially viable in the long run in providing regular steamboat service from Washington to Greenville, until 1849. Despite individual and governmental attempts to improve navigation, the meager volume of freight, lack of sufficient water depth, and other navigational issues made antebellum steamboat operations on the Tar River costly and unpredictable. Tactics employed during the Civil War only complicated already difficult navigation issues (Myers 1884:2).

The Tar River steamboat industry overcame these navigational hazards to peak in the late 19th century, fueled by the growth of cotton and tobacco farming that led to an increase in upriver exports. Additionally, the Army Corps of Engineers performed internal improvements that allowed several northern transportation companies to expand steamboat service upriver to provide connections with rail and coach lines at Greenville and Tarboro. These companies contracted with local shipwrights who relied on an amalgamation of available steamboat technology when designing upriver steamboats for cargo and passenger transportation on the postbellum Tar River.

River Statistics and Early Settlements on the Tar River

The Tar River winds through eastern North Carolina for a total length of 179 miles. Beginning in Person County, the Tar River flows through the counties of Granville, Vance, Franklin, Nash, Edgecombe, and Pitt before changing names at the town of Washington located in Beaufort County, North Carolina. At Washington, the river widens, deepens, and becomes known as the Pamlico River, before flowing into the Pamlico Sound 22 miles downriver (Figure 16). Located 32 miles below Washington, the mouth of the Pamlico River is less than 30 miles from a passage to the Atlantic Ocean, at Ocracoke Inlet (Parsons et. al. 1954:1-10; North Carolina Department of Environment and Natural Resources 1958:1).

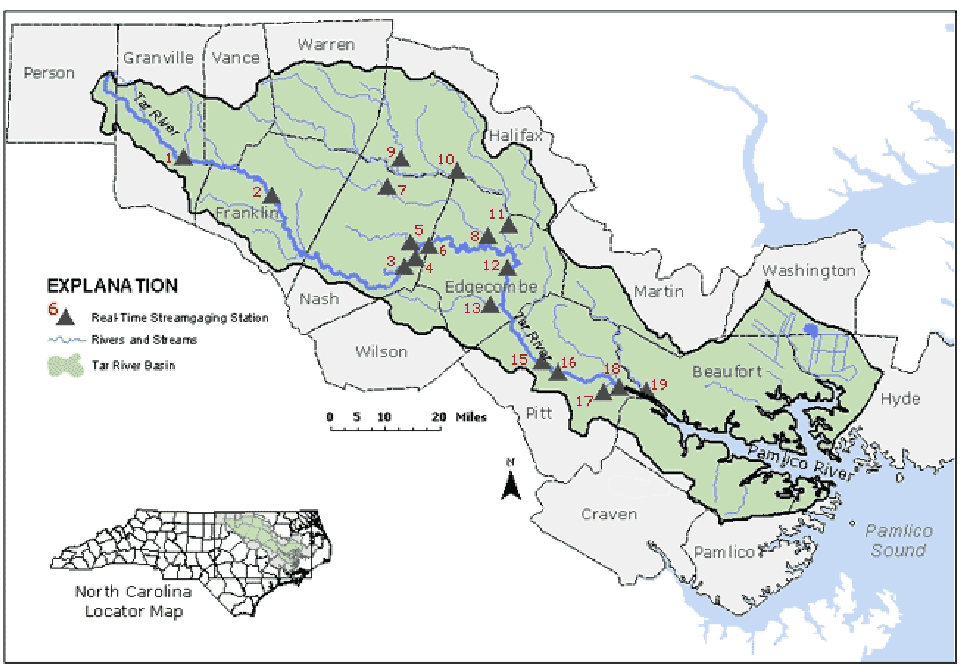

FIGURE 16. Map of the Tar-Pamlico River flood inundation area (Bales 2004).

The Tar-Pamlico River presents a valuable transportation route that enabled the settlement of 3.5 million acres of wilderness between the Roanoke and Neuse river basins. Ocean bound navigation through the Outer Banks of North Carolina proved extremely difficult throughout history due to continually shifting sandbanks and inlets. In this light, Ocracoke Inlet functioned as the primary shipping channel between the Atlantic Ocean and the Pamlico Sound until 1846, when storm surges created straits, obstructing the inlet (Lawrence 2003:66). Ocean-going ships had drafts too deep to navigate the sand choked inlet and were forced to sail through Oregon Inlet, which opened in 1846 during the same storm that closed off Ocracoke Inlet (Figure 17). The blockage of Ocracoke Inlet caused Tar-Pamlico River merchants to turn to intrastate commerce because it was difficult and dangerous to ship Tar River products directly overseas (Stick 1958:280).

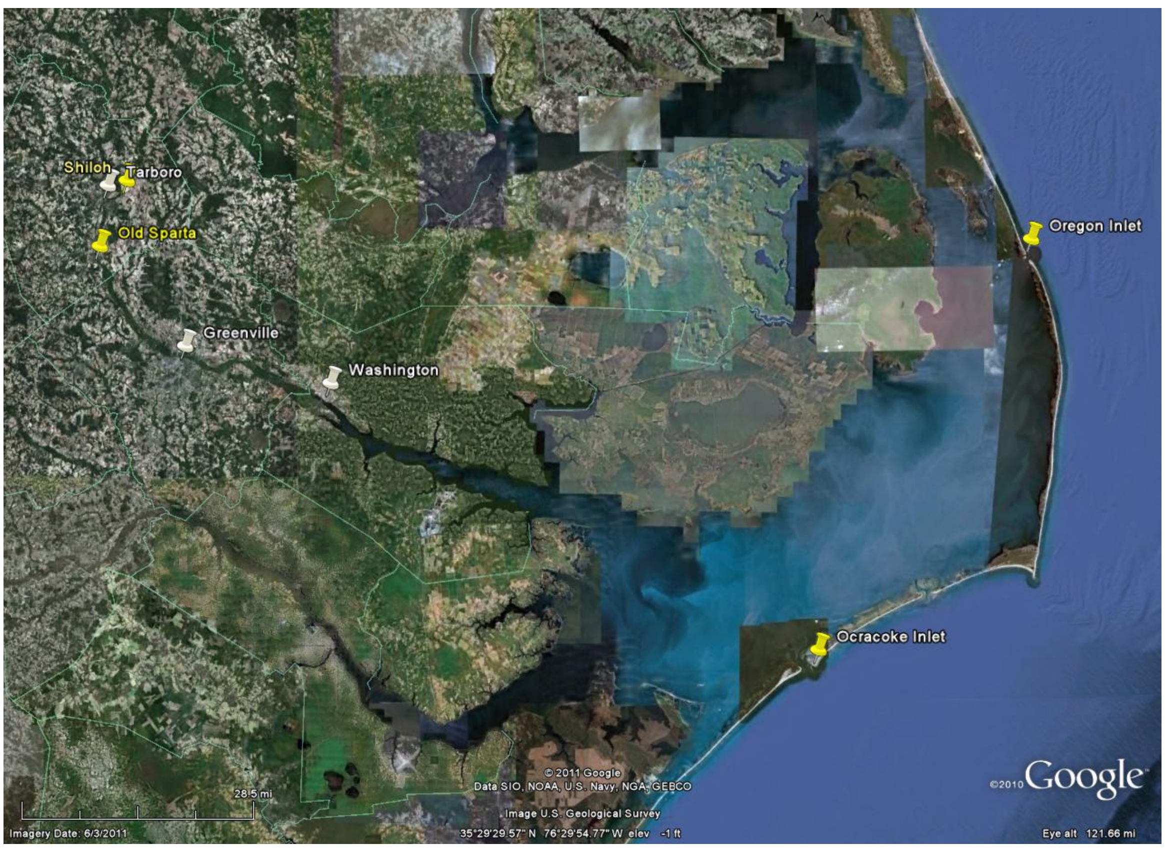

FIGURE 17. Google Earth image depicting important Tar River communities and shipping channels including Oregon Inlet and Ocracoke Inlet (created by author).

Evidence of human occupation first appears in eastern North Carolina during the post-glacial Paleo-Indian period dating from 10,000 to 8,000 years ago. Early inhabitants typically hunted large animals and gathered wild plants during this period, before transitioning to the Archaic period and the origins of semi-sedentary primitive agricultural activities capable of sustaining village-like settlements. Evidence of Native Americans relying on the Tar River basin for hunting exists dating to the Woodland period (ca. 1000 B.C. - A.D. 300). By that time, Native Americans no longer relied on seasonal migrations for food, becoming more dependent upon local resources for sustenance (North Carolina Museum of History 2006:1).

Archaeologists found a multitude of artifacts relating to nomadic hunter-gatherer tribes adjacent to watershed drainage areas, suggesting that the Native Americans relied extensively on waterways (Byrd 1995). In addition, archaeologists discovered several primitive dugout canoes in Lake Phelps, located just north of the Pamlico River watershed (Shomette 1993; Phelps 2002). Evidence suggests that during the Woodland period Native Americans increased settlement along large waterways including the Tar-Pamlico River and the Pamlico Sound. Native American settlements spread throughout North Carolina with around thirty distinct tribes, including the Bear, Tuscarora, Chonanoc, Coree, Cherokee, Hatteras, and Machapunga populating North Carolina by the time Europeans arrived (Paschal 1984:4; McCabe 2007:16).

Thomas Harriot, a member of the unsuccessful English colonization attempt at Roanoke, provides the first European account of North Carolina in *A Brief and True Report of the New Found Land of Virginia*. After the disappearance of the Roanoke settlers between 1585 and 1587, many decades passed before English settlers again attempted to settle in North Carolina, primarily migrating from the Chesapeake Bay region of northern Virginia. By 1629, a small number of Europeans settled in North Carolina when King Charles I of England granted Sir

Robert Heath lands in the New World, including the regions of present day North Carolina and South Carolina (Shaftesbury Papers 1629).

Sir Robert Heath did not settle in Carolina permanently, however, prompting King Charles II, in 1663, to grant the land of Carolina to eight Virginia planters known as Lords Proprietors (Saunders 1886:20). Attracted by the previously cultivated land, virgin timber forests, and navigable waterways, fur traders, tobacco planters, and captive slaves from Virginia settled along the Roanoke and Chowan rivers causing the European population in the Carolina region to expand to over 500 settlers. Due to the difficulty of overland travel, hunters, fur traders, and pioneers utilized small, shallow draft, wooden vessels suitable for coastal and riverine environments. The shallow, ever-changing barrier island inlets combined with the lack of an adequate deep-water ocean port forced many incoming settlers to avoid the coast altogether and migrate over inland water routes. The Tar-Pamlico River offered settlers dense forests and access to other parts of the southeast through an interconnected network of river systems (McCabe 2007:30-33).

Despite the influx of settlers to the Tar-Pamlico River Basin, the Lord Proprietors focused on the commercial development of Charles Town, South Carolina, because of its direct access to the Atlantic Ocean. In 1671, the Lords Proprietors relinquished their control and broadened the authority of Governor Thomas Eastchurch to include all settlements made upon the Pamlico and Neuse Rivers (Saunders 1886:233). Due to increased population, the Lord Proprietors designated a large segment of southern Albemarle County as the County of Bath in 1696. Captain Thomas Blount received the first land grant in the newly sanctioned Bath County two years later and cleared a portion of the 226 acre tract located on the northern shore of the Pamlico River, permanently settling upon the tract in 1701 (Reed 1962:22; McCabe 2007:37). In

1705, as the population increased, the General Assembly incorporated Bath Township, located on 60 acres of land in Bath County on Old Town Creek (Saunders 1886:302; Clark 1898:73).

Clusters of French Huguenots seeking religious tolerance, Rhine Germans from Pennsylvania, English, Welsh, Scots-Irish families from the Virginia colony, and African slaves settled on the plains of the Tar-Pamlico River watershed (McCabe 2007:43). Native Americans, including the Tuscaroras and the Cotechneys, frequented the Tar River Basin often interacting with the colonists in friendly relations. Some Europeans bought land from a Tuscarora leader, Chief Tom Blount (De Graffenried 1712). Historians estimate the Native American population of North Carolina to have numbered greater than 8,000 inhabitants, divided among politically autonomous settlements along the Roanoke River, Tar River, and Contentnea Creek (a major tributary of the Neuse River, just south of the Tar River) (Parramore 1982:313; McCabe 2007:45). The influx of European settlers eventually resulted in Native Americans losing their ancestral lands, hunting grounds, and autonomy.

In the early 18th century, a loose confederation of Tuscarora communities numbering around 5,000 people occupied several areas within eastern North Carolina. A large number of Tuscaroras lived in villages lying chiefly between the Tar River and the Neuse River (Paschal 1984:8). Interactions between colonists and the Tuscaroras turned violent as conflicts over land, resources, and slavery eventually erupted in the Tuscarora War that lasted from September 1711 until March 1715. The Tuscarora tribes waged a series of attacks on European settlements along the Neuse and Pamlico Rivers in response to tension over Native American slavery, unfair trading practices, and European encroachment (De Graffenried 1712).

European North Carolina residents received assistance from other Native American tribes as well as citizens of South Carolina to help fight the Tuscarora. As the conflict escalated, both sides employed vicious tactics including murder, torture, stealing property, and burning settlements, before the Tuscarora were forced to sign a peace treaty with the North Carolina government in March 1715. Most of the surviving members of the Tuscarora tribe fled to the safety of Iroquoian land in New York, joining the league of Five Nations. The Native Americans that remained in eastern North Carolina after the Tuscarora War numbered around 800 people who were forced to settle on a reservation in present day Bertie County. In 1803, the remaining Tuscaroras left North Carolina to join their tribe in New York. After the defeat and migration of the Tuscaroras, Native Americans no longer played a substantial role in life along the Tar River. Warfare, disease, and migration eventually led to the total disappearance of all Native American populations in North Carolina (Paschal 1984:4-13).

Shortly after conflicts with the Native American tribes calmed, European settlement in North Carolina resumed. The population of the Tar River Basin rose as transportation along the river enabled settlers to transfer their surplus goods to markets. A new wave of European colonists, traveling south from Virginia, appeared in the Tar River Basin. The population rise led these Tar River citizens to combine with citizens along the south side of the Roanoke River in 1732 to petition the governor to create an independent precinct for the area south of the Roanoke River (Turner and Bridges 1997:14-19; Rodgers et al. 2008:20). The large land area included in the proposed precinct of Edgecombe was not confirmed by the General Assembly for nine years. During this time, the area was governed by the authority of Bertie precinct until Governor Johnston ordered Edgecombe confirmed as an independent county in 1741 (Clark 1898:164). Increased settlement forced the general assembly to order the county divided in 1746, and again in 1758, with the last division creating the boundaries of modern day Edgecombe County (Turner and Bridges 1997:33).

The final division of Edgecombe County in 1758 necessitated establishing a new business center to function as the location of the county court at the town of Tarboro, thereby establishing businesses at the head of navigation on the Tar River. This strategic location allowed merchants and farmers to ship their exports 50 miles downriver, stopping along the way at landings including the towns of Old Sparta and Greenville before arriving in Washington, another growing commercial center located at the mouth of the Pamlico River (Clark 1898:451-452). Covering a land area of 309,056 acres, Edgecombe County encompasses the communities of Tarboro, Rocky Mount, Whitakers, Princeville, Old Sparta, Pinetops, Conetoe, and Speed (North Carolina Division of Water Resources, Inlets, and Coastal Waterways 1958:7).

Sparta is one of the Edgecombe County communities situated between Greenville and Tarboro along the Tar River. Originally the site of a pre-historic Indian village**,** the town is located on high ground a short distance from a Tar River landing. The town established a post office in 1829 and incorporated in 1879 (Rodgers et al. 2008:22). At the time of incorporation, the name of the town was officially changed to Old Sparta as there was another town named Sparta located in Allegheny County, North Carolina (Perkins and Johnson 1984:123). Tarboro newspapers recorded the disappointment of the citizens in the name change: “it is a crying shame and should be remedied as soon as possible” (*Tarboro Southerner* 8 September 1881). Old Sparta celebrated boom years in the late 19th century due to growing fertilizer sales and the ease of shipping afforded by the Tar River. During its most prosperous years, the town boasted 13 stores, 2 saloons, 1 cotton gin, and several warehouses (Edwards 1980:9; McCabe 2007:138).

As mentioned, the navigable portion of the Tar River flows through Edgecombe County and Pitt County before widening, deepening, and becoming the Pamlico River at the city of Washington. In 1714, Lewis Duvall became the first person to own a patent for land in what is now Pitt County. Early settlers established residences on the southern shore of the Tar River, midway between the city of Tarboro and the Washington landing (McCabe 2007:75). As the population increased, the General Assembly of North Carolina passed a bill in 1760 that created Pitt County from the upper part of Beaufort County (Stewart 1761). An act of 1774 induced the sale of lots in Martinborough; a Pitt county community on the Tar River, later renamed Greenville. The location of Greenville, along the Tar River between Tarboro and Washington, encouraged increased agricultural exportation that allowed Greenville to eventually become the county seat of Pitt County (Clark 1898:867).

Traveling farther down the Tar River, heading southeast, the city of Washington appears 23 miles below Greenville. In 1726, the Lord Proprietors wrote the first grant that included a portion of the land on which the city of Washington now stands. Christopher Dudley received the grant for 337 acres; however, after several land transfers, the Bonner family became the first European settlers of Washington. James Bonner inherited the site of Washington and established his residence at this strategic location (United States, Army Corps of Engineers 1879:702; Loy and Worthy 1976:1-2).

The town of Washington is located at a transit point between transport zones that required a change of vessel type to continue traveling upriver. In this light, Washington is the highest point upriver permissible to large ocean going vessels due to the shallow depth and navigational hazards of the Tar River. In 1782, the General Assembly incorporated the town of Washington, whose rising importance prompted the transfer of the Beaufort County seat from Bath to Washington in 1785 (Clark 1898:458). The town of Washington continued to grow in importance as it became known as a strategic harbor protected by the Outer Banks. Transportation at Washington naturally divided into two specialized routes: upriver trade with

Greenville and Tarboro, and outbound trade through the sounds to markets in the northeast of America, the West Indies, and across the Atlantic Ocean to Europe (McCabe 2007:88).

Due to its strategic maritime location, the United States Congress declared Washington a port in 1790 and the shipping industry flourished (Loy and Worthy 1976:3-10). The increased volume of shipping conducted at Washington resulted in the building of 10 wharves along the waterfront by 1794 (Rodgers and Richards 2006:13-14). Maritime industries played an important role in the lives of the citizens of Washington, and local shipbuilding flourished since the area around the Tar-Pamlico River and Pamlico Sound remained dependent on waterborne transportation until the 20th century.

Commercial Activity and the Tar River

Native Americans relied heavily on the waterways because of the speed and efficiency of river transportation as opposed to shipping over land. Although mostly self-sufficient, early inhabitants traded specialized goods, hunted, and made social connections via river travel. They developed an intimate understanding of the Tar-Pamlico River as they adapted to the navigational hazards and seasonal issues encountered in and around the river. Inhabitants living near the river constructed dugout canoes by burning, charring, and hewing out readily available large, felled pine and cypress trees. Native Americans carried trade goods in the hulls and propelled these vessels by poling or paddling upriver and floating downriver with the current (Rodgers et al. 2008:24). These dugouts proved shallow enough to avoid many navigational problems of the Tar River but had limited cargo capacities.

Maritime industries consistently played an important role in the lives of Washington citizens. Local shipbuilding played an important economic role from the construction of the first European vessel built in Washington, the 70-ton brig *Acorn* in 1769, until the mid 20th century

(Still 1981:28). A German traveler visiting Washington in 1783 noted that the town was comprised of around 30 houses, and that the main industry of the settlement was the building of cheap pine watercraft found to "rot easily" (Schopf 1968:124). Shipbuilding firms and shipwrights located in antebellum Washington included: John Gray Blount, the Farrows, the Fowle brothers, Henry Tuley, Jonathan Havens, John Myers and Sons, Benjamin Lavender, William Tannehill, A. P. Neale, and Hull Anderson (Brown Library Archives). Several occupations related to shipbuilding flourished, including ship outfitting, logging, naval stores production, and managing cargo as a commission merchant (Watson 1979:62).

In the 18th and 19th centuries, large tracts of farmland occupied the rural areas of Edgecombe County and Tarboro became the center of business for the county, boasting a plethora of shops including dry goods stores, jewelers, coach shops, millinery shops, and tailors (Watson 1979:62). Exports from Tarboro to Washington included pork, corn, oats, peas, rye, potatoes, flax, tobacco, and naval stores (Lawrence 2003:17). Plantation farming and the production of naval stores dominated industry in the antebellum Tar River communities.

During the colonial period, the banks of the Tar River displayed abundant supplies of timber and opened the path to other inland forests. The long leaf pine tree, *Palus palustri*, grew along the Tar River and many citizens exploited the resource for a variety of valuable commodities. Farmers, loggers, and distillers obtained rosin, resin, turpentine, tar, and pitch from these trees. These products, known by the general term of naval stores, were used to caulk and protect wooden ships and hemp lines. Additionally people found a new use for turpentine mixed with alcohol, referred to as camphene, Teveline, or palmetto oil, and used as a cheap form of lighting from around 1800 until 1860 (Johnson 2011:1). The importance and exploitation of the North Carolina pine trees cannot be overstated; by 1840 North Carolina produced 96% of the turpentine, tar, and rosin in the United States (Cecelski 2000:30; Rodgers et al. 2008:23). Eventually, the overproduction of naval stores took its toll on the forest, by 1850, many people who depended on exporting pine products returned to farming because the once enormous tracts of pine trees disappeared due to lack of replenishment (Rodgers et al. 2008:23). North Carolina residents also exported harvested lumber for ship and house construction. The naval stores industry fostered other occupations including sailing, chandlery, shipbuilding, blacksmithing, distilling, sail making, mercantile shipping, and land ownership (McCabe 2007:51).

European settlers appreciated the availability of long leaf pine trees and used them to construct dugout canoes. One historian, Rusty Fleetwood, notes the ubiquity of canoes, referring to them as the "'Model T' of colonial watercraft-- seemingly everywhere and used for every purpose" (Fleetwood 1995:42). Despite the wide use of canoes, European settlers desired more stability and an increased cargo capacity. Colonists, therefore, modified the dugout, which led to the development of other types of working craft, including plantation schooners and even late 19th century sailing vessels such as bugeyes and brogans (Rodgers et al. 2008:25).

In addition to canoes, early North Carolina colonial residents relied on frame built boats and periaugers for transportation and trade. Modified canoes, known as periaugers, became the main vessels used for transportation and shipping on the Tar River (Figure 18). Builders combined European propulsion with Native American dugout construction to form large dugout or log built periaugers with added side strakes to increase stability. Periaugers, popular in the late 17th and early 18th centuries, had an average carrying capacity between 7 and 15 tons and could be rowed or sailed. Although plans of periaguers do not exist, the Perquimans County Restoration Association constructed a replica vessel that offers a view of the ubiquitous workboat (Fleetwood 1995:40; Rodgers et al. 2008:25).

FIGURE 18. Photograph of a replica periauger (Perquimans County Restoration Association).

Historical shipping records indicate that flats took precedence over all other vessel types in the decades following the American Revolution into the 19th century. Plantation owners, shipwrights, and farmers built box like boats with flat bottoms, square ends, and shallow drafts to navigate the Tar River. Many flats, designed to operate in shallow water, drew only two to three feet when fully loaded, and traveled easily downriver with the current, but required substantial human resources for the upriver haul. In ideal circumstances, flats could carry up to 40 tons of bulk goods for the trip downriver but, typically, a crew of between 8 and 14 workers poled lightly loaded flats upriver against the current (Watson 1998:62). Many merchants employed a plan to reduce costs by using smaller crews and having the flats broken up and the lumber sold at the downriver landing (Fleetwood 1995: 87; Rodgers et al. 2008:27). Flats proved to be the workhorse of many shallow rivers, and small ports, and found use well into the era of steamboats. After the arrival of steam power on the Tar River, steamboats often towed cargo-laden flats upriver whenever the water allowed. During times of limited steamboat transportation, including periods of low water, merchants employed flats to carry exports from upriver communities to markets at Washington (Rodgers and Richards 2006: 39; Rodgers et al. 2008:28).

Antebellum Washington shipyards also proved capable of turning out sloops, brigs, schooners, and full rigged ships. As the port town grew, many commission merchants based in Washington established trade networks reaching the east coast of the United States, the West Indies, Barbados, and other Atlantic ports (Carr 1856; Myers 1884; Lichtenstein 1926; Still 1981). Shipwrights working on plantations and local shipyards built sloops, periaugers, and schooners along rivers throughout the south. Well-built colonial period plantation schooners made trips from the Carolinas to Bermuda, the West Indies, and the northeastern United States. These vernacular vessels, however, encountered difficulties traveling up the Tar River against the current (Pecorelli 2003: 104; Rodgers et al. 2008:28-30).

The problems encountered by sailing vessels attempting to travel upriver past the town of Washington sheds light on the rise to dominance of steam navigation in the 19th century. Three main sailing craft served the coastal waters and inland rivers of North Carolina: the periauger, the schooner, and the sloop. Seventeenth century periaugers, and schooners prevalent in the 18th and 19th centuries, possessed two masts, a mainmast slightly larger than the foremast. Due to the similarities in vessel type and rigging, many vessels labeled as schooners when registering in ports were actually periaugers (Fleetwood 1995 49; Rodgers et al. 2008:28). Sloops were noticeably different, having only one mast and a length to beam ratio of 4:1 versus the narrower 6:1 ratio of schooners and periaugers. With its flat bottom and wide breadth, the sloop had a large cargo capacity, and easily sailed on both rivers and coastal waters (Fleetwood 1995: 145).

Though the various colonial and 19th century watercraft mentioned above opened the interior of North Carolina to transportation, they were labor intensive and inefficient. The advent of steam power solved the problems of upriver transportation on the Tar River as steamboats provided quick and efficient transportation against the current to Greenville and Tarboro. Steamboat construction at Washington began in 1835, when John Myers allowed William Tannehill and Benjamin Lavender to use his shipyard to construct the first Tar River steamboat, *E. D. McNair*. Of the ten antebellum steamboats mentioned in newspapers and discussed below, Washington builders constructed *E. D. McNair*, *Wilson*, and *Red Skull*, while other antebellum Tar River steamboat owners chose to purchase vessels built at shipyards located in northern states. Antebellum attempts to build steamboats at Washington demonstrated that local builders apparently did not have a full understanding of the navigational issues the Tar River presented, or were unable to address the issues with the available technology (*Tarboro Southerner* 1855:2; Myers 1884:2).

Washington shipwrights did not concentrate efforts on steamboat construction, as it was a small part of their market, and continued to build sailing vessels for operation in deeper water. By 1850, Washington had become the most important shipbuilding center in North Carolina: 23 ship carpenters lived in Beaufort County and many worked out of Washington. The antebellum Washington shipbuilding industry reached its peak with the construction of nine schooners, two steamboats, and one flat in 1855. At that time, the Washington shipbuilding firms of Farrow, Burton Shipp, and John Myers and Son also operated marine railways for ship construction and maintenance (Still 1981:35-37).

In 1857, the United States experienced a financial panic followed by a recession that debilitated the shipbuilding industry. The census of 1860 reveals the affect that the sluggish economy had on the shipbuilding industry, indicating that the number of ship carpenters in Beaufort County dropped to only five. The shipbuilding industry did not regain momentum before the Civil War began in 1861 (Still 1981:35-37). Farming and cargo transportation dwindled during the Civil War as many citizens became involved in the conflict.

After the Civil War, Confederate soldiers returned home to rebuild their farms and businesses; however, the burning of Washington and the destruction of the Tar River bridges made it difficult for local farmers and merchants to reestablish cargo transportation. Citizens of the upriver communities concentrated on rebuilding, but the emancipation of the slave labor force caused many landowners to rent plots to tenant farmers to cut costs. These farmers adapted to changing markets and practiced diversified farming that included rotating crops of peanuts, grain, corn, and truck produce. Unfortunately, the high rate of tenant farming hindered progressive farming practices and kept profits low throughout the Tar River basin (Myers 1884:2).

Counties located along the Tar River remained poor and agrarian but received an economic boost when commercially grown cotton and tobacco returned to prominence in the late 19th century. Cotton production intensified and a government report from 1879 estimated that farms along the Tar River shipped around 23,000 bales of cotton to Washington every year, and its production seemed to be on the rise (United State Army Corps of Engineers 1879:702). The economic Panic of 1893, however, caused cotton prices to drop, allowing bright leaf tobacco to surpass cotton and become the primary money crop on the Tar River in the last decade of the 19th century (Watson 1979:78-88). River transportation of tobacco and cotton proved profitable as both had light densities that enabled large cargos to be heaped on decks of shallow vessels without the danger of overloading (Fleming 2003:21; Rodgers et al. 2008:24).

In addition to farming, many former naval stores producers turned to logging as the demand for cut lumber and shingles increased due to post-war reconstruction efforts, including the rebuilding of the city of Washington, North Carolina (Myers 1884:2). Lumber, cotton, cottonseed oil, knitting operations, carriage factories, and guano plants dominated Tar River industries in the decades following the Civil War. Unfortunately, widespread poverty prevented substantial progress, and caused Tar River communities to lag behind the state average in terms of per capita wealth and income from the end of the Civil War until well into the 20th century (Watson 1979:88-101).

The collapse of the Confederacy also eliminated the capital necessary to repair and rebuild shipyards damaged during the Civil War; therefore, only the Washington shipyard owned by Joseph Farrow remained operational in 1870. Shipwrights, hamstrung by financial constraints, did not build any vessels at Washington for nearly a decade following the conclusion of the Civil War. An influx of northern companies interested in purchasing less expensive southern built vessels eventually helped Washington shipbuilders reestablish their businesses in the late 19th century (Still 1981:38).

Northern railroad companies and steamboat firms purchased southern built vessels because they proved cheaper than those constructed in northern states. Washington shipyards owned by the Myers, the Farrows, Chauncey, Liddon, and Styron constructed steamboats and transfer barges for northern railroad and steamboat companies during the late 19th century. The Myers shipyard accepted many contracts from northern companies, growing into the largest and most prosperous shipyard in Washington that employed 40 workers in 1894. The steady supply of contracts from northern companies boosted local shipbuilding, resulting in Washington shipwrights constructing at least 20 motorized vessels (steamboats, tugs, and gas boats), 24 barges, and 7 sailing vessels between 1887 and 1900 (Still 1981:39-41).

The peak years of local ship construction did not last as few shipwrights constructed vessels in Washington after the turn of the 20th century because railroads began taking over the transport business. In 1905, local shipwright A. W. Styron signed a contract with the Virginia and Carolina Transportation Company and began constructing the last steamboat built at Washington; however, the company became insolvent. Therefore, the vessel remained uncompleted. The Myers shipyard adapted to changing markets by building towboats during its last operational years in the early 20th century, as the desire for upriver steamboats waned. The local firm owned by Chauncey outlasted other Washington shipyards, surviving until the 1930s and becoming famous for building *Jane Adams Floating Theater*, which inspired a book and the musical *Show Boat*. The shipbuilding industry at Washington nearly disappeared in the early 20th century, as railroads and automobiles took the cargoes typically carried by river and sound vessels (Still 1981:39-46).

Another reason Washington ceased to be an important shipbuilding center in the early 20th century relates to the inability of local shipyards to adapt to the new technologies needed to build iron and steel hulled vessels. Shipwrights building iron and steel ships required access to complex, cumbersome, expensive machinery to manufacture and fasten hull elements. Tar River shipwrights often had barely enough capital to construct wooden vessels and certainly could not afford to purchase all the necessary equipment for iron or steel ship construction. Despite the decline in construction of new vessels, the Tar River repair and hauling business remained lucrative, allowing small yards and marine railways to exist into the 20th century. Shipbuilding reappeared in Washington for a short period during World War II when the Pamlico Shipyard built 30 wooden barges for the Army Corps of Engineers on leased land just below Washington, between 1943 and 1945 (Still 1981:47-48, 449).

Tar River Conditions and Internal Improvements

Every captain operating on the Tar River had to contend with navigational hazards including shoals, logs, snags, overhanging trees, bridges, and periods of low water. Newspapers report that the Tar River had an average depth of three feet during the winter months and the depth of water increased dramatically during floods. The low water levels of the Tar River proved especially dangerous during the late summer months when numerous owners lost money as their vessels became immobilized on the riverbed waiting for the river to raise enough to allow them to float freely. Even in times of high water, the Tar River proved difficult to navigate due to numerous snags lurking below the surface of the river (Lawrence 2003:17).

Many of the navigational hazards plaguing the Tar River can be attributed to the heavy tree growth along the riverbank. Natural causes and logging of this riverbank-growth deposited trees and large branches in the river. This problem proved ubiquitous; debris associated with logging often clogged the already narrow waterways throughout the state of North Carolina (Sloan 1971:26). These sunken trees, referred to as sawyers when their roots remained on the bottom and the branches floated with the current, and snags when the branches pointed upstream, ripped holes in vessels (Hilton et al. 1976:46).

In 1715, the first North Carolina law pertaining to internal improvements established that precinct, and later county courts, controlled local transportation, including roads, bridges, and ferries. Private individuals or companies chartered by the General Assembly cleared rivers and maintained roads and bridges. Citizens used their own capital to form companies that charged tolls to offset the costs of building bridges and clearing waterways. The General Assembly allowed company agents and overseers to issue work orders requiring men living within a stipulated distance from the river to assist in clearing the waterway (Watson 2002:58). Apart from the general law, little information is available about early 18th century attempts to improve the Tar River.

The first evidence of the push for improvement of the Tar River came in the form a company incorporated in 1796 that did not succeed because members did not raise sufficient capital to fund improvement attempts. Citizens organized again, and the state legislature incorporated the Tar River Company in 1805. The company planned to clear the waterway from its source in Person County to Greenville. The results from these Tar River corporations and other individual efforts proved unsatisfactory and often unnoticeable (Watson 2002:4-58; Rodgers et al. 2008:17). The lack of results from independent efforts indicated that river navigation improvements needed to be organized and funded by the state government.

As the towns along the Tar River grew, the problems of transporting commerce via the Tar River became prominent in the minds of the citizens. Despite a reliance on the Tar River, not all local citizens supported state wide internal improvement plans that became popular in the 19th century. For example, an Edgecombe County newspaper, the *Free Press*, printed editorials opposing broad plans of internal improvement because the editors did not trust any effort to reform transportation beyond private, local endeavors. Unfortunately, private attempts to improve navigation on the Tar River did not prove fruitful. Statewide efforts to improve navigation, referred to as internal improvements, became a platform of state politics beginning in the early 19th century (Watson 2002:57).

Archibald Debow Murphey, state senator from Orange County, led the drive for government involvement in internal improvements in North Carolina. Murphey established a state senate committee devoted to internal improvements and described a broad program of statewide changes designed to increase intrastate commerce and communication. Murphey proposed clearing the rivers and constructing a system of canals to connect the major river systems of the Roanoke, Tar-Pamlico, and Neuse. Murphey, chairman of the Board of Internal Improvements from 1815 to 1823, recommended the state invest and subscribe to stock in companies designed to enhance the navigability of the major river systems of North Carolina (Hoyt 1914[2]:103-196).

The Board of Internal Improvements authorized state funded surveys of the Tar, Neuse, and Yadkin rivers beginning in 1815. In 1816, the General Assembly approved state subscriptions of stock, amounting to $8,000, in the Tar River Navigation Company, stipulating that tolls could only be collected when the water otherwise would have been too low for boat traffic. The Tar River Navigation Company controlled the river and all of its tributaries, and contracted to build a lock below Louisburg in Franklin County, upriver of Rocky Mount. The contractor abandoned his work and, by 1834, the Board of Internal Improvements noted that there had been no stockholder meetings for the Tar River Navigation Company for many years (Watson 2002:5). Despite the ineffectiveness of the Tar River Navigation Company and other local efforts, the federal and state government offered support to develop the shipping routes in the area around the same time the first steamboat traveled upriver to Tarboro.

The Board of Internal Improvements realized the importance of steamboat traffic in North Carolina and sent the United States Army Corps of Engineers to remove a shoal below Washington in 1836, and again in 1838. The Corps also installed dams and locks, in an attempt to keep a minimum of 3.5 feet of water in the channel as far inland as Tarboro at all times of the year. In 1848, the General Assembly subscribed $25,000 to the reformed Tar River Navigation Company, without noticeable results (Watson 2002:73).

An abundance of hazards continued to plague navigation to Tarboro and prompted merchant firm and steamboat operators, John Myers and Son, to clear the river themselves. When the dredging operation began to stress the company's financial capabilities, Washington merchants and Pitt County farmers contributed money that allowed the Myers to clear a passage to Tarboro in 1849 (Lawrence 2003:70-71). The General Assembly also pledged an additional $15,000 in 1855 to improve the Tar River from Washington to Rocky Mount, unfortunately, these efforts did not produce lasting results, and budgetary restraints caused the Army Corps of Engineers to discontinue efforts to maintain a channel to Tarboro in 1856 (Boyd 1919:352; Cox 1989:53; Watson 2002:73).

Private and governmental efforts accomplished little in regards to improving navigation of the antebellum Tar River and navigability worsened considerably because of the Civil War. Federal surveys revealed that both sides submerged and sunk pilings and vessels in efforts to hinder enemy navigation. Despite the removal of close to 900 wood pilings from the riverbed, considerable navigation problems plagued the Tar-Pamlico River throughout the 20th century (United States War Department [USWD] 1863a:963-974, 1863c:71). The multitude of river obstructions prompted the Federal Government to take control of the improvement of the Pamlico River in 1876. Three years later, the government realized the importance of the upriver section and required that the United States Army Corps of Engineers manage the improvements of the Tar River as well (Weaver 1903:64; Cox 1989:57; McCabe 2007:134).

The Corps originally planned to clear the Tar River and facilitate year round navigation from Washington to Rocky Mount. They began improvements in 1879 by dredging the riverbed for 26 miles between Old Sparta and Taft's Landing, near Greenville (McCabe 2007:134). The Corps installed wooden wing jetties throughout the Tar River in the following years, resulting in a low water depth at Greenville of 30 to 36 inches in 1882. The Corps placed an additional 1,900 linear feet of redesigned jetties in the Tar River from August 1883 through June 1884, though their effectiveness remains unclear (Cox 1989:73). The Corps discontinued jetty installation and focused efforts on clearing the middle portion of the Tar River where navigation proved most obstructed in 1888. For the stretch of river from five miles above to four miles below Greenville they cut or pulled back 51 trees, 10 cords of brush, and removed "246 large snags, 35 cords of small snags, 98 logs, 10 stumps, 122 old jetty pilings, and 45 cubic yards of mud from the river channel" (United States Army Corps of Engineers 1888:854). The work of the Army Corps of Engineers in the late 19th to the middle of the 20th century produced a navigable waterway that allowed steamboats to travel further upriver reaching new locations above Tarboro.

The focus of upriver improvements shifted in 1892, to clearing the upper Tar River for 64 miles from two miles below Rocky Mount to two miles above Greenville. These efforts improved upriver navigation and enabled steamboats to provide service to Shiloh Mills, located two miles above Tarboro. However, by 1905, the Army Corps of Engineers concluded that the volume of trade above Greenville no longer warranted river improvement projects extending there. Instead, the Corps concentrated on the lower river in 1915 and spent more than $132,000 to dredge a 10 ft. deep channel to Washington, and a 6 ft. channel to Greenville, despite the waning influence of steamboat traffic. At that time, only two steamboats, *Tarboro* (II) and *Shiloh*, as well as twenty gasoline-powered boats operated above Washington towing rafts of logs, fertilizer, coal, fuel, and oil. In a late effort to encourage river borne trade, the Army Corps of Engineers dredged between Tarboro and Rocky Mount in July 1938, for a cost of $81,300 (Rodgers et al. 2008:19). Although the Army Corps of Engineers improved trade in Washington and up the Tar River throughout the 19th and early-20th centuries, long periods of low water, snags, and sandbars consistently disrupted steamboat traffic (Cox 1989:86-91).

The Antebellum Tar River Steamboat Industry

In the early 19th century, several steamboats sporadically operated on North Carolina waters, including the Neuse and Cape Fear rivers and the Pamlico Sound, but proved only marginally successful. Despite the development of steamboat service on other North Carolina rivers, steamboats did not appear on the Tar River until 1836 (Lawrence 2003:11). But by the early 19th century, major trading points along the Tar River included Washington, Tarboro, Old Sparta, and Greenville. Plantation flats and other vessels also departed from landings along the Tar River including (in order, traveling downriver from Tarboro): Carr's Landing, Penny Hill, Dupree's Landing, Pillsboro, Bensboro, Centre Bluff, Reaves' Landing, Gohram's Landing, Guaff's Point, Slaughter House Point, Redbanks Landing, Barbers' Landing, Simpsons' Landing, Taft's Landing, Boyd's Ferry, Grimes' Landing, and Yankee Hall (Cotton 1935:50). In addition, citizens living near Greenville and Tarboro wished to import manufactured goods upriver, such as sugar, and exotic wares from Washington markets and the West Indies. Two businessmen from Washington were aware of the desires of local citizens to develop upriver trade lines and applied for a monopoly on steam navigation on the Tar-Pamlico River (Bridgers 1978:23).

In 1835, Washington residents Benjamin Lavender and William Tannehill obtained the exclusive right to steam navigation on the Tar-Pamlico River. The General Assembly contract granted the partnership a monopoly to operate steam-powered vessels on the these rivers for a period of 15 years, provided they charged 10% less than the going rate for freight, and placed a boat on the river system within 4 years (North Carolina General Assembly 1835:111). Wasting no time, Tannehill and Lavender contracted with Washington shipbuilders Samuel Peabody and Jesse Wilkinson to build the hull of *E. D. McNair* at John Myers shipyard. Mr. Baxley, a Washington mechanic and engineer who learned his trade in Baltimore, designed and built the steam machinery for *E. D. McNair*, the first steamboat constructed at Washington (Myers 1884:2; Bridgers 1978:22; Lawrence 2003:27). The 1836 launching of *E. D. McNair* set the precedence for building steamboats at Washington, specifically for use on the Tar River between Washington, Greenville, and Tarboro.

Captain Chamberlain operated the side paddlewheel steamboat *E. D. McNair*, steaming the 30 miles to Greenville in 5.5 hours, and returning to Washington in 3 hours, a fraction of the time the trip took under human-power (Johnson 1986:20; Stanton 2003:20). When *E. D. McNair* reached Tarboro, the steamer was greeted with fanfare and cannon salutes. The following day, Captain Chamberlain established precedence that a steamboat, upon its first arrival at an upriver community, provide an excursion along the river for important members of the community, including commission merchants, farmers, and newspaper reporters. Positive newspaper and personal reports of the amiable captain and the smooth ride enticed entrepreneurs to employ that particular steamboat. Newspapers often reported that the captain of the new steamboat desired to provide regular freight service for the community, though many issues faced antebellum steamboat owners attempting to ply the Tar River (*Raleigh Register and North Carolina Gazette* 1836:3).

The 5 ft. 6 in. draft of *E. D. McNair* proved too deep to provide regular service on the Tar River; therefore, Tannehill and Lavender sold the vessel to William Southerland of the Cape Fear River in 1837. Tannehill and Lavender did not continue to provide steamboat service after they sold *E. D. McNair,* thereby abrogating their monopoly, even though it specified an exclusive right of steam navigation from 1835 until 1850. A rival company, therefore, employed steamboats on the Tar River in 1847. The Dibble Brothers, a firm from New Bern, brought steamboats *Wayne* and *Governor Graham* to provide sporadic service on the Tar River in 1847, and 1848. The Dibble Brothers primarily ran their steamboats on the Neuse River and did not operate their steamboats on a regular Tar River schedule, only appearing at Tarboro a handful of times during periods of high water (Lawrence 2003:30; McCabe 2007:108; Rodgers et al. 2008:36).

Steamboat owners, including the Dibble Brothers, often chose to increase revenue by operating on multiple rivers, taking advantage of periods of high water by sending their steamboats to the Tar River whenever the depth of the river allowed. Several steamboats, including those owned by the Dibble Brothers, appeared in Tarboro newspaper articles and advertisements during the wet season that most often occurred in the fall and winter. Steamboat advertisements do not run in the summer, when the dry season caused low water levels, forcing owners to transfer their steamboats to other rivers. Owners often chose to keep their steamboats employed on deeper rivers, including the Neuse and the Cape Fear, because of the increased navigation seasons and larger volume of freight offered on these rivers (Lawrence 2003:32).

A group of Edgecombe County residents, frustrated by the continued lack of reliable and consistent upriver steamboat service, organized the Tar River Steamboat Company in 1848. The company purchased the Baltimore-built *Oregon*. After the steamboat arrived, it was found to be too deep drafted to service the Tar River and the company disbanded. Washington resident William H. Willard bought *Oregon* and employed it on the Pamlico River before Union troops destroyed the vessel while it was being sheltered in Tarboro during the Civil War (Watson 1998:49; Lawrence 2003:69; Rodgers et al. 2008:35).

Despite the setbacks faced by many early Tar River shipping companies, the Washington based shipbuilding and commission firm established by John Myers continued to play an important role in Tar River steam navigation until the 20th century. John Myers began his business, in 1825, by establishing shipbuilding facilities and a marine railway on the Washington waterfront. The firm, known for constructing sailing vessels, changed its name to John Myers and Son when Reading Lewis Myers became a partner in 1840. The firm offered the only reliable, scheduled antebellum upriver steamboat service, beginning with *Amidas* in 1849. In May 1867, shortly after returning steamboat service to the postbellum Tar River, John Myers passed away and the name of the firm changed to John Myers Sons, consisting of Reading Lewis and Thomas H. B. Myers. In 1878, the death of Reading Lewis Myers left Thomas H. B. Myers as the only surviving firm member, operating under the business name of John Myers' Son (Myers 1884:2; Rodgers et al. 2008:35).

Although the Myers shipyard played an important part in refining the design and construction of upriver steamboats in the late 19th century, the firm exclusively employed steamboats built in northern states prior to the Civil War. Douglas and Burbank of Hartford Connecticut constructed *Amidas*, the first steamboat owned by John Myers and Son. Designed to tow four flats loaded with cargo, the shallow, stern paddlewheel vessel did not make a profit from passenger and cargo transportation, therefore, owners took a contract with the United States mail service to supplement revenues. Bolstered by the mail contract, *Amidas* provided cargo and mail service on the upper Tar River between 1849 and 1854 (Figure 19) (Bureau of Navigation 1849; Myers 1884:1; Rodgers et al. 2008:35-36).

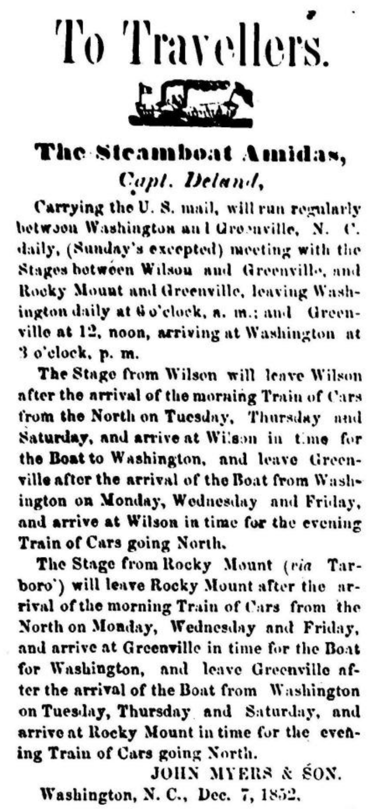

FIGURE 19. Advertisement for *Amidas* that sporadically appeared in the *Tarboro Southerner* 7 Dec 1852 until 5 March 1853 (Courtesy of the Bridgers Collection, Outer Banks History Center).

In 1852, the completion of the Greenville and Raleigh Plank Road, connecting Greenville to Wilson and the Wilmington and Weldon Railroad, made Greenville an inland transportation hub. Steamboat serviced increased as *Amidas* provided a vital connection at Greenville with stages and trains going to Wilson and Rocky Mount (Bureau of Navigation 1849; Lawrence 2003:20, 53). As *Amidas* reached the end of its use life, John Myers and Son contracted with the Philadelphia based shipbuilding company Reaney, Neafie, and Company for the construction of an iron-plated steamboat. The new sternwheeler *Governor Morehead* drew only 16 inches of water and replaced *Amidas*, working on the Tar River from 1853 until 1863 (*Tarboro Southerner* 1853:3; Bureau of Navigation 1859; Myers 1884:1; McCabe 2007:100; Rodgers et al. 2008:37).

Even in the face of competition, the firm of John Myers and Son remained successful on the antebellum Tar River. The Washington based company Havens, Wiswall, and Havens built the 107 ft. long, stern paddlewheel steamboat *Wilson* on the Washington waterfront in 1855. When designing *Wilson*, local builders relied on their knowledge of the problems encountered by other early steamboats operating on the Tar River. Compared to *E. D. McNair*, *Wilson* measured around 20 ft. longer, but had a shallower 3 ft. 6 in. draft. This shallow draft allowed *Wilson* to successfully operate on the Washington to Greenville route until John Myers and Son eliminated the competition by purchasing the vessel in 1859, and selling it to interests on a non-competing river (Bureau of Navigation 1860a, 1860b; Myers 1884:1; Lawrence 2003:60; Rodgers et al. 2008:38).

Another steamboat, *Red Skull*, was constructed on the Tar River in 1855, the same year *Wilson* entered the water. The local newspaper, *Tarboro Southerner*, printed the lone article about the experimental steamboat *Red Skull*. The reporter colorfully describes a local "genius" who built a self-propelling steamboat in 1855. The unnamed builder designed the craft to "propel itself upstream by the action of the downward current," but this method of propulsion proved impractical and *Red Skull* sank on its maiden voyage on the Tar River (*Tarboro Southerner* 1855:2; Rodgers et al. 2008:36-37). No additional information about *Red Skull* is available, though there is little doubt that the local builder designed the vessel to provide service to the upriver communities of Tarboro and Greenville. Washington shipbuilders, perhaps discouraged by the failure of *Red Skull*, did not construct any other steamboats prior to the Civil War; rather, many antebellum Tar River steamboat owners chose to employ steamboats built in northern states (Bureau of Navigation 1847a, 1849).

Some antebellum steamboat interests desired iron-plated hulls for their ships, similar to that of *Governor Morehead*, due to the perceived strength advantages of iron structural components in shipbuilding. Yet shipyards at Washington did not have the facilities to manufacture iron plates, forcing companies to purchase iron-plated steamboats from elsewhere. A group of Greenville citizens bought the iron-plated *Cotton Plant* from the Neafie and Levie shipyard of Philadelphia in 1860 and operated in carrying passengers and cargo on the upriver route. *Cotton Plant*, built with a design similar to *Governor Morehead*, had little time for cargo transportation on the Tar River before the outbreak of the Civil War (Lawrence 2003:61; Rodgers et al. 2008:38).

The size of the market for upriver cargo transportation could not support multiple competing steamboats operating on the antebellum Tar River. The competition faced by antebellum Tar River steamboat owners for the diminutive volume of freight resulted in low rates and profits that often drove firms off the river and occasionally out of business entirely. Furthermore, despite offering the only regular steamboat service on the antebellum Tar River, John Myers and Son found it necessary to take a government mail contract to supplement freight revenues, and actively eliminated competitive vessels (Myers 1884:1; Rodgers et al. 2008:30-38). The eruption of the Civil War disrupted all Tar River steamboat operations.

The Civil War and the Tar River

The outbreak of the Civil War nearly ended southern trade with northern states, and greatly diminished the volume of overseas trade conducted by North Carolina. The production of surplus crops came to a halt as many farmers abandoned their fields to join the war efforts. Therefore, during the Civil War, steamboats and sailboats no longer transported locally grown surplus. Owners of most of the idled antebellum Tar River steamboats converted the vessels for wartime use, scuttled, sold, or lost the steamboats during this violent time (McCabe 2007:131). Few antebellum Tar River steamboats remained operational following the conclusion of the Civil War.

Several Tar River steamboats assisted the Confederate Army and Navy during the conflict. Early in the war, John Myers, acting on his own accord, took *Governor Morehead* to Hatteras Island and removed the frensel lens from the lighthouse in order to confuse Union ships. Meanwhile, individual Confederate Army contractors acquired the services of the Tar River steamboat *Cotton Plant* and the Pamlico River steamboat *Post Boy* to provide troop and supply transportation. The Confederate Army paid the salaries of the steamboat captains and crews, resulting in North Carolina paying at least $1,200 to *Post Boy*, and $480 to *Cotton Plant*, during the summer of 1861. The Confederates also employed *Colonel Hill* (previously known as *Oregon*), owned by William H. Willard, to operate as part of the local signal service corps. For several months, Captain Benjamin Hank carried soldiers and citizens between Washington and Portsmouth aboard *Colonel Hill*. Later in the war, *Colonel Hill* made several trips between Washington and Tarboro, carrying 1,500 captured Federal troops for repatriation to the Union garrison at Washington. The Union and Confederate Navies both understood the value of steamboat transportation especially on southern waters (Lawrence 2003:103-109).

The Confederate Navy (CSN) contracted for the only steamboats built along the Tar River during the Civil War. The CSN realized the resources that shipbuilders in Washington offered, therefore, they contracted with John Myers and Son to build two 130 ft. gunboats, for $16,000 each. Washington shipwrights Rich and Joseph Farrow agreed to build an additional gunboat for $13,200. These vessels eventually became causalities of the Civil War, burned, or scuttled prior to completion (USWD 1862a:150-151; Confederate States of America 1864:449-443; Still 1981:37).

As the war reached the Tar River, Union forces focused efforts on controlling the port town of Washington. Unobstructed cargo transportation on the Tar River ended with the arrival of the Union Navy at Washington in March 1862, and the subsequent blockade of the port. Additionally, the Union Navy, under the command of Brigadier-General Edward E. Potter, burned and destroyed two partially built gunboats resting on the ways at the Farrow shipyard on the Washington waterfront (one contracted by the Myers, and one by the Farrows). Confederate forces towed the remaining gunboat, built by John Myers and Son, upstream to prevent Union troops from destroying the partially completed vessel (USWD 1862a:150-153; Still 1981:37).

The peaceful occupation of Washington lasted until September 1862, when Confederate forces attempted to recapture Washington, resulting in shots fired throughout the town. The following month, Union Navy troops attempted to steam upriver from Washington to Tarboro, but were only successful in reaching Greenville. Although the Mayor of Greenville immediately surrendered, rebel gunfire prompted the Union forces to burn the bridge there before returning to Washington. Afterward, the Union continued using a fleet of steamboats to transport troops, blockade the rivers, and prevent the Confederates from using the sounds (USWD 1862a:150-153, 1862b:205).

Throughout 1862, the Union maintained the blockade of the Tar River, and resumed the peaceful occupation of Washington, while Confederate forces established batteries on the south shore of the Tar River. In March 1863, the Confederates requested the removal of women and children from Washington as part of a plan to reengage the town in military action. Upon the denial of their request, the Confederates turned their attention to damaging the Union fleet (Figure 20). The constant barrage of bullets flying between the swamp batteries and the Union steamboats lasted for weeks, though accomplishing relatively little. The Confederate battery could not compete with the large number of armed Union vessels (USWD 1862b:698).

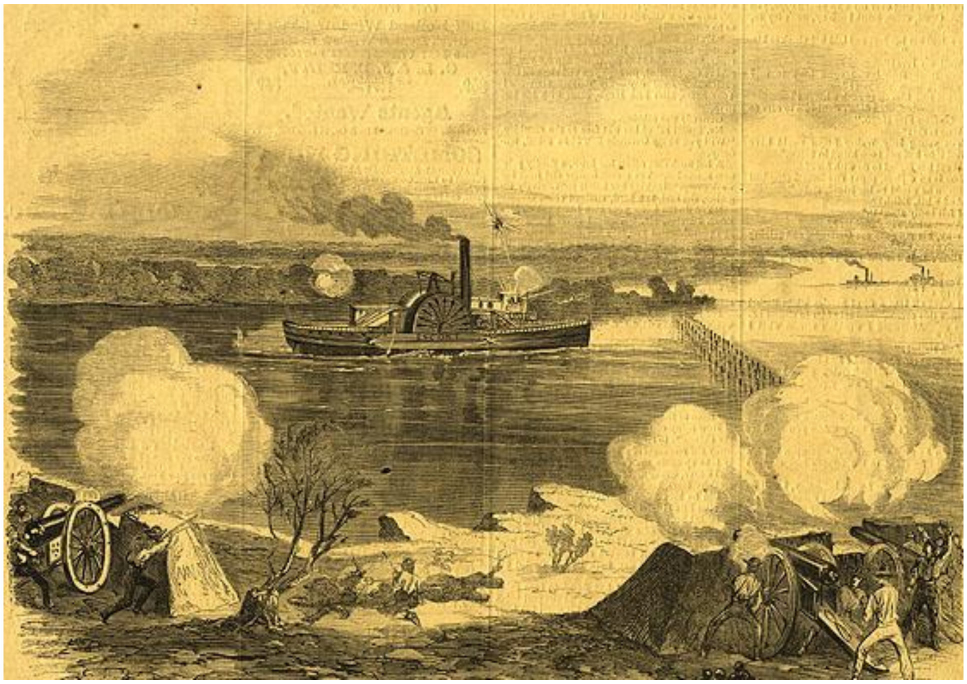

FIGURE 20. Depiction of the steamer *Escort* running the rebel batteries near Washington, North Carolina from *Harpers Weekly* 9 May 1863 (Courtesy of University of North Carolina at Chapel Hill, University Libraries).

On 18 July 1863, General Potter led federal troops up the Tar River, burning many objects in their path, in an effort to locate the rumored partially constructed Confederate gunboat. Major General John G. Foster and General Potter led troops to burn the bridges over the Tar River and ignite the boats docked and under construction nearby. While ransacking Tarboro, Greenville, and Old Sparta, the Union army destroyed ordinance stores, cotton, mills, one barge, a partially built ironclad ram, and two older unarmed river steamboats, *Governor Morehead* and *Colonel Hill* (USWD 1863a:963-974, 1863c:71). Unfortunately, the Tar River steamboats, *Governor Morehead*, owned by John Myers and Sons, and *Colonel Hill*, owned by William Willard, proved completely unsalvageable. Union forces went so far as to burn the remaining bridges spanning the Tar River at Tarboro, Greenville, and Old Sparta before returning to Washington (USWD 1862a:150, 1863b:964-973; Confederate States of America 1864:449-443; Still 1981:37).

The most notorious service from a Tar River steamboat occurred in April 1864, when *Cotton Plant* served as a floating battery and tender for the Confederate ironclad *Albemarle*, in defense against the Union attempted siege of the port of Plymouth, North Carolina. *Cotton Plant*, referred to as the "floating sharp shooter battery," carried soldiers on tow flats, with bushels of cotton shielding snipers on deck (USWD 1864:295; Myers 1884:2).Union forces retreated from Washington following the Confederate victory at Plymouth. As a parting gift, the federal troops set fire to the town of Washington and the bridge across the Tar River. To make matters worse, Union troops cut the fire company hoses, and a few days later, an accidental fire destroyed the remnants of Washington (USWD 1862b:698; Barrett 1995:158-220).

The Postbellum Tar River Steamboat Industry

The local business firm owned by the Myers continued to provide reliable upriver steamboat service to Tarboro until the early 20th century. John Myers and Son purchased *Cotton Plant* from the Federal Government after its service during the Civil War and returned it to the Tar River in 1866. The Myers faced no competition on the upriver route for five years until *Vesta* appeared on the Tar River in 1871. The Wilmington and Weldon Railroad, the Seaboard and Roanoke Railroad, and the Bay Line of Steamers purchased *Vesta* for $15,000 and used it to connect railroad stations at Tarboro to Washington, beginning in 1871 (*Tarboro Southerner* 1871:2). John Myers Sons refused to cooperate with the new competition by operating on alternate days, therefore, both *Cotton Plant* and *Vesta* arrived at Tarboro on Mondays, Wednesdays and Fridays, whenever possible (*Tarboro Southerner* 1871:3). John Myers Sons made an important business arrangement as newspapers began to report that the Wilmington and Weldon Railroad purchased a new steamboat, *Isis*, to operate in conjunction with *Vesta* to provide daily service to Tarboro (Myers 1884:1; Rodgers et al. 2008:39-40).

The increase in the volume of exports of cotton and tobacco required multiple steamboats towing cargo-laden barges from Tarboro downriver to the markets at Washington and inspired increased competition from non-local steamboat and railroad companies (*Tarboro Southerner* 1877:3). As previously mentioned, navigation improvements allowed the Tar River steamboat industry to flourish in the 1870s and 1880s because large, organized, companies expanded steamboat service to upriver communities to provide connections with stagecoach and train lines. Large companies with northern bases of operation, including the Wilmington and Weldon Railroad, the Seaboard and Roanoke Railroad, the Clyde Steamship Company of Philadelphia, Baltimore, and Norfolk, the Norfolk and Southern Railroad, and the Old Dominion Steamship Company, owned competing steamboats operating on the Tar River in the late 19th century. Companies hired local agents and established wharves, docking facilities, marine railways, and warehouses on the Washington waterfront and along the Tar River (Figure 21) (Loy and Worthy 1976:230; Rodgers et al. 2008:39).

FIGURE 21. Photograph of workers weighing bales of cotton for shipment at the Old Dominion Steamship Company wharf at Greenville, in the late 19th century, significance of bear unknown (Courtesy of Bridgers Collection, Outer Banks History Center).

Faced with competition in the form of established and well-funded companies, the independent, small business steamboat firm, John Myers Sons sold their Washington shipbuilding and merchant firm to the Old Dominion Steamship Company in 1872. Thomas H. B. Myers, and later his son T. Harvey Myers, acted as agents for the Old Dominion line from its connection to Washington in 1872 until the Norfolk and Southern Railroad purchased the remaining Old Dominion upriver steamboats in 1905 (Myers 1884:1; Loy and Worthy 1976:239). The Old Dominion Steamship Company formed in 1867 from an attempt to eliminate competition by joining the New York and Virginia Steamship Company with the Virginia line of the Atlantic Coast Mail Steamship Company. Principal steamer routes of the Old Dominion line included New York to Norfolk, New York to Richmond, New York to West Point, Virginia, and New York to Lewes, Delaware, while feeder lines for the company included transportation to Washington and up the Tar River (Prince 1972:25). The company also provided connections with the Norfolk and Southern Railroad in various parts of North Carolina and Virginia. The Myers managed, constructed, and owned partial shares of many upriver steamboats associated with the Old Dominion Steamship Company. Steamboats that operated on the Tar River for the Old Dominion line included *R. L. Myers* (I), R. *L. Myers* (II), *Cotton Plant*, *Pitt*, *Beaufort*, and *Greenville* (Bridgers 1978:109-133; Still 1981:39-42; Rodgers et al. 2008:40-48).

After the business transaction in 1872, the Old Dominion Steamship Company and John Myers Sons co-owned and operated *Cotton Plant*, carrying cargo and passengers on the Tar River. Despite navigation improvements, *Cotton Plant* had trouble steaming up to Tarboro, therefore, John Myers Sons decided to build a shallower steam flat to run in connection with *Cotton Plant* and reach Tarboro. John Myers Sons designed and built the small, freight upriver steamboat *Pitt* on the Washington waterfront, in 1874. Measuring 80 ft. long, grossing 30 tons, and having a shallow 2 ft. draft, *Pitt* carried large deck loads of cotton and tobacco on the shallow, snag ridden Greenville to Tarboro route until 1879 (Bureau of Navigation 1875, 1881a, 1882; Myers 1884:2).

Although *Vesta*, *Isis*, and *Pitt* offered upriver service in 1874, citizens of Tarboro felt unsatisfied with freight charges and the reliability of upriver service, therefore, several citizens formed the Tar River Navigation Company. The sale of company stock, in January of the following year, funded the purchase of the steamboat *North East*, constructed at Wilmington, North Carolina (Bureau of Navigation 1878a). The company received local support including messages and advertisements printed in the *Tarboro Southerner* that encouraged farmers to ship via the "home enterprise" of the Tar River Navigation Company (Figure 22). However, despite a promising start and ample publicity, the Tar River Navigation Company sold *North East*, after only a month of service, and the company dissolved in February 1875 (*Tarboro Southerner* 1875:3; Bridgers 1978:128; Rodgers et al. 2008:41). Competition for steamboat service on the Tar River escalated as A. W. Styron settled in Washington and immersed himself in the steamboat industry, eventually building, owning, and operating upriver steamboats at exceedingly low rates.

FIGURE 22. Advertisement for the *North East* printed in the *Tarboro Southerner* in January and February 1875 (Courtesy of Bridgers Collection, Outer Banks History Center).

Alpheus Whitehurst Styron, born on Portsmouth Island in 1848, gained experience during the Civil War that shaped his future. Styron was too young to enlist; therefore, he acted as a Confederate courier, carrying messages throughout the rivers and sounds of eastern North Carolina, usually under the cover of darkness. Styron settled in Washington after the Civil War ended, and used his intimate knowledge of navigating the rivers and sounds to become a steamboat captain by his early twenties (Figure 23). He eventually operated as a steamboat builder, captain, and owner, yet, despite building and operating over a dozen steamboats, Styron attempted too many business ventures at once, therefore, he "never really made his strike" (J. A. Burgess Papers, Joyner Library; West 1998:8; Kammerer 2006:34).

FIGURE 23. Photograph of Captain Alpheus W. Styron (Courtesy of Bridgers Collection, Outer Banks History Center).

Although he never became wealthy, Styron developed a good reputation from his many years of service on the Tar River, prompting one newspaper to print this glowing review:

> "Styron […] may be justly called the pioneer boatman in navigating the river, having built no less than three or four steamboats, and with his push and energy has always consulted the interest of the farmers in reducing the tariff rates to minimum prices. To him may be justly attributed the development and success of steam navigation hereabouts, his first boat being placed on the river nine years ago" (*The News and Observer* 1886:2).

Styron did not prosper during his lifetime and constantly faced criticism because he attempted too many things at once and seemed to always lack capital (West 1998:5). He became involved in a variety of businesses in eastern North Carolina during the late 19th and early 20th centuries. He acted as an agent for the Farmers' Co-operative Oil Mills of Tarboro and brokered the sale of lots of cottonseed, lime, and meal. For a short period in the late 19th century, Styron operated a limekiln on Castle Island, located in the Pamlico River adjacent to Washington, but unfortunately this business also failed. Styron found relative success in the 1890s manufacturing Mocking Bird Smoking Tobacco until the Duke brothers and the American Tobacco Company drove him out of business. Despite his business failures, Washington citizens respected Captain Styron, as he was locally known, and when he passed away in 1920 all the stores in Washington closed the next afternoon in tribute to him (West 1998:5-9).

Styron induced the Clyde Steamship Company of Philadelphia, Baltimore, and Norfolk to connect with his steamboats and run in opposition to the Old Dominion Steamship Company. Styron constructed his first steamboat, *Edgecombe*, in 1877 and enlarged the 73 ft. long, screw-propelled upriver steamboat two years later. *Edgecombe* operated under the Clyde Line on the Tar River route from its launching in 1877 until the Merchants and Farmers Transportation Company purchased the recently renovated vessel for $3,500 in 1880, and transferred it to service on the Pamlico Sound. Styron renovated the vessel by adding to the bow of the steamboat for a new length to 95 ft. while turning the original cabin into a freight room and adding a passenger saloon on the upper deck (Bureau of Navigation 1877). The Clyde Steamship Company continued to cooperate with Styron and several steamboats ran on the Tar River route for the Clyde line, including *Tarboro* (I), *Greenville*, *Edgecombe*, and *Defiance* (*Washington*

Progress 1886:2; Loy and Worthy 1976:233; Turner and Bridges 1997:353; Rodgers et al. 2008:42).

The booming cotton industry led Old Dominion Steamship Company to contract with John Myers Sons for the construction of a larger upriver steamboat. John Myers Sons built the sternwheel steamboat *R. L. Myers* (I) for the Old Dominion Steamship Company in 1879. This vessel, measuring 109 ft. long, by 25 ft. wide, by 3 ft. 8 in. deep, included a main saloon, a ladies saloon, and a saloon for "colored" passengers. *R. L. Myers* (I) provided comfortable passenger and freight transportation on the Tar River from 1879 until the Old Dominion Steamship Company transferred the vessel to New Bern in 1882 (Bureau of Navigation 1879a, 1883b, 1885a; Rodgers et al. 2008:41).

Meanwhile, Styron converted the barge *Red Ram* to complete his next upriver steamboat, *Greenville*, in 1879, the same year that the Myers launched *R. L. Myers* (I). The light draft, propeller-driven, upriver steamboat *Greenville* also had passenger accommodations that included a ladies parlor, a main dining saloon, and a saloon for black passengers. Styron rebuilt the steamboat after it caught fire in 1880, for an estimated loss of $2,500. Enrollment records indicate that Styron did not change the dimensions or tonnage of *Greenville*, retaining the original length of 112 ft. breadth of 24 ft. and depth of 2 ft. (Bureau of Navigation 1879b, 1892; Rodgers 2008:42).

Styron understood the value of publicity and the monetary rewards available from racing his steamboats and the *Tarboro Southerner* reported, "He will challenge any light draught propeller boat of the same draught as the *Greenville*, to beat her in speed" (*Tarboro Southerner* 1879:3). Styron also adapted to local desires and used the *Greenville* and his later steamboats to make excursions for the community, accommodating a variety of citizens including church groups and fire companies. *Greenville* plied the waters of the Tar River for 14 years, despite difficult weather conditions, variable water levels, numerous mishaps (including sinking twice), and fluctuations in regional economies (Figure 24). The Old Dominion Steamship Company bought the vessel and transferred it to the Neuse River in 1892; however, vessel enrollment from 1895 indicates that *Greenville* returned to the Tar River, for a short period, to transport guano (Bureau of Navigation 1892, 1895a; Rodgers et al. 2008:42).

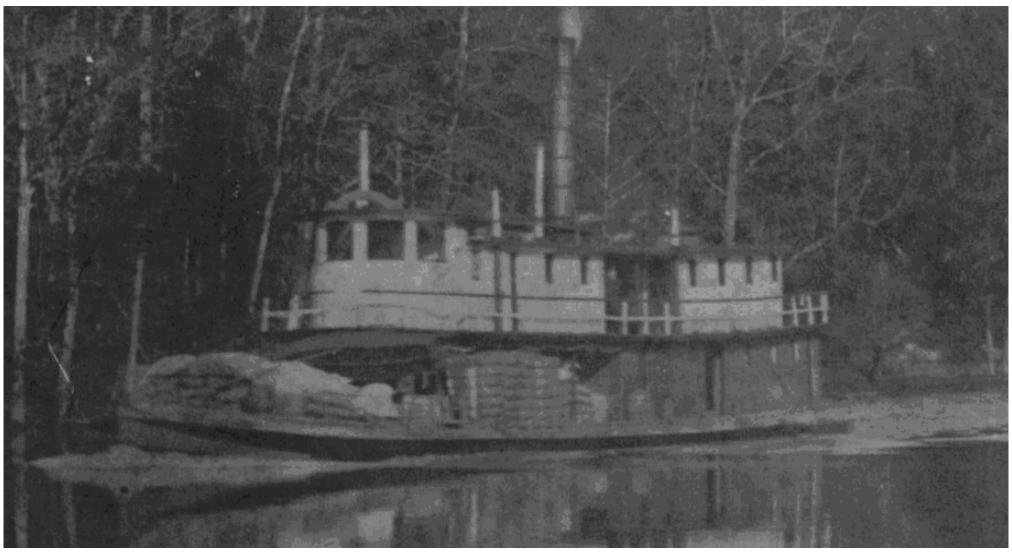

FIGURE 24. Photograph of upriver steamboat, believed to be *Greenville*, on the Tar River (Courtesy of Bridgers Collection, Outer Banks History Center).

Steamboats built by Styron proved successful because his understanding of the fluctuations of the Tar River and the difficulty of upriver transportation inspired him to build light draft steamboats designed to provide year-round service to Tarboro. *Tarboro* (I), built by A. W. Styron, had a draft of 8 in. with the boilers, engines, and 16 tons of ballast in place, when launched in 1881 (*Tarboro Southerner* 1881:3). *Tarboro* (I), originally owned by Styron and associated with the Clyde Line, carried freight between Washington and Tarboro until Styron rebuilt the vessel in 1882. It remains unclear why and exactly what Styron chose to remodel, however, he surrendered the vessel enrollment due to an auxiliary change. Styron increased the tonnage during the renovation, while slightly increasing the length, breadth, and depth of the hull. The newly designed hull, measured 115 ft. long, by 27 ft. wide, by 4 ft. deep and allowed *Tarboro* (I) to provide service upriver until becoming snagged on a stump in 1885. Newspaper reports from 1886 indicate that salvage attempts proved unsuccessful and caused the sunken *Tarboro* (I) to float into the Sparta bridge, breaking amidships (Bureau of Navigation 1881b, 1884, 1889; *The News and Observer* 1886:2; Rodgers et al. 2008:43).

Although Styron built the lightest draft vessel on the Tar River, *Tarboro* (I), he did not feel satisfied and hoped to build a boat capable of providing transportation to Tarboro throughout the year but faced many obstacles (*Tarboro Southerner* 1880:3). At times the lack of freight discouraged Styron, for example, in 1883, he told Dosset Battle “that if it were not for two men below Tarboro, it would not pay him to come higher than Greenville, so far as freight was concerned, and he thought it not improbably that this was his last season” (*Tarboro Southerner* 1883:3; Bridgers 1978:150). Fortunately for Tar River merchants and farmers, Styron continued to play an important role in the Tar River steamboat industry until the turn of the 20th century.

Despite his perceptions about the meager volume of freight, Styron enlarged *Tarboro* (I), built *Margie*, and constructed the 188 gross ton, propeller driven steamboat *Beaufort* on the Washington waterfront in 1883. Although *Beaufort* mainly operated in Virginia from 1883 until 1886, it was the largest steamboat on the Tar River when it appeared in 1884. *Beaufort* returned to Washington and operated on the upriver route from 1887 until Styron enlarged the vessel to nearly 400 tons in 1890, making it one of the largest vessels built in steam-era North Carolina. The redesigned *Beaufort* boasted a passenger capacity of 250 and carried excursion traffic for the Old Dominion Steamship Company from Washington and New Bern to Ocracoke Island until the company changed its homeport to Delaware in 1891 (Bureau of Navigation 1883a, 1890b, 1896; Bridgers 1978:153; McCabe 2007:154; Rodgers et al. 2008:43-44).

Steamboat owners offered passenger accommodations and meals on the excursion voyages from various ports, including Washington, to resort towns, including Ocracoke and Morehead City. The excursion business became a viable summer employment option for a steamboat, and certain steamboats, including *Beaufort*, served primarily as excursion boats and rarely carried cargo. Near the end of the 20th century, railroad companies occasionally owned the railroad providing transportation to the steamboat, the steamboat used to reach the vacation destination, and the hotel or resort (Bridgers 1978:114).

Styron kept busy in 1883, building *Margie*, and *Beaufort*, and enlarging *Tarboro* (I), despite financial strains that led him to borrow money in order to complete the construction and outfitting of *Margie*. Builders Styron and Duncan took out a mortgage against the steamboat for $800 that they owed to W. F. Kornegay and Company for various furnishings and a boiler. Court records indicate Kornegay and Company placed a lien on *Margie* for the unpaid mortgage; however, the company unwittingly abandoned their lien when they agreed to the sale of *Margie* to the New Berne, Beaufort, and Onslow Inland Coasting Company of Carteret County. The courts ruled that, by accepting the sale of *Margie*, Kornegay and Company had forfeited their lien and could not force the collection of the mortgage, although the company maintained that Styron and Duncan owed them $800 and interest for a marine boiler and other equipment (West Publishing Company 1890:153-154). Styron did not attempt to construct another steamboat for several years, perhaps because of his difficulty financing the construction of *Margie*.

Meanwhile, the Old Dominion Steamship Company operated *R. L. Myers* (I) on the upriver route, competing with *Greenville* and *Tarboro* (I), until 1885. When the company could no longer rely on *R. L. Myers* (I), they contracted with T. H. B. Myers to build another upriver steamboat with the same name. *R. L. Myers* (II) operated on the Tar River for the Old Dominion

Steamship Company from its launching in 1885 until the Norfolk and Southern Railroad moved the vessel to New York in 1905. The screw-propelled steamboat *R. L. Myers* (II) boasted two cabins and the ability to hold 50 passengers, which proved lucrative as the excursion business to the Outer Banks of North Carolina blossomed in the late 19th century (Figure 25) (Bureau of Navigation 1885b; Bridgers 1978:110-115).

FIGURE 25. Photograph showing Washington residents lining the waterfront before boarding the steamboat for an excursion offered by the *R. L. Myers* (II), which can be seen in the background (Courtesy of Bridgers Collection, Outer Banks History Center).

After *Tarboro* (I) sunk and salvage operations failed, Styron constructed another small, freight upriver steamboat, *Beta*. Styron captained the 40 ton upriver steamboat, that measured 77 ft. long, 17 ft. 7 in. wide, and 3 ft. 2 in. deep, on the Washington to Tarboro route from 1887 until 1889. One newspaper reported that in 1888 Styron lowered the freight rates for cotton carried by *Beta* to 75 cents a bale, while the competition, *R. L. Myers* (II) and *Greenville*, charged $1.50 per bale, resulting in the competing boats not making any money shipping cotton (*The News and Observer* 1888:2). Styron remodeled *Beta* in 1889, increasing the gross tonnage to 57, though the dimensions remained the same, probably indicating the addition of superstructure components. The renovation coincided with ownership transferring to the

Farmers' Cooperative Manufacturing Company of Tarboro (Bureau of Navigation 1887b, 1890a, 1895b; Rodgers et al. 2008:47).

The Farmers' Cooperative Manufacturing Company produced crude and refined cottonseed oils, and operated under a variety of names during the late 19th and early 20th centuries, including Zoeller Farmer's Oil Mills, Tar River Oil Company of Shiloh, and Shiloh Oil Mills. The company employed steamboats to transport cargo upriver to their mills located two miles above Tarboro at Shiloh (Figure 26). Company steamboats encountered difficulties because the steamboat landing was located upstream of a railroad bridge and a highway bridge, neither of which had draw capabilities (Tar River Oil Company Records 1892; Rodgers et al. 2008:48).

FIGURE 26. Photograph of the Shiloh Oil Mills of Tarboro Oil Company, located two miles above Tarboro (Courtesy of Bridgers Collection, Outer Banks History Center).

The bridge built by the Albemarle Railroad Company had a clearing of around 17 ft. from the bottom of the bridge to the surface of the Tar River, making navigation difficult because most vessels risked becoming stranded in times of high water if they could not fit under both the highway and railroad bridges. Captains operating steamboats for the company often unscrewed and removed the exhaust pipe and steam whistle in order to pass under the bridges but this did not always prove possible. Therefore, the company sued the Albemarle Railroad Company for obstructing a navigable waterway by not erecting a drawbridge. The Farmers' Cooperative Mills of Shiloh received compensation for several days of lost service, and subsequently contracted with local builders to design shallow and squat upriver steamboats that could pass under the bridges (Tar River Oil Company Records 1892; North Carolina Supreme Court 1896:579; Bridgers 1978:160).

The Zoeller Farmer's Oil Mills owned *Beta* and employed it carrying personal cargo, cottonseed, and cottonseed oil between Washington and the company mills from 1893 until enrollment records indicate that the vessel was unfit for service in 1895. That same year, the Zoeller brothers, acting through the Tar River Oil Company, contracted with Shiloh based shipwright David S. Liddon to construct a steamboat to replace *Beta*. Liddon built the 84 gross ton, screw propelled, upriver steamboat *Shiloh* that measured 83 ft. long, by 22 ft. 7 in. wide, and 4 ft. deep (Figure 27, Figure 28, Figure 29, and Figure 30). *Shiloh*, boasting two decks with first class and second class saloons, operated on the Tar River from 1895 until remodeled to operate on gasoline and sold in 1924 (Bureau of Navigation 1895b, 1895c, 1925, 1929; Still 1981:44).

FIGURE 27. Photograph of upriver steamboat *Shiloh* on the Tar River (Courtesy of Bridgers Collection, Outer Banks History Center).

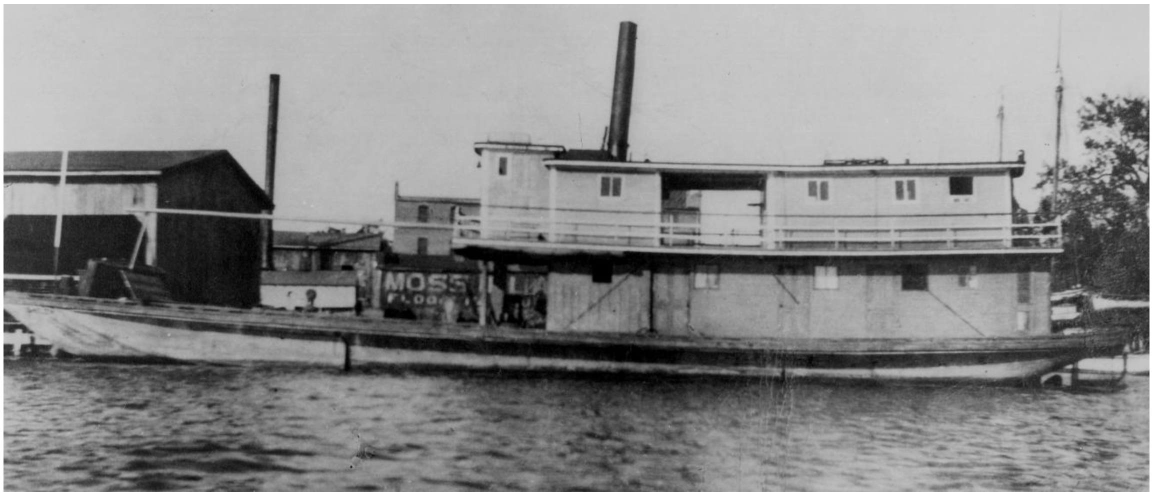

FIGURE 28. Photograph of the upriver steamboat *Shiloh* at Washington, North Carolina (Courtesy of Bridgers Collection, Outer Banks History Center).

FIGURE 29. Photograph of *Shiloh* at the steamboat landing in Tarboro during a flood in winter ca. 1900 (Courtesy of Bridgers Collection, Outer Banks History Center).

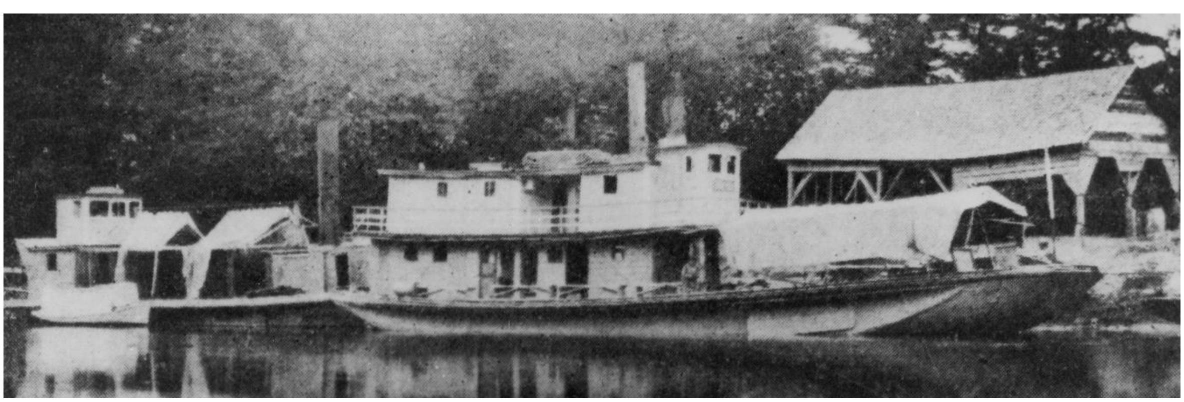

FIGURE 30. Photograph of *Shiloh* with *Tarboro* (II) astern, at a steamboat landing in Tarboro ca. 1900 (Courtesy of Bridgers Collection, Outer Banks History Center).

In 1898, the Zoellers contracted with A. W. Styron to build a small, freight, upriver steamboat to run with *Shiloh*. The 77 ft. 5 in. long, stern paddlewheeler, *Tarboro* (II), had a construction cost of $4,240.96. Styron designed the hull with a length and breadth measurement that was similar to his other small freight upriver steamboats *Beta* and *Edgecombe*; *Tarboro* (II), however, had a 5 ft. 10 in. draft that was deeper than most other upriver steamboats. A. W. Styron designed *Tarboro* (II) with an open section in the middle of the deck for loading cargo and did not include cabin space for passenger accommodations (Figure 31 and Figure 32). The Tar River Oil Company ran *Tarboro* (II) between Washington and the mills at Shiloh until surrendering its enrollment at Washington in 1922, declaring the steamboat unfit for further navigation service (Bureau of Navigation 1889, 1898, 1920, 1922; Bridgers 1978:200).

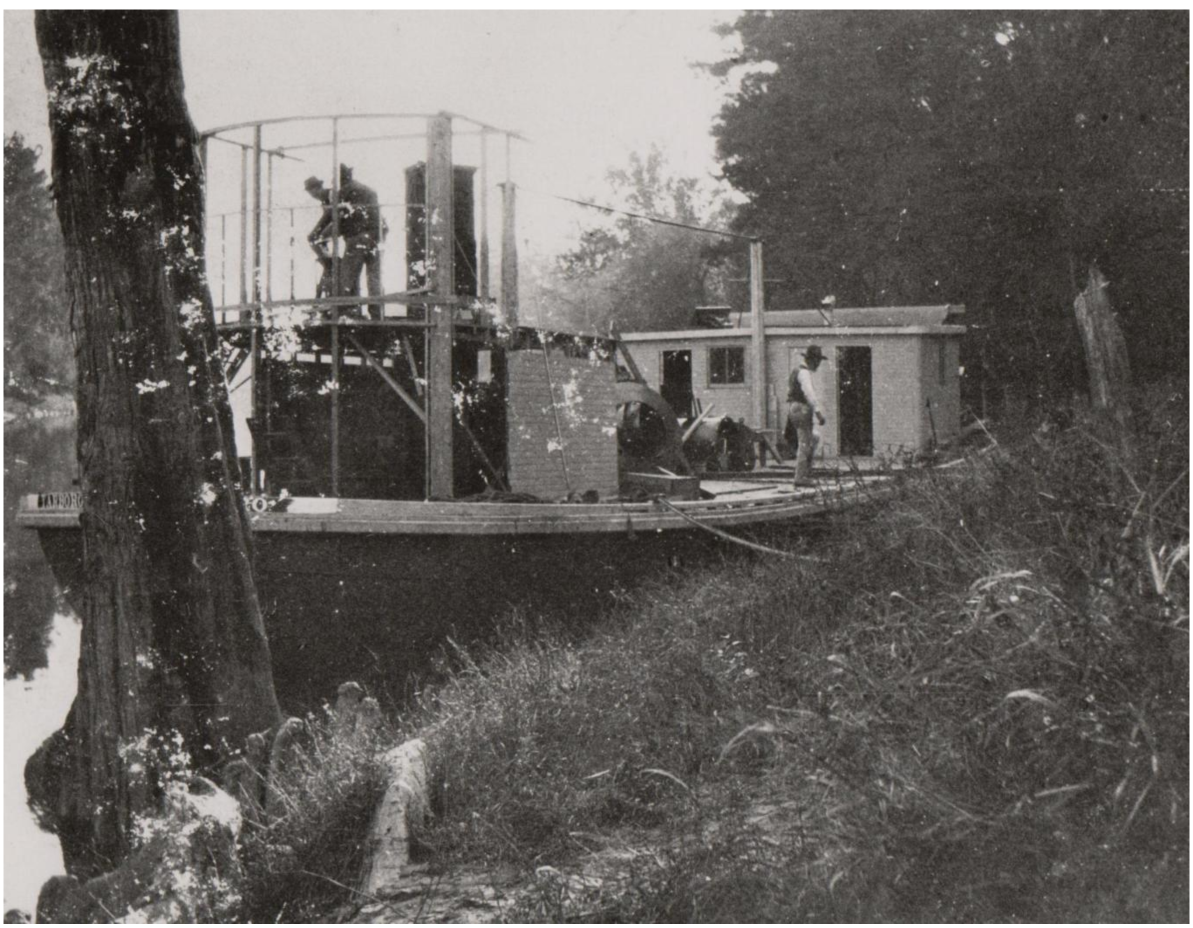

FIGURE 31. Photograph of *Tarboro* (II), under construction, with its bow in the forefront (Courtesy of Bridgers Collection, Outer Banks History Center).

FIGURE 32. Photograph of the steamboat *Tarboro* (II) viewed from stern to bow (Courtesy of Bridgers Collection, Outer Banks History Center).

Steamboats under the control of the Farmer's Oil Mills, *Beta*, *Shiloh*, and *Tarboro* (II), operated under the colors and moniker of the Tar River Line. The company continued to transport cotton and cottonseed aboard their steamboats until 1925, although railroads began to take the cargo normally carried by steamboats. This is the only example of Tar River steamboat service persisting despite the influx of railroads and gasoline powered boats in the early 20th century (J. A. Burgess Papers, Joyner Library).

As described above, the ubiquity of navigational hazards and prevalence of low water levels consistently hindered navigation on the Tar River; however, local residents continued to rely on the river for transportation until the early 20th century. Early area residents used available resources, including cypress and pine trees, to construct vernacular vessels including canoes, flats, periaugers, schooners, and sloops. Although these vessels allowed merchants and farmers to ship agricultural exports from upriver landings to Washington, transportation upriver against the current proved difficult and expensive before the arrival of steamboats (Rodgers 2008:24-30).

John Myers and Son was the only company that prospered, despite the appearance of ten steamboats on the antebellum Tar River. Navigational hazards, deep drafted steamboats, and a relatively small volume of cargo for transportation made regular Tar River navigation difficult. Early firms and individuals operating steamboats did not have a full understanding of how to overcome the navigational hazards of the Tar River, therefore most vessels could not reach Tarboro (Myers 1884:2; Rodgers et al. 2008:30-38).

After the destructive Civil War, the growth of cotton and tobacco farming increased the volume of cargo needing transportation to Washington. Post war internal improvements supervised by the Army Corps of Engineers improved Tar River navigation and allowed steamboats to open markets upriver of Tarboro. The establishment of railroads at Tarboro inspired northern transportation companies to expand service up the Tar River to provide connection with rail and stagecoach lines. These companies employed Washington based agents and shipwrights to oversee local transportation (Loy and Worthy 1976:230; Rodgers et al 2008:38-48).

After unsuccessful antebellum attempts to build steamboats, shipwrights in Washington used their knowledge concerning the hazards of the Tar River to develop steamboats specifically designed for the upriver route. These postbellum upriver steamboats, owned by large northern companies, competed for cargo and passenger transportation during the late 19th and early 20th centuries. The following chapter relies on enrollment records, archaeological surveys, and photographs of Tar River steamboats to identify the salient design features of upriver steamboats and compare them to other regional steamboat designs.

CHAPTER 5: COMPARATIVE ANALYSIS AND CONCLUSION

Tar River shipwrights kept few written records concerning steamboat construction or operations; therefore, the preceding chapter relied on available primary records, including enrollment records, archival documents, newspaper articles, and advertisements, to describe the Tar River steamboat industry. Unfortunately, important details about many Tar River steamboats do not persist today as historic records often lack complete information, including identifying the builders, or listing the dimensions, operational career, and demise of these historic steamboats. The fragmented historical records may have resulted in individual Tar River steamboats slipping through the cracks of history without leaving a paper trail (Rodgers et al. 2008:48-50). While fragmentary historic records provide insight into the movements and general characteristics of Tar River steamboats, archaeological examples of upriver steamboats offer in depth views of construction techniques not readily apparent in photographs or written records. Only two preliminary archaeological surveys of upriver steamboats exist to augment the limited information available from newspapers and enrollment records. Therefore, only combined historic/archaeological analysis can help identify the characteristics of Tar River upriver steamboats.

Statements made in the preliminary archaeological reports of two upriver steamboats, Castle Island Vessel 4 and the Old Sparta Vessel, claim upriver steamboat designs are similar to, or “very reminiscent” of western river or mountain steamers (Rodgers and Richards 2006:33; Rodgers et al. 2008:82). Therefore, a comparison of upriver steamboats and steamboats from other American waterways developed from an attempt to justify the validity of these statements. A comparative analysis conducted at the end of this chapter indicates that southeastern upriver steamboat builders likely utilized an amalgamation of available inland marine technology and did not rely solely on copying only the technical adaptations of western river and mountain steamboats.

Archaeological Examples of Upriver Steamboats

The close proximity of the Tar River and East Carolina University has led to substantial interest in the waterway from many departments within the school. The Program in Maritime Studies at East Carolina University archaeologically investigated the remains of two upriver steamboats, Castle Island Vessel 4 and the Old Sparta Vessel. Unfortunately, several important historical facts, including the identities of these two steamboats cannot be determined without additional research, yet these wrecks offer abundant information about Tar River steamboat construction. In a similar vein, the Program in Maritime Studies also excavated the remains of another type of Pamlico River steamboat, the *Oregon/Colonel Hill*, whose history revealed the need for a change to upriver steamboat designs in eastern North Carolina rivers (Lawrence 2003; Rodgers and Richards 2006:32-34; Rodgers et al. 2008).

In 1999, the Program in Maritime Studies conducted a survey of the Tar River below Tarboro and located the remains of *Oregon/Colonel Hill*, a Pamlico River steamboat that sank during the Civil War. The Tar River Steamboat Company bought *Oregon* in 1848, however, the company disbanded after it found the 5 ft. draft of the vessel too deep to service the Tar River. The following year, Washington merchant William H. Willard purchased *Oregon* for his personal use on the Pamlico River, where the increased water depth permitted its operation. As the Civil War began, *Oregon* became *Colonel Hill* and operated in support of the Confederate cause before retreating to Tarboro. A reporter from the *New York Herald* described *Colonel Hill* as “a fair specimen of a Southern river steamer,” however, Lawrence notes that it did not provide upriver service and was not representative of antebellum steamers operating on the Tar River.

The Baltimore shipyard responsible for the construction of *Oregon* utilized construction features that melded typical east coast steamer construction with a conventional shallow draft hull and a high-pressure engine, resulting in a vessel that was better suited to fresh water rivers (Lawrence 2003:116, 163). Despite the shallow draft of this side paddlewheel steamboat, it could not effectively provide service up the Tar River, but its excavation increased knowledge about the contrasting differences between upriver and Pamlico River steamboats.

From 1998 until 2000, the Program in Maritime Studies conducted pre-disturbance archaeological field surveys of eleven vessels located near Castle Island, a land formation in the Tar River adjacent to Washington (Figure 33). Researchers identified the remains of Vessel 4 (0055PMR) as a stern paddlewheel steamboat that measured 43 ft. in hull length. The steamboat possessed a beam of 15 ft. and a 3 ft. depth of hold, resulting in a draft of around 2 ft. Though the wreck lacked machinery, the presence of composite (wood and iron) cylinder timbers indicates the vessel was a paddlewheel steamboat. The machinery and superstructure were probably salvaged at the time of sinking or sometime thereafter and reused or scrapped, which was a common occurrence when boats sank in shallow river waters (White 2002:29; Rodgers and Richards 2006:32-33; Rodgers et al. 2008:62-71).

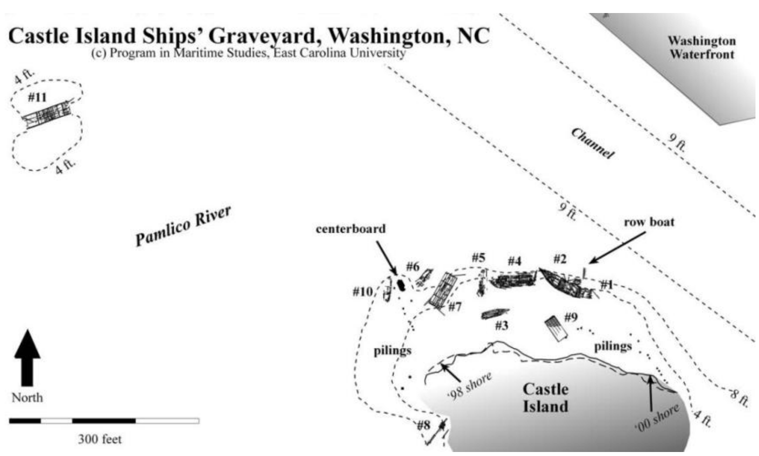

FIGURE 33. Master plan of the watercraft studied from during the East Carolina University Maritime Studies Field Schools in 1998 to 2000. Castle Island Vessel 4 is the remains of an upriver steamboat (Rodgers and Richards 2006:6).

Castle Island Vessel 4 displays various features that are indicative of steamboat construction when compared with flats and other vernacular upriver watercraft. Cylinder timbers, similar to those found in Castle Island Vessel 4, support the paddle shaft (arguably the heaviest piece of steamboat machinery) and are exclusively associated with paddlewheel steamboat construction. Builders of Castle Island Vessel 4 employed composite cylinder timbers with diagonal bracing that were lighter and stronger than traditional solid wooden cylinder timbers. Longitudinal support to the shallow draft hull derived from floor frames that extended across the beam of Vessel 4 and were held in place by three stringers per side. Unlike Castle Island Vessel 4, flats generally do not have athwartship floors, stringers, and cylinder timbers, because of their small size, simple construction, and lack of propulsion elements. The lightweight internal support system and the sophisticated structure of the composite cylinder timbers indicates that Castle Island Vessel 4 is a late 19th or early 20th century upriver steamboat (Rodgers and Richards 2006:33; Rodgers et al. 2008:62). The dimensions of Castle Island Vessel 4 roughly correspond to the dimensions of the Washington based steamboat *Alma*, though researchers caution that based on the initial report it is “much too early to pronounce a match” (Figure 34) (Rodgers and Richards 2006:33). Captain George R. Jones operated the 41 ft. long, 13 ft. wide *Alma* out of Washington from its build date of 1897 until 1899. *Alma* had a shallow draft of 2 ft. and displaced 16 tons while carrying agricultural goods to upriver markets (Bridgers 1978:211). Unfortunately, researchers returning to Castle Island after Hurricane Floyd in 2000 could not relocate Vessel 4 (Rodgers and Richards 2006:33-35). The great quantity of vessels found adjacent to Castle Island inspired research concerning the economy and maritime cultural landscape of the Tar-Pamlico River system.

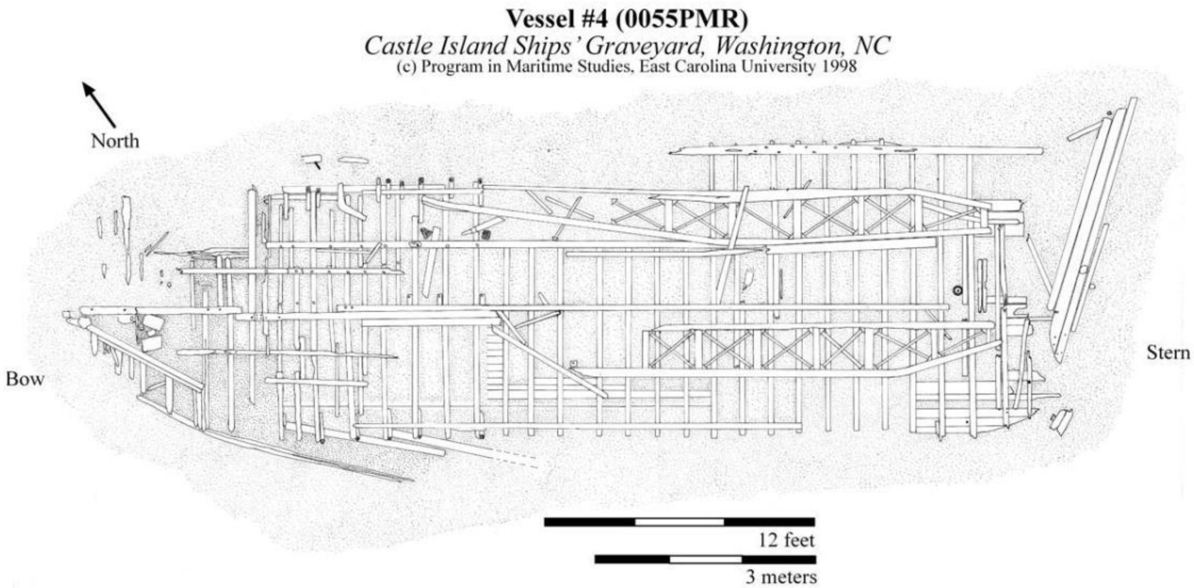

FIGURE 34. Plan view site map of Castle Island Vessel 4 (Rodgers and Richards 2006:34).

Continuing to focus on the Tar River, the Program in Maritime Studies at East Carolina University received a grant in 2008 to conduct a Phase II pre-disturbance archaeological survey of the Old Sparta Vessel, located in the Tar River between Tarboro and Greenville, near the town of Old Sparta. Initial grant funded research included around 14 days of fieldwork and months of archival investigation, resulting in a site map and preliminary report (Figure 35) (Rodgers et al. 2008:6-15). The size of the vessel remains, and artifacts, including coal, cinder, burned bricks, and disarticulated cylinder timbers support the identification of the Old Sparta Vessel as a steamboat. The extant wreckage, measuring 81 ft. long, and 12.6 ft. wide, displays a flat-bottomed wooden hull with flaring sides and a stage like stern (Figure 36). Although the remains lack a bow section, which may have been destroyed during the construction of the nearby highway 52 bridge, photographic evidence of Tar River steamboats indicates that the bow could have added an additional 30 ft. to the overall length of the hull. Most ferryboats, pole boats, and river flats do not normally approach the dimensions of the Old Sparta Vessel because they would be difficult to control and would require a large costly crew. The extant remains of the Old

Sparta Vessel are perplexing because while the hull looks diagnostically like a steamboat of sophisticated shallow water design dating to the late-19th century, artifacts and fastenings suggest an earlier date of the second quarter of the 19th century (Rodgers et al. 2008:55-57).

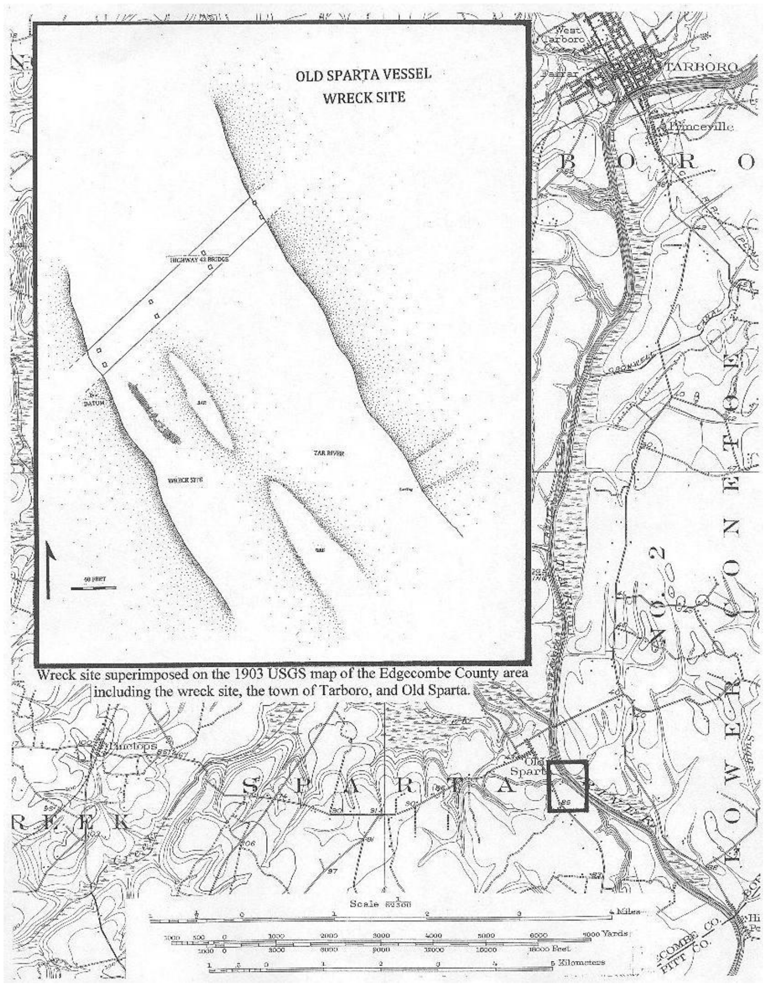

FIGURE 35. Old Sparta Vessel wreck site superimposed on a 1903 Edgecombe County map (Rodgers et al. 2008:2).

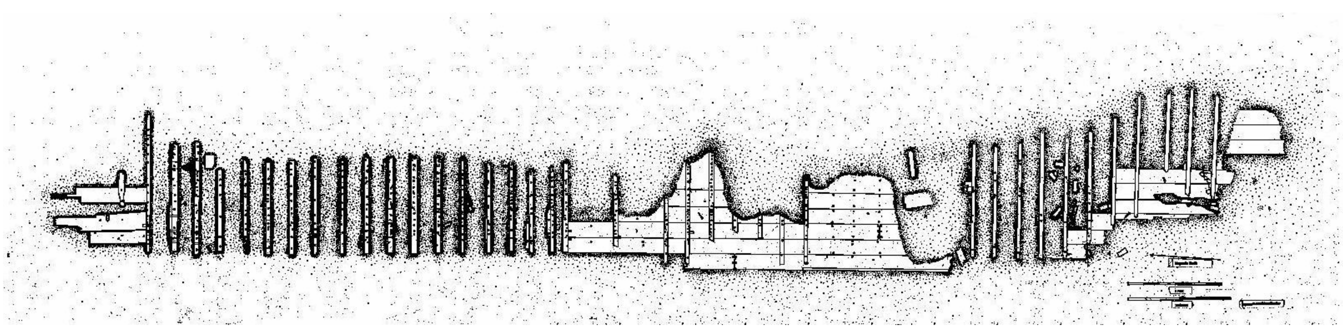

FIGURE 36. Plan view site map of the Old Sparta Vessel with the stern to the right (Rodgers et al. 2008:56).

The builder of the Old Sparta Vessel seldom utilized iron fasteners, except in the form of hand wrought iron nails and spikes in the tops of some floors, and rose head nails in limber holes in the floor frames running down each side of the hull. Otherwise, wooden treenails connect hull components throughout the Old Sparta Vessel. By the second quarter of the 19th century, mass produced iron cut nails, through pins, spikes, and drift pins were available, inexpensive, and stronger. Iron, therefore, began to take the place of wooden treenails certainly before mid-century. In fact, mass produced cut nails and extruded pins typically replaced hand wrought iron fasteners (like the ones used on the Old Sparta Vessel) by the first half of the 19th century. The appearance of hand wrought iron fasteners and the predominance of treenails on the Old Sparta Vessel confounds identification, as the use of these outdated fasteners complicates efforts to determine a construction date (Rodgers et al. 2008:69-75).

A penny from 1830 found under a floor frame further puzzles archaeologists attempting to date the Old Sparta Vessel. The significance of this artifact is unknown; however, as discussed in previous chapters, steamboats did not appear on the Tar River until 1835. Unfortunately, despite substantial historical research, the Old Sparta Vessel cannot be assigned the name and history of a known steamboat without further research. The archaeological survey of the wreck, however, added substantial information about upriver steamboat construction techniques (Rodgers et al. 2008:64-76).

The Old Sparta Vessel displays a shallow, lightweight design, featuring crooked knees that combined with floor frames to support the turn of the bilge and the two or three side planks above the chine. The small, lightweight scantlings and floor frames of the Old Sparta Vessel resulted in a draft of a foot or two of water, thereby allowing it to operate nearly year round on the Tar River. The flaring sides of the Old Sparta Vessel provided an additional two feet of overhang on each side of the hull, increasing cargo capacity while maintaining a shallow draft (Rodgers et al. 2008:55-61). The builder of the Old Sparta Vessel designed a complicated system of support beams throughout the upriver steamboat to add hull strength. In order to bear the load of the paddlewheel machinery, the builder designed the cylinder timbers to fit between and over the floor frames, and to match the sloping angle of the aft apron or stern. The builder chose to fasten the cylinder timbers with wooden treenails rather than utilizing readily available and stronger iron drift pins, perhaps to increase buoyancy (Rodgers et al. 2008:64).

The archaeological surveys of Castle Island Vessel 4 and the Old Sparta Vessel provide additional information that defines construction techniques utilized on upriver steamboats. Builders apparently adapted to the shallow waters encountered on the upriver route by using technology designed to increase cargo capacity without increasing vessel draft. For example, they utilized complicated internal support systems of lightweight timbers that added strength to the hulls without increasing weight. Furthermore, the builder of the Old Sparta Vessel fastened hull components with lightweight treenails as opposed to readily available heavier iron fastenings in order to produce the shallowest and lightest hull possible. The following analysis of Tar River steamboats places Castle Island Vessel 4 and the Old Sparta Vessel in an appropriate technical context and allows for additional comparisons (Rodgers and Richards 2006:33-35; Rodgers et al. 2008:55-69).

Upriver Steamboat Analysis

Historical sources mention ten steamboats appearing on the Tar River between the launching of the first vessel in 1835 and the outbreak of the Civil War in 1861. Complete dimensional information for seven of these antebellum steamboats appears in Table 1. Based on the dimensions of these vessels, steamboats operating on the antebellum Tar River averaged 99.2

ft. long, 18.2 ft. wide, and 3.9 ft. deep, with an average length to beam ratio of 5.5:1. With the exception of *E. D. McNair*, *Red Skull*, and *Wilson*, antebellum Tar River steamboats all possessed northern build locations and encountered difficulties transitioning to service on the Tar River. Few antebellum steamboats were built specifically to function on the narrow, winding Tar River, prompting owners to quickly transfer service to different waterways; therefore, antebellum Tar River steamboats are not considered typical upriver steamboats. Antebellum steamboat experiences taught local captains that a flat-bottomed vessel with a raked, square, and wedge-like bow proved capable of overcoming sandbars and other navigational obstructions frequently encountered on the Tar River. Local antebellum owners focused on cargo capacity, purchasing steamboats that could carry freight on deck and tow flats loaded with cargo, while passenger accommodations, if available, remained sparse due to scant demand for passenger service (Bureau of Navigation 1836, 1839, 1841, 1847a, 1849, 1858, 1859, 1860a, 1860b, Myers 1884:2; Sloan 1971:7).

TABLE 1
ANTEBELLUM TAR RIVER STEAMBOAT MEASUREMENTS

Steamboat Name	Year Built	Length (feet)	Breadth (Feet)	Depth/Draft (Feet)	Length to Beam Ratio	Tonnage
Edmund D. McNair	1835	83.16	16.67	5.5	5:1	71
Oregon/Colonel Hill	1846	100	14.25	5	7:1	69
Governor Graham	1847	119	19.5	5.25	6.1:1	116
Amidas	1849	77.5	16.5	3	4.7:1	35
Governor Morehead	1853	100	23	1.33	4.3:1	55
Wilson	1855	106.92	18.34	3.5	5.8:1	65
Cotton Plant	1860	108	19	4	5.7:1	77

TABLE 1. Displays the measurements of several antebellum Tar River steamboats as reported in newspapers and enrollment records. If historical sources did not indicate tonnage measurements, they were calculated using the formula: [(Length- 3/5 Breadth) Breadth X Depth of hold] / 95 (Lawrence 2003:45). Tonnage measurements were rounded to the nearest whole number.

Local builders gained an understanding of the extreme navigational hazards along the Tar River after experiencing the problems of steam navigation on the waterway during the antebellum era. Therefore, in the post-Civil War era, Washington shipwrights designed utilitarian, shallow, light draft upriver steamboats to increase service to locations further upriver, including Tarboro and Shiloh Mills, despite low water levels (Still 1981:34). Table 2 lists complete dimensional information for 13 postbellum Tar River steamboats for easy comparisons. Analysis of the photographs and the available dimensions of postbellum steamboats indicates two different styles of upriver steamboats developed on the Tar River in the decades following the Civil War. Local builders relied on shallow hulls, and developed small, freight steamboats, designed to provide cargo transportation to the upriver communities and versatile larger steamboats that offered comfortable passenger saloons on the upper deck and ample multi-purpose space on the main deck (Still 1981:34).

TABLE 2
POSTBELLUM TAR RIVER STEAMBOAT MEASUREMENTS

Steamboat Name	Year Built	Length (feet)	Breadth (Feet)	Depth/Draft (Feet)	Length to Beam Ratio	Tonnage
North East	1872	86.3	18	2.9	4.8:1	49
Pitt	1874	80	14	2	5.7:1	30
Edgecombe (I)	1877	73	21.3	4.6	3.4:1	45
R. L. Myers (I)	1879	109.2	24.9	3.7	4.4:1	97
Greenville	1879	116	24	2	4.8:1	68
Tarboro (I)	1880	110	26.8	2.5	4.1:1	73
Beaufort	1883	121	29.2	4	4.1:1	188
R. L. Myers (II)	1885	118.6	24.8	4.1	4.8:1	128
Beta	1887	77.1	17.6	3.2	4.4:1	60
Shiloh	1895	83	22.6	4	3.7:1	49
Alma	1897	41	13	2	3.2:1	16
Edgecombe (II)	1897	65	16	5.9	4.1:1	45
Tarboro (II)	1898	77.4	23.8	5.8	3.3:1	72

TABLE 2. Displays the measurements of several postbellum Tar River steamboats as reported in newspapers and on enrollment records. Tonnage measurements are rounded to the nearest whole number.

The smaller freight version of the Tar River upriver steamboat had an average length of 72.85 ft., breadth of 18.29 ft., and depth of 3.8 ft. These freight steamboats, including the original construction of *Pitt*, *Edgecombe* (I), *Edgecombe* (II), *Alma*, *North East*, *Beta*, *Shiloh*, and *Tarboro* (II), had gross tonnages that ranged from 16 to 73 tons, with a 45.75 ton average. The dimensions of Castle Island Vessel 4 and *Alma* represent the smaller side of this class of upriver steamboats. Washington builders constructed these vessels primarily for freight service on the upper Tar River; therefore, they did not include elaborate passenger accommodations. Builders instead chose to feature open deck space on which crewmembers could pile cargo, including hogsheads of tobacco and bales of cotton. After a few years of service, A. W. Styron remolded *Edgecombe* (I) and *Shiloh* to resemble the larger, more versatile class of upriver steamboats because new owners desired increased passenger capacity (Bureau of Navigation 1875, 1877, 1881a, 1882, 1887a, 1887b, 1888, 1890a, 1895b, 1895c, 1898; Bridgers 1978:211; Rodgers and Richards 2006:34).

Upriver steamboats *R. L. Myers* (I), *R. L Myers* (II), *Greenville*, *Tarboro* (I), and *Beaufort* comprise a larger class of upriver steamboats that measured, on average, 114.96 ft. long, 25.94 ft. wide, 3.26 ft. deep, and 110.8 tons. Although the visible remains of Old Sparta Vessel measure 81 ft. long by 12.6 ft. wide, researchers believe the extant vessel measured 111 ft. long by 26.6 ft. wide, placing it within this larger class of upriver steamboats (Rodgers et al. 2008:55-82). Local builders designed these larger upriver steamboats with passenger accommodations that the smaller freight steamboats often lacked. An enclosed area on the main deck could hold cargo or passengers, while passenger saloons occupied the upper deck, aft of the pilothouse. Several photographs of Tar River steamboats depict an open, unobstructed, versatile area on the forward portion of the main deck that could carry cargo or passengers (Figure 37). In some instances, steamboat owners increased their passenger accommodations by adding a tent and benches to the open bow area, as seen in photographs of *R. L. Myers* (II), *Shiloh,* and *Tarboro* (II) (Bureau of Navigation 1879a, 1879b, 1881b, 1883a, 1884, 1885a, 1885b, 1889, 1892, 1895a, 1904, 1907, 1908; Bridgers 1978:200).

FIGURE 37. Photograph of upriver steamboat *R. L. Myers* (II), note the tented versatile main deck and the passenger saloons on the upper deck (Courtesy of Bridgers Collection, Outer Banks History Center).

The passenger accommodations offered on Tar River steamboats did not compare to those of packets on other waterways because the short distance between upriver landings did not mandate overnight passenger berths. However, captains of the larger class of Tar River steamboats provided passenger amenities including furnished areas on the upper deck that were often divided into saloons for ladies, "colored" passengers, and men. Upriver steamboats carrying passengers typically employed a cook and offered meals at an additional cost. The fare proved to be an important point of consideration for travelers; therefore, owners of the upriver steamboat *Greenville* advertised a "first class table furnished with the best market affords"

(White 2002:23). Tar River steamboats also offered open deck areas for passengers to stroll, provided cargo did not block the passageways (Bureau of Navigation 1889, 1892, 1895a).

Both types of Tar River steamboats typically had model or spoonbill bows that proved well adapted to shallow river environments for several reasons (Figure 38). The combination of a flat-bottomed sternwheel vessel with a spoonbill bow became popular because together these features offered a reduced risk of grounding and made riverbank landings more feasible. Many Tar River builders chose to install stern paddlewheels because, when combined with spoonbill bows, they allowed captains to nose into or alongside a sandy beach when necessary. Additionally, the slow-turning stern paddlewheel and twin rudders kept the vessel in place for loading and unloading passengers and cargo at the undeveloped Tar River landings (Corbin 2000:7; Corbin and Rodgers 2008:64; Rodgers et al. 2008:55).

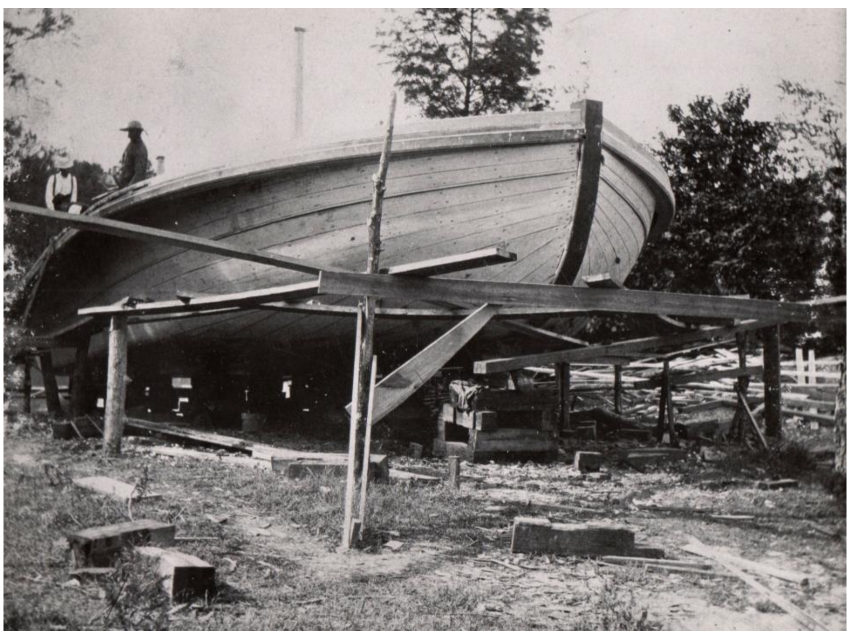

FIGURE 38. Upriver steamboat, believed to be *Tarboro* (II), under construction as seen from the bow (Courtesy of Bridgers Collection, Outer Banks History Center).

Although stern paddlewheels allowed for easy riverbank landings, builders also used side paddlewheels and propellers on Tar River steamboats. Few side paddlewheel steamboats plied the Tar River after the Civil War, perhaps because on side paddlewheel steamboats the engine and boiler occupied the most valuable cargo space in the middle of the hull. Many Tar River builders also favored stern paddlewheels or propellers because of the difficulty captains encountered trying to manage side paddlewheel vessels in swift currents and winding channels, combined with the fact that side paddlewheel steamboats required docks with deep water on both sides. After the Civil War, upriver builders began to realize that propeller driven steamboats had more cargo space then similarly sized paddlewheel vessels, therefore, builders installed propellers on several Tar River steamboats. Propeller driven steamboats also had reduced drafts that made them especially practical on shallow rivers (Smith 2005:30). However, the propensity for propellers to foul in shallow water, resulting in bent blades and snapped shafts, caused some Tar River builders to rely, instead, on easily maintained stern paddlewheels (Kemble 1935:45).

Tar River steamboat builders utilized small and lightweight interior scantlings for the larger class of steamboats that approached 120 feet in length, in order to increase the number of operational days despite low water levels. The high length to beam and length to depth ratios of these upriver steamboats necessitated additional strengthening agents. For example, upriver steamboat *R. L. Myers* (II) had iron rods and chains that formed a hogging truss system to help alleviate the stress inherent in the bow and stern of the wooden steamboat that measured 118 ft. long, 24.8 ft. wide, and 4.1 ft. deep (Figure 39). Crewmembers on upriver steamboats likely adjusted turnbuckles on hogging trusses to help prevent hull hogging and sagging. Although no physical or written evidence remains, based on the high length to beam ratio of the Old Sparta Vessel and other large upriver steamboats, stringers and hogging trusses would have been necessary to maintain proper hull shape (Corbin and Rodgers 2008:78-82; Rodgers et al. 2008:58-60).

FIGURE 39. Photograph of *R. L. Myers* (II) at Tar River Landing ca. 1897. Note the hogging chains indicated by arrows (Courtesy of Bridgers Collection, Outer Banks Historical Center).

Photographs of *Tarboro* (II) show a similar form of hogging chains that builders may have used on smaller upriver steamboats (Figure 40). Although typical hogging chain systems on stern paddlewheel steamboats include one chain on the port side and one on the starboard side of the hull, *Tarboro* (II) displays a singular, centrally located chain in the middle of the ship, running above the main deck. This chain reaches just forward of the pilothouse before angling down through the cabin to the stringers in the stern of the vessel. Although similar to the Sampson post system characteristic of west coast steamboats, *Tarboro* (II) lacks the large structural components of Sampson posts. Perhaps the smaller length of 77.5 ft. and deep 5.8 ft.

draft of *Tarboro* (II) eliminated the need for port and starboard chains like the ones seen on the larger class of upriver steamboats (Hilton et al. 1976:70).

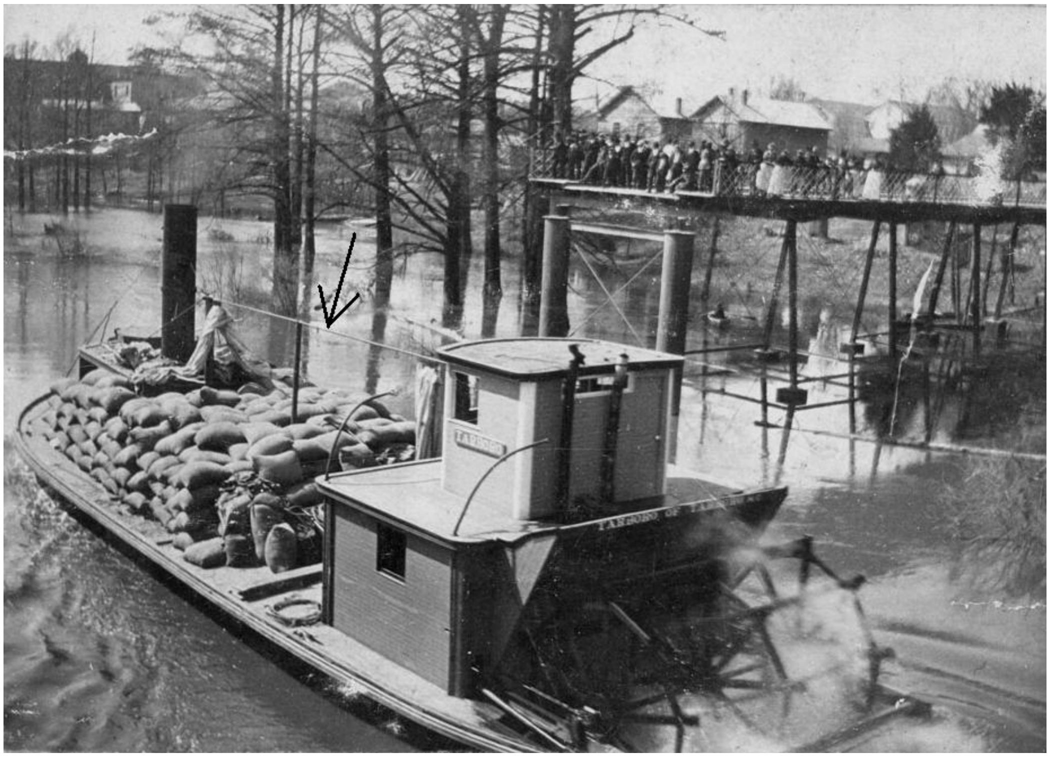

FIGURE 40. Photograph of *Tarboro* (II); note the central hogging truss indicated by an arrow (Courtesy of Lena Martin Photograph Collection, Edgecombe County Memorial Library).

Although photographs and archeological surveys reveal several previously undocumented characteristics of Tar River steamboats, the engines are not visible. Unfortunately, the engines and machinery from the Old Sparta Vessel and Castle Island Vessel 4 are no longer extant, and information regarding the engines used on other Tar River steamboats remains fragmented and inconclusive. Historic records often incorrectly attributed engines to the local engine erector and supplier of the boiler, firebox, engine house, and other compartments, instead of the actual manufacturers who designed and fabricated the cylinder, piston, and valve assemblies for the engine. These problems complicate efforts to determine specifics about Tar River steamboat machinery. However, it seems likely that, because of their preoccupation with producing light draft steamboats, postbellum Tar River steamboat builders utilized lightweight, small volume, high-pressure engines, as opposed to low-pressure condensing engines. High-pressure engines were simple and cheap in comparison to the Boulton-and-Watt low-pressure engines, making them ideal for the upriver transport zone (Halsey 1981:726-740).

Although written historical information concerning vessel machinery is inconclusive, archaeological remains, photographs, and historic records reveal several engineering characteristics of upriver Tar River steamboats. As has been described, Tar River steamboat builders relied on shallow, wooden hulls with flat-bottoms, and flaring sides. Builders were concerned above all else, with reducing draft and depth, therefore, they installed a complex system of lightweight floor frames connected to knees that supported side planks. Stringers running on top of the floor frames provided longitudinal strength, supplemented by hogging truss systems. Upriver hulls typically measured less than 125 ft. long, had model or spoonbill bows, and stage like sterns that supported stern paddlewheels or propellers. In the decades following the Civil War, two classes of upriver steamboats developed on the Tar River; small freight steamboats measuring less than 100 ft. long, and a larger class that offered passenger saloons on an upper deck with a versatile main deck area for freight or passengers (Rodgers and Richards 2006:33-35; Rodgers et al. 2008:56-76).

Comparative Analysis

Tracing the differences between regional steamboat varieties reveals the importance of reinvention, “the degree to which an innovation is changed or modified by a user in the process of adoption and implementation” (Rogers 2003:17). Potential adopters of an innovation, in this case steamboat designers and builders, gathered information concerning the innovation, made a subjective evaluation, and then decided whether to implement the innovation. The differences between steamboat hull styles are examples of borrowing, adaptation, and minor reinventions.

Reinvention allowed shipwrights to adapt steam-powered vessels to fit a variety of natural environments and intended cargoes.

Steamboats in the 19th century opened communication channels to many remote areas as the technology advanced. Steamboats themselves traveled throughout the United States allowing builders to examine vessels whenever they docked nearby. Newspapers also played an important role by informing the public about the innovations seen on visiting steamboats. Ultimately, shipwrights decided to modify specific innovations to fit their individual situation, highlighting the probability that no two steamboats were exactly alike (Corbin and Rodgers 2008:57). Flexibility in the process of adopting steamboats encouraged customization of the innovation to fit more appropriately with local conditions, giving rise to regional styles of steamboats (Rogers 2003:185).

Builders also faced constantly changing innovations in many aspects of steamboat design because of the short life of steamboats and the desire to continue improving successive generations of steamboats (Corbin and Rodgers 2008:61). Technological developments in propulsion methods, machinery, strengthening agents, and hull designs had to be evaluated when building a steamboat. The financial risk inherent in adopting an innovation, such as building a steamboat, cannot be overlooked. For example, after rising in the steamboat trade to the position of captain, A. W. Styron had to take out several mortgages to complete his first steamboat *Edgecombe*, and never struck it rich, despite being involved in the operation of over 20 vessels (Rodman 1880; West 1998:8). The success of steamboats on waters throughout the United States influenced Tar River builders by allowing them to observe a variety of adaptations in hull design and auxiliary equipment in response to environmental and cargo restraints (Rogers 2003:186).

The theory of transport geography, espoused by Westerdahl, promotes the environment as a deciding factor in ship construction, stating that environmental aspects, including the depth, current, and navigational hazards of the intended route, play a large role in determining the vessel style best suited for use. Studies in maritime transport geography have split the landscape into transport zones, separated by transit points where natural obstacles require a change of boat or reloading of cargo. Westerdahl assigns transport zones for the United States, and national transport zones include waterfront zones of the Atlantic Ocean, coastal zones closer to the shore including sounds, lake zones that include the Great Lakes, and inland zones that include rivers. Westerdahl states that the construction of ships is "intimately adapted to the natural geography of the transport zone and intended cargo" (Westerdahl 1998:2). When constructing steamboats, the transport zone and the intended cargo dictated the size and style of the hulls. Operating inside these parameters, innovative builders modified steamboat hulls and introduced new technology to develop vessels for upriver routes.

The theory of transport geography needs to expand to include an upriver zone for river routes that required different vessels for upriver stretches. The need for specially designed upriver Tar River steamboats stemmed from the change in river conditions at Washington. As mentioned, sailing vessels and coastal steamboats could not overcome the natural obstacles of the upper Tar River. The Pamlico River and Tar River routes, however, were economically interdependent, technically the same riparian system that functioned as a greater transportation network, yet required different vessels (Lawrence 2003:84). The Tar-Pamlico River and the Cape Fear-Black River are examples of inland transport systems that also feature upriver zones.

Historian F. Roy Johnson printed two books pertaining to North Carolina steamboats, *Riverboating in Lower Carolina*, which focuses on the Cape Fear and Black rivers, and *Sail and*

Steam Navigation of Eastern Carolina that includes information about steamboats on the Neuse River, Tar River, and Albemarle Sound. In addition to the information provided in these books, Earl White looks at the steamboat industry on a variety of North Carolina and South Carolina waters in *Carolina Riverboats and Rivers: The Old Days*. Based on information from a variety of locations, White characterizes Carolina river steamers as vessels of "small dimensions with spartan passenger accommodations" (White 2002:22). Newspapers and historic documents indicate that upriver steamboats, similar to those of the Tar River, operated on shallow rivers throughout North Carolina, including the Neuse, Meherrin, Chowan, Blackwater, Contentnea and Wiccacon rivers (Figure 41). The similar upriver environments and volume of cargo and passengers resulted in steamboats with shallow hulls and versatile freight or passenger areas that resembled Tar River steamboats (Johnson 1977:12; Johnson 1986:26; Kammerer 2011).

FIGURE 41. Photograph of late 19th century Black River upriver steamboat *Thelma* (White 2002:102).

Upriver steamboats appearing on waterways throughout North Carolina in the postbellum years often utilized more efficient, lower cost engines that allowed captains to act as pilots and carry a small, three to four person crew. Upriver steamboats specifically built to carry cargo to remote locations not accessible by other inland vessels were used on upper rivers throughout North and South Carolina (White 2002:27). The Cape Fear River shared several similarities with the Tar-Pamlico River, including a change from an inland transport zone to an upriver zone. Large Cape Fear River steamboats, similar in design to Pamlico River steamboats, could not negotiate the twisting and narrow passages of the Black and South rivers, therefore, local builders developed smaller, more efficient steamboats that could reach upriver (Johnson 1986:30; White 2002:109). A number of upriver steamers, usually light draft of 2 or 3 feet, and generally just over 100 ft. long by 15 to 20 ft. wide, were built in Fayetteville for the upper Black River trade (White 2002:103). Local historian Roger Kammerer published an article in *Greenville Times* that indicates similar, locally built, light draft, utilitarian steamboats also operated on Contentnea Creek, the upriver zone of the Neuse River, in the last quarter of the 19th century (Kammerer 2011).

Coastal, sound, and lower river steamboats, on the other hand, traveled on routes of greater distances, and in less protected waters. Captains operating on these routes required larger vessels with deeper drafts than those of typical upriver steamboats (Lawrence 2003:82). For example, Matthew Lawrence categorizes antebellum Pamlico River steamers as small east coast steamboats, noting that some had build locations near New York City. He attributes the New York City area's shipbuilding traditions for the appearance of walking beam engines and deeper draft hulls on some early steamboats operating on the Pamlico River. Additionally, coastal and sound steamboats tended to have sharp model bows because they utilized wharves and docks, as opposed to riverbank landings on which spoonbill bows dominated (Figure 42) (Lawrence 2003:164).

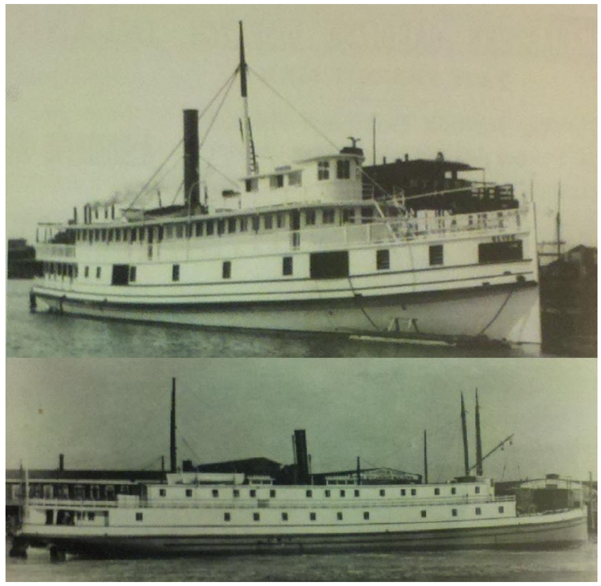

FIGURE 42. Photographs of sound steamboats: *Olive* operated between Washington, North Carolina and Norfolk, from 1896 to 1924 (top), *Manteo* operated between Newbern and Norfolk (bottom) (White 2002:118).

By the late 19th century, coastal steamboats using inland routes took over the coastwise trade that previously depended on small schooners and sloops (Still 1981:41). Washington shipwright, A. W. Styron seized the opportunity for more revenue and built steamboats with deeper drafts and larger carrying capacities for the Washington outbound trade through the sounds and canals of North Carolina. His positive reputation allowed Styron to combine with "some of the best businessmen in Washington," forming the Styron Transportation Company, in the 1890s, to provide steamboat service on the lower Pamlico River and the Pamlico Sound (*Washington Gazette* 1894:2).

Although some coastal steamboats made it upriver during periods of high water, builders had not designed them for use on the upper stretches, including the Tar River. One Tar River newspaper notes the dichotomy, stating upon the arrival of *Alpha* at Tarboro, "Except that the boat was built in Washington, there is nothing remarkable about her; being built for plying on the

Ocean or the Sound she was somewhat of a novelty to our people who have been used to the low-decked river boats" (*Tarboro Southerner* 1888:2). Styron built the coastal steamboat *Alpha*, which displaced 154 net tons and had a 200 person passenger capacity, making it considerably larger than his upriver steamboats. *Tar River* is another example of a Washington built steamboat intended for use on the sounds and canals, as opposed to specifically designed upriver steamboats (Figure 43) (Lawrence 2003:80-84). A deep hold and high freeboard, as seen on *Tar River*, are characteristic of steamboats built to provide comfortable passenger transportation in areas of moderate traffic density with some degree of protection from the seas, including the lower rivers and sounds of North Carolina, the Long Island Sound, and the Chesapeake Bay. Builders constructed steamboats with deep hulls, ample freeboard, and luxurious passenger accommodations to attract passengers and luxury freight for travel on the deep, open waters encountered in these coastal and inland transport zones (Hilton et al. 1976:31-36). Shipwrights relied on completely different designs to overcome the navigational hazards and provide southeastern upriver transportation.

FIGURE 43. Photograph of steamboat *Tar River*, built at Washington for use on the sounds of North Carolina (Courtesy of Bridgers Collection, Outer Banks History Center).

Preliminary research on Tar River steamboats highlighted the similarities between the hull forms of western river mountain steamboats and upriver steamboats. Researchers stated that "internally, this vessel [Castle Island Vessel 4] is similar if not identical to construction demonstrated on 'Western River' or 'mountain' steamers, although of a smaller size" (Rodgers and Richards 2006:33). Similarly, the Old Sparta Vessel report stated that the wreck "is designed in a fashion very reminiscent of western river Mountain Steamers" (Rodgers et al. 2008:82). Time constraints did not allow researchers to compare Tar River steamboats with other regional steamboat varieties, however, the similarities between Missouri River and Tar River steamboat hulls are a result of adaptations for the upriver transport zone and careful analysis indicates several important differences.

As mentioned in previous chapters, shipwrights constructed specialized mountain steamers for operation on the shallow, winding Missouri River. Builders of other western river steamboats concentrated on appealing to potential passengers with ornate woodwork, gilded saloons, ample staterooms, large hulls, and towering superstructures. The smaller volume of cargo and the narrowing of the river usually prevented Missouri River mountain steamboats from reaching the large sizes typical of other western river steamboats. Mountain steamboats, having an average carrying capacity of 300 to 400 tons, ranging from 132 to 216 ft. in length, with 24 to 36 ft. breadths, and drafts less than 4 ft., were larger then southeastern upriver steamboats (Hilton et al. 1976:52; Corbin and Rodgers 2008:5-7). Tar River upriver steamboats operated in smaller markets; therefore, builders designed steamboats that rarely reached a length above 120 ft. and had carrying capacities below 200 tons. Tar River steamboat owners found that larger vessels were too costly to construct and maintain, as well as unnecessarily large for the typical volume of cargo and passengers encountered in the upriver markets (Myers 1884:2).

Although southeastern upriver steamboats and mountain steamboats share similar flat-bottom, lightly built hull designs, flat-bottomed boats with shallow sides are found in inland transport zones throughout the world. The environment of inland upriver transportation zones, sheltered from rough seas and winds but having comparatively shallow waters, necessitates shallow hulls with superstructures confined by the volume of trade in cargo and passengers (Westerdahl 1998:4). Several mountain and Tar River steamboats featured spoonbill bows that proved beneficial in areas with undeveloped landings, and sandbars. Unfortunately, research did not yield information concerning the development and diversification of bow type.

The light, shallow hull form of Tar River steamboats is most similar to mountain steamboats, due to the similar environmental restrictions, intended cargo, and small market sizes along southeastern upper rivers and the upper Missouri River. The appearance of single, stout smokestacks and propellers on the Tar River and other southern rivers, however, diffused from the Great Lakes and the Chesapeake Bay where these technologies initially developed and proved successful (Smith 2005:30). The use of propellers on western rivers, including the Missouri River, presented nearly insurmountable problems including leaks and difficulties repairing blades damaged by snags, therefore, most mountain steamboat builders relied on easily reparable stern paddlewheels (Kane 2004:81). Southeastern upriver steamboat builders, however, may have determined that propellers operated successfully on specific rivers. For example, builders of steamboats operating on the Contentnea Creek determined that "the screw propellers kept the creek channel open, while stern wheelers did not" (Kammerer 2011). The variety of hogging truss systems captured in photographs of Tar River steamboats also indicates opportunistic builders adapting features from a variety of waterways.

A comparative analysis of Tar River steamboats and other American steamboats indicates that a separate class of southeastern upriver steamboats emerged in the decades following the Civil War. Westerdahl's transport geography zones need to be reconfigured to include upriver zones above a transit point on inland river zones in which a changing of vessel occurs. The Pamlico, Cape Fear, Neuse, and Mississippi rivers are examples of inland transport zones that require a change of vessel to provide service to the upriver zones of the Tar, Black, Contentnea, and Missouri rivers, respectively. Similarities between southeastern upriver steamboats and Missouri River mountain steamboats may stem from the environmental considerations of the upriver transport geography zone. It is unclear if southeastern builders examined mountain steamers and adopted similar hull styles, but it is a possibility. One of the differences between these vessel types illustrates the importance of intended cargo in steamboat design, as Missouri River steamboats were larger because they typically carried more cargo and passengers then southeastern upriver steamboats did (Johnson 1986:30; White 2002:109; Kammerer 2011).

Conclusion

The upriver transport zone of the Tar River has a commercial history that mirrored other southeastern waterways including the Black River and Contentnea Creek, making it a good case study of navigation on an upriver transport zone in the southeastern United States. The Tar River historically offered the easiest means of local transportation before the arrival of railroads. People living in the counties surrounding the waterway relied on the resources provided by the river, finding employment farming along the flood plain, and utilizing the riverbank forests for naval stores, while operating vessels on the river to transport commodities. The population of cities situated along the main transportation artery of the Tar River increased as the river grew in importance, and the success of the naval store industry fueled the growing shipbuilding industry located at Washington (Myers 1884:2; White 2002:103).

The dichotomy between the inland transport zone and upriver zone had many implications for citizens living near several southeastern rivers, including the Tar. Sailing vessels loaded with trade goods from the East Indies and the northern states offloaded cargo at Washington because the Tar River proved too narrow, shallow, and turbulent for profitable operation of these vessels. This also occurred on the Cape Fear River as it transitioned to the shallow, narrow Black River. There was an accepted and intrinsic separation between upriver and downriver that extended to ship construction. Before the arrival of steam-power, upriver Tar River merchants and farmers utilized flats and pole boats to carry agricultural surpluses downriver to Washington. At Washington, upriver exports were loaded onto ocean going sailboats intended for northern ports or the West Indies. Before steamboats arrived, conducting trade upriver, from Washington to Greenville or Tarboro and from the Cape Fear to the Black River, required extensive manpower at a high cost (Myers 1884:2; White 2002:151).

Local businessmen, Tannehill and Lavender, owned the first steamboat designed specifically for Tar River service, the *E. D. McNair*. After steam-power reached Tarboro via the *E. D. McNair* in 1836, close to fifty steamboats provided service on the Tar River before the industry succumbed to gasoline powered boats, railroads, and overland trucking in the early 20th century. In the steamboat era, individual owners attempted to provide service along the antebellum Tar River; however, ultimately, the firm of John Myers and Son was the only successful company. Antebellum steamboat owners faced navigational difficulties including snags, sand bars, and periods of low water that prevented them from reliably reaching locations upriver, including Tarboro. The northern built steamboat hulls operating on the antebellum Tar

River simply proved too deep to provide continued service (Myers 1884:2; Rodgers et al. 2008:20-40).

Although the Civil War interrupted commercial shipping completely, the conflict had the positive effect of bringing a variety of steamboat technologies to North Carolina (Myers 1884:1-3). A shipbuilding boom followed the Civil War, as northern interests contracted for cheap southern built vessels. Shipbuilding firms in the Washington area, including John Myers Sons and A. W. Styron received contracts from northern companies for the construction of steamboats specifically designed for upriver service. Locally expanding the service of the Clyde Line and the Old Dominion Steamboat Line to include Greenville and Tarboro also increased the market for upriver imports and exports. To fill the economic niche, Tar River shipwrights developed a complex upriver steamboat capable of traveling to Tarboro despite low water levels (Myers 1884:2).

American steamboat builders developed hulls and propulsion methods that diversified along geographic transport zones, therefore vessels differentiated based on upriver, inland river, and coastal or sound routes. Comparisons between steamboats from coastal zones, including the sounds of North Carolina, and upriver steamboats, including the Old Sparta Vessel and Castle Island Vessel 4, reveal several variations in design. Steamboats built for the open water conditions typical of coastal zones looked completely different from inland steamboats on the southeastern upriver zones and western rivers (Westerdahl 1994:266).

In addition to environmental considerations along an intended route, the available resources and the intended cargo confined steamboat designs. Western river shipwrights relied on technological innovations, including flat-bottomed hulls, hogging chains, and high-pressure engines to construct shallow steamboats of exceptionally large sizes. Owners invested substantial amounts of money on passenger furnishings and berths in order to attract the abundant quantity of passengers requiring transportation along the western rivers. These steamboats became known as palace steamers due to their ornate gingerbread woodwork, lavish passenger accommodations, and incredible height. Mountain steamboats, on the other hand, evolved differently and rarely reached the large sizes and opulence typical of other western river steamboats. Missouri River shipwrights developed shallow, flat-bottomed, utilitarian steamboats that were easy to repair on the frontier (Corbin and Rodgers 2008:64; Rodgers et al. 2008:55). Although the interior of the hulls are virtually the same, southeastern upriver steamboat builders did not rely solely on replicating the technical adaptations of western river mountain steamboats. Confined by the particular environmental and cargo considerations of the upriver transport zone, southeastern upriver builders also adapted other inland marine technology to construct incredibly shallow, relatively small steamboats capable of carrying agricultural cargo and a small number of passengers.

As mentioned, southeastern upriver steamboat builders employed several deviations from typical mountain steamboat design. Though internally similar in form and function, archaeological examples of southeastern upriver steamboats reveal that builders used lightweight knees to connect the flaring side strakes to the floor frames, as opposed to the cocked hat system employed on mountain steamboats (Corbin and Rodgers 2008:64; Rodgers et al. 2008:67). Additionally, many builders installed propellers on southeastern upriver steamboats, while mountain steamboat builders found many problems with this propulsion method and relied on sternwheelers (Kane 2004:81). Upriver steamboat builders also saved weight by mounting a single vertical tube boiler whereas the mountain steamboat builders used boiler banks whose “gathers” went up one of two smokestacks (Bradley A. Rodgers 2012, pers. comm.) (Figure 44).

The variety of hogging truss systems employed on upriver steamboats further supports the theory that builders relied on an amalgamation of inland marine technology when constructing steamboats for the southeastern upriver zone.

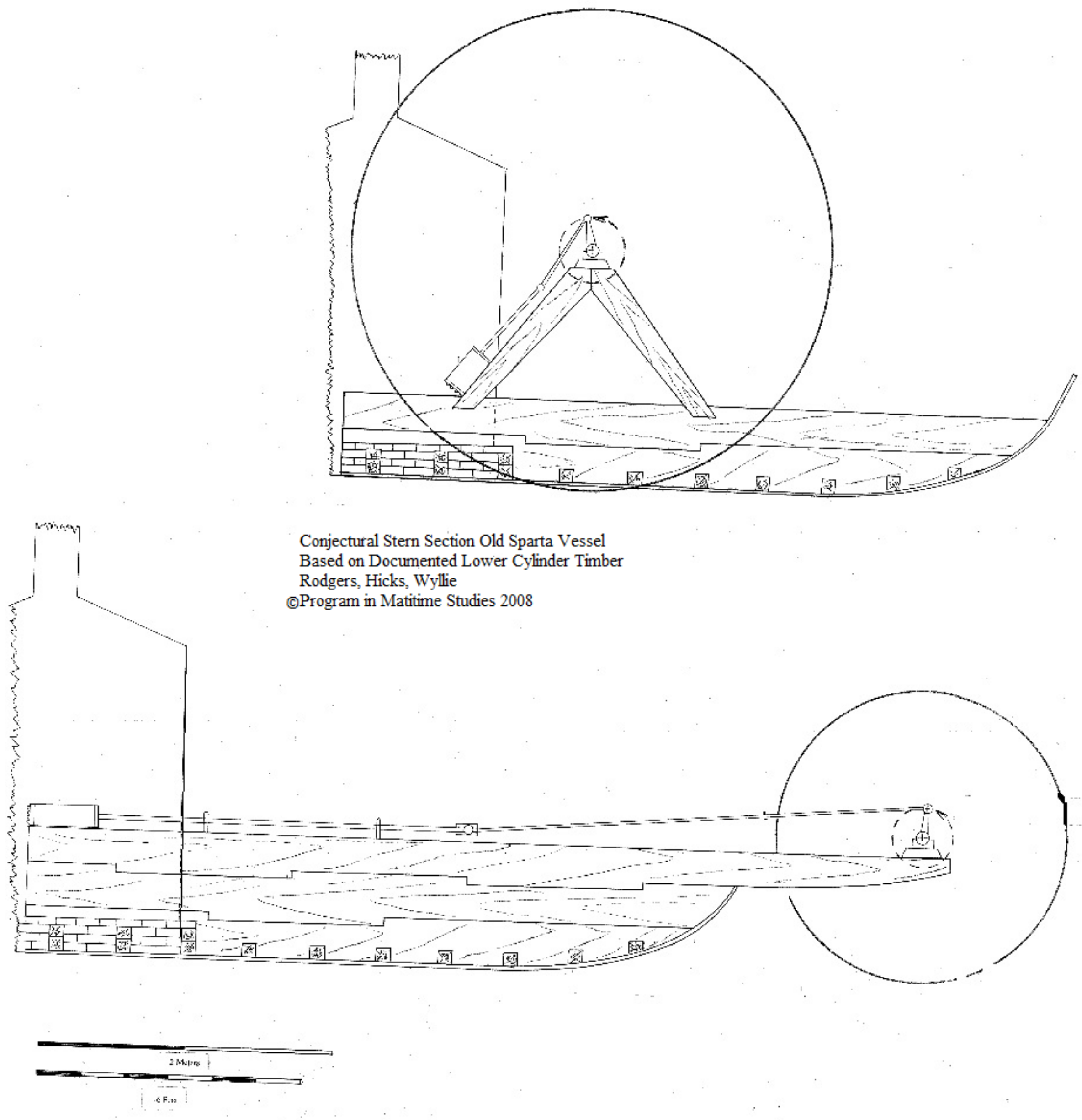

FIGURE 44.Conjectural stern section Old Sparta Vessel, based on documented lower cylinder timber. Note the single vertical tube boiler (Rodgers et al. 2008:87).

This thesis began with a question concerning the similarities between mountain steamboats and archaeological examples of Tar River steamboats. After establishing characteristics of all Tar River steamboats, research expanded to adequately compare and analyze regional steamboat varieties and steamboats from similar geographical transport zones. Very little research has focused on southeastern steamboats in general, therefore research expanded to include environmental constraints along an intended route, and the volume and type of intended cargo. In this light, a new class of steamboats designed for the upriver transport zone began to appear at previously unreachable upriver landings in the decades following the Civil War. This thesis establishes a previously unrecorded class of utilitarian upriver steamboats that, while less glamorous then palace steamboats, provided essential freight and passenger service to previously isolated communities on rivers throughout the southeastern United States.

Future Studies

This thesis brings to light several new avenues for future research pertaining to southeastern navigation. The establishment of a new class of steamboats that operated on the southeastern upriver transport zone allows future researchers to compare and contrast construction techniques of other southeastern steamboats. This study should be consulted when evaluating wrecks appearing on archaeological surveys of waterways throughout the state of North Carolina. Washington shipwrights produced upriver steamboats with advanced, shallow hull designs, and shipwrights on other nearby rivers did as well. Future research into southeastern steamboats should seek to uncover the variety of steamboat designs operating on waterways to determine the validity of the upriver class.

Additional avenues of study include an assessment of the internal improvements and river surveys in order to rebuild the maritime cultural landscape along North Carolina rivers. An understanding of the maritime cultural landscape would provide a context of the specific navigational restraints imposed on upriver steamboat builders. Substantial information about southeastern waterways would aid comparison with other upriver zones.

Many anthropological aspects of steamboats, including crew life, captains, disasters, and passenger experiences, did not appear in this thesis because it focused instead on technological reinvention and establishing a classification of upriver steamboats. Photographs and historic records indicate that slaves and former slaves played an important role in Tar River steamboat crews and should be the focus of future studies (Figure 45). Studies of probate records, family records, and steamboat ledgers may provide information about the identities and responsibilities of the upriver crews. Research into the captains, owners, and builders of the easily overlooked utilitarian upriver steamboats would provide further insight into the upriver steamboat industry.

FIGURE 45. Upriver steamboat crew, believed to be from *R. L. Myers* (II) (Courtesy of Bridgers Collection, Outer Banks History Center).

Historic sources mention several steamboats finding their final resting place on the Tar River due to sinking or abandonment. Future archaeological studies of southeastern rivers could focus on locating the remains of similar upriver steamboats and assess site formation processes. The information provided in this thesis outlines the construction techniques utilized by upriver steamboat builders and will help future researchers examining southeastern vessels. The Underwater Archaeology Branch of North Carolina has located the remains of a wooden vessel (0025TRR) near the Old Sparta Vessel in the Tar River (Figure 46), but little information is currently available concerning the vessel because no formal survey has taken place. Archaeological research conducted on this wreck may indicate it is an upriver steamboat and yield new information about construction techniques.

FIGURE 46. Photograph of wreck 0025TRR located in the Tar River (Henry 2010).

This thesis closes with an analysis concerning the name and identity of the enigmatic Old Sparta Vessel. As previously mentioned, the vessel remains present several issues that hinder efforts to link it with a known historical upriver steamboat, specifically the lack of a build or use date, the absence of iron fastenings, and the predominance of treenails. Furthermore, the extant remains of the wreck measure 81 ft. long by 12.6 ft. wide, though the addition of absent features, such as the side paddlewheel boxes and the bow, could stretch the dimensions to around 110 to

115 ft. long and around 26.6 feet wide. Additionally, the wreckage does not indicate whether the vessel employed side, three-quarter, or stern paddlewheels, generating greater ambiguity still. Because of these uncertainties, any paddlewheel steamboat believed to have wrecked or been abandoned in the Tar River, measuring between 80 and 115 ft. long, between 12.6 and 26.6 ft. wide, and around 2 to 4 ft. deep should be considered as a possible candidate for the remains of the Old Sparta Vessel (Rodgers et al. 2008:80-81).

Historical sources report that two vessels wrecked near Old Sparta during the 19th century, *Tarboro* (I) and *Cotton Plant*. Measuring 108 ft. long, 19 ft. wide, and 4 ft. deep, the dimensions of the sternwheeler *Cotton Plant* correspond nicely with the believed dimensions of the Old Sparta Vessel. However, information gathered from contemporary newspaper articles indicates *Cotton Plant* possessed iron platting, a feature not observed during field work conducted on the Old Sparta Vessel, though the possibility remains it could have been salvaged around the time of wrecking (Rodgers et al. 2008:80). After a long career on the Tar River and service during the Civil War, *Cotton Plant* caught fire in 1880 at a Tarboro dock before Captain W. B. Myers towed the charred remains downriver to rest above Old Sparta (*Tarboro Southerner* 1880:3, 1880:2; Lawrence 2003:83). Although the remains of the Old Sparta Vessel do show burning on the tops of floor frames, they do not exhibit iron sheathing, a full-scale excavation could potentially reveal more regarding these features, suggesting it is *Cotton Plant*.

The other vessel potentially matching the dimensions of the Old Sparta Vessel and reported to have found its final resting place in the Tar River near Old Sparta is *Tarboro* (I), measuring 115 ft. long, 27.3 ft. wide, and 4 ft. deep. *Tarboro* (I) carried freight and passengers on the Tar River until becoming snagged on a stump and sinking above Old Sparta in 1886. Salvage efforts to raise and repair the sunken vessel resulted in *Tarboro* (I) floating free and smashing into bridge pilings at Old Sparta before sinking again. Several years after the unsuccessful salvage attempts, owners surrendered the enrollment records *Tarboro* (I) at New Bern, stating, “vessel abandoned” (Bureau of Navigation 1881b, 1884, 1889).

In addition to steamboats that newspapers reported wrecked in the Tar River, research expanded to include steamboats that owners may have abandoned elsewhere in the river. As demonstrated by the enrollment records of *Tarboro* (I), the location of enrollment surrender does not always correspond to the location of vessel loss or abandonment. In this light, *R. L. Myers* (I) and *Pitt* appear similar to the Old Sparta Vessel and may have been abandoned in the Tar River, although owners surrendered their enrollment records in New Bern. In addition to these possibilities, fragmented historical information regarding *Vesta*, *Isis, Wilson*, *Edgecombe* (II), and *May Bell* identify these vessels as other potential matches for the Old Sparta Vessel (Rodgers et al. 2008:40-51). Although the dimensions and final resting place of *Tarboro* (I), and *Cotton Plant* correspond to the believed dimensions and location of the Old Sparta Vessel, there is simply insufficient evidence to declare with certainty an identity. Future research could uncover additional information about other steamboats wrecked or abandoned in the Tar River, or it may reveal the Old Sparta Vessel to be a steamboat that slipped through the gaps in the written historical record entirely.

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