SENEGAMBIAN WATERCRAFT

by

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December, 2021

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ABSTRACT

The goal of this thesis was to explore the form, construction, and use, of Senegambian watercraft, with a particular focus on neglected Gambian watercraft in the context of the Gambian maritime cultural landscape. This was done through the synthesis of large amount of data primarily consisting of textual evidence including historical accounts and modern studies, and pictographic evidence such as illustrations and photographs. The period covered in this thesis spanned from the mid fifteenth century to the mid twentieth century. Prior to this thesis there was no comprehensive study of Senegambian watercraft through history. Historical African watercraft are an understudied topic in need of more attention. This thesis covered three main themes, the maritime cultural landscape of Senegal, and in particular the Gambia, a synthesis of the historical data and technical details of Senegambian watercraft. The Senegambian watercraft were shown to be simultaneously diverse and convergent in several areas. This appeared to have been the result of the interconnectedness of the region and geographic constraints. Watercraft also showed careful adaptation to the areas they were used in and for their intended uses.

Senegambian watercraft despite being influenced by Europeans also displayed a highly indigenous character and showed many unique innovations and design features.

SENEGAMBIAN WATERCRAFT

A Thesis

Presented to the Faculty of the Department of History

East Carolina University

In Partial Fulfillment of the Requirements of the Degree

Master of the Arts in Maritime Studies

by

By Trenton Michael Zylstra

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DEDICATION

To all the people who encouraged me along the way

ACKNOWLEDGEMENTS

I would like to thank my advisor Dr. Lynn Harris for allowing me to pursue this research despite the challenges. I would also like to thank Jerreh Miles Jr. who provided me with invaluable information, and the Field Museum who allowed me to access their collections. Finally, I give thanks to my friends for providing me with support in the form of help in the form of sources, translations, and discussions. You all believed in me and encouraged me to make my dreams a reality. Thank you.

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CHAPTER 1: INTRODUCTION

1.1 *Introduction*

The objective of this research was to analyze the form, construction, and use, of Senegambian watercraft, with a particular focus on neglected Gambian watercraft in the context of the Gambian maritime cultural landscape. This research had a particular focus on the synthesis of existing sources both textual and pictographic. The primary question that this research sought to answer was what the Senegambian tradition of boats was, how it changed over time, and why. Much of this research focused on aspects of technical construction and landscape with other factors being of secondary concern due to the limitations of time and length. Questions of how economic and political history influenced Senegambian watercraft should be addressed in further research that this study laid the groundwork for by gathering and synthesizing much of the technical data and contextual information. There was too much data and too many limitations to cover all Senegambian watercraft in equal detail. For example, Senegal River boats are only covered in brief as are boats past the mid-twentieth century. The Gambia was the initial focus of this research but some of the focus on it had to be scaled back due to the limitations of data able to be collected.

1.2 *Methods*

The data for this research came from a combination of around one hundred primary source texts and many additional secondary source texts, plus extensive collections of illustrations, photographs, academic figures, and physical artifacts. This synthesis of data and its interpretation was what formed the bedrock of the facts and arguments presented in this research.

1.2.1 Sources on methods

The approach this research took to vocabulary was an attempt to dispense with harmful, vague, and inappropriate terms. English technical terms were used wherever able to decrease confusion for the reader that the use of terms in multiple different languages brings. Reference lists for vocabulary term definitions and Senegambian terms were included for clarity. Discussion of common terms and the issues with them that informed this research could be found in a number of publications (Farrar 1992; Wright 1999; Lowe 2001; Tymowski 2003). Specific terms used in this research in place of others included the use of the term king and kingdom in place of chief and chiefdom, the use of people and ethnic group in place of tribe, the use of enslaved people instead of slave, the use of soldier in place of warrior, and the use of boat in place of canoe or pirogue.

Due to the historical classification of the peoples of Senegambia into distinct groups being highly problematic as the vagueness of borders classification analysis by ethnic group was not included in this research (Wright 1999). This was also done due to littoral societies often being more similar to each other than to those said to be of the same ethnic group but living inland (Pearson 2006). Oral history sources were not used in this research due to well-known issues using them for historical research in the area and lack of access to them (Wright 1991).

The physical recording aspect of this research was informed by *Boats A Manual for Their Documentation* (Lipke et al. 1993). Other recording practices were informed by practical lessons and classes taken at East Carolina University on boat construction and recording.

1.2.2 Cross-referencing

The primary way data was analyzed in this research was through cross-referencing between textual and pictorial data from many different sources. Data was then compared over time and place and put in context. A primary objective of the analysis was to find the factors behind form, use, and change. A secondary objective was to gather as much technical data as possible and organize it so that it may be subjected to later analysis. This research should serve as a resource giving a comprehensive overview of known data, useful sources, to provide as a reference to understand Senegambian watercraft through history. Due to the historical focus of most studies being on Senegal, this research also sought to focus on the Gambia where possible for deeper analysis.

1.2.3 Theoretical framework

The main theoretical framework through which Gambian watercraft were examined was maritime cultural landscape (MCL) theory. MCL theory was an approach to understanding the physical and cognitive landscapes in which maritime cultures operate (Westerdahl 1992). This made MCL theory an ideal tool for contextualizing data in association with more abstract and cognitive concepts. Importantly MCL theory allowed for the creation of comprehensive overviews of human and natural landscape interaction. For watercraft in the Gambia to be studied, it was important that they be examined within the broader MCL context in which they existed. MCL theory was an accurate way of understanding the evolution and context of the Senegambian boat tradition due to its incorporation of broad contexts and so made an ideal theoretical for this proposed thesis research.

Christer L. Westerdahl first proposed maritime cultural landscape theory in his 1992 paper The Maritime Cultural Landscape, whereupon it became a valuable tool for holistically understanding large maritime regions. MCL theory focused on the juxtaposition and dichotomy of land and sea and was defined by Westerdahl as “human utilization (economy) of maritime space by boat: settlement, fishing, hunting, shipping, and, in historical times, its attendant subcultures, such as pilotage, and lighthouse and seamark maintenance” (Westerdahl 1992:5). Although MCL theory incorporated some cultural and cognitive aspects from its beginning, over time, it had been developed to have a more cultural focus, with the prior stress on networks of sea routes and harbors becoming more balanced with cultural and cognitive aspects (Westerdahl 2011).

Westerdahl proposed seven different categories of landscape in his update to MCL theory, later published in The Oxford Handbook of Maritime Archaeology, once again titled The Maritime Cultural Landscape (Westerdahl 2011). These categories form the basic building blocks of maritime cultural landscape studies:

1. Economic Landscape: The economic landscape concerned subsistence, which included both terrestrial and marine resources.
2. Transportation Landscape: The landscape of transport and communications, which included routes, seamarks, pilotage, harbors, roads, and portages. The transportation landscape also included navigational aspects such as transit lines and place names
3. Power Landscape: The power landscape included the structures of power both social and physical.

4. Outer Resource Landscape: The outer resource landscape concerned the supplies necessary to build and maintain watercraft.
5. Inner Resource landscape: The inner resource landscape concerned the surplus necessary to support waterborne trade.
6. Cognitive Landscape: The cognitive landscape delt with mental maps as well as the ritual landscapes and was heavily associated with place names.
7. Recreation landscape: The recreation landscape dealt with recreation and leisure activities.

Although Westerdahl noted that the urban landscape could be added to the list, it was not with the reasoning that urban landscapes were too particularist to integrate into MCL theory (Westerdahl 2011). All the listed human landscapes were also connected inseparably to the natural landscape, which was also dynamic and cyclical, interacting with other landscapes and events to create maritime cultural landscapes (Westerdahl 2011). All seven aspects of MCL were incorporated into this thesis.

1.2.4 <u>Translation</u>

For this research to be conducted it was often necessary to utilize textual sources in multiple languages. While I have had language training and some experience in translation for German during undergraduate years, which helped with understanding principles and translation pitfalls, it was not useful for directly reading primary sources as almost none were in German. While many sources had available English translations, and a few had critical editions, it was necessary to rely on machine translation for many primary sources as well as for most studies.

Fortunately, many primary sources on Senegambia watercraft had previously been analyzed, translated, or paraphrased in secondary sources providing an easy way to cross-reference sources for accuracy. For the remaining primary sources, the sections concerning watercraft-related topics had to be first transcribed then translated and extensively checked for accuracy. Sometimes this necessitated research into obscure and outdated terms which were not always possible to find. For particularly challenging sections consultation with speakers of various languages was required and many people generously assisted in translation. Fortunately, the relevant content of many sources were straightforward listings of facts and figures that did not present many issues to decode. Facts could then be cross-checked with translated sources, images, and final synthesis caught many remaining mistakes. Primary sources also had to be carefully read for their biases and original contexts as occasionally the descriptions were plagiarized from older sources. The extensive gathering of illustrations, photographs, academic figures, and physical artifacts also allowed for a robust system of checking information. These also had to be considered for their own contexts and biases as well as even photographs could suffer from inaccuracy due to factors such as sampling bias.

The main disadvantages of this system were the large amounts of time and effort that went into it and the inevitable loss of some nuance in translation. Loss of nuance was a known disadvantage of this system but unavoidable without deep knowledge of historical languages (Jones 1994). Many translations available, particularly older ones, were known to have changed what was said in ways that lost nuance, occasionally dropping important words completely. Not all original sources were able to be cross checked so some sources may have lost information due to mistranslation. Avoiding a methodology predicated entirely on translated text alone was critical for the success of this research. Studies were more difficult than primary sources to extract information from as many were much longer and denser than primary sources. However, extensive reference figures often allowed them to be checked against themselves unlike many primary source texts. Studies also often cited each other and would sometimes critique each other or note differences, occasionally they would conduct analysis. Studies generally used more straightforward descriptions, numbers, and lists than primary sources. The bulk of supplementary images and artifacts were also from this same period allowed for the most comprehensive cross-referencing. The process of synthesis, the creation of figures, and the use of measurements contributed a great deal to helping check information from studies as did the detailed breakdown of every aspect of the boats.

1.2.5 Primary sources

The primary source texts used for this research included around one hundred accounts spanning from the fifteenth to the twentieth centuries. Some of these sources also included accompanying illustrations. Most were accessible on archive.org and other online archives such as Gallica, Hathi Trust, and Google Books. Primary source review utilized several reference bibliographies which had lists of existing primary sources. The review incorporated almost all sources cited by previous studies. Primary source collection and review were most comprehensive for the Gambia to compensate for existing bias in research areas. The sheer number of pages that needed to be sorted through likely resulted in some missed information as tens of thousands of pages had to be skimmed by hand for potential data. Often scans of books were low quality as well, many needed to be skimmed by also running them through translation software. Despite the challenges, many previously unstudied and useful sections of books were found.

Two main sources list the most relevant primary source texts for Senegambia relevant for this research. David P. Gamble's book (1979) *A General Bibliography of The Gambia* which included a large section of travelers' accounts. Gamble's Gambian Studies supplementary bibliography series provided additional resources to add to the general bibliography (Gamble 1987a; Gamble 1990; Gamble 1994; Gamble 1998; Gamble 2002; Gamble 2003). For Senegambia in general the report by Jean-Pierre Chauveau (1984) "Bibliographie historique du littoral sénégambien et de la pêche maritime (milieu du 15e, début du 20e siècle)" gives a large collection of accounts with data useful for maritime research specifically.

1.2.6 Collections

Many digital museum collections, university archives, and collections were consulted for this research. These collections included illustrations, photographs, artifacts, and sometimes whole boats. There was no reliable way to find which museums had Senegambian maritime material available digitally, so the search was not comprehensive but did include dozens of collections, most of which had no material available. Some image collections were available online including an extensive organized archive of picture postcards from the photographer Edmond Fortier at https://edmondfortier.org.br. Many other images were collected from postings on online stores that were selling old postcards and provided photographs of them.

The nature of digitized content made it possible to access huge amounts of data but also made it very hard to sort through and assign provenience. It also only represented a fraction of the physical material that existed. The objects needed to be preserved, digitized, uploaded, then found through searching. The quality of scanned and photographed images varied tremendously as well. Much of the searching was accomplish by keyword searches on search engines, primarily Google and various websites, as well as individual collections, and archive searches. Google keyword searching was often very luck-based, but many useful images, and whole archives to search, were found using it. Collections and archive searching was also very difficult as useful data could be at any random museum or university in the world but was often much more useful as it gave better provenanced data and large collections of data.

The digitized "Cartes postales collectées par Georges Meurillon" was available at http://richardis.univ-paris1.fr/cartes_postales/. It contained a collection of useful postcards but with no dates. The British National Archive contained some digitized images; however some were inaccessible but able to be obtained through the 'Gambia Historical Photography' Facebook Group which posted copies. It was known the archive had many documents on the Gambia including ones quoted in secondary sources, but digitized copies were not accessible. The 'Gambia Historical Photography' Facebook Group was very useful as the source of several useful collections not posted in other areas, although they did not always specify the archive source.

Particularly useful collections were the New Bedford Whaling Museums "A New Bedford Whaler in Africa Frederick Sowle's photographs of Senegal and Cape Verde, 1899 Collection", the Quai Branly Museums collection, the Museum of Archaeology and Anthropology in the UK, the University of Wisconsin-Madison's collections, and the Smithsonian collection. Other useful collections were the Universitas Bergensis collection, the Carlotta Museum collection, the Netherlands National Museum of Ethnology collection, the Ethnologische Museum, Staatliche Mussen zu Berlin collection, the Pitt Rivers Museum collection, the Tropenmuseum collection, the online RAF No. 95 Squadron - West Africa Coastal Command collection, and the Royal Geographical Society collection.

A number of museums without digitized collections were known to have collections that included Gambian artifacts such as the National Museum of the Gambia and the Musée de la mer on Goree in Senegal. Known collections that contained boats included the Field Museum, the Canadian Canoe Museum, the Quai Branly Museum, the National Maritime Museum, Poland, the Overseas Museum, Germany, and the Smithsonian.

1.2.7 New data collection

New data from the Gambia was gathered with the help of a resident of the Gambia, Jerreh Miles Jr., including interviews, observations, and photos there. This data was highly useful and much of it was not found in any primary or secondary sources. Other data was gathered from measurements taken from a Senegambian boat kept at the Field Museum in Chicago. Much of the collected digitized content in this study had also never been studied in any capacity and so could be considered as new data, particularly the many illustrations and picture postcards.

1.2.8 Studies

A comprehensive review of studies was done and every accessible study on Senegambian boats was found and read. If any were not found by this review it would be very difficult to determine their existence and locate copies.

Throughout the 20th century and into the 21st Senegambian watercraft have been recognized as an important area of study in Senegal often as part of wider efforts to study subjects such as fishing. This led to the production of several studies that have gathered technical and cultural information on Senegambian watercraft and their use. Unfortunately, this academic interest did not seem to have been present in The Gambia. The primary concern of almost all these texts was the recording of gathered information as part of wider studies, often concerning fishing. For this reason, much of the available literature on Senegambian watercraft was concerned the with the presentation of data and not in-depth analysis. As such, each of the studies contained pieces of a larger picture and must necessarily be brought together to understand and contextualize Senegambian Watercraft and form the basis on which a comprehensive understanding could be built. An understanding of Senegambian watercraft as a whole was the first step in filling empty spaces in the understanding brought about by the neglect of research in The Gambia. A chronological review of these sources provided the best contextualization as many build off previous publications. Not all studies were included in the following review due to some being mostly irrelevant to the research topic.

Abel Gruvel's (1908) book *Les pêcheries des côtes du Sénégal et des rivières du sud* was the first publication containing a comprehensive overview of Senegambian fishing, fishers, fishing equipment, and watercraft. Relevant information for this research was contained in chapter six, pages 71-132, titled Indigenous Fishing. The somewhat rambling text contained information on a wide range of fishing-related topics from material culture to cultural traditions, as well as photographic images of watercraft, somewhat badly sourced, and detailed drawings of fishing equipment. However, the sources' information on The Gambia was limited, covering only three pages with brief descriptions of watercraft and a short discussion of fishing.

As the first publication of this type, this work formed the basis on which later research was built and was frequently cited. It also established an early twentieth-century baseline reference that later works compared their present against. In aggregate this allowed for an academic discussion of change in Senegambian watercraft spanning the twentieth century. The main drawback of this work for this research was the limited discussion of The Gambia. This was partially compensated for by the additional information on neighboring areas as methods and watercraft designs were to an extent shared across Senegambia. This neglect was continued in later works and likely arose due to the status of The Gambia as a British colony and Senegal as a French colony.

The book by N. Leca and Henri Labouret's (1935) *Les pêcheurs de Guet N'Dar, avec une note ur les Wolof, leur parler, les langages secrets* was the next publication to give a detailed look at Senegambian fishing, fishers, fishing equipment, and watercraft. Unlike Gruvel they focused exclusively on the Senegal River and adjacent coast. Relevant information for this research was contained in part 3, chapters 1-4, pages 51-107. The text contained many detailed technical illustrations of watercraft, however, the context of several was difficult to understand as they lacked labels, or the labels were small and handwritten. The limited scope also detracted from the usefulness of the text.

As the second publication of this type, this work was frequently cited in later studies. The illustrations and discussions were in-depth, and it was notable for the description of sewn construction techniques that had disappeared by the time of later studies and its information on Senegal River frame-based boats.

The article by G. Balandier and B. Holas (1946) "Quelques galat de pêche observés à M'bao" and the follow up article by B. Holas (1948) "Moyens de protection magique chez les Lebou" both covered the "galat" used to provide supernatural protection and luck on watercraft and fishing nets by the Lebu. Although this study was limited to the Lebu the practice of using "galat" often termed "gris-gris" was common across West Africa.

Mais Théodore Monod's (1947) article "Sur un détail de gréement de la pirogue Wolof-Lébu (Sénégal)" was a short article exclusively devoted to a description of the spritsails used in

Senegambia. It contained very detailed technical illustrations and descriptions that allowed for a full understanding of the sail rig. Other sources also provided supplementary descriptions and diagrams of rigging. Although focused on the Wolof and Lebu mostly identical rigs were used around Senegambia.

Similarly E. Postel's short (1950a) article "La pêche au Sénégal" contained a brief overview of Senegambian watercraft with particular attention to rigging. One of the main contributions of this source was the equation the author created to calculate the sail area and size ratio of the mast used by Senegambian watercraft employing spritsails.

G. Balandier and P. Mercier's (1952) book *Les pêcheurs Lebou du Sénégal particularisme et évolution* built on the previous work of Leca and Labouret, and Gruvel. It recorded Senegambian fishing, fishers, fishing equipment, and watercraft, in this case specifically the Lebu. The main section of concern for this research was part 5, Techniques and Economic life, Chapter 2, Acquisition techniques and economic life, pages 160-199. Previous research on Lebu galat by Balandier was incorporated into Part 2, The Lebu, Chapter 5, Religious and magical activity the syncretism of the religious system, pages 108-133. Part 5, Chapter 2 contained multiple supplementary technical illustrations, but most were of fishing equipment. Monod is mentioned in the forward but his work on rigging was not cited despite a discussion of rigging being included. Supplementary photographs were included in Part 7, Documents and photographs, pages 217 onward.

As the third large publication of this type, this research built on the previous two books adding additional original research, making comments on Leca and Labouret, and Gruvel, and discussing what had changed. The major advantage of this work in combination with Leca was that it covered the Lebu specifically whereas Leca and Labouret focused on the Senegal river area. In contrast, larger Gruvel's observations provided the historical context. The main drawbacks of this work were the limited number of technical illustrations and short time spent discussing Senegambian watercraft in comparison to previous major works.

Thomas C. Gillmer and Øyvind Gulbrandsen's short (1967) article *The Location and Shape of Engine Wells in Dug-out Canoes* was notable for the inclusion of lines drawings for a Senegambian watercraft from the Cape Verde Peninsula. This was the only proper lines drawings of Senegambian watercraft available in general so their existence should be noted for comparison to any collected in the future. However, the drawing appeared difficult to use as they removed the projecting cutwaters. The article also discussed the resistance of the hull at different speeds and with an engine well but was mostly concerned with the adaptation of engine wells into Ghanaian watercraft. It was overall not very useful. This research was ultimately not directly helpful.

Babacar Diop's (1963) doctoral dissertation "La peche maritime au Senegal" contained a basic overview of Senegambian watercraft and nets that appeared to be all original research. The relevant section was Part 2, pages 35-50. Gruvel was cited in Part 3, but citations were absent from Part 2. The usefulness of this research was limited but it did include one technical diagram of a watercraft and a variety of measurements. Most of the relevant text was taken up by discussions of fishing and fishing gear.

Virginia Coulon's (1973) article "Niominka Pirogue Ornaments" was a short article focused specifically on the decorative carvings found on Niominka watercraft, Niominka were a subgroup of the Serer. It contained detailed descriptions and images of these ornaments along with descriptions of their use. These same ornaments were present in some primary sources and early photographs of watercraft from The Gambia, so this source provided directly relevant information to this research. This amount of detail concerning decorative Senegambian watercraft carvings was not found in any other source.

Arona Gueye's (1977) doctoral dissertation "Les Lébous et la pêche artisanale" was one of the major notable works on Senegambian fishing, fishers, fishing equipment, watercraft, and navigation and was specifically concerned with the Lebu. Chapter 2, The Canoe, pages 21-33, and Chapter 3, Navigation Sciences, pages 35-45, were the relevant parts of this work. This research included multiple maps, technical drawings, and photographs. In contrast to most other sources on these topics, little time was spent discussing fishing nets as it was focused on the Lebu themselves and not specifically on fishing as most other sources are. Although sources were not mentioned in chapters 2 and 3 both Gruvel and Balandier were cited in the bibliography (1908; 1952).

It was notable that the text spent a chapter exclusively discussing navigation which provided useful lines of inquiry and insights into navigation in The Gambia. Although it was short on citations, only citing two major works, it made up for this with large amounts of original research into aspects of maritime culture and practice not previously discussed in depth by other sources. Little time was spent on watercraft construction with only some basic technical drawings but as Balandier covered those aspects of Lebu watercraft only two decades beforehand this lack was not of much concern (1952). The texts' attention to other aspects of watercraft operation and use were much more important in comparison.

P.A. Seck's (1980) report *Catalogue des engins de pêche artisanale du Sénégal* covered Senegambian watercraft and fishing nets. It had one detailed technical drawing and collected technical information but only references some previous work citing the work of Arnoux, Blanc, and Diop. The author of the report inaccurately described these works as the first descriptions of

Senegambian watercraft. This was made problematic by the absence of a bibliography in the digital copy which was the only copy that was available. The relevant sections for this research were 1.3 Canoes, 2.1 Previous Descriptions, and 2.2 Current Canoes. There were no pages due to the nature of the digital document. The problems with this source make it difficult to trust fully but it does contain useful information and was cited in later sources.

Bernard Lleres's (1986) doctoral dissertation "La pêche piroguiére maritime au Sénégal, son évolution son introduction dans l'économie du marché" which looked at the fishing economy of Senegal included sections addressing Senegambian watercraft construction. This included detailed technical diagrams, photos, and discussion of fishing, motorization, variation, and change over time. The relevant sections were section A pages 122-130, section B pages 131-154, and section C pages 155-178. Most of the works on Senegambian watercraft including Gruvel, Leca and Labouret, Postel, Balandier and Mercier, and Seck were cited to provide historical background (1908; 1935; 1950a; 1952; 1980).

This source was notable for its detailed discussion of some of the limitations and drawbacks of Senegambian watercraft. The research also contained detailed descriptions of aspects not previously discussed in-depth such as methods of moving the watercraft on the beach, the differences between watercraft design in the north and south, and more recent watercraft designs.

O. Gulbrandsen's (1991) report *Canoes in Ghana* was mostly concerned with Ghana but also contained information on recent Senegambian watercraft. The few technical drawings were before the appendices. Appendices 7 and 8, Resource Life for Timber Species, pages 51-53 gave details about the attributes of the wood types used in boatbuilding including the ones used in

Senegambia. Although the information in this report was limited and technical it supplements other sources.

T. Bousso's (1994) report *Typologie des engins et techniques de peche artisanale utilises au Sine-Saloum (Senegal)* contained detailed overviews of fishing equipment and a detailed breakdown of watercraft types among the Niominka. The relevant sections were Part 3, fishing equipment, and Part 4, the canoe, as well as Appendix 1, 2, and 3, fishing gear technical sheets and data sheets, boards and technical sheets for boats, and synoptic tables of boats. The research contained numerous technical diagrams of watercraft and fishing gear. The only notable previous work on Senegambian watercraft cited was Seck (1980).

The work was notable for having a detailed classification scheme of modern Senegambian watercraft. Much of the research was original and the classification breakdown was notable for being of modern watercraft types and specifically for the Niominka. This contrasts with previous classifications which were less detailed and broadly focused. The report was very technical and concerned almost entirely with the classification and description of fishing nets and watercraft.

Gahidï Marenjaka Masimana and Man Wai Rabenevanana's (2018) book *Manuel technique pour la construction des pirogues Senegalaises* was created as a result of a collaboration between Senegal and Madagascar and records the step-by-step process of construction one of the modern types of Senegambian watercraft. It does not contain additional information beyond that, but the construction process was described in detail and extensively illustrated with technical diagrams and photographs.

This was both a very new source and a very comprehensive one. No other source goes into such extensive detail about the construction process for a Senegambian watercraft. However, the construction of the modern craft was very different from older craft. It was exclusively a how-to guide and so lacks any discussion of history, cultural context, or analysis. It should be noted that the watercraft type shown in this book was not the only type present in Senegambia.

1.2.9 Secondary sources

The secondary sources discussed here included a selection of notable studies and publications that were particularly useful or notable for this research. The first of these was the compilation grey literature reports by Jean-Pierre Chauveau (1988a) that make up *Rapports et travaux a diffusion restreinte sur l'histoire et la sociologie de la peche maritime Senegalaise (1981-1988),* Volume 1 contain information and extensive analysis of Senegambian watercraft and their history. The reports looking at the Senegal river area contained information gathered by the author about the history of fishermen in Saint Louis and analysis. The section on the history of maritime Senegambia provided context for the use of watercraft and an analysis of why they changed over time. The appendix to that history provided a number of primary source quotes from which analysis was conducted as well as associated maps. Gruvel, Leca and Labouret, Monod, Postal, and Balandier were cited by the author giving a base of previous research (1908; 1935; 1947; 1950a; 1952).

These reports were notable for being the first systematic attempt to analyze the history of Senegambian watercraft as a whole. Prior studies typically gathered information with some brief comparison with older works and limited analysis. This collection of documents, therefore, was an important basis on which to build further arguments and test the hypotheses of. The documents also present a number of hypotheses that could be followed up on.

Also by Chauveau (1986) was the paper “Une histoire maritime africaine est-elle possible? Historiographie et histoire de la navigation et de la pêche africaines à la côte occidentale depuis le XVe siècle”. Which gave an overall analysis of West African maritime factors, including Senegambia-specific factors, and a variety of primary sources. This source was useful for guiding research and providing important contextual information on climatic, environmental, and historical topics in relation to maritime topics.

The book by George E. Brooks (1993) *Landlords and Strangers: Ecology, Society, and Trade in Western Africa, 1000-1630* was a book that also provided a great deal of information on climatic, environmental, and historical topics as well as primary sources. Its analysis of the Senegambian maritime landscape in its geographic and social context was particularly useful.

The old history book by John Milner Gray (1966) *A History of The Gambia* was a useful source specifically for its primary source research. The book contained a large amount of information sourced from documents in the British Archives which were not available anywhere else. These contained very important pieces of information such as details on Gambian attacks on James Island. The book other than these sections was not particularly useful as a history as it was only European perspectives and now outdated analysis.

The book by John K. Thornton (2003) *Warfare in Atlantic Africa 1500-1800* analysis Senegambian maritime conflict using a variety of primary source and so was useful reference for both source and an overall overview. Although it was not cited directly it informed this research.

The paper by Ousmane Traoré (2017) “State Control and Regulation of Commerce on the Waterways and Coast of Senegambia, ca. 1500-1800” was particularly notable as a source that delved deeply into the power landscapes of Senegambia. This source was comprehensive enough including extensive primary source on the topic of the power landscape that a summary was provided in this research in the place of a full original analysis of sources.

1.2.10 Maps and charts

Maps used in this research came from a large variety of sources, but one very useful set of data came from navigational charts. These were from the British Admiralty, the French Service Hydrographique de la Marine (Shom), and the Defense Mapping Agency (DMA) Hydrographic Center (DMAHC now NGA) of the United States. These charts contained depth data as well as landing areas, environmental data, and navigational landmarks. In terms of visualizing the maritime landscape and referencing textual accounts to regions, they were invaluable tools. The David Rumsey Historical Map Collection provided a comprehensive catalog of old maps as well.

CHAPTER 2: CONTEXT AND BACKGROUND

2.1 *Historical Overview*

Little was known about the early history of the Gambia and speculation about population movements were too tenuous and had little relevance to this overview. However, two notable early archaeological assemblages do stand out. These were the megaliths found throughout the middle and upper regions of The Gambia, and the large shell mounds found near the mouth of the Gambia. It was the shell mounds that had the most relevance to maritime concerns. They attest to the importance of riverine resources for subsistence in the lower Gambia from an early date and watercraft likely played some role in the gathering of the oysters that form portions of these mounds. Research into these sites was limited but it was known that they were not habitation sites. Some mounds served as burial sites suggesting a conceptual connection of burial rituals to riverine subsistence. Other mounds served to create artificial islands. Shell mounds were common all along the coast including both the Casamance and Sine-Saloum Delta. The Megaliths and mounds date from generally the same period, around 200-1500 CE (Ceesay and Ceesay 2012:23–26).

An oral history of the Gambia existed attesting to the occupation of the river region by the Bainuk people who were integrated into the expanding Mande trade network and were then conquered by the Mali Empire. Although it was not known for sure it was highly likely that this period saw an expansion of commercial riverine activity and may have experienced riverine conflict as part of the conquest. Much of the Senegambian region fell under Malian control in this period but some periphery areas seem to have maintained various levels of independence mostly in the Casamance region (Brooks 1993:109–111).

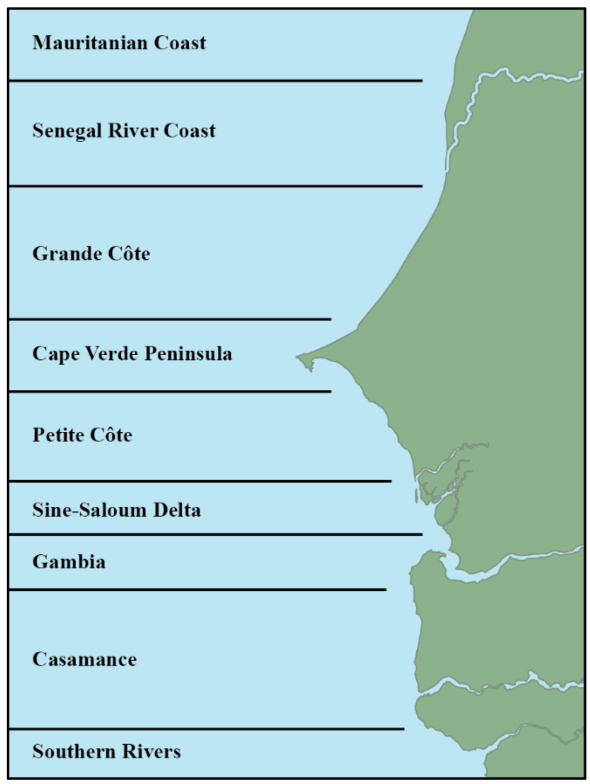
By the time arrival of Europeans in the fifteenth century, the Senegambian region seemed to have possessed a well-developed trade network running along the rivers and coasts, and overland into the interior. Well-established kingdoms along the Gambia river first came into conflict with then came to mutually beneficial trading arrangements with Europeans. European traders would be absorbed into the preexisting networks integrating into existing African paradigms on African terms (Brooks 1993:125–141). The beginning of a wet climatic period around 1500 CE likely also contributed to the expanded reach of riverine commerce as waterways grew more navigable than they were during dry periods (Chauveau 1986:208). At this same time the influence of Mali was collapsing (Brooks 1993:170; Gomez 2018:169). From this period onward much more information was available concerning the history of the Gambia due to the recorded accounts of European travelers. This contact introduced new paradigms of watercraft construction to Senegambia along with maritime economic growth that would spur the growth of the Senegambian boat-building tradition beyond the preexisting paddled dugouts (Chauveau 1988b:28–29).

The fifteenth, sixteenth and seventeenth centuries saw the expansion of trade as numerous European states jockeyed for position along the Gambia River (Gray 1966). These were carefully balanced by Gambian kingdoms who employed diplomacy and leveraged their administrative control of waterways and trade along with their military forces on land and water to their advantage (Traoré 2017:66). The period also saw conflict across Senegambia, large political rearrangements, and wars. Particularly notable for the Gambia was the growth of independent Kaabu on the south bank, and the rise of Saloum, the invasion of the Fulbe, and the rise and fall of Jolof on the north bank (Arbor 1975:57–74; Brooks 1993:198–199, 225, 251; Wright 1997:76–79; Fall 2012:220–239, 398–417). The development of extended dugout watercraft and the adoption of sails characterize this period as Senegambian mariners adapted what European techniques were advantageous for them and innovate new designs (Chauveau 1988b:29–30).

The eighteenth and especially nineteenth centuries saw growing political instability, war, European encroachment, and religious reformist upheaval, causing damage to many Gambian kingdoms and culminating in the devastating Soninke-Marabout wars (Arbor 1975:76–98; Wright 1997:127–169; Fall 2012:418–439). The slave trade likely contributed to this degradation due to its corrosive effects on societies and the general situation was exacerbated by a drying climate. However, the largest issue was the growing dependence of the region's economy on world trade and the increasingly lopsided military situation. The small Gambian kingdoms found themselves in a new position in the nineteenth century as the control of waterways began slipping out of their hands presaging their ultimate loss of control. However, the European takeover was neither fast nor without resistance (Wright 1997:127–169). Two notable developments also occurred in the nineteenth century as the Atlantic slave trade came to an end and groundnuts began to be exported from the Gambia (Gray 1966:294–305, 379–387). During this same period, distinct boatbuilding methods emerged on both The Gambia and the Senegal River and sail plans underwent several changes (Chauveau 1988b:31–32).

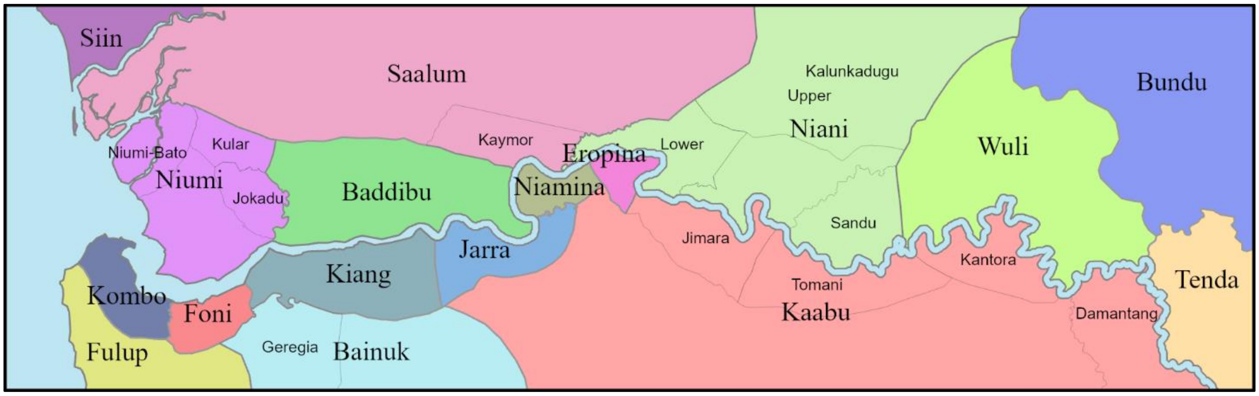
By the end of the nineteenth century, Senegambia came fully under the control of colonial regimes. This fully subjected the waterways of the Gambia to colonial oversight and brought a new economic orientation (Wright 1997:170–218). Importantly for the development of Senegambian watercraft the groundnut trade continued to grow, and this seems to have been the impetus for the emergence of the large groundnut cutters of Gambian design. These would spread to all of Senegambia and their construction methods, derived from an earlier Gambian design with added iron fasteners, form the basis of the modern Senegambian tradition boats all along the coast and even into the Senegal river supplanting most other designs. Most boats transitioned from extended dugout forms to plank build shell-based designs and the district Gambian plank-built boats that existed previously began a steep decline. Deforestation having started in the mid-nineteenth century grew dramatically largely due to clearing for groundnuts (Chauveau 1988b:33).

The Gambia became independent in 1965 and the groundnut trade declined in the late twentieth century (Wright 1997:240–241). The artisanal fishing industry continued to grow, however (Tobey et al. 2009:4, 7). The introduction of outboard engines altered some design aspects of Senegambian watercraft and lead to the almost complete disappearance of sails (Lleres 1986:134). The size of craft had also increased as engines allowed larger and larger boats (Lleres 1986:163). A notable, change was the proliferation of smaller craft mounting outboard motors on their sterns (Lleres 1986:148). All ocean-going boats were now plank-based shell-built watercraft. Dugouts, extended and unexpended, were only found on rivers. It remains to be seen whether any additional changes will take place in the future due to the pressure of decreasing fish stocks and



Map 1.2.10.1: Maritime coastal zones of Senegambia
Own work, Southern border of the Casamance at Cape Roxo

deforestation (Chauveau 1986:205; Tobey et al. 2009:4). Despite attempts and environmental pressures, the Senegambian boat building tradition appeared highly resistant to imposed changes.



Map 1.2.10.2: Gambia regions and kingdoms map	Showing approximate regions and kingdoms (Bankolu) along the Gambia River, unspecific period, own work (Bellin 1764a; Bellin 1764b; Arbor 1975:1a; Bühnen 1992; Wright 1997:107; Fall 2012:47)

2.2 *Economic Landscape*

2.2.1 Seasonal Cycle

The most important factor for the agricultural and fishing production of the Gambia was the cycle of wet and dry seasons. The dry season went from approximately September/October to May/June, and the wet season went from approximately May/June to September/October. Given Gambia's position at the intersection of climatic zones and the variability of climate in West Africa over hundreds of years and the year-to-year variability, these were only general ranges. Most of the Gambia could, however, be placed in the savanna woodland ecological zone (Brooks 1993:13). Fishing and oyster harvesting primarily took place in the dry season when the weather was most conducive to fishing and upwelling occurs attracting fish to the coast (Gruvel 1908:111; Mittelstaedt 1983; Chauveau 1986:179, 203; Lleres 1986:32–33; Brooks 1993:44). Agriculture occurred during the wet season from mid-June to early November (Curtin 1975a:15–

16). The most important food crops included millet, rice, and later maize and peanuts (Curtin 1975a:13–29). As a result of this seasonality fishermen in the Gambia mostly alternated between primarily farming or fishing depending on the season.

The Gambia had long been connected to the trans-Saharan trade routes bringing goods from the north as well as routes going south bringing goods from the forest region as well as routes running East to West. European traders would later connect Gambian trade to the Atlantic trade (Brooks 1993:59–61; Malacco 2016:31–35). The Gambia stood at an intersection of north-south trade due to its position on the edge of north-south climatic zones which divided production zones for different trade goods. The river itself also formed a long-distance east-west route going deep into the interior (Malacco 2016:35–37).

Maritime trade in the Gambia was administered and taxed by local kingdoms and was until later centuries conducted on the terms of those same kingdoms (Wright 1997:127–169; Traoré 2017). Numerous goods were traded at different times, but a selection of the most important were presented below. Important exports of the Gambia at different times in history were hides, wax, ivory, gum, gold, textiles, peanuts, salt, and enslaved people. Some of these would only pass through the Gambia and were not produced locally such as gold and gum, gum imported from the north and gold from the east. Ivory was hunted locally and imported. Textiles were produced locally as well as imported and exported. Important imports were iron, textiles, horses, kola nuts, and salt. Salt being produced and transported internally as well as exported. Textiles were a key good exchanged to the south to obtain kola nuts, a luxury good high in caffeine. Horses were important for warfare and prestige, but the environment of the Gambia was not conducive to their survival due to the Tsetse fly which carried trypanosomes, a parasite lethal to horses, so they had a short lifespan and were imported, often from across the Sahara or bought from Europeans. Iron was not smelted in western Senegambia but was imported from eastern Senegambia, the Jallon mountains to the south, and brought from Europe. Wax was an export to Europe as were cowhides in some centuries. Agricultural goods were regularly traded around the region and peanuts became a central export in the nineteenth century (Curtin 1975a:153–270, 309–333). Salt was produced in the lower river kingdoms and regularly shipped upriver by both Gambian and European boats. This was an enduring route that was very economically important for the upper river economy (Wright 1997:57). Fish, dried fish, and dried oysters played a particularly outsized role for Senegambian fishers and were widely exported (Chauveau 1988b; Chauveau 1986:199).

A large amount of trade arrived in the Gambia by sea routes coming from the Atlantic via Europeans and from along the coast by Africans (Brooks 1993:79). Much of the trade in the Gambia itself was shipped using the river by both African and European boats and sailors. A maximum-sized dugout of 12 meters would have a cargo capacity of more than a metric ton. Their shallow draft would have allowed them to operate easily all along the Gambia River and in the shallow bolongs that branched off of it (Curtin 1975a:98; Bousso 1994:94). "Grumentes" being the often vague term for the African sailors who worked for Europeans (Brooks 1993:124, 195). Europeans made use of African produced boats both hired and bought directly (Moore 1738:243; Durand 1806:42; Hecquard 1853:88; da Silva 2019). European ships and boats were also construed and repaired locally and dugouts could even be made by Europeans (Hecquard 1853:129, 159; de Almada 1984:58; Coelho 1985:13, 15, Chapter 2; da Silva 2019). The Portuguese were forbidden from selling rigs and sails to Africans, but it was doubtful this ban was followed strictly and observations, as well as firsthand experience by Africans hired as sailors, would have made this mostly meaningless. In addition, other Europeans would not have had this policy (Chauveau 1988b:28). The interaction of African and European boatbuilders and hired sailors was likely a key contributor to maritime developments for both in the region in addition to allowing the smooth operation of trade.

Important overland routes existed as well, large long-distance caravans made up of hundreds to thousands of people and donkeys would transport goods overland to the Gambia these were noted to arrive in July to the port town of Barrakunda located near the head of easy navigation on the Gambia river and make their way to the mount of the Gambia. These traders came from inland bringing gold, ivory, enslaved people in exchange for salt which they exchanged for cloth. They also traded with European merchants. Smaller caravans from neighboring kingdoms of up to one hundred people also traded all around the Gambia bringing ivory and enslaved people to exchange for salt (Purchas 1625a:300; de Almada 1984:Chapter 2, 1, 9-10, 25-27). Caravans would operate in the dry season and were coordinated by local merchant diasporas (Curtin 1975a:271–278). The limits of navigation on the Gambia were Kassang far up the middle Gambia for large seagoing ships, and Barrakunda for smaller ships, further beyond was limited to small boats (Brooks 1993:23).

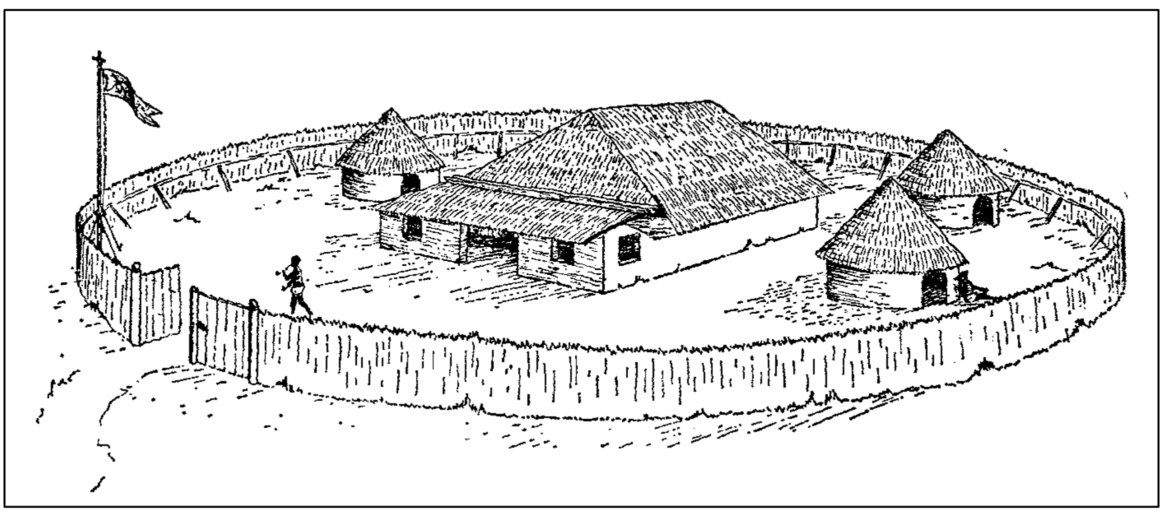
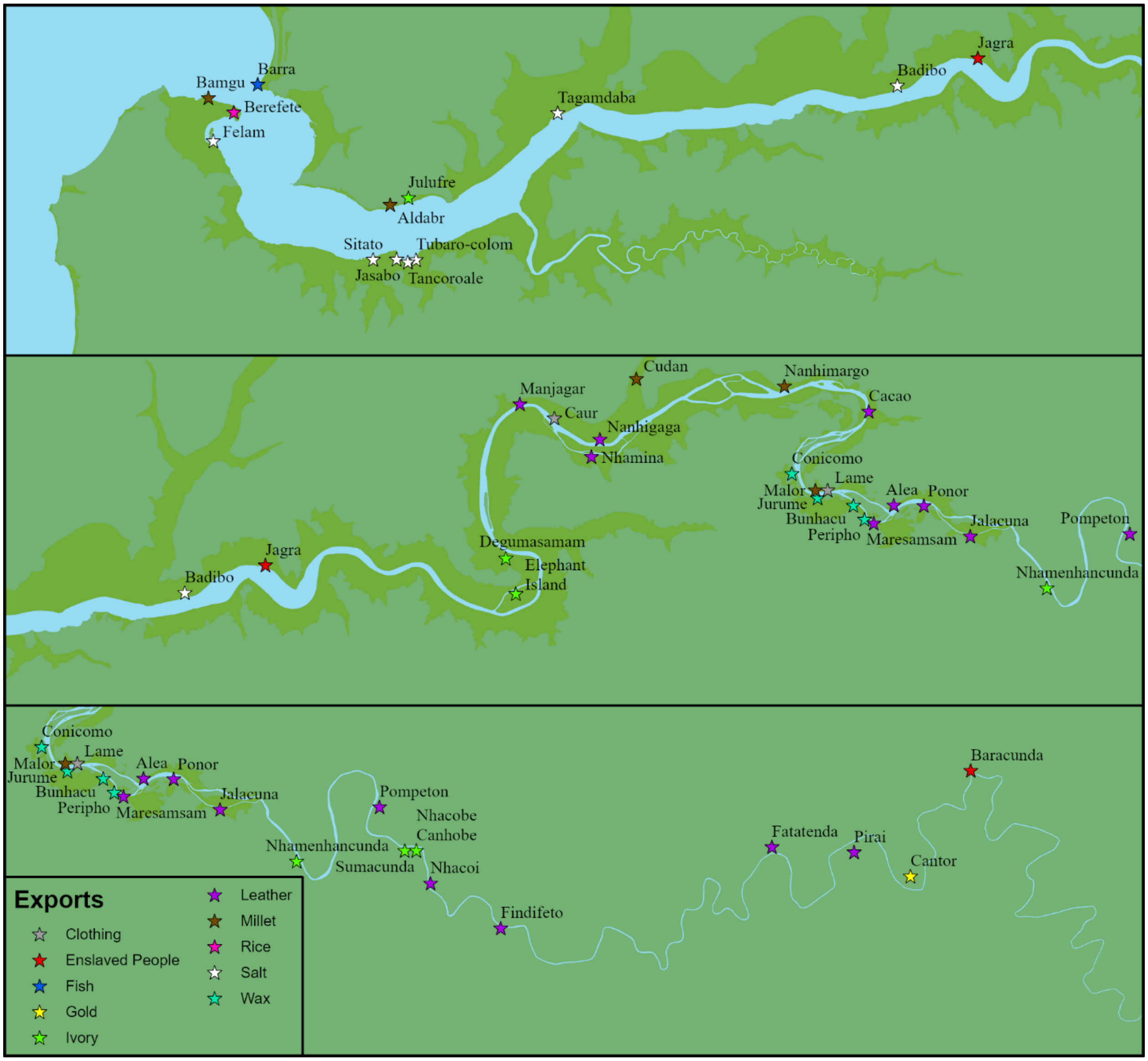
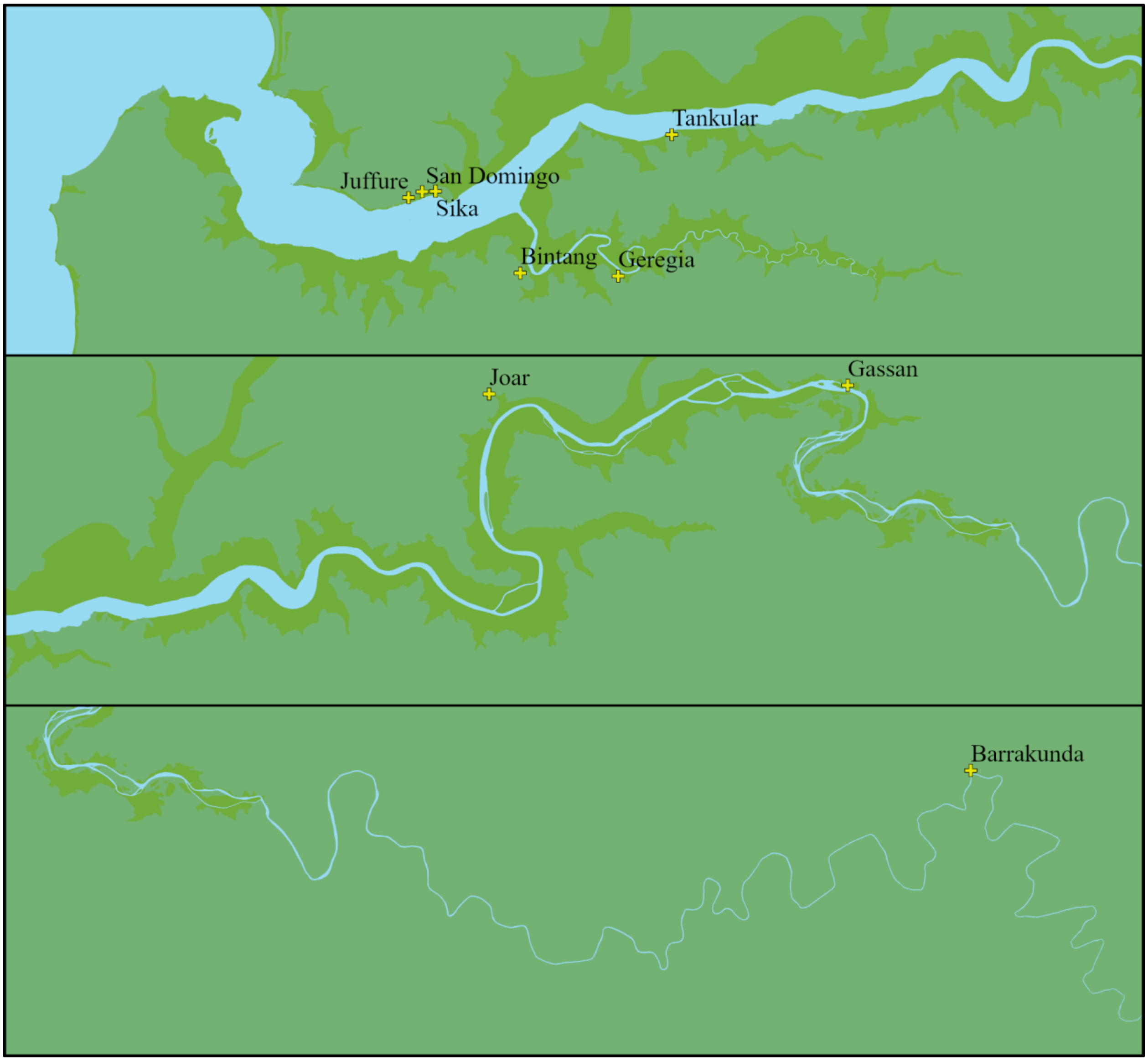


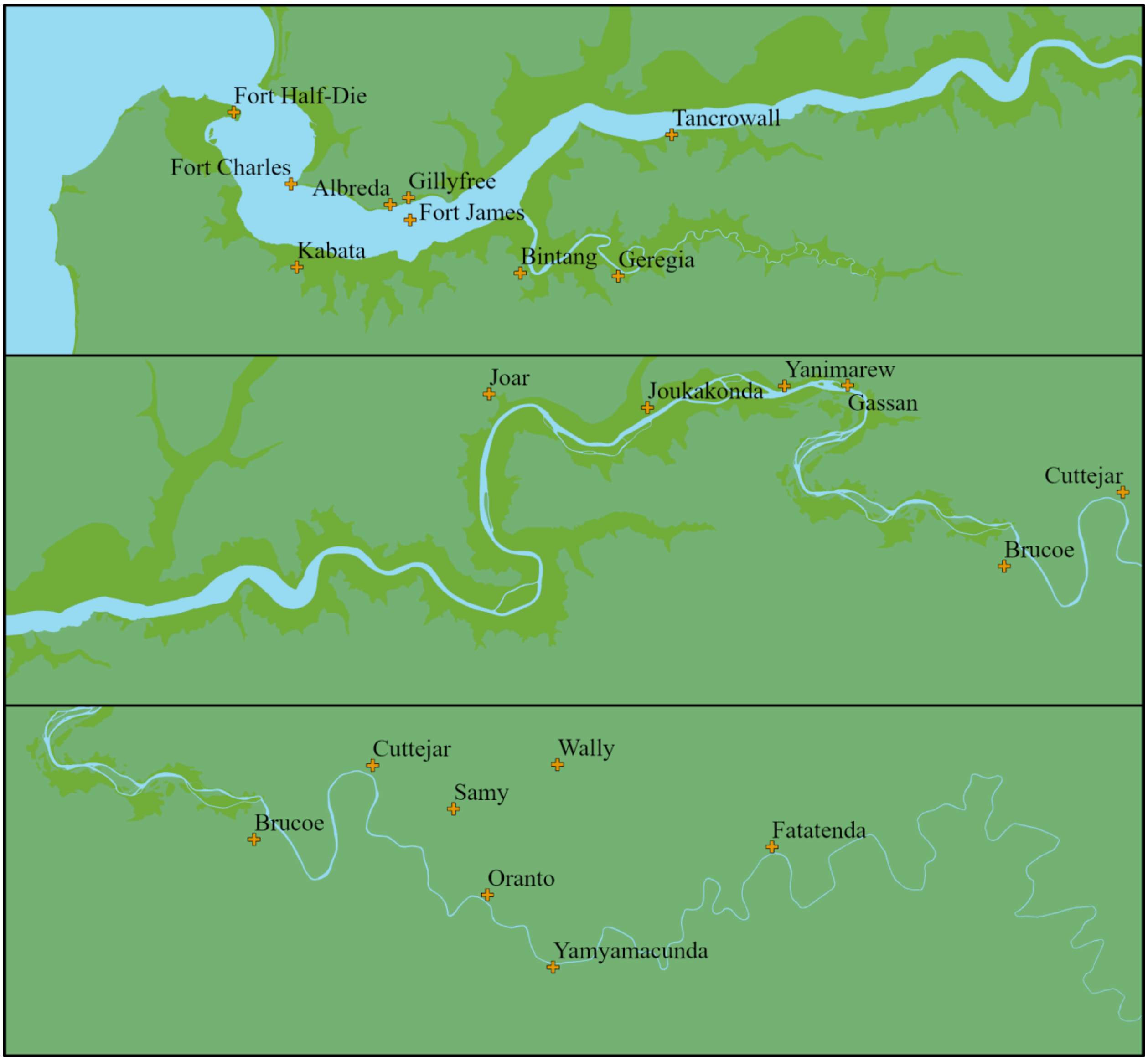
Illustration 2.2.1: European trade post “factory”	Cropped from (Wood 1967:61)



Map 2.2.1.1: Gambia export ports and goods 1580-1630	Own work, adapted from (Malacco 2016)



Map 2.2.1.2: Portuguese Gambian trade posts 1488-1600	Own work, adapted from (Wood 1967:40)



Map 2.2.1.3:Gambia trade posts 1600-1800	Own work, adapted from (Wood 1967:55)

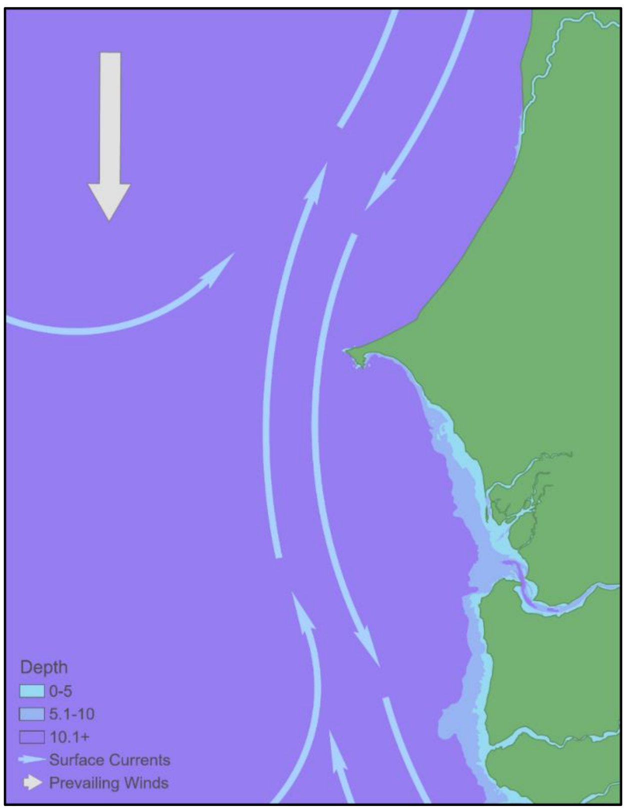
2.3 *Transportation Landscape*

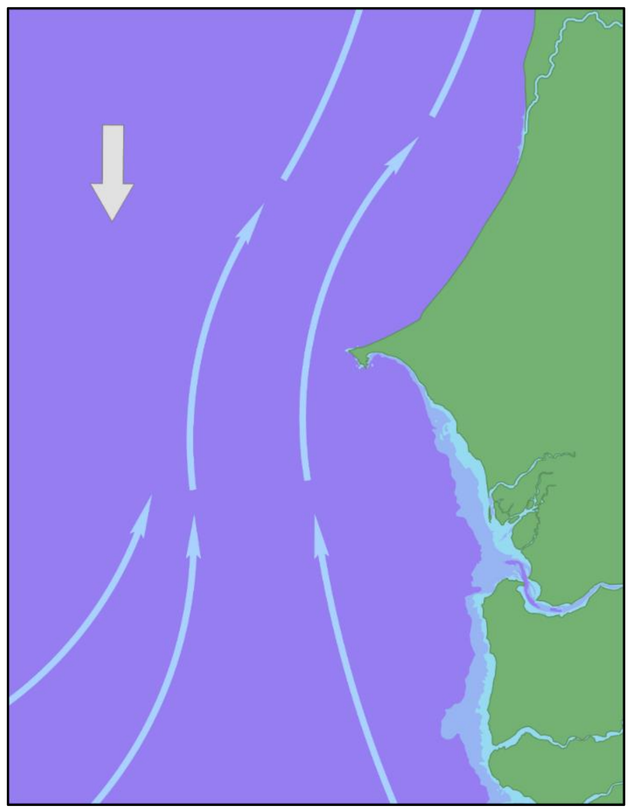
2.3.1 <u>Environment</u>

European and African traders were limited by the same seasonal weather patterns that controlled all aspects of Gambian life. Dangerous squalls in the wet season discouraged ocean commerce and would have often forced ships to either depart, retreat upriver for safe harbor or else anchor themselves more securely in place. The Gambia River would also swell with rains in the wet season increasing depth but also the current and causing violent floods on the upper river. It was therefore much safer to travel using the tide during the dry season which reaches far up the river. Overland travel would likewise be difficult due to swollen streams and wet roads. Diseases would also be rampant due to the breeding of mosquitoes until the ground dried up (Durand 1806:36; de Almada 1984:57; Brooks 1993:23, 175–177). The dry season was season of fishing. However, fishing was not strictly limited to the dry season, particularly on inland rivers and bays which were far more sheltered (Gruvel 1908:90; Leca and Labouret 1935:76).

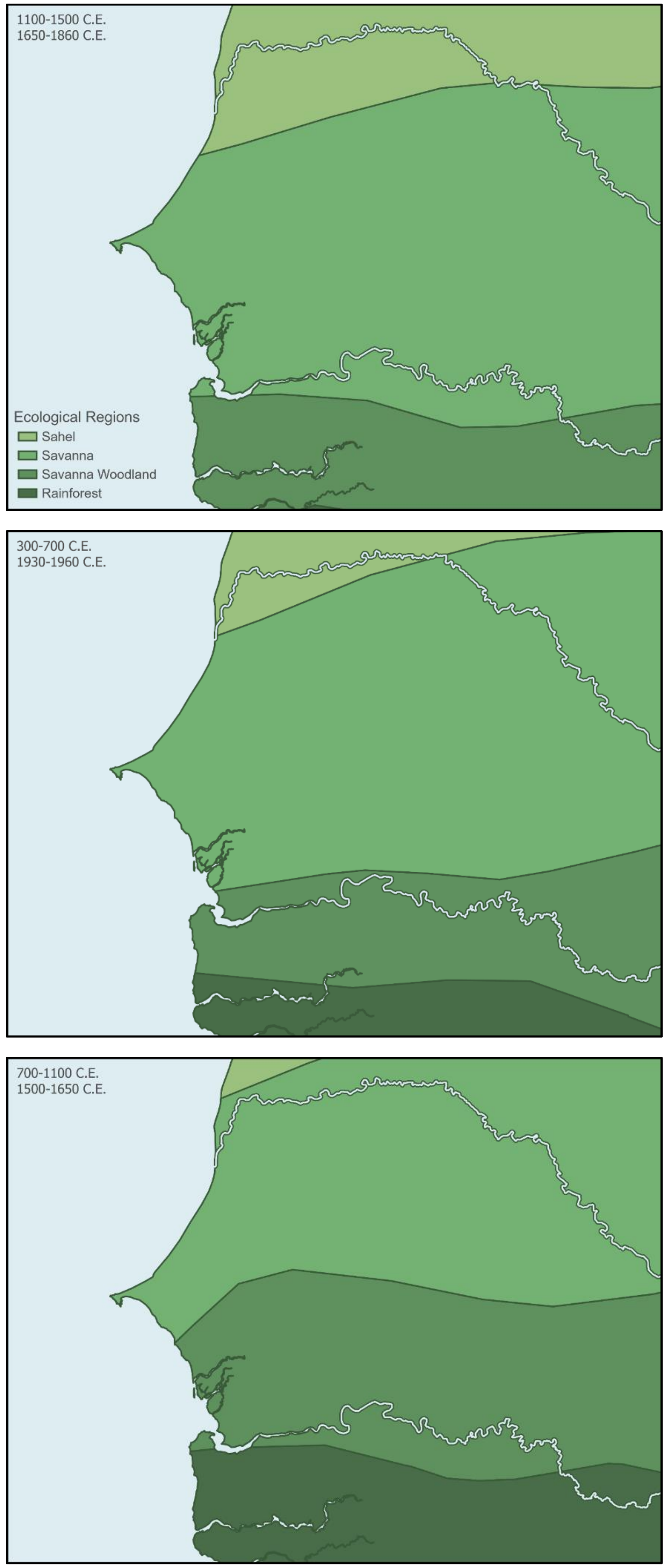
The variable currents close along the Senegambian coast circulated in the dry season and North to South in the wet season but were not generally very strong. Typical prevailing winds came from the North. With the beginning of the dry season, strong winds coming from the North facilitated travel to the South while weaker winds starting at the onset of the wet season allowed easier voyages to the North against the prevailing winds (Mittelstaedt 1983:310, 313). The same winds that brought traders from the North also later brought fishers from the Cape Verde Peninsula facilitated interaction between local and foreign fishermen. These were deep water longline fishermen in contrast to the shallow water net using fishermen of the Gambia (Brooks 1993:14, 16, 216; Gruvel 1908:114, 119). In later years fishermen from the Senegal River Coast also traveled south as far as the Casamance (Gruvel 1908:75, 91). In the morning a land breeze made it easy to depart into the ocean while in the evening a sea breeze made it easy to return (Brooks 1993:19). The dry season was also the campaigning season for West African militaries (Smith 1989:28). During this time it was likely that the raids described by a 1594 source were launched down the coast into the Casamance from the Gambia (de Almada 1984:62). All factors combined made the dry season the season of maritime travel, commerce, and fishing in the Gambia and thus the season of maritime activity.

Small watercourses called bolongs crisscrossed the Gambia, mostly in the lower and middle river, some navigable even to larger ships (Durand 1806:45–46). Many of these shallow winding watercourses would be easily traversable by paddle in shallow drafted dugouts. Many towns were located along these watercourses giving them some protection from attack from the main river. They made ideal places to lay an ambush for passing river traffic and many fortified strongholds were located on them giving access to the water for drinking and to stage waterborne attacks from (de Almada 1984:44). The tidal nature of bolongs could limit access at low tide but also could be used to their advantage by trapping enemy vessels in them and waiting for the tide to go down (Durand 1806:46–47). On the lower river, many bolongs were filled with oysters clinging to mangrove roots also only accessible at low water (Gruvel 1908:108).

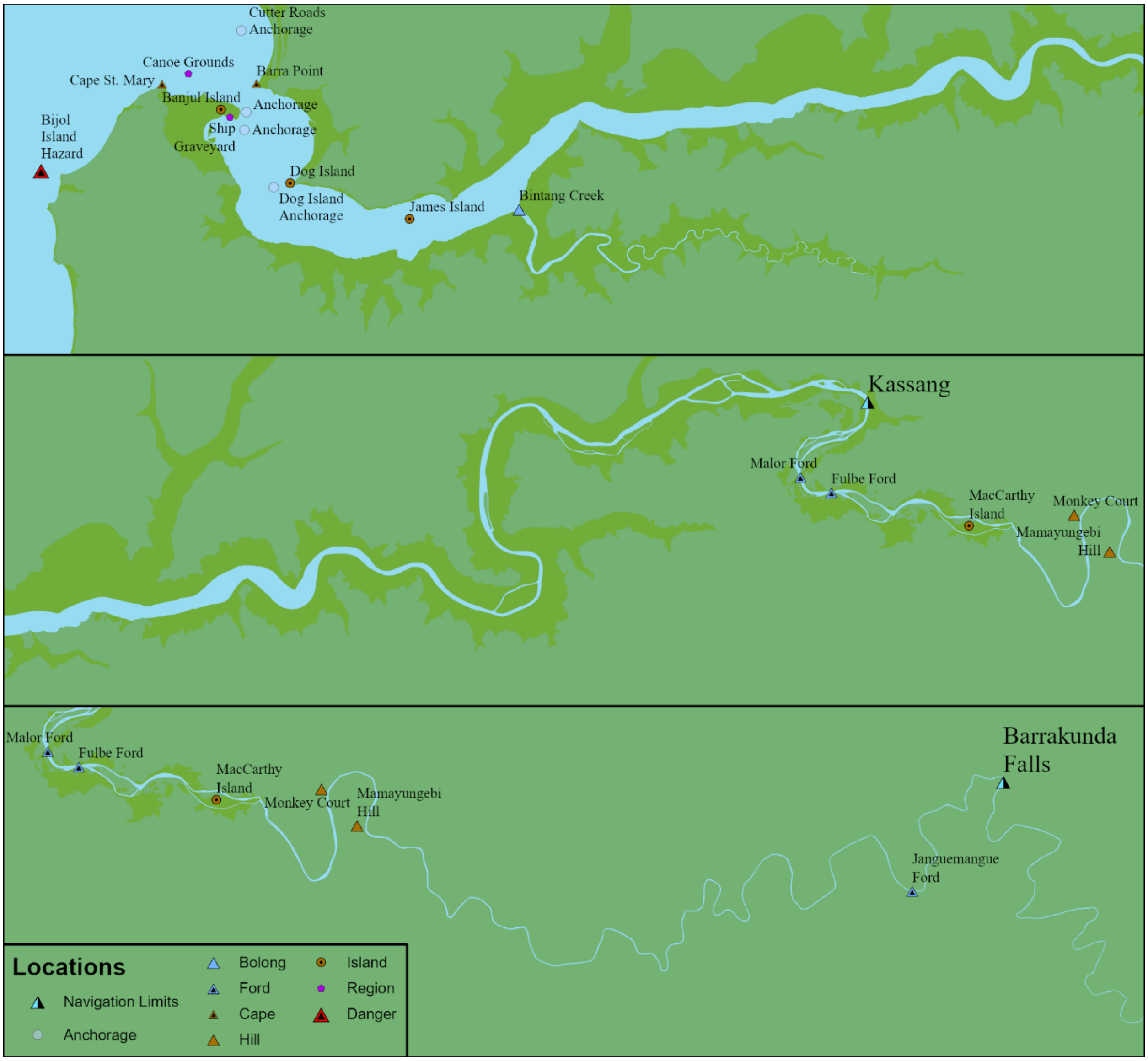




Map 2.3.1.1: Dry season currents and winds	Map 2.3.1.2: Wet season currents and winds
Generalized map of wind and current directions with coastal bathymetry, Adapted from (Mittelstaedt 1983), own work	Generalized map of wind and current directions with coastal bathymetry, Adapted from (Mittelstaedt 1983), own work



Map 2.3.1.3: Ecological regions over time
Adapted from (Brooks 1993:10), own work



Map 2.3.1.4: Gambia notable places and navigation limits	Own work, locations from Charts and Sailing directions, location of Janguemangue Ford is a guess

2.3.2 Naval Conflict

There were large differences in the naval history of different Senegambian regions. This overview focused on the Gambia. Some early sources were vague in region and so have been excluded.

One of the earliest accounts from the Gambia also contained the most detailed descriptions of boat and ship combat. A European trader exploring the mouth of the Gambia River had sent out boats which were spotted by and followed by three Gambian boats which emerged from a bolong with twenty-five to thirty people in each. The numbers would suggest that these were armed soldiers watching the borders of their kingdom acting as a coast guard. The European boats returning to their ship they observed the unfamiliar ship before departing (Cà da Mosto et al. 1937:57–58). The following day seventeen large boats with around one hundred and fifty soldiers approached the ship, likely assembled for precisely the reason of attacking the ships after being warned of its presence by those that observed it on the previous day. The lead ship maneuvered splitting the boats into two groups and the two other ships approached. It was likely that they did not know that three ships were present when assembling the force and only intended the force to confront one.

These soldiers were observed to be fit and clothed in white cotton shirts some with small white caps, described as similar to the German style of the time but with whing shapes on each side and a feather in the center. These probably marked officers. Each boat also had a soldier at the front holding a round leather shield on their arm likely intended to shield those behind during approaches. Upon the ship approaching them they dropped their oars and took up their bows and began shooting, almost certainly poisoned, arrows. The following ships discharged four canons which failed to hit and only briefly surprised the soldiers who then resumed the attack. The ship approaching to around a “stone’s throw” of the boats and returned fire with crossbows. The Gambians appeared to have taken casualties and changed tactic attacking the smallest ships stern. The other two ships moved in and towed the smaller ship between them and formed up together with chains attaching them and dropped anchor in a defensive formation as shots continued to be exchanged. A parlay was then achieved, and the Europeans explained they were traders and the Gambians explained that they had heard that the Europeans were hostile cannibals come to attack them and the Gambians had come to kill them. They also explained that they came from three days distance away. The wind picked up and the ships moved towards them causing them to withdraw to shore. The ships left the Gambia the next day (Cà da Mosto et al. 1937:58–61).

In later centuries Gambian tactics appeared to have been to have been more to assault and board the ships, by surprise ideally. Although the scattered descriptions from later times have far less detail and must be largely inferred. Later sources on Gambian war boats distinguished a captain who was seated in the middle of the boat (Fernandes 1951:29, 31). These boats were likely paddled while standing frequently and it appeared all the crew had paddles in addition to their weapons (Cà da Mosto et al. 1937:69; Fernandes 1951:31).

The large open mouth of the Gambia made possible the easy use of the large watercraft by the kingdoms there. These could take advantage of the large expanses of calm water in the river and off the coast to mount multiple masts and sails. The largest of these boats could carry one-hundred soldiers (Thilmans 1976:25). The ready availability of skilled sailors and well-established boat building due to the extensive marine economy in these regions would support the quick adaptation of sails to existing large dugouts. These crafts would not be as effective at ambush as ones further upriver due to the width of the river, but many ships were still vulnerable to capture if they strayed too close to shore. However, it would be generally in the interest of the

Kingdom of Niumi, the most prominent of the coastal kingdoms to not resort to piracy and instead leverage its geographic position to profit from tolls and trade first and foremost. Using their administrative control, diplomatic savvy, and military advantage Niumi successfully maintained its maritime control for centuries until confronted with an armed steamship which decisively tipped the balance (Wright 1997:149; Traoré 2017). It is likely that most piracy in the Gambia occurred with at least the tasset consent if not endorsement of the kingdoms they operated from and may in many cases have been soldiers of the kingdoms. The kingdoms were small, coastal, and had control over their waterways and piracy would have been a useful financial and diplomatic tool.

Effective use of river fortresses and ambushes could be used to block river traffic. This was most effective in the middle section of the Gambia where it narrowed. European forts and their cannons could block ship traffic, but coverage was limited for most of the period as fort James was the only fort (Wood 1967:53–56). These defenses meant for ships would also not be effective against fast-moving and narrow naïve boats as was demonstrated in 1729 when the garrison of Fort James depleted its store of gunpowder attempting to fire on passing boats (Gray 1966:200).

The mere mustering of marine forces by kingdoms could also serve as deterrence and intimidation as was demonstrated twice during the seventeenth century when this tactic was used to effect to get James Fort to be turned over to new owners (Gray 1966:50–51, 76–77). During the years 1661-1662 Charles Fort was unsuccessfully assaulted by Gambian forces at low water during the night over the exposed land. However, communication between the two forts were endangered by Niumi, Foni, and Kombo who were assembling naval forces and could cut off communications by boat. Fort James itself was attacked on two occasions during hostilities in the mid eighteenth century. Once in 1754 when a dispute between the kingdoms of Foni and Niumi and the residents of the island lead to a shorth skirmish in which the brother of the king of Niumi was captured. This incident appeared to have been more a failed attempt at intimidation that escalated to a skirmish (Gray 1966:233–234). In 1768 reinforcements had been sent to the fort as it was believed that it may have already fallen or would soon fall to a Gambian attack which proved forthcoming. The assault came later in 1768 when five-hundred soldiers in twenty boats likely all from Niumi began a surprise amphibious assault on the garrison of forty and attempted to breach the fort with siege ladders. They nearly succeed in taking the garrison totally off guard but were spotted at the very last moment nearly ashore. Four of the garrison were killed in the fighting but the Gambians casualties were unknown. The garrison was able to cut some off and force a retreat but unable to capitalize on this to inflict damage. Following the battle, the garrison was devastated by disease and if it had been attacked again, they would not have been able to resist as only four were still fit for duty. Help from the crew of European vessels was the only reason the fort was still in operation at all when it was finally relieved (Gray 1966:241–242). Ultimate failure after being spotted was not surprising given the very high difficulty of an opposed beaching landing and assault on a fortified position but the attempt speaks to the naval organization of Gambian kingdoms. It was possible similar tactics were used to assault native coastal forts.

The utilization of European ships for any hostile action against the kingdoms of the Gambia without local cooperation always proved undecisive. An English ship having a trade dispute with the kingdom of Foni attempted to attack them through the Bintang Bolong but was ambushed by soldier with guns placed on either side of the river whose firing infected casualties and forced the crew to shelter below deck. They remained there until the ship was stranded at low tide and forced to surrender their ship. This took place sometime before 1684 (Durand 1806:46–47; la Courbe and Cultru 1913:208). In 1724-1725 disputes between Europeans resulted in the burning of trade posts excepting the Geregia factory which was protected by the king of the area. There was during this by one commander to send a sloop up river to capture the boats of the kingdom of Niumi but the attempt was a failure and they admitted that Niumi was too powerful for them and they could not bring them to the negotiating table (Gray 1966:190–191). Given that it would have been extremely dangerous and difficult to attack the up the bolongs which were likely home to fortified positions it is unsurprising there were no accounts of rooting out pirates and that European attempts at attacking Gambian kingdoms were unsuccessful.

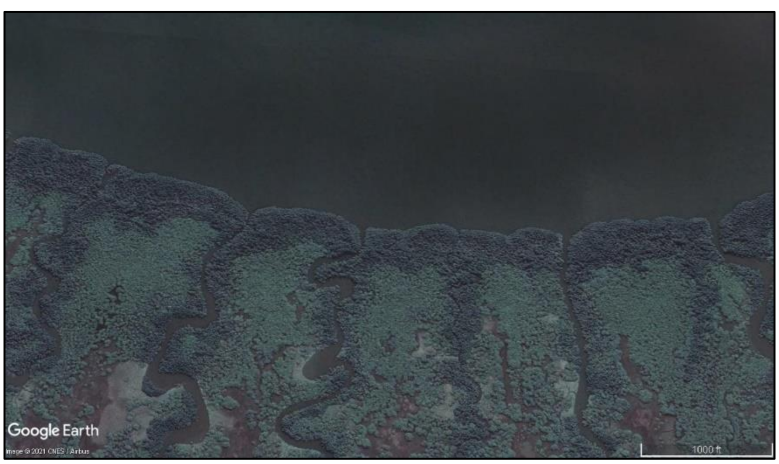
Reports of captured ships were a constant in sources on the Gambia, particularly the mid river region. The advantageous landscape of the mid-river region to ambush seemed to have given rise to specialized craft designed to capture passing vessels. This region was described as being full of pirates (Mitchinson 1881:423, 454; Coelho 1985:7–8, Chapter). Armed boats would suddenly emerge out of bolongs to assault passing ships and boats (Coelho 1985:7–8, Chapter 2). One 1594 source described these craft as large and that they mounted thick wooden shields on the bows of the boats to block gunfire (de Almada 1984:56–57). This design seemed to be iterative of the earlier method of having a soldier with a leather shield at the front of each boat. The long narrow boats would be protected by the shields while they moved towards the enemy (Cà da Mosto et al. 1937:58–59). The wooden shields likely resembled enlarged versions of the front covers supported by the tapering strakes on later boats. Probably using the same sewn fastening technique. If so, this was the first recorded instance of extended dugouts in Senegambia and may be the ultimate origin or front cover design.

Piracy and the capture of ships and boats by hostile kingdoms and peoples was constantly cited in sources on the Gambia to the point it appeared to have been a totally normal occurrence. A 1594 source identified the south side of the Gambia River as particularly dangerous as the people killed Europeans and often seized their ships. They warned that any people going to the area be well armed on a strong ship. Kingdoms were also described as robbing passing river traffic when at war (de Almada 1984:44, 56–57). The source also described raids by the kingdoms of the Gambia down the coast of the Casamance to capture people (de Almada 1984:62). Around 1661-1662 a source described a sloop being captured by Niumi while passing between Dog Island and James Island as part of a larger conflict between European powers and Gambians with the Dutch aligned with the Gambian kingdoms (Gray 1966:76–77). A 1780s source described the transport of goods by Gambians on behalf of French traders, these boats were sometimes attacked but were seemingly adept at protecting themselves. The were paid highly and were likely very skilled at delivering the cargos fast and preventing loss (Durand 1806:42). In 1842 an expedition on the upper river were unable to proceed due to the threat of gunfire from the banks and demands to pay a toll or rum. Due to the narrowness of the river in these areas passing ships and boats appeared to be subject to the same vulnerabilities as the ship that entered the Bintang Bolong with hostile intent (Governor Ingram and Earl Grey 1847:154–155). As later as 1881 a writer remarked on the danger of robbery on the river, particularly on the upper river past MacCarthy Island (Mitchinson 1881:423, 454).

The upper river, lacking an incentive to maintain large numbers of boats due to the narrowness of the river, a lack of places to beach boats, and fewer marine resources was less subject to this dynamic. A 1594 source described this eastern part of the Gambia as having hostile people but no watercraft to threaten ships due to a lack of beaching areas (de Almada

1984:56–57). Unlike on other places on the Gambia the Upper river was more vulnerable to attack by ships. A story from a 1684 source described European ships fighting on the upper river when one thinking that Gambians had helped their foe escape fired on coastal towns (Coelho 1985:24–25, Chapter 2). A 1843-1844 source asserted that brigs (brick) near the mouth of the Gambia were too large to be captured it appeared to have been speculation based on what they knew and not from experience or accounts (Raffenel 1846:483).

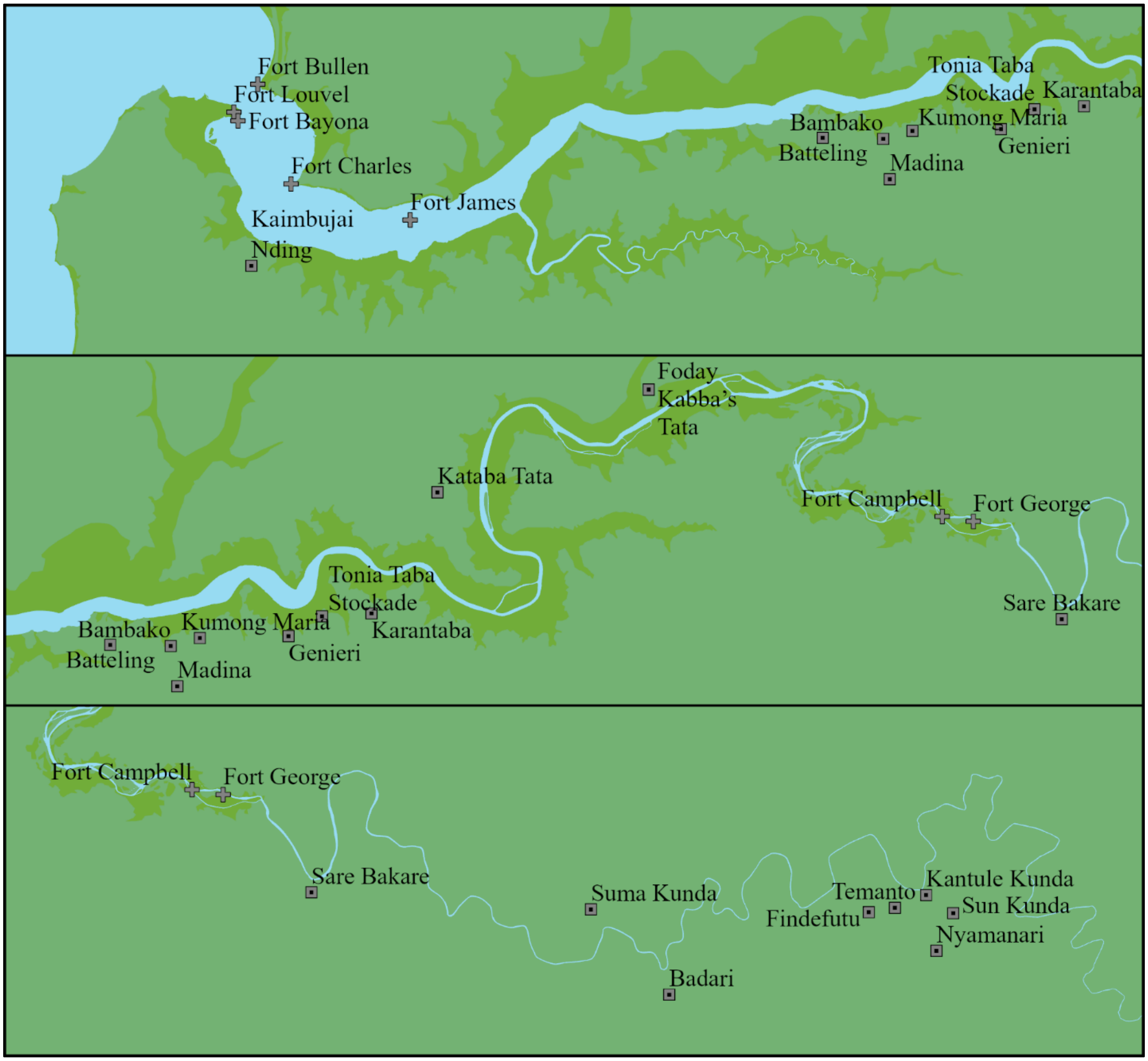
Few bridges existed in Senegambia and those that existed were confined to smaller streams and functioned only during the dry season. Floods in the wet season washed away the temporary bridges (Shoberl 1821a:167–168). More permanent bridges would have had the effect to closing off easy navigation and trapping debris creating dangerous buildups and so would be impractical. This dynamic was well attested in Southeast Asia (Walker Vadillo 2019). The marshy landscape around the Gambia would also make bridges impractical in many areas and they could also be stranded by river shifting. This had the effect of creating a demand for ferries that operated all along the river. These mostly took the form of boats but rafts were present on the upper river as was the use of calabash floats (Moore 1738:269; Gray and Dochard 1825:150). There were no mentions of wharves in the Gambia until the nineteenth century.



Photograph 2.3.1: Bolongs on the south bank of the Lower River Division, Gambia	From Google Earth, Map data ©2021 Google

Map 2.3.2.1: Gambia Bolongs and ambush points	Own work, from charts and satellite imagery
Map shows a dot over every bolong entrance and channel on the banks of the Gambia that could hide a boat, subject to seasonal and change and change over years and climatic periods, not every bolong could be seen from imagery and maps, wetlands shown in green	

Map 2.3.2.2: Landing places, wharfs, and boatyards	Map shows landing places and wharfs shown on charts and modern boatyards, own work, from (British Admiralty 1942a; British Admiralty 1942b)



Map 2.3.2.3: European and Gambian forts	Most from later centuries, own work, adapted from

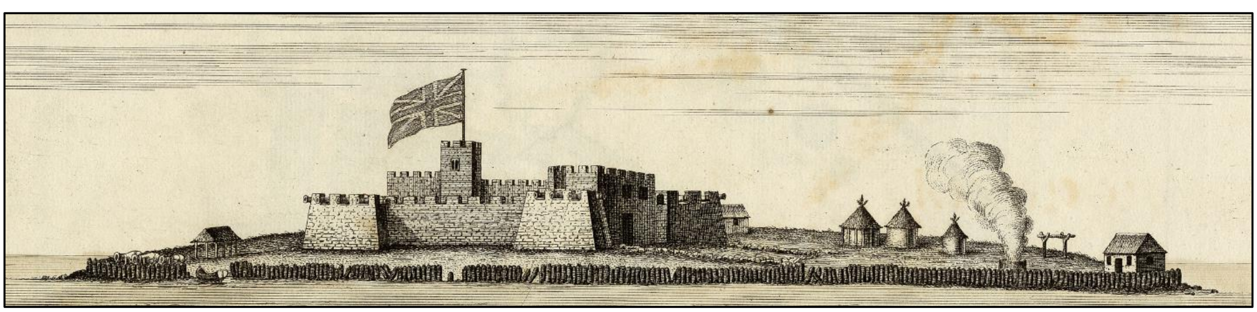
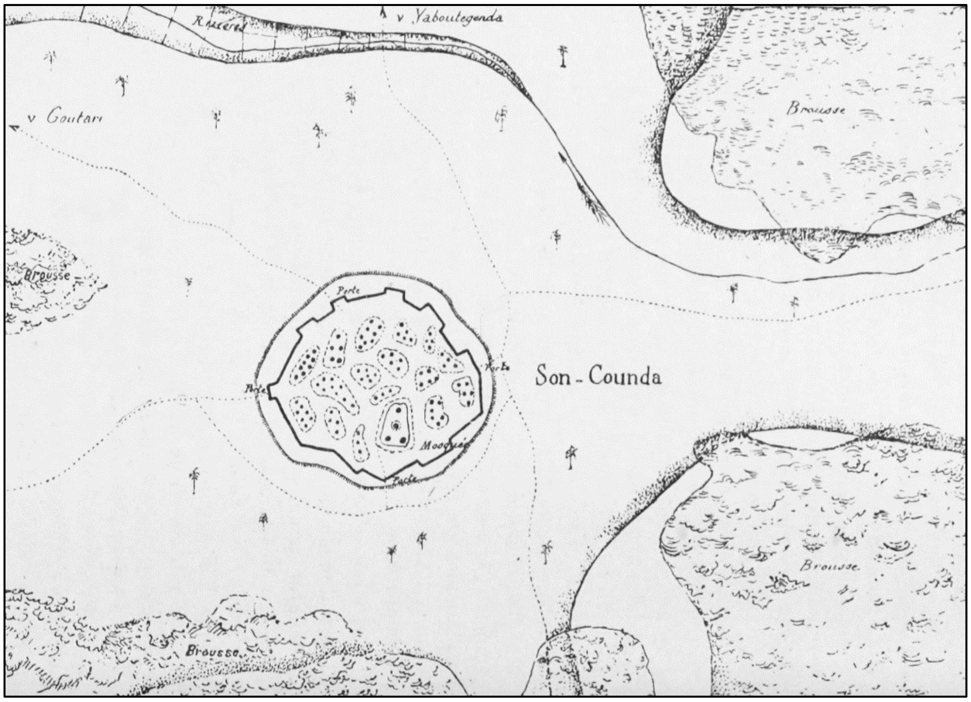


Illustration 2.3.1: Fort James, 1727	Clipped from (Smith 1727:4), an in-depth analysis can be found in (Balcerek 2020)



Map 2.3.2.4: Fortified town of Son-Counda, Kantora, Gambia	From (Rançon 1894:232; Gamble 1996:40–41)
Enclosure of tied stakes and thorns followed by a ditch followed by a two-meter timber stockade and ditch with loopholes, followed by a hardened clay “tata” wall three and a half to four meters tall, two meters at the base and eighty-centimeters at the top, the wall had battlements, recesses, and salients, homes inside were likewise stockaded with the residence of the town leader being double stockaded	

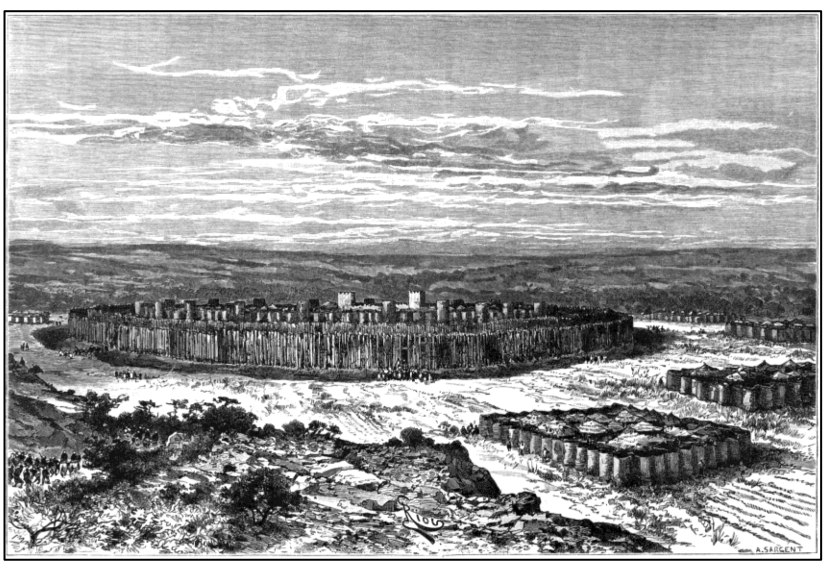


Illustration 2.3.2: Fortified city of Toubakouta, Senegal	From (Gallieni 1889:409)

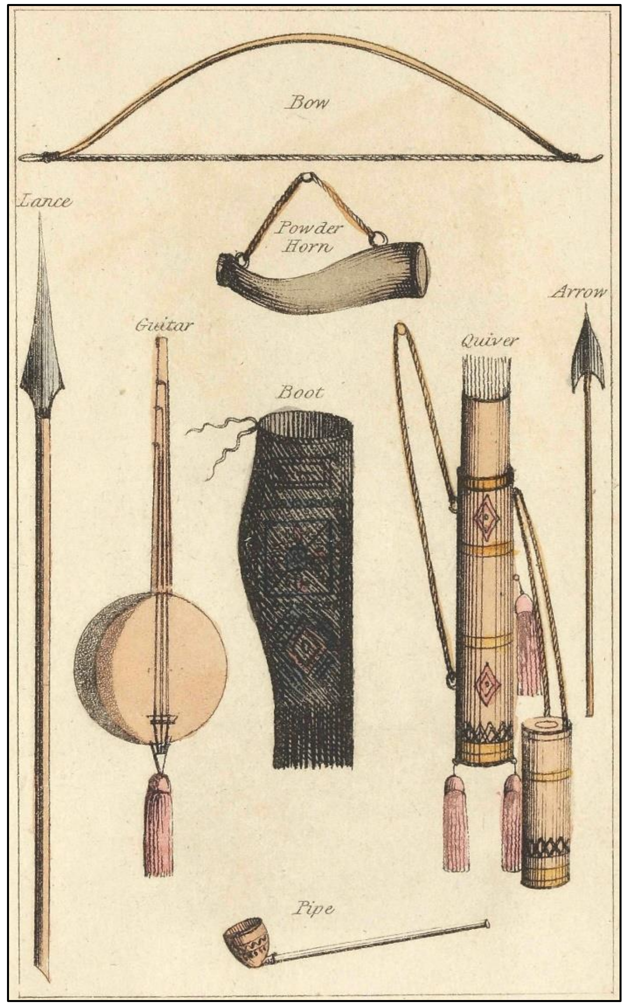


Illustration 2.3.3: Wolof Soldier	Illustration 2.3.4: Weapons and other objects
From (de Villeneuve 1814a:36a)	From (de Villeneuve 1814b)

CHAPTER 3: HISTORICAL PRIMARY SOURCES AND ILLUSTRATIONS TO c.1900

3.1 *Introduction*

Numerous sources described the boats of Senegambia at different times, but many were vague and when divided based on region there were many large holes in the record. The details given also varied widely and they were biased by locations visited, the author's own biases, and the author's knowledge. An author may also quote past authors, accurately or inaccurately, or fabricate or distort accounts in whole or part. It was also not always certain that the author always identifies the difference between logboats and extended logboats (Anonymous 1843:292). Nonetheless, a general pattern was observed over time by synthesizing many accounts and illustrations. Some illustrations and discussions of boats were by necessity excluded as they could not be for certain identified as being Senegambian boats. Many were also low detail and could be difficult to interpret. Additionally, some illustrations may have been wholly or in part made up, conveyed false impressions, or did things like put boats in one area in another. For the purposes of analysis and due to the large difference in reliability primary accounts and illustrations were presented separately from later photographic evidence and boat studies. Measurements were mostly recorded in English and French feet, so the original measurements and metric equivalents were included.

3.2 *Hull types*

3.2.1 <u>Senegal River Coast</u>

An issue for many sources discussing the Senegal River Coast was that coastal boats also operated frequently on the river around the settlement of Saint Louis and the fisher’s quarter of Guet Ndar where noncoastal boats operated as well. This often made it difficult to distinguish between riverboats and coastal boats and introduced the issue of the same boats being operated differently in different areas. Some illustrations were excluded from the analysis for this reason. Some of the same boats around the Senegal River Coast may also have been present along the Grande Côte, but the area was sparsely inhabited and sources on it were lacking.

Boats off the coast of the Senegal River in the fifteenth century were described as small logboats that operated with a crew of three to four (Cà da Mosto et al. 1937:34). A location unspecified source in 1670 claims a typical crew of three, but may have been quoting the previous source (Ogilby 1670:347). Sails were first attested on the Senegal River in 1675 and also appeared on a 1678-1682 illustration of Saint Louis both slightly earlier than the sources on the coast (Ritchie 1967:85; Barbot 1992:40a). A 1682 source described the largest boats as being thirty feet long (nine meters, fifteen centimeters) and a two-and-a-half-foot beam (seventy-five centimeters). They were described as logboats able to hold a maximum of ten to twelve people and had sails. The text was unclear if the larger boats were used on the coast (Le Maire 1695:164). Extended logboats were observed on the coast in 1685 which were around seven to eight feet long (two meters, fifteen centimeters to two meters, forty-five centimeters) and held a crew of five (la Courbe and Cultru 1913:19). In 1749 boats were observed to be ten to thirty feet (three meters to nine meters, fifteen centimeters) long with a beam and hollow of one to two feet (thirty to sixty centimeters), although it was still unclear if the thirty-foot (nine meter, fifteen centimeter) boats were used on the coast (Adanson 1759:94). One 1749 source described the boats as pointed, possibly the same characteristic projecting cutwater known from later boats (Adanson 1759:94). Around 1784-1785 extended logboats were observed to be typically only twelve feet (three meters, sixty-five centimeters) long, with a typical crew of five (Durand 1806:111). An 1840s illustration (Illustration 3.2.4) of boats on the coast showed extended logboats with projecting cutwaters. The boats appeared to be on the lower end of the size range around perhaps ten to fifteen feet (four meters, sixty centimeters) long. Another illustration (Illustration 3.2.2) from the 1840s around Saint Louis of a boat that may have also been used on the coast depicted a likely extended logboat with projecting cutwaters probably around thirty feet (nine meters, fifteen centimeters) long with four people on it. Another illustration (Illustration 3.2.5) of what may have been coastal boats from around 1840-1856, on a landing stage near Saint Louis, also showed extended logboats with projecting cutwaters which appeared to be on the upper end of the thirty-foot (nine-meter, fifteen-centimeter) range. An 1850-1852 source described extended logboats gives a typical length range of ten to thirty feet (three meters to nine meters, fifteen centimeters) and described the beam as between two and four feet (sixty centimeters to one meter twenty centimeters) and the depth as ‘proportionate’. They noted that the typical length boats used on the Senegal River Coast was ‘medium’ suggesting the larger boats were only used inland. It was unclear if the thirty-foot (nine meter, fifteen centimeter) figure applies to the coast (Boilat 1853:192–193). Another illustration (Illustration 3.2.7) showed probable coastal boats on a landing stage on the Senegal River were extended logboats with projecting cutwaters around 1852-1854. These boats were a shorter length likely around fifteen to twenty feet (Four meters, sixty centimeters to six meters). An 1861 illustration (Illustration 3.2.9) showed extended logboats with projecting cutwaters around Saint Louis with a likely length of around twenty feet (six meters). Two illustrations (Illustration 3.2.12, Illustration 3.2.13) from 1891 showed extended logboats with projecting cutwaters. The size of one was approximately thirty feet (nine meters, fifteen centimeters) described in older sources lending support for their use on the coast.

The development of extended logboats, the adoption of the sail, larger crews, and the growth in the size of boats were all likely interrelated developments that occurred simultaneously by at least the seventeenth century. The most common boat size appeared to have been a little over ten feet (three meters) likely due to the lack of suitable timber in the area and the expense of importation from further south. Thirty feet (nine meters, fifteen centimeters) appeared to be the possible maximum length of any boat on the coast, but these were uncommon. Unlike boats appearing in the twentieth century photographs and studies, boats in the nineteenth century appeared to have only had one level of strakes.

3.2.2 Senegal River

Boats on the coast could also be found on the Senegal River and its navigable tributary the Faleme River. Boats observed unambiguously on the rivers and boats ambiguous in location were presented here. Boats operating on the river had different operating conditions that may have affected size, shape, and load. The boats would also have likely been operated and used in different ways even if they were also used on the coast.

Like the coast the Senegal River was formerly the domain of logboats only according to accounts (Cà da Mosto et al. 1937:34; Fernandes 1951:7). As described previously a 1682 source which seemed to include the river described the largest boats as being thirty feet (nine meters, fifteen centimeters) long and two with a half foot (seventy-five centimeter) beam. They were described as logboats able to hold a maximum of ten to twelve people and had sails (Le Maire 1695:164). A 1685 source described a thirty-foot (nine meters, fifteen centimeter) boat loaded with twenty-one people, significantly more than noted on the coast. However, this boat may have been overloaded as it was easily swamped by a wave (la Courbe and Cultru 1913:92).

In 1675 an entirely different design of Senegambian boat was attested. These boats seemed to be shell-based plank-built boats built to carry cargo on the river. The size of the boat described was unknown, but it was described as the largest kind of boat and as being able to carry a very large cargo. The capacity was difficult to calculate from the given numbers and cargo but was likely many tons possibly exceeding ten tons (Ritchie 1967:85). A 1685 source described the same type of boat and gives more details. They were the largest boats on the river, which would mean around thirty or more feet (nine meters, fifteen centimeters) long, and were reported to be three to four feet (ninety centimeters to one meter, twenty centimeters) wide with a crew of eight or nine of which one was a bailer. It was possible that there was an additional crewmember or even two as on twentieth century boats as the person operating the steering oar may not have been included in the seven or eight paddlers described. This boat was described as weak due to a lack of frames which may explain the later addition of frames on Senegal River boats. This observation could also be due to the bias of the observer. (la Courbe and Cultru 1913:131–132). The planks for these boats were created with an adzed and sewn together, likely in the same manner as the strakes on extended logboats (la Courbe and Cultru 1913:131–132; Ritchie 1967:85). They likely looked more like later Senegal River frame-based boats than the shell-based plank-built boats of the Gambia. The existence of these boats and later frame-based boats made descriptions lacking detail confusing as the boat may have been a logboat or a plank-built boat.

An observer in 1749 rented a thirty-foot-long (nine meters, fifteen centimeter) boat with a beam and hollow of one to two feet (thirty to sixty centimeters) for use on the river. The same observer noted that boats varied from ten to thirty feet (three meters to nine meters, fifteen centimeters) (Adanson 1759:94). In 1751 a thirty-foot (nine meters, fifteen centimeter) boat was observed on the river (Adanson 1759:231). The same observer in 1752 saw a small boat with a crew of three (Adanson 1759:272). The boat they traveled in for a time had a dedicated bailer suggesting it was plank-built (Adanson 1759:273). Likely coastal extended logboats with projecting cutwaters around Saint Louis which appeared in an 1840-1856 illustration (Illustration 3.2.5). An 1840s illustration (Illustration 3.2.3) showed an extended logboat but appeared to be a boat reused from other illustrations. Another 1840s illustration (Illustration 3.2.2) appeared to have been an extended logboat with projecting cutwaters that may have been a coastal boat. An 1841 illustration (Illustration 3.2.6) of a logboat on the Senegal shows one end only with a large projecting cutwater but its accuracy was questionable. An 1843-1844 source described the boats of the Faleme river as "wide, long and well built " but rare (Raffenel 1846:122). A previously mentioned 1850-1852 source described extended logboats with projecting cutwaters gives a typical length range of ten to thirty feet (three meters to nine meters, fifteen centimeters) and described the beam as between two and four feet (sixty centimeters to one meter twenty centimeters) and the depth as 'proportionate'. They noted that the typical length one used on the Senegal River Coast was 'medium' suggesting the larger ones were used on the river only. (Boilat 1853:192–193). An 1840-1856 illustration (Illustration 3.2.7) showed probably coastal boats with expended logboats with projecting cutwaters around Saint Louis. An 1860 illustration (Illustration 3.2.8) depicted extended logboats with projecting cutwaters that were claimed to also be found on the Faleme River. An 1861 illustration (Illustration 3.2.9) of probable coastal logboats with projecting cutwaters around Saint Louis. An 1881 account described what was an Senegambian, likely frame-based, boats bottom planking giving out during a journey on the Faleme and the obtaining of new boats (Mitchinson 1881:368–369). An 1879-1880 illustration (Illustration 3.2.10) showed an extended logboat. An 1890 illustration (Illustration 3.2.11) showed an extended logboat. Two illustrations (Illustration 3.2.14, Illustration 3.2.15) from 1891 showed what appeared to be the frame-based boats with projecting cutwaters that were known from later pictures in the twenty to thirty-foot (nine meters, fifteen centimeter) range. A 1908 study gave the number of crew on a typical river boat as five to six. They distinguished two main river boats, frame-based plank-built boats and extended logboats. The extended logboats were described as similar to the coastal boats but with less freeboard and with flatter bottoms (Gruvel 1908:76).

Like the Senegal River Coast by at least the seventeenth century boats had adopted sails. A new design of shell-based plank-built boat also developed at the same time. It was likely the predecessor to later frame-based boats that existed by at least the late nineteenth century. The motivation behind this was likely the expanded cargo capacity they provided and the better availability of timber due to not needing whole large logs. The coast and the river were interconnected areas of watercraft use and development and so would have had a large amount of interaction, overlap, and a rapid spread of developments. However, the vastly different environments lead to divergent watercraft designs and use. The largest boats on the river appeared to have been thirty feet (nine meters, fifteen centimeters) although there would have been a wide variety of sizes.

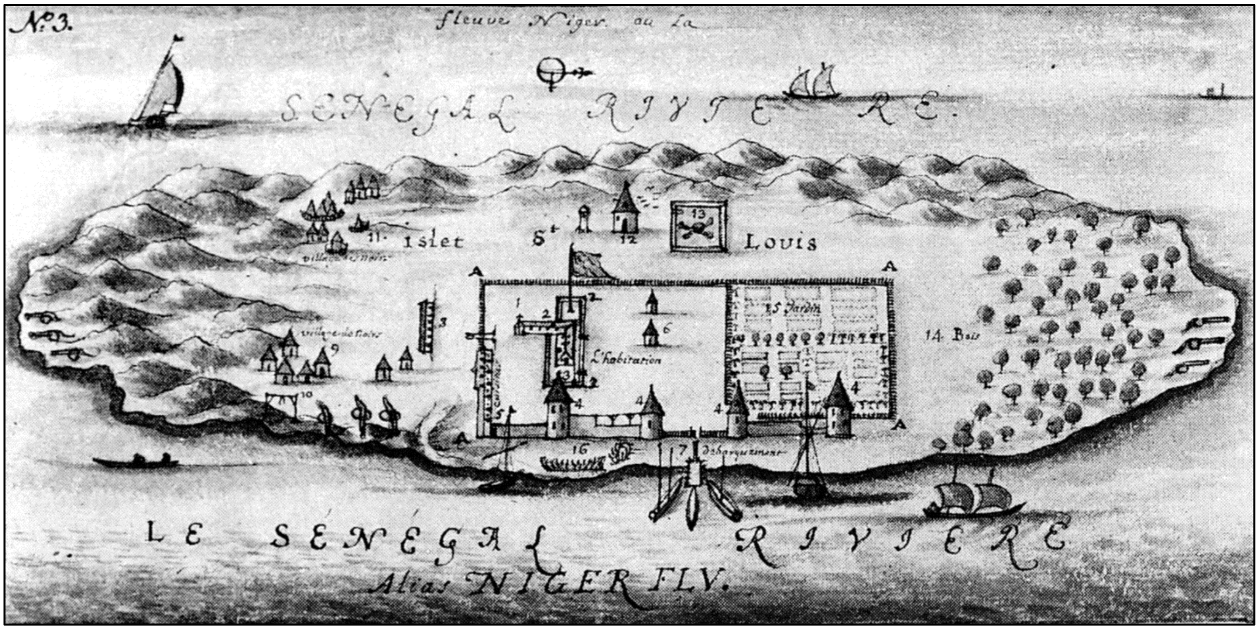


Illustration 3.2.1: Depiction of the Island of St. Louis	1678-1682, cropped, from (Barbot 1992:40a)	Drawn from firsthand observations but low detail. Elements may have been shared with other illustrations by the same author.

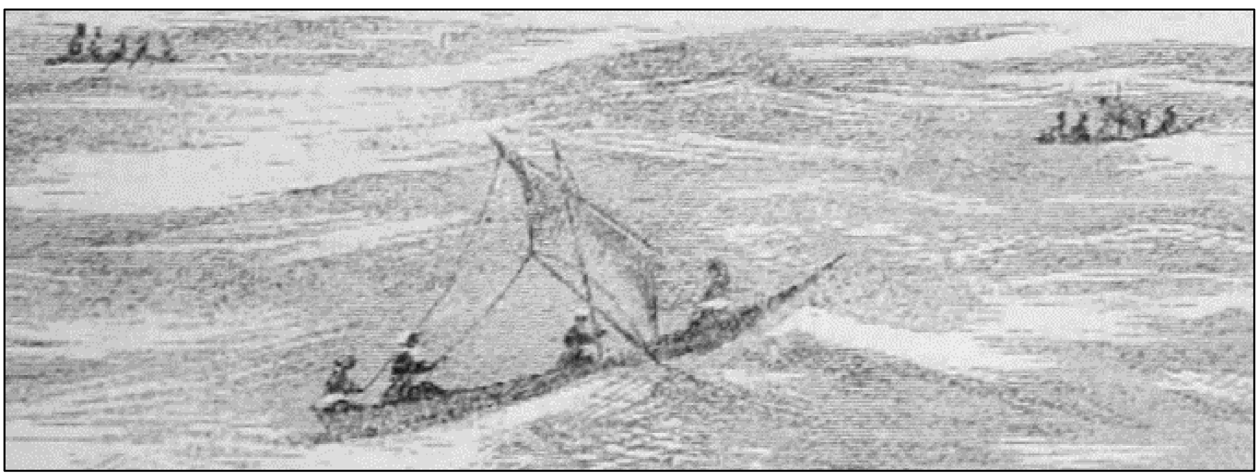


Illustration 3.2.2: Boats near St. Louis, seen from the Guet Ndar anchorage	1840s, cropped from half of two page spread, from (Frey 1890:5)	Drawn from firsthand observations but low detail and a reproduction of original.

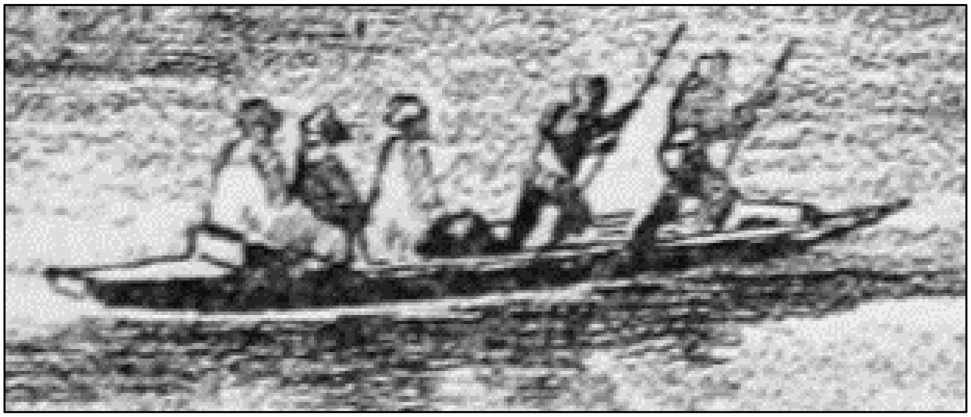


Illustration 3.2.3: Boat at Kounghany on the upper Senegal	1840s, cropped from half of two page spread, from (Frey 1890:149)	Drawn from firsthand observations but low detail and a reproduction of original. Elements may have been shared with other illustrations by the same author.

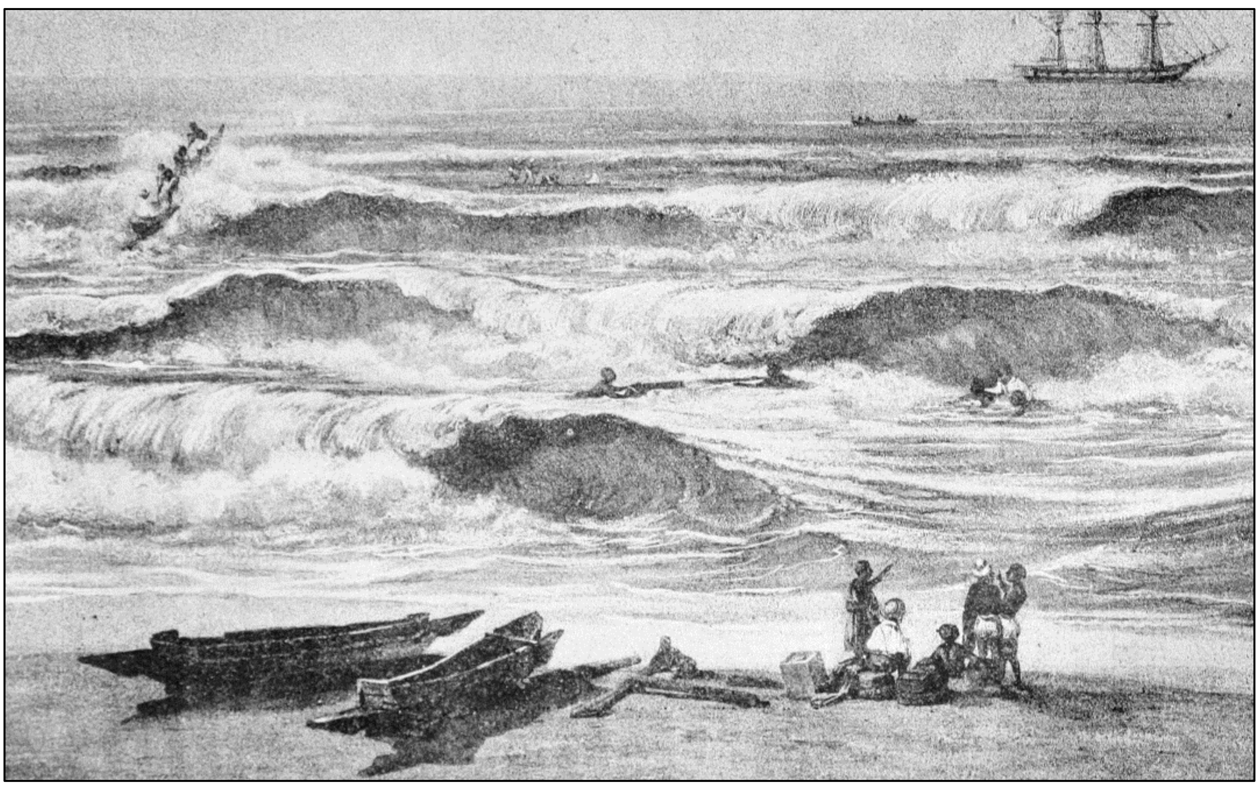


Illustration 3.2.4: Boats crossing the Guet Ndar breakers	1840s, cropped, from (Frey 1890:3)	Drawn from firsthand observations but a low detail reproduction of original.

Illustration 3.2.5: Landing stage downstream from St. Louis	1840-1856, from (Gillotin 1840)	Drawn from firsthand observations but art style made it difficult to interpret details.

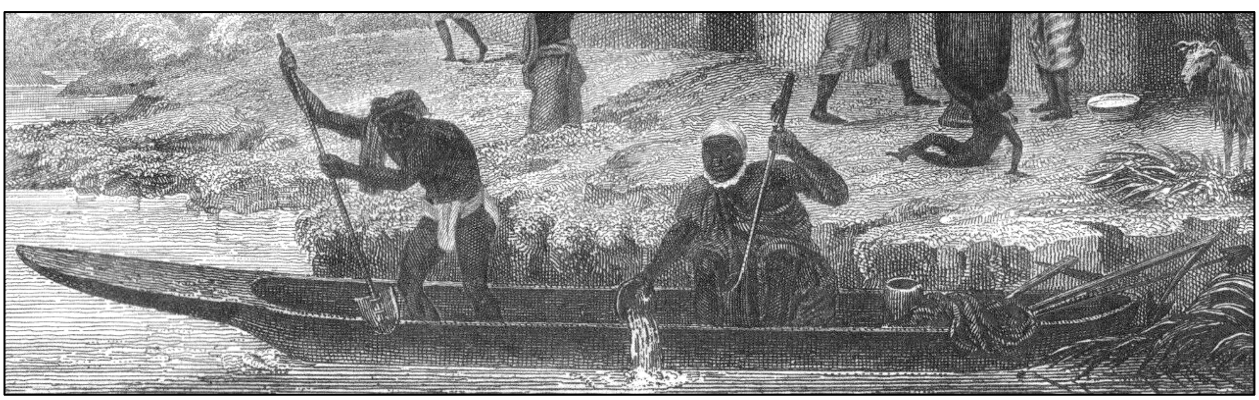


Illustration 3.2.6: Scene on the bank of the Senegal	1841, cropped, from (Florange 1841)	Shaky provenience and questionable accuracy.

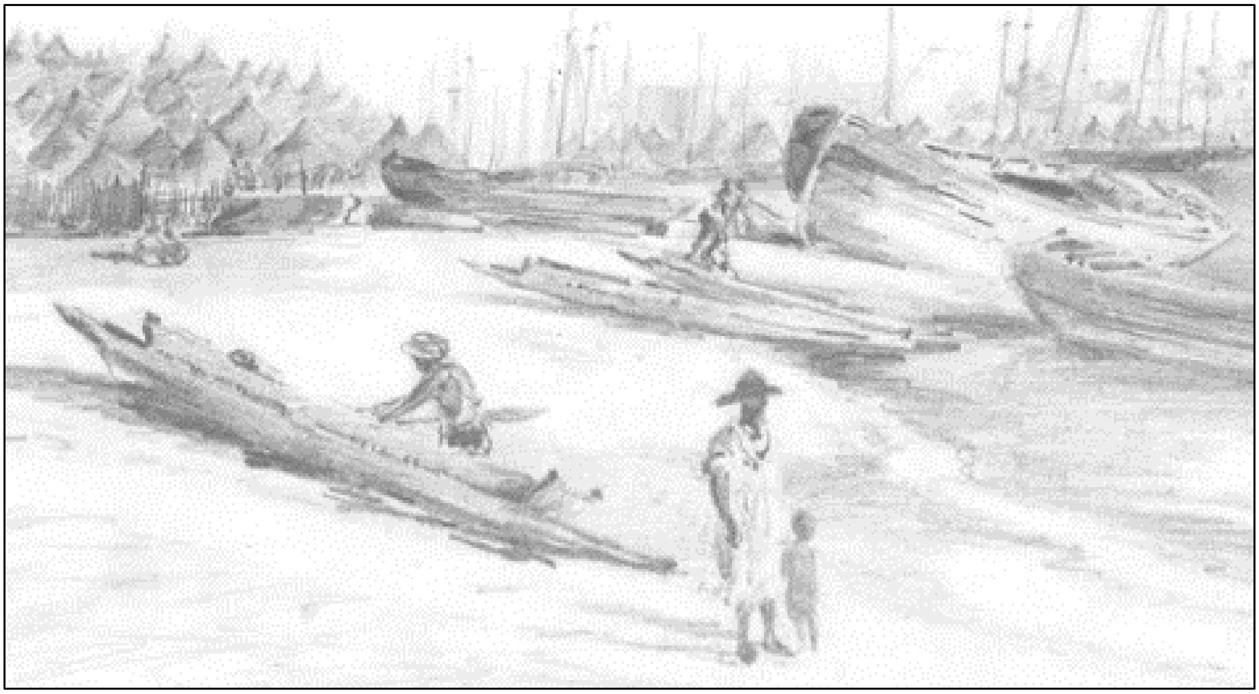


Illustration 3.2.7: Saint Louis, Senegal, beached boats	1852-1854, cropped, from (Gillotin 1852)	Drawn from firsthand observations but art style made it difficult to interpret details.

Illustration 3.2.8: Fishermen of Upper Senegal and Faleme	1860, cropped, from (Charton 1860:41)	May have been drawn from firsthand observations.

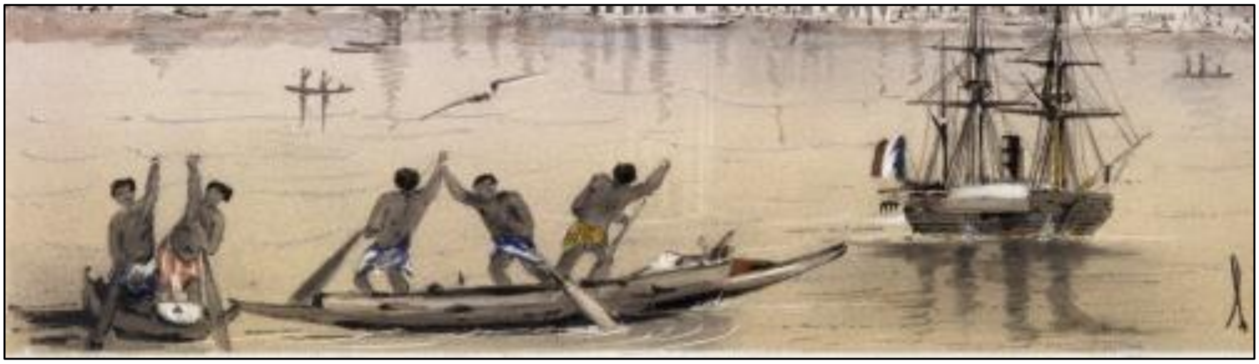


Illustration 3.2.9: St. Louis, Senegal, boats on the water	1861, cropped, from (Armand 1861)	Likely drawn from firsthand observations. Not to scale and stylized.

Illustration 3.2.10: Bridge over the Senegal at St. Louis with boat in the foreground	1879-1880, cropped, from (Lenz 1886:335)	May have been drawn from firsthand observations.

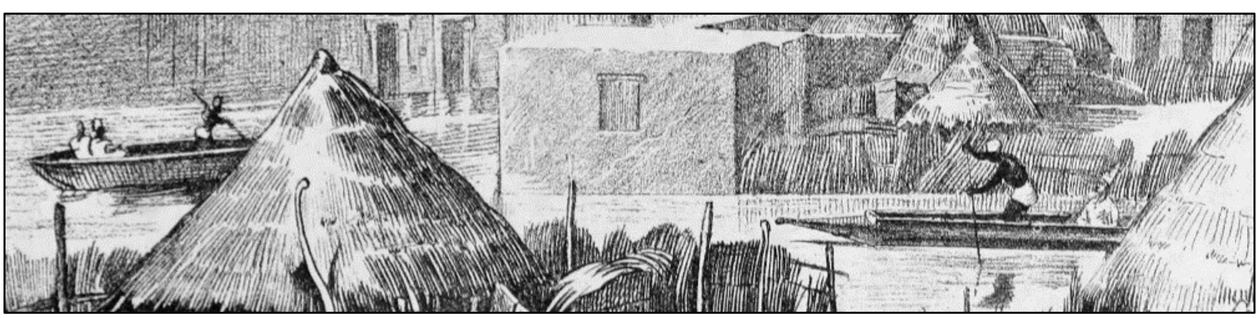


Illustration 3.2.11: Boats in Saint Louis during a flood	1890, cropped, from (Frey 1890:141)	May have been drawn from firsthand observations.

Illustration 3.2.12: Departure of the fishing boats of Guet Ndar, Senegal	1891, from (Perret 1891a), © Musée national de la Marine/P.Dantec N° inv. : 9 OA 173	Drawn from firsthand observations and high detail.

Cropped sections

Illustration 3.2.13: Departure of the fishing boats from Guet Ndar	1891, from (Perret 1891b) Musée d'Orsay, Paris	Drawn from firsthand observations and high detail. Accessible copy low resolution.

Illustration 3.2.14: Guet Ndar boats	1891, cropped, from (Roullet 1891a)	Drawn from firsthand observations but art style made it difficult to interpret details.

Illustration 3.2.15: Boats near the Sohr Bridge, St. Louis	1891, cropped, from (Roullet 1891b)	Drawn from firsthand observations but art style made it difficult to interpret details.

3.2.3 Cape Verde

Similarly, to other areas when Europeans ventured to the Cape Verde Peninsula in the fifteenth century, they encountered boats like those found farther north. One pair of boats encountered had ten crew while another six had thirty-five or forty crew including armed men in them (de Zurara 1896:226–227). This would give a general average range of five to seven people per boat. An illustration (Illustration 3.2.16) in an account in 1601 showed logboats with projecting cutwaters with from four to eight people in them. The text does not describe the numbers and form but the image seemed to match later descriptions (van Spilbergen 1617:3; Anonymous 1725:371–375). In 1606 there was a direct mention of sails being used around the Cape Verde Peninsula (Thilmans and De Moraes 1977:487). A 1669 source gave the first size estimates saying that most boats were no longer than seven or eight feet (two meters, fifteen centimeters to two meters, forty-five centimeters), had a one and a half to two feet (forty-five to sixty centimeters) in beam, and had a crew of five or six. The boats described may be logboats the source was unspecific and the ends were vaguely described as rounded off (Du Bois 1897:10). A 1675 illustration (Illustration 3.2.17) showed logboats with no projecting cutwaters and a crew of two. The original illustration was accessible and details about its creation have not been located. 1681 illustrations (Illustration 3.2.18, Illustration 3.2.19) showed boats with two masts which may indicate longer boats then observed but they seem to all have been based on the same basic template used by the illustrator in all regions and so could not be said to be reliable. A 1684 source simply described boats as not very large (Coelho 1985:5, Chapter 1). A 1785-1788 observer described extended logboats with a raised front and a projecting cutwater. They varied from twenty-five to thirty feet (seven meters, sixty centimeters to nine meters, fifteen centimeters) long with a crew of four to seven depending on the size of the boat. An illustration

(Illustration 3.2.20) of two of them showed a crew of four and five respectively in large extended logboats with projecting cutwaters. An 1805 source simply noted small raised front extended logboats with pointed ends (Spilsbury 1807:13). A model (Model 3.2.1) based off of 1830 measurements was an extended logboat with projecting cutwaters. A 1837-1840 source also described and depicted (Illustration 3.2.21) extended logboats with projecting cutwaters and two masts suggesting it was fairly long (Pâris 1841a:6). An 1840s illustration (Illustration 3.2.22) showed an extended logboat with projecting cutwaters with four people but was likely a reused depiction with an unknown original location. An 1841 illustration (Illustration 3.2.25) showed extended logboats with projecting cutwaters. An 1842 illustration (Illustration 3.2.23) showed an extended logboat with projecting cutwaters and likely holding three people. Two 1843 illustrations (Illustration 3.2.24, Illustration 3.2.25) showed extended logboats with projecting cutwaters and three to four people in each. One had an accompanying text that described the capacity of a boat as ten people. Alternatively an ox laying down inside the boat plus crew and two ox tied to the boat and swimming beside it (Anonymous 1843:292). These projecting cutwaters of extended logboats were described as four to five feet (one meters, twenty centimeters to one meter, fifty centimeters) long by a 1850s source but no overall length was described (Hewett 1969:36–37) An 1850-1852 source gave a capacity of thirty people with the boats described as extended logboats with pointed cutwaters (Boilat 1853:192–193). An 1875 source reiterated the presence of extended logboats with projecting cutwaters and included an illustration which showed them (Illustration 3.2.26) (Anonymous 1875:126). An illustration (Illustration 3.2.27) from 1880 departed from the norm by showing small two-to-three-person unextended logboats with notably long cutwaters fishing close to the coast. Other illustrations from the nineteenth century depicted the same form (Illustration 3.2.22, Illustration 3.2.24).

The development of watercraft around the Cape Verde Peninsula appeared to have followed the same general pattern as the Senegal River Coast. Initially, small boats became larger, up to thirty feet (nine meters, fifteen centimeters). However, early descriptions of length were much more limited, so it was difficult to be certain. Sails emerged in the seventeenth century at the latest and extended logboats were present by at least the late eighteenth century. The boats seem to have gone through a period of transition from raised front to fully extended sides around the early nineteenth century. Their length seemed to have also been limited compared to boats found further south likely due to only operating on the coast.

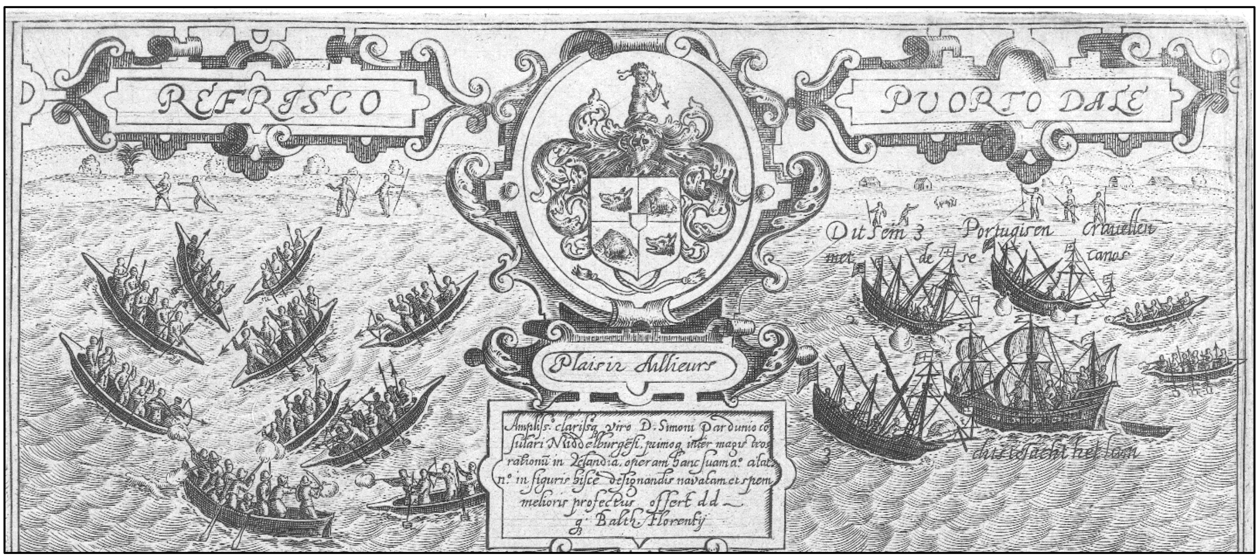


Illustration 3.2.16: Boats fighting at Rufisque and Portudal (Saly)	1601, cropped, from (van Spilbergen 1617:3; Anonymous 1644)	Unknown where the descriptions of these boats came from, but they appeared accurate to what would be expected.

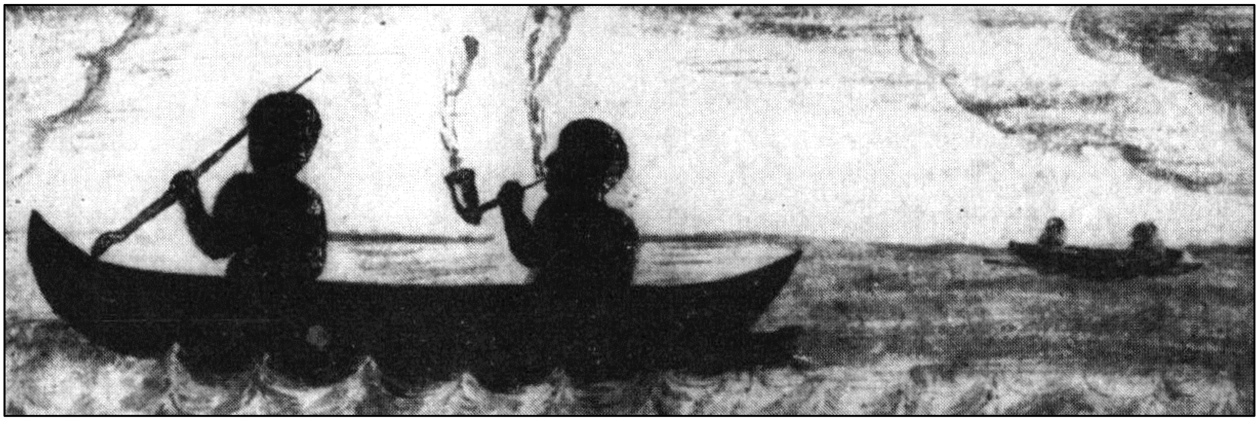


Illustration 3.2.17: Boats off Goree	1675, cropped, from (De Moraes 1973:250)	Unknown provenance details. Seemed to have divergent shapes from other illustrations. Boat in background may have displayed projecting cutwaters and extended sides but not certain.

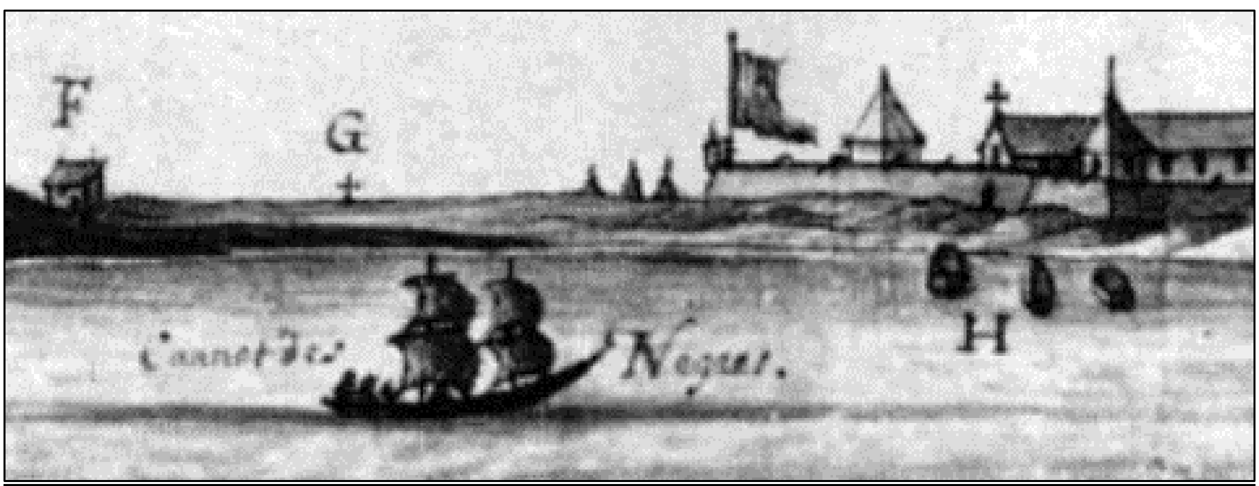


Illustration 3.2.18: Goree scene	1681, cropped, from (Barbot 1992:40b)	Drawn from firsthand observations but low detail. Elements may be shared with other illustrations by the same author.

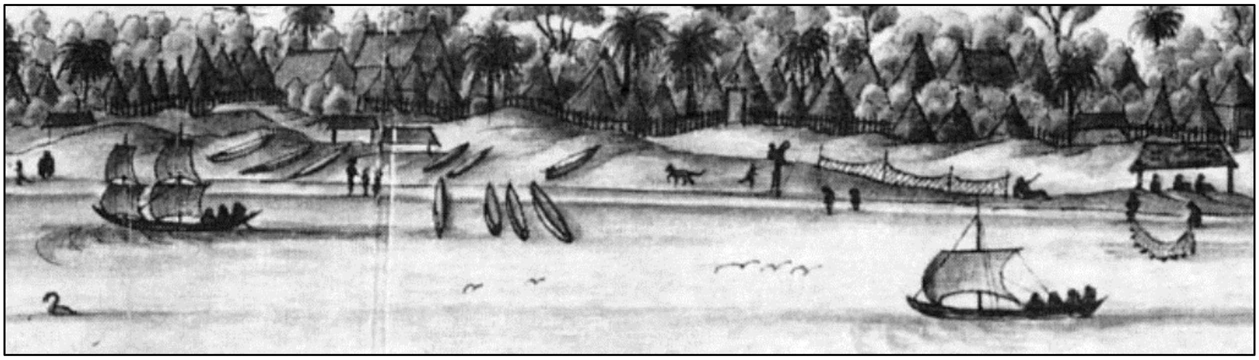


Illustration 3.2.19: Rufisque scene	1681, cropped, from (Barbot 1992:50a)	Drawn from firsthand observations but low detail. Elements may be shared with other illustrations by the same author.

Illustration 3.2.20: Boats off Rufisque on the Cape Verde Peninsula	1785-1788, cropped, from (de Villeneuve 1814a:60a)	Drawn on the spot from firsthand observations by author but simple style.

Model 3.2.1: Cape Verde Peninsula boat model	1830, from (François 1873)	Model made from direct measurements of a boat and overseen by someone who observed the boats firsthand although significantly after initial measurements and observations. Boat likely mounted a lugsail.

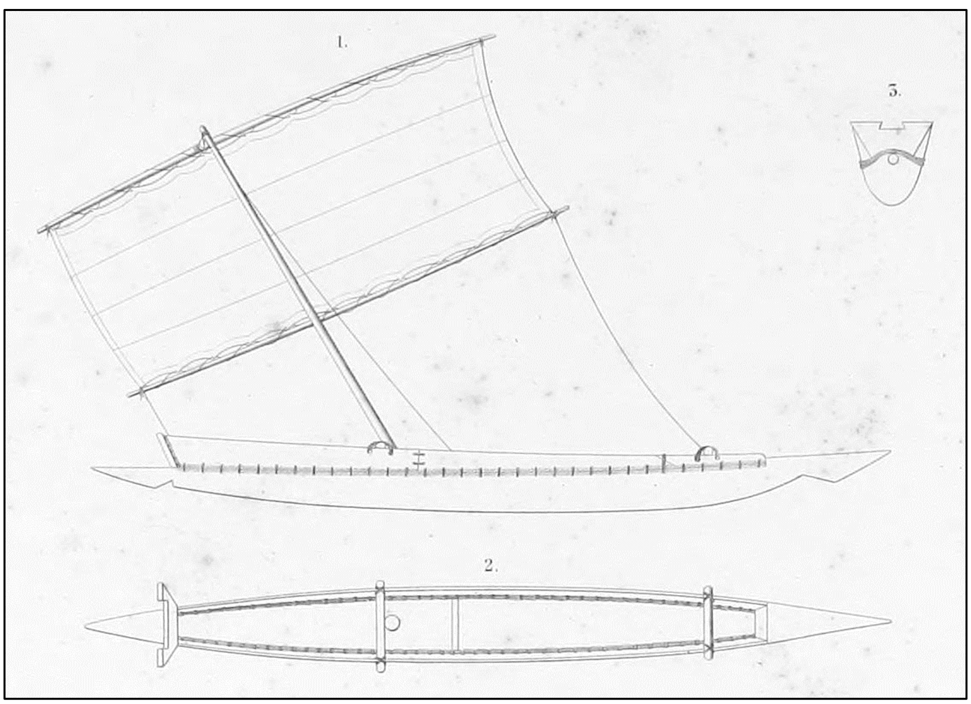


Illustration 3.2.21: Goree boat technical drawing	1837-1840, From (Pâris 1841a:Figures 1-3)	Drawn from the firsthand observations of skilled illustrator.

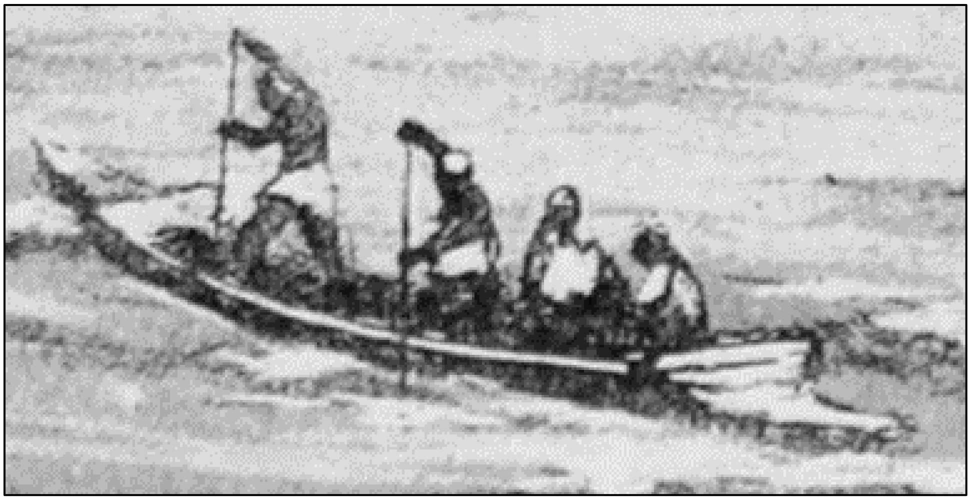


Illustration 3.2.22: Boat near Goree	1840s, cropped from half of two page spread, from (Frey 1890:189)	Drawn from firsthand observations but low detail and a reproduction of original. Elements may be shared with other illustrations by the same author.

Illustration 3.2.23: Boat in the background of an illustration of Goree	1842, cropped, From (Nousveaux 1842)	Made from firsthand observations but low detail background element.

Illustration 3.2.24: Boat in an illustration of Goree with lugsail	1843, cropped, from (Nousveaux 1843)	Made from firsthand observations but low detail background element.

Illustration 3.2.25: Boats near the southern tip of the Island of Goree	1841, cropped, from (Anonymous 1843:292)	Drawn from firsthand observations but low detail.

Illustration 3.2.26: Boat near the Cape Verde Peninsula	1875, from (Anonymous 1875:125)	Unknown details of creation but appeared to be from firsthand observation and high detail.

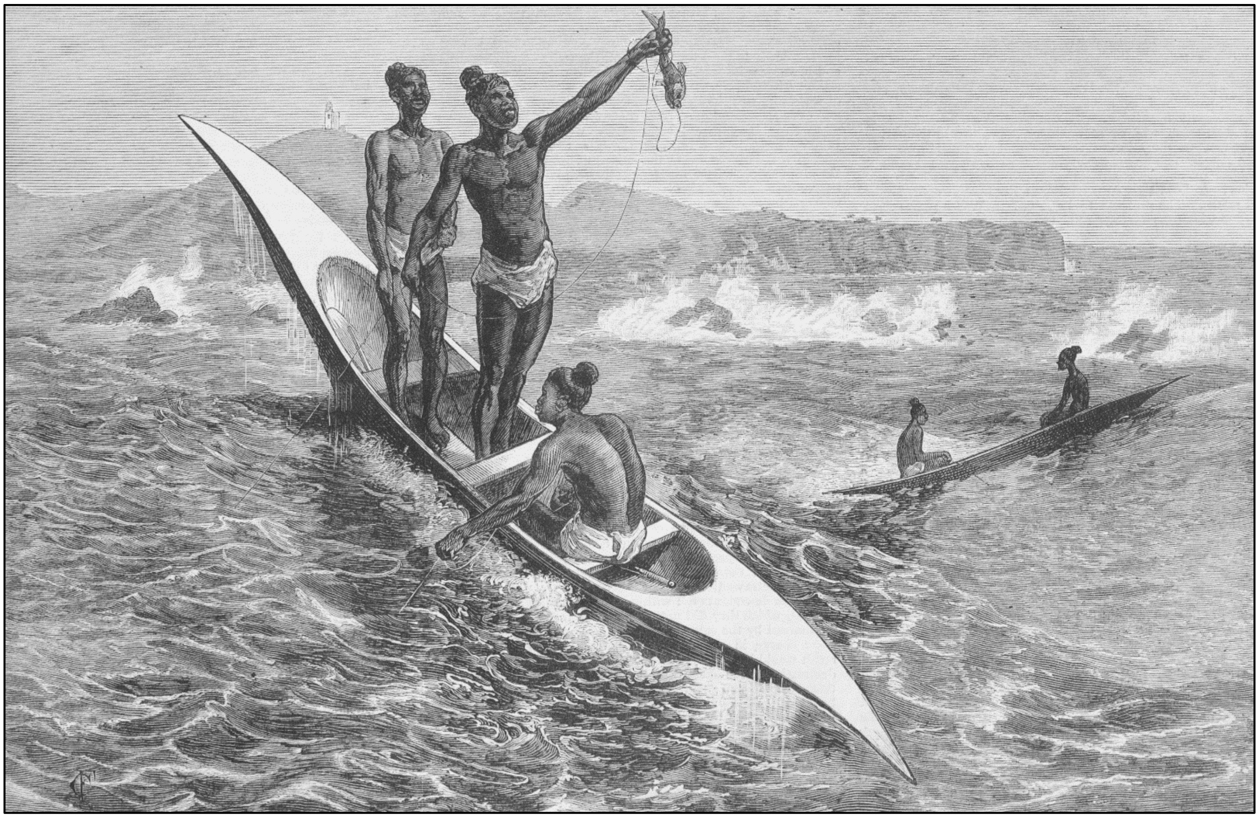


Illustration 3.2.27: Fishing boats off the Cape Verde Peninsula	1880, from (Anonymous 1880:653)	Unknown details of creation. Divergent from other illustrations but believable.

3.2.4 Petite Côte

The sources for the watercraft of the Petite Côte, which covered the area from the southern end of the Cape Verde Peninsula to the Gambia and here includes the Sine-Saloum Delta, were very limited. A 1601 illustration (Illustration 3.2.16) showed boats with projecting cutwaters holding five to six people in identical boats to the same illustration's depiction of the Cape Verde Peninsula. The text did not have any details on numbers or shapes (van Spilbergen 1617:3; Anonymous 1725:371–375). A 1749 account described a large boat with a crew of four and which likely held the same number of passengers (Adanson 1759:114). A brief mention of caulking secondhand gave support for the presence of extended logboats which would have been observed sometime before the 1780s (de Villeneuve 1814a:81). The same source later described boats able to hold twelve people as well as the existence of smaller boats (de Villeneuve 1814a:72–73). A 1785-1788 illustration appeared to show a large number of logboats (Illustration 3.2.29). An 1865 illustration (Illustration 3.2.28) showed a logboat with very long projecting cutwaters. An 1876-1877 source described extended and unextended logboats that typically held two to four people with projecting cutwaters (Corre 1883:9). The same observer also made an illustration (Illustration 3.2.30) of one part of the logboats. Some sources on the Gambia that described boats may also have applied to the Sine-Saloum Delta which had overlapping cultures and kingdoms with the Gambia. The same applied to the Cape Verde Peninsula making the Petite Côte an area of translation and overlap as it had diverse geographic areas and overlapping cultural and political groups with other regions. There was far too little data to make any substantial analysis of the region.

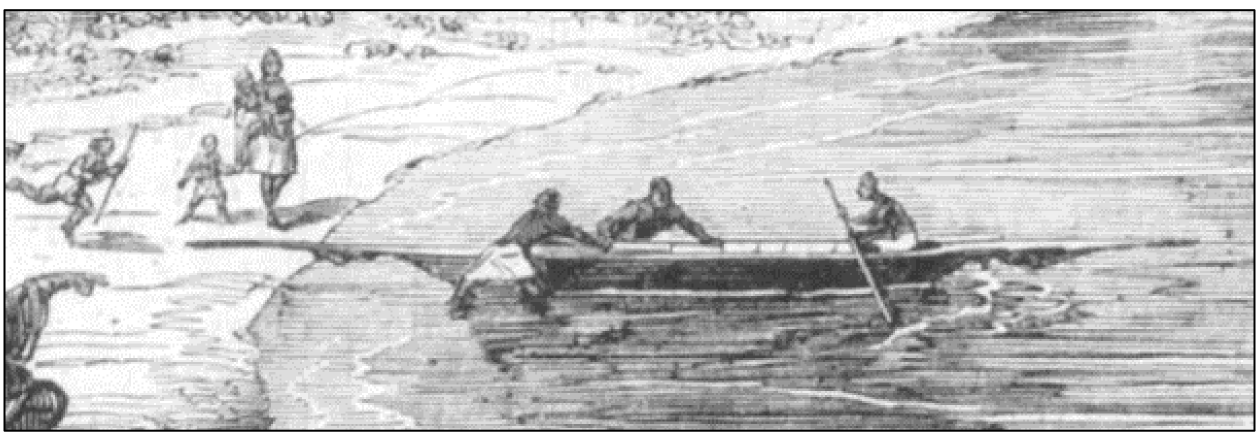


Illustration 3.2.28: Boat at Kaolack post in the Sine-Saloum Delta	1865, cropped, from (Anonymous 1865a:77)	Unknown details of creation but appeared accurate but low detail.

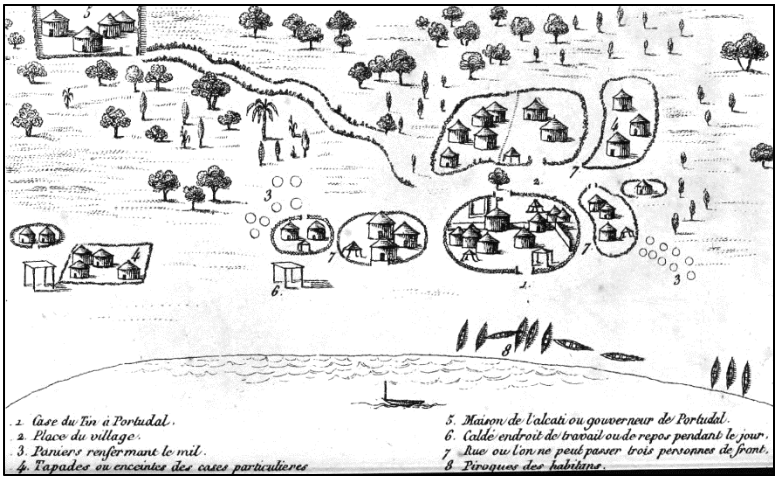


Illustration 3.2.29: View of Saly, Petite Coast	1785-1788, from (de Villeneuve 1814a:73a)	From firsthand observations but low detail.

Illustration 3.2.30: Okhem, place of offering to the spirits of the sea	1876-1877, from (Corre 1883:17)	Drawn from firsthand observation but only included a partial boat. A full boat illustration exists in original notes but was not accessible.

3.2.5 The Gambia

Although the review of primary sources was more extensive for the Gambia there were comparatively few details recorded. Like other areas, the boats of the Gambia were first observed in the fifteenth century to be only logboats. These boats held twenty five to thirty people (Cà da Mosto et al. 1937:57). Later seventeen boats armed to fight and described as large which held an estimated one hundred and fifty combined people were observed. This averaged out to around nine per boat but the numbers were likely not evenly distributed (Cà da Mosto et al. 1937:58). A 1506 source described the southern region generally likely referring to the Sine-Saloum Delta, Gambia, and Casamance areas. They described both small and large logboats that could hold three people, six people, or twelve people plus three or for cows. Boats specifically for war were described as holding sixty, eighty, and one hundred people (Fernandes 1951:29). A similarly geographically vague description from 1594 also gave a figure of one hundred people likely quoting the earlier source, this source also gave the earliest description of sails being used along the whole southern region (de Almada 1984:38). The same sources described large boats made to capture boats and ships in the middle region of the Gambia river with raised fronts meant to act as shields against gunfire (de Almada 1984:56). Some travelers in 1600 were offered caulkers for their boat by a local king suggesting that local people were already familiar with how to caulk boats (Purchas 1625b:246–247). Around 1682-1683 another source noted a figure of fifty to sixty people per boat and claimed to have personally observed one that could have held more than one hundred people in the lower Gambia (Thilmans 1976:25). A 1723 expedition purchased multiple logboats and recorded their size to the inch including how many people were in each. The table they included was transcribed with label changes and meter measurements below (Moore 1738:246).

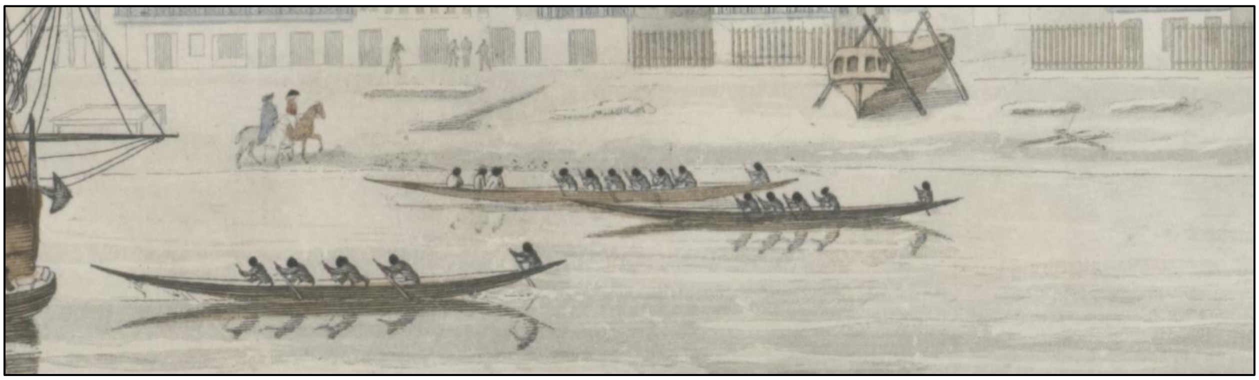
Table 3.2.5-1: Dimensions of Gambian boats										
Names of the boats	Length			Breadth			Depth			Number of Men
	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters	Men
The Chandos	42	6	12.95	6	4	1.93	4	9	1.45	12
Royal *Africa*	37	10	11.53	5	4	1.63	3	7	1.09	12
Gambia	34	0	10.36	4	4	1.32	3	4	1.02	10
Expedition	39	6	11.89	3	11	1.19	3	2	0.97	9
Discovery	33	0	10.06	5	3	1.60	3	3	0.99	10
									Total	51

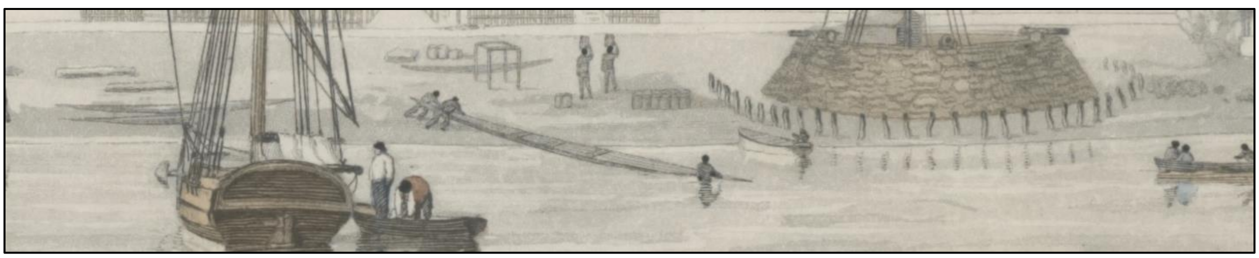
A 1750 source described the largest boats in the Gambia as forty to fifty feet (twelve meters, twenty centimeters to one meter, fifty centimeters) long with a four-to-five-foot (one meter, twenty centimeters to one meter fifty centimeters) beam and less slightly less hollow (Adanson 1759:170). An illustration (Illustration 3.2.31) from the Gambia of uncertain dating but around the early-to-mid nineteenth century showed boats around Bathurst that appeared consistent with the shapes of later boats. They appeared to be large logboats, likely as large as forty feet (twelve meters, twenty centimeters), and had very long and tapering cutwaters. An 1818 source mentioned boats carrying thirty people (Mollien and Berthier 1820:313). An 1834 source observed a boat described as a logboat (Alexander 1837:72). One source in 1845 observed two boats described as long, lashed together (Poole 1850:101). An 1850s observer described Gambian boats as similar to the extended logboats on the Cape Verde Peninsula they had seen previously (Hewett 1969:64). An observer in 1877 described boats “fashioned like crocodiles” providing the first account of the distinctly shaped boats seen later in photographs from the Gambia and the Sine-Saloum Delta (Ellis 1883:2). An 1891-1892 observer on the far upper

Gambia river described a logboat four meters (thirteen feet) long and fifty centimeters in beam with a hollow of thirty-five centimeters (one and a half feet). The boat was a specifically mahogany logboat, in contrast to the kapok boats most sources described (Rançon 1894:73). A final source in 1881 described kapok boats sixty five feet (nineteen meters, eighty centimeters) in length and six feet (one meter, eighty centimeters) wide (Mitchinson 1881:418). Kapok trees could provide logs that large however it was uncertain if such a boat would simply break in half under the strain. Approximately twelve meters or around forty feet seemed to be the typical upper limit.

It was clear from the records that large boats have always been the norm in the Gambia. This was likely due to the abundance of large timber and the large river. These boats appeared to have reached lengths of forty feet (twelve meters, twenty centimeters) or more and were able to hold a hundred people. However, there was a clear diversity of lengths with boats of all sizes operating along the river would have been all sizes like those found in other areas. An apparent absence of discussion of extended logboats in the sources may have been the result of the geographical layout of the Gambia. Unlike other areas to enter the Gambia did not require taking a boat across a rough bar to coastal settlements. Ships with travelers simply sailed up the river with a pilot if necessary. There was little reason for most observers to go to the coastal settlements where ocean fishing extended logboats may have been. Gambian watercraft were also being far less documented in written and visual sources than might have been expected and large logboats on the river tended to dominate most observations which were also mostly very cursory descriptions. Almost no illustrations existed of Gambian boats.

Illustration 3.2.31: View of the Town of Bathurst on the River Gambia	Early-to-mid nineteenth century, cropped, from (Busby 1800)	Likely from firsthand observations but low detail.





Cropped sections

3.2.6 The Casamance

Detailed discussion of boats from the Casamance was very limited and few conclusions could be reached about them. Much of the boat size variability attested on the Gambia would also likely apply to the Casamance as the sources were often vague enough in their geography to cover both areas (Fernandes 1951:29; Thilmans 1976:25; de Almada 1984:38). Given the abundant supply of large timber in the Casamance, there would be little reason to doubt that they could reach the same size as those in the Gambia. Boat sizes specifically attributed to the Casamance were uncommon. The earliest direct description of the boats of the Casamance described logboats able to carry fifty to sixty people (Fernandes 1951:63). The only other description located described the largest ones as fifteen meters (fifty feet) long and one and a half meters (five feet) in beam (Hecquard 1853:107). The same source discussed large boats and barges with a cargo capacity of up to thirty tons but does not specifically distinguish between the boats and barges (Hecquard 1853:105). Two illustrations (Illustration 3.2.32, Illustration 3.2.33) from 1890 showed small logboats at least one with a bench. A 1912 source also identified the boats of the region as logboats (Léon d' 1912:206). The data for this area was so limited it was impossible to determine what relationship the boats of the Casamance had to those of the rest of Senegambia.

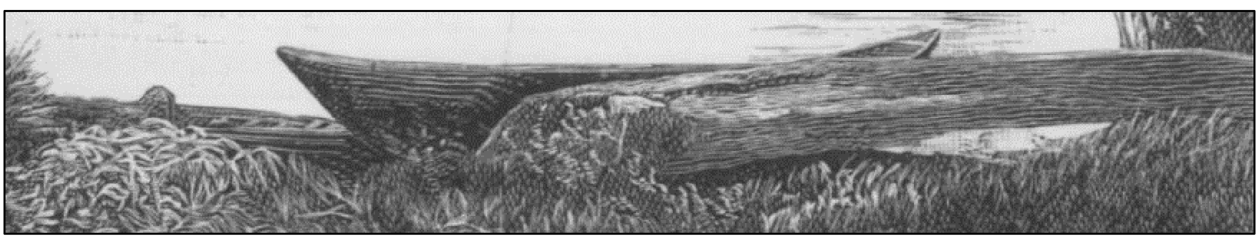


Illustration 3.2.32: Boats on the beach in the Casamance	1890, cropped, from (Anonymous 1890:219)	Unknown details but likely accurate.

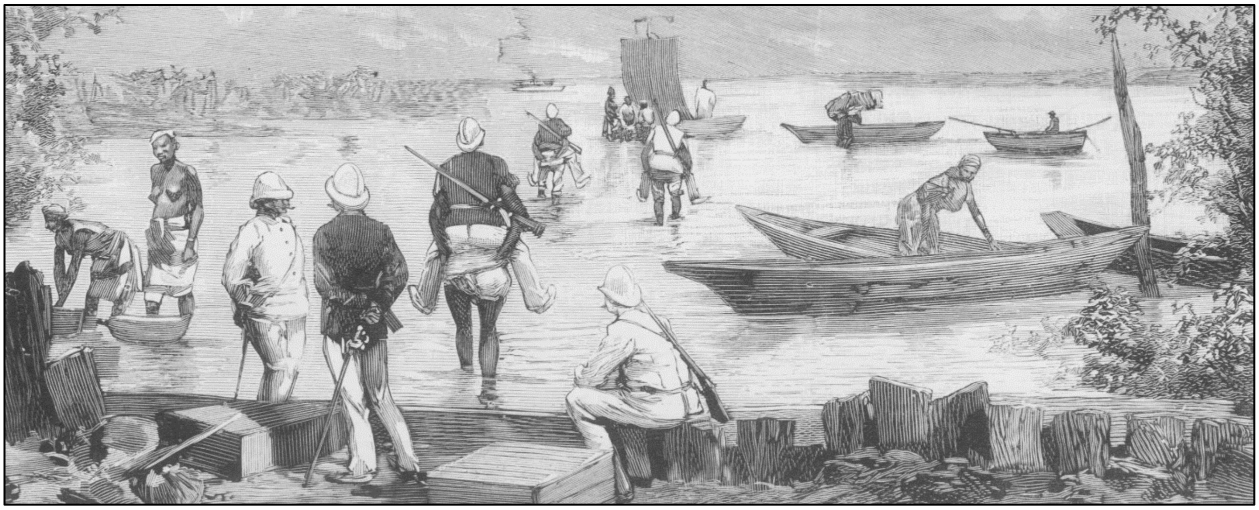


Illustration 3.2.33: Pier in Karantaba, on the Casamance River	1890, cropped, from (Anonymous 1890:219)	Unknown details but likely accurate.

3.2.7 Hull form conclusion

Overall, boats from all over Senegambia displayed features that appeared in later twentieth century boats studies and photographs such as projecting cutwaters, cutwater notches, extended sides, and raised bows. The evidence was, however, limited enough for much of the period and many regions, so it was mostly impossible to say for sure when and where specific innovations emerged for sure. Projecting cutwaters may be as old as the sixteenth century as they appeared in an early illustration from the Petite Côte and Cape Verde Peninsula and raised bows just as old in the Gambia according to primary sources, although they were not attested around the Cape Verde Peninsula until the late eighteenth century. However, full extended logboats appeared to have already appeared around the Senegal River Coast along with the predecessor of later frame-based boats. What was apparent however was that there were widely shared forms between areas.

It was difficult to accept the periodization and conclusions of Chauveau about the factors behind changes due to the very limited sample size they constructed their argument out of and the numerious flaws in information. While the fishing economy and the slave trade may have affected development of Senegambian boats, it was not supported enough to be definitive from such limited study (Chauveau 1988b). Any assertion from studies using modern oral history of the historical development of boats in centuries past was also suspect (Wright 1991).

3.3 *Sails*

3.3.1 Sail designs (Senegal River and Coast)

There were few detailed references to sails around the Senegal River Coast and on the Senegal River as well as ambiguity in illustrations. Due to this both the coast and the river were presented together. Sails were first attested on the Senegal River in 1675 on shell-based plank-built boats and were described as consisting of a sail and topsail (Ritchie 1967:85). A 1685 source describing the same boats fails to mention sails, only describing paddles and punting (la Courbe and Cultru 1913:131–132). Sails appeared on a 1678-1682 (Illustration 3.2.1) of Saint Louis drawn from firsthand observations. In the illustration, the sails were square sails on double masted boats with one sail on each mast and people sitting in the stern. The same boats were also used on other illustrations by the author and the detail was low so its accuracy was uncertain. A 1682 source described boats as being paddled or sailed on the coast (Le Maire 1695:164).

A 1751 source described a makeshift sail used on the Senegal river. A thirty-foot (nine meters, fifteen centimeter) boat had a ten-foot (three meter) mast set up in the front half of the boat with a small yard on top on which was set a rectangular piece of cloth the author calls a "paan" commonly used as a multi-purpose piece of clothing, bedding, and improvised sail (Adanson 1759:231–232). This sail was likely constructed of multiple 15 to 18 cm wide strips of cloth produced on Senegambian looms (Curtin 1975b:211–215; Kriger 2005). It would have been longer than it was wide and was linked to a banner when set as a banner. The two lower corners of this improvised sail were fastened to each side of the boat. The sail was then managed by one person while another steered. This sail proved fairly effective and traveling down the Senegal took the observer the equivalent of almost six nautical miles in less than an hour (Adanson 1759:231–232). The next description of sails on the cost came from 1845-1848 and was a dismissive comment about the boats sometimes having sails and how they were of low quality. The source in general was fairly bigoted with its language and its opinion on the quality of materials was thus not particularly trustworthy (de Pina 1972:246). An 1840s illustration (Illustration 3.2.2) showed boats operating around Saint Louis one of which had what appeared have a lug sail with a boom mounted in the front third of the boat. Although it is difficult to be sure due to the low detail the boom suggests a spritsail over a square sail as booms were never shown on previous square sails and on known spritsails. The sail appeared to have been controlled by two crew members sitting in the stern. Another person sits right behind the mast and another near the bow. The image was known to have been drawn from firsthand observations but it was possible the author could have used the same references sketched in multiple illustrations around Senegal so its original provenance could be questionable and its low detail made interpretation difficult (Frey 1890:5). An 1850-1852 source described boats as having one or two sails if the wind allowed, otherwise, they had to paddle (Boilat 1853:193). An 1881 source described boats with sails and boats paddling on the Senegal river (Mitchinson 1881:77). An 1891 illustration (Illustration 3.2.12) of the Senegal River Coast shows what were likely spritsails on boats in the background. A 1908 study described all sails as being spritsails (Gruvel 1908:74–75).

In total, the amount of information on sails use on the Senegal River Coast and the Senegal River was extremely limited with only a handful of mostly vague sources for different areas and boat types. In addition, the only illustrations were from around Saint Louis. The boats and sail setups therefore may or may not have been the same as those used on the coast. Little could be said about sails in the area than other than the evidence points towards the use of square sails during the same period as other areas which varied in number and number of masts. This was followed by a transition to lug sails then spritsails but a definitive timeline for this was impossible and it was uncertain.

3.3.2 Sail designs (Cape Verde)

The first mention of sails on the southern coast was from 1594 (de Almada 1984:38). The first account of sails specifically around the Cape Verde Peninsula was from 1606 and described boats as having three sails on one mast (Thilmans and De Moraes 1977:487). A 1669 account described the sails as like those on ships, so much so they were mistaken for European vessels at a distance (Du Bois 1897:9–10). A 1681 source described boats around the Cape Verde Peninsula and along the Petite Côte as having two or four sails with a few having six sails (Barbot 1992:100). A 1681 illustration (Illustration 3.2.18) of Goree shows a boat with two masts each with two square sails. Another 1681 illustration (Illustration 3.2.19) of Rufisque showed the same boat and a boat with a single sail. Although they were from firsthand observation the same boats were also used on other illustrations by the author and the detail was low. A 1684 source described boats with two “galope” sails on a single mast (Coelho 1985:5, Chapter 1). Galope apparently referred to the top section of the mast between the top of the mainsail and the top of the mast (O’Scanlon and Castillo 1831). This would suggest a mainsail with smaller topsails above it which was consistent with previous descriptions and later descriptions. A 1785-1788 description described boats as having one or two masts and two or three sails on each mast. They also described the masts as movable likely referring to them being able to be unstepped to cross the bar (de Villeneuve 1814a:61). An accompanying illustration (Illustration 3.2.20) shows a boat with a square mainsail with a smaller square topsail above it and a tell-tale attached to the top of the mast which was mounted in the center of the boat. All the sails described in the seventeenth century and before appeared to also be square sails. A 1908 study described all sails as being spritsails (Gruvel 1908:91).

An 1805 source described boats as having one or two sails which were "shoulder of mutton" sails (Figure 3.3.3) according to the sailors he asked (Spilsbury 1807:13). This type of sail was a right triangle with the angled side attached to the mast and the short side on the bottom (Steel 1794:90, 137). A model based on measurements from 1830 had two masts raked and lashed to thwarts and positioned in the front and back third of the boat (François 1873). An 1837-1840 illustration (Illustration 3.2.21) by the same person who oversaw the creation of the model depicted a very similar but smaller boat also with a raked mast in the front third of the boat lashed to a thwart but also set with a rectangular lug sail with a boom. They described the sails boats of the area as having no specific shape but this seemed to the result of bigotry which was clearly evident through the text (Pâris 1841b:6). An 1842 illustration (Illustration 3.2.23) depicted a boat with an unraked mast positioned in the front third of the boat An 1843 illustration (Illustration 3.2.24) depicted a similar sail but without a boom and not raked, the mast was positioned in the front third of the boat. An 1875 source asserts that sails were less used than paddles (Anonymous 1875:126).

It appeared there was a rapid adoption of square sails that started by at least the late sixteenth century. The number of sails and masts was highly variable. It appeared that in the nineteenth century there was a shift in sail designs with the lug gaining prominence for a time possibly along with other types. By the late nineteenth century, Senegambians had settled on the spritsail as no other type of sails could be seen in pictures and sources from the twentieth century anywhere in Senegambia.

3.3.3 Petite Côte and the Gambia

Very few descriptions of sails and no illustrations that could be definitively identified as Senegambian boats were available for the areas of the Petite Côte and the Gambia River. None were known from the Casamance. A 1682-1683 source on the Petite Côte mentioned sails but does not describe them (Thilmans 1976:25). The same source described the boats of the Gambia as having two "popesies" and two topsails (Thilmans 1976:25). The word "popesies" likely meant mainsails (Gamble 1993:3). This would suggest that the boats had two masts each with two sails. These were probably all square sails like in other areas. An 1876-1877 source on the Petite Côte described the sails as rectangular (Corre 1883:9). A 1908 study described all sails as being spritsails (Gruvel 1908:113). The same study asserted that in the Casamance sails were rarely used. (Gruvel 1908:128). It was apparently common for many boats from the Petite Côte to the Gambia to do without sails even much later (Postel 1950a:124).

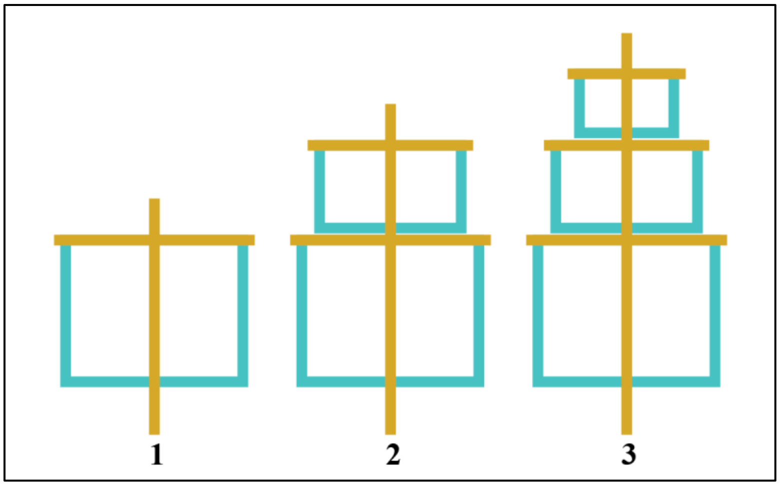


Figure 3.3.1: Square sails diagram	Partly theoretical, adapted from illustrations and text, own work
1: Sail, 2: Sail and topsail, 3: Sail, lower topsail, and upper topsail	

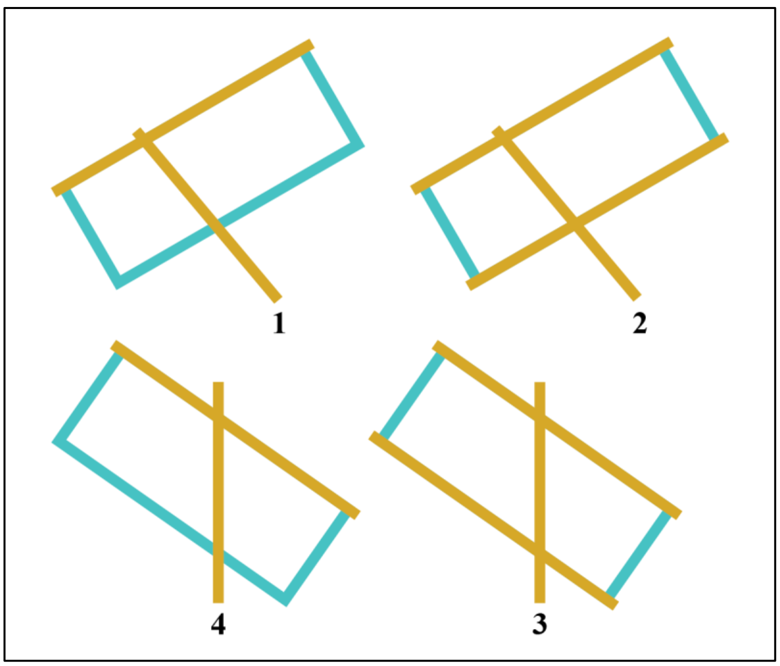


Figure 3.3.2: Lugsail diagram	Adapted from illustrations, own work
1: Raked mast with no boom, 2: Raked mast with boom, 3: Unraked mast with no boom, 4: Unraked mast with boom	

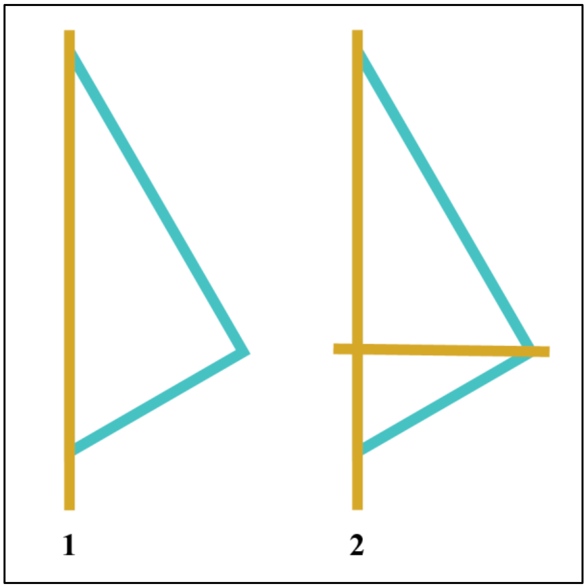


Figure 3.3.3: Shoulder of mutton sails diagram	Own work
1: Without boom, 2: With boom	

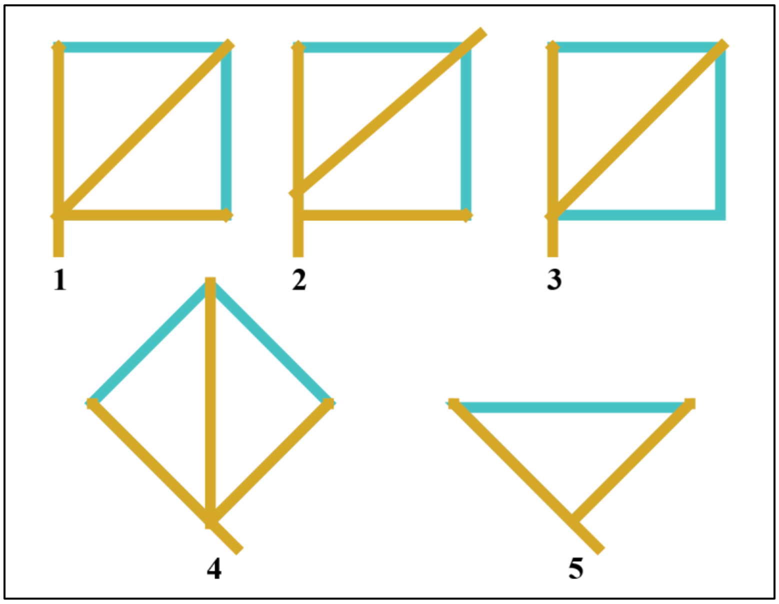


Figure 3.3.4: Spritsail diagram	Adapted from studies, own work
1-2: Spritsails with boom and different sprit positions, 3: Spritsail with boom, 4: “Wantareer”, 5: Bat wing “laafu njugup”	

3.3.4 Sails conclusion

Senegambians by the late sixteenth century adopted the square-rigged sail little more than a century after extended contact with European sailors which allowed for increased ability to traverse the coasts. The square sails efficiency when running before the wind was advantageous for fishing, leaving with the land breeze in the morning and returning with the sea breeze in the afternoon. Its simplicity and it being well suited to the daily rhythm of fishing and general ability to take advantage of the seasonal prevailing winds along the coast were likely the reasons for the quick adoption. The change in sail plan away from the square-rig to the lug sail, and the shoulder of mutton sail seemingly very quickly, by the early nineteenth century suggests a change in use and what aspects of sail performance were valued. The change to a fore-and-aft rig allowed much better performance when sailing close to the wind. This would indicate an increased emphasis on flexibility in performance and frequent operations outside the daily and seasonal rhythm that had prevailed for centuries. These sails may have been used before the nineteenth century, but only in the nineteenth century did they come to dominate and totally displace the square-rig.

The culmination of Senegambian sail development was the adoption of the spritsail and the subsequent development of the "wantareer" capable spritsail. The spritsail was another fore-and-aft rig that allowed good performance when beating to windward. The unique wandering spritsail sail arrangement, which appeared to have been a totally indigenous development, allowed for a spritsail to be canted, the side to side angle of the mast as opposed to forward back angle which was rake, and shifted into a configuration resembling a double spritsail. This meant that the wandering spritsail could have both the running power of a square-rig, and the ability of the spritsail to sail close to the wind. Furthermore, the canted "bordas" configuration even further increased the spritsails' ability to sail close to the wind. The "larga" maneuver likely helps this as well. This effectively obsoleted all other competing sails and by the twentieth century no other rig but the spritsail existed on Senegambian boats, spritsails pushed out alternatives even on boats with a fixed spritsail. The spritsail was likely present as a minor sail among other similar sails such as the shoulder of mutton sail in the nineteenth century until the development of the "wantareer" rig. Throughout the history of Senegambia many sail types would have been present from different European ships and later Senegambian sailed European style ships like the European style cutter. This suggested a strong intentionality in the types of sails used not a phenomenon brought about by a lack of ability to recognize and adapt other sail designs which when done happened very quickly.

3.4 *Paddles*

The sources on paddle shape were few and for the most part vague. Along the Senegal River Coast a source in 1749 described them as "small flat boards, laid across one another, and fixed to the end of a stick" appearing to say that the paddles were made of separate pieces attached together (Adanson 1759:95). A 1785-1786 source compared the shape to that of a peel, a tool with a long handle and broad head for extracting bread from an oven (Durand 1806:111). An 1845-1848 source also compares the shape to a peel (de Pina 1972:245).

On the Senegal River a 1685 source described the paddles as small (la Courbe and Cultru 1913:19, 132). An illustration (Illustration 3.2.6) dated to 1841 showed paddles that appeared to be U shaped with the handle tied. An 1861 illustration (Illustration 3.2.9) showed narrow bladed paddles in use on boats around Saint Louis. Some paddles were also shown in an illustration (Illustration 3.2.10) from an 1879-1880 account that may show a longer wide blade paddle and a shorter narrower blade paddle. Neither of these illustrations have particularly strong provenance that show they were based on accurate first-person observations. The 1841 illustration was the most suspect in this regard. The 1879-1880 illustration (Illustration 3.2.10) was of unknown authorship.

The earliest details about paddles from the Cape Verde Peninsula came from a 1601 illustration (Illustration 3.2.16) depicted them with U shaped blades, although there was no text description (van Spilbergen 1617:3; Anonymous 1725:371–375). A model (Model 3.2.1) based on information collected in 1830 had two paddles included that had triangular blades, flat side on the bottom, with a crosspiece at the top. No more details about these were known and no other information had been located on them or earlier paddle shapes in the area. An 1850s source described the paddles as spade shaped (Hewett 1969:37). While an 1853 source compared them to the shape of a spoon (Boilat 1853:193). And 1875 illustration (Figure 27) shows oval shaped paddles. In 1876-1877 on the Petite Côte paddles were observed to be short and have large ovel blades (Corre 1883:9).

Around the Gambia a fifteenth century source described the paddles as having a shaft shaped like a lance the equivalent of five feet five inches (one meter, sixty-five centimeters) long with a round blade tied at the end (Cà da Mosto et al. 1937:69). This description was later repeated inaccurately by another source (Fernandes 1951:31). In 1682-1683 the paddles were described as long flat poles, wide at the end, suggesting a narrow bladed style (Thilmans 1976:25). Around 1891-1892 a paddle was made on the upper Gambia for use on a boat made of palm rachises and described in detail. The shaft, made of a stick, measured a meter and twenty centimeters (four feet) long. The blade was made of a piece of wood fifteen centimeters (half a foot) in length was attached to the end (Rançon 1894:238). An illustration (Illustration 3.2.31) from the Gambia of uncertain dating but around the early-to-mid nineteenth century shows paddles that appeared thin bladed but were low detail.

The evidence suggested that wide bladed paddles predominated in all areas. However, the unspecific nature of many descriptions and the frequent presence of narrow bladed paddles in descriptions, and photographs, and artifacts from around the Senegal River and Senegal River Coast suggests they were more common in those areas. It was likely that paddle length was also longer in areas where paddles were mostly used standing up compared to sitting down. The overall performance may not have been different enough between paddle shapes to create a clear preference, or other factors such as material availability or personal preferences may have been much more influential on the choice of paddle shape.

3.5 *Thwarts*

There were very few explicit mentions of thwarts in primary sources. Some sources from the Senegal River Coast even mentioned the lack of thwarts or how they were only on some boats, attached in an unspecified manner (Durand 1806:111; Adanson 1759:94–95; de Pina 1972:245). This would make sense as a common mode of paddling was standing which would remove the need for seats although thwarts could be used to strengthen the hulls of boats by resting transverse forces this was likely less necessary for boats which had logboat hulls. The Cape Verde peninsulas descriptions indicated that thwarts served as benches for passengers (Boilat 1853:193; Anonymous 1875:1875). This was consistent with their implied presence by the paddlers being described as sitting by sources, as well as early images and illustrations.

The earliest illustration to depict thwarts was a 1785-1788 illustration (Illustration 3.2.29) from the Petite Coast with three thwarts per boat but had low detail so it was difficult to tell the exact number. An 1830 model (Model 3.2.1) from the Cape Verde Peninsula showed cylindrical thwarts lashed along the top of the sheer strake and halyard thwarts between the sheer strake and the logboat hull. The boat had a cylindrical bow and stern thwart as well as two mast thwarts and associated halyard thwarts. A boat illustration (Illustration 3.2.21) from the Cape Verde Peninsula lashed along the top of the sheer strake in an X pattern. The boat had a mast thwart, a halyard thwart behind it, and a thwart in the stern. An 1875 illustration (Illustration 3.2.26) from the Cape Verde Peninsula showed bow and stern thwarts lashed to the top of the sheer strake. An 1876-1877 illustration (Illustration 3.2.30) of a boat from the Petite Coast showed a small thwart (Corre 1883:17). An 1880 illustration (Illustration 3.2.27) of logboats from the Cape Verde Peninsula showed three bench thwarts. Three illustrations, one from the 1840s (Illustration 3.2.4), the others from 1891 (Illustration 3.2.12, Illustration 3.2.13), of boats from the Senegal River Coast showed cylindrical mast thwarts. An illustration (Illustration 3.2.31) from the Gambia of uncertain dating but around the early-to-mid nineteenth century shows boats with wide benches. It was likely that most boats with people sitting had benches due to wanting to avoid sitting in the water that would collect at the bottom of the boat.

The illustrations and sources would suggest that thwarts were used and that from at least the nineteenth century boats with sails used mast thwarts. These were located a third the total length of the boat from the bow in the case of single masted boats. Boats also often had thwarts in the bow and stern.

3.6 *Cargo capacity*

There were only a few notes on the cargo capacity of the largest Senegambian watercraft. One estimate for large kapok boats in southern Senegambia gave a capacity of 18 or 20 tons

(Reclus 1876:135). Two more vague estimates likely referred to plank build boats on the Senegal river. One compared the amount one could hold to a fully loaded large “goélette” or schooner (Boilat 1853:273). Another gave measurements but the exact conversion ratio was unknown but certainly in the multiple tons. It reads “They carry a hundred matas, of the big moule of millet which was the measure of the country which we use at the Colony to accommodate ourselves to them. This came to seventy barrels or thereabouts” This seemed to be an estimate specifically for an early design of plank boat without frames and not a logboat (Ritchie 1967:85). An 1853 source that discussed boats and barges on the Casamance gave a figure of up to thirty tons but did not distinguish between the boats and barges so it was unclear if one or both of had that capacity (Hecquard 1853:105). A 1908 study gave a figure for the logboats of the Casamance of eight to ten tons (Gruvel 1908:128).

3.7 *Numbers*

Almost no estimates for the number of boats in different areas existed. One vague estimate from 1684 set the number of boats operating in the Gambia at over one thousand (Coelho 1985:1, Chapter 2).

A 1908 study gave an estimate of five hundred boats of Senegambian design operating out of Saint Louis. These were split between sea and river boats (Gruvel 1908:73). The same study estimated that around one hundred boats at a time operated offshore (Gruvel 1908:77). An estimate in 1912 asserted the number of boats operating off of the Senegal River Coast was one hundred and fifty (Léon d’ 1912:45).

The 1908 study also estimate a total of thirty boats which conducted ocean fishing out of Dakar. Rufisque was reported to have around one hundred boats of which half were seasonally there from the Saint Louis coast. Other smaller settlements along the coast had between ten and thirty boats each (Gruvel 1908:90–91).

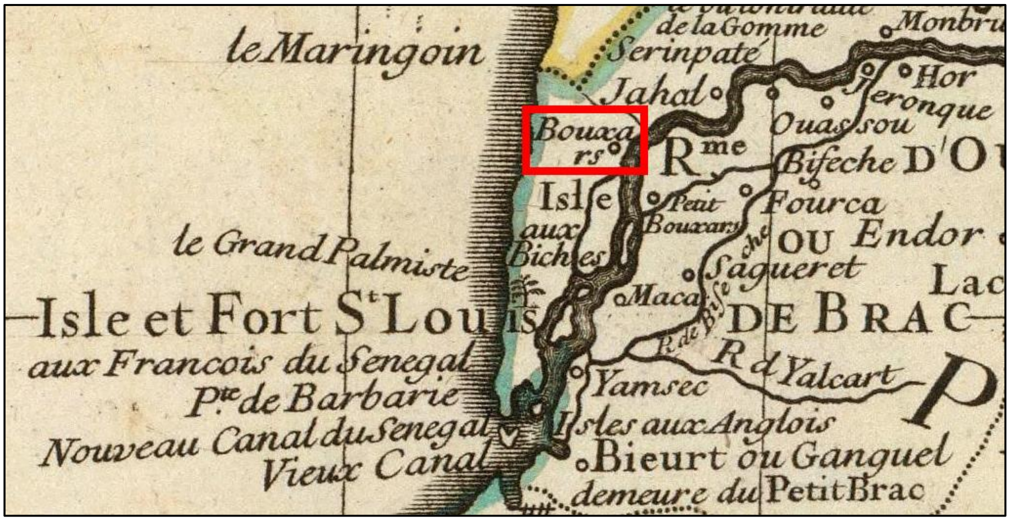
One the Petite Côte the numbers varied considerably by settlements over which the boats were spread. Somone with twelve, N'Gaparou with around the same, M'Bour with twenty, Nianing with seven or eight, N'Gazobil with four or five, Joal with one hundred, Palmarin had an unspecified number of boats as well. There were also seasonal migrant fishers from the Cape Verde Peninsula. In total the number of fishing boats added up to around one hundred and fifty five or one hundred and sixty operated by around seven hundred and fifty to eight hundred fishers (Gruvel 1908:104).

The Sine-Saloum Delta was reported to have around two hundred to two hundred and fifty fishing boats with around seven hundred or eight hundred fishers. It also attracted significant migrant fishers numbering some eight hundred to one thousand (Gruvel 1908:113–114).

3.8 *Locations*

Boats appeared to have been made everywhere around Senegambia to some degree likely in a decentralized manner as specific towns were rarely mentioned but boats of all sizes seen everywhere. However, some areas were particularly notable for their production of large boats for export. A 1685 source discussing the construction of an early design of shell-based plank-built boats used for trade all along the Senegal River identified the center of production for the largest boats as "Boucsart", in Waalo (la Courbe and Cultru 1913:131–132).

The other major center of boat production was the Petite Côte, particularly the kingdom of Sine. This area specialized in the production of boats including boats for export further north as far as the Saint Louis coast. This appeared to have been an active center of boat production from at least the late eighteenth century into the twentieth century (de Villeneuve 1814a:70–73; Boilat 1853:193; Lasnet et al. 1900:171). An unnamed town in Sine-Saloum Delta was noted by a traveler as having boat carvers (de Villeneuve 1814a:147).



Map 3.3.4.1: Possible location of Boucsart	1727, from (Delisle 1727)

3.9 *Price*

The knowledge of the price of a Senegambian boat historically was limited and subject to difficulty in interpretation. However, one source around 1785-1788 discussing the cost of boats produced on the Petite Côte give a price of twenty to thirty bars (a type of iron currency traded in West Africa), equivalent to 60 to 90 francs at the time for a large boat capable of holding a dozen people. Small boats were simply described as costing much less (de Villeneuve 1814a:72–73). Other price quotes existed for boat and various materials but only for the twentieth and twenty first century making them not useful for understand pre-colonial prices.

3.10 *Other watercraft*

There were three main aquatic animals that present a high degree of danger to boaters in Senegambia. Hippos, Crocodiles, and Sharks. Primary sources were full of warnings about the danger of hippos to the unwary to such an extent that they should be regarded as the most dangerous animal to boats on the waterways of Senegambia. A particular danger was accidentally passing over the back of a submerged hippo or disturbing a mother hippo. Aggressive hippos were described as easily capable of biting a boat in half (Shoberl 1821b:164–165; Reeve 1969:259; Thilmans and Rossie 1969:111; de Almada 1984:55). Although a belligerent hippo may merely upset a boat (Le Maire 1695:123). This was not surprising given their massive size and aggression which gives the hippo a reputation as an extremely dangerous animal down to today. Fortunately for coastal mariners, Hippos were mostly confined to inland rivers.

The crocodile had a strong reputation as a danger to people and animals but its danger to boats seemed to have been limited as warnings about crocodile's danger to boats were far less common than warnings about hippos. They could still present a danger to a boater however particularly if they managed to overturn the boat, the boat was upset somehow, or the person was out of the boat in the water or on the bank (Le Maire 1695:122; Mitchinson 1881:442–443). They appeared to have been far more of a danger to swimmers and cattle. It was common to employ guards in boats armed with a bow or a gun to escort swimming animals (Purchas 1625a:286; Rançon 1894:216–217). An alternative way was to send someone into the water with sticks to beat the water and yell to scare them off (Lajaille 1802:29–30). They appeared to also have been dissuaded by the noise of large herds (Lajaille 1802:29–30; Gaunt 1911:38). Like hippos, they would be mostly confined to inland rivers. It appeared that the local people knew which areas were dangerous enough that they should only travel by boat and where crossings could be safely done.

Sharks would be present in the ocean and some species in the river, as the Gambia River was notable for having saltwater far up its mouth and some sharks such as the bull shark can tolerate fresh water. An unlucky boater whose boat capsized may be bitten by a shark, although no direct accounts of this from Senegambia accounts existed from other areas of the Atlantic coast (Frey 1890:7–9; Dawson 2017:101).

Domesticated animals of all kinds swam, sometimes tied behind or to the sides of boats, and were ridden across rivers (Durand 1806:133; Alexander 1837:72; Hecquard 1853:93, 102; Frey 1890:175–176; Rançon 1894:113, 237). Swimming was most common in areas of relatively shallow water and narrow crossings. This practice would indicate that it was a reasonably safe and common practice with the right precautions. Alternatively, if large enough boats were available or the river to wide could be transported on boats or rafts (Alexander 1837:72; Anonymous 1843:292; Boilat 1853:192; Huntley 1850:308; Fernandes 1951:29).

Africans were well known as skilled swimmers and divers including the people of Senegambia. Almost universal ability to swim and dive could be assumed for most people, men, women, and children near water. The history of West African swimming and diving had been explored by other research (Dawson 2017). Numerous sources reinforce this assertion as true for Senegambia in all regions and time periods (Le Maire 1695:164; Adanson 1759:274; Boilat 1853:194; Anonymous 1875:127; Cà da Mosto et al. 1937:34; Fernandes 1951:7; Thilmans and De Moraes 1977:487). Children notably swam extensively (de Villeneuve 1814b:121; Dawson 2017:91–92, 97, 100, 113). Children, particularly of fishers, would have also grown up learning to paddle and sail canoes and fish as well and both women and children would do so adeptly (Le

Maire 1695:164; Corre 1883:9). This was in stark contrast to Europeans who could for the most part not swim (Dawson 2017:82). This was used to the advantage of Africans in their dealings with Europeans who when on boats, particularly in rough waters, were at their mercy (Dawson 2017:87).

3.10.1 Alternatives

There were two main alternatives to a wooden boat, floats and rafts. Sources describing these were extremely limited and by necessity extrapolated from a handful of sources. Calabashes were a common type of float in Senegambia (Gray and Dochard 1825:150; Mitchinson 1881:148, 268). Calabash floats were used in other places as well. More Elaborate floats could have existed that had multiple calabashes fastened together An example of this would be the "kunun" of Nigeria (The Mariners' Museum 2000:335). The root cluster of the shrub *aeschynomene elaphroxylon* were used as an improvised float due to its extremely low density and ready accessibility on river banks and weak attachment to the soil (Adanson 1759:242; PROTA 2021a). An alternative was to use a bundle of dry rushes picked up on the river edge, braided rolled, and tied. This small float could then be positioned under the chest allowing a person to safely swim across a river (Purchas 1625a:286; Boilat 1853:381–382).

Rafts were attested on the Gambia and Senegal. The Fulbe were described as making rafts on the Senegal River, likely of bamboo or palm rachises. These were called "taro" and large enough to hold twenty or thirty horses (de Almada 1984:14). The rafts on the Gambia seem to have been smaller. And made of palm rachises and described with the largest observed holding only four people the alternative seemed to have been to simply use a cut log (Moore 1738:269). This same type of raft was later described in detail. It consisted of palm rachises solidly joined edge to edge, likely tied with palm leaf rope. The rachises curved forming a bottom and the assembly was shaped and functioned in such a way that the craft would in truth be classified as a boat, a fact emphasized by the observer. The boat was three by one and a half meters and could hold four people. The person in the back held a paddle for steering that was constructed of stick one meter and twenty centimeters long and a blade fifteen centimeters long. That paddle was held with either the left or right hand on the top and the second hand in the middle depending on if the boat was being steered to port or starboard. The boat was described as extremely light and hard to capsize, this was likely due to the high breadth of the craft. Two ropes were tied to either side of the boat and it was hauled back and forth by ten people on each bank. These ropes where made of palm leaves, later stronger ropes made of woven palm rachises were made by applying fire to them to soften them and then braiding them. A separate boat of the same kind appeared to be present in the background of a photo (Photograph 3.10.1) included by the author later which appeared to show a lattice of supports crisscrossing the top of the boat to help it hold its shape. The boat seemed to be easily able to be made in a day (Rançon 1894:237–238, 348–349). This type of boat may have resembled the Angolan Bimba (Filgueiras 1977).

The Smithsonian had a large raft in their collection described as made of rushes that may be from Senegambia, but its provenance was uncertain. It was recorded as having a length of 18 feet 10 inches (five meters, seventy-five centimeters) and a width of three-feet one-inch (ninety five centimeters) (Smithsonian 1887). It was described as follows:

> This is a type of balsa used for crossing small rivers on the lower coast of Senegambia. The body is made of two cigar-shaped bundles of rushes firmly bound together with two-stranded rope and strongly curved up at ends; above the outer edges of these are two smaller bundles of nearly uniform diameter, so lashed as to

increase the height on the sides and form a sort of hollow inside. (Smithsonian 1887)

Chauveau asserted the prior existence of these boats in Senegambia which he calls “galu-kheref”, Wolof: straw/rush boat, but provided no evidence of them (1988c:3). These may be the same craft made of bundles held in the Smithsonian or the one observed in the Gambia.

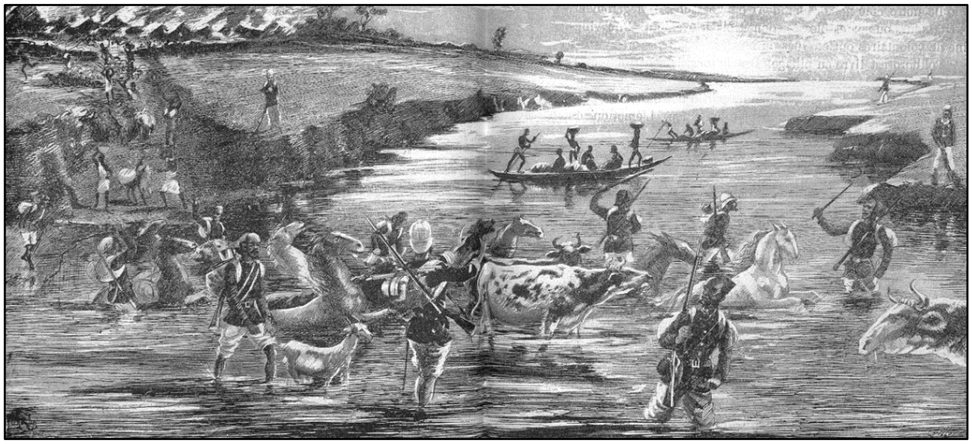
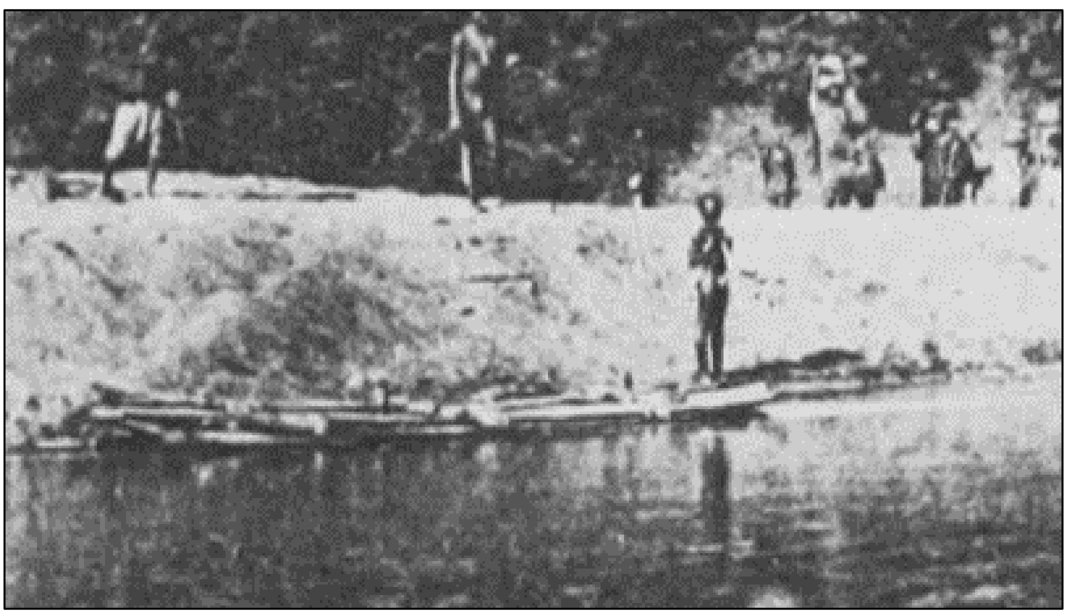


Illustration 3.10.1: Passage of the Senegal river, by a column bringing back loot taken from the enemy	1890, from (Frey 1890:172–173)	Very likely totally made-up illustration



Photograph 3.10.1: Voumboutouguenda (Gambia) ford, road from Damantan to Bady	1891-1892, cropped, Rançon (1894:348a)

CHAPTER 4: FORM, CONSTRUCTION, INNER AND OUTER RESOURCE LANDSCAPE

4.1 *Overall general boat hull size and shape*

Several attempts at classification of Senegambian boats have been made in the past but none were comprehensive. The following presented the general types of boats found in Senegambia at the beginning of the twentieth century. Most scantlings starting in 1950 study have been excluded from overall analysis due to being too far from sewn construction techniques and forms, as well as the wider standardization and change of boats and boat building techniques that occurred in the mid-twentieth century. Table of measurements included in appendix 2.

4.2 *Logboats*

Logboats were highly variable and displayed a great deal of diversity (Figure 4.2.1). In general, studies did not discuss log boat size. A 1950 study gave the typical logboat beam of the time as around one-third the height. The bottoms were described flat, and the bow and stern were described as concave. The described that the ends could be used by the operator as support when punting. They also asserted a lack of thwarts and paint. The logboats were made of kapok or mahogany (Postel 1950a:124). The same study described extended logboats as flat bottomed and rockered (Postel 1950a:123). Many small logboats were observed in photographs being used by children. These ranged in quality from the worn bottoms of old boats to seemingly specifically made child sized boats. One on the Senegal river even appeared to have a small sail (Edmond 1902a).

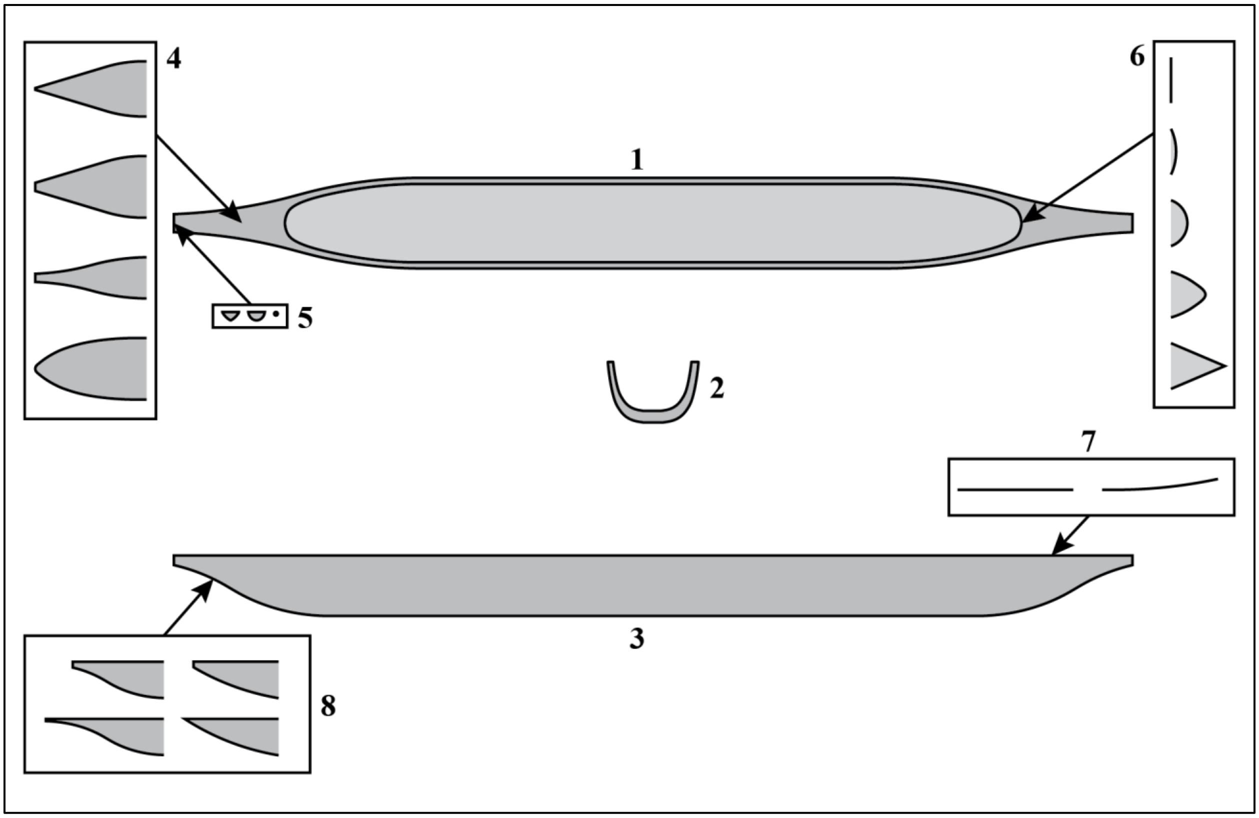


Figure 4.2.1: Logboat variability	Diagram from photographs, partly adapted from postcard diagram, own work
1: Plan view, 2: Section view, 3: Profile view, 4: Prow side shape, 5: Prow end shape, 6: Inside prow shape, 7: Sheer, 8: Prow underside shape	

4.3 *Senegal River Coast-South extended logboats*

4.3.1 <u>Senegal River Coast extended logboats and related designs</u>

The extended logboats with projecting cutwaters and often raised fronts (Figure 4.3.1, Figure 4.3.2, Figure 4.3.3, Figure 4.3.4) of the Senegal River Coast, along with local variations all along the Senegambian coast, were commonly described in studies. Boats around the Senegal River Coast were often referred to as boats of Saint Louis or Guet Ndar, the fishers' quarter of Saint Louis. The general Wolof term for boat "gal" may be appropriate as a term for referring to the extended logboats of the Senegambian coast and rivers. A 1908 study described the shapes of

Senegal River Coast boat as narrower than those found in other areas. They also described them as relatively stable and their bottoms as flat. The boats varied from six to eight meters. They were described as having projecting cutwaters. The design was quite variable (Gruvel 1908:74–75). A 1935 study gave a total length of fifteen meters five of which were the total length of the two projecting cutwaters which were both around the same length. This would give a hull ten meters in length with two and a half meter projecting cutwaters on the fore and aft ends (Leca and Labouret 1935:51). Boats of these lengths appeared to have been the largest and used for transport (Postel 1950a:123). The beam at amidships was ninety centimeters at the bottom of the hull, one hundred thirty centimeters at the top of the logboat hull, and one hundred and seventy at the top of the sheer strakes. The logboat hollow was measured at thirty-six centimeters thickness at amidships and the height of its two strakes totaled around thirty centimeters. This brought the hollow of the boat to seventy centimeters. The boat was described it as having a slight rocker and a flat bottom (Leca and Labouret 1935:53–54). Observed boats in photographs also showed wide variation in the height of the front sheer strakes, cutwater size and shape, and in general size, shape, and quality.

These boats appeared to have been common along the Senegambian coast in the early twentieth century as they would often travel as far as the Casamance to fish. Being brought back north by steam ship (Gruvel 1908:75). Consequently, it was impossible to say for sure whether boats in photographs in other areas were local boats or from the Senegal River Coast. It also appeared that the same basic design of boat was built and used all along the coast with minor variations. The only difference between these boats and styles of boat in the same area from the later nineteenth and the very early twentieth century appeared to have been that earlier boats only had one level of strakes. There also appeared to have been racing boats very similar in construction to coastal boats but striped of thwarts and rigging related features.

The measurements given by Leca and Labouret were for an abnormally large and wide boat. The boat may have been a transport boat according to later sources (Postel 1950a:123). It was also uncertain if the measurements were taken from the inside or outside of the boat which may have distorted the shape slightly due to the thick bottom of the boat. The majority of boats at the time were probably narrower in beam. The width of the logboat portion would have been near maximum for available logs and likely expensive. Studies collectively showed a typical variation of between one meter thirty centimeters, and seventy centimeters for the maximum beam of a logboat hull.

Coastal boats would have no issue operating in the Senegal River if needed but there were also specific extended logboats used on the river as well which were very close in design to coastal boats. They were generally smaller, with less depth and a flatter bottom (Gruvel 1908:76).

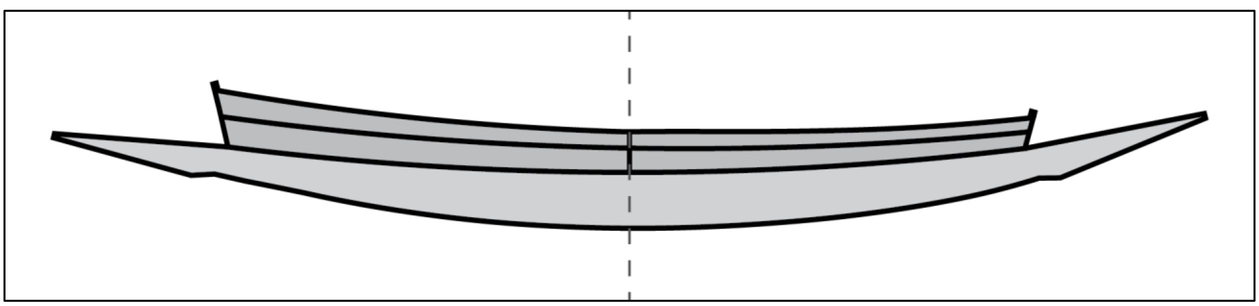


Figure 4.3.1: Senegal River Coast to Cape Verde Peninsula boat, Profile view	Approximate shape from photographs

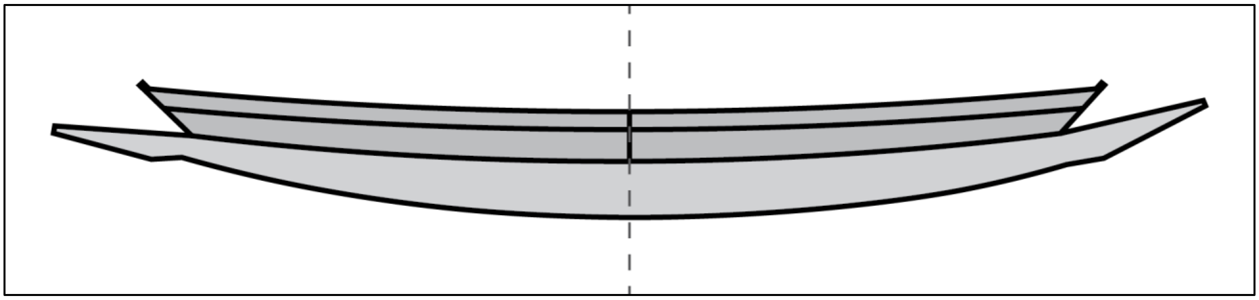


Figure 4.3.2: Cape Verde Peninsula to Gambia River Coastal boat. Profile view	Approximate shape from later photographs

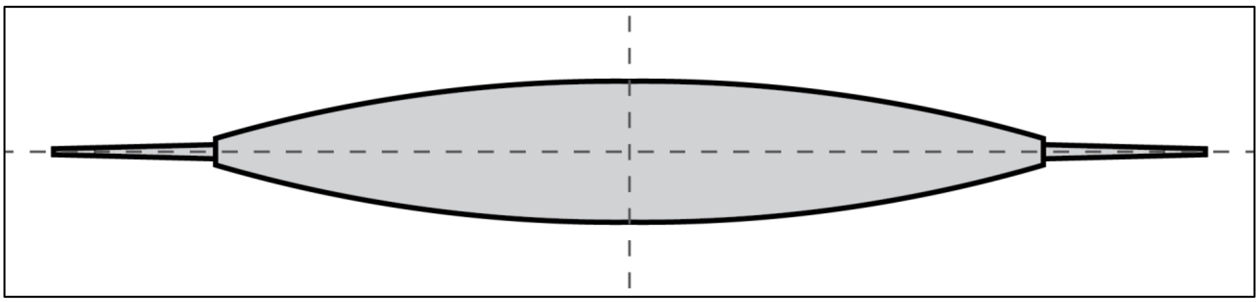


Figure 4.3.3: Senegal River Coast boat, Plan view	Approximate shape from measurements (Leca and Labouret 1935:53–54)

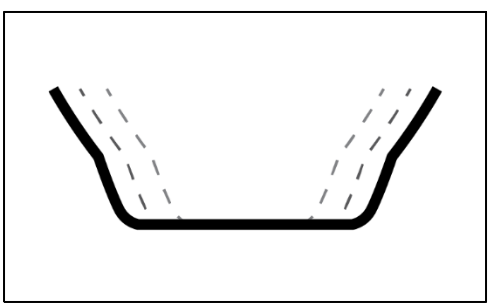
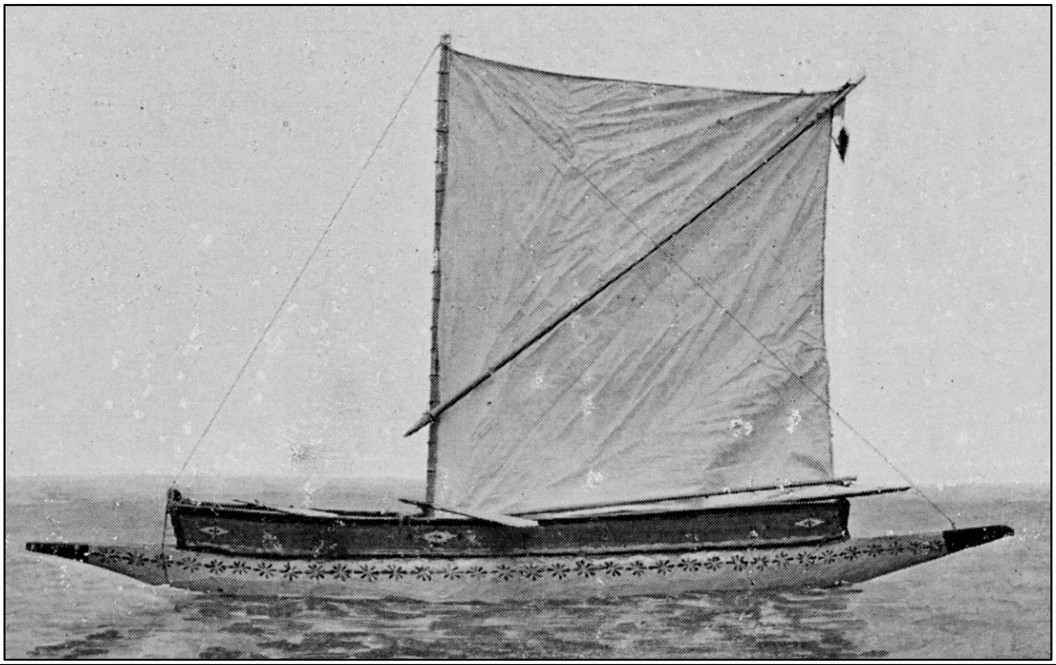
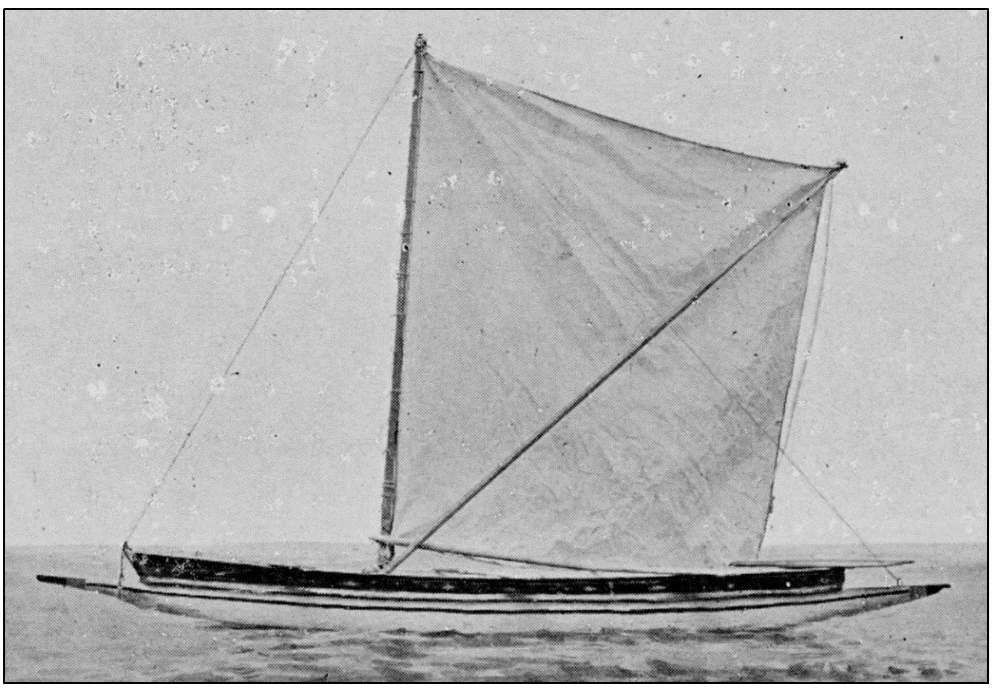


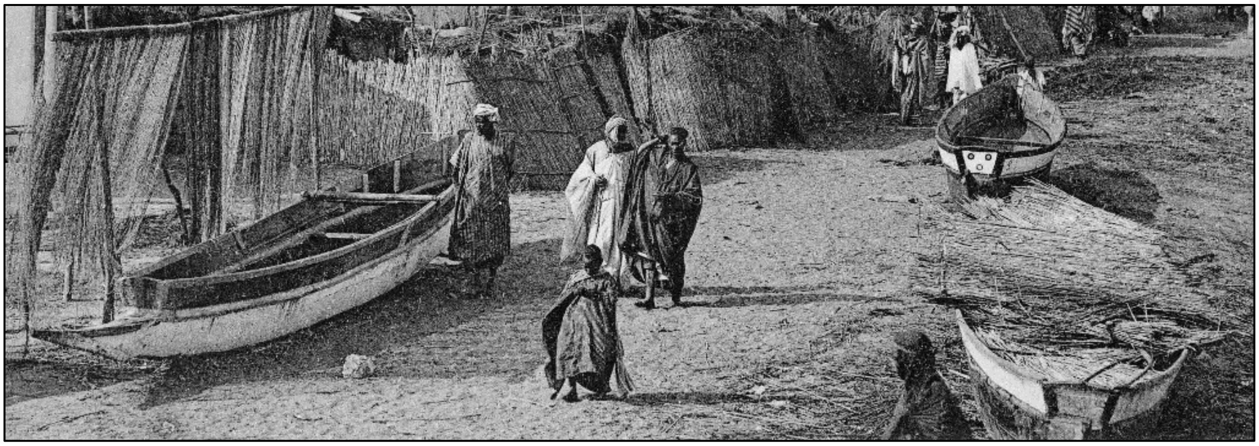
Figure 4.3.4: Senegal River Coast boat, Section view	Approximate shape at amidships from measurements (Leca and Labouret 1935:53–54)
Included dotted lines indicating variable bottom widths to show variation due to available tree sizes down to seventy centimeters	



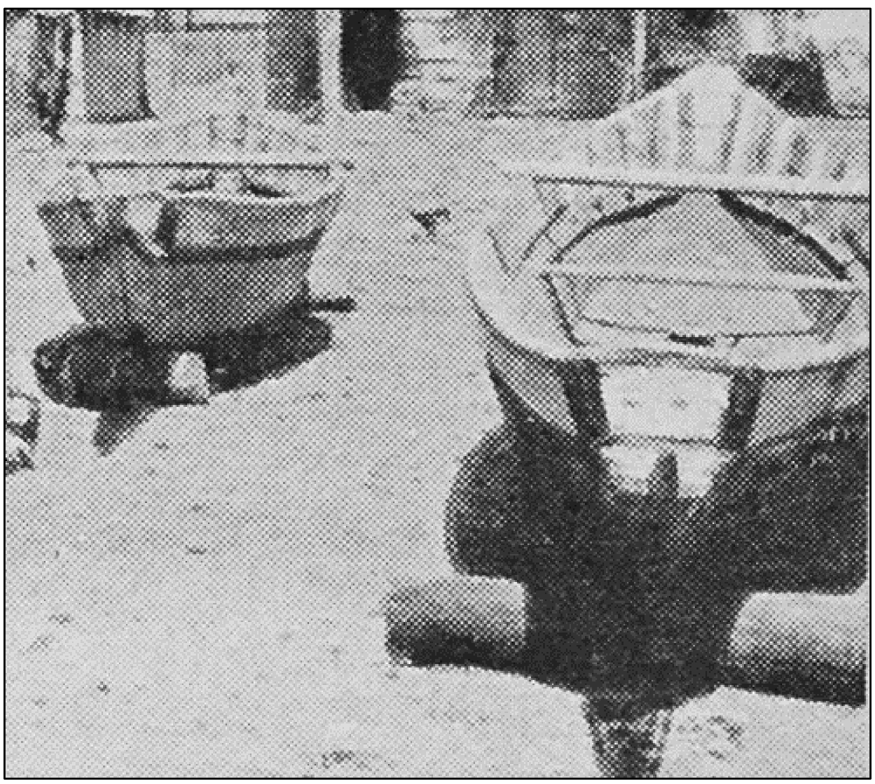
Photograph 4.3.1: Senegal River Coast boat	Earlier style with lower front likely more reflective of nineteenth century styles, from (Gruvel 1908:74)



Photograph 4.3.2: Senegal River boat with near identical construction to coastal boat	Earlier style with lower front likely more reflective of nineteenth century styles, from (Gruvel 1908:74)



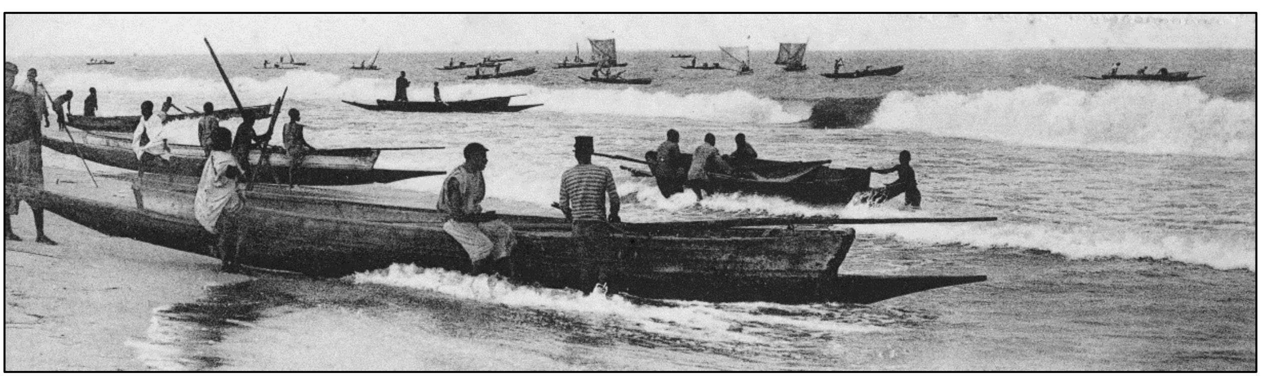
Photograph 4.3.3: Three Senegal River Coast boasts in storage	Cropped, from (Edmond 1902b)



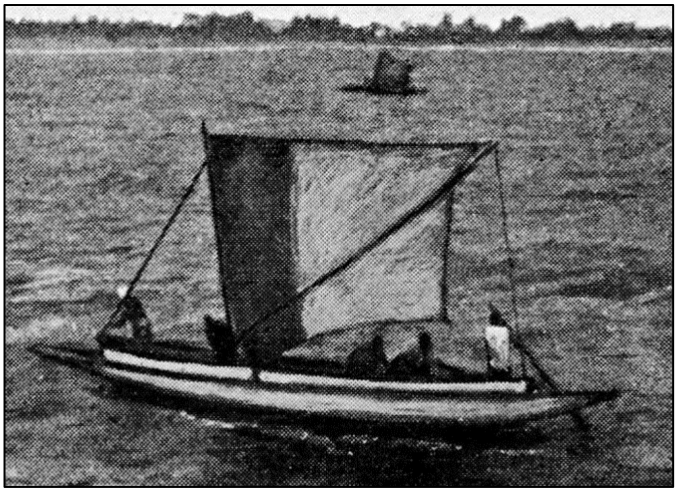
Photograph 4.3.4: Two Senegal River Coast boasts in storage	Cropped, from (Anfreville de La Salle 1912)

Photograph 4.3.5: Senegal River Coast boats being moved and launched	Cropped, from (Tacher Unknown)

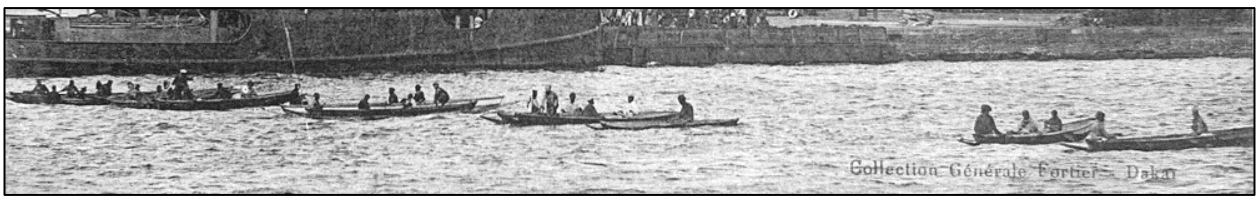
Photograph 4.3.6: Senegal River Coast boats being launched	Cropped, from (Edmond 1909a)



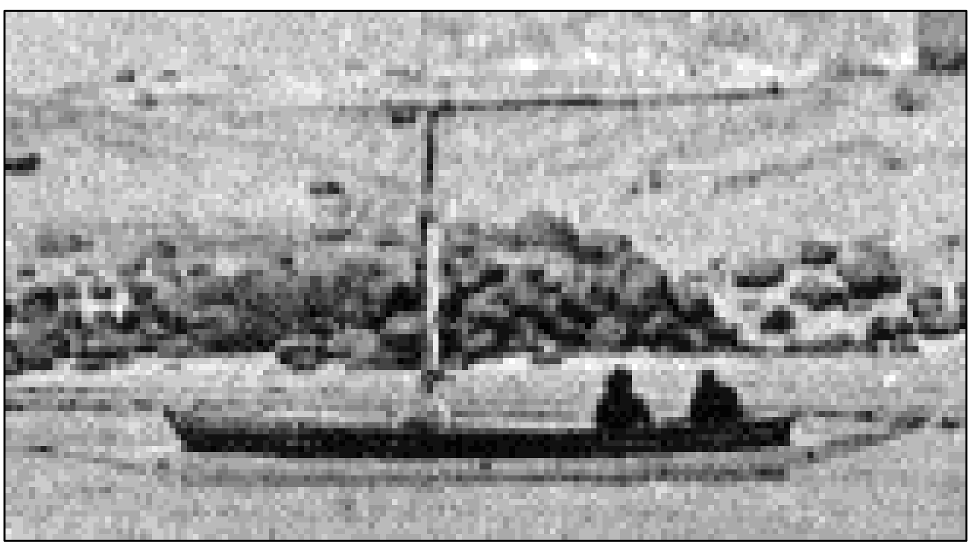
Photograph 4.3.7: Senegal River Coast boats being launched and boats across the bar	Cropped, from (Tacher Unknown)



Photograph 4.3.8: Cape Verde Peninsula boat under sail	Cropped, from (Gruvel 1908:78)



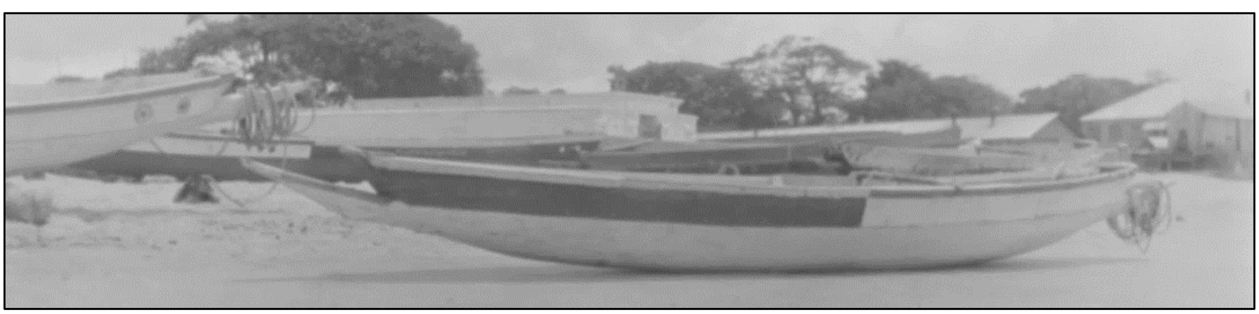
Photograph 4.3.9: Cape Verde Peninsula boats lined up	Cropped, from (Edmond 1913a)



Photograph 4.3.10: Cape Verde Peninsula boat, Profile view	Cropped, from (Edmond 1902c)

Photograph 4.3.11: Cape Verde Peninsula boat with raised front	Cropped, from (Edmond 1909b)

Photograph 4.3.12: Cape Verde Peninsula boat with no extended front, appeared to be using nailed construction	Cropped, from (Edmond 1916)



Photograph 4.3.13: Gambia boat with no extended front, appeared to be using nailed construction	Cropped, from (Hornell 1928a)

Photograph 4.3.14: Early photograph of boats in the Gambia, including one with an extended cutwater	Cropped, from (Anonymous 1871a)

4.3.2 Senegal River Coast extended logboats without projecting cutwaters

These boats (Figure 4.3.5, Figure 4.3.6) appeared to have foregone the use of an extended cutwater completely likely at the expense of their ability to cross the bar as well as boats with projecting cutwaters. Their existence and use along the coast suggested that projecting cutwaters were not required for the area. They may have been used due to wanting to maximize capacity for the length of the log. They appeared to have otherwise been identical to the boats with projecting cutwaters they operated alongside.

No cutwater coastal boats would have no issue operating in the Senegal River if needed but there were also specific extended logboats used on the river as well which were very close in design to coastal boats and likely also came in no cutwater forms. River boats were generally smaller, with less depth and a flatter bottom (Gruvel 1908:76).

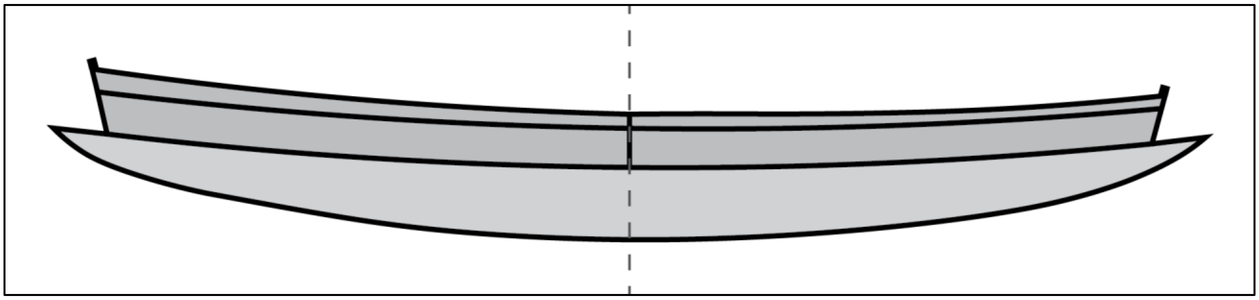


Figure 4.3.5: Senegal River Coast boat without extended cutwaters, Profile view	Approximate shape from photographs

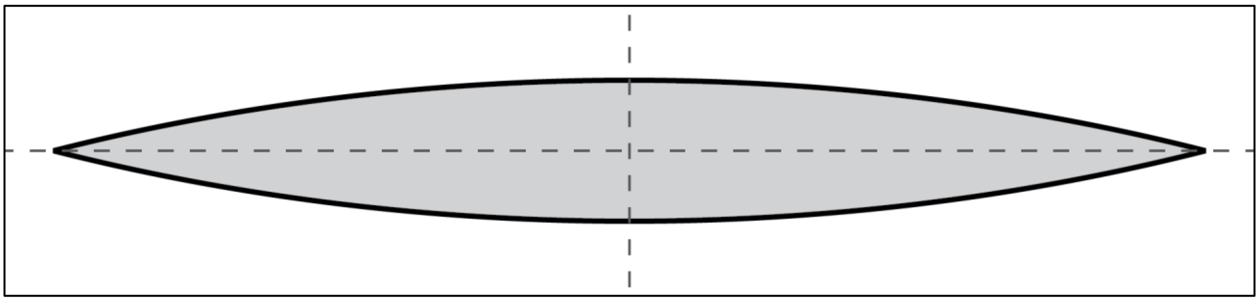


Figure 4.3.6: Senegal River Coast boat without extended cutwaters, Plan view	Hypothetical shape

Photograph 4.3.15: Senegal River Coast boats with no extended cutwaters being launched	Cropped, from (Tacher Unknown)

Photograph 4.3.16: No extended cutwater boat with reinforced front, likely a coastal boat, appeared to be nailed construction	Cropped, from (Tignol 1900)

4.4 *Senegal River frame-based boats*

4.4.1 Senegal River narrower frame-based boats

These boats (Figure 4.4.1, Figure 4.4.2, Figure 4.4.3, Figure 4.4.4) were referred to as "tare" (Leca and Labouret 1935:64). The boats came in two major variants which shared the same methods of construction. Frame-based boats were not frequently recorded and received little attention in sources but appeared to have been used in large numbers along the Senegal River. They came in a wide variety of sizes. Their form and construction restricted their operation to the river. The frame-based boats of the Senegal River used an entirely alternate construction method other that used in other areas and only one study covered their construction in any detail. The smaller of the two variants appeared to be still used on the Senegal (Leca and Labouret 1935:64–67). These boats sometimes had an extra sheer strake like on the wide variant

(Photograph 4.4.5). Due to a lack of information, its complexity, and being ancillary to the topic of this research their construction was not covered in detail here. It is possible that these boats would be classed as bottom based boats, but they have not been examined enough to determine this for certain.

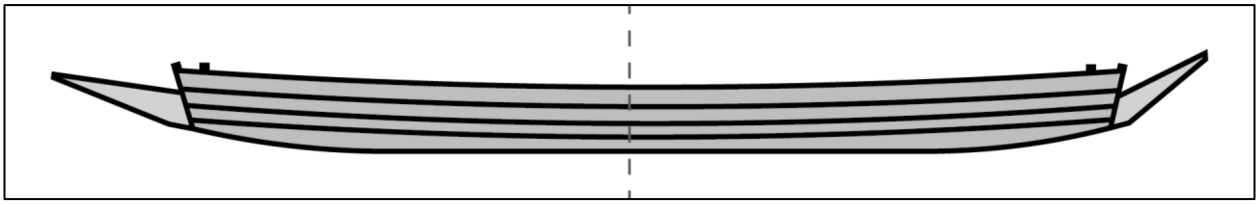


Figure 4.4.1: Senegal River frame-based boat (large), Profile view	Approximate shape from photographs

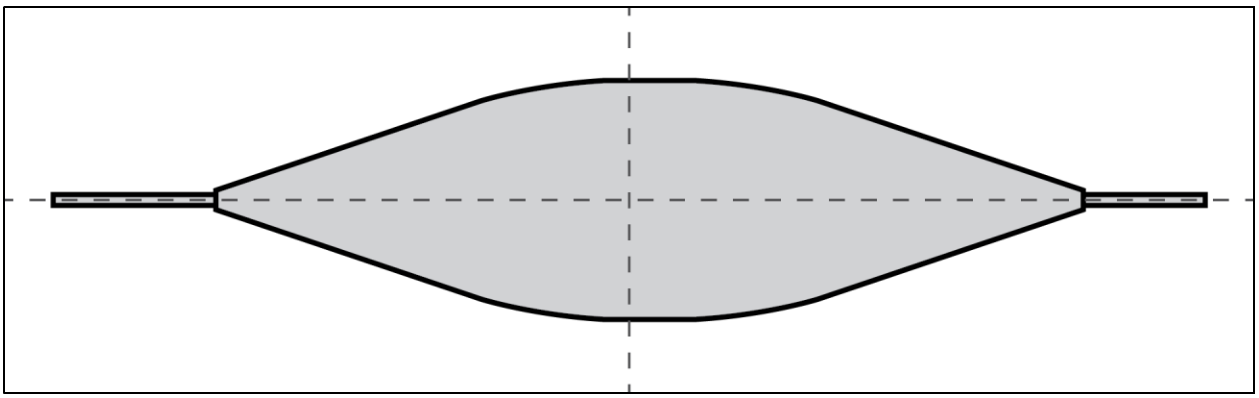


Figure 4.4.2: Senegal River frame-based boat (small), Plan view	Approximate shape from measurements (Leca and Labouret 1935:64–66)

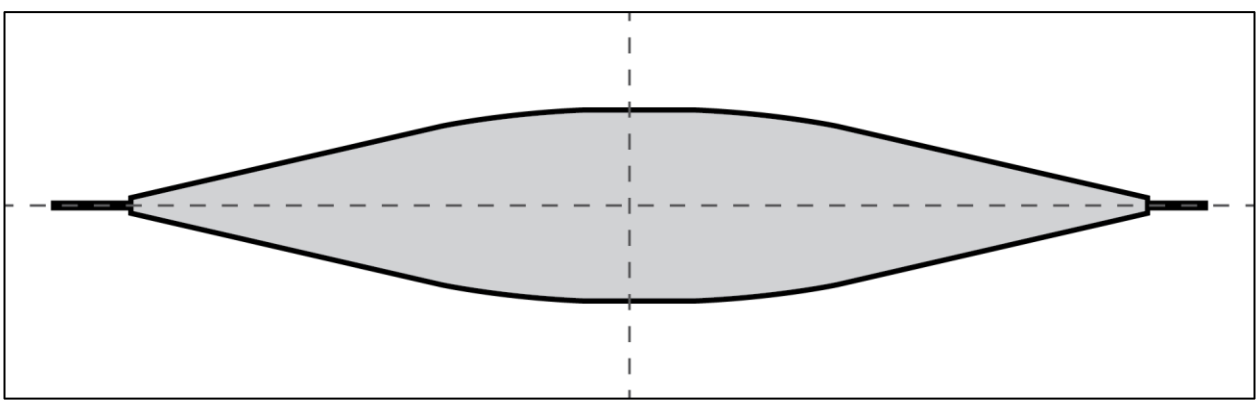


Figure 4.4.3: Senegal River frame-based boat (large), Plan view	Approximate shape from photograph (Edmond 1909c)

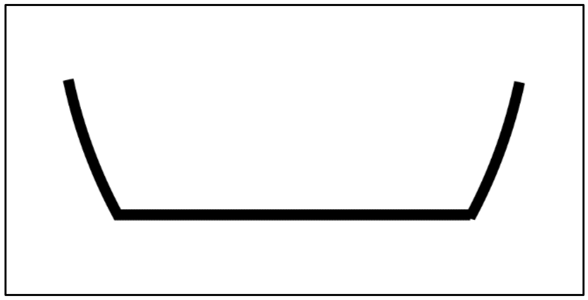
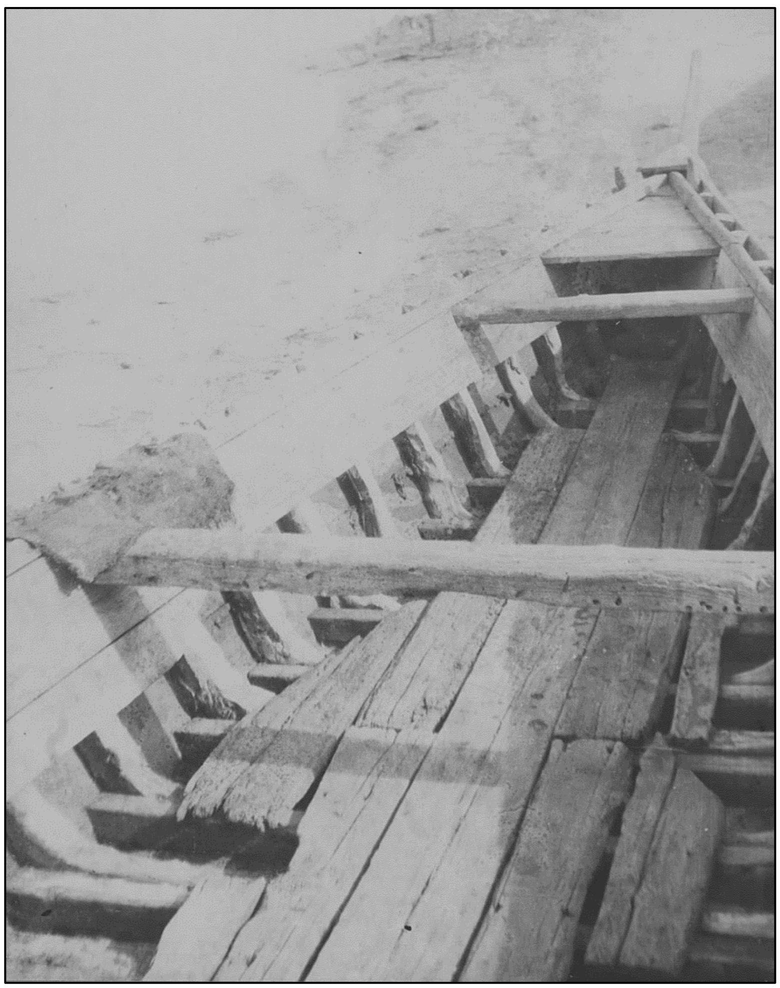
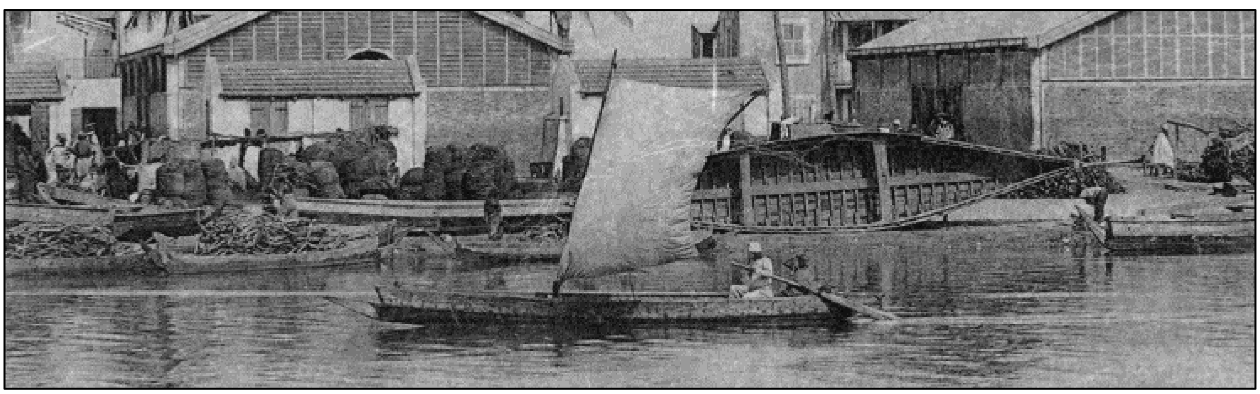


Figure 4.4.4: Senegal River frame-based boat (small), Section view	Approximate shape at amidships from measurements (Leca and Labouret 1935:64–66)



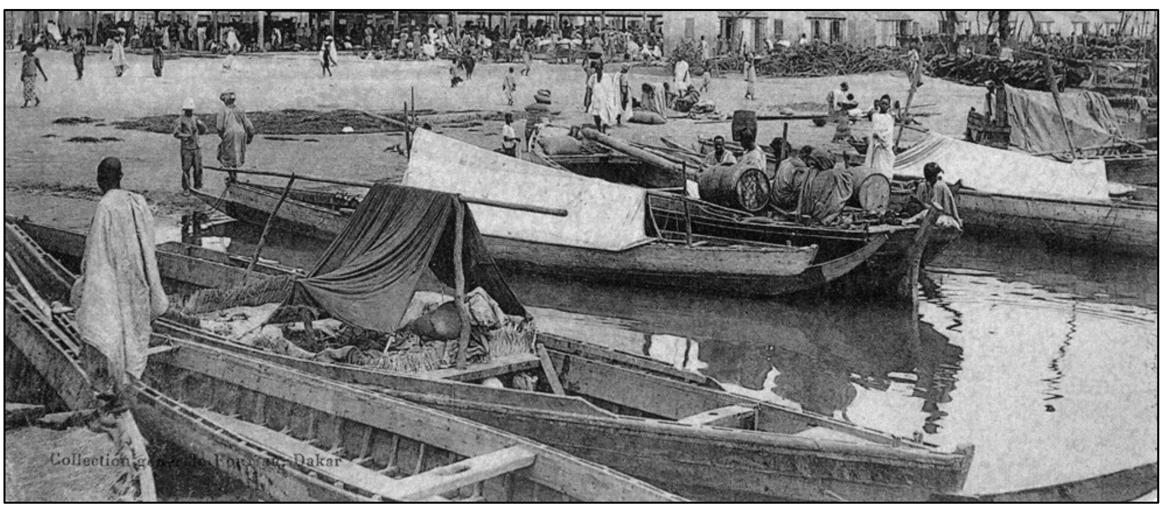
Photograph 4.4.1: Inside view of a Senegal River frame-based boat	From (Labouret 1929)

Photograph 4.4.2: Senegal River frame-based boat under sail, Profile view	Cropped, from (Edmond 1909d)



Photograph 4.4.3: Senegal River frame-based boat under sail and large boat on its side	Cropped, from (Edmond 1909c)

Photograph 4.4.4: Senegal River frame-based boats beached	Cropped, from (Anonymous Unknown)



Photograph 4.4.5: Senegal River frame-based boats	Cropped, from (Edmond 1909e)

4.4.2 <u>Senegal River wider frame-based boats</u>

A wider variant of the Senegal River frame-based boats (Figure 4.4.5, Figure 4.4.6) these boats appeared to have been widely used to carry large amounts of cargo. There appeared to only be large sized boats of this type.

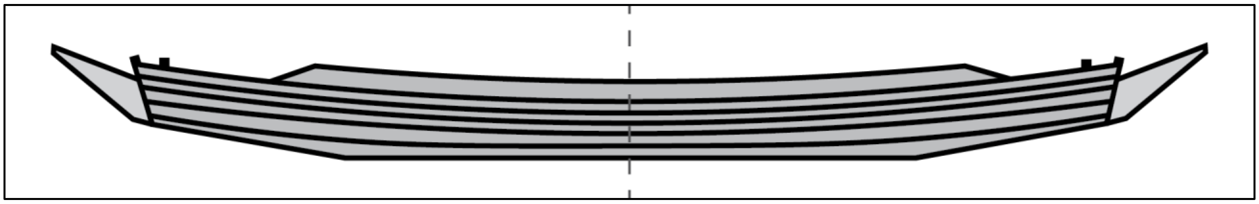


Figure 4.4.5: Senegal River wide frame-based boat, Profile view	Approximate shape from photographs

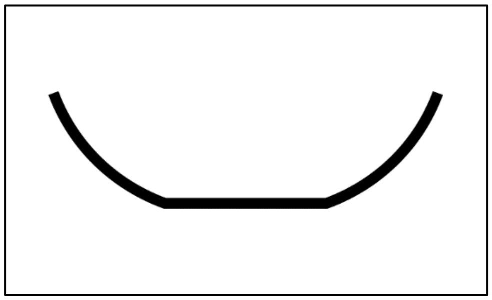
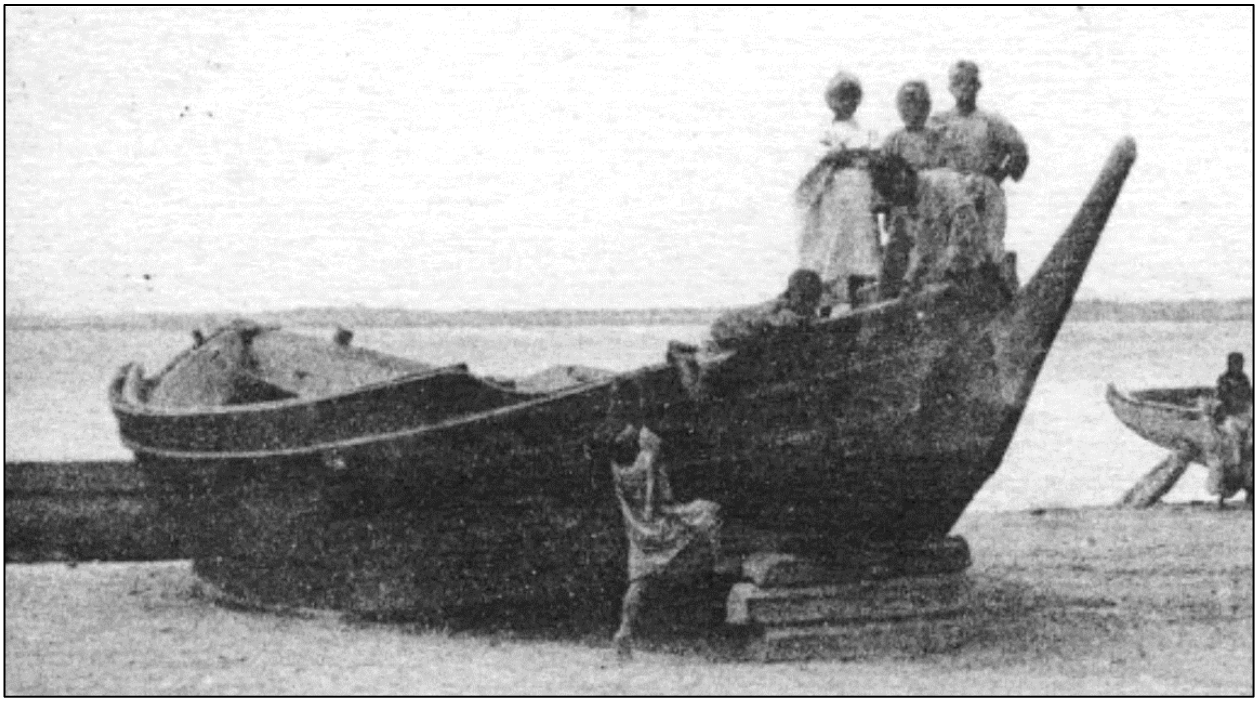


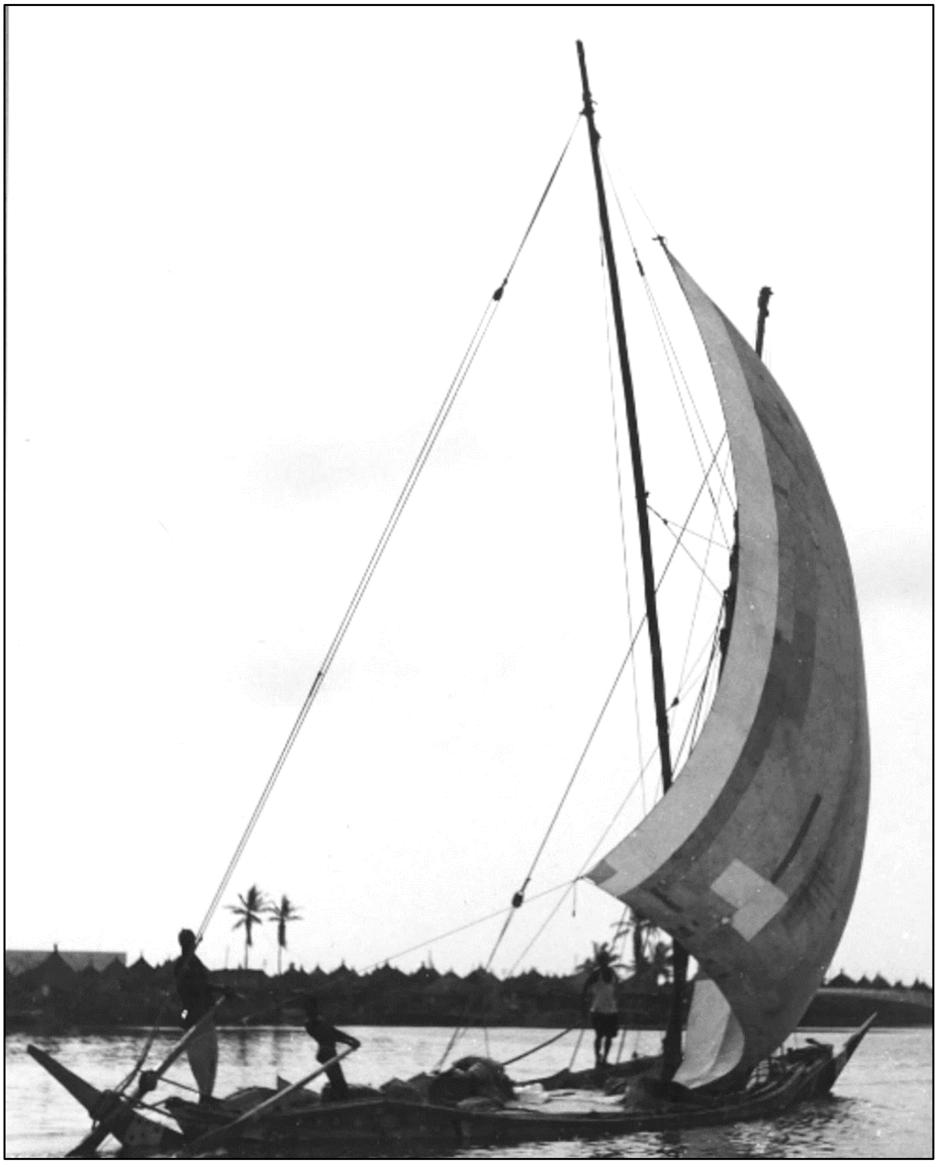
Figure 4.4.6: Senegal River wide frame-based boat, Section view	Hypothetical shape from photographs

Photograph 4.4.6: Senegal River wide frame-based boats, view from above	Cropped, from (Anonymous Unknown)



Photograph 4.4.7 Senegal River wide frame-based boats, Profile view	From (Griaule 1931)

Photograph 4.4.8: Senegal River beached wide frame-based boat	Cropped, from (Albaret Unknown)



Photograph 4.4.9: Senegal River wide frame-based boat under sail	From (Duchemin 1958)

4.5 *Cape Verde Peninsula-South extended logboats*

4.5.1 Cape Verde Peninsula single and double short cutwater extended logboats

The boats of the Cape Verde Peninsula were frequently called Lebu boats due to the Lebu being the name of the Peninsulas inhabitance who at times had an independent state. Their characterization as a separate ethnic group however was suspect as it appeared to be based on little. The boats of the Cape Verde Peninsula were described as similar in appearance to those of the Senegal Rive coast but more unstable and smaller with narrower strakes making them much lower in the water. Some were described as simply logboats with two thwarts (Gruvel 1908:91–92). A 1963 study also described the boat of the area as lower due to narrower strakes, although larger in size then Senegal River Coast boats. They were also described as more tapered and had smaller cutwaters (Diop 1963:41). Photos mostly showed boats with single or double short cutwaters. Boats with projecting cutwaters did appear in some photographs but generally from a distance. This was probably the case due to these boats being far easier to access to take photos of. These boats also appeared to have been modified with more bench thwarts and used as racing boats.

4.5.2 Double short cutwater boats

Many photographs of the boats (Figure 4.5.1, Figure 4.5.2) of the Cape Verde Peninsula were of double short-cutwater boats with a single layer of strakes that appeared to have been near shore boats. They appeared to have sacrificed projecting cutwaters for capacity due to a reduced need. Short cutwater boats operated on the Petite Côte although due to the movements of fishers from the Cape Verde Peninsula south it would be impossible to tell where they were from. The largest departure from the internal layout of extended cutwater boats appeared to be that boats of this type typically had many wide benches placed at the top of the logobat hull in place of cylindrical thwarts. Although a cylindrical thwart in the stern and often a cylindrical mast thwart appeared to have been common.

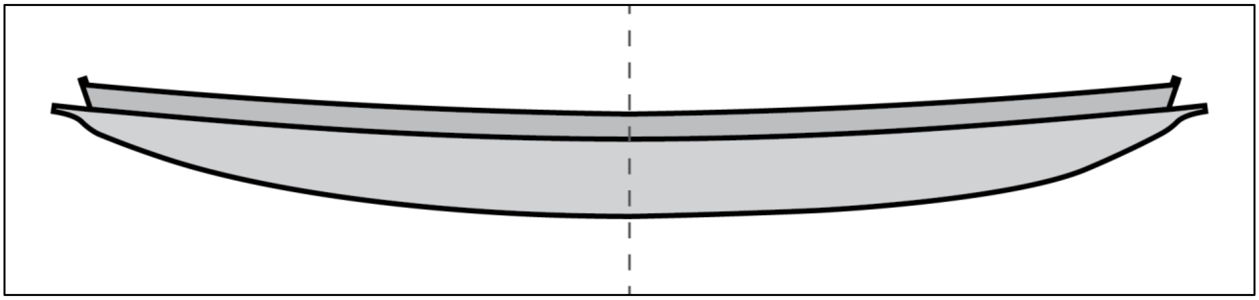


Figure 4.5.1: Cape Verde Peninsula double short cutwater extended logboat, Profile view	Approximate shape from photographs

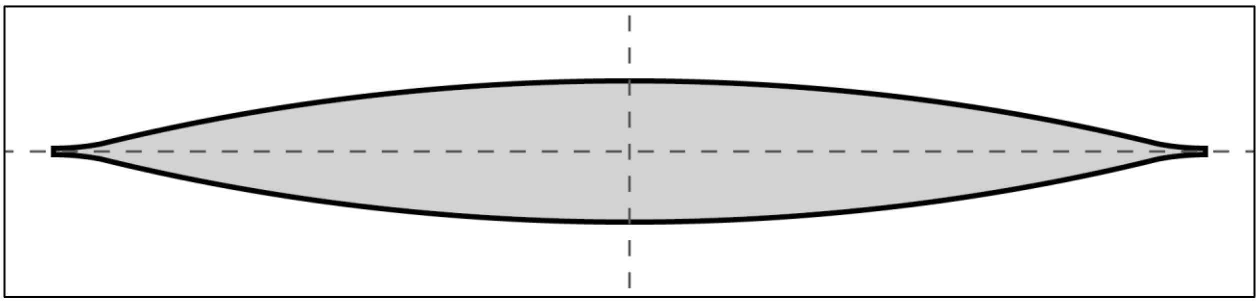
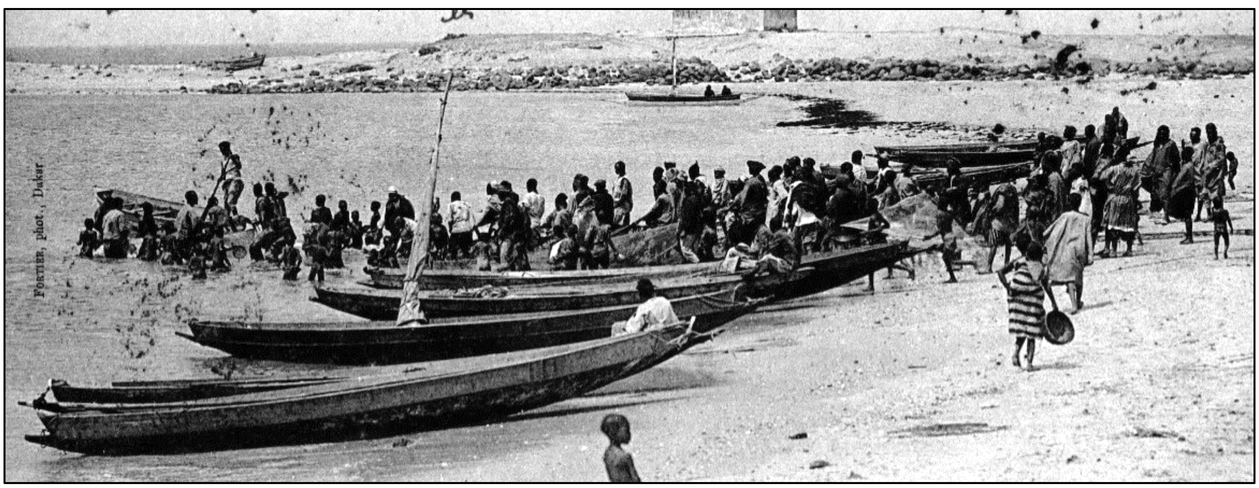


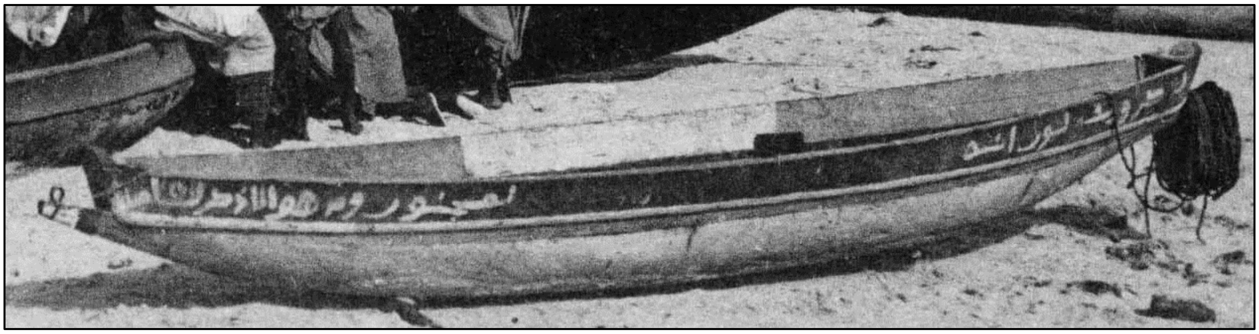
Figure 4.5.2: Cape Verde Peninsula double short cutwater extended logboat, Plan view	Approximate shape from photographs

Photograph 4.5.1: A large number double short cutwater boats being paddled around the Cape Verde Peninsula	Cropped, from (Edmond 1909f)

Photograph 4.5.2: Cape Verde Peninsula boats with single and double short cutwaters on the beach	Cropped, from (Edmond 1908a)



Photograph 4.5.3: Cape Verde Peninsula double short cutwater boats on the beach	Cropped, from (Edmond 1902c)



Photograph 4.5.4: Short double cutwater boat on the beach on the Cape Verde Peninsula	Cropped, from (Anonymous Unknown)

4.5.3 Cape Verde Peninsula single short cutwater extend logboats

Single cutwater boats (Figure 4.5.3, Figure 4.5.4) appeared frequently in photographs. They were specifically mentioned in a 1952 study but received little attention. They were noted to be more common in more southern settlements like Rufisque, Bargny, and Yen, but less in Mbao. The source also noted boats with no cutwaters and that they were being fitted with strakes the same height as cutwater boats at that time. The source noted the existence of boats with a pseudo cutwater between single and no cutwater boats but was very vague about these boats (Balandier and Mercier 1952:158). They appeared to have shared all the same features as double short cutwater boats and been identical excepting the stern shape. The stern was characterized by the strakes and hull meeting in a point and having a deck on this stern on which the coxswain often sat.

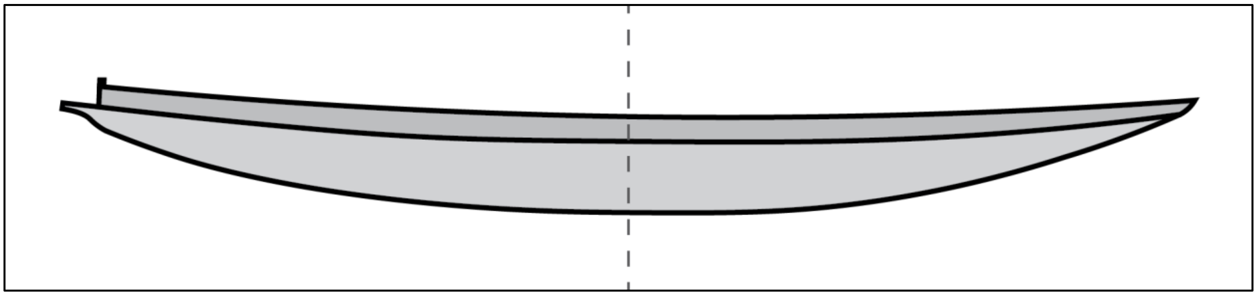


Figure 4.5.3: Cape Verde Peninsula single short cutwater extended logboat, Profile view	Approximate shape from photographs

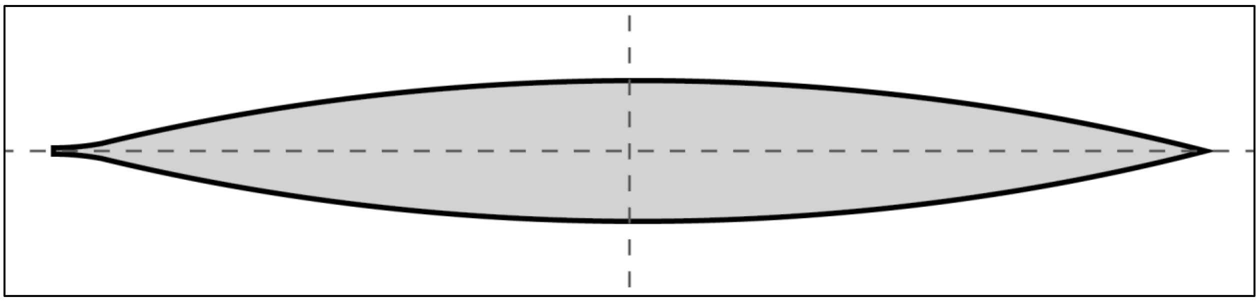
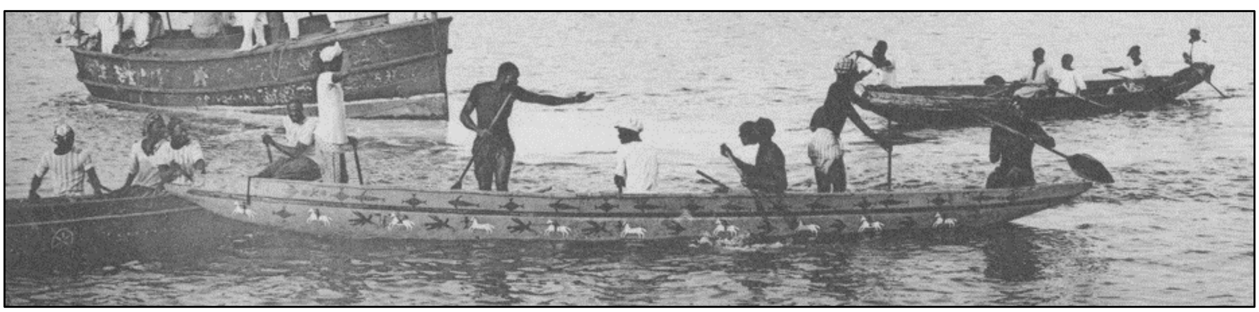


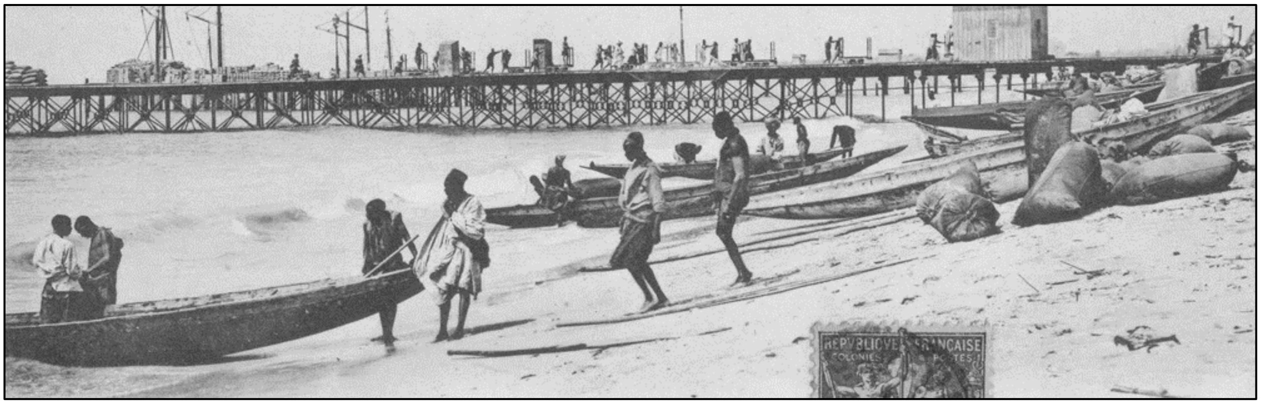
Figure 4.5.4: Cape Verde Peninsula single short cutwater extended logboat, Plan view	Approximate shape from photographs

Photograph 4.5.5 What were likely single cutwater boats on the Petite Côte	Cropped, from (Gruvel 1908:78)

Photograph 4.5.6: Cape Verde Peninsula boat, Profile view	Cropped, from (Edmond 1902d)



Photograph 4.5.7: Cape Verde Peninsula boats being paddled	From (Edmond 1902e)



Photograph 4.5.8: Cape Verde Peninsula boats on the beach	Cropped, from (Edmond 1902f)

Photograph 4.5.9: Cape Verde Peninsula boats, Viewed from above	From (Hottot 1906)

4.6 *Gambia-Sine/Saloum Rivers and coast boats*

It was difficult to determine what style of boat many descriptions of boats from the Petite Côte to the Gambia were referring to as descriptions were vague and photos scarce. The boats of the Petite Côte were simply described as mostly unextended logboats usually made from mahogany and had pointed ends (Gruvel 1908:105). A 1963 study described the coastal boats of the area as having narrower strakes and a narrower beam than boats found around the Cape Verde Peninsula. Logboats, also used on the coast in the area were described as mostly mahogany with some kapok (Diop 1963:43).

Those of the Saloum Delta were described as both logboats and extended logboats around six to seven meters long, often the logboats were the smaller ones, and often made of either kapok or mahogany, mahogany being more typical of larger more specialized fishing centers. They had the distinctive long extended cutwater seen on Gambia boats and the extended sides that tapered. The crew was from three to five (Gruvel 1908:113). A 1963 study described the river boats of the delta as extended logboats with very short and narrow projecting cutwaters. The boats were overall very long, tapered, and narrow as well as having low sides raised by one strake. The boats had a large deck at the front (Diop 1963:43).

It was likely the author of the study did not spend much time in the Gambia and their description was for the most part vague and appeared to not match up with photographic evidence from the same period. They described the coastal boats as large and high in the water. The river boats were described as narrow, sort, low in the water, and had large amounts of thwarts of which one or two were wider benches. They were described as extended logboats but with small extensions (Gruvel 1908:119). A much later 1986 source reiterated a continued tendency for boats across the region to be lower and more tapered than Senegal River Coast boats and that this gives them increased capacity having but making them unsuitable for rougher water (Lleres 1986:156).

4.6.1 Gambia-Sine/Saloum Rivers and coast short cutwater extended logboats

Some boats (Figure 4.6.1) around the Gambia that appeared in photographs strongly resembled the form of Cape Verde Peninsula double short cutwater boats, but the strake arrangement was notable different. The exact arrangement was difficult to see clearly in early photographs, but a notable high front could be observed. Later clearer photos showed boats with bow strakes offset higher than stern strakes. Overall photographs of these boats appeared to be very rare.

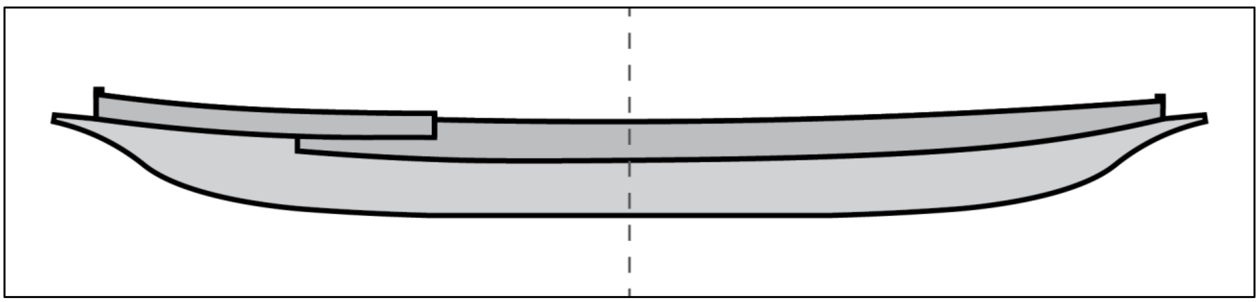
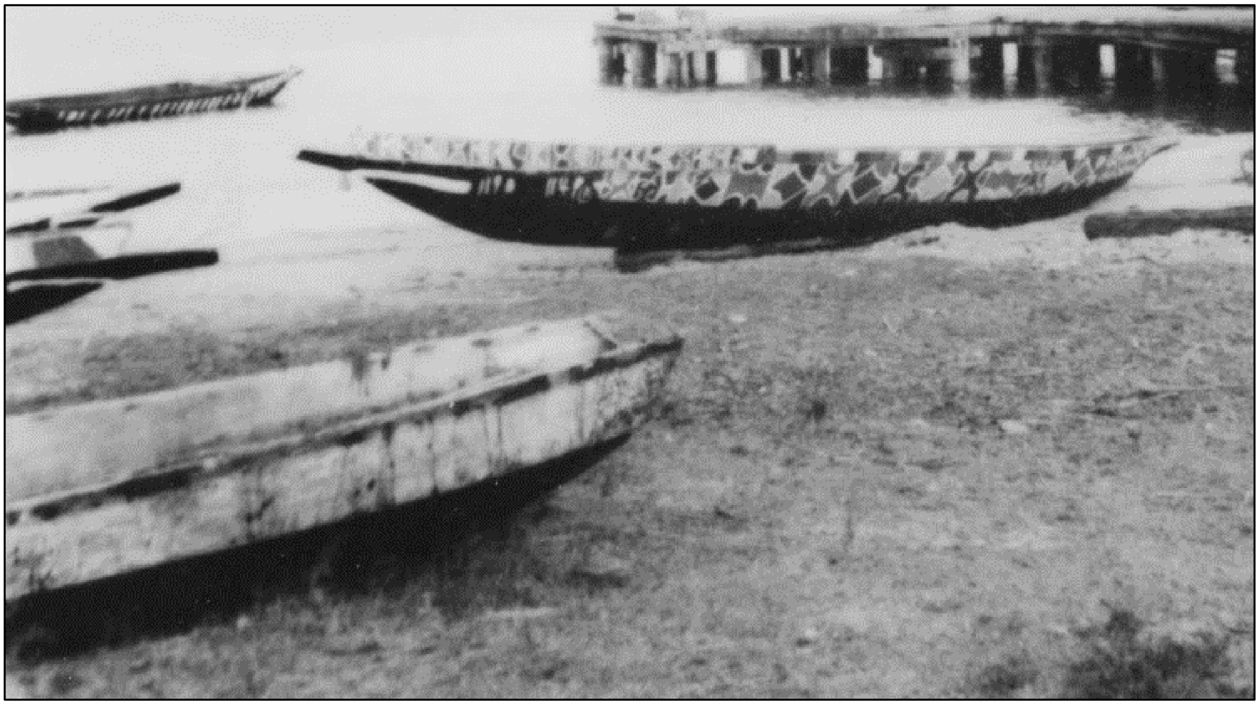


Figure 4.6.1: Gambia River short cutwater extended logboat, Profile view	Approximate shape from photographs

Photograph 4.6.1: Early photo of boats in the Gambia	Cropped, from (Anonymous 1871b)



Photograph 4.6.2: Boats on the beach in the Gambia	Cropped, from (Anonymous 1901)

Photograph 4.6.3: Gambian boats on the beach and moored offshore	Cropped, from (Spooner 1956a)

Photograph 4.6.4: Short cutwater boats on the beach in The Gambia	Cropped from,: (Anonymous 1951)

4.6.2 Gambia-Sine/Saloum projecting cutwater extended logboats

A distinctive boat (Figure 4.6.2, Figure 4.6.3) observed in photographs on the Gambia river and Sine-Saloum Delta was a type of long extended logboat with distinctively long and angled carved cutwaters and a deck on the front. These boats were rarely referred to but were called “Niominka” boats by some sources. Niominka was a term used for the people who lived mostly around the Sine-Saloum Delta who were a variety of groups. Given the apparently prominence of the Serer as boat builders and fishers in the region it may be appropriate to use the Serer term for boat “suk” for boats of this form. These were likely the boats described as resembling crocodiles by an 1877 observer (Ellis 1883:2). An early nineteenth-century illustration also showed boats the resembled these boats in form (Busby 1800). It was not known when this type of extended logboat emerged, but they were likely quite an old design. The design could not be located in late twentieth-century photography and people in the area expressed unfamiliarity with the design suggesting it fell out of use (Miles 2021). Photographs of these boats were very rare.

This design had several distinctive features. The first of these was the thin strakes on the boat with met at the bow in a small bow cover and tapered off at the stern. The long and thin projecting cutwaters were the second. These projecting cutwaters appeared to have been mostly identical on the bow and the stern excepting that the bow one was covered with a strake and very small bow cover and a triangular large deck on top making the bow projecting cutwater look very small. This large deck was the third distinctive characteristic of these boats. Observed boast of this type appeared to have mounted a sail near the center of the boat through a mast thwart with a circular hole in it. They overall appeared to have had relatively few thwarts for their length. One cylindrical thwart on top of the sheer strake was located near the stern but in front of the coxswain who sat on top of the long stern projecting cutwater. The rest of the thwarts appeared to have been wider and bench-shaped and located around where the logboat hull met the strake.

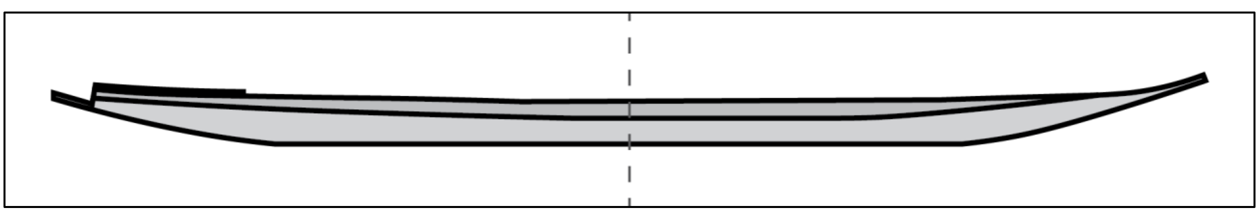


Figure 4.6.2: Gambia-Sine/Saloum extended logboat with projecting cutwater, Profile view	Approximate shape from photographs

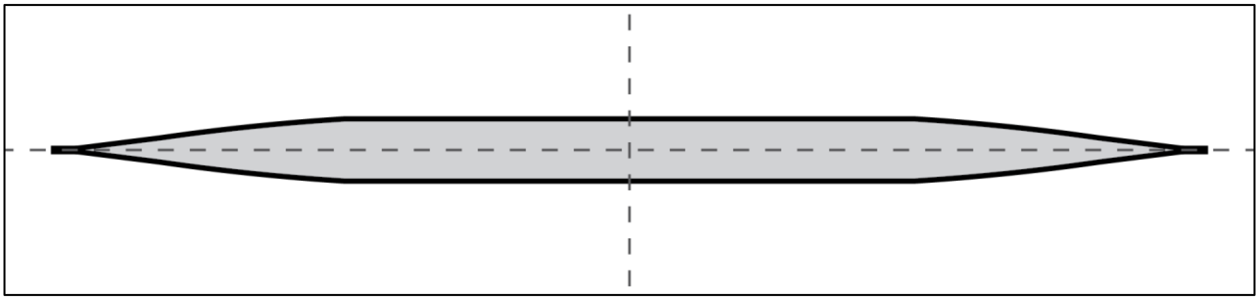
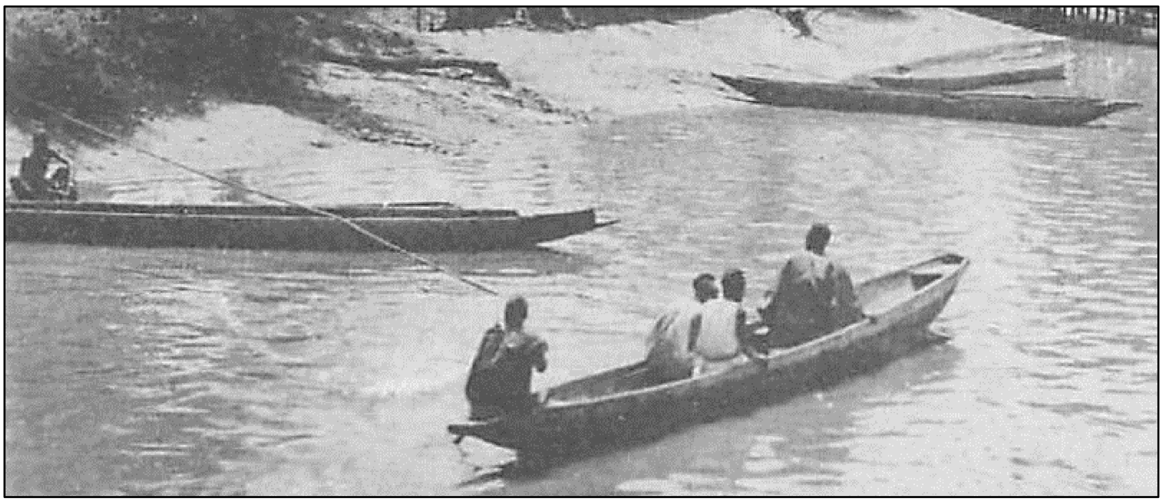
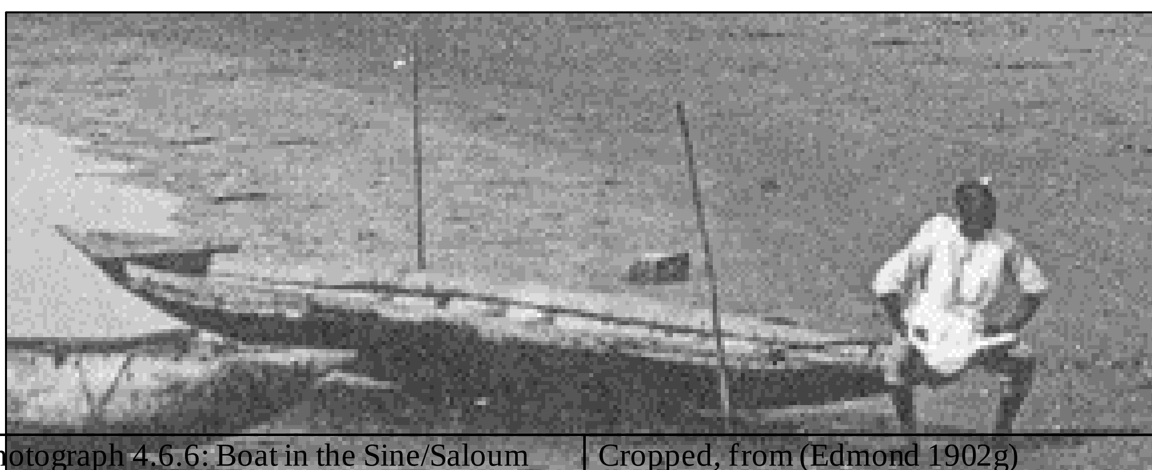


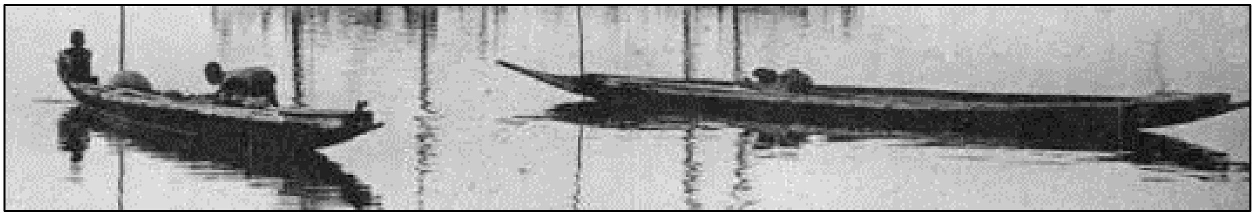
Figure 4.6.3: Gambia-Sine/Saloum extended logboat with projecting cutwater, Plan view	Approximate shape from photographs



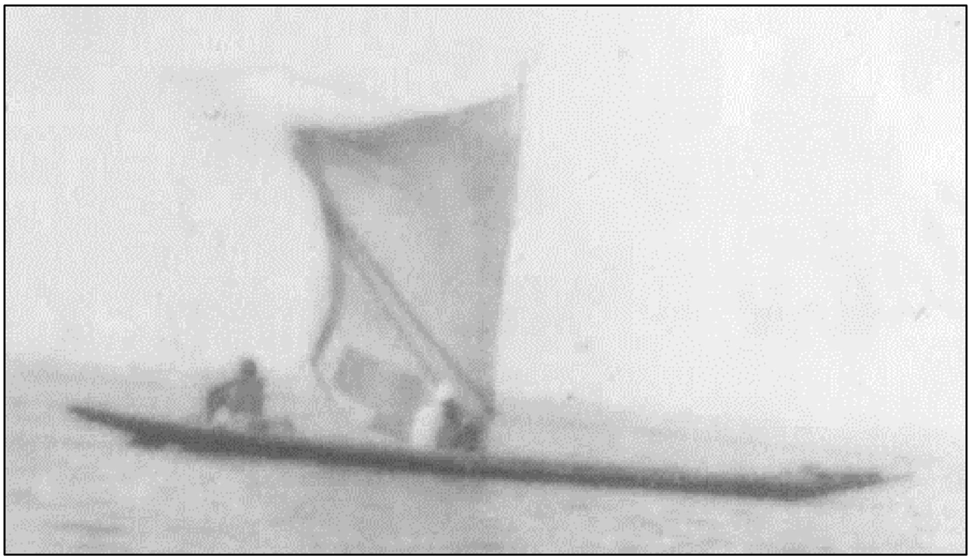
Photograph 4.6.5: Boats on the Gambia River	Cropped, from (C.M.C. Unknown)



Photograph 4.6.6: Boat in the Sine/Saloum Delta	Cropped, from (Edmond 1902g)



Photograph 4.6.7: Boats in the Sine/Saloum Delta	From (C.F.A.O. Unknown)



Photograph 4.6.8: Boat on the Gambia under sail	From (RAF No. 95 Squadron 1944a)

Photograph 4.6.9: Boat on the Gambia River, Viewed from above	Cropped, from (Hamlyn 1933) © Royal Geographical Society, watermarked high resolution image can be seen at Getty images number 1034306918

4.6.3 Gambia-Sine/Saloum and coast projecting cutwater shell-based plank-built boats

These boats (Figure 4.6.4, Figure 4.6.5, Figure 4.6.6) were very similar in general appearance to the projecting cutwater extended logboats but differed substantiality in the construction methods used and the overall shape of the hull. They appeared to have been constructed from a carved keel to which were added to levels of strakes. The first level appeared to have been edge joined but the second was at an angle. The bottom of the boat was highly rockered and the beam was far wider than the extended logboat type. The appearance of the projecting cutwaters and the deck was however identical making them difficult to differentiate when in the water. They had a notable high number of thwarts in a double layer and were able to fit two banks of paddlers with a lot of space in between. The sail setup appeared to have been identical to the extended logboat type. It appeared these boats operated on the coast as well as river transport and fishing boats. They were also frequently seen decked out with elaborate carvings. It was probably this design was developed to increase the cargo capacity of boats. It was uncertain when this design was developed but by the late twentieth century, seemed to have completely disappeared like the expended logboat version. It appeared that some of the construction methods and aspects of the form of these boats may have been adapted to later cutter type boats.

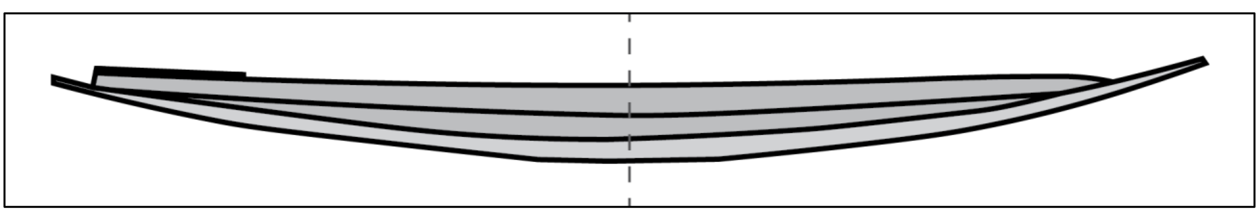


Figure 4.6.4: Gambia River-Sine/Saloum projecting cutwater shell-based plank-built boat, Profile view	Approximate shape from photographs

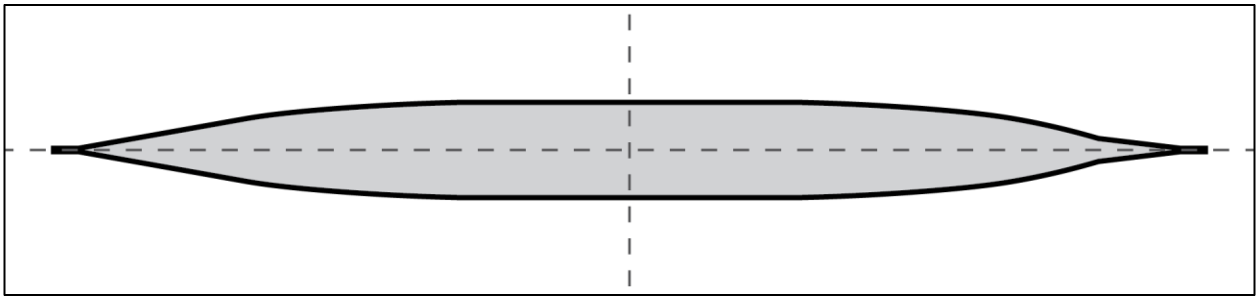


Figure 4.6.5: Gambia River-Sine/Saloum projecting cutwater shell-based plank-built boat, Plan view	Approximate shape from photographs

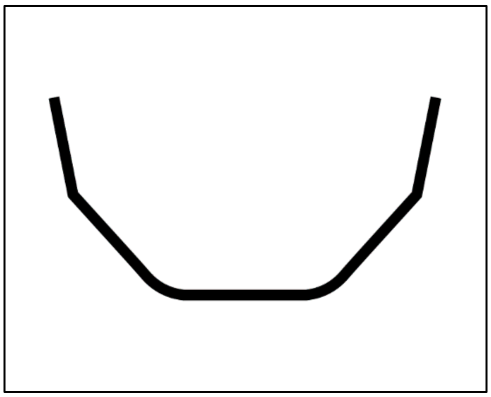
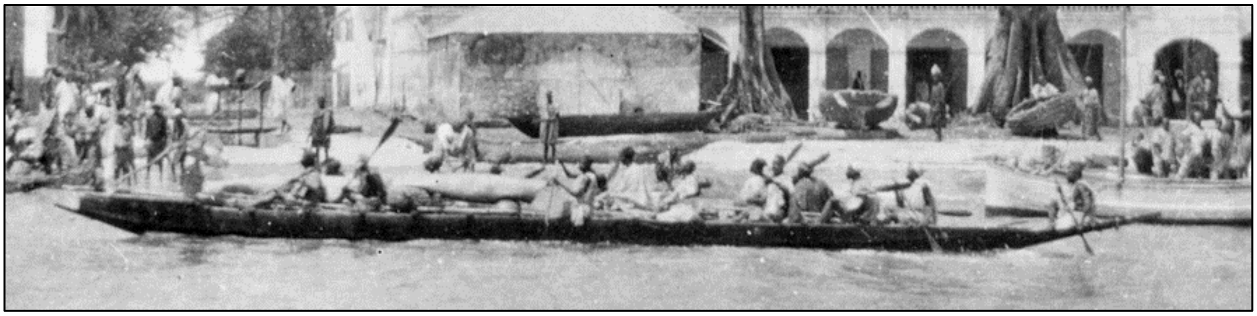


Figure 4.6.6: Gambia River-Saloum projecting cutwater shell-based plank-built boat, Section view	Hypothetical shape from photographs

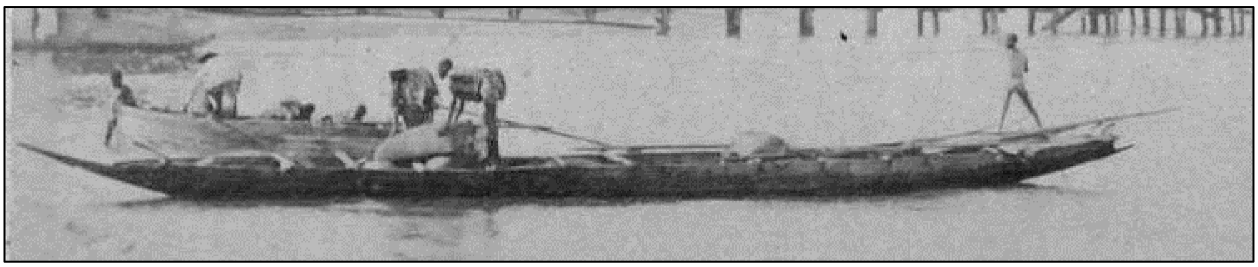
Photograph 4.6.10: Boats lined up on the Shore in The Gambia	Cropped, from (Sowle 1899a)

Photograph 4.6.11: Boats in front of a ship in The Gambia	Cropped, from (Sowle 1899b)

Photograph 4.6.12: boat on the Gambia River, Profile view	Cropped, from (Sowle 1899c)



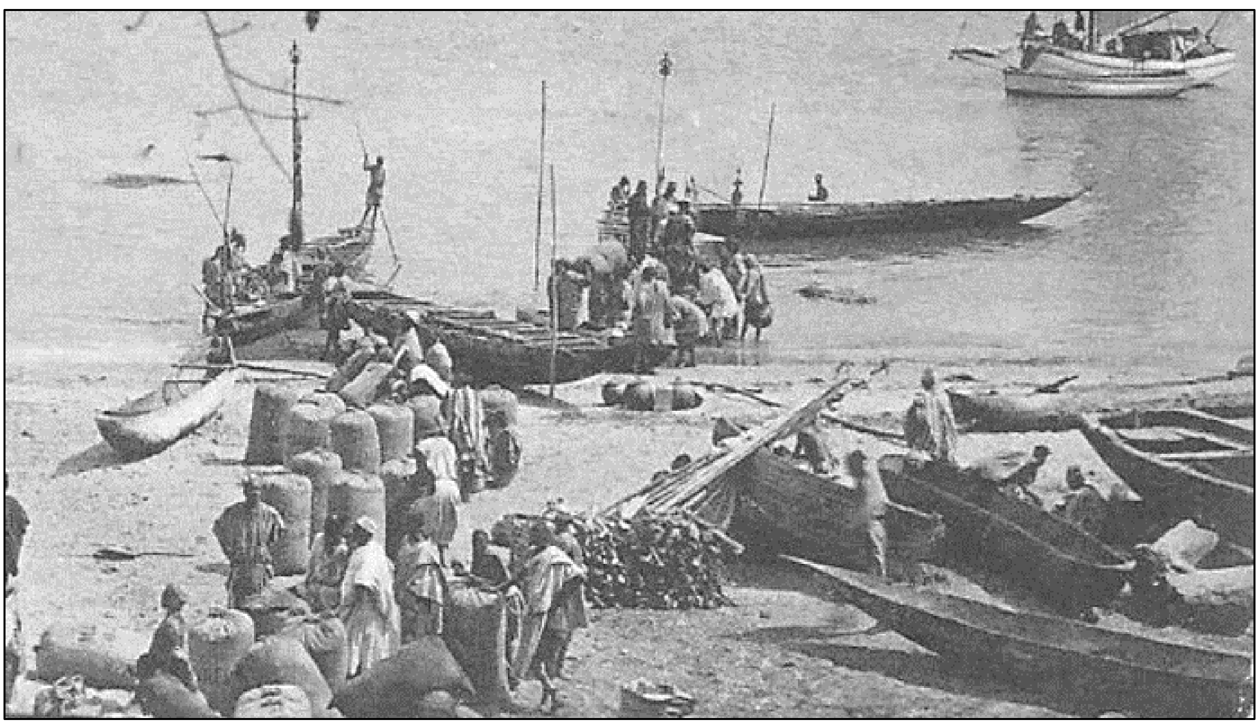
Photograph 4.6.13: Boat being paddled on the Gambia River, Profile view	Cropped, from (Sowle 1899d)



Photograph 4.6.14: Boat being unloaded of cargo on the Gambia	Cropped, from (Anonymous 1891)

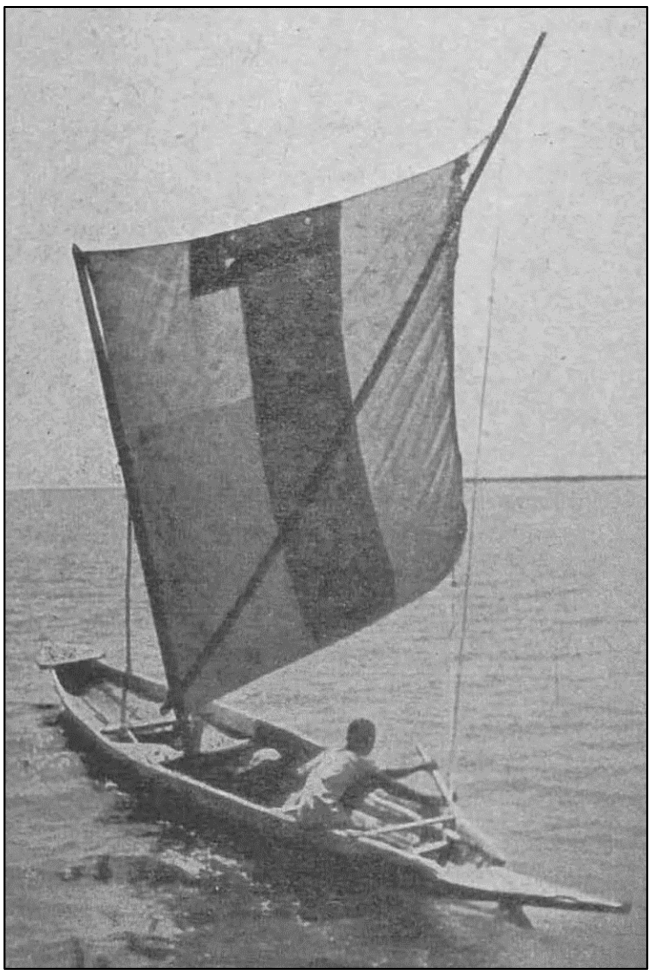
Photograph 4.6.15: Boat on the beach in the Gambia, Profile view	Cropped, from (Hornell 1928b)

Photograph 4.6.16: Fishing boat in The Gambia being unloaded	Cropped, from (RAF No. 95 Squadron 1944b)



Photograph 4.6.17: Boats on the Gambia River	Cropped, from (Verneret 1909)

Photograph 4.6.18: Beached boats on the Gambia River	Cropped, from (Hornell 1928c)



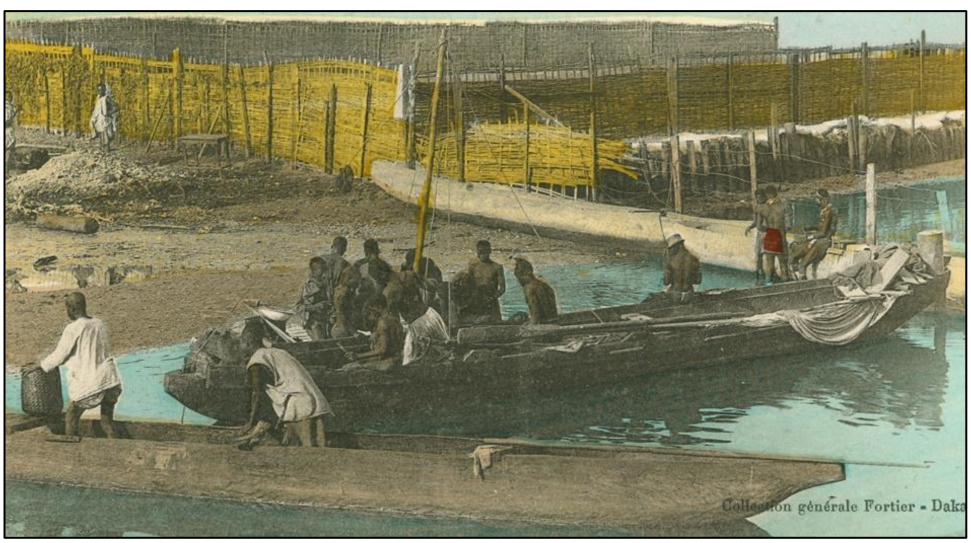
Photograph 4.6.19: Sine-Saloum Delta boat under sail	From (Postel 1950b:105)

Photograph 4.6.20: Boats in The Gambia from video	Cropped, from (Mallinson 2018)

4.7 *Casamance boats*

The boats of the Casamance were briefly described as logboats that could be quite large and were made of kapok or mahogany. These were mostly cargo boats (Gruvel 1908:128). The riverboats of the region were described in a 1963 study as mostly mahogany and kapok and similar to those found further north (Diop 1963:48). Very few photographs of boats from this area existed and the ones found appeared to show wide divergence between their forms and the forms of other Senegambian boats suggesting divergent development.

Photograph 4.7.1: Casamance boat	Cropped, from (Edmond 1909g)



Photograph 4.7.2: Casamance boats	Cropped, from (Edmond 1909h)

4.8 *Tools*

4.8.1 Tools (logboat)

Axes were consistently mentioned in relation to boat construction. It was known however that adzes existed and would have been used as well. It was likely observers who had no expertise in woodworking would not have distinguished between the two tools. Only a handful of sources even mention the word adze supporting this inference. Therefore, axe could be inferred to be a general term that referred to both adzes and axes, but this is uncertain.

Boats were described as being dugout with "axes" (de Villeneuve 1814a:72; Boilat 1853:193; Thilmans 1976:25). Planks were also described as being shaped by "axes" alone. Saws were not known to be used by woodworkers in Senegambia (Lasnet et al. 1900:67; Ritchie 1967:85). These "axes" were described as having the tang of the axe blade hafted through the handle (de Villeneuve 1814a:72). This was typical of Axes and adzes in the region which have a handle with a knob on one end with a socket through which the solid tang of the triangular axe or adze head passed directly through. This contrasted with the type of axe hafting that the observers would have been familiar with where the axe head had a hole in it through which the handle passes. A 1682-1683 observer claimed to have seen stone axes being used alongside iron ones on the Petite Côte but no other evidence of this exists in other source (Thilmans 1976:25). Fulbe woodworkers known as the Lawbe who still make logboats were recorded around 1900 as having the following woodworking tools: an axe (Fulbe, Singular: senine (i), Plural: diembere), an adze (Fulbe: Singular and plural: saoteu), a chisel, and knives (Figure 4.8.1). The source specifically notes they did not use saws or lathes (Lasnet et al. 1900:67, 67d). In the Gambia around 1891-1892, it was recorded that the wood used as handles for "axes" was *faidherbia albida* which the observer noted as having the drawback of breaking easily (Rançon 1894:199). It was likely that a variety of woods were used over different times and places as handles.

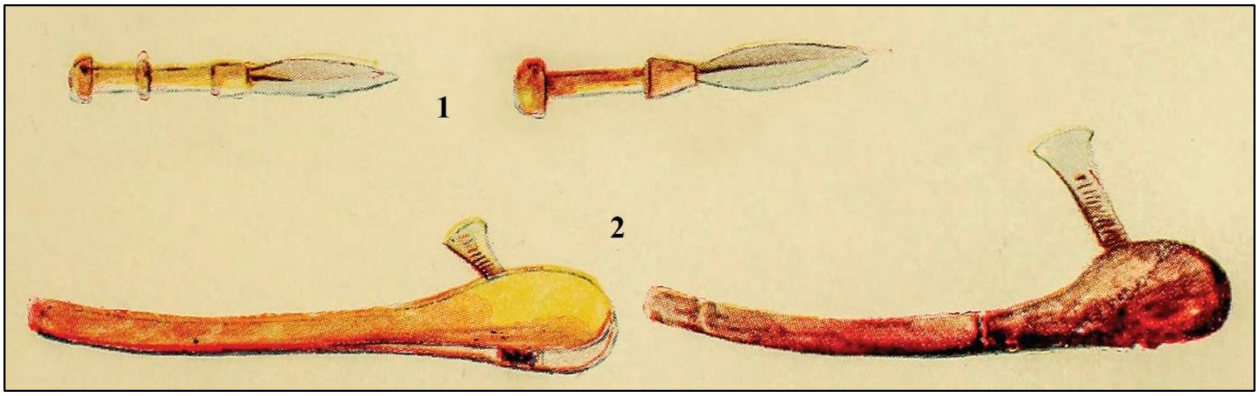


Figure 4.8.1: Lawbe woodworking tools	Not to scale, adapted from (Lasnet et al. 1900:67d)
1: Knifes, 2: Axes	

A modern Lawbe, a subgroup of Fulbe historically known for their woodworking, logboat carver living in the village of Djululung, Casamance who was consulted described the three tools (Photograph 4.8.1, Photograph 4.8.2) used to carve a logboat. There were only three tools used and were all locally made (Miles 2021).

- Axe: (Mandinka: *Tearan-ngo*)
- Large Adze: (Mandinka: *Deno or Dabu-Ndingo*)
- Small Adze: (Mandinka: *Sawto*)

A sharpening stone (Photograph 4.8.3) was used to keep the tools sharp throughout the process and although not mentioned by the carver appeared in a photo of a collection of tools and would be very important (Petersohn Unknown).

Photograph 4.8.1: Boat carver with their tools	Photograph 4.8.2: Boat carving tools
From (Miles 2021)	From (Miles 2021)

Photograph 4.8.3: Boat carvers' tools, Senegal	From (Petersohn Unknown)

4.8.2 Extended logboat tools

Descriptions of the tools used to make extended logboats and how they were used were limited. Only one study gave information on some of the tools used to make extended logboats. They highlighted three tools as the main ones used, an adze, a plane, and a drawknife described as a double-handled curved scraper (Leca and Labouret 1935:59). A later study described the tools and process as the same as the previous study (Balandier and Mercier 1952:159).

Sewn boats also used a metal needle made of stiff wire or recycled umbrella rib to sew cord lashings (Leca and Labouret 1935:59). A nailed boat would have necessitated the needle and cord be replaced with a hammer, and nails. It is not stated how the holes for the lashings were made but a drill of some kind may have been utilized.

The process itself was not described but likely involved the logboat hull being carved with an axe and adzes then the plain and drawknife being used for fine shaping of joints of the logboat hull, the extended sides, and the stakes and end covers to make them fit together tightly to the hull. The tools described were likely not a complete list.

4.8.3 Caulking tools

No specific tools were mentioned as being used to make frame-based boats. It was likely that they would have utilized many of the same tools as were used to make extended logboats, however. These same tools were probably used on extended logboats when the oakum and pitch caulking method was used.

The only tools mentioned in relation to frame-based boats were described in a study and were those used by a caulker called in Wolof a “kalfat-kal”. They had responsibilities that included caulking, correcting minor mistakes in construction, and generally finishing the boat. Wolof terms for the tools were included below (Leca and Labouret 1935:67). Their tools (Figure 4.8.2) consisted of:

- Three or four steel scissors (sisu), fifteen centimeters long, four centimeters wide at the base, and two centimeters wide at the end. These were presumably for cutting the fabric covering for the caulking.
- A wooden mallet (male), with a head fifteen centimeters long, a head with two iron rings reinforcing the ends five centimeters in diameter, a handle three centimeters in diameter, and a total length of thirty-five centimeters. This was presumably for hammering in tacks and for the caulking iron.
- A caulking iron, fifteen centimeters in length, four centimeters at the base, and two centimeters at the head. For use in hammering caulking fiber between bords.
- A pincer for removing nails.
- A stick with a bulge on one end (dyipo), one to one and a half meters long with the bulge (bot) twenty centimeters in diameter. Used to stir the pitch.
- Also, brought by the caulker was a gas can (istano) full of pitch (sadol), a box of European nails, and an open tin of sardines containing tallow, shea, or machine oil, and chalk, oakum, paint.

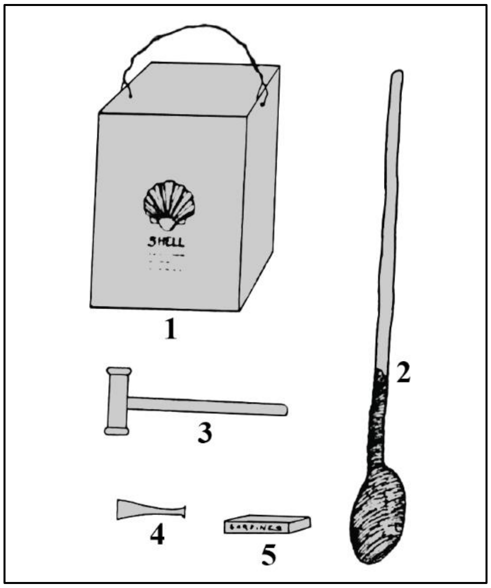


Figure 4.8.2: Caulking tools	Adapted from, Not to Scale (Leca and Labouret 1935:67)
1: Gas can, 2: stirring stick, 3: wooden mallet, 4: caulking iron, 5: box of nails	

4.8.4 <u>Later tools</u>

More recent observations were less useful due to the fundamental change in construction techniques undergone due to the transition of most boats to a shell-based plank-built design and the introduction of more types of tools including electric tools.

A 1986 study mentioned and adze, a hand saw, a drill with a long bit, a knife, and a hammer. A plane and a carpenter's square were mentioned to be sometimes used. No measuring instruments were used (Lleres 1986:126). One 1994 study listed hand saws, planes, braces (a type of manual drill), adzes, axes, hammers, and pincers, as important tools (Bousso 1994:28). Another included angle grinders, electric drills, electric saws, Adzes, hammers, chisels, knives, pincers, buckets, and brushes (Masimana and Rabenevanana 2018:10, 14, 17, 19, 22, 28–30, 32–34, 36, 38).

4.8.5 Tool vocabulary

Hand tools with known terms

- **Axe:** Vertically orientated triangular blade on a handle (Fulbe: Singular: *senine (i)*, Plural: *diembere*) (Mandinka: *Tearan-ngo*)
- **Small adze:** Horizontally orientated triangular blade on a handle (Fulbe: Singular and plural: *saoteu*) (Wolof: *sawto*) (Mandinka: *sawto*)
- **Large adze:** Horizontally orientated triangular blade on a handle (Mandinka: *deno* or *dabu-ndingo*, also *daba*)
- **Knife:** (Wolof: *pako*)
- **Scissors:** (Wolof: *sisu*)
- **Hammer**: General term (Wolof: *marto*)
- **Wooden mallet:** Wooden hammer (Wolof: *male*)
- **Knobbed stirring stick:** Used to stir tar (Wolof: *dyipo*)
- **Gas can:** (Wolof: *istano*)

Hand tools

- **Chisel:** A metal wedge used to gouge wood
- **Caulking iron:** A type of chisel used to force caulking into plank seams
- **Hand saw:** Hand-operated saw (Wolof: *see*)
- **Pincer:** Pliers for removing nails (Wolof: *tenach*)
- **Drawknife:** Curved blade between two handles used for smoothing
- **Plane:** Angled blade set in flat wooden case used to smooth wood (Wolof: *rabot*)

- **Brace:** Drill operated by rotating a handle bent in a U-shaped bend
- **Brush:** Paintbrush (Wolof: *brush*)

Electric tools

- **Angle grinder:** Used on wood and metal
- **Electric drill:** Drill with long bit used to make dowel holes
- **Electric saw:** Used to cut timbers

4.9 *Trees and carving process*

4.9.1 Tree selection and acquisition

Trees used in boat carving according to the carver fall into the category of either male or female. This seemingly does not map entirely with botanical culture, and it was unknown why. The Female trees were preferred for boat carving.

Female Trees

- (*Ceiba pentandra*) Mandinka: *Bantan-ngo* English: Kapok
- Described as the preferred wood for canoe making because it would not sink even when filled with water. They were where the largest tree available. Trees could allow for boats 12 meters long and 1 meter wide.

- (Daniellia oliveri) Mandinka: Santan-ngo

- Most trees of this type were described as allowing for a canoe 7 meters long and less than 1 meter wide.

- (Faidherbia albida) Mandinka: Barang-sango
- Most trees of this type were described as allowing for a canoe 7 meters long and .5 meters wide.

- (Chlorophora regia) Mandinka: Tumbu-yirow koyo
- (Bombax costatum) Mandinka: Bun-kung

Male trees

- (Chlorophora regia) Mandinka: Tumbu-yirow Fingo
- (Afzelia Africana) Mandinka: Lenko
- (Albizia ferruginea) Mandinka: Banetto
- (Detarium senegalense) Mandinka: Talo

4.9.2 Tree and boat transport

Waterways were often critical to transporting timber. A trunk would be roughly shaped and floated to the construction site if not simply finished at the site of the felling near a river and launched (Lleres 1986:125). Timber could also be transported by ship longer distances (Leca and Labouret 1935:59). It might be presumed that long-distance overland transport would have been prohibitively expensive, however, this was not necessarily the case. Around the former kingdom of Sine just north of the Sine-Saloum Delta roughly shaped boats of the best kapok were routinely transported what would be the equivalent of 55-70 miles in 3 to 4 days via rolling from village to village in a relay fashion for little more expense than food provided to the rollers (de Villeneuve 1814a:70–72). This feat was no doubt made possible by the flat coastal plain and a lack of thick vegetation in much of northern Senegal although no doubt rolling boats short distances was common. Finished boats from southern Senegambia could be sailed at least as far as Cape Verde to sell and were often transported to Saint Louis (Boilat 1853:193; Lasnet et al. 1900:171). In more modern times it was common for logboat hulls to be finished on-site and shipped by truck due to issues with shipping timber across borders (Miles 2021). One photo (Photograph 4.9.1) from 1933-1934 in the Casamance shows a boat being hauled overland by a team of men holding on to ropes tied to either end of the boat. A man with a leaver at one end of the boat was lifting the end up and it was likely rollers were placed under the boat. A cart pulled by animals may be employed as well as shown in another photo (Photograph 4.9.2).

Photograph 4.9.1: Hauling a boat, ropes and a leaver, and possibly rollers	Cropped, from (Tastevin 1933)

Photograph 4.9.2: Finished logboat being transported	From (Petersohn Unknown)

4.9.3 Timber

There were three main native tree species used to construct most Senegambian watercraft. The first of these was *khaya senegalensis* commonly known as dry zone mahogany. The second tree used was *ceiba pentandra* commonly known as kapok. The third was *bombax costatum* commonly known as red kapok. Many designs rely on whole carved trunks for logboat hulls and keels. These three kinds of wood possessed contrasting properties that make them ideal for use in different regions and boat sections to balance concerns of buoyancy, durability, and accessibility.

Mahogany was distinguished by a distinct reddish-brown color, high durability, and high density. It was the preferred wood for making keels due to its strength, and for strakes in the south where the calmer water would not swamp heavier boats. The advantage of mahogany was durability with hulls able to last up to 25 years. However, this came at the cost of buoyancy as its high density means a capsized boat made of mahogany would quickly sink (Lleres 1986:125). The largest Senegambian watercraft in the modern-day were made exclusively of this wood and rely on their size to avoid being swamped like smaller boats. Mahogany does not grow in much of the north (PROTA 2021b). There were no records of the trees use to build boats before the late nineteenth century but it was probable it was used in southern Senegambia going back centuries (Hecquard 1853:107; Rançon 1894:73).

Kapok was a light-colored wood characterized by high buoyancy and low durability. A boat made from kapok would not sink, a quality mentioned and demonstrated in primary sources, studies, and attested by modern carvers (Gruvel 1908:76; Leca and Labouret 1935:58; Miles 2021). This was an ideal quality for Cape Verde Peninsula and the Grande Côte where rough water made capsizing inevitable. This came at the cost of durability and longevity, however. Hulls last an average of 10 years, half that of boats made of mahogany (Lleres 1986:125, 155. 168). Due to the lightness of the wood, boats constructed of kapok, or with kapok strakes, could have higher freeboard than those constructed of mahogany while retaining stability. This was because the light wood does not shift the center of gravity as high as the heavy mahogany (Lleres 1986:155). The earliest description of this tree being used for watercraft came from 1594 but its use was likely far older (de Almada 1984:38).

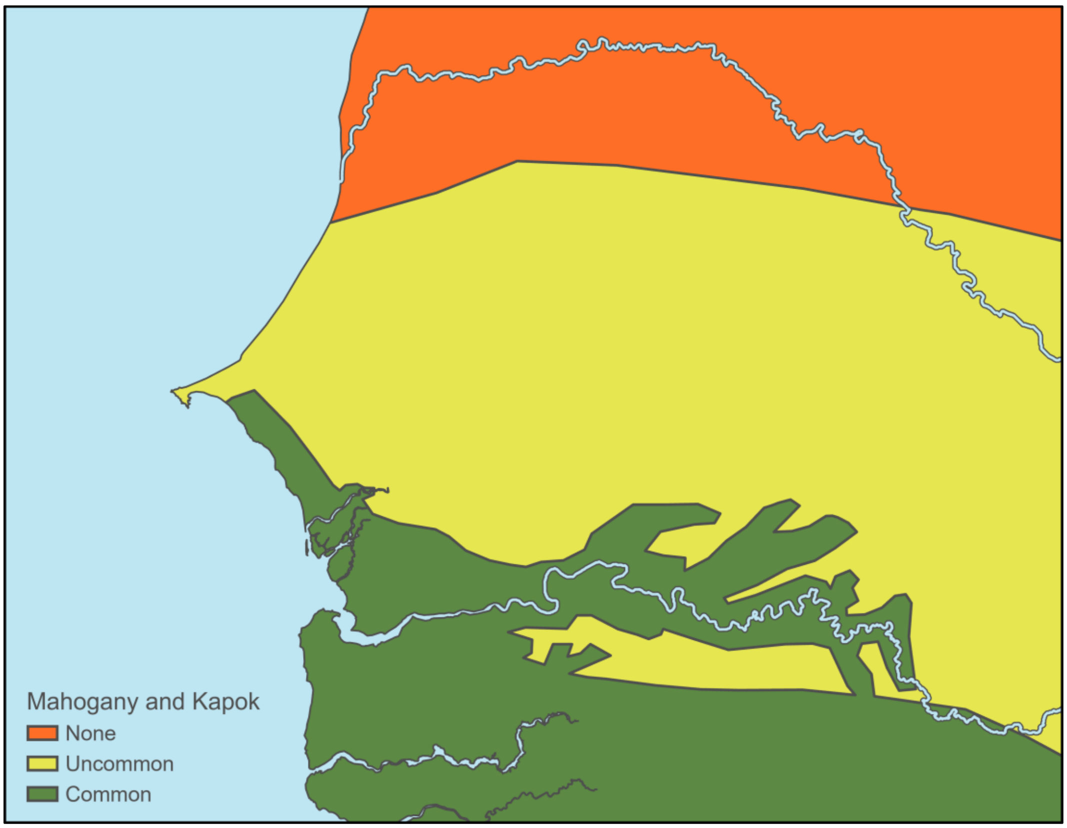
Red kapok was strictly inferior to kapok in both maximum size and buoyancy while retaining kapok's low durability (PROTA 2021c). Red kapok, therefore, was an unideal wood used where kapok was restricted in availability such as in the north. Confusion between kapok and red kapok in the sources appeared to be partly the result of a bias in data collection towards the north. Often when sources cover the south where kapok was readily available, they do not specify as *ceiba pentandra* even when they previously specified *bombax costatum*. The trees were often simply called “fromager” a French name that included both kapok and red kapok. Their similarity was likely a source of confusion in primary sources as well.

Many native wood types were used in addition to the three primary kinds of wood. These fall into two general categories: woods that could be used as substitutes for the primary woods if they cannot be obtained; and woods that were used for specific parts of some watercraft. Substitute woods for kapok all possess middling buoyancy while retaining low durability. Notably, coconut palm, *cocos nucifera,* was observed being used for some extended logboat off the Senegal River Coast in the mid-twentieth century. It made a poor hull that waterlogged quickly (Brenton 1969:169). The coconut palm was introduced to West Africa likely sometime in the sixteenth century by Europeans (PROTA 2021d).

In addition to native Senegambian timber, sources attest to the widespread use of imported pine or fir planks. French “sapin” likely *Picea* or *Abies* genus was used for frame-based boatbuilding on the Senegal River (Leca and Labouret 1935:59, 67; Diop 1963:37, 43). Due to a lack of information on what species these planks came from, if there was even a consistent source, it was difficult to compare them to native woods. However, given their use as strakes on coastal boats it was likely they possess high to middling buoyancy. Overly dense strakes would result in a problematic decrease in buoyancy and stability. The common practice of buying and recycling both these planks and other available timbers was reflective of a scarcity of locally available timber due to the climate and deforestation (Chauveau 1986:205; Lleres 1986:126, 167–168). A*cacia nilotica*, a dense and durable native wood, was used for the frames on Senegal riverboats (Seck 1980).

The regions where three species were able to grow (Map 4.9.3.1) and the reach of the river network allowing access to timber have shifted greatly over time with climatic change

(Chauveau 1986:205, 208–209). In addition, modern deforestation largely due to land clearing for farming, particularly related to the rise of groundnut production, had reduced the available timber. Much of the modern supply was now imported from the Casamance or even further south as timber supplies in the north have been steadily depleted over the nineteenth and especially twentieth century (Chauveau 1986:205; Chauveau 1988d:33). Regardless of supply constraints, the heavy use of wooden watercraft continues.



Map 4.9.3.1: Estimated distribution of tree species	Own work, from GIS data and sources, does not show ranger of Red Kapok as it was everywhere

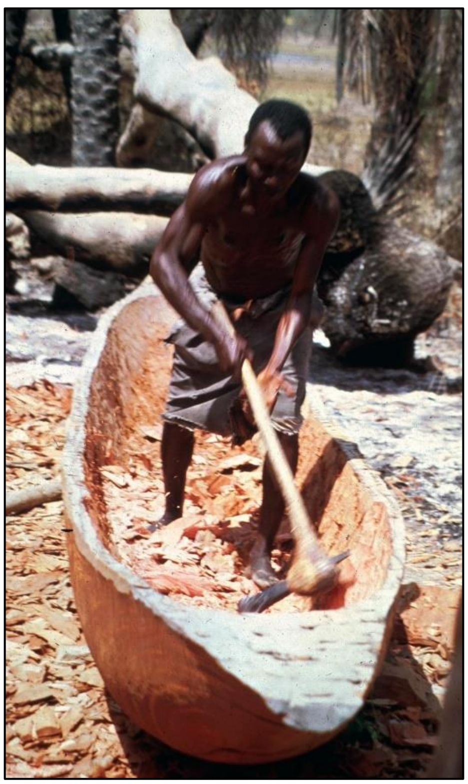
4.9.4 Carving

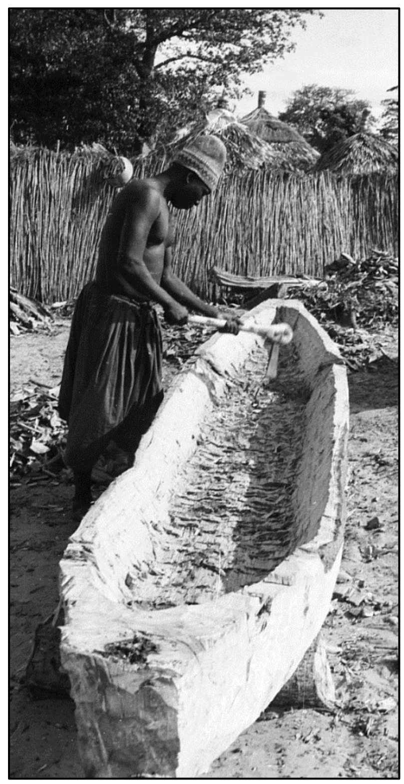
The following was a description of the carving process from the same Lawbe carver. The same basic process would be used for the creation of both logboats and extended logboat hulls.

- Step 1: Cut down tree with axe
- Step 2: Roll the tree so the flattest side was up, this would the top side of the boat
- Step 3: Mark the trunk with the axe
- Step 4: Use axe to shape ends
- Step 5: Use axe to carve out internal hollow of the boat
- Step 6: Turn the boat upside down
- Step 7: Shape the outside of the boat
- Step 8: Use large adze to smooth outside and inside
- Step 9: Use small adze for additional smoothing (step optional)

In recent times according to the carver the small adze had become less used to save time and effort. This would have the effect of making the boats surface rougher. The time the carving process took was variable depending on the size of the tree, how many carvers there were, and how long they spend a day on the process (Miles 2021). Pictorial evidence from gathered historical imagery suggests that the outside of the boat could be carved and finished with an adze first before hollowing out the inside (Photograph 4.9.4, Photograph 4.9.5, Photograph 4.9.6, Photograph 4.9.7).

Photograph 4.9.3: Felled tree to be used for the carving of a logboat, Ziguinchor, Casamance	From (Tastevin 1900)





Photograph 4.9.4: Carving a logboat, Senegal	Photograph 4.9.5: Carving the bottom of a logboat, Cape Verde Peninsula
Cropped, from (Petersohn Unknown)	Cropped, from (Elisofon 1970a)

Photograph 4.9.6: Carving the inside of a logboat, Ziguinchor, Casamance	From (Tastevin 1900)

Photograph 4.9.7: Carving the interior of a logboat, Cape Verde Peninsula	Cropped, from: (Elisofon 1970b)

Photograph 4.9.8: Partially carved logboat, Gambia	Cropped, from (Petersohn 1989)

Photograph 4.9.9: Smoothing the Inside of a logboat, Senegal	From (Petersohn Unknown)

Photograph 4.9.10: Finished logboat carving, Djibelor, Casamance	Cropped, from (Mitch 2009)

4.9.5 <u>Heat treatment</u>

After the carving was finished the whole boat was reported to be heat treated with fire to prevent the wood from splitting (de Villeneuve 1814a:72; Boilat 1853:193). Although the process was not described in much detail similar practices existed in other areas such as on the Gold Coast. The Gold Coast process involved burning straw inside the hollow of the boat while posts were placed along the sides of the boat likely to prevent damage to the boat from the expansion of the wood due to the heat. This process reportedly was used to prevent the boat from splitting due to ambient heating and cooling and made it resistant to attack from insects and marine borers (Dapper 1686:297). Kapok woods were known to be particularly vulnerable to attack (PROTA 2021c; PROTA 2021e). They were conversely fairly resistant to warping and splitting untreated (Postel 1950a:123; PROTA 2021c; PROTA 2021e). This seemed to be counteracted by the tropical environment which causes the soft sap-filled wood to shrink and split (Mitchinson 1881:418). This deterioration would likely be exacerbated by constant immersion in water and exposure to the elements. It was not known if this method was still in use later. It was unknown if this method was used later or used on extended logboat hulls.

4.10 *Extended logboat construction*

4.10.1 Workers

Historically boat carving and construction was done by specific groups in many areas of Senegambia. Many of these groups still make boats but particularly since the beginning of the twentieth century there had not been any restriction on who produced Senegambian boats any many people work producing boats. Workers may also travel all around working in many areas of Senegambia (Miles 2021). One observer noted Chinese workers were hired to build Senegambian boats (Lleres 1986:123).

All the peoples along coasts and rivers appeared to have practiced boat building and carving to a great or lesser degree. The most notable group associated with boat building were the Lawbe, the former “caste”, endogamous occupational group, of Fulbe woodworkers who spread all across Senegambia (Dupire 1985). The other groups heavily associated with boatbuilding in Senegambia were the Serer who lived all along the South coast as far as the north bank of the Gambia and produced boats for export (de Villeneuve 1814a:70–73; Boilat 1853:193; Lasnet et al. 1900:171). Fishing and boat building were still commonly associated with the Serer (Miles 2021). An 1850-1852 source described the Petite Côte boatbuilding crew as the owner of the log which would be used to make the boat and their enslaved workers (Boilat 1853:193). This appeared to have been the only pre-colonial source to describe any boatbuilding work crews makeup.

A 1935 study records some details of different parts of the construction process. Some parts of extended logboats were done by professionals such as the carving and finishing of the hull and addition of projecting cutwaters, if necessary, as well as the attachment of thwarts. However, much of the rest of the construction was often done by the boat owner and their relatives. This often included the addition of strakes. The creation of the mast was also commonly done by the boat owner (Leca and Labouret 1935:59–60). A photograph (Photograph 4.10.1) of the process showed several people working on a boat surrounded by observers and playing children, likely the family members of the workers. Senegal River frame-based boats were caulked and finished by a professional called a “kalfat-kal” (Leca and Labouret 1935:57).

A 1952 study around the Cape Verde Peninsula reaffirmed that the boats were frequently finished by the boat owner themselves which included caulking, painting, decoration, sail making, paddle making, and spar making. The carpenters were by this time not associated with any caste and were sometimes trained in European schools. The finishing could however still be done by the carpenters if needed. The main difference by this time was that the nailed construction was done by the carpenter instead of sewing being done by the boat owner. Professional boat painters also existed (Balandier and Mercier 1952:159).

4.10.2 Extended sides process

A 1935 study around the Senegal River Coast described the arrangement and process of creating extended logboats in that region. The hull was imported roughly shaped from the Casamance from Lawbe woodworkers and transported by steamboat. After it arrived a local carpenter refined the hull by smoothing it with an adze, a plane, and a drawknife. They also attach projecting cutwaters if needed. They also add the thwarts which were three at that time and the mast step. They sometimes added the planking but often the job was done by the boat owner and their relatives. Four planks were obtained for use as strakes and placed in water for half an hour to soften them and allow them to bend better. Both river and seawater could be used for this purpose. To make the planks even more pliable they were then heated above a fire lit in a hole in the ground (Leca and Labouret 1935:59). A 1908 study recorded that the strakes on Senegal River Coast boats totaled twenty-five to thirty centimeters in width (Gruvel 1908:74).

Photograph 4.10.1: Boat under construction on the Cape Verde Peninsula	Cropped, from (Anonymous Unknown)
A pile of fiber could be seen next to the boat likely used for lashing or caulking. Boat appeared to be supported on one end by logs. Multiple workers work on the boat whole observers watch and children play	

4.10.3 Lashing

No detailed descriptions of the pattern of lashings used to make extended logboats, frame-based Senegal River boats, and shell-based boats on the Senegal and Gambia rivers existed from before the twentieth century. Only a handful existed from the beginning of the twentieth century before the method declined as (Gruvel 1908:74; Leca and Labouret 1935:55, 59). Also, due to being replaced with nailed construction or covered over lashings were almost never visible in old photographs except on some Gambia River shell-based boats. The only source for how the extended sides of boats were attached was a handful of illustrations and one model. All lashing illustrations (Illustration 4.10.1, Illustration 4.10.2, Illustration 4.10.3, Illustration 4.10.4, Illustration 4.10.5) and one model were from the nineteenth century around the Senegal River and coast as well as the Cape Verde Peninsula. They all depicted prominent lashings positioned vertically or diagonally. It was difficult to infer more than this from the illustrations. The model boat (Model 4.10.2) had lashings which on the inside displayed a Z shaped pattern where the lashings wrap around vertically and then go from the top of one lashing to the bottom of another and repeat with the outside showing only vertical lashings.

To secure the strakes to the hull a metal needle made of stiff wire or recycled umbrella rib attached to a long cord was used. The cord was probably composed of tree bark fiber and overlapped the needle by a few centimeters and was attached to it (Figure 4.10.2). The cord, called a “fil di wol”, was passed through holes drilled along the top of the logboat hull and a strake. The holes in this case were lined up straight up and down although the angle of some boats lashings in illustrations suggests this was not always the case. The text and figures were difficult to interpret but considering what the figures likely show and other illustrations it appeared that a layer of caulking fiber composed of palm leaves of around five to ten centimeters in diameter, called a “dyoho”, was positioned at the seam, called the “naw”, on the inside and outside of the boat and held by the crisscrossing lashings (Figure 4.10.1, Figure 4.10.3). This was then covered with a cloth referred to as a “parla”, in this case sailcloth or tarred tarpaulin was described (Figure 4.10.4). This cloth was then secured to the hull by tacks positioned close together described as having wide and flat heads. Several people worked assembling the boat at the same time (Leca and Labouret 1935:55, 59).

It was probable based on the consistent look of all lashings observed in illustrations and models that the crisscross pattern was only present typically on the inside of boats. One photo (Photograph 4.10.2) however for a Gambian shell-based plank-built boat appeared to have straight up and down lashings on the inside (Photograph 4.10.2) between the garboard and the keel, however. An extended logboat also in the Gambia displayed what appeared to be straight up and down lashings on the outside (Photograph 4.10.7). Due to this inconsistent data the exact pattern of lashings on Senegambian boats cannot be identified. A comparison to methods of lashing used on the Middle Niger suggests that the Senegambian lashing pattern was relatively simplistic in comparison (Pitot and Daget 1948:10–12). This may be the result of not being used as the primary structural fastener for most boats. The weakness of these lashings may explain the replacement of the Senegal River and Gambia River sewn plank-based boats by boats using alternate methods of construction.

Given the presence of Somono fishers from the Niger river by at least 1908 on the Senegal it was possible that the practice of sewn lashings was transmitted from the Middle Niger to the Senegal and Gambia (Gruvel 1908:80). However, the differences in lashing methods and a lack of earlier evidence for these groups' presence make it impossible to know if sewn boats were developed independently on the Senegal and Gambia or not. They could have even predated known examples by centuries given the apparent presence of sewn boats all along the waterways of the West African savanna from Lake Chad to Senegambia. It was almost certainly impossible to know the ultimate origin of the methods used in Senegambia, however.

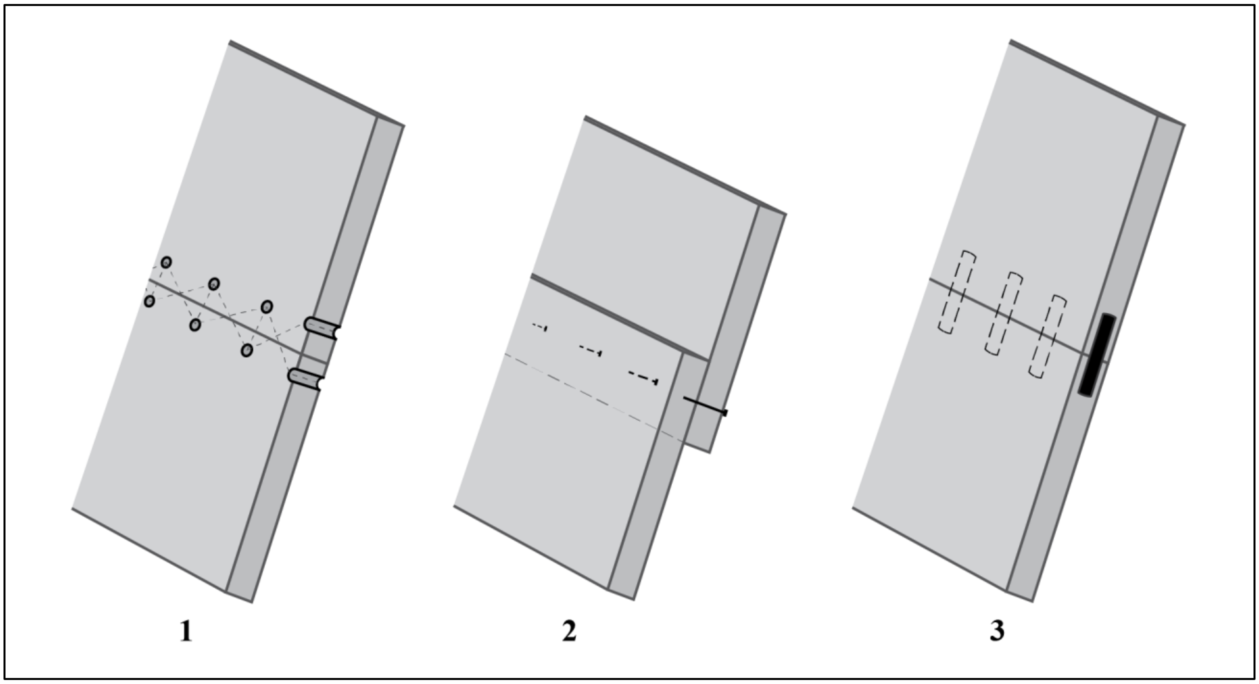


Figure 4.10.1: Strake fastening methods, Isometric view	Partially adapted from Leca and Labouret, Not to scale (Leca and Labouret 1935:55)
1: Lashings, 2: Nailed lapstrake, 3: Dowel/Coak/Drift bolted	

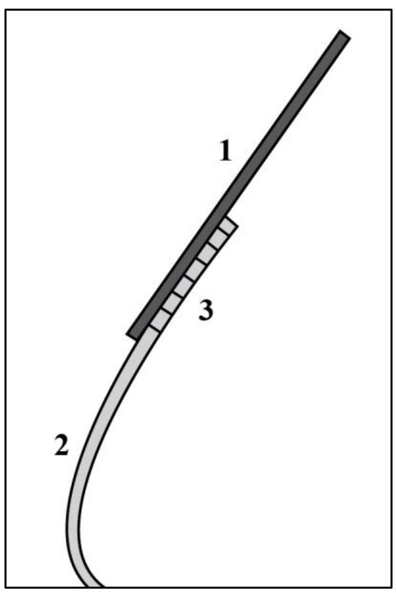


Figure 4.10.2: Needle with cord attached for sewing lashings	Adapted from Leca and Labouret , Not to Scale(Leca and Labouret 1935:59)
1: Needle, 2: Cord (fil di wol), 3: Attachment of needle to cord	

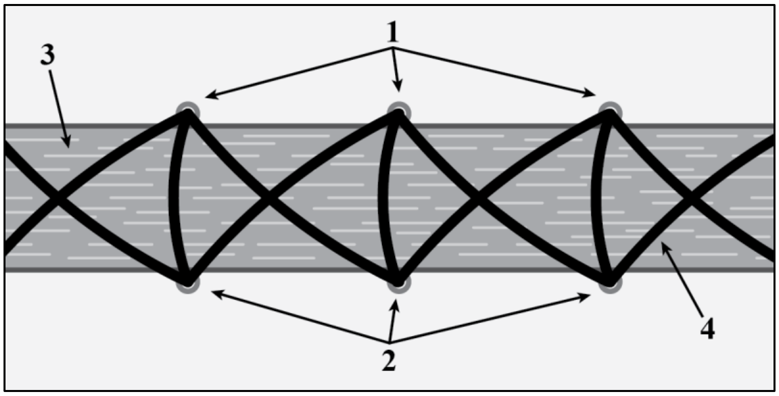


Figure 4.10.3: Caulking fiber and lashing pattern, Profile view	Adapted from Leca and Labouret, Not to scale (Leca and Labouret 1935:55)
1: Holes in strake, 2: Holes in hull, 3: Fiber (dyoho), 4: Cord (fil di wol)	

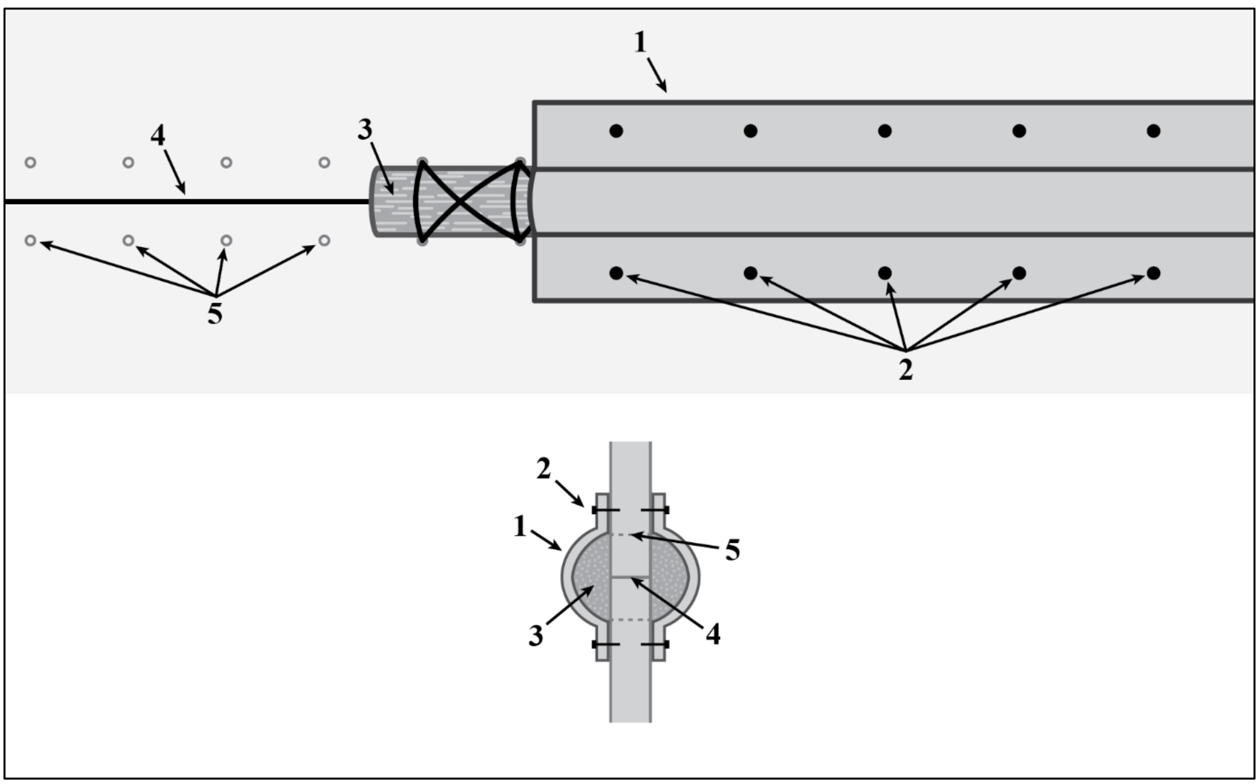


Figure 4.10.4: Caulking fabric cover and tacking, Top: profile view, Bottom: Section view	Adapted from Leca and Labouret, Not to scale (Leca and Labouret 1935:55)
1: Fabric cover (parla), 2: Tacks, 3: Fiber (dyoho), 4: Seam between hull and strake (naw), 5: Holes in hull and strake	

Illustration 4.10.1: Landing stage downstream from Saint-Louis, 1840-1856	Cropped, from (Gillotin 1840)
Drawn from firsthand observations but art style made it difficult to interpret details.	

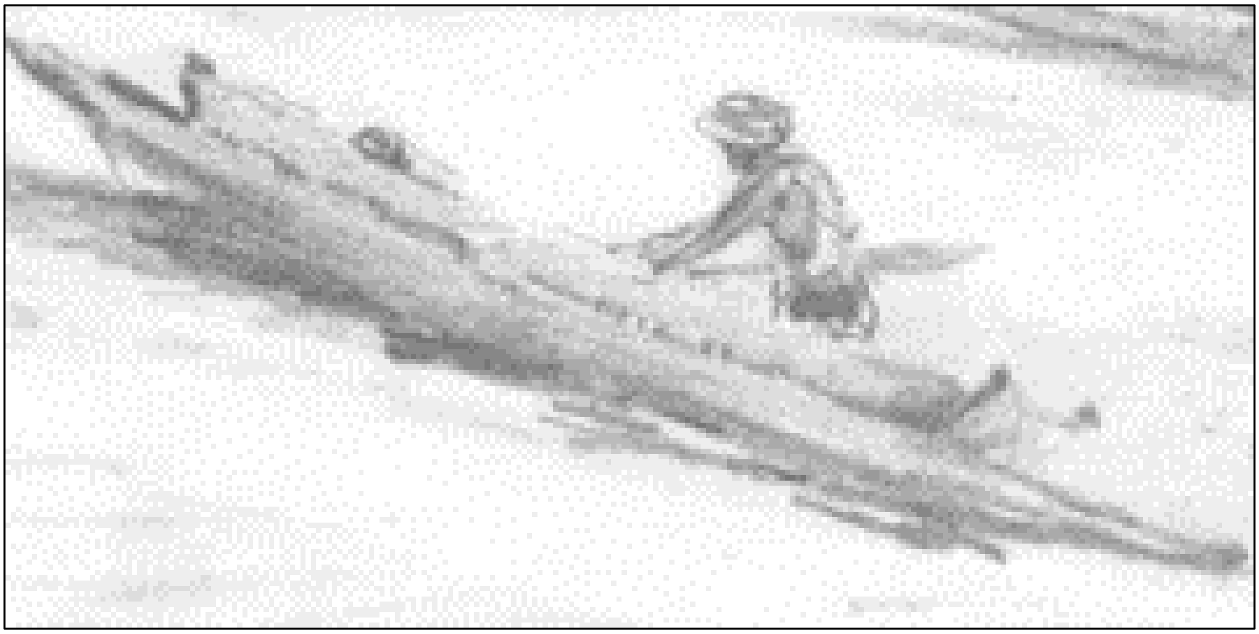


Illustration 4.10.2: Saint Louis, Senegal, 1852-1854	Cropped, from (Gillotin 1852)
Drawn from firsthand observations but art style made it difficult to interpret details.	

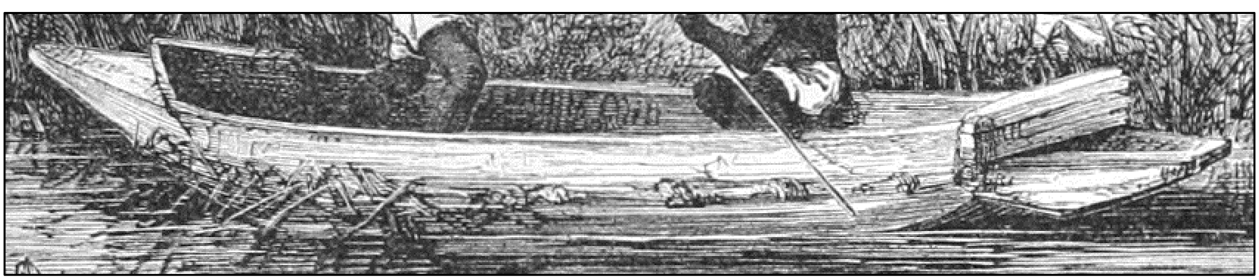


Illustration 4.10.3: Fishermen of Upper Senegal and Faleme, 1860	Cropped, from (Charton 1860:41)
May be drawn from firsthand observations.	

Model 4.10.1: Model of an 1830 boat from the Cape Verde Peninsula	Cropped, from (François 1873)
Model made from direct measurements of a boat and overseen by someone who observed the boats firsthand although significantly after initial measurements and observations.	

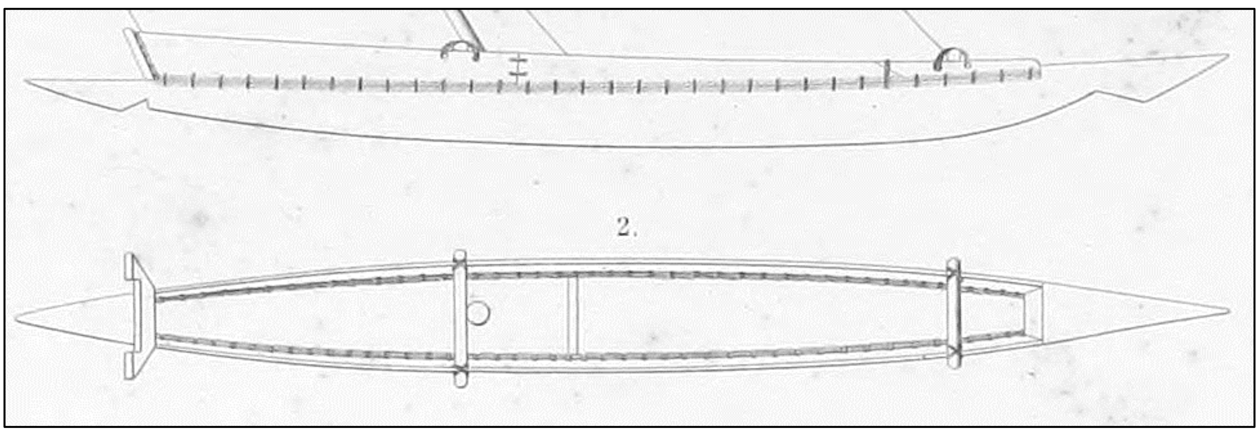
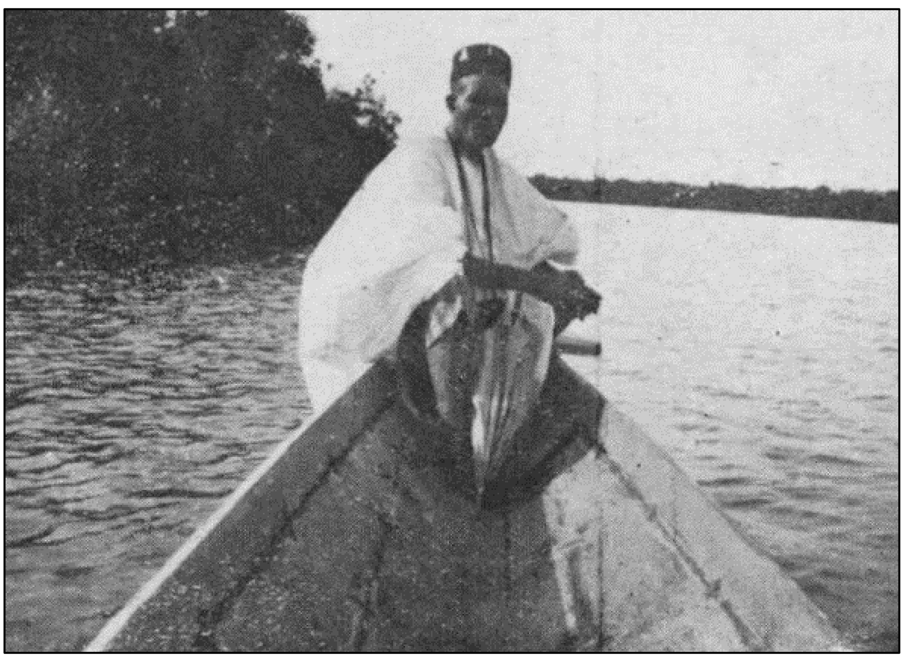


Illustration 4.10.4: 1837-1840 Goree boat	Cropped, from (Pâris 1841a:Figures 1-2)
Drawn from firsthand observations of skilled illustrator.	

Illustration 4.10.5: Cape Verde Peninsula boat, 1875	(Anonymous 1875:125)
Unknown details of creation but appeared to be from firsthand observation and high detail.	

Model 4.10.2: 1933 Boat model from the Senegal River Coast	From (Labouret 1933a)

Photograph 4.10.2: Fore end and interior of a shell-based plank-built fishing boat, Bathurst Gambia	From (Hornell 1928d)



Photograph 4.10.3: Sine-Saloum Delta bow of a boat appearing to have all sewn construction	Cropped, from (Lafont 1938:Plate 1)

4.10.4 Fastener technique evolution

The fastening technique on Senegambian extended logboats used historically was a sewn method. Nailed boats appeared already well established by a 1935 study (Leca and Labouret 1935:51). They also appeared all along the coast in photographs. By 1950 nailed fastening methods had mostly replaced sewn construction (Postel 1950a:124). In the same year outboard motors were first fitted onto boats (Lleres 1986:134). A 1952 study did not observe any sewn boats at all (Balandier and Mercier 1952:153). Given nailed construction had long been growing and had already mostly relaced sewn construction by the time of the engine's introduction Chauveau's preliminary hypothesis of engines influencing this change seemed unfounded (Chauveau 1988c:4). Nailed methods utilized a lapstrake technique, sometimes also using large battens, to attaching strakes. Boats also appeared to have shifted to completely nailed projecting cutters replacing carved projecting cutwaters. Pure nailed construction was superseded by combined nailed and iron dowel and bolt construction (Figure 4.10.1) by the late twentieth century (Lleres 1986:129–130). The dowel and bolt method appeared to have originated first in the construction of cutters in the Gambia and spread from there in later decades to other areas. Cutter-type boats using this technique were observed under construction in photographs construction as early as 1944 (Photograph 4.10.4) but likely predated this time. Dowel construction methods allowed for the direct edge-to-edge attachment of planks in the same way as sewn construction had. Using the dowel method holes were drilled along the top edge of the hull and in the sides of strakes. The dowels/coaks ("nai" in Mandinka, "wenyee" in Wolof) were then inserted, and the assembly hammered together. This method appeared similar to the edge doweling used in boat building methods used in other regions. The Austronesian lashed lug method which utilized wooden dowels instead of iron dowels but combined them with lashing in contrast to Senegambian style which only used dowels (McCarthy 2005:27). The closest method to Senegambian styles however appeared to be Swahili style which appears to have shared the same pattern of crisscrossed lashings one side and straight lashings on the other. The Swahili style like the Austronesian style used wooden dowels (Hornell 1941:60). The dowels being iron on later Senegambian boats likely allowed for enough strength to forgo additional reinforcement from lashings. At the top edge of the dowel fastened garboard, and other strakes if present, a nailed lapstrake method was to create the turn of the bilge. Cutters and later boats abandoned the extended logboat design replacing it with a keel plank or specially carved keel. The garboards were attached to these keels by passing bolts the whole way through their width. Further strakes were added using dowel and lapstrake methods. The boats thus heavily resembled the older shell-based plank-built boats of the Gambia which combined a carved keel with an edge joined garboard and a lapstrake sheer strake.

This style of bolt, dowel, and lapstrake shell-based plank-built boat was likely developed for the peanut cutters of The Gambia whose boat builders were in need of stronger fasteners to hold together large boats with heavy cargos. They invented the bolt and dowel method to edge join planks without needing to use the weak sewn pattern that already existed or develop new stronger sewn patterns that may not have worked. These new boats, the cutters, and the later smaller boats of the same design all shared the same carved keel, garboard, and lapstrake layout. The cutter simply replated the sewn fastenings with dowels and bolts on older shell-based plank-built Gambia-Sine/Saloum boats, added more strakes, and adopted the projecting cutwater style of coastal boats. The only fundamental cross-sectional difference between the Gambia river boats and later smaller shell-based plank-built boats was that the lashings were replaced with dowels and bolts and unnecessary extra thwarts removed. The bottom rocker could be similar between the boats as well but was not necessarily carried over to all later boat designs as some opted for a low rocker hull shape. Extended logboats using dowel and lapstrake construction along the coast appeared to have slowly adopted it after the development of the cutter. Almost all boats along the Coast in Senegambia were now cutter or cutter-derived designs. The cutter design also appeared to have displaced older wide Senegal River frame-based boats for cargo carrying.

No previous research had noted this progression pattern likely due to the lack of research on Gambian watercraft. The twentieth-century era of development deserves in-depth investigation as a critical time of maritime construction innovations but cannot be explored further here. The iron dowel and bolt method of construction appeared to be wholly unique to the Senegambian boat building tradition and developed indigenously.

Photograph 4.10.4: Earliest appearance found of a cutter-type boat utilizing dowel construction, the Gambia	Cropped, from (RAF No. 95 Squadron 1944c)

4.10.5 Extra front strakes and strake shape

The size and shape of strakes on Senegambian boats appeared highly variable shape. Generally, the number varied between one to two but in some cases, there may have been more. Strakes could be very narrow and in some cases, sheer strakes tapered off completely (Illustration 4.10.4, Illustration 4.10.5) before reaching a stern cover if one was present. Historical sources suggested the tapered bow strake preceded the use of full-length strakes (Spilsbury 1807:13; de Villeneuve 1814a:60a). Boats around the Senegal River Coast and the Cape Verde Peninsula often had sheer strakes which were raised in the bow and tapered towards the stern until they met a second sheer strake around halfway down the boat. For some boats, two butted strakes (Illustration 4.10.1, Illustration 4.10.4) appeared to have often been used in the place of one longer strake. The size of the strakes on more northerly boats was likely impacted by scarcer timber supplied which necessitated the use of multiple narrower planks in place of single larger planks. A 1935 Senegal River Coast study gave measurements for the strakes. They totaled in width thirty centimeters, which was split between the garboard and the sheer strake The strakes were three centimeters thick (Leca and Labouret 1935:54). The split in width appeared to have been uneven.

On boats around the Senegal River Coast and the Cape Verde Peninsula, a sheer strake was present and nailed to the garboard using an interior batten called a “taf u bir” and often futtocks on the interior of the bow (Figure 4.10.5) (Leca and Labouret 1935:54; Balandier and Mercier 1952:154). Conversely, on Gambia River and Sine-Saloum Delta boats the sheer strake appeared to have sometimes been nailed on in a beveled lapstrake fashion although sewing (Photograph 4.10.2, Photograph 4.10.3) was still a possibility so it was not certain. Not enough was known to definitively state the method of fastening. Most boats appeared to only have had one row of strakes.

4.10.6 Batten

The large batten, which could also be called a clamp, (Figure 4.10.5) the "taf u bir" appeared to have been a feature on boats around the Cape Verde Peninsula and the Senegal River Coast. It consisted of a plank of variable size that was attached to the inside of the hull on both sides. It appeared to have been positioned to be under the mast thwart and often centered on it in photographs. This plank was nailed to the strakes seemingly for several possible reasons. The first was acting as a batten to hold the garboard and sheer strake together (Leca and Labouret 1935:54; Balandier and Mercier 1952:154). The positioning under the mast thwart suggests it may have also been useful for reinforcing the mast. It was likely that this plank in many cases did not need to be as large as it was on some boats. The batten and front futtocks, and the end covers appeared to have been the only fasteners holding the sheer strake on. This method may have been used instead of the sewn technique used on the garboard due to the sheer strake not being constantly immersed in the water and so to avoid the effort of sewing caulking the whole seam, boat builders opted to simply but the strakes and rely on the batten in the middle plus the sheer stakes' connection to the end covers and bow futtocks.

A 1935 Senegal River Coast study gave measurements for this plank as two and a half meters in length and twenty-two centimeters in width. The nail pattern appeared to have been variable with one diagram showing a row on the top corners and the bottom middle and another showing evenly spaced top and bottom nails (Leca and Labouret 1935:52, 54). It covered approximately the middle third of strakes length (Balandier and Mercier 1952:154). The reason for the large batten was likely party aesthetics as one boat in a photograph could be seen with a smaller batten and uneven futtocks and generally appearing to be of lower quality and cheaper than other boats (Photograph 4.10.5) and as such compromising aesthetics for functionality. Later photographs also show ones that did not appear to be functioning as battens, but they may have still held the scarfs together or reinforced the mast thwart. On cutter-type boats, a part with the same name served an alternate function (Bousso 1994:11).

4.10.7 Bow Futtocks

Boats around the Cape Verde Peninsula and the Senegal River Coast frequently also had reinforcing futtocks (Figure 4.10.5) called "bar" nailed onto the inside of the bow which appeared in many photographs as well. These typically numbered four to five. These bows were also often raised with several additional strakes which could also be seen in photographs (Photograph 4.10.6). These numbered typically from four to five and could be vertical or angled with their tops tilting towards the bow (Leca and Labouret 1935:52, 54). They appeared to have had a similar role to the "taf u bir" acting to hold strakes together and reinforce part of the boat.

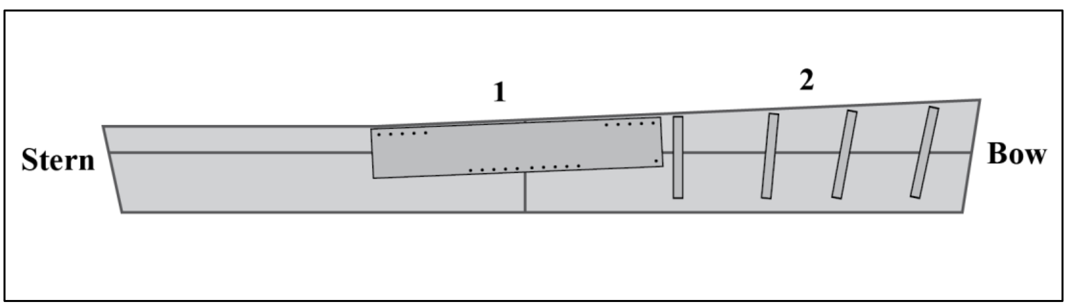
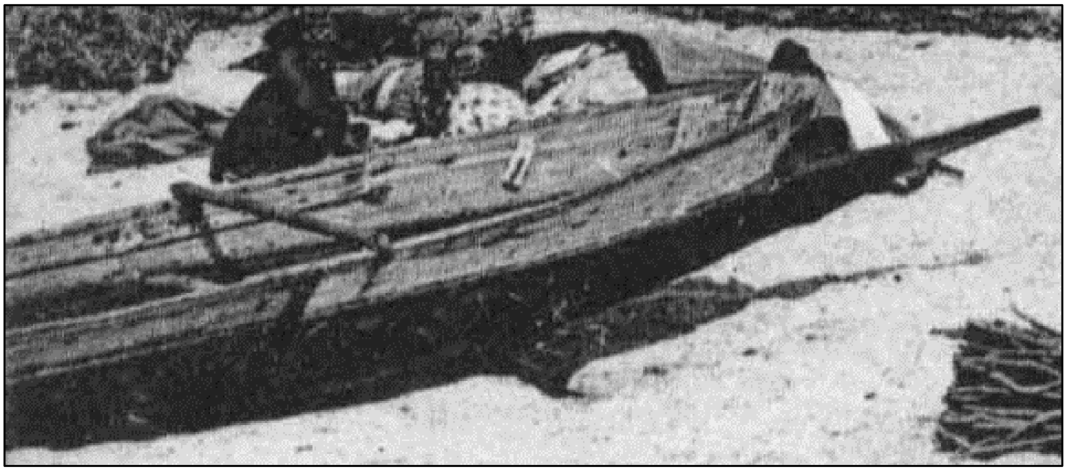


Figure 4.10.5: Interior inside view diagram of bow futtocks and batten fastening a garboard and sheer strake together	Hypothetical, own work, not to scale
1: Batten, 2: Futtocks	



Photograph 4.10.5: Boat using small batten and uneven futtocks	Cropped, from (Edmond 1902h)

Photograph 4.10.6: Senegal River Coast boat	Cropped, from (Edmond 1902b)
Boat with a "taf u bir" batten, also shows futtocks, gunwales, a stern cover batten, projecting cutwater extension, steering oar rail, mast strake, shroud strake, and caulking fabric covering	

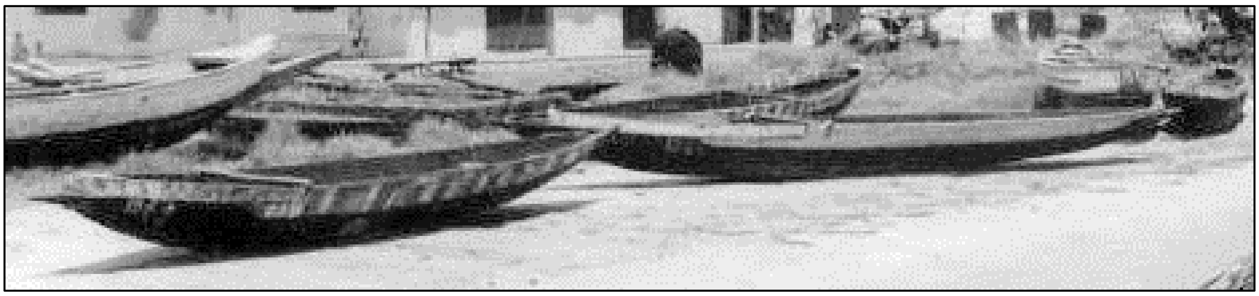
4.10.8 Joints/Scarfs

Evidence of scarfs on boats was rare but evidence suggests they varied in size and angle (Figure 4.10.6) to a large degree. In general feel into recognizable categories, however. When multiple strakes needed to be placed end to end in the absence of a single longer strake it appeared that a butt joint (Illustration 4.10.4) was used but examples were scarce and only from the Cape Verde Peninsula. They appeared to have been fastened with horizontal lashings (Pâris 1841a:Figures 1-2; François 1873). This type of joint was likely best for the sewn method of fastening. The attachment of projecting cutwaters onto some logboat hulls could resemble an S-scarf on the bottom and Z-scarf at the top (Figure 4.11.4) (Leca and Labouret 1935:53; Anonymous Unknown). Other projecting cutwater extensions appeared to have been diagonally scarfed on (Edmond 1902b).

Examples from the Gambia River in the twentieth century seemed to deviate from this by having using scarfs that resemble Z-scarfs instead of butted joints. Both full three planed scarfs (Photograph 4.10.7) appeared as well as scarfs where one side was three planed and the other a square butt (Photograph 4.6.3, Photograph 4.10.8).

Early cutter-type boats appeared to have used diagonal scarfs on their strakes and S-scarfs to attach their stem and stern posts (Spooner 1956b; Spooner 1957; Beare and Tanimomo 1991:13). Z-scarfs and S-scarfs appeared on the stem and stern posts of modern studies on cutter-derived boats (Bousso 1994:93; Masimana and Rabenevanana 2018:19–22). Recent photographs and videos showed the use of Z-scarfs and butt joints on cutter-derived boats. While there appeared to be patterns more common in different areas and boat construction methods the evidence was too limited to have definitive conclusions drawn from it.

Photograph 4.10.7: Boat in the Gambia with visible Z-scarfs on the strakes and lashing	Cropped, from (Spooner 1958a)



Photograph 4.10.8: Boats in the Gambia with Combined Z and butted scarfs	Cropped, from (Anonymous 1957)

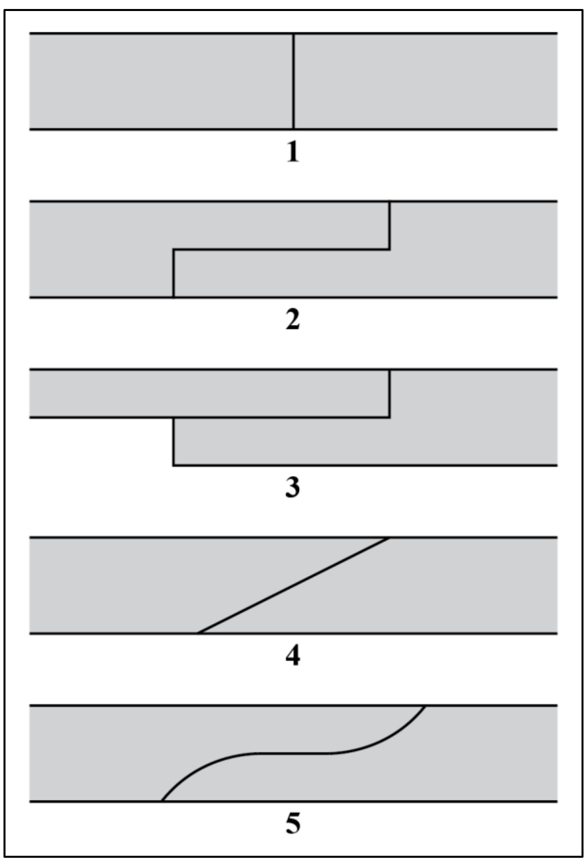


Figure 4.10.6: Scarf types	Own work, from photographs and studies, not to scale
1: Butt joint, 2: Z-scarf/ three-planed scarf, 3: Combined Z and butted scarf, 4: Diagonal scarf/butt, 5: S-scarf/curved scarf	

4.10.9 Gunwale

The gunwale called the “molor” or “kordon” seemed to have often been made by nailing a strake to the top of the sheer strake of the boat or by nailing a thin wooden strip along the upper edge, inside and outside, of the sheer strake (Figure 4.10.7). (Balandier and Mercier 1952:154; Gueye 1977:24). The attachment outside and inside appeared to have been more common on the Senegal River Coast.

One source described the gunwale as running the length of the boat on the outside but on the inside stopping half a meter from the ends. Its bottom edge was above and butted with the batten (Balandier and Mercier 1952:154). In early photographs of boats, the interior rail appeared to have exclusively on the stern section of the boat and stops before reaching the batten (Photograph 4.10.6).

Photographs of boats from the Cape Verde Peninsula showed boats using the top (Photograph 4.10.10) method frequently although some appeared to also have used the side method in conjunction with it and show an outside edge rim but not running the full length of the boat, stopping a few meters from the bow and stern (Photograph 4.10.9). Due to a lack of textual sources, it was difficult to verify the method.

The role of the reinforcement as described in a 1950 study was to prevent rapid wear of the sheer strakes (Postel 1950a:124). This was likely a particular concern with fishing boats many of which would have gouged the sides. Damage from raising nets was recorded on a Cape Verde Peninsula boat in the collection of the Quai Branly Museum (Quai Branly Museum 1931a). The same wear was observed on the outer rail of the boat in the Field Museum collection (Brenton 1968). The rails appeared to have often not been used on older boats in illustrations.

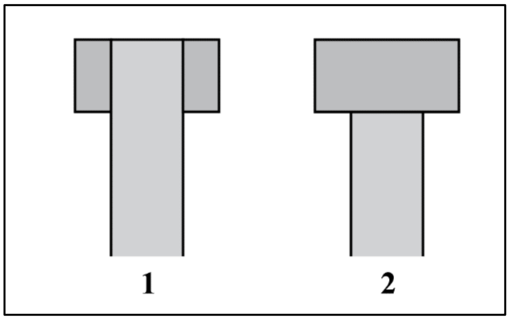
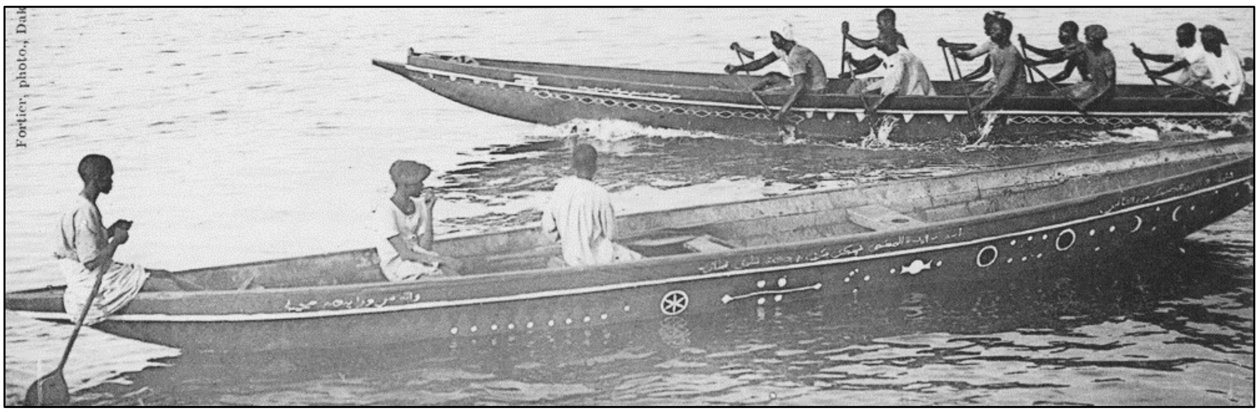
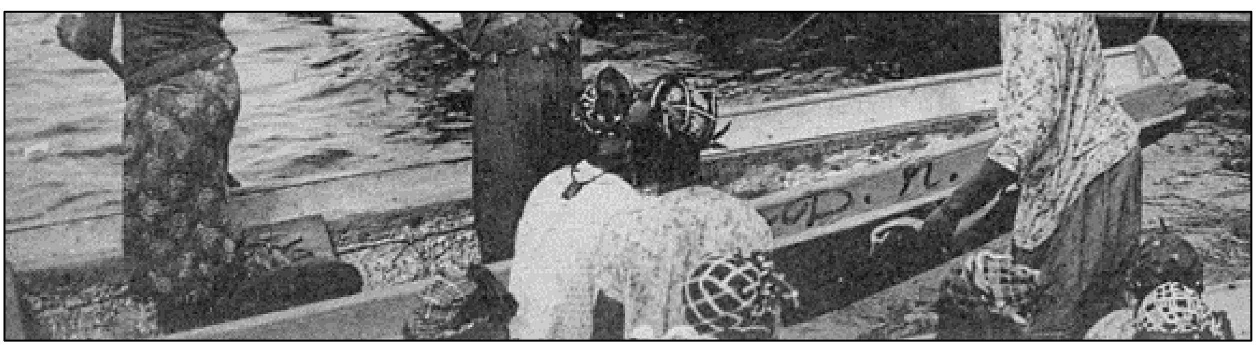


Figure 4.10.7: Gunwale types, Section view	Own work, not to scale
1: Rail method, 2: Strake method	



Photograph 4.10.9: Boats around the Cape Verde Peninsula with visible gunwales	Cropped, from (Edmond 1902i)



Photograph 4.10.10: Close view of boats around the Cape Verde Peninsula with visible gunwales	Cropped, from (Edmond 1902j)

4.10.10 Front covers

The bow and stern covers, “mbap/nden/ndan” Serer: “ndagne”, were likewise shown to be connected to the strakes by horizontal lashings on a model (Labouret 1933a). The bow and stern covers may not have been attached directly to the hull, but it was uncertain. It may have been that some joints were not attached together but it was difficult to determine from the available evidence. From examples observed in photographs and illustrations (Figure 4.10.8), they could vary in size from small to large. They were generally either rectangular or trapezoidal with the shorter side down and curved tops. They could be angled to greater or lesser degrees outward. Some protruded above the strakes and had rounded tops. Bow covers that protruded a large amount and had a trapezoidal cutout on the middle of their top appeared to have been present in the nineteenth century. The cutout gave them the appearance of flaring out to the sides. Some of these boats did not have a stern cover or had a short one (Pâris 1841a:Figures 1-2; François 1873; Anonymous 1875:125). Raised front covers and ones with flares would have had the practical effect or reducing splash for passengers and crew. The cutout was possibly developed to aid the attachment of a forestay to the bow cutwater.

A 1935 Senegal River Coast study gave measurements for angled trapezoidal end covers. They were seventeen centimeters at their base and thirty-two centimeters at their top. They sat directly on the hull (Leca and Labouret 1935:54). They were the same thickness as the strakes, three centimeters (Balandier and Mercier 1952:154). Some in photographs appeared to have been thicker (Photograph 4.10.10). End covers were at least as tall as the strakes were but often protruded above them. Most observed in early twentieth-century photographs observed in photographs had rounded tops.

The front and back were probably all solid pieces. It appeared to have been the practice to have the end covers be meet on the back not the sides by the strakes (Figure 4.10.9). This was likely to do with the use of sewn methods as nailed methods had the strakes meet the front covers on the sides in order to be able to nail them from the side. This could be seen in two 1891 illustrations (Illustration 3.2.12, Illustration 3.2.13) and photographs from the Senegal River Coast.

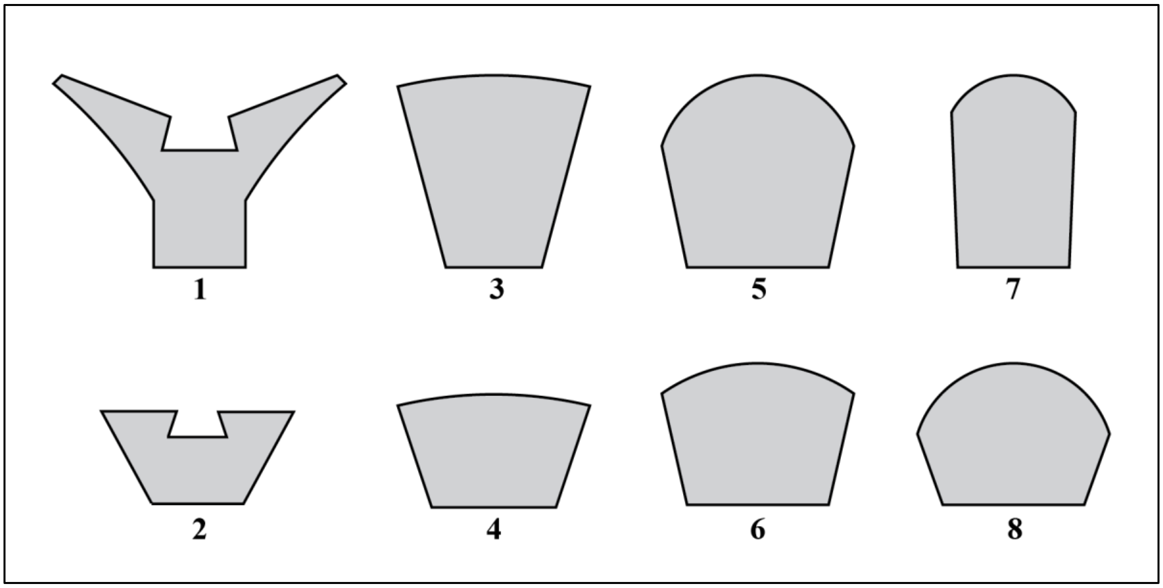


Figure 4.10.8: Bow and stern covers variation	Own work, not to scale
End covers, 1-2: Nineteenth century Cape Verde Peninsula bow covers, 3: Senegal River Coast bow cover, 4: Senegal River Coast stern cover, 5-8 Cape Verde Peninsula Small Cutwater boat bow and stern covers	

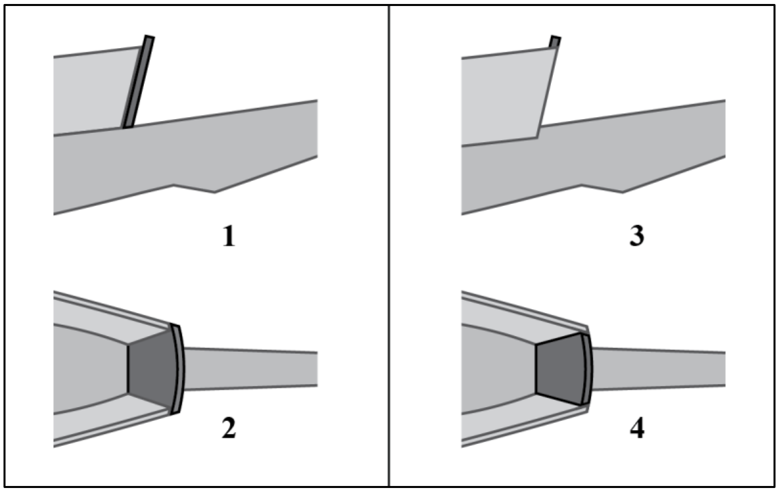


Figure 4.10.9: Bow cover arrangements	Own work, not to scale
Left: Cover over strakes sewn method, Right: Strakes over cover nailed method	
1: Profile view sewn, 2: Plan view sewn, 3: Profile view nailed, 4: Plan view nailed	

4.10.11 Decks

Small decks (Figure 4.10.10) “dis” on the bow and or stern were present on some boats. Decks appeared most often on the stern of single cutwater boats around the Cape Verde Peninsula. These were triangular and could reach ninety centimeters long (Balandier and Mercier 1952:158). These could be seen in early photographs (Photograph 4.10.11). Some boats in the Gambia-Sine/Saloum area frequently mounted large decks (Photograph 4.10.12, Photograph 4.10.14, Photograph 4.10.13) on their bows. These decks were used for casting nets (Diop 1963:43). These decks also allowed for the display of elaborately carved wooden ornaments and flags. However, decks on the bow or stern of coastal boats excepting the types without projecting cutwaters appeared to have not been present on many boats seen or recorded until later. The first study to mention them was in 1952 (Balandier and Mercier 1952:155).

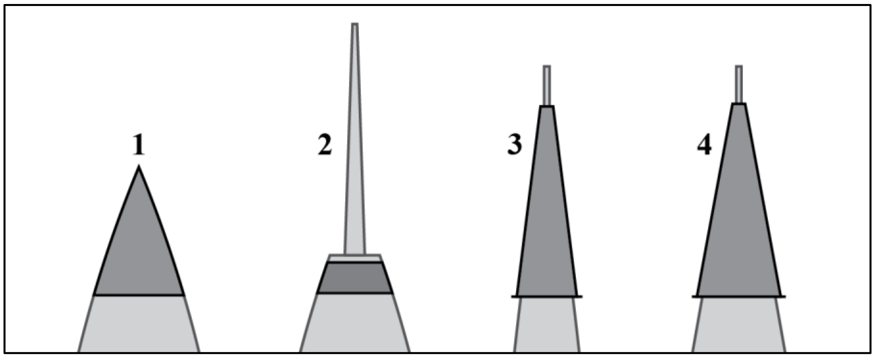
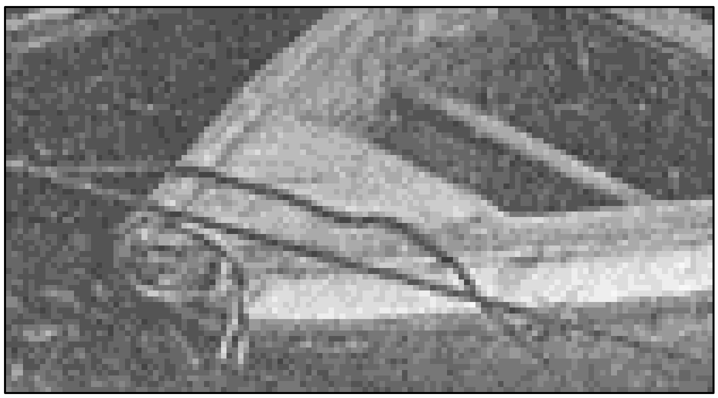
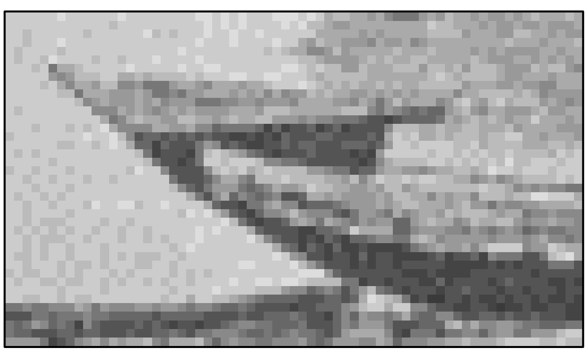
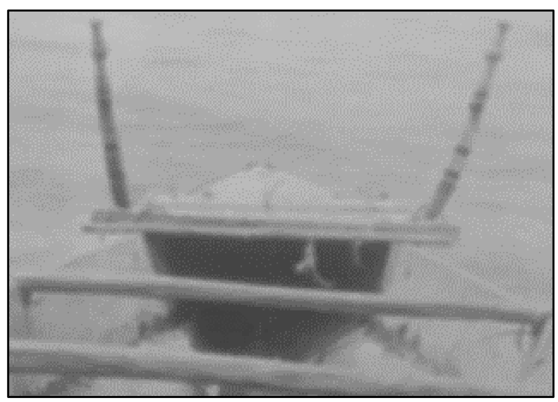


Figure 4.10.10: Deck types, Plan view	Own work, not to scale
1: Cape Verde Peninsula single cutwater stern, 2: Coastal boat bow and stern, 3: Gambia extended logboat bow, 4: Gambia plank-built boat bow	



Photograph 4.10.11: Stern deck on a single cutwater boat, Cape Verde Peninsula	Cropped, from (Edmond 1908a)





Photograph 4.10.12: Deck on the bow of a boat in the Sine-Saloum Delta	Photograph 4.10.13: Deck on a Gambian boat seen looking towards the bow
Cropped, from (Edmond 1902g)	Cropped, from (Hornell 1928d)

Photograph 4.10.14: Deck on a Gambian boat	Cropped, from (Sowle 1899b)

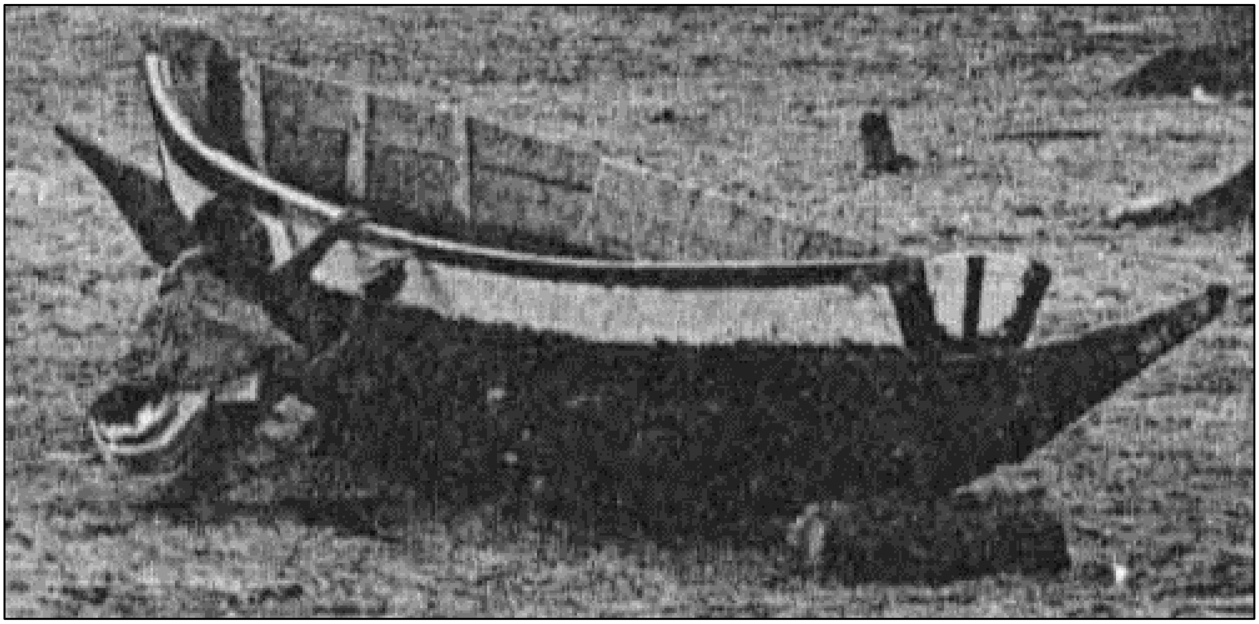
4.10.12 Waterproofing materials

The methods and materials used for waterproofing watercraft in precolonial Senegambia were fragmentary and incomplete but displayed a high level of diversity including types that appeared unique and independently developed. The one indigenous method was a mixture of cow dung, clay, covering raffia palm leaf fibers used as caulking first observed in the late eighteenth century. It was also attested in Saint Louis and among the Serer suggesting it was widespread. (Durand 1806:111; Boilat 1853:193; Corre 1883:9). The method was attested on the Senegal River and the coast at the mouth of the Senegal River in 1685 used on shell-based plank-built boats suggesting it may be the earliest type of caulking used in Senegambia (la Courbe and Cultru 1913:18, 131–132). Not all accounts described both dung and clay, but it was likely always a mixture of both. It was unknown how long it would remain effective when exposed to water. The only other reference to dung as a waterproofing material on boats came from Vietnam where it was mixed with coconut oil and used as a sealant for basket boats (Hornell 1946:110). The dung was applied to the inside of the boats (McCann 2021). Another method of caulking was reported secondhand and seemed to date from at least the late eighteenth century among the Serer. It consisted of melted ambergris applied to seams (Durand 1806:28; de Villeneuve 1814a:80–81). While seemingly fantastical, sources attest to ambergris's abundance on the Senegambian coast from at least the sixteenth century into the nineteenth century (de Villeneuve 1814a:80–81; de Almada 1984:24). There were at least two other separate accounts from outside Senegambia of ambergris being used as caulking due to its apparent resemblance to tallow or resin that were apparently used to caulk ships (Brito et al. 2015:591). Another method was only attested as far back as 1994, among the Serer. However, it was possibly older and more widespread. It consists of the inner bark of *detarium senegalense* which was dried, ground, and mixed with baobab leaves then ground a second time with added water. This mixture was then spread with fingers between planks (Bousso 1994:11; Hardy and Kubiak-Martens 2016:77).

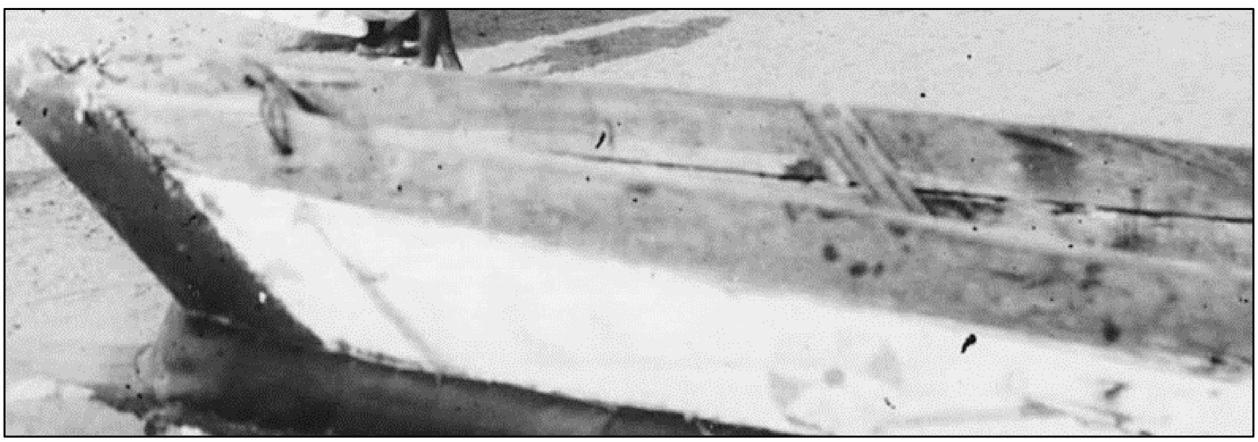
Caulking on extended logboats in Saint Louis was attested in the early twentieth century and consisted of palm leaf fiber covering the seams which was then covered over by a length of either leather or tarred canvas. It was likely plain canvas was also used in some cases. The canvas was described as old sailcloth, but it was likely any number of cloth materials would do. The strips of material were secured to the hull by tacks (Gruvel 1908:74; Leca and Labouret 1935:55). It was likely this method was older than the 1875 source that recorded it (Anonymous 1875:126). In contrast to this, frame-based Senegal River boats utilized European-style oakum-and-tar based caulking where fibers were inserted into the gaps between planks with a hammer and chisel then coated with tar, the tar was likely imported. The oldest mention of tar being used in Senegambia was hot tar being used as a defensive weapon in sieges in the Gambia noted in 1594 (de Almada 1984:44). However, there does not appear to have been any evidence of locally produced tar, so it was likely an imported good. *Agave sisalana* was cited as well as *hibiscus* *cannabinus*, but any number of fibers could have been used (Masimana and Rabenevanana 2018:32; Postel 1950a:124). This caulking was then covered with canvas or tarred canvas. Leather was also likely used like on the extended logboats although it was not observed. This method was by far the best attested due to being adopted for wide use in planked boats around Senegambia. The majority of descriptions were from the twentieth century but the technique was observed as far back as the late eighteenth century (Durand 1806:111; Leca and Labouret 1935:111; Postel 1950a; Gueye 1977:26; Lleres 1986:131; Bousso 1994:29). In Saint Louis resin, likely gum arabic which was found in the area, was observed to be sometimes added to this caulking as well (Leca and Labouret 1935:67–68; Curtin 1975a:215–216). Resin mixed with lime was observed to serve as a substitute for oakum in the Casamance occasionally, but only in more recent times (Lleres 1986:131). Lime was historically produced locally from shells using kilns around Senegambia (Corre 1964:18–19; Adanson 1759:266).

Tarring the outside of the whole boats, particularly the Senegal River boats, seemed to date from at least the late nineteenth century but, like caulking, became more widely used in the twentieth century (Mitchinson 1881:208; Gruvel 1908:74; Leca and Labouret 1935:59; Lleres 1986:131). Paint also provided a degree of protection for hulls but evidence of use of paint dates from the late nineteenth and early twentieth century where it was shown in paintings and pictures from around Senegambia. The earliest depiction was in a 1891 paintings (Illustration 3.2.12, Illustration 3.2.13) from the Cape Verde Peninsula. It likely predated this time, however. A 1908 study described the common colors used as red, green, and blue, with the name of the boat written in white in Arabic script along with other designs (Gruvel 1908:74). Modern boats seem to either have one coat of paint or have a base white coat on top of which a second colored coat was applied (Masimana and Rabenevanana 2018:37). The earlies painted hulls appeared mostly decorative and were placed mostly on the upper strakes. The paint may not have been primarily intended as a form of protection for the hull but mostly an aesthetic choice. It was unknown what types of paints were used in the past, but modern paints were oil paints (Miles 2021).

In recent times recycled fire hose was used as an alternative to older coverings like canvas (Gueye 1977; Masimana and Rabenevanana 2018:32). Two new mixes reminiscent of the *detarium senegalense* and baobab mix have been observed as well. Heated diesel with polystyrene added followed by baobab sawdust was used in one recipe (Hardy and Kubiak-Martens 2016:77). Heated gasoline had polystyrene added to it followed by wax, dried baobab leaf powder, and water was the other (Masimana and Rabenevanana 2018:34). Other waterproofing materials have also been observed. For one a thin coating of cement on the bottom of the hull was added (Lleres 1986:131). Another used drain oil and cement on the inside of the hull and plaster and oil paint on the outer hull (Masimana and Rabenevanana 2018:34)



Photograph 4.10.15: Working on the hull of a Coastal boat in Saint Louis, likely painting	Cropped, from (Edmond 1902k)



Photograph 4.10.16: Close up view of a bow, showing caulking fabric cover, bow wire and other features	Cropped, from (Anonymous 1910)

4.10.13 Vocabulary

Fasteners

- **Strake Lashings:** long cord used to sew planks together over caulking fiber (*fil di wol*)
- **Needle:** Needle used to sew lashings
- **Nails:** Long iron nails used for fastening
- **Dowels:** Cylindrical iron dowels used for fastening
- **Bolts:** Long cylindrical iron bolts used for fastening

Caulking

- **Tacks:** Small nails used to hold caulking cover to the hull
- **Caulking fiber:** Fiber but over strake seam under the caulking cover (*dyoho*)
- **Fabric caulking cover:** Fabric used to cover fiber (*parla*)

Hull

- **Strake:** Planks that make up the hull (Name dependent on order of planks)
- **Strake seam:** The seam where the hull meet the garboard (*naw*)
- **Lashing holes:** Holes drilled in hull and strakes to be used for sewing strakes together

4.11 *Projecting Cutwaters*

4.11.1 Cutwaters carving and assembly

The triangular projecting cutwaters (Figure 4.11.2) were known as "tyon/coon" with the bow cutwater being the "bop/bop op gal tyon op gal" and the stern cutwater being the "gien/gyen op gal/tyon ep gyen". Projecting cutwaters were observed to be created in three main ways. Carving the full length from the log along with the hull (Photograph 4.11.3, Photograph 4.11.4) appeared to have been the oldest method. Carving part of the length and nailing extra pieces onto it (Figure 4.11.3, Figure 4.11.4) appeared later (Leca and Labouret 1935:53). The most recent method was fully constructing the cutwater from different pieces attached to the hull (Figure 4.11.6) which appeared in the mid-twentieth century. The size and shape of cutwaters varied a large amount over time and place (Figure 4.11.1). Most were roughly triangular tapering vertically and horizontally. They tended to not have large curves but could be angled up particularly stern cutwaters. Bow cutwaters tended to be less angled. Wear on the bow cutwaters may have made them slightly concave over time. Longer cutwaters on coastal boats appeared to have been around one-fourth the length of the interior of the boat. Two cutwaters together could add up to around half the length of the interior of the boat. It was likely the first constructed sections to be added to cutwaters were extra strips of wood on the top and bottom (Figure 4.11.5). It was claimed in a 1935 study that projecting cutwaters were borrowed from the Senegal River Coast but the long attestation and representation of their use all along the coast over centuries makes this doubtful (Leca and Labouret 1935:158).

The role of the projecting cutwater was to prevent waves from breaking on the front of the boat. They were also useful when moving the boats on the beach (Postel 1950a:123). It was the opinion of fishers that boats with projecting cutwaters were better. Boats without projecting cutwaters were mostly used for close-range fishing and were found to be harder to steer with the steering oar (Balandier and Mercier 1952:158). More angled-up bow cutwater appeared to have a better ability to straighten a boat through waves. Boats that were lower in the water and had less angled cutwater tended to nose down (Lleres 1986:157).

A 1935 study recorded the measurements of the projecting cutwaters on a Senegal River Coast boat which were partly carved cutwater, presumably measured at the juncture with the hull. They were one meter and ninety-six centimeters long, twenty-five centimeters wide, and seventeen centimeters thick. The pieces overlapped in a combination S and Z shaped scarf due to the flat point of the small cutwater and the curve of the hull. It was presumably nailed in place. The offset of the bottom of the attached piece created the notch called the "sikin/sikim" on the bow and stern projecting cutwaters (Leca and Labouret 1935:53). These notches may have originated for tying forestays and backstays around, but their role appeared to be aesthetic in most cases.

The bow fully constructed cutwaters appeared to not have been fastened to the hull as strongly as may have need ideal as evidence by the boat in the Field Museums collections which had a fully constructed cutwater that tore off completely after being subjected to an ocean crossing (Brenton 1968). This would suggest that carved cutwaters or cutwaters with only some additions were far stronger and not prone to coming apart like fully constructed ones. Modern cutwaters appeared to be far more integrated with the hull of the boat for this reason. Cutwaters on Gambian boats appeared to have been fully part of the logboat hull or keel. The only difference between the two was the bow had a strake and deck on top of most of its length.

It appeared that the long slat of wood attached to the top face of the cutwater sometimes covering most of the top or one-third of it may have played some role in attaching the sheet ring or could have functioned similar to the steering oar rail but it was uncertain (Leca and Labouret 1935:53–54; Balandier and Mercier 1952:155).

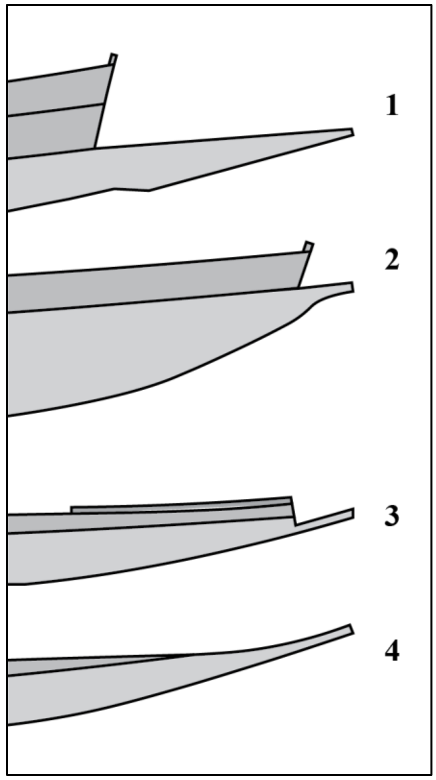


Figure 4.11.1: Types of cutwaters	Own work, not to scale
1: Projecting cutwater boat, 2: Short cutwater boat 3: Gambia boat bow, 4: Gambia boat stern	

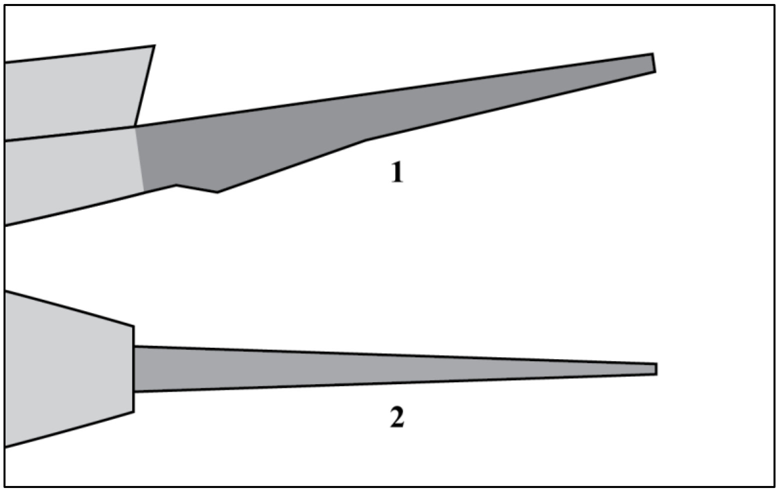


Figure 4.11.2: Projecting cutwater	Own work, base width and length to scale from measurements
1: Profile view, 2: Plan view	

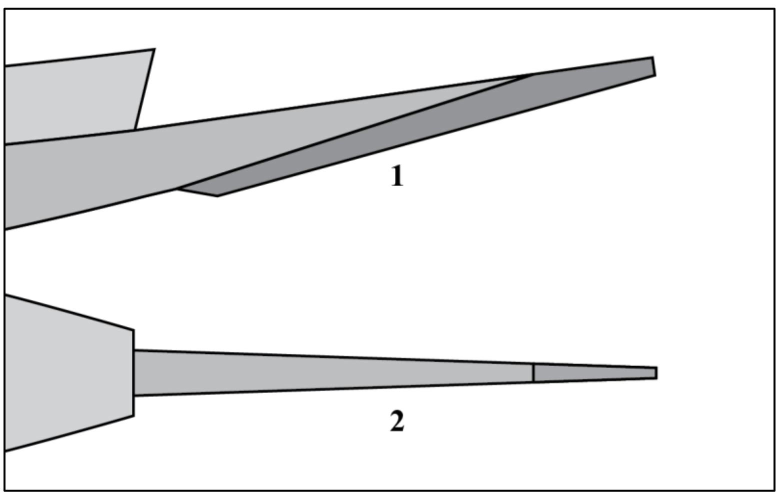


Figure 4.11.3: Projecting cutwater with additional length added	Own work, not to scale
1: Profile view, 2: Plan view	

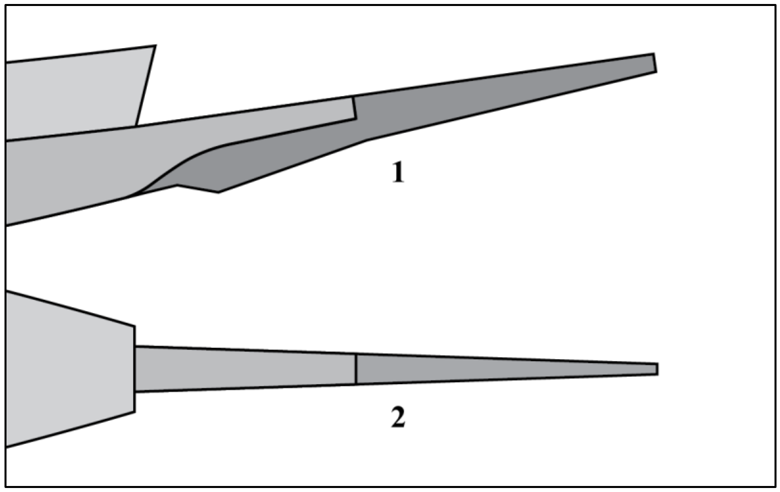


Figure 4.11.4: Projecting cutwater scarfed to hull	Own work, not to scale
1: Profile view, 2: Plan view	

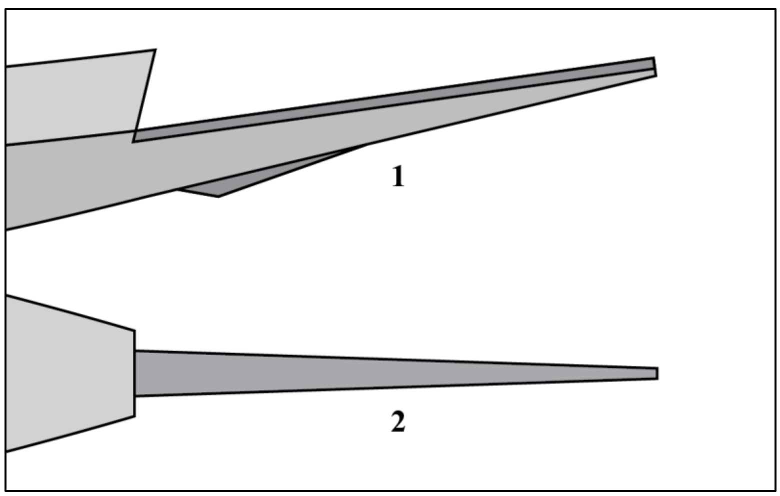


Figure 4.11.5: Projecting cutwater with top and bottom extensions	Own work, not to scale
1: Profile view, 2: Plan view	

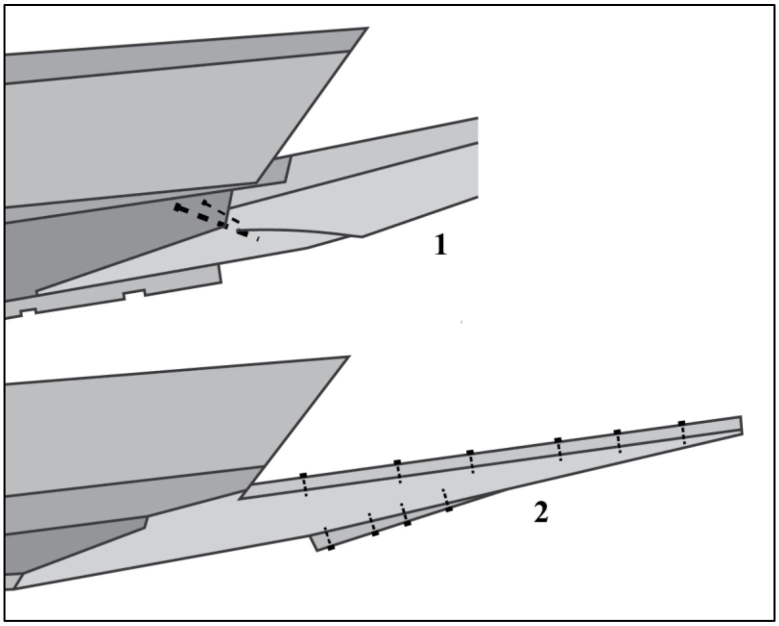
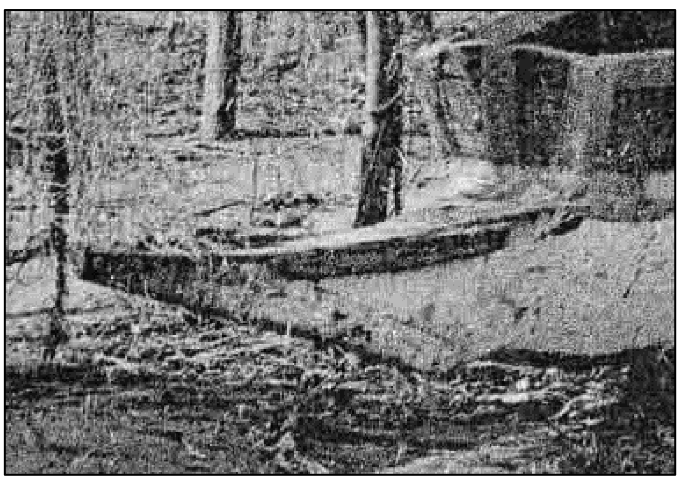
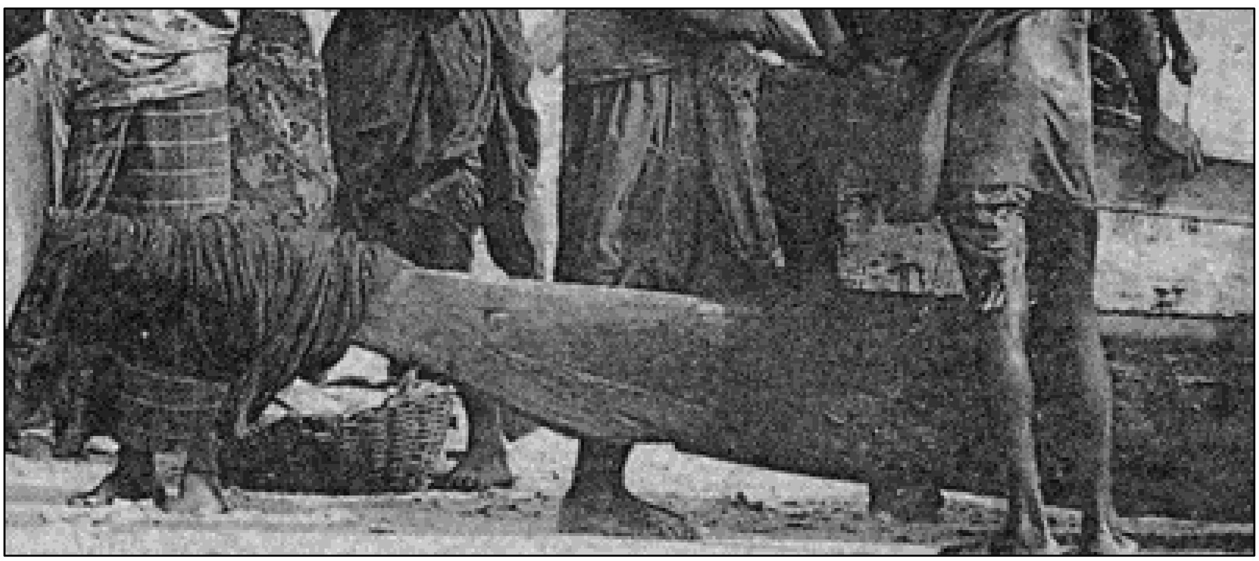


Figure 4.11.6: Fully constructed cutwaters	Showing attachment to hull and attachment of top and bottom extensions of a cutwater, not to scale, 1 own work, 2 adapted from (Lleres 1986:128)
1: Field Museum boat, 2: Diagram from study	

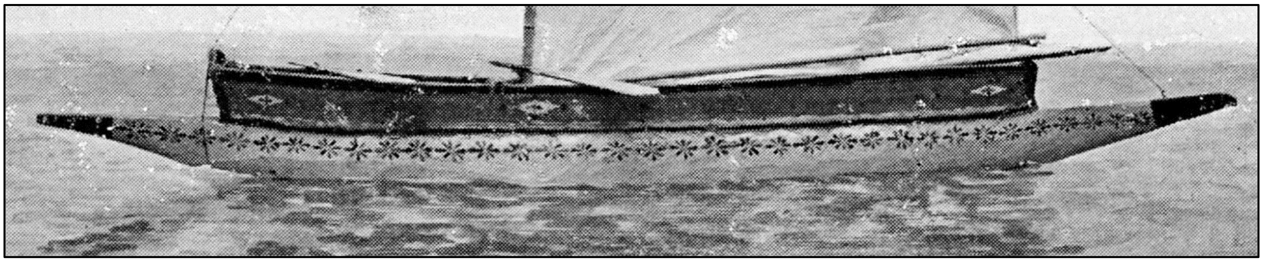


Photograph 4.11.1: Projecting cutwater with extension added to the end, Senegal River Coast	Cropped, from (Edmond 1902b)

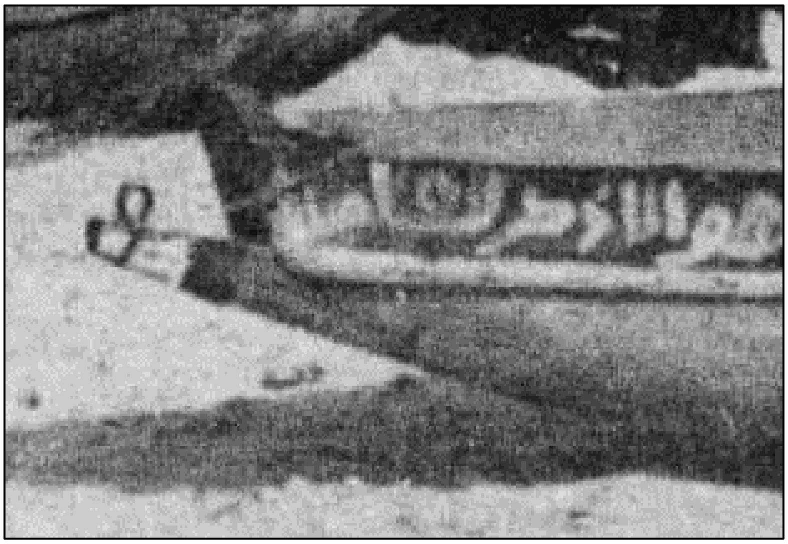
Photograph 4.11.2: Boat with extended cutwater revealing scarfed extension Senegal River Coast	Cropped, from (Anonymous Unknown)



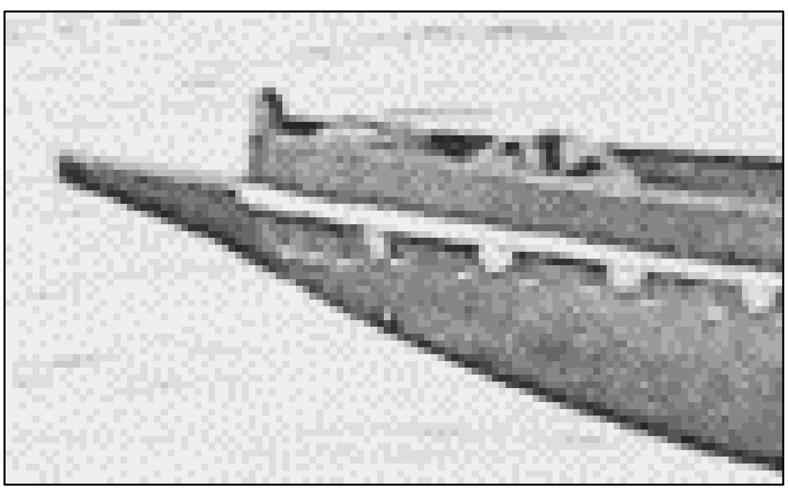
Photograph 4.11.3: Carved cutwater, Senegal River Coast	Cropped, from (Edmond 1909i)



Photograph 4.11.4: Carved cutwater, Senegal River Coast	Cropped, from (Gruvel 1908:74)



Photograph 4.11.5: Short carved cutwater, Cape Verde Peninsula	Cropped, from (Anonymous Unknown)



Photograph 4.11.6: Short carved cutwater, Cape Verde Peninsula	Cropped, from (Edmond 1902i)

4.11.2 Steering oar rail

The 1935 study also recorded the use of a steering oar rail (Figure 4.11.7) three centimeters wide nailed along the top sides of the stern projecting cutwater called the “taf u gien/taf u gyen” which was used to lean the steering oar against and protect it from hitting the cutwater itself. These rails appeared infrequently in some photographs of boats and became increasingly more common in pictures from later decades of the twentieth century. This rail started from around the notch and could go all the way to the end of the projecting cutwater. A 1952 study recorded the size of the rail as three to five centimeters wide and two centimeters thick (Balandier and Mercier 1952:154–155). Not all rails in photographs appeared to reach all the way to the end of the stern projecting cutwater and some began all the way at the edge of the stern cover or well away from it. The rails were difficult to identify due to resolution. On boats such without a large projecting cutwater such as those common around the Cape Verde Peninsula a short rail (Figure 4.11.8) appeared to have sometimes been used for the same purpose although it may have been rare as it would be mostly identical to the gunwale and a gunwale that extended to the stern would look and function identically. A similar rail was attached along the top of the stern projecting cutwater and the sheet ring called the attached on top of it (Leca and Labouret 1935:53–54). A mid-twentieth century photo showed a boat with a long cutwater but a steering oar rail on the strake (Pales 1946).

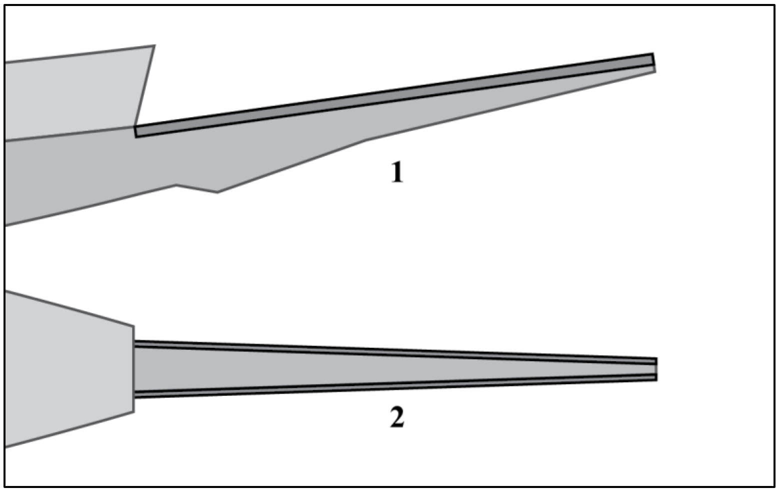


Figure 4.11.7: Steering oar rail	Own work, partly to scale from measurements
1: Profile view, 2: Plan view	

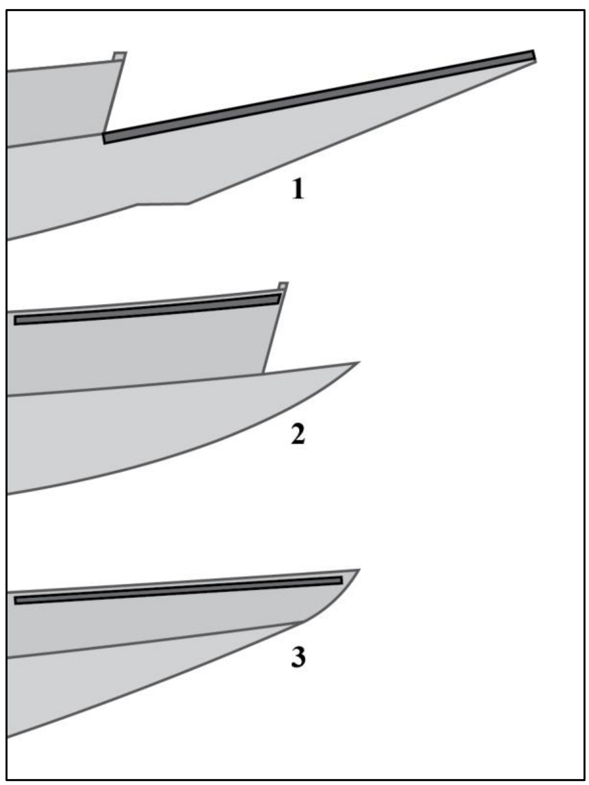
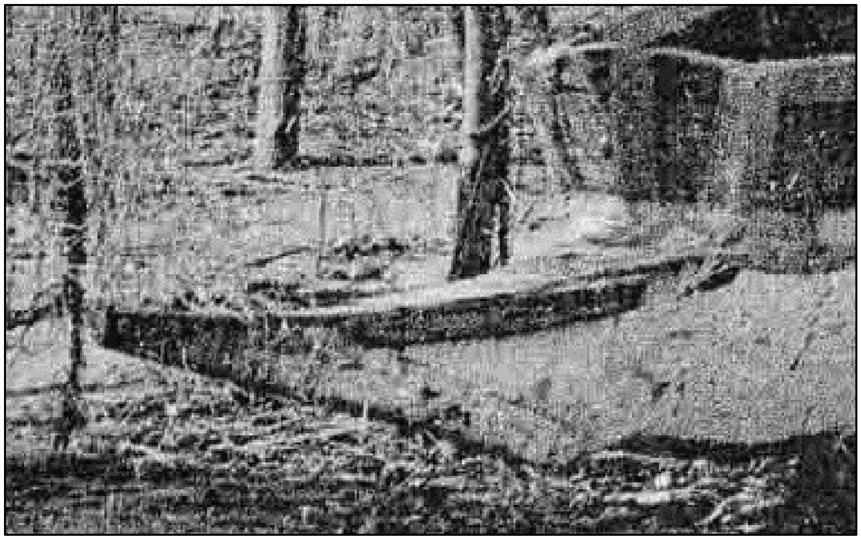
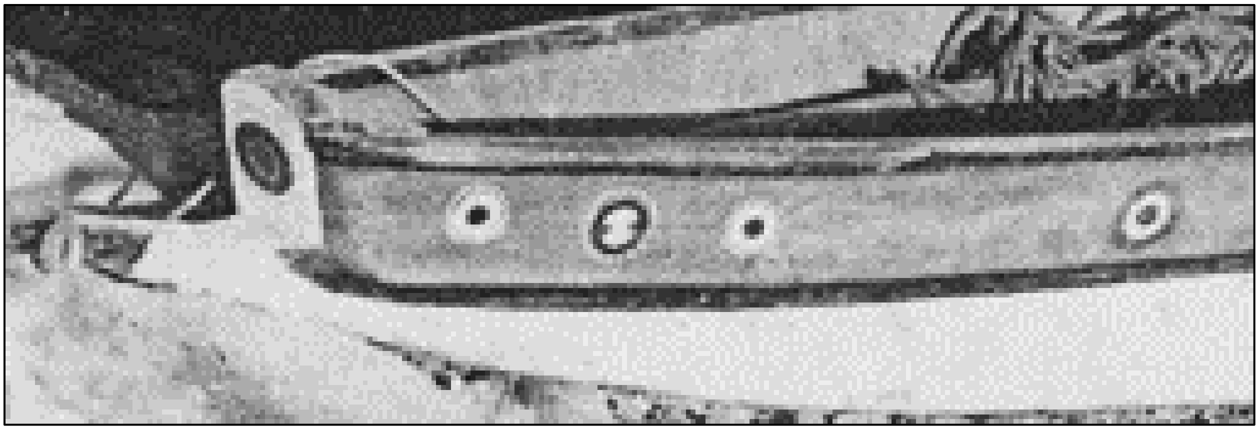


Figure 4.11.8: Steering oar rail	Own work, not to scale
1: Senegal River Coast boat, 2: Cape Verde Peninsula boat, 3: Cape Verde Peninsula boat	

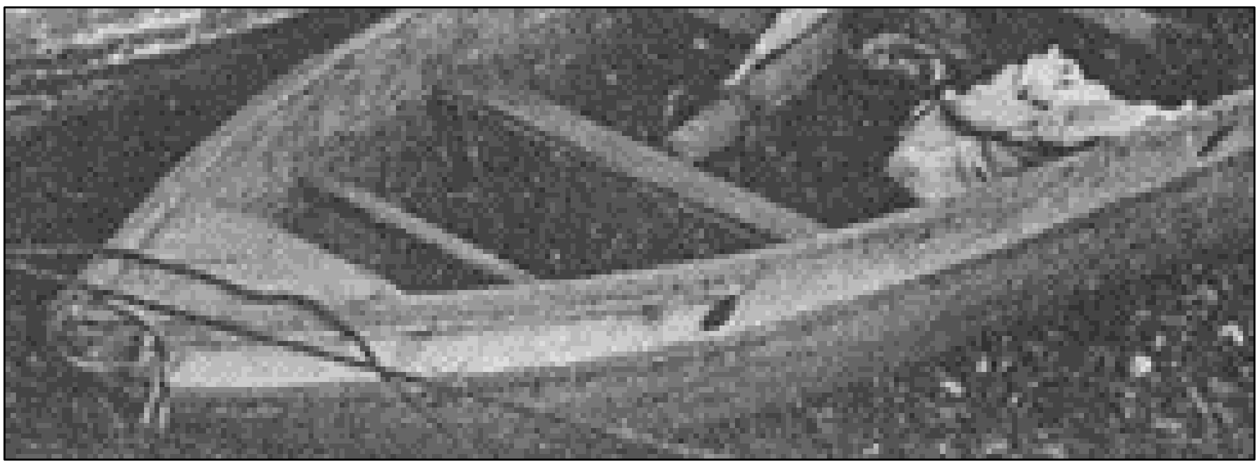


Photograph 4.11.7: Steering oar rail, Senegal River Coast	Cropped, from (Edmond 1902b)

Photograph 4.11.8: Boat with rails on their stern projecting cutwater	Cropped, from (Edmond 1909a)



Photograph 4.11.9: Stern of a double cutwater boat with steering oar rail, Cape Verde Peninsula	(Edmond 1908a)



Photograph 4.11.10: Stern of a single cutwater boat showing steering oar rail, Cape Verde Peninsula	Cropped, from (Edmond 1908a)

4.12 *Thwarts*

4.12.1 Thwarts

Thwarts (Figure 4.12.2), called “bako/banco” served a variety of purposes but were overall very similar in construction. They would be either rectangular or cylindrical. The width of rectangular thwarts could vary, and cylindrical thwarts could vary in shape as well due and may simply be formed from a stick which may not have been totally straight. Often, they appeared to have stuck out between the garboard and hull or over the top of the sheer strake. Thwarts appeared to have taken some skill to install as it was the job of the boatbuilder to install them (Leca and Labouret 1935:59–60). The exact layout and number appeared to have varied, particularly on Cape Verde Peninsula boats and on logboats. Later twentieth-century boats also had very different thwart layouts (Photograph 4.12.3).

On extended logboats most thwarts appeared not to be critical structural pieces but served other purposes such as supporting the mast, tying lines, and being a place for sitting, some could also be used as footrests. Gambia River shell-based plank-built boats appeared to have had two rows of thwarts in very large numbers. The thwarts on top of the strakes appeared to have been notched (Hornell 1928d). The number of thwarts likely indicates that they were structurally necessary as such a large amount would get in the way when moving inside the boat. This may have been due to the weak lashing and broad beam.

A 1908 study described the two thwarts, in the form of benches present on Senegal River Coast boats. One thwart was around one-third the total length of the boat from the bow, seemingly located partway down the inside of the boat. This bench would have been positioned just behind the mast which was attached to a cylindrical thwart in front of it. On some boats, only a bench with a hole was used. The boat also had another thwart located in the stern of the boat but in front of the coxswain which was smaller than the other bench. This bench was presumably also partway down the inside (Gruvel 1908:74).

The thwarts on a Senegal River Coast boat were recorded in a 1935 study to be twelve centimeters wide and seven centimeters thick rectangular benches. Their length varied depending on their position. At amidships that would mean around one hundred thirty centimeters long. They would have gotten short towards the bow and stern. There were three benches which were positioned around one third the total length of the boat from the bow slightly behind the mast step and was called the “ba u dige” which functioned as the shroud thwart, one at one fourth the total length of the boat from the stern, and the last positioned in front of the stern cover but not close enough to touch it (Leca and Labouret 1935:53). The shroud thwart appeared to have been rectangular in twentieth-century boats but a nineteenth-century model had cylindrical ones (François 1873).

Around the Cape Verde Peninsula, the 1908 study noted that logboats had two bench thwarts. These were likely positioned in around the one-third position from the front and in the stern (Gruvel 1908:91). Around the Sine-Saloum Delta, they noted logboats did not appear to have any additions which presumably indicated a lack of thwarts (Gruvel 1908:113).

The thwart in front of the coxswain appeared to have been occasionally used as a footrest in boats where the coxswain could sit. It was uncertain why not all boats had a bow thwart or bow wire, but it was possible that a projecting bow cutwater could serve to hold a forestay that would have otherwise been attached to it saving space. It would make it difficult to operate the sheets from the bow of the boat, however.

4.12.2 Mast thwarts

All boats that mounted sails likely had mast steps of some kind. These were possibly carved out of the bottom of some logboat hulls, but attested examples were nailed to the bottom of the hull. Mast steps were accompanied by a thwart called the “le/ba u kao/ba u tak/ ba u kaw” that helped support them (Figure 4.12.2). These thwarts appeared to have come in three variants (Figure 4.12.1) which appeared commonly in photographs. The first type was a simple bench with a round hole allowing for a straight mast, although it is possible one could be raked at a set angle as well (Gruvel 1908:74). The second used a rectangular hole in a bench which likely than had chocks put next to the mast to hold it in place which appeared most often on Senegal River frame-based boats (Leca and Labouret 1935:64, 66). This shape was probably to allow for the mast to be canted slightly if needed. The third style was a cylindrical thwart to which the mast was tied offset to the front of the mast step which allowed it to be canted and was the most well-attested in studies and with examples (Illustration 4.13.2, Model 4.10.1) as far back as the early nineteenth century.

The cylindrical mast thwart was recorded to be around ten centimeters in diameter. It was positioned around one third the total length of the boat from the bow Postel 1950:124). A 1952 Cape Verde Peninsula study reported that the mast thwart was between seven and ten centimeters in diameter. It also noted that by having the thwart protrude slightly past the side of the boat it the mast shroud, strop/rope ring, could be looped around the outside protrusion. They also noted that a newer variation of the mast thwart was square in cross-section which allowed for better attachment of the mast shroud (Balandier and Mercier 1952:155). Mast thwarts in photographs and illustrations displayed inconsistent shapes with some being bent upward likely due to being cut from a curved branch. They also appeared as both fully round and oblong shapes, others appeared to have had their ends flattened on the bottom to fit better over the sheer strake (Photograph 4.12.1). The mast thwart appeared to have been frequently removed as photographs showed boats clearly meant to have one without one when put away. The mast thwart had the additional role of preventing the sides of the boat from spreading or being pressed inward (Balandier and Mercier 1952:124; Gueye 1977:24). The only measurement given for the width of a rectangular hole mast thwart was seven centimeters width on a Senegal River frame-based boat (Leca and Labouret 1935:66).

Although lug sails often used a mast raked forward indicating a large offset between the thwart and the mast step spritsails were not known to have been raked, although individuals may have varied, so the mast step was always positioned close behind the mast thwart. Bench style thwarts appeared most often on boats that operated on rivers or close to shore likely as they did not need the capability to use a "wantareer" configured sail. Gambia River shell-based plank-built boats appeared to have exclusively used a mast thwart with a circular hole (Photograph 4.12.2) but the evidence was limited. It was probable that these three general mast step and thwart setups were used far in the past but there was a lack of descriptions. The cylindrical thwart to which the mast was tied appeared to be a distinctly Senegambian style and may have been the oldest. These mast thwart designs likely arose due to the need to frequently step and unstep the mast particularly in areas with coastal bars.

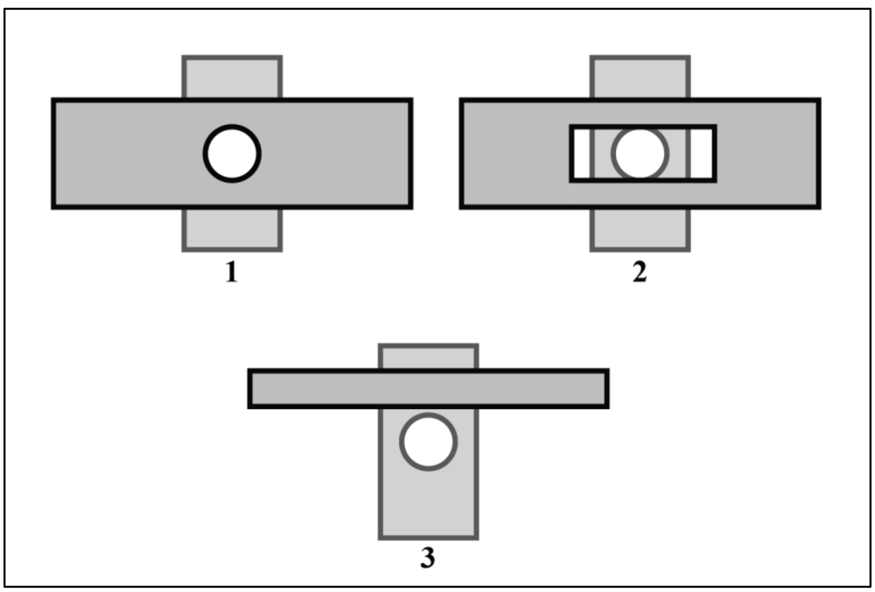


Figure 4.12.1: Top-down view of mast thwarts, Plan view	Own work, not to scale
1: Circular cutout mast thwart, 2: Rectangular cutout mast thwart, 3: Cylindrical mast thwart and mast step	

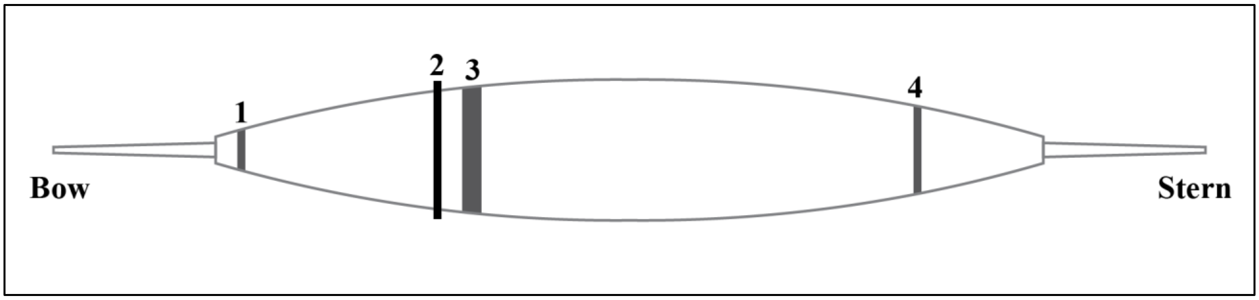


Figure 4.12.2: Thwart layout on a Coastal boat with projecting cutwaters, Plan view	Own work, positions mostly to scale
Black colored thwart positioned on top of strakes, grey colored thwarts located around junction of strakes and logboat hull	
1: Bow thwart (could be replaced by bow wire), 2: Mast thwart, 3: Shroud thwart, 4: Stern thwart	

Photograph 4.12.1: Boat being moved in the Gambia, Mast thwart with a slight curved shape and notched ends could be seen, mast thwart was likely nailed in place	Cropped, from (Martinsson 1968a)

Photograph 4.12.2: Fore end and interior of a shell-based plank-built fishing boat showing thwart layout and mast thwart, Gambia	Cropped, from (Hornell 1928d)

Photograph 4.12.3: Cape Verde Peninsula boats displaying a diversity of thwart numbers and types	Cropped, from (Edmond 1908a)

4.12.3 Mast step

The first study to record a mast step was the 1908 study which noted their use on the Senegal River Coast and appeared to describe it as a hole carved into the bottom of the boat itself (Gruvel 1908:75). This also seemed to be the case on an early nineteenth century boat around the Cape Verde Peninsula (Pâris 1841a:Figures 2). This should be possible due to the thick bottoms of logboat hulls which could also leave extra thickness around the area if needed or presumably carve a raised mast step.

The mast step (Figure 4.12.1) was called an "isiep/estep" or "lamplanter/lamplatro", Serer: "idenousouk" and the mast step hole was called the "bot-bot". A mast step on the Senegal River Coast boat was described in detail by a 1935 study. It was placed around one-third the total length of the boat from the bow. In profile, it was a single piece shaped like an isosceles trapezoid and was fifty centimeters at the base and twenty centimeters at the top. It was eleven centimeters wide, fifty centimeters long, and eleven centimeters tall. The hole itself was nine centimeters in diameter, six centimeters in depth, and in the center on the flat face. Three nails fastened the mast step to the hull on both the fore and aft ends and would have gone in at an angle. Two nails were depicted closer to the end with one closer to the center on each side giving them a triangular arrangement (Leca and Labouret 1935:52–53). The mast being around eight centimeters in diameter compared to the mast step (Leca and Labouret 1935:55). A 1952 study recorded the mast step as being ten centimeters high with the hole going most of the way through. The step was nailed to the bottom (Balandier and Mercier 1952:155). A mast step was also noted in a 1950 source (Postel 1950a:124). The boat in the Field Museums collections appeared to have had the mast step carved as part of the logboat hull sticking up in a cylindrical shape (Brenton 1968). Due to the "wantareer" setup needing a canted mast it was possible the mast step hole was not perfectly cylindrical but angled in some cases.

4.12.4 Thwart lashing

Thwarts could be wedged in the hull, and such appeared to have often been the case of logboats, but often they were lashed either between the garboard and the hull or on top of the sheer strake. This lashing (Figure 4.12.3) called “bumoglo/bumaglo” appeared to have been done by drilling two holes in the hull and lashing them in a crisscross X pattern with wire, likely cord earlier, with the extra length hanging down inside the boat (Leca and Labouret 1935:54; Balandier and Mercier 1952:155). It appeared that thwarts attached between the strakes and the hull may have been more common on larger boats. Thwarts between the strakes appeared to also have at one point been lashed to secure them and the ends extended outside the boat perhaps (François 1873). The alternative to this method appeared to have been to nail the mast thwart in place. Notching appeared to have been more common in The Gambia, but close-up photographs of mast thwarts were difficult to locate to this was not certain.

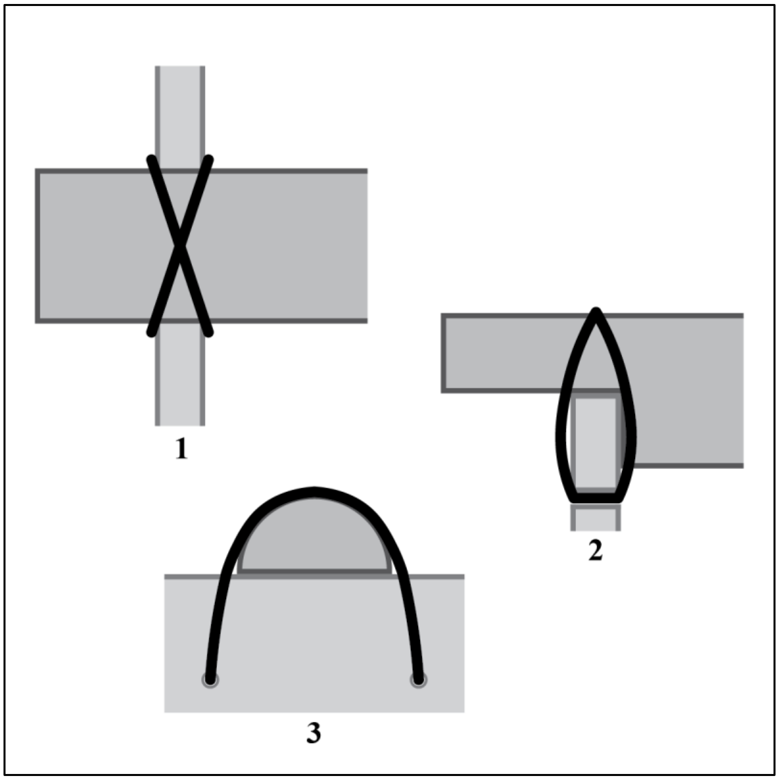


Figure 4.12.3: Attachment of thwart to sheer strake the “bumoglo”	Own work, not to scale
1: Profile view, 2: Section view, 3: Plan view	

4.13 *Sails and Spars*

4.13.1 Spars

The spars used by Senegambian boats which mounted spritsails were the mast, called a “ma/mao”, the sprit called a “verg/verga/vergro”, and the boom called a “bo/bom/bom suf/bom wake”. They were connected together and to the boat entirely by means of ropes.

The historical documentation was limited but some records of woods used for masts, yards, and paddles existed. The tree *mitragyna inermis* was mentioned as providing the mast timber. Little information was available on this tree so further discussion cannot be undertaken. The boom material was unknown but likely the same wood as the mast. Yard arms were commonly made of bamboo, likely *oxytenanthera abyssinica* or *bambusa vulgaris* (Leca and

Labouret 1935:57; Balandier and Mercier 1952:156). Bamboo in historical sources could also refer to palm leaf stems (Lasnet et al. 1900:253). The construction of the mast was often not done by specialists as it was not very complex (Leca and Labouret 1935:60).

Measurements for the masts of boats, on Senegal River Coast boats were given in a 1935 source. The mast varied from six to ten meters tall and had a diameter of eight centimeters. The sprit was longer and thinner than the mast. The boom was shorter than the mast (Leca and Labouret 1935:55–57). A 1950 study reported that the sprit on boats was longer than the mast and had a V-shaped notch on its bottom to hold the snotter. The boom was reported to be close to the length of the boom above the edge of the boat. It also had a shaped notch on its bottom to hold the boom snotter (Postel 1950a:124). The study gave an equation to calculate the sprit size:

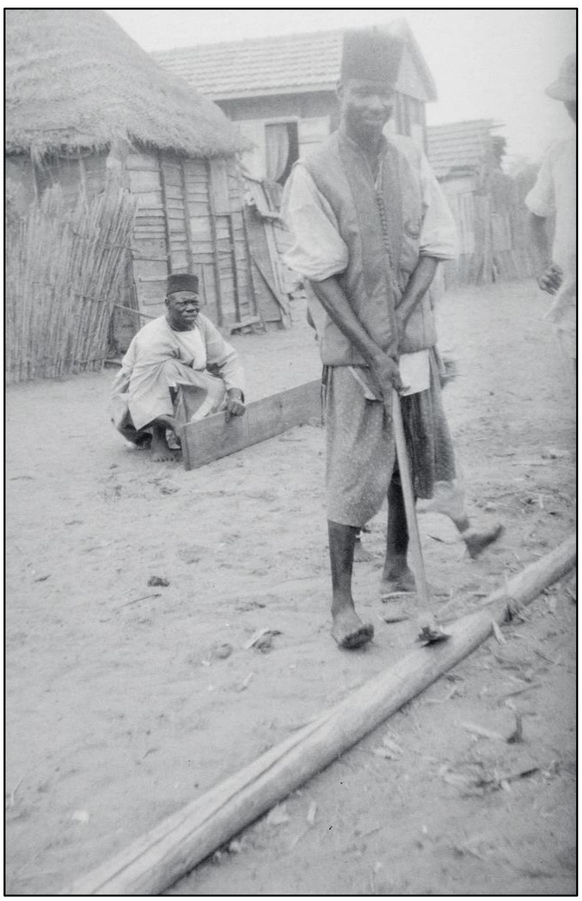
$$S = 2(M - D)$$

S = Length of the sprit

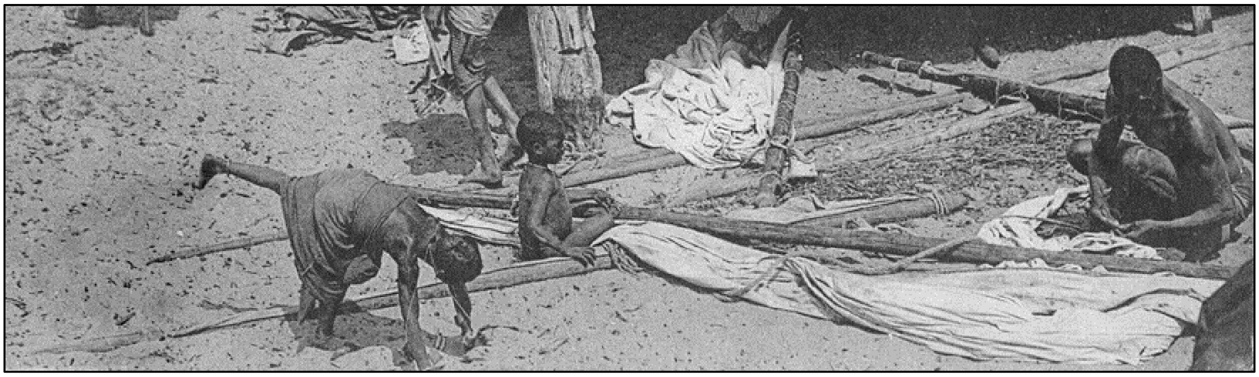
M = Height of the mast

D = Depth of the boat.

A 1952 study around the Cape Verde Peninsula described the measurements of spars as variable but gave some examples of typical measurements. The mast was described as tapered, seven centimeters in diameter at the bottom and five at the top. The top of the mast was sometimes forked for the purpose of tying the forestay. This could be replaced with a large nail driven straight into the top of the mast which served the same purpose. The typical mast height was five meters. The measurement for the sprit was six meters notched on the tack end and could exceed the peak of the sail by up to a meter. The sprit was also tapered with the tack end being larger in diameter. The boom was shorter than the mast at four meters long and was notched at the tack end and sometimes forked at the clew. The boom was held in position by the boom snotter and the tension of the sail alone (Balandier and Mercier 1952:156). A 1963 study gave a figure of six to ten meters for mast height and a diameter of eight centimeters. The boom was also reported to be shorter than the mast (Diop 1963:37). The only angle give for the possible canting of the mast was twenty-five degrees but it may have been able to be canted more (Balandier and Mercier 1952:156). Wooden spars appeared to have often been carved with an adze (Photograph 4.13.1).



Photograph 4.13.1: Carving a mast with an adze	Cropped, from (Quai Branly Museum 1931b)



Photograph 4.13.2: Spars and sails, Cape Verde Peninsula	Cropped, from (Edmond 1906)

4.13.2 Sail material

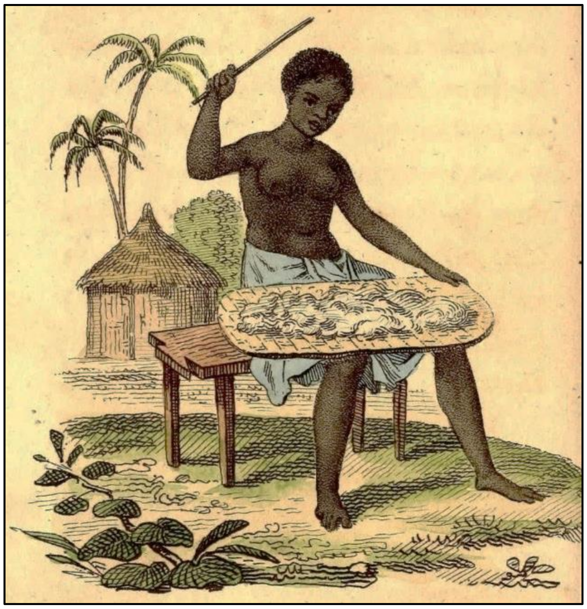
Sail material was both locally made and imported. Senegambia's native production of cotton textiles would provide abundant material and expertise for the local production of sails. local looms produced cloth fifteen to eighteen centimeters wide and sixteen meters long so any larger sail would be made up of multiple of these sewn together (Curtin 1975b:211–215; Kriger 2005). Cotton sails were described on the Senegal river in 1675 (Ritchie 1967:85). A source in 1682-1683 described cloth sails used all along the coast. It also states that The Gambia was an exception as boats used woven mats as sails (Thilmans 1976:25, 28; Gamble 1993:3). These mat sails were still in use in the nineteenth century (Mitchinson 1881:389). These were probably the ubiquitous raffia palm (Genus *raphia*) leaf mats. It appeared to have been common to refer to raffia leaf fibers as straw or rushes, French "paille" (Barbot 1992:212–213). These were likely similar to those used other parts of West Africa (Smith 1970:519). The use of sails predates this account by a century as they were first observed in 1594 (de Almada 1984:38). In the twentieth century imported sails, cotton sails, and stitched together "cretonne" sails were attested (Quai Branly Museum 1931c; Leca and Labouret 1935:60; Postel 1950a:124). Cotton sails made of "malicane" a name for unbleached cotton cloth bolds with a narrow width were still in use in

1977 (Gueye 1977:29). Sails started giving way to outboard motors in the latter half of the twentieth century were now rarely used (Lleres 1986:134). Photographic evidence suggests that most small sails still in use were made of recycled organic and synthetic fabrics, or even just plastic sheeting. Rare large sails still in use were likely modern synthetic materials. Around the Cape Verde Peninsula kites of a synthetic material have recently entered use as backups in case of engine failure (Galliot 2011).

4.13.3 Sail makers

A 1785-1788 source noted that Wolof women made the sails used on their boats as well as their nets and clothes (de Villeneuve 1814b:183). These probably resembled the sails depicted in a later illustration. These sails were composed of four horizontal strips of fabric forming a long rectangular sail approximately twice as wide as it was tall (Illustration 4.13.2). These were likely mostly constructed of 15 to 18 cm locally produced strips of cloth (Illustration 4.13.1) (Curtin 1975b:211–215; Kriger 2005). They may have also produced cords in general for use on boats.

Notably, the Wolof and Fulbe both had specific weaver castes (Tamari 1991). In general, however, assembly of the sail was likely done by the wives of the fishers. Who was responsible for creating textiles would have varied greatly over time and place across Senegambia but much of the production was likely decentralized household production and assembly (Curtin 1975a:213).



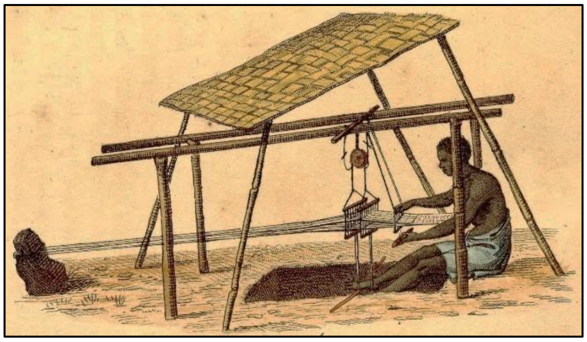


Illustration 4.13.1: Senegambians beating cotton, spinning cotton, and weaving textiles	From (de Villeneuve 1814b:180a, 180d, 182a)

4.13.4 Sail shapes and construction

Fundamentally almost all sails used on Senegambian watercraft throughout their history have been quadrangular and so were likely to share many similarities with later sails. Few sources' illustrations depicted sails in enough detail to comment on construction. No early images were in high enough resolution to be able to draw any conclusions from them. It did not appear two spritsails were used on single Senegambian style boats although other types of boats in the Gambia region were observed to have two. Only single masts with spritsails were evidenced in all studies and photographs. Cutter-type boats could occasionally be seen with one or two jibs in photographs.

Photograph 4.13.3: Needles from Mali, likely similar to ones used in Senegambia	From (de Zeltner 1930)

A 1908 study noted that spritsails around the Cape Verde peninsula were while identical in shape to those of the Senegal River Coast were at that time commonly constructed of many different cloth panels of differing sizes. Another study from 1935 described sails on boats around the Senegal River Coast as constructed of four to five cloth panels called "wir/wiir/vir/uir" which together formed a sail of around six to seven meters square (Leca and Labouret 1935:57). The width of these cloth panels would suggest they were not produced locally but imported. The mismatched fabrics on Cape Verde peninsula sails would also suggest they did not use locally produced fabric but a variety of recycled cloth much of which was likely imported. A 1950 study described the sails as tearing easily (Postel 1950a:124). A 1952 study around the Cape Verde peninsula gave a typical dimension of four meters square. These sails were constructed from four cloth panels (Balandier and Mercier 1952:156). A 1963 study also gave a typical size of six to seven meters square and did not appear to cite the previous study that gave the same dimensions (Diop 1963:37). A 1994 study around the Sine-Saloum Delta gave a sail size of four meters tall and three meters wide for boats that were twelve meters long. Although these boats were also equipped with an engine so the sail was not the primary means of propulsion (Bousso 1994:30). The same source described the size of sails on large cutter-type Senegambian boats as seven meters tall and four meters wide. These boats were also equipped with engines (Bousso

1994:31). The spritsails diagram included appeared to display rectangular sail panels that were vertically oriented (Leca and Labouret 1935:56). Photographs of a sails in use also showed vertically oriented sail panels (Photograph 4.13.4, Photograph 4.13.5).

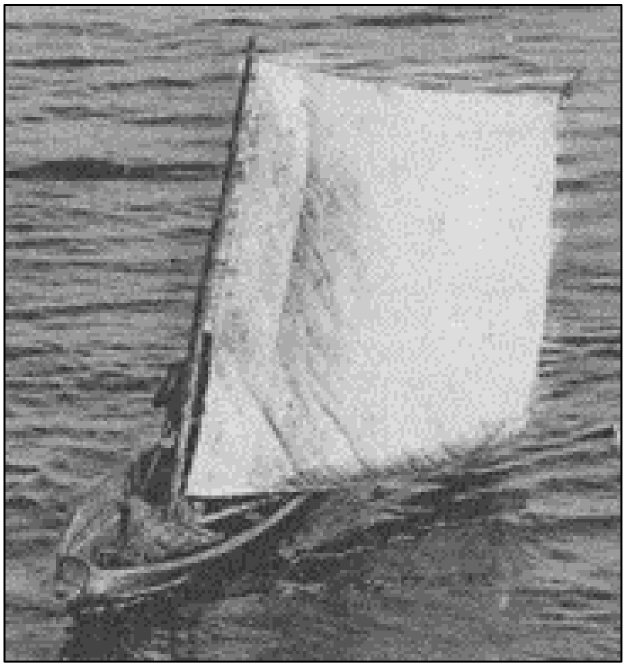
A formula for calculating the approximate area of a spritsail on a Senegambian boat was created by the author of a 1950 study from their observations. This formula was:

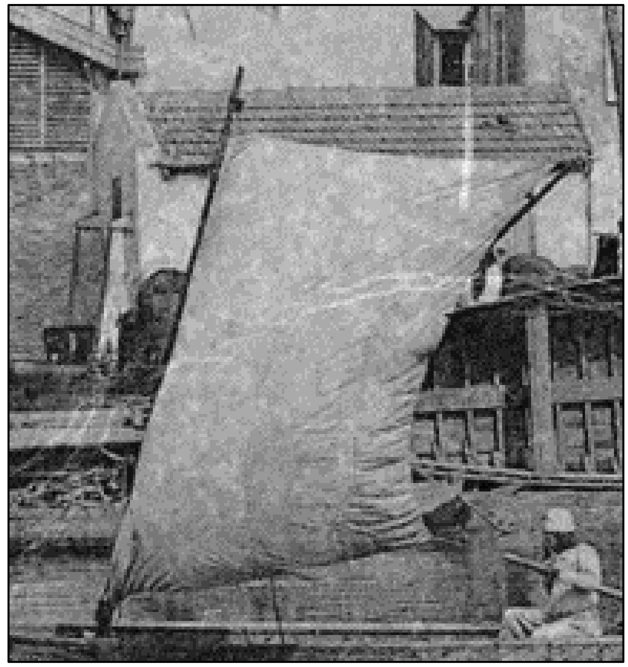
$$A=(L/2)^2$$

A = area

L = length of the boat

The overall height of the sail was around two-thirds the total length of the boat. They were roughly square in shape (Postel 1950a:124). A 1963 study gave typical measurements of six to seven meters a side for sails and asserted the sails were square (Diop 1963:37).





Photograph 4.13.4: Cape Verde Peninsula short cutwater boat, distortions could be seen around seams between sail panels	Photograph 4.13.5: Spritsail on a Senegal River frame-based boat, distortions could be seen around seams between sail panels
Cropped, from (Edmond 1908b)	Cropped, from (Edmond 1909c)

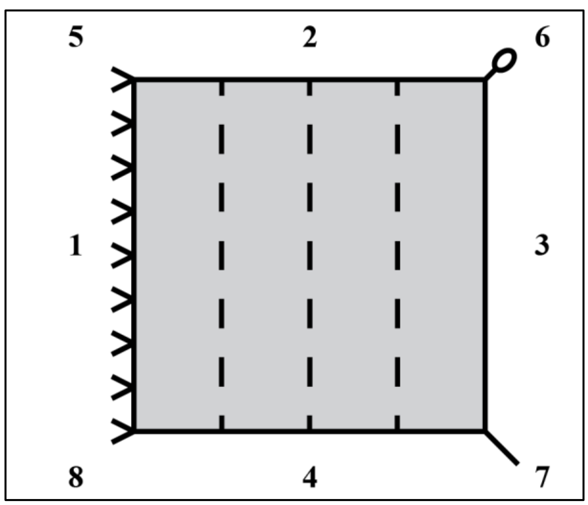


Figure 4.13.1: Clew sheet attachment to boom	Not to scale, adapted from (Balandier and Mercier 1952:170)
1: Sail, 2: Boom, 3: Clew sheet	

4.13.5 Sail tanning

Tanned sails were sails treated to improve longevity with various substances which often resulted in red colored sails (Crane and Jarvis 2020:3–8). It was very difficult to interpret sail color from old photographs due to being in black and white and so sails that may have been subject to tanning could only be guessed at when darker sails appeared in black and white photos. In addition, sails may have been subject to staining which would render it almost impossible to identify a sail that was subject to tanning from a black and white photograph.

During the twentieth century, no sails other than spritsails appeared on Senegambian watercraft. The only additions sails seen to be in use were one or two jibs seen in use on Groundnut-cutters. Of note, the 1908 study described the sails of the Cape Verde Peninsula as different colors and noted that many were colored red suggesting they may have been tanned (Gruvel 1908:91). This was the only source to mention any notable sail colors. A 1950 study speaking generally about Senegal specifically described sails as not tanned (Postel 1950a:124).

4.13.6 Bolt rope

Bolt rope called “karleg/karlige/karlen/rebu” was a rope sewn around the edge of a sail to reinforce it (Figure 4.13.2). The rope was often covered with a layer of cloth after being sewn on. If done wrong it could negatively impact the performance of a sail (Kipping 1847:58).

Edges of sail appeared to be reinforced and had a cloth covering, probably with a bolt rope under (Illustration 4.13.2). A 1935 study described the use of bolt ropes, ropes sewn onto the edges of sails to reinforce them (Leca and Labouret 1935:57). The bolt ropes were likely often covered with strips of fabric like those that could be seen in an illustration (Illustration 4.13.2). A 1952 Cape Verde peninsula study described the bolt rope as attached by a thick wire which was sewn in a spiral pattern around the bolt rope and through the sail (Balandier and Mercier 1952:156). A 1977 study around the Cape Verde peninsula also described bolt ropes on sails (Gueye 1977:29).

4.13.7 Sheet and loop

Sheets were called “kon/berngue”. The clew sheet “kul u suf/konu suf/kon u ksuf” was attached directly to the bolt rope of the clew (Figure 4.13.2) via unknown method (Monod 1947:108, 111; Balandier and Mercier 1952:156–157). A loop on a cord “mbreken” attached to the peak (Figure 4.13.2), presumably via the bolt rope, was meant to hold the sail to the sprit (Monod 1947:108, 111; Balandier and Mercier 1952:156). The peak sheet “kut u kao/kona kaw/kon u kao” was lashed to the sprit directly and did not connect to the sail (Figure 4.13.2). The clew sheet if a boom was present only wrapped around the end of the boom but was not permanently fixed to it (Figure 4.13.4). It the absence of a boom the clew sheet hung free from the clew of the sail (Postel 1950a:124).

When not being controlled by the coxswain the sheets were tied, likely normally to the thwart in front of them by wrapping it, called a turn (Postel 1950a:124). They could also be tied to the shroud thwart or the front wire and presumably operated from amidships or bow of the boat (Leca and Labouret 1935:157).

4.13.8 Lacing

The lacing (Figure 4.13.2) called “rakas/raskaas/derkat” served the purpose of both holding the sail to the mast and allowing the sail to quickly slide up and down the mast when being raised and lowered (Gruvel 1908:74).

A 1935 study around the Senegal River coat described how the lacing was attached to the luff edge of the sail intended to be tied to the mast were held to the luff bolt rope. Cords were tied to the bolt rope so as to leave a length of cord on each side to tie around the mast. These were spaced every thirty to fifty centimeters (Leca and Labouret 1935:57). A 1947 study showed the methods of attachment of the cords to the bolt rope with an overhand knot (Figure 4.13.3) (Monod 1947:110). It was somewhat unclear if the topmost and bottommost lacing differ at all from the others. A 1952 study for the Cape Verde peninsula gave the cord spacing as every thirty centimeters (Balandier and Mercier 1952:156). A 1977 study around the Cape Verde peninsula also mentions the cords (Gueye 1977:29). A 1908 study described the use of wooden rings as an alternative to lacing (Gruvel 1908:74). It was possible that the wooden rings described were used as top and bottom rings, it was also possible that the top and bottom rings were simply tied with thicker cords. The lacing was tied to the mas using a square knot (Monod 1947:110). The throat of the sail was fixed directly to the mast. Spritsail rigged boats did not have halyards due to this (Postel 1950a:124).

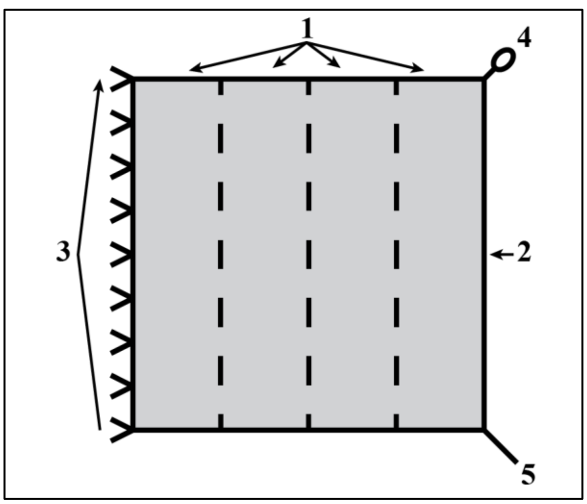


Figure 4.13.2: Spritsail diagram	Own work, not to scale
1: Sail panels, 2: Bolt rope, 3, Lacing, 4: Sprit loop, 5: Sheet	

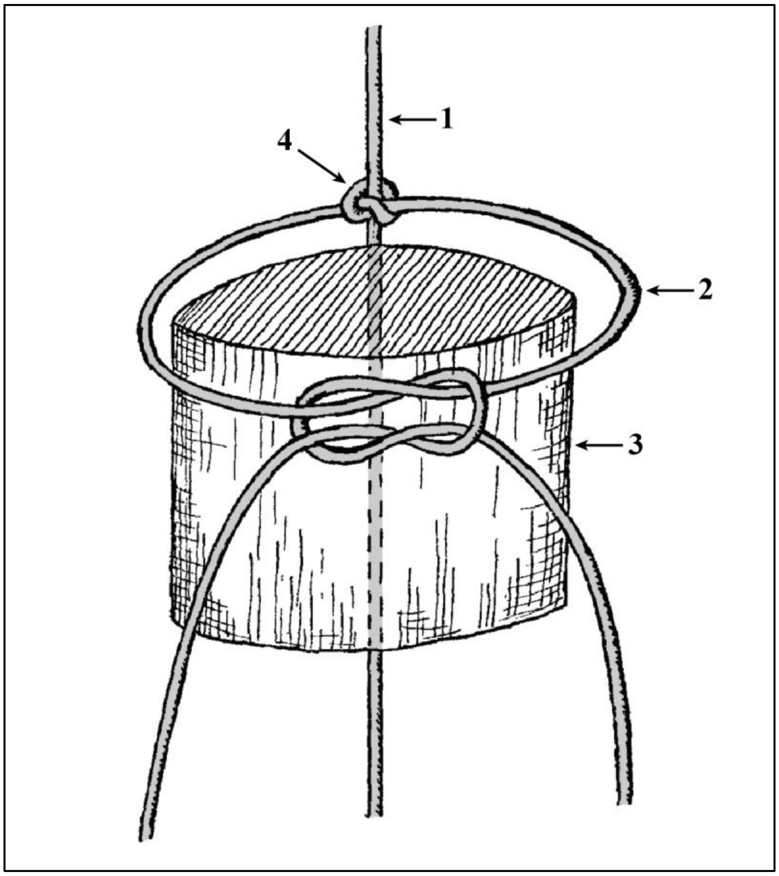


Figure 4.13.3: Diagram showing the attachment of the lacing to the bolt rope and mast	Not to scale , adapted from Monod, (Monod 1947:110)
1: Bolt Rope, 2: Lacing, 3: Mast, 4: Overhand knot	

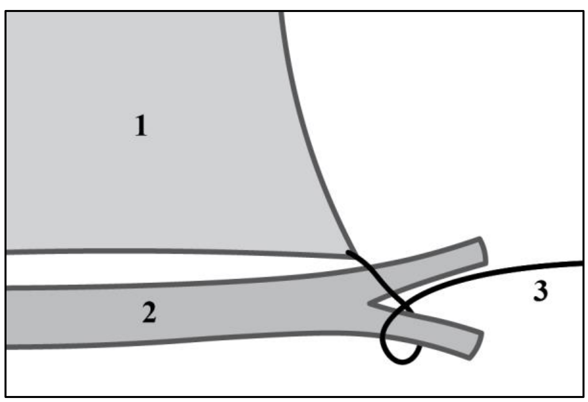


Figure 4.13.4: Terms for the sides and corners of a sail	Own work, not to scale
1: Luff, 2: Head, 3: Leach, 4: Foot, 5: Throat, 6: Peak, 7: Clew, 8: Tack	

4.13.9 <u>Shrouds</u>

Masts appeared to have been held in place by two shrouds (Figure 4.13.6) “darigu/derik”, one forestay, and one backstay. The forestay “darigu-bop/derik bu bop” ran from the top of the mast and could attach either to a thwart or wire in the bow of the boat or could be tied around the bow projecting cutwater, seemingly passing over the top of the front cover and wrapping around the bottom notch. The second shroud appeared to have been attached to the side of the boat, possibly to the edge of the bench behind the mast. This shroud appeared to have been always on the side of the sail with the yard and against the wind. Photographs showed boats with a backstay running from the top of the mast to the ring on the stern projecting cutwater, but the text description does not fit with this, and they were possibly set like that to keep the sails straight for the photo. The sails also appeared to have be simple spritsails with booms but were not capable of a "wantareer" setup (Gruvel 1908:74a–775). A later study noted that two shrouds “derik bur difi” were used in addition to the forestay and went from around halfway up the mast to the bench behind the mast (Leca and Labouret 1935:56). This was likely the common setup for wander capable sails which probably removed one shroud, if they had an extra, and reduced the length of the other. The shrouds’ main purpose was to prevent the loss of the mast in the event of capsizing (Gruvel 1908:75). The loss of the mast when capsizing would have been more possible with the "wantareer" capable setup due to having a mast step allowing the sail to be canted and being only tied to a thwart not put through a hole in a bench. The exact attachment point of the shrouds appeared to have been variable.

A 1950 study noted that the sprit forestay was not always present particularly on small boats, likely as it was not necessary on non "wantareer" sails. The shroud attached to the shroud thwart behind the mast was noted to be positioned around two-thirds the way down the mast.

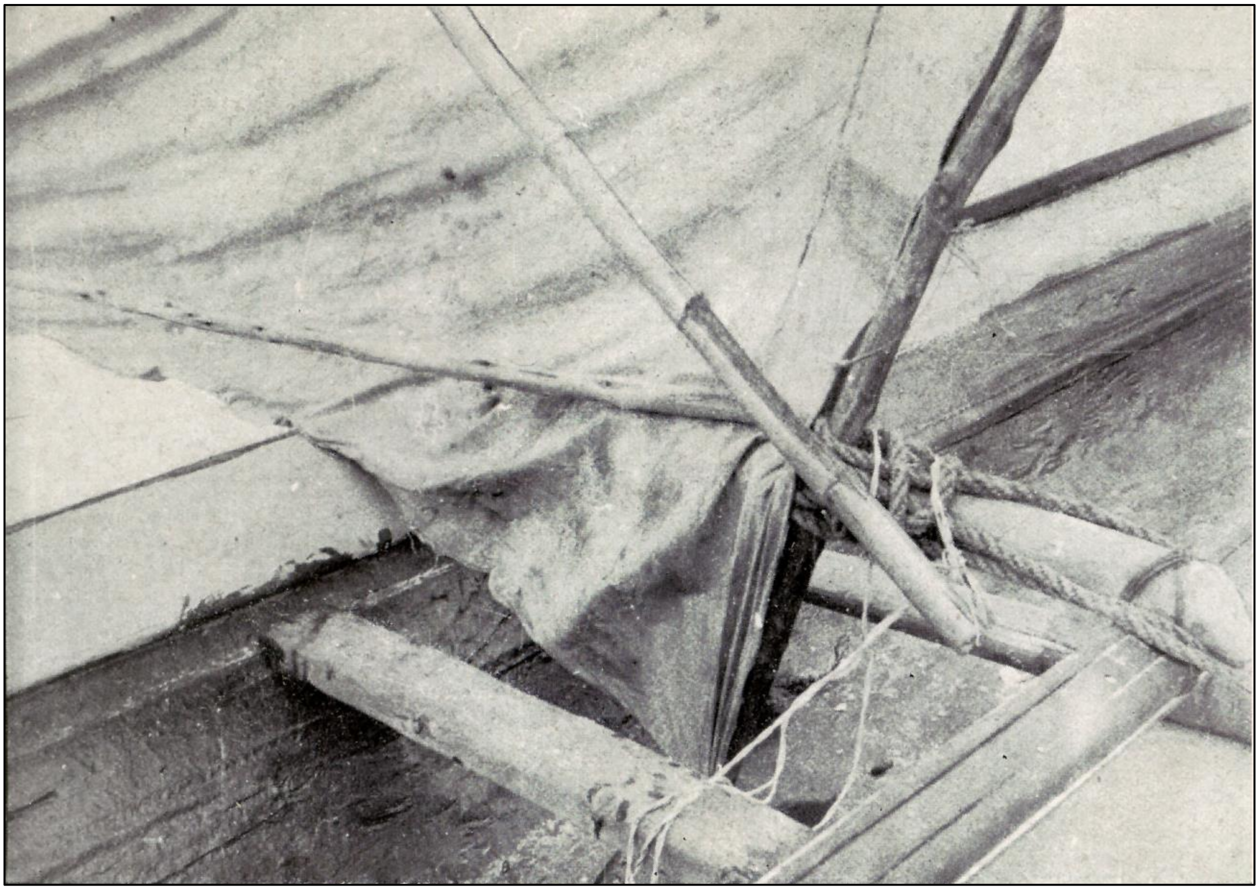
When the sail was in the normal spritsail position it would be loose and could be used by a crew member to perform the “larga” maneuver (Postel 1950a:124).

The tying of shrouds was possibly the reason for the development of the notched projecting cutwater. The forestay may have been the reason some large older front covers had trapezoidal cutouts in the center. However, there were alternative rigs and setups that did not require the notch or cutout to function and utilizing a thwart removes the need so on many boats the features were likely purely aesthetic.

4.13.10 Snotters, strops, and other lashings

The spars were held to each other and the hull entirely by means of lashings (Figure 4.13.6). There appeared to have been multiple methods of tying the snotter which held the sprit. Few clear images of other lashings such as the boom snotter or the mast shroud, strop, but likely utilized similar methods. The mast shroud was called the “tak u ba/istrop u ba”, the snotter was called the “isistrob u verg/istrop u verg/istrop u ma/theu/tehu hummak”, the “tehu gundao/istrob u bo”, and the sprit lashing was called the “birgatin/balanti”. These appeared to have come in a wide diversity of knot types and arrangements (Photograph 4.13.6, Photograph 4.13.7, Figure 4.13.5).

Photograph 4.13.6: Snotter replica, Cape Verde Peninsula	From (Quai Branly Museum Unknown)



Photograph 4.13.7: Mast shroud and snotter, Cape Verde Peninsula	From (Balandier and Mercier 1952:Plate 14)

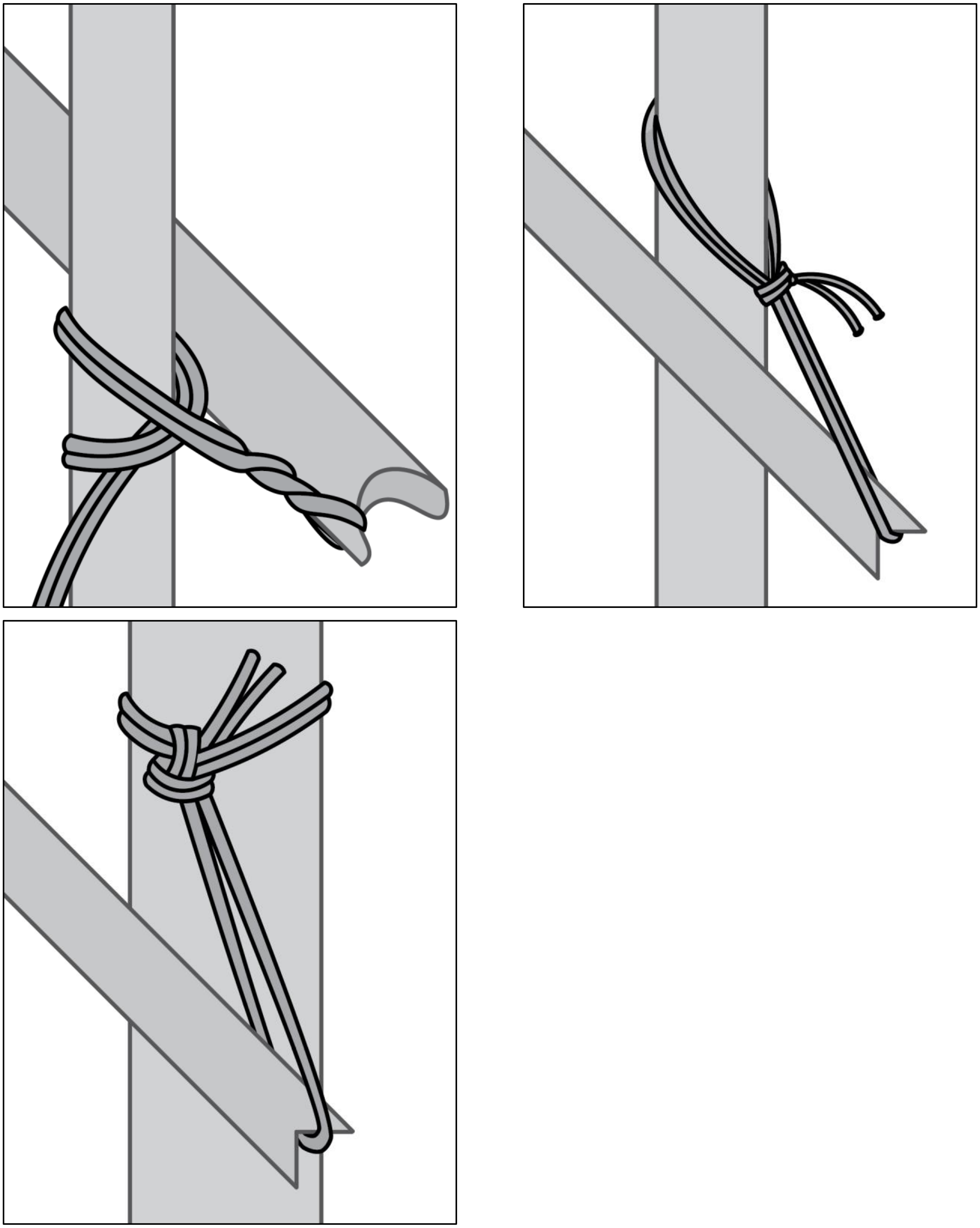


Figure 4.13.5: Types of snotter attaching sprit to mast	Adapted from studies, not to scale
Lower left: (Balandier and Mercier 1952:156), Upper Left and Right(Monod 1947:109–110)	

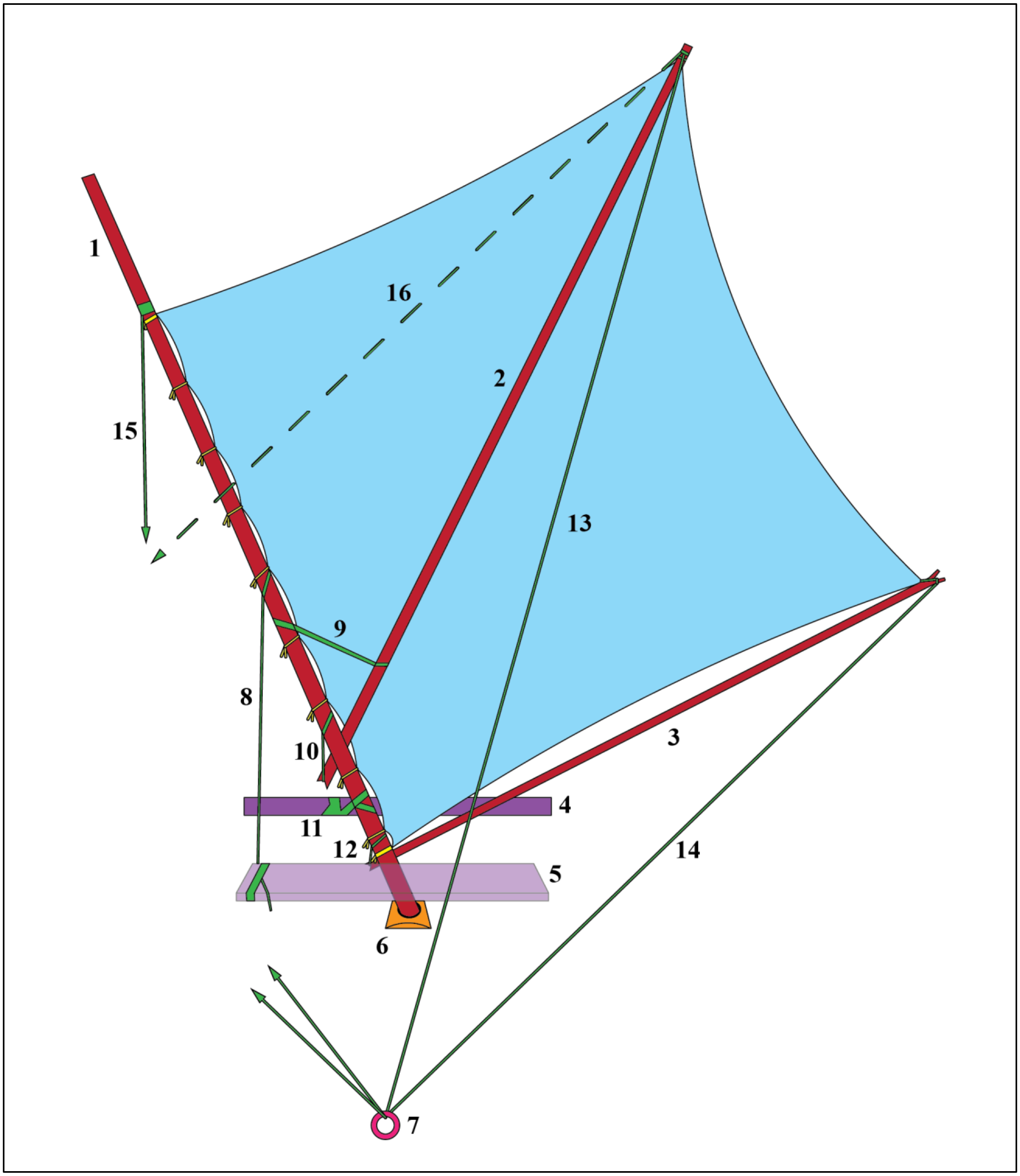


Figure 4.13.6: Sail diagram for "wantareer" capable sail, looking towards the bow	Own work, not to scale, mostly adapted from Monod (1947:108)
1: Mast, 2: Sprit, 3: Boom, 4: Mast thwart, 5: Shroud thwart, 6: Mast Step, 7: Sheet ring, 8: Shroud, 9: Sprit lashing, 10: Snotter, 11: Mast shroud, 12: Boom snotter, 13: Upper sheet, 14: Lower sheet, 15: Forestay, 16: Sprit forestay	

4.13.11 Lugsail Cape Verde Peninsula boats

The only details clear about early square sails was that they had no boom and were square to rectangular with more width than height and varied in size. The rigging depicted in them did not appear detailed enough to evaluate (Illustration 3.2.1, Illustration 3.2.18, Illustration 3.2.19, Illustration 3.2.20).

The one detailed depiction of a lugsail on a Senegambian boat appeared to have a sail assembled from four horizontal panels and have the edge trimmed with a bolt rope covered with a fabric cover all around the sail. The ratio of length to width of 2.5 making the sail quite wide. The sail had spiral lacing around the head and foot of the sail holding it to a yard and a boom. The sail also had a halyard attached to the top of the mast which appeared to be tied to a thwart positioned at the bottom of the garboard and behind the mast slightly forward of amidships. This was reminiscent of the shroud thwart on the "wantareer" capable spritsail. The sheet appeared to have been tied to the thwart just forward of the stern. The tack line was positioned just behind the front over, but it was unclear if it was tied to anything but may have attached (Illustration 4.13.2). The boom was also shown on a second illustration but the low detail with what appeared to be two sheets on a side of the sail (Illustration 3.2.2).The boom did not appear in another illustration which showed indicating it was optional (Illustration 3.2.24). It was unclear were the sheet and tack line were attached to the sail or boom (Illustration 4.13.2). The lugsail was set on the starboard side (Illustration 4.13.2). The lugsail was set on the port side (Illustration 3.2.24). Some of the depictions of lugsails were raked forward (Model 4.13.1, Illustration 4.13.2). The known lugsail was unraked (Illustration 3.2.24).

The illustration of the lugsail boat had three thwarts. One cylindrical thwart was positioned at around one-third the total length of the boat on top of the garboard to which the mast was lashed. Another was positioned just forward of amidships seemingly at the bottom of the garboard. The third was just forward of the stern and identical to the mast thwart being cylindrical and on top of the garboard. It appeared the mast step may have been a hole in the bottom of the bat (Illustration 4.13.2). A model of a similar boat with two masts also followed the pattern of having a lower thwart positioned a distance aft of the mast thwart and having a thwart near the stern. A notable difference between the model and the illustration however was that the model had a bow thwart located on top of the garboard that was likely used to tie the tack line (Model 4.13.1). The only other major divergence between the models besides the sail appeared to have been the lack of a bow cutwater notch on the larger boat, both had stern notches. This may explain the absence of a bow thwart as it could have been used to tie the tack line. The trapezoidal cutout on the bow cover may have aided this (Model 4.13.1, Illustration 4.13.2). The basic thwart setup was notable similar to too later spritsail mounting boats in layout. Many of the design features and techniques used on the lug sail were likely shared with earlier square-rigged sails and adopted by later spritsails.

Model 4.13.1: Model of an 1830 boat from the Cape Verde Peninsula, likely mounted a lugsail	From (François 1873)
Model made from direct measurements of a boat and overseen by someone who observed the boats firsthand although significantly after initial measurements and observations.	

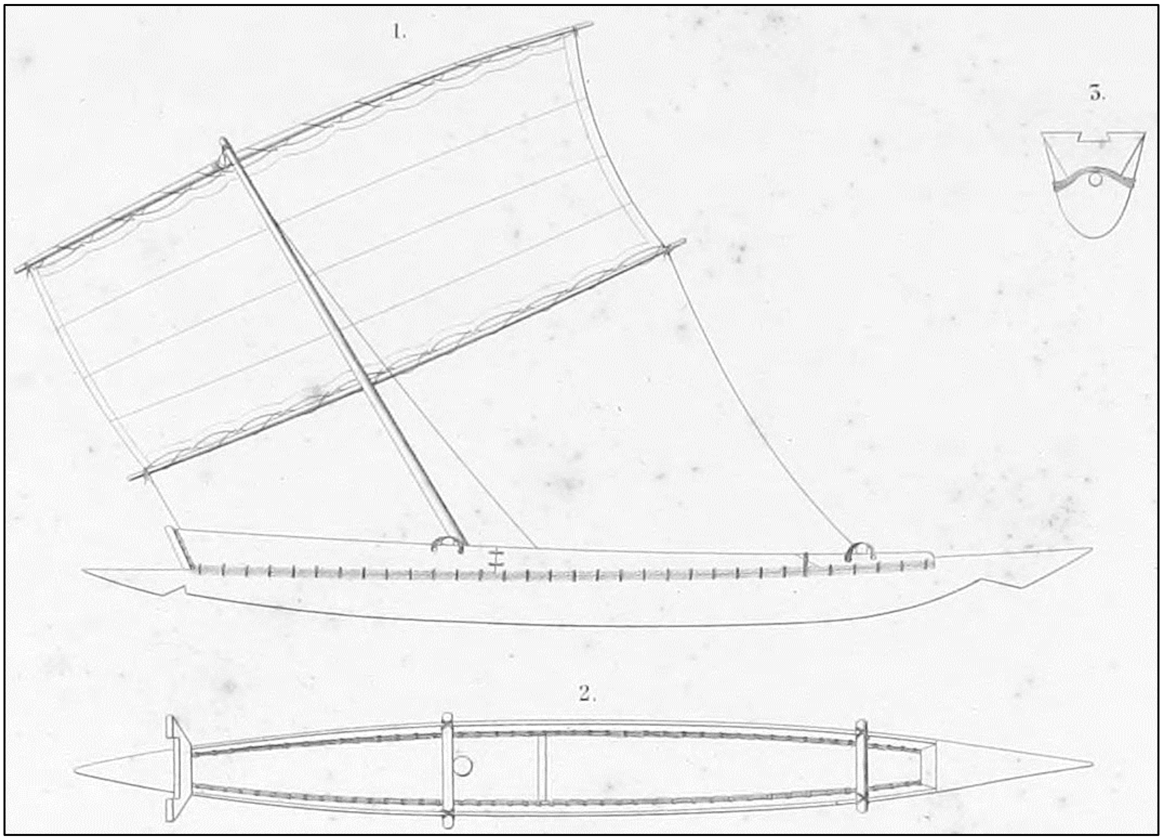


Illustration 4.13.2: Lugsail, Sail likely made locally, Cape Verde Peninsula, 1837-1840	From (Pâris 1841a:Figure 1-3)
Drawn from firsthand observations of skilled illustrator.	

4.14 *Metals*

Iron smelting in Senegambia from approximately 1500 CE was mostly confined to the eastern half of the region. Places like Futa Tooro along the Senegal River, Gajaaga, Bundu, Bambuhu, and the Jallon Mountains in Guinea supplied the bulk of iron imports. This appeared to have a result of the drying climate that reduced the general availability and the regrowth of timber used for charcoal in furnaces, although this may not suffice to explain it completely. Despite this, all of Senegambia continued to maintain a robust iron smithing tradition utilizing imported iron in the regions where it was not produced (Curtin 1975a:210; Brooks 1993:52). In the case of the Jallon Europeans served as intermediaries transporting iron north by sea.

Europeans also exported great quantities of European produced iron to Senegambia. Although this iron was of inferior hardness to what was imported from other areas of West Africa (Brooks 1993:52; Evans and Rydén 2018). One late seventeenth-century observer in the Gambia reported that carvers mostly used stone axes alongside some iron ones in canoe carving. This was possible but was not mentioned in any other source before or after (Thilmans 1976:25, 49). It was notable that the price of iron grew greatly over time across West Africa and was quite high by the nineteenth century which may have discouraged its use in boatbuilding (Evans and Rydén 2018:61, 63).

The place of iron in Senegambian watercraft had historically been primarily related to the tools used to construct them. Most of the iron associated with early watercraft in everyday use would have been fishing equipment or weapons. The use of iron as primary fasteners on Senegambian watercraft construction appeared to be a mostly twentieth-century development, although it likely predates this to some extent. The exception to this appeared to be Senegal River frame-based watercraft which likely adopted nails as primary fasteners much earlier than other regions but there was a lack of sources on it.

The other iron parts likely to be present on watercraft before the twentieth century were rings to run rigging through and tacks on caulking fabric covers, both of which could be seen in early photographs (Photograph 4.3.1, Photograph 4.3.2). The iron fasteners of the twentieth century primarily consisted of nails, dowels, bolts, and wire. These methods supplanted earlier sewn techniques. (Leca and Labouret 1935:54; Postel 1950a:124; Balandier and Mercier 1952:153–156; Gueye 1977:24; Lleres 1986:126; Bousso 1994:29–30; Masimana and Rabenevanana 2018). Boatbuilders have been observed making bolts out of rebar (Miles 2021).

Most twentieth and twenty-first-century fasteners were bought from a store or derived from scrap iron (Lleres 1986:126; Balandier and Mercier 1952:159). Similarly modern tools were a mix of locally produced and imported (Miles 2021). Senegal River boats in early twentieth-century photographs appeared to mount European-style iron anchors. Modern anchors frequently observed in pictures were often made of rebar. Vertical metal bulkhead grates were present along the bottom of some boats, and there were doubtless many other small metal items of uncertain composition. The general lack of iron parts on older boast was likely due to a combination of the expense and the fact that the iron would have deteriorated quickly. Alternatives not as susceptible to deterioration and cheaper were available.

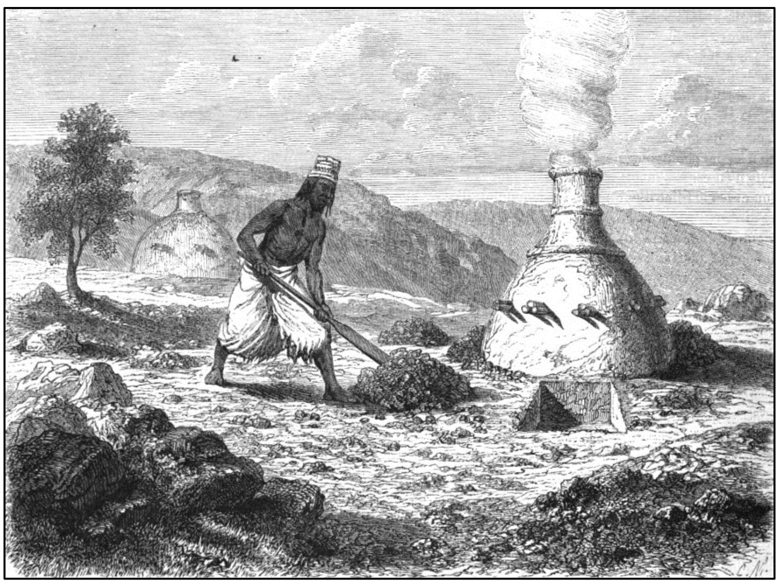


Illustration 4.14.1: Futa Jallon bloomery	From (Lambert 1861:388)

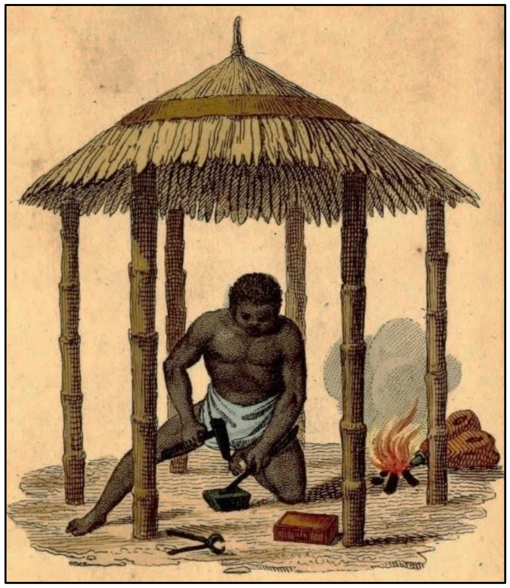


Illustration 4.14.2: Senegambian blacksmith	From (de Villeneuve 1814b:178a)

4.14.1 Iron parts

One of the few metal parts excluding fasteners to be observed with any frequency in early twentieth-century pictures was a metal ring attached to the top of the stern or stern projecting cutwater. It only appeared in a handful of photographs suggesting it was frequently not used and replaced by other methods. However, it may have simply been too small to see in many low photographs. The ring was described in multiple later studies. This ring was intended to have the sheets attached to the clew and peak of a spritsail pass through it and be held by the coxswain. It was referred to as a "kos/aria" (Leca and Labouret 1935:57; Monod 1947:108; Postel 1950a:124; Balandier and Mercier 1952:155–157).

Based on photographs and studies two different methods of attachment (Figure 4.14.1) were used to attach this ring to the boat. One method uses a cord that wrapped around the stern projecting cutwater and had the iron loop threaded through it, another appeared to be a nail with a ring on top, and eye bolt, driven into the hull or projecting cutwater (Leca and Labouret

1935:57; Monod 1947:108; Balandier and Mercier 1952:155–157). The cord and loop method may have been cheaper as well as easier to use on thin projecting cutwaters. There did not seem to be any consistent distance along the cutwater that they were attached to.

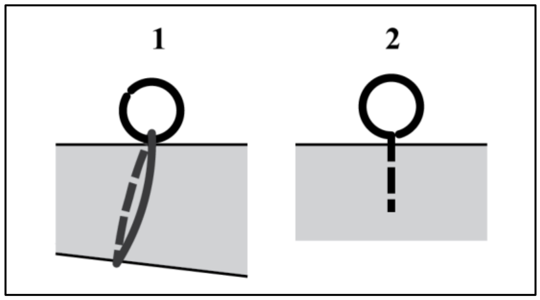
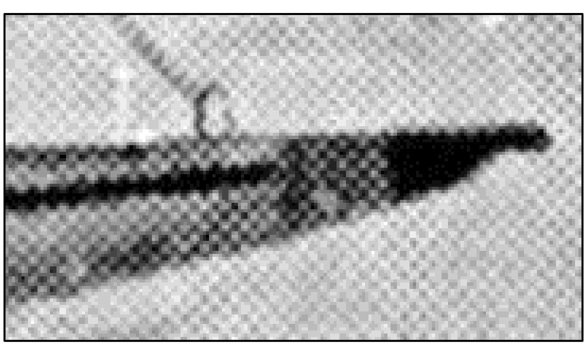
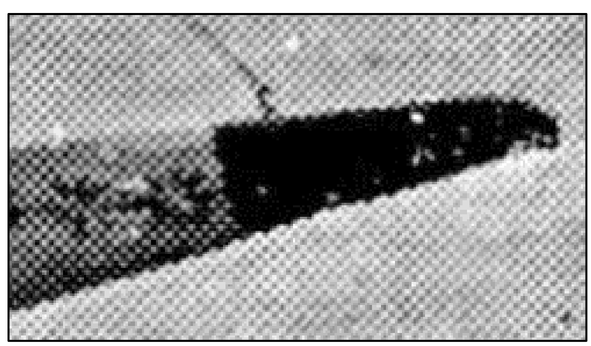


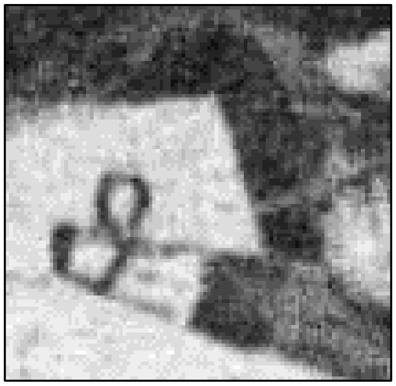
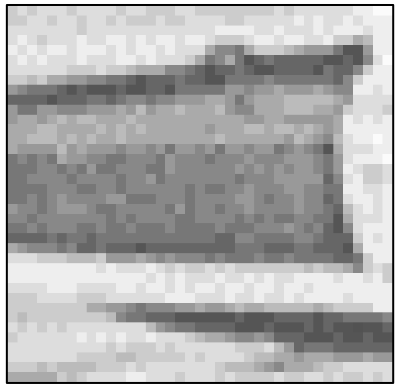
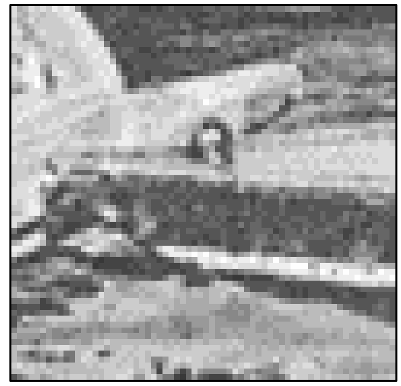
Figure 4.14.1: Sheet ring fastening methods	Own work, not to scale
1: Wraparound cord with ring, 2: Eye bolt	

Illustration 4.14.3: Some type of unknown attachment on the stern projecting cutwater of a Senegal River Coast boat, 1891	Cropped, from (Perret 1891a)
Drawn from firsthand observations and high detail.	

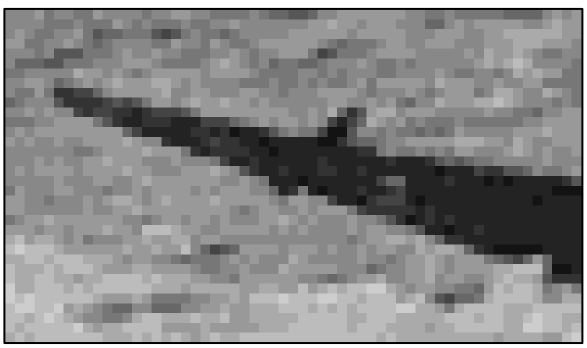
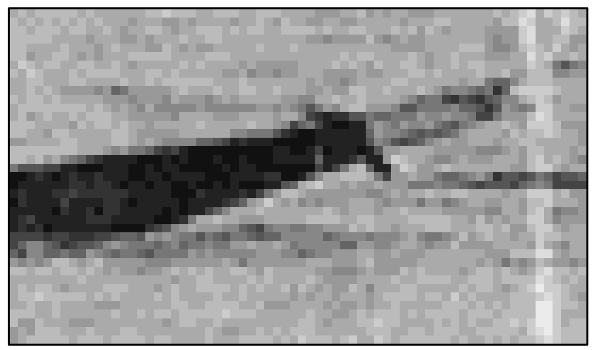




Photograph 4.14.1: Senegal River boat stern projecting cutwater	Photograph 4.14.2: Senegal River Coast boat stern projecting cutwater
Cropped, from (Gruvel 1908:74a)	Cropped, from (Gruvel 1908:74a)

Photograph 4.14.3: Stern of a short double cutwater boat in Rufisque	Photograph 4.14.4: Stern of a single cutwater boat in Dakar	Photograph 4.14.5: Stern of a single cutwater boat in Dakar
Cropped, from (Anonymous Unknown)	Cropped, from (Edmond 1902i)	Cropped, from (Edmond 1902l)

Photograph 4.14.6: Senegal River Coast boat stern projecting cutwater	Photograph 4.14.7: Senegal River Coast boat stern projecting cutwater
Cropped, from (Edmond 1909j)	Cropped, from (Edmond 1909k)

4.14.2 Projecting cutwater wire

Some mid-twentieth century and later boats had a wire strung through one or both end covers to the projecting cutwater (Figure 4.14.2). This wire was twisted together in the center and passed through holes in the cover and spur forming a figure eight with an elongated center. Some observed boats appeared to have used a solid piece of metal nailed onto the top of the end cover and projecting cutwater. Its purpose was unknown, but it may have been to prevent attached cutwaters from pulling away from the hull or as a replacement for the sheet ring.

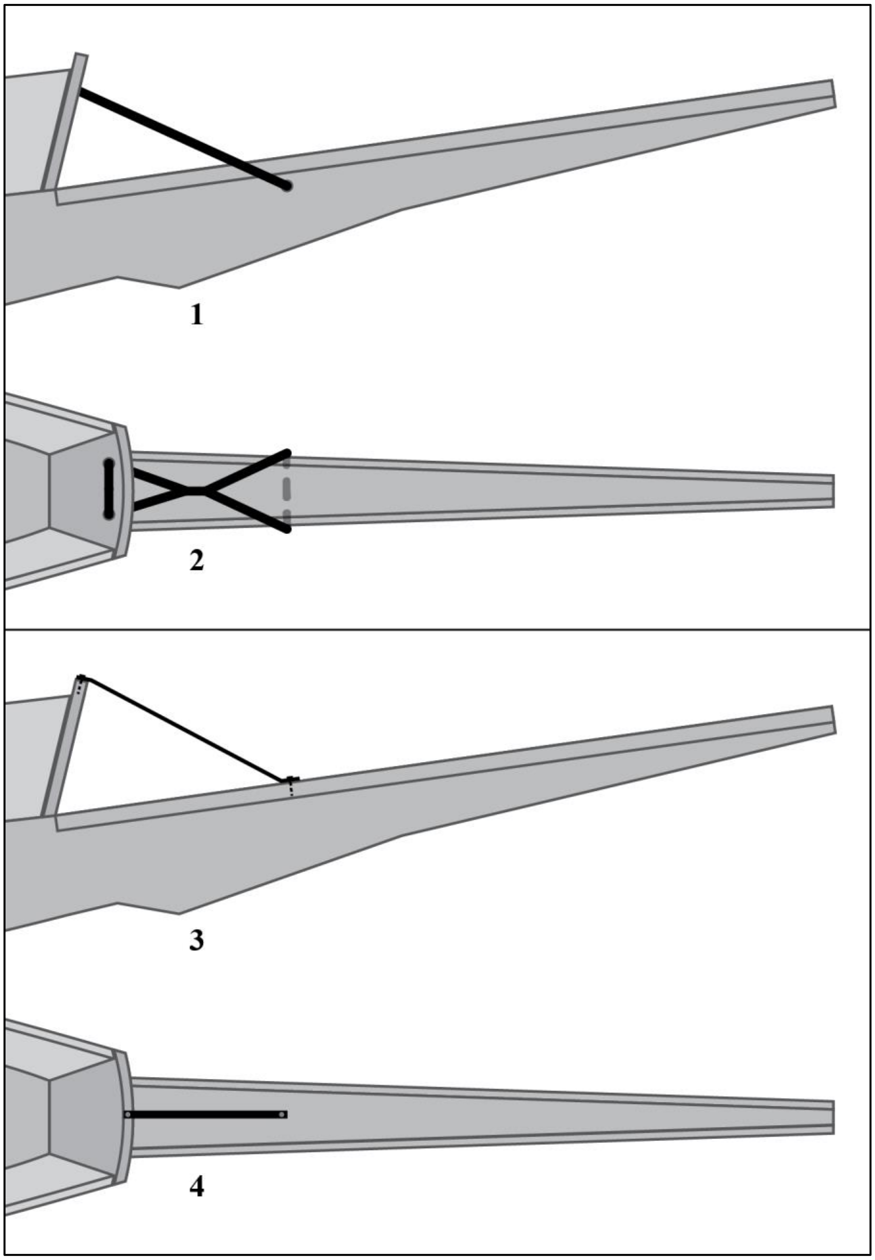
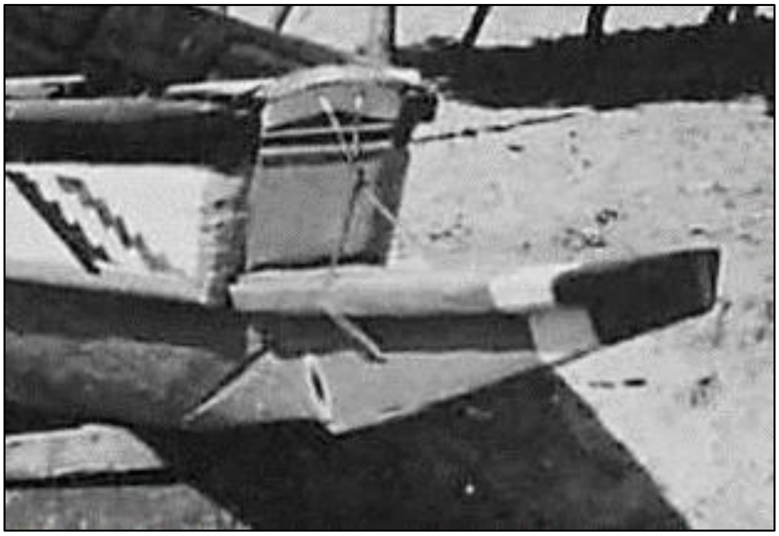


Figure 4.14.2: Projecting cutwater wire (Top), Projecting cutwater bar (Bottom)	Own work, not to scale
1: Profile view wire, 2: Plan view wire, 3: Profile view bar, 4: Plan view bar	



Photograph 4.14.8: Wire attached through stern cover and stern projecting cutwater, probably in Dakar	Cropped, from (Robel Unknown)

Photograph 4.14.9: Iron bar attached to top of stern cover and projecting cutwater	Cropped, from (Spooner 1958b)

4.14.3 Bow wire

Another small but important iron part was the front wire, the wire (Figure 4.14.3) "u bop", which served multiple functions. It was strung between the sheer strakes at the bow of the boat on the inside, about seven to eight centimeters behind the front deck or "dis" if it was present. Sometimes there were two wires roughly braided together. This wire could serve as an attachment point for the forestay, as well as for the hawser, and stowed fishing lines (Leca and Labouret 1935:52, 54, 56, 63, 78; Postel 1950a:124; Balandier and Mercier 1952:154–155). It was also an attachment point for talismans (Balandier and Holas 1946; Holas 1948; Balandier and Mercier 1952:120, 154). This wire would likely have been substituted for a thwart on older boats.

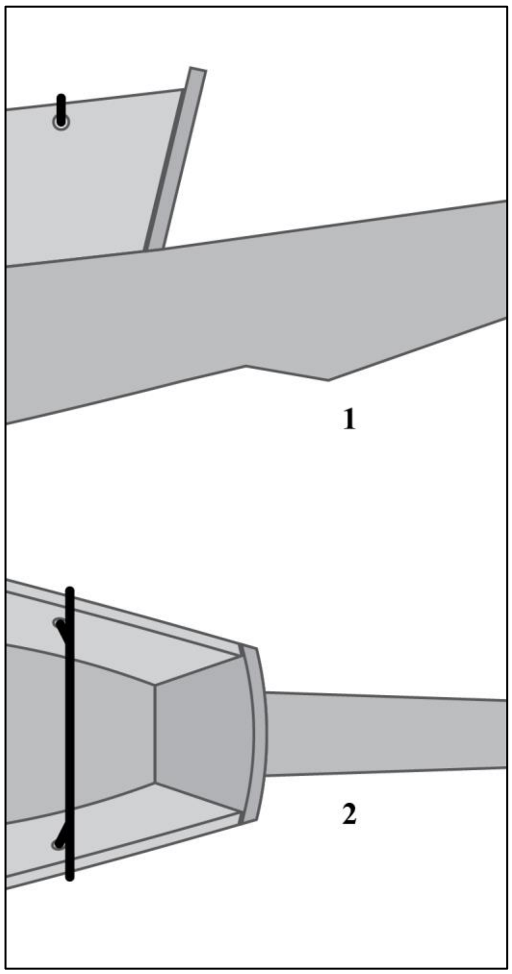


Figure 4.14.3: Bow wire	Own work, not to scale
1: Profile view, 2: Plan view	

Photograph 4.14.10: Bow wire with talismans on a Cape Verde Peninsula boat	Cropped, from (Balandier and Mercier 1952:Plate 23)

4.15 *General Vocabulary*

Terms used. Words in ellipses were Wolof unless otherwise stated. Many terms were borrowed from other languages. From studies and personal correspondence. Differences were due to a lack of standardized spelling and different pronunciations in different areas as well as transcription language. The movement of boat builders and sailors further complicates understanding.

General

- **Bow:** Front of the boat (*bop*)
- **Stern:** Back of the boat (*gien/gyen*) (Mandinka: *fenyemaa*)
- **Port:** Left side of the boat (*bor u tyamoy*)
- **Starboard:** Right side of the boat (*bor u mdeyor*)

Cutwaters

- **Notch in the projecting cutwater:** triangular cutout from the bottom of a spur or shape formed by the meeting of pieces of constructed spurs (*sikin/sikim*)
- **Projecting cutwater:** Spurs on the ends of boats. Could also refer to large carved vertical bow carvings on newer boats. If separate piece could seemingly mean stem or stern post (*tyon/tyo/coon/chone/lew lew*) (Serer: *thione*)
- **Bow projecting cutwater:** Spur on the front of a boat (*bop/bop op gal tyon op gal*) ("*bop*" meaning bow)
- **Stern projecting cutwater:** Spur on the back of a boat (*gien/gyen op gal/tyon ep gyen*) ("*gien/gyen*" meaning stern)
- **Deck:** Small deck on the bow and or stern (*dis*)
- **Over deck reinforcement:** Long piece of wood that goes on top of the deck and the gunwale to reinforce the connection (Serer: *tchiang*) (difficult to understand description)
- **Steering oar rails:** Rails on stern projecting cutwater that steering oar leans against (*taf u gien/taf u gyen*) ("*gien/gyen*" meaning stern)

Hull (names marked CV were specific to the Cape Verde Peninsula)

- **Gunwale:** Rail added along the top edge of the sheer strake (*molor*) (CV: *kordon*) (Serer: *nguemboungue*)
- **Sheer strake:** The closest plank to the top edge of the boat (*tyok*) (CV: *coog*)
- **Second strake:** Strake between garboard and sheer strake, edge joined to sheer strake with the "*taf u bir*", could be specific or refer to all strakes (*farga*/*fargue*) (CV: *parga*)
- **Garboard:** Closest plank to the keel or logboat hull (*dyok/dyao*) (CV: *bori*)
- **Batten:** strake on the inside that covered the garboard and sheer strake, used to edge join the strakes at butt joints and between upper and lower strakes, also possibly reinforces the mast thwart as well, probably redundant in large part, also appeared to in some modern cases support the deck (*taf u bir/tafou bir*)
- **Futtocks:** bow reinforcing frames (*bar*)
- **Frames:** Ribs (Serer: *membarte*)
- **Bow and stern covers:** flat covers on the ends of the boat (*mbap/nden/ndan*) (Serer: *ndagne*)
- **Hull:** Could refer to the boat themselves or the boats hull or logboat hull (*gal*) (CV: *mandin*)
- **Keel:** The central timber of the hull, likely refers to logboat hulls as well (*tes*) (Serer: *kessing*)

Sail assembly

- **Spar:** General term that included masts, yards, and sprits
- **Mast:** Vertical sail support (*ma/mao*)
- **Boom:** Bottom horizontal sail support (*bo/bom/bom suf/bom wake*) ("*suf*" meaning lower)
- **Sprit**: Diagonal sail support (*verg/verga/vergro*)

- **Thwarts:** Rectangular and cylindrical benches (*bako/banco*)
- **Mast thwart:** Cylindrical thwart that supports the mast located forward of the mast (*le/ba u kao/ba u kaw/ba u tak*) ("*ba u tak*" means the mast mooring) ("*kaw/kao*" meaning upper, "*ba*" meaning thwart?)
- **Mast-thwart lashings:** X shaped lashing securing the mast thwart to the hull (*bumoglo/ bumaglo*)
- **Shroud thwart:** Thwart behind the mast to which a shroud or two were tied (*ba u dige*) ("*ba*" meaning thwart?, "*dige*" meaning middle)
- **Mast shroud:** Cord attaching the mast to the mast thwart, a type of strop acting as a shroud (*tak u ba/istrop u ba*?) (Istrop meaning shroud/strop, a rope ring)
- **Snotter:** Lasing attaching sprit to mast (isistrob u verg/istrop u verg/istrop u ma/theu/tehu hummak) ("tehu hummak" meaning large "tehu", "isistrob u verg/istrop u verg/istrop u ma" meaning sprit and mast, "isistrob/istrop" meaning strop or rope ring, "verg" meaning sprit, "ma" meaning mast) (knot called "ayarkat [a] veko")
- **Sprit lashing:** Cord holding sprit midway up to keep it at an angle, resembles a halyard (*birgatin/balanti*)
- **Shroud:** Cord holding the mast to the thwart behind the mast (*derik bur difi*) ("*difi*" meaning protect?)
- **Boom snotter:** Cord that holds the boom to the mast (*tehu gundao/istrob u bo*) ("*tehu gundao*" meaning small "*tehu*", "*istrop*" meaning strop or rope ring, "*bo*" meaning boom)
- **Mast step:** Raised block with a hole in it on the bottom of the boat that the mast fits into (*isiep/estep/lamplanter/lamplatro*) (Serer: *idenousouk*)
- **Mast step hole:** Hole in the top of the mast step (*bot-bot*)

- **Sheet ring:** A ring on the stern projecting cutwater or stern deck that the sheets pass through (kos/aria)

Rigging

- **Sail:** Square or triangle of fabric that catches the wind to move boats (*weekka*) (The words "*wir/wiir/vir/uir*" could also seemingly be used as a general term of a sail)
- **Sail panels:** The strips of material that make up the sail, could also mean sail (*wir/wiir/vir/uir*)
- **Bolt rope:** Rope sewn along the edge of the sail (*karleg/karlige/karlen/rebu*)
- **Lacing:** The cords which tied the luff edge of the sail to the mast (*rakas/raskaas/derkat*)
- **Shrouds:** Cords holding the mast in place (*darigu/derik*)
- **Forestay:** A shroud that goes from the mast to the bow of the boat (*darigu-bop/derik bu bop*) ("*bop*" meaning front)
- **Sheets:** Chords attached to the peak and clew of the sail to move it (*kon/berngue*)
- **Clew sheet:** Sheet attached to the clew (*kul u suf/konu suf/kon u ksuf*) ("*suf*" meaning lower)
- **Peak sheet:** Sheet attached to the peak (*kut u kao/kona kaw/kon u kao*) ("*kaw/kao*" meaning upper)
- **Sprit Forestay:** Optional shroud attached to the end of the sprit and the bow used by "wantareer" sail (*gay*)
- **Sprit loop:** Loop of rope on the peak that holds sail to the sprit (*mbreken*)
- **Tack line:** Cord attached to the tack corner of a lugsail
- **Halyard:** Cord used to haul sail up and down mast

Sails used in Senegambia

- **Square sail:** Quadrangular, square or rectangular sail, square rig
- **Shoulder of mutton sail:** Triangular sail shaped like a right triangle, long side attached to mast with short side down, could mount a boom, fore-and-aft mounted
- **Lug sail:** Quadrangular, rectangular sail, could mount a boom, fore-and-aft mounted, mast if often raked forward
- **Spritsail:** Quadrangular, usually square, could mount a boom, fore-and-aft mounted

- **Triangular sail:** Sail with three sides and three corners (*wiirom fok*) ("*wiirom fok*" meaning three cornered)
- **Quadrangular sail:** Sail with four sides and four corners (*libije/libidye*)

Other

- **Bailing calabash:** Half a bottle gourd used for bailing (Mandinka: *koojee mirango*)
- **Large ornament:** Centrally placed on the bow (Serer: *n'deep*, plural: *teep*) ("*n'deep*" meaning bird)
- **Small ornament:** Placed to the sides of the bow and on the mast (Serer: *n'deet*, plural: *teed*)
- **Talismans:** Talismans made of various material intended to protect to bring luck, often called "*gris-gris*" as a general term (*galat-gal/galaju-gaal*) ("*gal/gaal*" meaning boat)

Boat names

- **Gal, gaal:** Boat (Wolof)
- **Fana fana:** Boat (Wolof) (uncommon)

- **Gal-wolof/gaal i olof**: Wolof boat (Wolof)
- **Gal gundao:** Small boat (Wolof)
- **Gal bumak:** Large boat (Wolof)
- **Gal u mbul:** Nailed boat (Wolof) ("*mbul*" uncertain meaning)
- **Gal u lic:** Leaky boat (Wolof) ("*lic*" meaning leak)
- **Suk:** Boat (Serer)
- **Waaru/waaruuji/la-na**: Boat (Fulbe)
- **Juwaane:** Boat (Mandinka)
- **Kulungo/kulun-ngo:** Larger boats and ships (Mandinka)
- **Basafaani Kulung:** Literally means "sail-boat", referred to groundnut cutters or cutters (Mandinka) ("*basafaani*" meaning sail)
- Esanai/esanayee: Boat (Jola)

<u>Serer names for boat types</u>

- **Isik Sibong:** Shell-based plank-built boat with projecting cutwater at bow and stern with only one level of strakes
- **Immanding:** Shell-based plank-built boat with projecting cutwater at bow and stern with two levels of strakes
- **Illebou:** Boat with a projecting cutwater at the bow and an outboard engine at the stern
- **Ngueth:** Cutter type boat
- **Mbandory:** Cutter type boat with extra wide beam, used for transport

4.16 *Talismans*

Talismans (Figure 4.16.1, Figure 4.16.2) related to boats were recorded by studies generally came in four types. Ones attached to the front of the boat on the bow wire, ones under the caulking fabric covers, ones attached to sinkers on nets or attached in small bags to the top of nets, and ones worn by the fishers themselves. They appeared to have been mostly used for protection and to give luck fishing.

Common kinds included sheep or goat horns, which could contain other materials, and papers with writings on them called “waindare”. They were often Islamic religious text or drawings. Various parts of plants, animals, people, or minerals could also be used. The materials were often put in small sinched bags or stoppered bottles. Some like the papers could be soaked in other substances. Sometimes liquid the was used to wash a paper was the talisman. They often appeared wrapped in iron wire. Three to six mounted at the boat of the boat appeared to have been the common amount. They were commonly made by marabouts. They came in a large variety and likely changed a great deal over time and varied by place. Almost all the study on Senegambian boat talismans appeared to have been focused on the Cape Verde Peninsula (Leca and Labouret 1935:63, 104; Balandier and Holas 1946; Holas 1948; Balandier and Mercier 1952:108–128, 160, Plate 23; Coulon 1973:30; Gueye 1977:26).

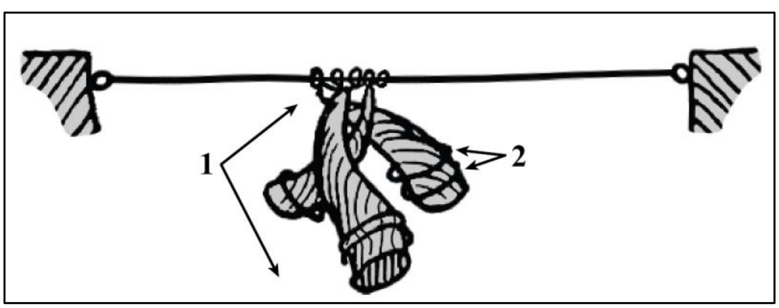


Figure 4.16.1: Talisman at the bow of a boat	Not to scale, adapted from (Holas 1948:22)
1: Sheep or goat horns, 2: Iron wire	

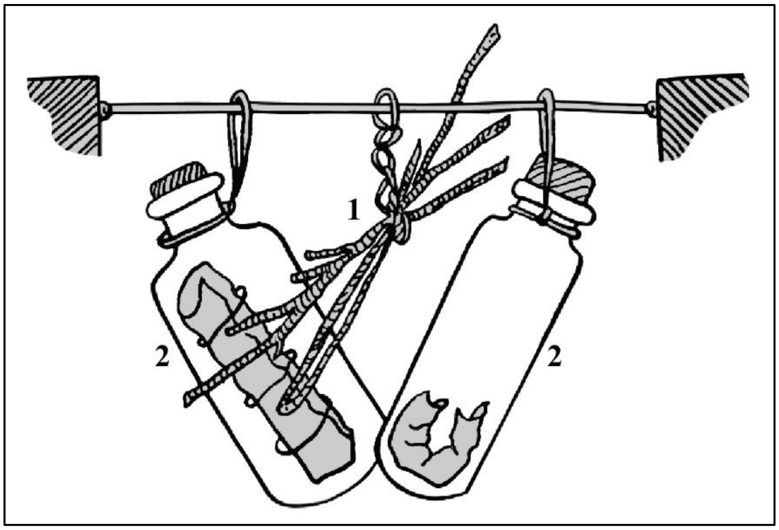


Figure 4.16.2: Talisman at the bow of a boat	Not to scale, adapted from (Holas 1948:22)
1: Roots, 2: bottles with "*waindare*" that had been soaked in a yellow liquid inside	

4.17 *Ornaments*

Carved ornamentation (Photograph 4.17.1, Photograph 4.17.2, Photograph 4.17.3, Photograph 4.17.4) was common on boats in the Gambia and around the Sine-Saloum Delta during the late nineteenth and early twentieth century. They often incorporated religious symbolism but their only function was as aesthetic augments to watercraft (Coulon 1973:30). Larger centrally placed ones were called n'deep (plural: teep), while smaller n'deet (plural: teed) were often mounted to either side of the n'deep, and on the mast. The word n'deet means bird in Serer and these carvings often took the shape of birds. There was no restriction on how many of each could be used. These appeared to have no particular fixed size or shape other than being typically long and narrow or roughly rectangular (Coulon 1973:28). Only two observers in the nineteenth century noted their use in the Gambia, one in 1862 and another in 1877. Both characterized them as idols but this should not be taken as a reliable claim (Ellis 1883:2; Hewett 1969:64). The only other mention of prow ornaments in Senegambia came from the Senegal

River. They were described as having “high ornamented prows resembled, at first sight, Venetian gondolas on festive occasions” and “the first boat, occupied by the bride, was covered with a bower of green branches, and decked with flags of different colors at the stem and stern.” (Mitchinson 1881:208–209). The ornaments only being attested on rivers may be related to the roughness of the coast which would make them prone to damage if used in those areas.

They were recorded as being used to fully deck out a boat during the maiden voyage as it was paddled. Thereafter it was typical to only fully display all the boats large carving when the owner wanted to show off, particularly during long stays in foreign ports. (Coulon 1973:28). It was unknown what the practice was in earlier centuries.

Modern boats around Senegambia could often be seen with elaborate permanent carvings on the prow but they were of distinctly different form and function to older styles serving as part aesthetic and part functional as they shield the area behind them from spray. These were known as “chone” in Wolof the same word use for the projecting cutwaters (Miles 2021). Some large later cutter-type boats also used a carved bowsprit to which a forestay was attached but these have not been seen on older boats (Mallinson 1966; Coulon 1973:27, 31).

Two kinds of wood were cited specifically for use to make the special carvings that decorated Serer boats. These were, red kapok, and *terminalia superba*, a higher quality wood that was preferred for its colors (Coulon 1973:28). Typical carvings on modern boats use mahogany or kapok. One observer in the 1850s claimed they were carved from mahogany (Hewett 1969:64).

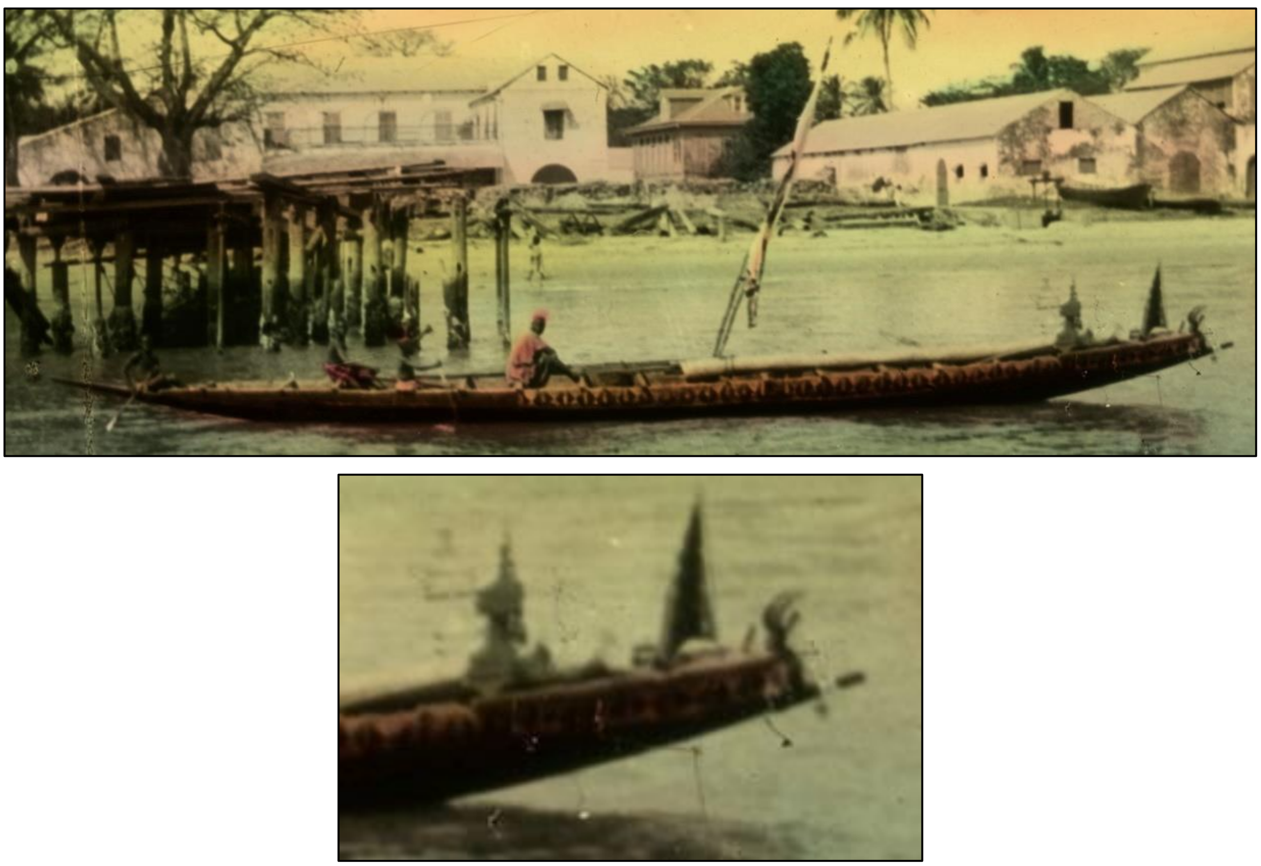
Some ornaments had pieces of cloth tied to them that acted as a tell-tale for determining wind direction (Coulon 1973:28). Sometimes this cloth appeared to have been tied to the mast or mounted on the bow instead for the same purpose. These may have often also had an aesthetic function.

Also common on Gambian boats were a set of horns on the bow. These were of unknown source or meaning but it was possible they were a type of talisman or decoration. They may also be related to the use of ox horns as symbols of royal power used by the kingdom of Saloum as well as generally in Senegambia (Raffenel 1846:129; Hecquard 1853:159). If this was the case it would suggest the boat with horns on the bow were owned by a king.

Ornaments were known to be in the collections of the Quai Branly Museum in Parise, France, and on display at the Musée de la mer in Goree, Senegal.

Photograph 4.17.1: Boat ornaments from the Sine-Saloum Delta	From (Poujade 1930; Poujade 1949a; Poujade 1949b; Poujade 1949c; Poujade 1949d)

Photograph 4.17.2: Bow ornaments, horns, and tell tales on a Gambian boat	Cropped, from (Sowle 1899b)



Photograph 4.17.3: Bow ornaments and horns on a Gambian boat	Cropped, from (Sowle 1899c)

Photograph 4.17.4: Ornaments on bow and masts, tell tales, and horns on a Gambian boat	Cropped from (Sowle 1899a)

4.18 *Rope*

4.18.1 Rope materials

A notable element of construction for many Senegambian watercraft until the mid-twentieth century were the twisted fiber cords used as lashings to fasten strakes together. The source of this material was often described as being derived from local tree bark fibers (Chauveau 1988e:25, 27). Possibilities for this tree included *adansonia digitat*a, *grewia bicolor*, *piliostigma reticulatum*, *raphia sudanica*, and *saba senegalensi* (Gamble 1987b:11, 97; Gamble 2005:41; Gamble 1993:6). Some also describe palm leaf fiber cord but in such a way that it was unclear if they were discussing caulking material. Only one source from the Senegal River seemed clear on its use (Ritchie 1967:85). Coconut husks imported from Guinea and converted into cord were known to have been used among the modern Serer (Bousso 1994:11, 29). Although the trees also grow in Senegambia. Other sources of fiber such as locally grown cotton (*gossypium herbaceum*), locally grown hemps (*sansevieria senegambica* and *hibiscus cannabinus*), and raffia palm leaves (Adanson 1759:202–203; Durand 1806:167; Lasnet et al. 1900:229–230). Imported cords, and synthetic materials were likely used at various points for cord. Only raffia was directly attested for use in pulling boats (Rançon 1894:237). Cords make from these materials would have also been used for rigging, sail edge reinforcement, anchor and mooring lines, and other parts (Balandier and Mercier 1952:156). The process of manufacturing cords by hand was described in Leca and Labouret (1935:61–63). The earliest definite recorded use of sewn construction came from 1685 on the Senegal River and the coast at the mount of the river (la Courbe and Cultru 1913:18, 131–132). However, it may have existed by 1594 in the Gambia but the method of attachment was not described (de Almada 1984:56).

4.18.2 Rope manufacture

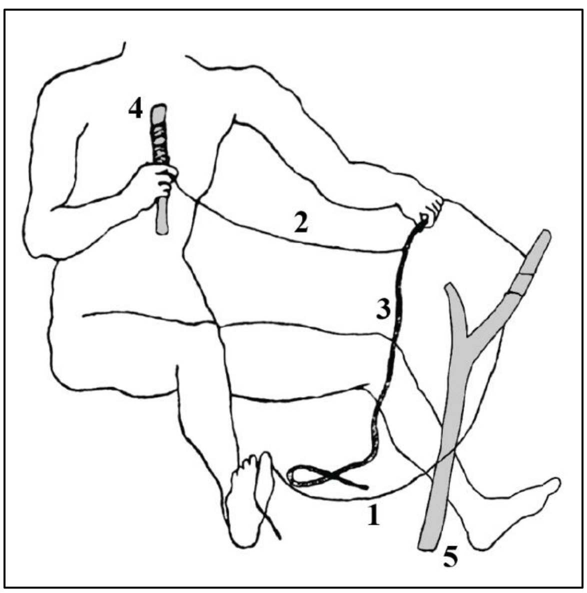
One study recorded the method of cord making used by the fishers of the Senegal River Coast (Figure 4.18.1). A basic single strand of cord was made in the common thigh roll method. This was done taking the fiber and rolling it on the anterior thigh, the area of leg just above the knee. The palm of the right hand was used to roll the fiber while the left hand held horizontal and kept it stretched. After the two strands were rolled the left-hand let go and the core formed. Cords of up to two strands would be created this way usually starting from existing single cords. To create a larger cord another process was used. The person sits on the ground with legs spread apart with a Y-shaped wooden stick, called a “diun”, in front of them stuck in the ground between their legs with the forked ends pointed up. This stick was fifty centimeters in height and three to five centimeters thick. The fork occurred at twenty-five centimeters up the stick and the two forks spread around twenty-five centimeters apart.

A two-stranded cord was held in the left hand and looped twice around the right fork of the stick. The cord to be combined with it had the excess strung between the big toe and the second toe of the right foot from the top of the foot. The toes kept tension on the one line to stop it from slipping. The right hand held a wooden spool, called a “solom”, around thirty centimeters wrapped with the third strand of cord. This cord was run between the index and middle fingers. The two cords were already begun being twisted together in front of the person. To twist the cords together the left-hand rolled the cord being held clockwise. The right hand could feed more cord from the spool and the left hand could pull more cord from the stick. (Leca and Labouret 1935:61–63).

The two-strand cable was referred to as “raw” and the cable to be combined with it was called “rot” in Wolof. It was recorded as half a centimeter thick and appeared to have been a single strand of cord. The larger cable created by combining the two was called “danu”. The term “raw-kat” referred to the person creating the cord.

Both techniques were tested by and found to be effective although the improvised setup and lack of familiarity with the movements made the process slow. The most difficult part was the rotation of the cord clockwise as the precise movements used were unclear and I was unpracticed at it. Wetting the cord was used to make it easier to roll. The experimental archaeology also allowed for a proper understanding of the process and clarified unclear parts of the method.

The study reported that an average anchor cable took two days to complete for a fisher. Due to only having time in the afternoon after fishing and during bad weather when fishing could not take place it could take make the process last five or six days. This was also dependent on personal skill as cord was made by the fishers themselves. Not all fishers knew how to make cord and so had to exchange for them (Leca and Labouret 1935:61–63).



<table>
<tr><td>Figure 4.18.1: Setup for rope making</td><td>Not to scale, adapted from (Leca and Labouret 1935:62)</td></tr>
<tr><td colspan="2">1. Two stranded cord (raw), 2. One stranded cord (rot), 3. Combined cord (danu), 4. Spindle (solom), 5. Forked stick (diun)</td></tr>
</table>

Photograph 4.18.1: Rope of European origin used on a Senegambian boat	From (Quai Branly Museum 1931b)
Attached to the rear projecting cutwater, likely strung between spur and stern cover, inaccurately called "kos" which was the ring on the stern projecting cutwater the rigging ran through.	

4.18.3 Vocabulary

- **Two stranded cord:** (*raw*)
- **One stranded cord:** (*rot*)
- **Combined cord**: (*danu*)
- **Spool:** Wooden cylinder used to wrap cord around (*solom*)
- **Forked stick:** (*diun*)

4.18.4 Anchors, anchor lines, and ballast

Stone appeared to have been used for many anchors in the past. In the twentieth-century, anchors were made from heavy scrap metal or bundles of rocks in a net before the rebar anchor replaced them (Corre 1883:9; Gruvel 1908:77; Balandier and Mercier 1952:157; Gamble

2005:57). Ballast, such as rocks, sandbags, and scrap iron were sometimes used in the past as well (Leca and Labouret 1935:63; Bousso 1994:30). The ballast bags were recorded to total from one hundred up to two hundred kilograms in some cases (Leca and Labouret 1935:63). The use of stone anchors dated back to at least 1808 (Gamble 2005:57).

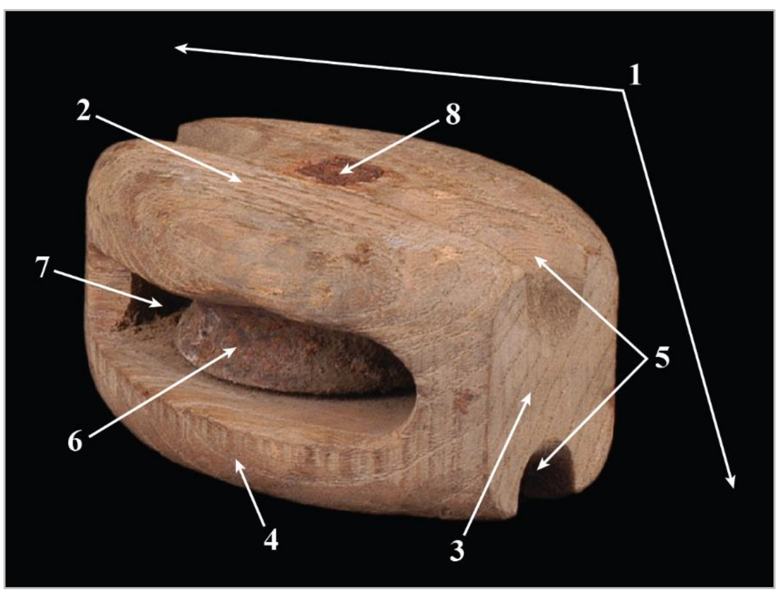
One measured in a 1935 study (Figure 4.18.2) was fifty centimeters long with a diameter of twenty centimeters made of random debris wrapped in wire. In that case, it included pieces of metal, iron and cast iron, and broken ceramics. A half-circle of wire formed an attachment point to which the hawser was tied. The boat observed used a single block pully attached to the shroud thwart. The pulley recorded was fifteen centimeters long, eleven centimeters wide, and seven centimeters thick. It was attached to the wire "u bop" at the bow of the boat (Leca and Labouret 1935:54, 61, 63).

A surviving example of a pully used on a boat from the Cape Verde Peninsula (Photograph 4.18.2) was eight point three centimeters long, six centimeters wide, four-point-three centimeters thick, and one hundred and seventy-seven grams. It was a single block constructed of a solid wooden shell with four scores, a single metal sheave, and a metal pin. The pulley was listed as European in origin. It was described as attached directly forward of the mast (Quai Branly Museum 1931d) Pullies were not used in the rigging of boats (Postel 1950a:124).

4.18.5 Vocabulary

- **Block:** Pulley used to haul ropes (*puli/poli*)
- **Shell:** Whole housing of the pulley
- **Cheek:** Side face of the pulley housing
- **Crown/Tail:** top and bottom of pulley housing

- **Face:** Front of pulley housing which had the sheave exposed
- **Scores:** Cutouts on the cheeks of the pulley that strop rope wraps around
- **Sheave:** Rotating wheel inside the shell that rope wraps around
- **Swallow/Breech:** space between the sheave and the inside of the Crown/Tail
- **Pin:** Holds the sheave inside the shell
- **Hawser:** Rope attached to anchor (*dile danu*)
- **Strop:** Rope that wraps around the shell and scores and holds the pulley to something, also has a more general meaning as a rope ring
- **Anchor:** Weight tied to a rope and resting on the bottom that holds a boat in place ("*tambal*" stone used as an anchor) ("*lankar*" in the Gambia, unknown language) ("*ser*" to anchor)



Photograph 4.18.2: Isometric view, Anchor block	From (Quai Branly Museum 1931d)
1: Shell, 2: Cheek, 3: Crown/Tail, 4: Face, 5: Scores, 6: Sheave, 7: Swallow/Breech, 8: Pin	

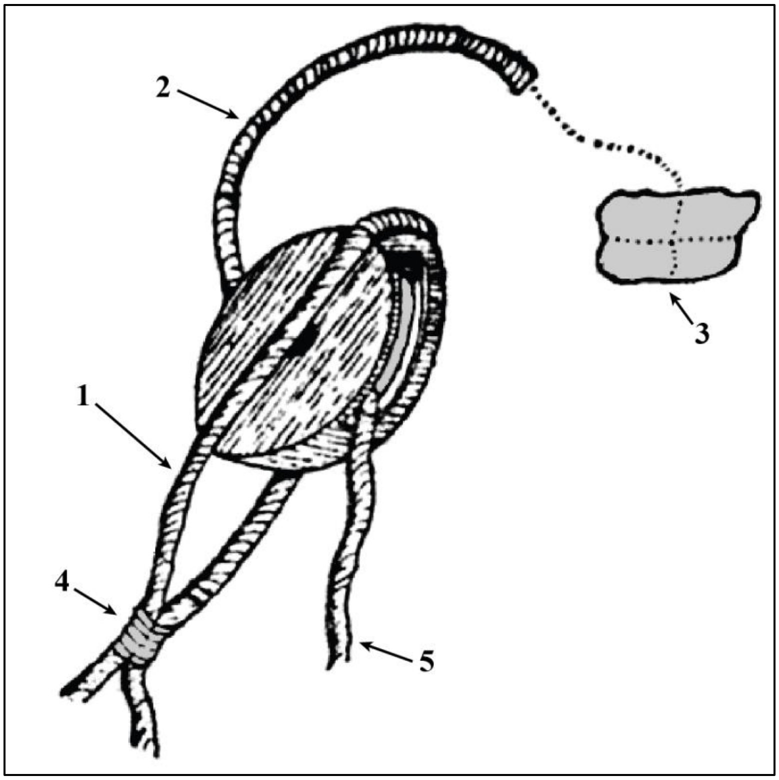


Figure 4.18.2: Anchor block and lines, Isometric view	Not to scale, adapted from (Leca and Labouret 1935:61)
1: Strop, 2: Hawser, 3: Anchor, 4: Seize, 5: Extra Hawser	

4.19 *Paddles*

4.19.1 Paddles and paddle making

There were two basic ways to make a paddle, carving one from a solid piece of wood, or attaching two pieces of wood together. The two-part paddles were attested twice in the Gambia and once on the Saint Louis coast all at different times and was likely always in use to some extent. What appeared to be one of these paddles could be seen at the National Museum of the Gambia. Three different paddles were held by the Quai Branly Museum, and each was of a different type (Quai Branly Museum 1931e; Quai Branly Museum 1931f; Labouret 1933b). Another was held by the Museum Volkenkunde and was a single-piece paddle (Museum Volkenkunde Unknown). Wolof terms for tools and paddles included.

The preferred wood for paddle appeared to have been *pterocarpus erinaceus* commonly known as African rosewood (Leca and Labouret 1935:60; Balandier and Mercier 1952:159; Quai Branly Museum 1931f; Gueye 1977:28). Paddles made of this wood were described as floating if dropped in the water (Gueye 1977:28). Another source also reiterated paddles as being buoyant (Gruvel 1908:78). One surviving steering oar from the Senegal River was listed as oak supposedly from "sen" in Wolof but this was very likely confusion with between Rosewood which was called "ven" particularly as the paddle appeared identical in color to known rosewood paddles (Quai Branly Museum 1931e).

A 1935 study described the paddles as being bought roughly carved from Lawbe woodworkers in the Casamance. These were then finished by the fishers using a small adze and knife which took around two hours (Leca and Labouret 1935:60). All paddles observed were likely originally carved from rough flat-sawn planks and had grains running parallel to the length of the paddle by necessity. Paddles with separate shafts may have had the shaft carved from a straight branch. They could also be assembled by lashing a blade and shaft together by overlapping them and tying them with cord (Adanson 1759:95; Rançon 1894:238; Labouret 1933b). One such paddle appeared to be on display at the Gambian National Museum. Another observed method was to join two pieces of blade with a rectangular piece of wood inserted into a cutout and nailed (Quai Branly Museum 1931e). Paddles were sometimes painted (Gueye 1977:27; Museum Volkenkunde Unknown). Paddles could be repaired by drilling holes on either side of the crack and wrapping the split area with wire through the holes (Balandier and Mercier 1952:157).

Two types of paddles were used in Senegambia, the Wolof terms being for steering oars "watu-lahu/dyeir/jayir" and normal paddles "watu-dyou/dyu/jowu-tog" (Leca and Labouret

1935:57–58; Balandier and Mercier 1952:157; Gueye 1977:28). “Dyow, jow, diove, dioe, joow” were all terms meaning paddle (Gamble 2005:57). “Jaa” was the Mandinka word. “Wat/watt” referring to a paddle or oar, the -tu on “watu” being the reflexive version (Gamble 1992:5, 56). “Tog/toog” referring to sitting (Gamble 1992). The steering oar (Figure 4.19.1) appeared to have varied between a long, thin, and straight blade “pel” with gradually tapering shoulders a pointed tip, to a kite shape with the short side the point and the long side the shoulders. The almost cylindrical shaft “gul” was close in length to the blade (Leca and Labouret 1935:57–58). The Steering oars were highly variable in length from around one meter seventy-five centimeters to four and a half meters. This was likely scaled with the size of the boat. The shaft and blade were often near the same length (Quai Branly Museum 1931e; Leca and Labouret 1935:57–58; Balandier and Mercier 1952:157). The blade thickness from one study was one-and-a-half centimeters (Leca and Labouret 1935:57–58). The shaft could be extended by lashing on another shaft with cord (Leca and Labouret 1935:58).

The standard paddles came in two types, wide-bladed and narrow-bladed (Figure 4.19.1). The narrow-bladed paddles were close in appearance to the steering oar, straight blades, and kite blades, but had a longer shaft relative to the blade on the examples that could be seen in pictures. The wide paddles were leaf bladed with a tapering pointed tip and a more rounded shoulder. These paddles were typically between one meter and one-and-a-half meters, but some may have been shorter. The blades were variable but typically between fifteen to twenty centimeters wide and thirty to fifty centimeters long with a known blade being point four centimeters thick (Quai Branly Museum 1931f; Postel 1950a:124; Balandier and Mercier 1952:157; Gueye 1977:28; Museum Volkenkunde Unknown). Individual studies and artifacts measurements and details of paddles were included in appendix 1.

In general, the difference in performance between wide-bladed and narrow-bladed paddles would be that wide-bladed paddles would generate more power per stroke than narrow-bladed paddles but take more energy to use per stroke. This would make wide-bladed paddles better for short bursts of speed and narrow-bladed paddles better for use over a longer period of time as the paddler does not tire as fast. It was unclear if this was enough of a difference to matter to Senegambian sailors or offset other considerations. It was notable that no paddles observed seemed to have a grip at the top due to how they were held.

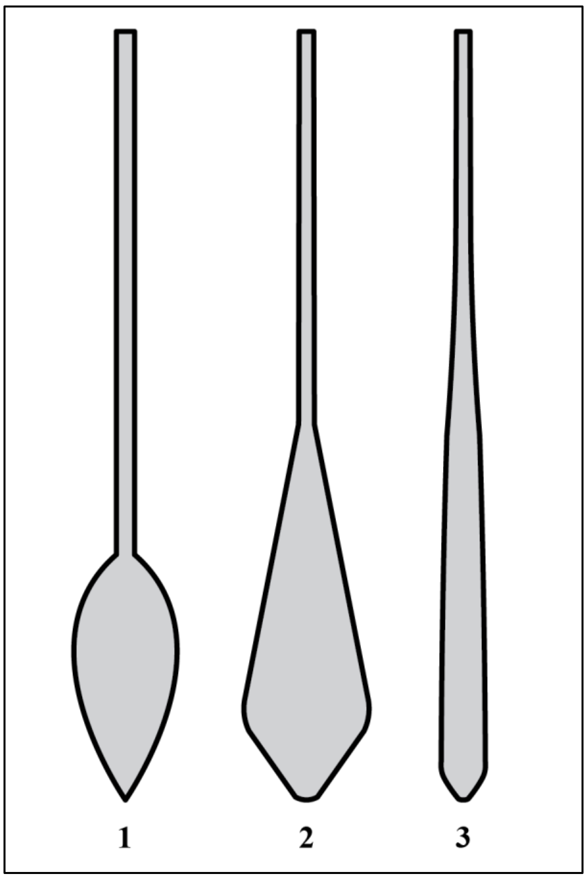


Figure 4.19.1: Paddle reference diagram	Own work, not to scale, from photographs and studies
1: Leaf bladed, 2: Kite bladed, 3: Narrow bladed	

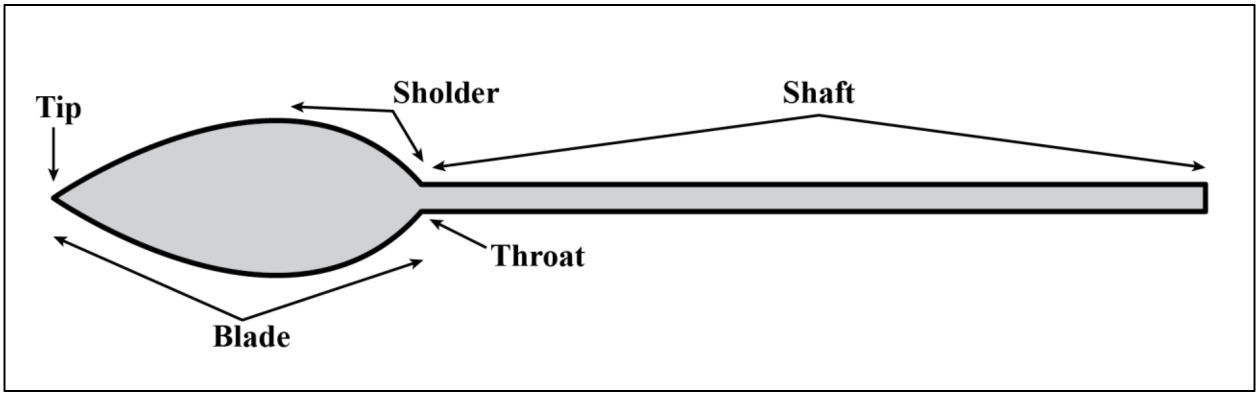
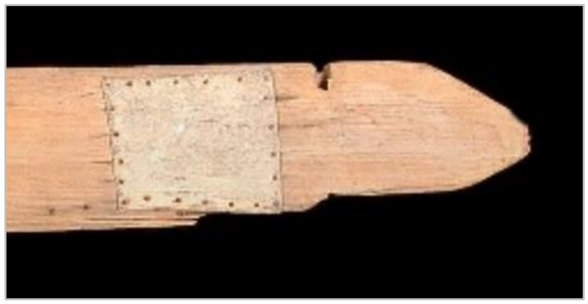


Figure 4.19.2: Paddle reference diagram	Own work, adapted from photograph

4.19.2 Paddle Weights

It appeared that some steering oars were weighted. in one case with a square of lead was tacked onto the bottom of a steering oars blade (Photograph 4.19.2). A paddle in the Gambian National Museum may have had iron wrapped around the tip of the blade for this purpose although the details of the artifacts were not known.

Photograph 4.19.1: Steering oar that appeared to have had a lead square attached to it, Senegal River	Cropped, from (Edmond 1909)



Photograph 4.19.2: Lead plate attached to a steering oar from the Cape Verde Peninsula	Cropped, from (Quai Branly Museum 1931e)

4.19.3 Vocabulary

- **Steering oar:** Paddle used to steer from back of boat (*watu-lahu/dyeir/jayir*)
- **Paddle:** General paddle used to move boat (*watu-dyou/dyu/jowu-tog*) ("*wat/watt*" referring to a paddle or oar, the -*tu* on "*watu*" being the reflexive version) ("*tog/toog*" referring to sitting)
- **Other:** Unknown specific type of paddle (*dyow, jow, diove, dioe, joow*) (Mandinka: *jaa*)

CHAPTER 5: OPERATION AND USE

5.1 *Sail operation*

5.1.1 Crew

The crew of coastal fishing boats appeared to have been comprised of all men and could vary greatly in size.

5.1.2 Vocabulary

- Coxswain: Steers the boat, usually also the owner and captain (*moolu geen*)
- Captain: Commands the boat
- First mate: Second in command (*moolu bay mar*)
- Crew: General term for workers on a boat

5.1.3 Sailing description

One 1875 source described the way boats were sailed near the Cape Verde Peninsula heavily angled on their sides and prevented from capsizing the careful balance achieved by the positioning and movement of the pilot's body who could straighten the boat (Anonymous 1875:126). An earlier source from 1682-1683 around the Petite Côte recounts how the boats there with a failure to counterweight properly by the positioning of crew could capsize (Thilmans 1976:25). A 1785-1788 source around the Cape Verde Peninsula described them as sailing well when close to the wind (de Villeneuve 1814a:61). Given the size and shape of the boats and their stability properties balance would be key to sailing them.

5.1.4 Stepping the mast

Two people were required to step the mast but three was easier as the third would keep the boat orientated properly so that the wind did not interfere with the operation. The sail was set up by first unrolling the sail which was always kept attached to the mast with lacing and stepping it to the mast step along. The shrouds having been previously attached to the mast hanging loose until the last step. The clew sheet being permanently attached to the sail was passed through the sheet ring to hold it. The spirit loop was attached to the sprit and the peak sheet attached after it then the sprit was put in place with the sprit lashing and snotter. Presumably, the peak sheet was put through the sheet ring as well at this point. After the boom was put in place with the boom snotter the clew sheet was attached to it. The shrouds were only attached to the boat after the other steps were complete (Balandier and Mercier 1952:160).

5.1.5 Rigging

The rigging of a "wantareer" capable spritsail on a Senegambian boat was more complex than a normal spritsail. Fixed masts however appeared to have had a much simpler standard spritsail setup.

To move the spritsail the operation was very simple and noted as such (Gruvel 1908:75). One must simply pull on the sheets that flow from the peak and clew of the sail to the ring on the stern projecting cutwater and forward into the boat. The lines could then be tied off to a thwart or held. The sail could seemingly be operated from wither the stern, amidships, or the bow of the boat (Leca and Labouret 1935:157; Postel 1950a:124; Balandier and Mercier 1952:160).

5.1.6 Spritsail

A spritsail not intended to be set in the "wantareer" position could remove the boom entirely and use a snotter called a "brigatin/birgatin/balanti" alone to attach to sprit to the mast. The sail was attached to the mast and yard than had two sheets run to the ring on the stern projecting cutwater to the operator, or around a thwart. The mast was set through a mast thwart with a hole in it and possibly into a mast step. A tied thwart setup would also work. A boom could be used and was attached to the mast with a lashing called a "tehu gundao" positioned below the sprit attachment.

The spritsail was easy to operate however size of the spritsail was very large in comparison to the size of the boat. Due to this, in strong wind the spritsail generated a great deal of heeling, meaning tipping to the side, which needed to be countered by the crew moving to the windward side of the boat and sitting on the gunwale. The arrangement of the sail disallowed it from reefing, meaning reducing the sail while in use which would reduce this. To reduce sail either before going out or on the way the crew rolled the foot of the sail up and tied the ends to the sprit and the peak sheet. The sheets that controlled the sail were either held by the coxswain who stood behind the rear thwart at the stern of the boat or one of the crew. They were able to be quickly held firm or given slack as needed with the wind (Gruvel 1908:74–75).

Although the sails were large and set fore-and-aft and so were mostly on one side of the boat the boats were prevented from capsizing by easily luffing when hit by a wind that may otherwise overturn them. Luffing being the boat or sail turns up into the wind enough that it took some or all of the power from the sail. A shroud when not in use holding a "wantareer" sail in place could be held onto by a crew member leaning off the side of the boat as a counterweight (Postel 1950a:124).

5.1.7 Vocabulary

Bordas: Spritsail maneuver where the mast was canted all the way over

Larga: Spritsail maneuver where the mast was canted and held by a crew member sitting on the side of the boat by the shroud, the first mate held

Wantareer: Mast canted and sail set in a rhombus configurated in the center of the boat, operated by first made

Laafu njugup: Mast canted and sail set in a triangular configuration in the center of the boat (meaning bat wing)

Photograph 5.1.1: Fishing boat under sail	From (Labitte 1953)

5.1.8 Bordas/borde

The close haul, "bordas/borde" (Figure 5.1.1), maneuver was a very difficult maneuver used by experienced crews when the wind was unfavorable. It consisted of canting the mast all the way to the side of the boat. A detailed description of the of the "bordas/borde" maneuver was given by a 1935 study, it was also described in a 1977 study. In the 1935 example, a crew of three was used to simplify the description. Sailor one started on the bow thwart with facing aft, sailor two on the amidships thwart and the coxswain on the stern thwart (Leca and Labouret 1935:79–80; Gueye 1977:31–32).

Both the crew members moved to be on either side of the shroud thwart after the spars and shrouds were detached. Crewmember two lifted and held the mast up while crewmember one secured the lashing to the mast thwart and secured the forestay in the new canted position to windward. The coxswain attached the sprit and boom to windward but angled across the boat. Crewmember unfurled the sail and handed the sheets to the coxswain who strung them through the sheet ring and held it with their foot. Crew member two secured the sail to the sprit first and then the boom when the coxswain gave the command "pus". The coxswain then started steering as the sail catches the wind to properly orientate the boat. Crew member two then secured the shrouds and with the help of crewmember one lifted and secured the ballast bag to the windward side of the boat. Both then take their positions as the boat could experience significant motion at this point. Crew members one and two at this point often sat on the windward side of the boat on top of the strake and clung to the shroud to help counterbalance the boat. The coxswain steered and managed the sheets, letting go of them if necessary to take the wind out of the sails (Leca and Labouret 1935:79–80).

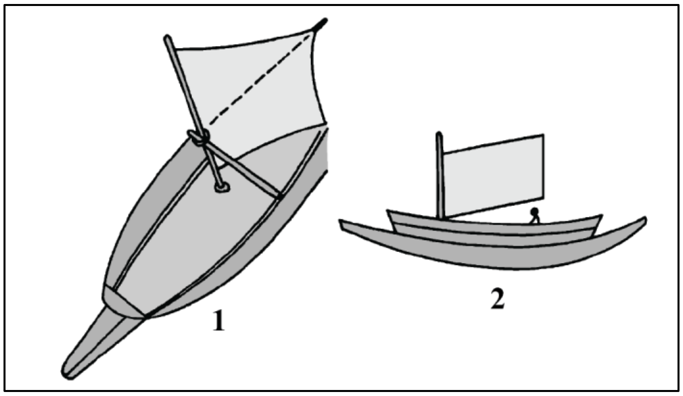


Figure 5.1.1: Bordas sail	Not to scale, adapted from (Gueye 1977:32)
1: Isometric view, 2: Profile View	

5.1.9 Larga

The "Larga" (Figure 5.1.2) maneuver was a maneuver where the mast was canted and held by a strong and brave crew member sitting on the side of the boat by the shroud, the first mate holds. It was used when a good wind was coming from the starboard side (Gueye 1977:31–32).

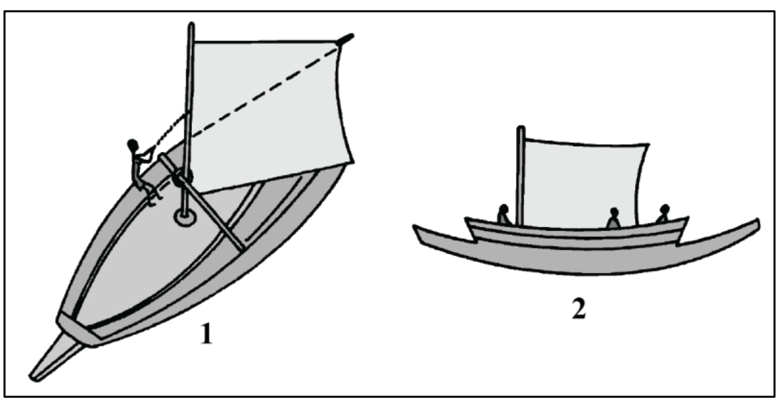


Figure 5.1.2: Larga sail	Not to scale, adapted from (Gueye 1977:32)
1: Isometric view, 2: Profile View	

5.1.10 Wantareer

The characteristic sail setup of Senegambian coastal boats was the “wantareer”, likely meaning wanderer, sail (Figure 5.1.3). It consisted of canting the mast and positioning the sprit at the former position of the mast and the boom at opposite side of the boat to the mast forming a rhombus-shaped sail that allowed the boat to run with the wind. The sheets of this setup were handled by the first mate. A variant of this, the batwing "Laafu njugup" (Figure 5.1.4), setup which removed the sprit and reduced the sail to a triangular shape with the pointed end down. I was for use when the wind was too strong (Gueye 1977:29–30).

Sails capable of this needed a variety of extra lines. The characteristic look of a “wantareer” capable sail was the presence of a line connecting the mast to the sprit above the snotter. They were always lashed with a knot called the “islrob u bo” to a cylindrical thwart in front of them called a “le/ba u kao/ba u tak/ ba u kaw”. A shroud called a “derik bur difi” held the mast to a bench positioned behind it. They were always used with a boom. The mast step likely had angled sides to allow for the canting of the mast.

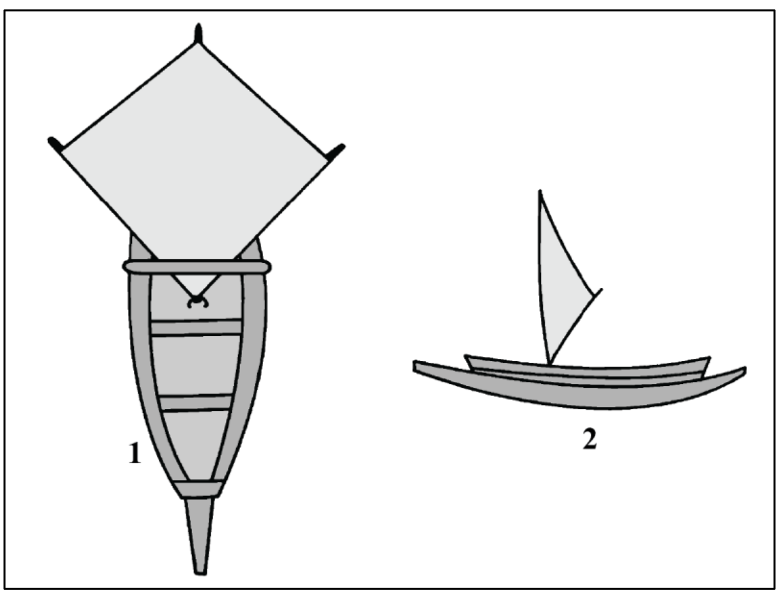


Figure 5.1.3: “Wantareer” sail	Not to scale, adapted from (Gueye 1977:30)
1: Plan view, 2: Profile View	

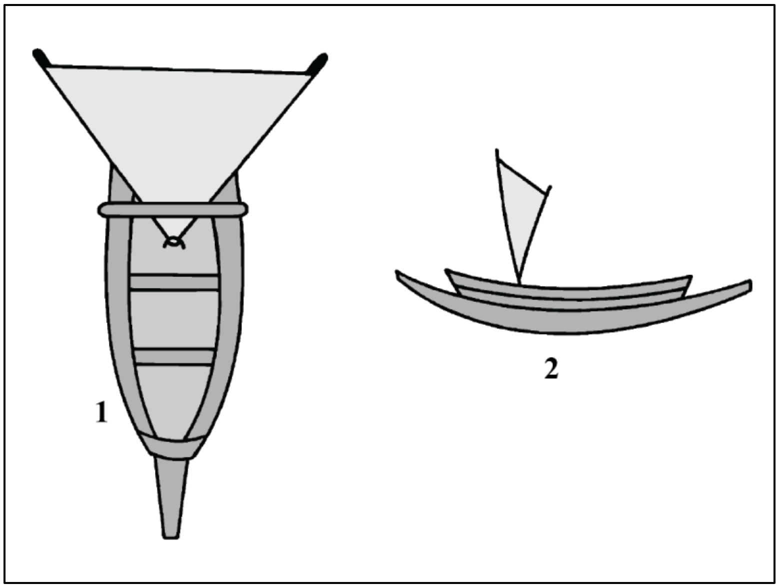
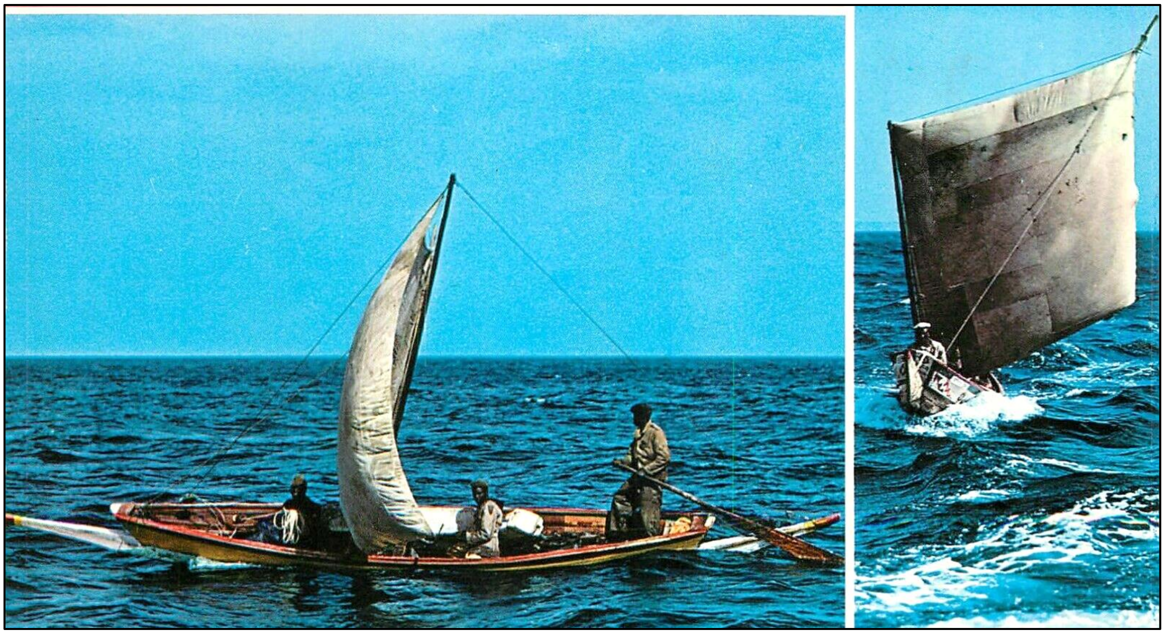
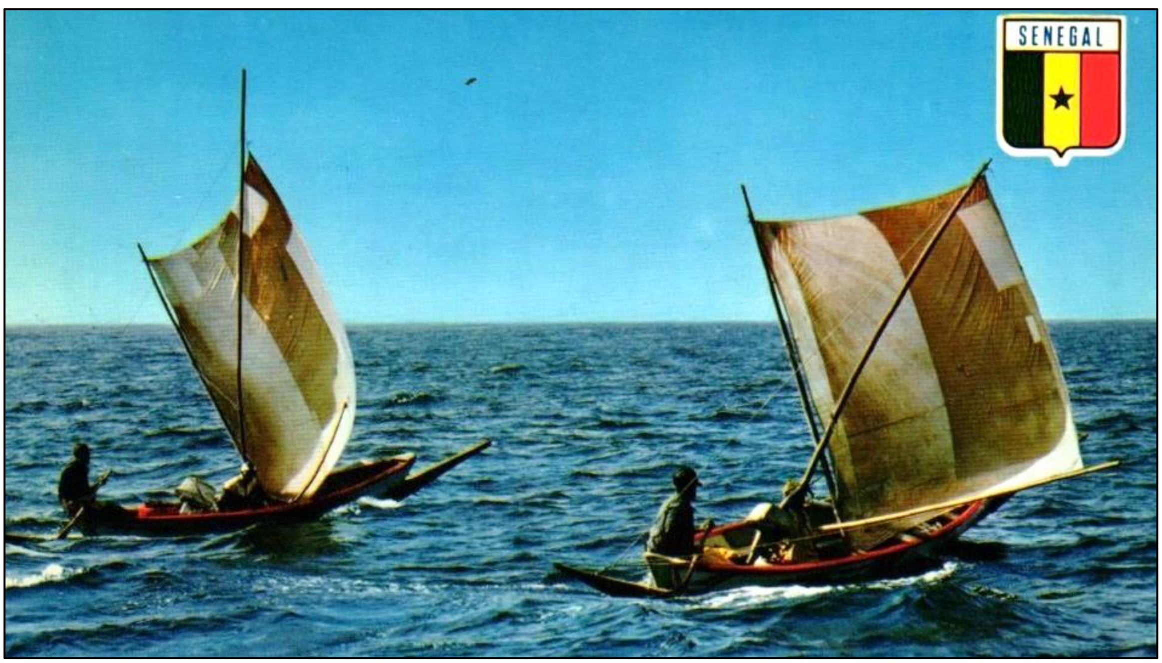


Figure 5.1.4: “Laafu njugup” batwing sail	Not to scale, adapted from (Gueye 1977:30)
1: Plan view, 2: Profile View	

Photograph 5.1.2: Boat with “wantareer” sail, Cape Verde Peninsula	Cropped, from (Edmond 1913b)



Photograph 5.1.3: Boats under sail	From (Anonymous Unknown)



Photograph 5.1.4: Fishing boats under sail	From (A. D. P. Unknown)

Photograph 5.1.5: Fishing boat under sail	From (A. D. P. Unknown)

5.2 *The Bar, moving, capsizing, and bailing*

5.2.1 Beaching and launching

Boats appeared to mostly have operated off landing places where they were hauled on and off the beach by hand and did not require wharf infrastructure. They were described as being launched off of the beach directly and hauled back up on the beach upon returning (Adanson 1759:95). As Senegambia lacked wharves in many areas and boats were designed to be hauled on shore limited landing place availability heavily affected what areas on rivers boats could operate easily. This was noted as one of the reasons for the lack of boats in some regions of the upper Gambia (de Almada 1984:56–57). A 1681 source contained multiple illustrations (Illustration 3.2.18, Illustration 3.2.19) of coastal settlements showing watercraft pulled up on the beach. A 1785-1788 illustration (Illustration 3.2.29) of Saly on the Petite Côte shows in addition to beached boats, a boat that appeared to be moored in the water by means of being tied to a long stick embedded in the ground in the same way to later boats were known to have been moored. These sticks were shown clearly in a later photograph, probably deeply embedded in the ground, were quite tall. This was likely to make sure the hawser tied around the stick could not detach due to the rising and falling of the tide. The hawser was likely tied to the thwart of the moored boat (Sowle 1899a). Mooring would likely have only been done along rivers and in sheltered areas along the coast (Postel 1950a:122). A boat near Saint Louis on a river landing stage around 1840-1856 was depicted on two small rollers (Gillotin 1840). An 1880s source quoting another earlier source described boats on the Senegal River coast as being rolled, likely on logs as was still done today, to the water where it "enter the sea by successive jolts" (Frey 1890:6). Two illustrations (Illustration 3.2.12, Illustration 3.2.13) from 1891 depicted boats on the beach and being launched. Some appeared to be sitting on two log rollers. The largest boat which appeared around thirty feet was being hauled out by five people. One source noted boats turned upside down (Mitchinson 1881:389). An upside down small logboat was also shown in an illustration (Illustration 3.2.32). This would be a difficult thing to do with large boats and largely unnecessary in the dry season when it does not rain. Numerous other illustrations (Illustration 3.2.4, Illustration 3.2.5, Illustration 3.2.7, Illustration 3.2.12, Illustration 3.2.13, Illustration 3.2.14, Illustration 3.2.18, Illustration 3.2.19, Illustration 3.2.20, Illustration 3.2.29, Illustration 3.2.30, Illustration 3.2.31, Illustration 3.2.32) showed beached boats of all kinds as well but did not depict boats docked at wharves. This was consistent with later photographs and modern practices as well. A later study gave a size of one meter long and thirty centimeters in diameter for the logs that were used as rollers called "togor" and noted they were rot-resistant woods. The boats could also be stored on the rollers to keep them from sitting on the ground as well as keep sand from piling up on them (Leca and Labouret 1935:81). Three to four people were required for a smaller boat and more than fifteen for the largest modern boats still able to be moved without rope (Leca and Labouret 1935:52; Balandier and Mercier 1952:160; Lleres 1986:165). A 1952 noted that larger crews that operated nearer to shore of eight to ten performed the launching themselves whereas more distant operating crew of two or three had help launching by others at the back of the boat (Balandier and Mercier 1952:161). The very largest modern boats were only able to be moved with ropes tied to the end and large crews pulling over hours but non-cutter designs do not seem to have required this.

A 1908 study described a process around the Senegal River coast as alternately rocking the boat parallel to the shore on the beach. They reported this was done with the assistance of women and elders (Gruvel 1908:79). A 1935 study around the Senegal River coast described the same process and the helpers as a mix of crew, parents, and volunteers. For large boats, they reported that up to eight men and three children were needed. They also described the use of rollers as rare (Leca and Labouret 1935:80). A 1952 study around the Cape Verde Peninsula described the roller moving process as the common process. It involved all those around and covered a distance of fifty meters. The process involved alternatively pushing on the projecting cutwaters and moving the rollers seemingly often balancing one (Balandier and Mercier 1952:160). The rocking method was described in detail in a 1986 later study and appeared to still be in use. Boats of five to ten meters were moved by four to eight people could move a boat about fifty to sixty centimeters per rotating push. To move the boat first one side was lifted and then pushed to the side while the other side was held down. The same operation was then done on the opposite end. Some slip of the side being held down occurred due to unequal force but was relatively minor. The process repeated until the boat was safely outside the reach of the tide (Lleres 1986:164–165). The operation could be done by a single person my sitting on the projecting cutwater and pushing with their feet first on one side then the other. The rocker of the boat and the long projecting cutwaters helps with boat moving operations (Postel 1950a:123). Both the log roll method and the rocking method of moving the boat were likely very old.

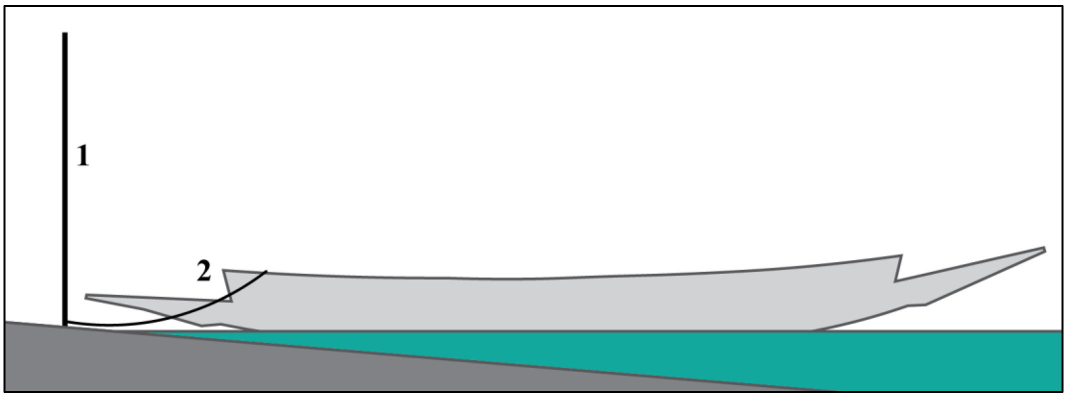


Figure 5.2.1: Style of mooring used for Senegambian boats	Own work, not to scale
1: Stick stuck in ground, 2: Hawser tied to thwart and stick	

Photograph 5.2.1: Boats moored at Bathurst, Gambia	From (C. O. I. 1957)

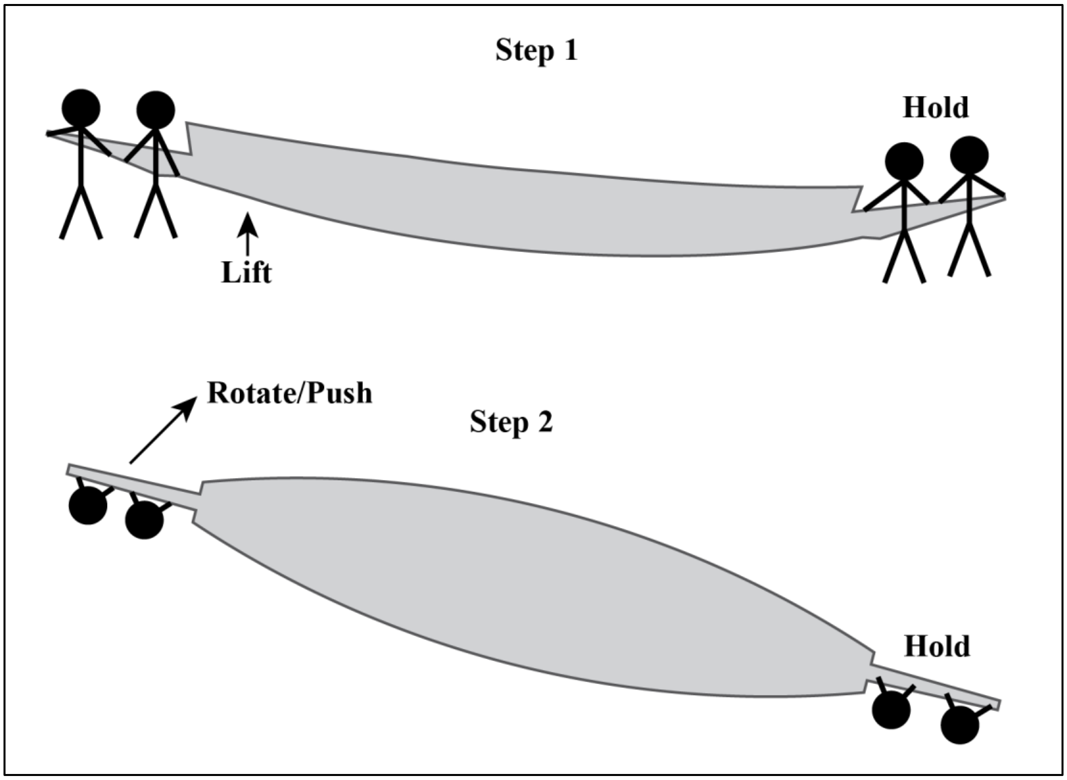


Figure 5.2.2: Method of moving a boat sideways to or away from the shore	Own work, not to scale, adapted from (Lleres 1986:164)

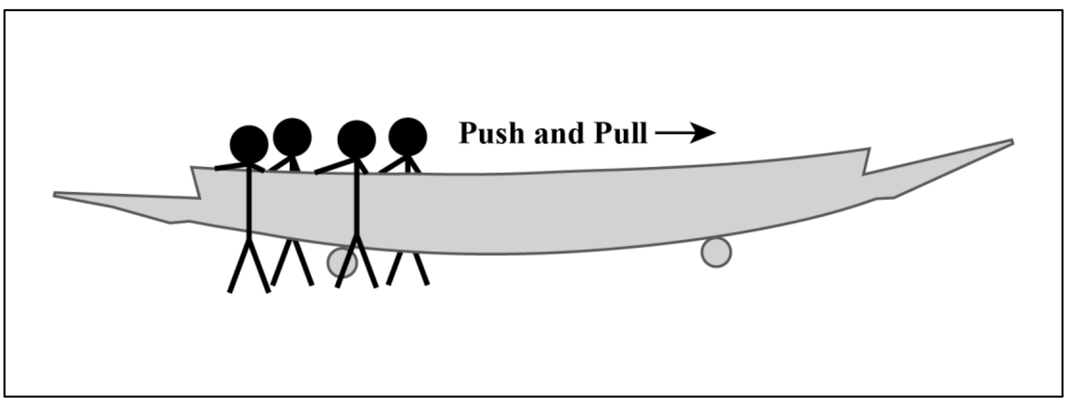
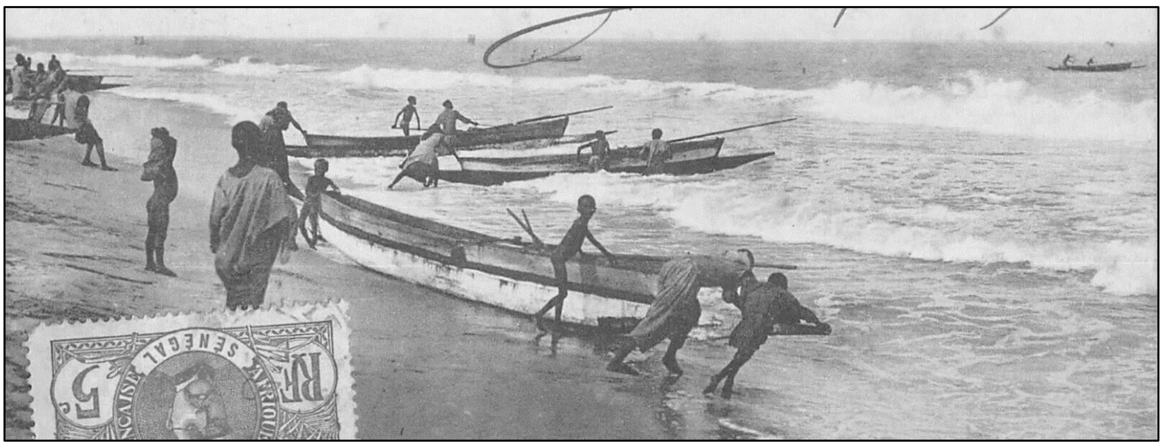
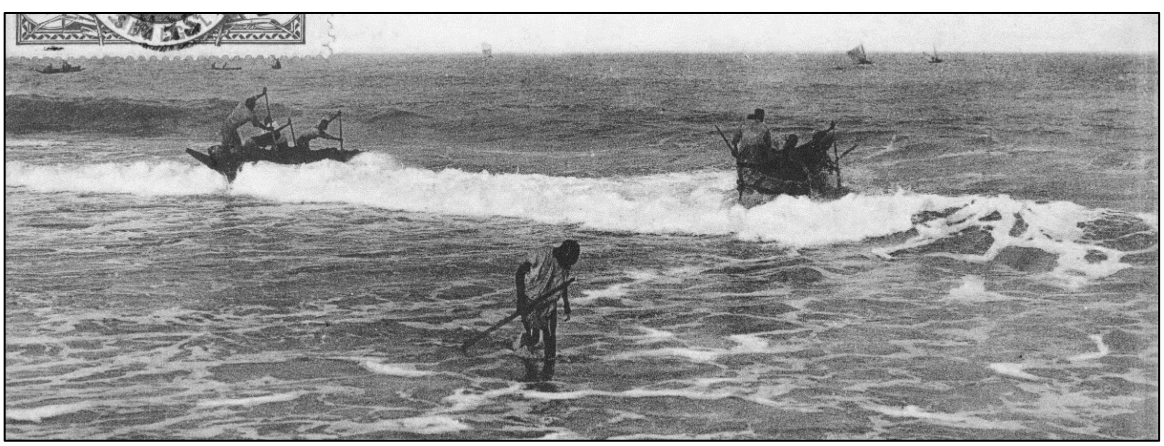


Figure 5.2.3: Method of moving a boat on rollers in or out of the water	Own work, not to scale, from photographs

Photograph 5.2.2: Boats launching on the Senegal River Coast, Part one	From (Tacher Unknown)



Photograph 5.2.3: Boats launching on the Senegal River Coast, Part two	From (Tacher Unknown)



Photograph 5.2.4: Boats launching on the Senegal River Coast, Part three	From (Tacher Unknown)

Photograph 5.2.5: Boats launching on the Senegal River Coast, Part four	From (Tacher Unknown)

5.2.2 Crossing the Bar

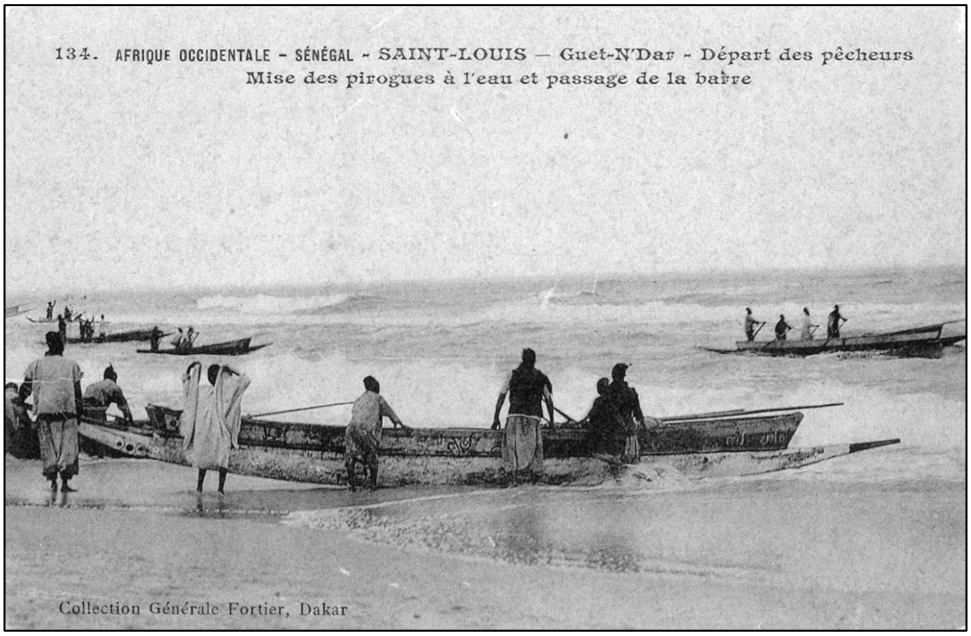
The surf zone and offshore bars usually referred to as “the bar” in sources was a phenomenon that was the result of the rapid rise of the sea bottom that was of variable intensity but occurred near the shore and seemingly up to around half a mile offshore. The size and intensity of the bar was likely highly variable. Large waves rose rapidly in quick succession due to the offshore bars and surf zone and break on the shore. This made traversing the area from shore to calmer waters beyond the bar a harrowing process and in bad weather, it may have been impossible (la Courbe and Cultru 1913:18–19; de Pina 1972:245–246). At the most basic level the crew would position the boat perpendicular to the shore paddling as rapidly as they could through swells and breakers and endeavor to stay straight and upright after having pushed the boat into the water or before pushing it out of the water. A traveler in 1749 on the Petite Côte described their experience of crossing the bar thus:

> I had landed very easily upon my arrival at Portudal, because the sea bar of was gentle and calm: but at my return I was much embarrassed how to reach our vessel; as there was then a great swell, and the agitation of the waves upon the bar, rendered it very dangerous and difficult to get over. We ventured nevertheless in a large pirogue, the agent for the company, a few passengers, and myself who were prepared to empty the water as fast as it came in, with half calabashes. The

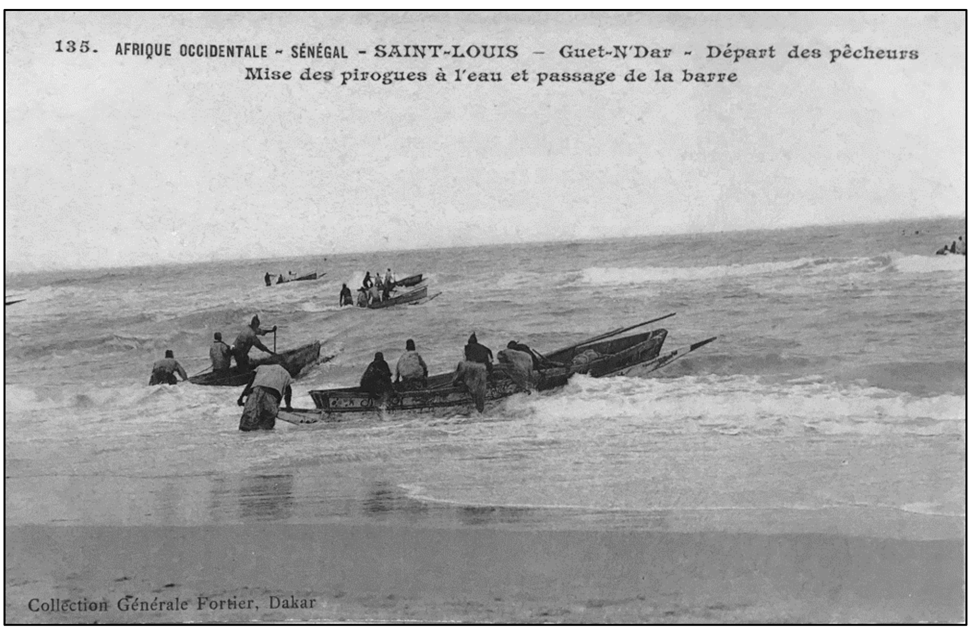
boat was thus laden, when a wave drove on shore, and lifted it off, with the assistance of four Negroes, all good swimmers; they pushed it forwards with their whole might, and leaped in as fast as the part where they were to row entered the water. We soon found ourselves in a very high sea, when the waves swelling like a ridge of hills, drove against the pirogue, and washed it all over. We worked hard, and with great resolution, to empty it again; and indeed we had enough upon our hands, while the Negroes rowed with all their might, to avoid the waves, which came rolling upon them. Now the pirogue raised its prow upon the back of a billow, while its stern sunk deep into the water: now it was supported as it were at both ends on the edge of two different waves: now only the middle of it was suspended upon a rolling surge, so that the extremities seemed to be poised in the air. In this manner, apprehending every moment to be overset and inevitably lost, we got over the bar, with great good fortune, and went on board the vessel, which carried us to the isle of Goree. (Adanson 1759:113–115)

The distinctive projecting cutwater found on many Senegambian boats was one of the special adaptions to dealing with the bar allowing the boats to cut through the waves (Anonymous 1875:126). It was important while traversing the waves to keep the bow perpendicular to the waves lest the boat be swamped, a maneuver that requires much skill (Burdo 1880:50). Another adaption was the ability to easily step and unstep the mast which would get in the way and cause issues if a boat were to capsize while crossing the bar (de Villeneuve 1814a:61). It was typical to unstep the mast when not in use (Leca and Labouret 1935:156). Crossing a rough bar was always done with paddles due to the rough water and danger of capsizing. It was never recorded with sails.

The process would be directed by a pilot who with shouts, orders, and gestures of their right hand directs the paddlers who must make quick and powerful actions to keep the boat on track. The paddlers shouted for encouragement and at the peak of a wave pilot let out a characteristic long whistle produced by blowing through their half-open teeth which was repeated by the paddlers to help time the paddling (Frey 1890:6; Anonymous 1875:126; Gruvel 1908:76).

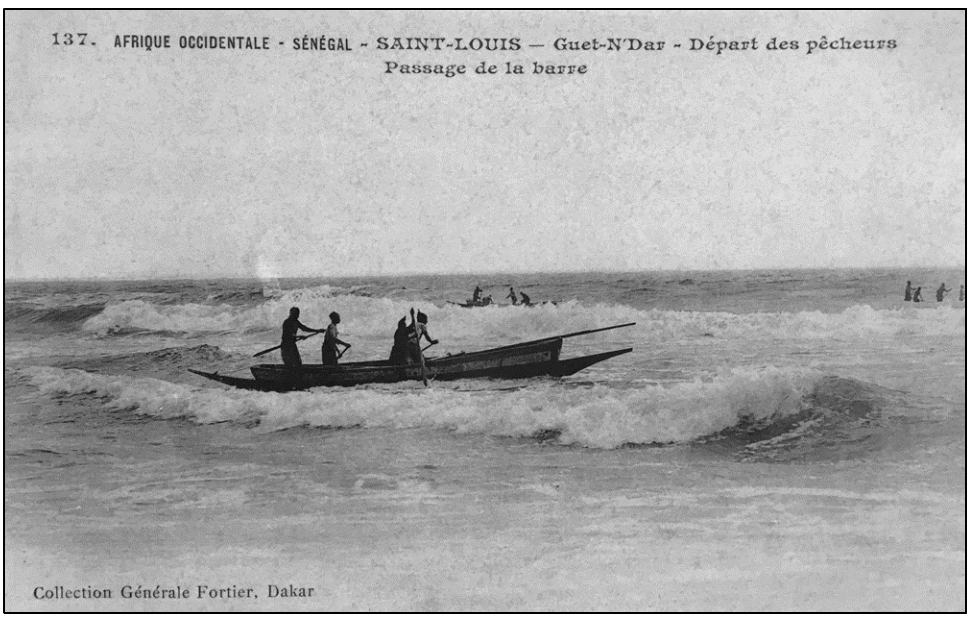


Photograph 5.2.6: Departing the coast, one	From (Edmond 1909a)



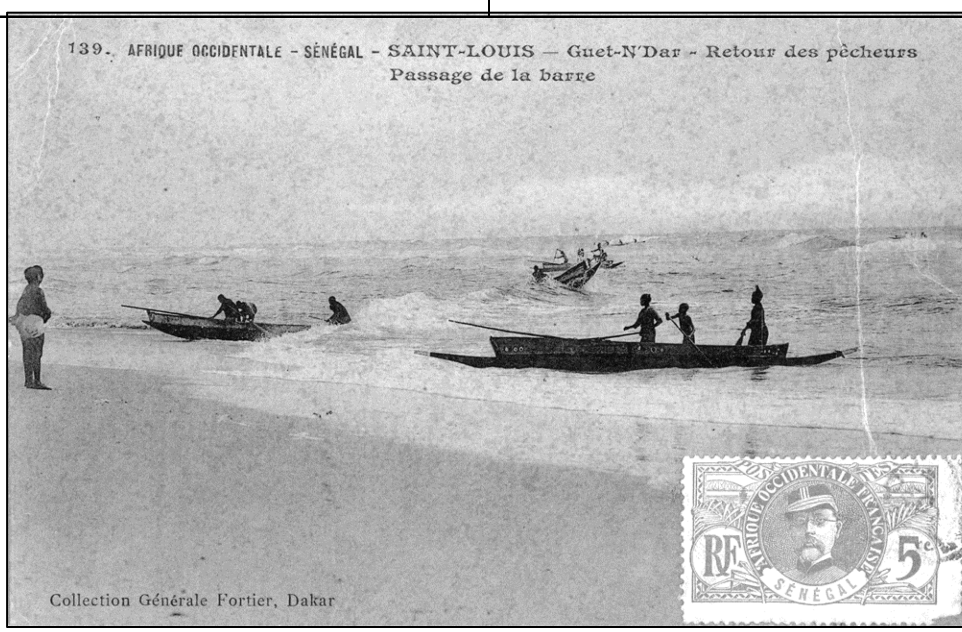
Photograph 5.2.7: Departing the coast, two	From (Edmond 1909m)

Photograph 5.2.8: Departing the coast, three	(Edmond 1909n)



Photograph 5.2.9: Departing the coast, four	From (Edmond 1909o)

Photograph 5.2.10: Returning to the beach, one	From (Edmond 1909p)



Photograph 5.2.11: Returning to the beach, two	From (Edmond 1909q)

5.2.3 Bailing

Boats accumulated water in several ways including leakage through seams, splashing water, waves, or being overturned. Bailing could be done by the free hand of the person holding the steering oar. This setup appeared common on the coast (Durand 1806:111; la Courbe and Cultru 1913:19). Alternatively, some boats had a dedicated bailer. These boats leakiness appeared to be related to being plank-built riverboats instead of having a solid dugout hull (Adanson 1759:273; la Courbe and Cultru 1913:132). Passengers could also be employed in bailing in an emergency (Adanson 1759:114). In the event a boat became swamped or overturned and needed to be emptied everyone would work to empty the water with calabashes (Adanson 1759:114; de Pina 1972:246). A boat could also be rocked back and forth in the water to help empty it (Adanson 1759:273).

Calabashes were the often-spherical fruit of *lagenaria siceraria* and *crescentia cujete* that were used as containers. Calabash bowls (Photograph 5.2.12) were critical pieces of equipment on any boat and used to bail out water (Leca and Labouret 1935:63; Balandier and Mercier 1952:157). These were constantly mentioned in primary accounts. In more modern times any number of containers could serve the same purpose from a tin-can to a plastic tub (Gruvel 1908:76).

Photograph 5.2.12: Calabash that was used as a bailing device on a Senegambian boat	From (Quai Branly Museum 1931g)

5.2.4 Capsized boats

European travelers often experienced difficult balancing in Senegambian watercraft (Shoberl 1821b:70; Gruvel 1908:105–106; Thilmans and Rossie 1969:111). Often operated in rough water, it was a common occurrence for Senegambian logboats and extended logboats to capsize. One source described a boat overturning ten times on the Senegal River Coast (Frey 1890:2). Other common ways for boats to capsize were accidents and due to upset balance due to people or sails. There were numerous accounts of the process of righting an overturned boat. These boats were due to being made of kapok easily buoyant enough not to sink and the crew were all skilled swimmers, so it was a matter of turning them back over and emptying the water (de Villeneuve 1814a:62; Boilat 1853:194; Gruvel 1908:76; de Pina 1972:246; Thilmans 1976:25). The operation was apparently performed with the shoulders which were used to turn the boat and hold it in place (Le Maire 1695:164; Du Bois 1897:10). A study described the procedure as having one crew member climb inside and empty most of the water after the boat had been righted. Once mostly empty the crew hanging on the sides of the boat returned to the boat (Gruvel 1908:76).

Cargoes could be secured to the sides or bottom as to not be lost in the event of the boat capsizing (Durand 1806:111; de Pina 1972:246). Unsecured cargo could be lost in the event of an overturned boat. A 1669 source on Cape Verde described the loss of fish due to this but extended dugouts would likely have more attachment points than a logboat so it may have been less of an issue later (Du Bois 1897:10). European passengers however would need to cling to the boat or be saved by the crew as they could not swim (Boilat 1853:194; Dawson 2017:87). Due to the swimming skill of the crew, the buoyancy of the boats, and the constant practice the righting of a boat was a routine process and deaths were extremely rare (Adanson 1759:273–

274). No confusion would overtake a professional boat crew (Anonymous 1875:126; la Courbe and Cultru 1913:19). However, nonprofessionals may be susceptible to rushed action and confusion (Raffenel 1846:492–493). Sometimes boats were overturned deliberately while doing business with a ship in on the Senegal River Coast seemingly to prevent them drifting away (Durand 1806:111).

5.3 *General Operation*

5.3.1 Position

On the Senegal River coast and Senegal River typically paddlers would stand while the crew member with the steering oar remained seated (Le Maire 1695:164; Adanson 1759:94–95; Durand 1806:111; Boilat 1853:193; Frey 1890:2; Ritchie 1967:85; de Pina 1972:245–246). This sitting may have sometimes been done on the edge of the boat and not a thwart (de Pina 1972:245). On the Senegal River in frame-based boats the steering oar was often held while standing up in historical photos. Both the paddlers and those holding the steering oars on racing boats in the Senegal river stand up as seen in photos and videos. If the boat was being punted the person with punt stands up by necessity. Around the Cape Verde Peninsula and the rest of the south coast it was more typical to have the paddlers sitting down (Boilat 1853:193; Anonymous 1875:126).

On the Gambia River it the typical arrangement appeared to have been paddling all standing up (Cà da Mosto et al. 1937:69; Fernandes 1951:31). Some boats on the Gambia would also have had a pilot seated in the middle (Fernandes 1951:29, 31). Early war boats had a shield-bearer standing in the front with a large leather shield (Cà da Mosto et al. 1937:58–59). At some point, a sitting position appeared to have become the most commonly used position around the

Gambia but there was a lack of sources that describe the paddling position after the fifteenth century to determine when this occurred. Video and images starting in the late nineteenth and early twentieth-century show sitting paddlers (Mallinson 2018). The practice on other rivers was unknown but likely similar to the Gambia. Paddlers would be arranged in two rows if boats were sufficiently wide to allow it (Cà da Mosto et al. 1937:69; Fernandes 1951:31; Hewett 1969:36).

If boats were to narrow the paddlers would by necessity need to be positioned one behind the other and paddle on alternate sides. Alternatively as observed they would switch between paddling sides (de Pina 1972:246). In the case of there being only a single paddler, they would need to alternate sides.

Passenger position appeared inconstant in written sources. In 1749 on the Senegal a traveler was seated in the middle of a boat with one crew member on either end (Adanson 1759:94–95). A 1785-1788 Cape Verde Peninsula source described how a passenger sitting in the back would not get wet in all but the worst weather (de Villeneuve 1814a:61). An 1850-1852 source for the Senegal River coast asserted that passengers were seated on thwarts in the back (Boilat 1853:193). In contrast, an 1875 source for the Cape Verde Peninsula claimed that important passengers were seated on a bench directly behind the front cover with crew behind. This was notable for being the reverse of the typical European arrangement as described by the source (Anonymous 1875:126). If a boat was being operated by one person, according to a 1675 for the Senegal River, they sit in the rear (Ritchie 1967:85).

Visual sources for position were often not reliable as they were for the most part low detail and the accuracy and even original location could be suspect. For example, three illustrations (Illustration 3.2.3, Illustration 3.2.11, Illustration 3.2.22) showed standing paddlers in the front and sitting passengers in the back on the Senegal River and off the Cape Verde

Peninsula but the boats appeared to be mostly identical in both images suggesting they used an image of a boat originally from one area and put in another area. Another source suffered from this same issue of reused illustrations (Illustration 3.2.1, Illustration 3.2.18, Illustration 3.2.19). Another illustration (Illustration 3.2.6) also must be discounted due to shaky provenance. There was also the issue that few depicted boats had sails set which may change the crew layout positions and it was also difficult to tell the difference between passengers and crew in many cases.

An 1840s illustration (Illustration 3.2.4) on the Senegal River Coast showed boats with three crew standing and a sitting person in the front of the boat. An 1840s illustration (Illustration 3.2.2) from near Saint Louis shows the crew all sitting with a sail set. An 1861 illustration (Illustration 3.2.9) also from near Saint Louis showed the crew all standing. An 1879-1880 illustration (Illustration 3.2.10) shows two paddlers in the stern and another in the bow with a sitting passenger between them. Two 1891 illustrations (Illustration 3.2.12, Illustration 3.2.13) showed crews on the Senegal River coast all standing. An 1891 illustration (Illustration 3.2.15) of what appeared to be Senegal River frame-based boats showed the crew all standing.

An illustration (Illustration 3.2.16) from the Cape Verde Peninsula and Petite Côte depicted events in 1601 and showed the crew all standing many with weapons in hand but the text accompanying it had no mention of position (van Spilbergen 1617:3; Anonymous 1644). A 1675 illustration (Illustration 3.2.17) from the Cape Verde Peninsula showed crew that appeared to be sitting but the accuracy of the illustration was unknown. A 1785-1788 illustration (Illustration 3.2.29) from Cape Verde Peninsula showed the crew all standing with one boat having sails set. An 1842 illustration (Illustration 3.2.23) showed a crewmember in the back sitting and may showed one person sitting next to the mast while another stands. An 1843 illustration (Illustration 3.2.24) from Cape Verde Peninsula appeared to show the crew standing with sails set. An 1875 illustration (Illustration 3.2.26) showed a passenger sitting in the front of boats and crew standing and paddling behind them and also included a written description of the same thing. An 1880s illustration (Illustration 3.2.27) showed the crew all sitting except for the ones handling the fishing gear.

An illustration (Illustration 3.2.31) from the Gambia of uncertain dating but around the early-to-mid nineteenth century showed boats with a steering oarsman at the far back with paddlers variable in number from four to six likely sitting in the middle of the boat while one had three passengers in the bow. It appeared to have been the practice to sit during the rainy season according to a 1935 study (Leca and Labouret 1935:78). Overall illustrations were highly inconsistent with their depictions of positions and very spread out in time and location with few in total. Many also were suspect in their accuracy and were difficult to interpret.

5.3.2 Paddling vs rowing

All Senegambian watercraft utilized paddling. Although many sources used the words paddle and row interchangeably when early sources described the motions in detail it was clear paddling was the method that was used (Hewett 1969:37; de Pina 1972:245; Thilmans 1976:25). A fifteenth-century source specifically highlighted the lack of oarlocks and that paddles were held steady in the hands (Cà da Mosto et al. 1937:69). Illustrations and current practices similarly support this. The only evidence of oars on Senegambian watercraft at all was from a 1953 coronation day celebration video which shows some oars mounted on a large groundnut cutter where they were used somewhat awkwardly in conjunction with paddles (Mallinson

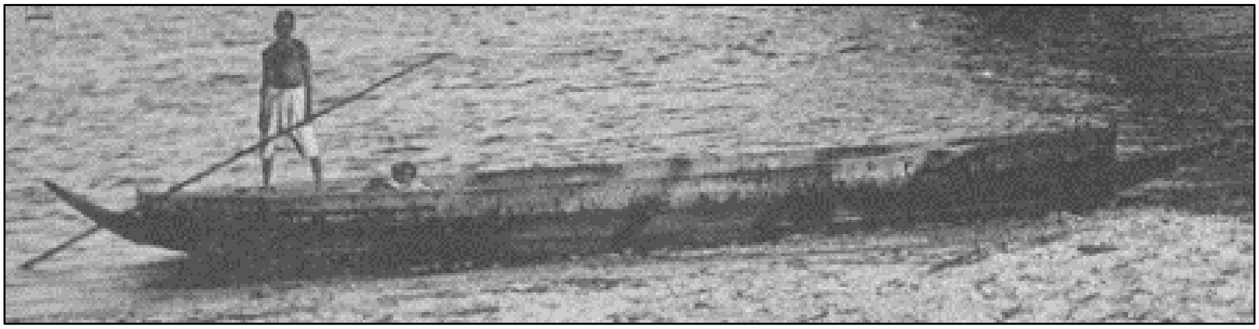
2018). Only a 1908 study described Casamance boats as something being rowed (Gruvel 1908:128).

5.3.3 Paddling motion

An observer in the Gambia described the paddling motion thus "The paddles were worked with as much regularity of stroke and feather in circular form as a first-class University boat crew might be proud of" (Mitchinson 1881:410). The paddling form of Gambian shell-based plank-built boats could be seen in a video from 1952 (Mallinson 2018). Modern paddling forms could be observed in many videos of races around Saint Louis and Dakar. It was unknown how they compare with older forms but there was likely a high degree of relation. The motion used on various boats could be seen in videos but was too complex to analyze here.

5.3.4 Punting

Punting (Photograph 5.3.1), pushing a boat with a long pole, was known to have taken place on the Senegal River in 1685 and likely had always been a means of propulsion on shallow rivers (la Courbe and Cultru 1913:132). Punting was frequently shown in photographs from the twentieth century and was still used on the rivers of Senegambia, particularly the Senegal River. An 1891 illustration (Illustration 3.2.15) from the Senegal River appeared to depict punting. It was difficult to identify possible depictions of punting in illustrations due to standing paddling and punts looking much the same when in use.



Photograph 5.3.1: Punter on a Senegal River boat	Cropped, from (Edmond 1902m)

5.3.5 Speed

The speed that Senegambian watercraft could achieve was frequently noted. Being able to easily outpace the fastest European vessels and comparing favorably with European rowing teams (Le Maire 1695:164; Spilsbury 1807:13; Poole 1850:1001; Cà da Mosto et al. 1937:57, 69; Thilmans 1976:25). This speed could be used to effect when launching surprise attacks (Coelho 1985:7–8, Chapter 2). The speed of watercraft with a large team of paddlers could be observed in races that occur around Dakar and Saint Louis. These races have taken place since at least 1865 (Anonymous 1865b:140).

One account gave a travel time seemingly with paddlers trying to move at high speed. It took less than two hours to travel seven and a half nautical miles in what was likely a plank-built boat on the Senegal River (Adanson 1759:273). This would be around four miles per hour. The same account also gave a time of almost six nautical miles in less than an hour with the aid of a makeshift sail on a large probably plank-built boat (Adanson 1759:231–232).

Groups of boats traveling from settlements on the Cape Verde Peninsula to the Gambia at the end of the wet season to trade recorded in a 1952 study took two days for the journey which they sometimes did uninterrupted. A distance of around ninety nautical miles (Balandier and Mercier 1952:172).

5.3.6 General performance

Many comments were made by observers about the seaworthiness and well-adapted form of Senegambian boats as well as the skill of the crew. The boats were well adapted to the environment and this was recognized by the people who saw them in action and sailed in them (Adanson 1759:94; Boilat 1853:193; Du Bois 1897:9–10; Anonymous 1875:126). They were considered the only boats able to consistently and safely navigate the dangerous coastal bar that was present in many areas of the Senegambian coast, particularly around the Senegal River Coast (Boilat 1853:192–193; de Pina 1972:246).

5.3.7 Storms

Around the rainy season violent squalls and thundersqualls known locally as “tornados” could occur suddenly. The calm followed by a violent onset of wind and rain was particularly hazardous to anyone on the water (Kenworthy 2000). These typically came from the southeast reversing normal prevailing winds in Senegambia and could reportedly last from fifteen minutes to an hour (Purchas 1625b:246; Reclus 1876:134). Squalls could result in the sudden generation of strong winds and large waves which may run in different directions to normal waves which could result in violent and dangerous conditions (Mitchinson 1881:119). Most fishing, travel, and trade took place during the dry season to these storms were only a major issue around the beginning and end of the season.

One such squall was observed while boats were off the Saint Louis coast. The fishers offshore having sensed the oncoming squall had immediately retreated to shore. The fishermen and their wives and brothers onshore quickly worked to haul all the boats back onshore and safely up the beach before the squall hit to prevent them from being washed away by the violent waves and the fishers being drowned (Mitchinson 1881:118–119). Fishers appeared relatively unworried about potential surprise squalls while offshore (de Pina 1972:246). The few accounts suggest they were practiced at recognizing an oncoming squall and getting to safety.

Another observer was along with other boats caught on the lower Senegal River hit by such a squall after failing to reach the shore in time. The boat crews and passengers got out of the boats into the shallow water on a sandbank and standing in the water held the boats against the growing waves and wind to prevent them from being swamped, washed away, or smashed apart on the riverbanks. In this position, for two hours they reportedly held the boats (Adanson 1759:220–223).

Two other accounts of squalls came from the Gambia River. One observer's boat was forced to take shelter on the river and they waited out the storm sleeping in their boat (Hecquard 1853:89). Another recounts an incident in which a boat acting as a ferry across the mouth of the Gambia from Niumi to Bathurst was hit by a squall that lasted half an hour. By the time they were spotted and a rescue boat arrived only three of the original fifteen were alive clinging to the overturned hull (Huntley 1850:220). The lack of shelter and trees to blunt the winds at the mouth of the Gambia plus the likelihood that many of the passengers were European and thus unable to swim was likely responsible for the death toll of this disaster as compared to the other travelers calmer experience.

5.3.8 <u>Rapids</u>

Due to the maneuverability of Senegambian boats and their ability to operate quickly independent of sails plus their high buoyancy they were used to traverse rapids. Rapids were mostly found along the Senegal with the Gambia only having the comparatively minor Barrakunda falls. Really more a shallow ledge of rock, could be navigated over when water was high (Cà da Mosto et al. 1937:137). There was apparently an attempt to remove this ledge by Portuguese engineers sometime before the mid seventeenth century but it proved futile (d'Ablancourt and del Marmol y Carvajal 1667:74).

One observer on the Senegal described a boat crossing rapids on the upper Senegal River thus:

> Most of these rapids can be crossed by canoes, when the latter are ridden by skillful and enterprising natives. But it is not without difficulties and great dangers. During the 1885-1886 campaign, we had to descend from Senegal, from Badumbé to Medina, over a length of about 160 kilometers: we had to cross eight to ten rapids in this way.
>
> We were given on this occasion to admire the marvelous skill of the blacks on the shores of Senegal in handling their frail craft, their daring and their coolness. Camped at both ends of the canoe, their bodies half bent, they let themselves be carried along by the current until, at the signal of one of them, pushing their paddles with force into the water, they throw violently the canoe to the right or to the left to avoid colliding with a rock invisible to a less trained eye, and against which it would have broken. The canoe thus reaches the rapid, which it descends with dizzying speed, flying above the eddies of the river and the waves of foam. (Frey 1890:158–159)

5.3.9 <u>Clothing</u>

Typical clothing worn when fishing or operating a boat at sea or on rivers appeared to have often been a loincloth of variable design (de Villeneuve 1814b:143; la Courbe and Cultru

1913:19). Many different examples were shown in illustrations (Illustration 3.2.8, Illustration 3.2.9, Illustration 3.2.26, Illustration 3.2.27). This would have been advantageous for movement while wading and swimming when boats overturned and would dry quickly. Often people seem to have simply worn the typical clothes of the region which could be more substantial (Illustration 3.2.10, Illustration 3.2.26), passengers in particular. A 1935 study asserted that heavier clothes were used during the dry season and light clothes during the wet season (Leca and Labouret 1935:77).

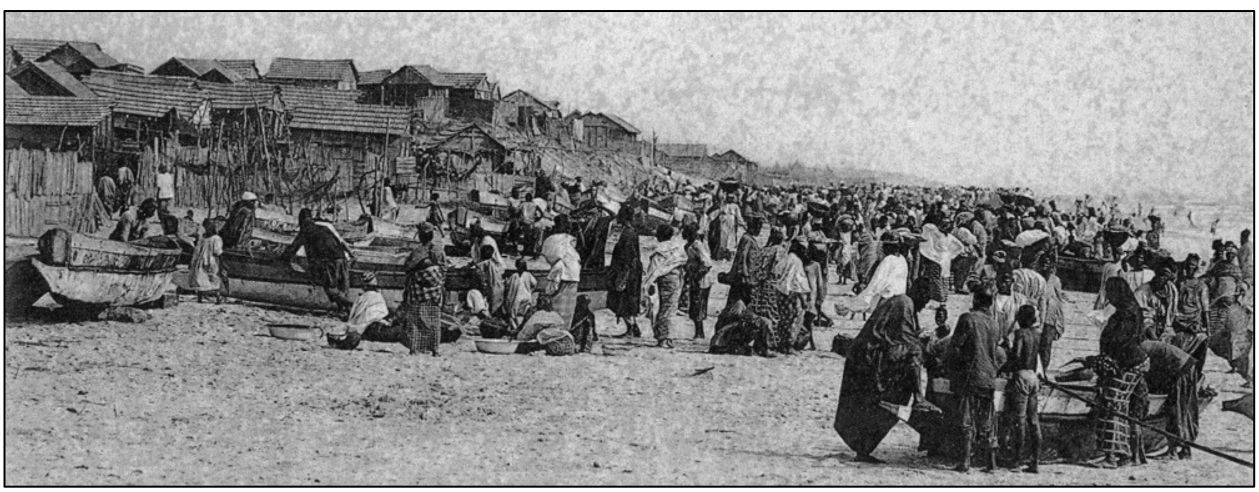
5.3.10 Storage and drying of sails and nets

After boats were stored safely onshore sails and nets or laid out on the beach or hung up to dry in the sun which could be seen in some photographs. These along with rigging, sails and paddles were removed from the boats and brought to the fishers' homes (Gruvel 1908:79; Leca and Labouret 1935:81; Balandier and Mercier 1952:161). In 1908 on the Cape Verde Peninsula the boats themselves were described as being brought back to the fishers homes (Gruvel 1908:90). Photos show boats in front of fishers homes around the Senegal River Coast as well (Photograph 4.3.3).

5.4 *Women and Children*

The most attested presence of women relating to the operation of fishing vassals was dealing with collection, distribution, and processing of catches (Photograph 5.4.1) (Gruvel 1908:79, 95–97, 125, 128; Leca and Labouret 1935:81, 103). Women were also known to be involved directly in fishing outside of offshore coastal fishing (Gruvel 1908:95–97, 125, 128). Of note, oyster fishing was a major occupation of women in the Gambia in modern times and appeared to have been so in the past (Corre 1964:18; Njie and Drammeh 2011:4). Women participated in the launching and return of boats (Gruvel 1908:79). Women were also engaged in general cargo handling for ships (Le Maire 1695:71; Burdo 1880:67; Corre 1883:10; Banbury 1889:34; Léon d’ 1912:208). A historical source also attests to Wolof women manufacturing sails and nets (de Villeneuve 1814b:183). Women were clearly integral to maritime activities of many kinds.

Children were frequently seen helping with a variety of tasks such as the movement of boats and noncoastal fishing (Gruvel 1908:95–97, 125, 128). They were also present during the construction of boats in a photograph (Photograph 4.10.1). Sources and photos attest to children operating boats. Many appeared to have had specific child sized boats. They were also observed on larger boats and seemingly being taught how to paddle. One photo of a child sized boat possessed a sail (Photograph 5.8.5, Photograph 5.8.6, Photograph 5.8.7, Photograph 5.8.8, Photograph 5.8.9, Photograph 5.8.10, Photograph 5.8.11, Photograph 5.8.12, Photograph 5.8.13). All these activities appeared to demonstrate observation and, in many cases, active involvement in maritime activities from a young age.



Photograph 5.4.1: Fish collection and processing on the beach. Senegal River Coast	From (Edmond 1909r)

5.5 *Fishing*

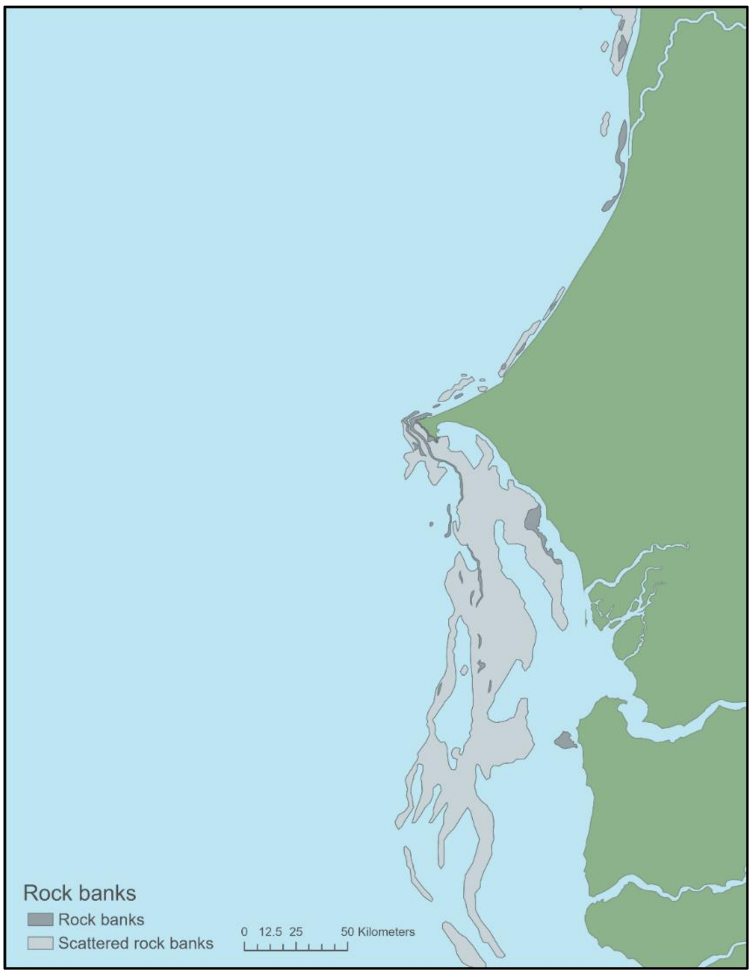
5.5.1 Fishing distance

The first report of the distance from shore Senegambian boats operated at was from 1506-1510 and observed that the fishers off the Senegal River coast operated at what would be around six to nine nautical miles out to sea (Fernandes 1951:15). Another source gave the distance that boats around the Senegal River Coast in 1682 operated at as the equivalent of around five to seven nautical miles (Le Maire 1695:165). A 1908 study gave a distance of five or six miles (Gruvel 1908:75).

A 1684 source discussing the Cape Verde Peninsula simply said they go went of sight of land, which would be more than three nautical miles out (Coelho 1985:5, Chapter 1). Two later sources reported the six to nine nautical miles distance in their summaries but seem to simply have been quoting the earlier source (de Villeneuve 1814a:60; Barbot 1992:100). One of these sources even revised their estimate later and gave a distance equivalent to nine and a half to twelve nautical miles from direct observations around the Cape Verde Peninsula in 1785-1788 (de Villeneuve 1814a:60).

These numbers would suggest that even before the introduction of sails and extended logboats fishers often operated far out of sight of land. Due to the observations all being in different geographic areas it cannot be said for certain if the introduction of these changes increased the distance fishers operated at, but it seemed plausible. The fishers in these areas traditionally fished with long lines and traveled to offshore rocky banks which occurred along the coast particularly around the Cape Verde peninsula (Gruvel 1908:75, 77, 92, 120; Domain 1977). It was likely the sail increased the accessibility of rock banks around the Cape Verde peninsula which were far more numerous and spread further than those around the Senegal River coast which had banks a more consistent distance away from shore (Domain 1977). Regardless, the introduction of the sail would have reduced travel times, reduced crew fatigue from paddling, and increased range.

Many studies covered various aspects the fishing itself which constituted an entire subject in and of itself so it was not covered here. These important banks which were the destinations of fishers could be seen on maps of the bottomland (Domain 1977). One study was worthy of note as it contained a detailed description fishing and the organization of these rocky areas called "xeer", meaning rock (Gueye 1977:43–44).



Map 5.5.1.1: Rock banks along the Senegambian coast	Own work, adapted from (Domain 1977), some southern shore areas did not have data

5.5.2 Swept out to sea

In 1846 a traveler recorded a story around the Cape Verde Peninsula of a fisher missing for eight days before returning supposedly visiting water spirits. This was apparently a common enough occurrence to be a standard explanation (Boilat 1853:57–58). A study recorded in 1952 about an event in 1938 recounted how a fisher was supposedly swept out to sea from the Cape Verde Peninsula for four months and eleven days all the way past the Cape Verde Islands before being picked up by a ship. Various studies apparently existed about fishers swept out to sea for long stretches and sometimes returning supposedly held by water spirits (Balandier and Mercier 1952:160).

Two old stories of Senegambian sailors traveling far outside of Senegambia into the ocean existed. One asserts a population of Senegambians settling on the Cape Verde Islands before the Portuguese arrived there (Shabaka:134–138). Another was the famous story Mansa Musa told in Egypt about his predecessor launching expeditions into the ocean (Levtzion 2011:268–269). While possible, a castaway community on the Cape Verde Islands large enough to establish a lasting population solely from unlucky sailors on coastal logboats appeared highly unlikely particularly given that sea fishing always appeared to have been done solely by men and these boats did not have sails making survival even less likely. The story Mansa Musa told appeared to be similarly unlikely and was probably made up by the king or at least highly exaggerated as no other evidence of such an event appeared to exist. Certainly, any such expedition would be doomed to a quick death equipped only with logboats without sails.

5.5.3 Boat lifespan

Kapok boats were reported to last around seven to ten years, mahogany boats twenty to twenty five (Lleres 1986:125). A 1950 study gave the typical lifespan of an extended logboat as seven or eight years (Postel 1950a:123). A 1986 source gave the longevity of a constructed sailed boat of four to five meters as around ten years. The keel lasted ten to twelve years, the strakes eight to fifteen years. It should be noted that these boats would have differed from older boats in construction techniques. Larger boats with engines appeared to have suffered a large drop in longevity for all parts (Lleres 1986:168). The lifespan of an individual would likely vary tremendously depending on multiple factors including material quality, maintenance, and what it was used for.

Old boats were often recycled into other things. One source mentioned Diola rice farmers using old boats as locks for their rice fields (Lasnet et al. 1900:164). Another showed an old boat being used as a feeding trough (Lafont 1938:418a, Plate 3). Other uses included reusing salvaged parts for other boats or for other wooden objects such as furniture observed to be done today. Boats could also simply be abandoned and left to rot.

5.6 *Power landscape*

The maritime power landscape of Senegambia had already been comprehensively covered in *State Control and Regulation of Commerce on the Waterways and Coast of Senegambia, ca. 1500-1800* and so was covered only in brief. Senegambian kingdoms control of their waters rested on three pillars, military dominance, a solid administrative network, and active diplomacy. They regulated the waters of Senegambia which included many administrative offices and extensive taxation to which all visitors were obliged to submit. They could and would confiscate goods and seize ships or trade posts that failed to comply. They would also hold hostages and leverage their control of critical resources and diplomatic connections to force compliance. Any shipwrecks were also the property of the kingdoms (Traoré 2017).

5.7 *Cognitive landscape*

5.7.1 Songs

Aside from the whistles used when crossing the bar it appeared common to sing boat songs to keep time and also for celebration and entertainment. Most of the accounts of songs contain almost no details and all but two came from around the Gambia River. One states that the song they heard could be heard from a great distance (Adanson 1759:273). Another discusses how singing accompanied by drumming was on the delivery of a new boat to the Senegal river coast (Boilat 1853:193). Many Gambia accounts were also low on details other than singing while paddling (Alexander 1837:72; Hecquard 1853:88; Thilmans 1976:28). One gives more detail describing a boat song as a "national song" of the Mandinka, suggesting that the song was widespread and popular in the area. It was described as starting with a few singers before the whole crew joined in and could be heard from across the river (Bowdich and Bowdich 1825:210). Another source described whistles (Mitchinson 1881:410). Another described a ceremony in which a boat was paddled along the shore while the crew sang (Borel 1866:22). Only one source (Figure 5.7.1, Figure 5.7.2) provided a short sample of the actual music sung by the paddlers. It was described as a Serer boat song used to keep the padders in time (de Villeneuve 1814b:212b–2215). An audio version was made by Jed Estep, using a xylophone to represent the lyrics and percussion for the time. It was made from the English transcription of the sheet music.

It can be listened to through the following link: https://soundcloud.com/trenton-zylstra/serer-air

Figure 5.7.1: Serer boat song, original French transcription	From (de Villeneuve 1814b:212b)

Figure 5.7.2: Serer boat song, English transcription	From (Shoberl 1821c)

5.7.2 Navigation

Senegambian sailors were not known to have used any navigational instruments but were known to have used celestial navigation. These stars (Figure 5.7.3) as well as the winds and currents around the Cape Verde Peninsula were discussed in detail in a 1977 study (Gueye 1977:34). A 1988 study described the navigation as relying on several different methods. These included the position of the moon and starts, the direction of the swell coming from the West adjusted for the effects of wind, bottom depth, travel time, and fuel consumption on boats with outboard engines (Chauveau 1988d:4).

Important stars and their uses in navigation according to a 1977 study of the Cape Verde Peninsula (Gueye 1977:34–36):

- Deloon: Pleiades

A group of seven stars. It had an annual trajectory. From September to December it was in the East. From April to July it was in the West. Was useful during night fishing in Mbour.

- Senjbi: Sirius

Meaning: “that which is bursting with light”.

Located in the Southeast. Was used during the migration to Joal and Banjul.

- Buntu Ker Makk: Pegasus

Meaning: “the gate of Mecca”.

Group of 4 stars located to the East. Appeared at the time of evening prayer.

- Biddeew daac: Gemini

Appeared in the East around midnight in the "noor" season from January to March.

- Ndey-naey: Southern Cross

- Xajjal noor ag nawet: Milky Way

Was oriented to the North.

- 7. Ney wi ag nox bi: Big Dipper

Meaning: "the elephant and its trunk".

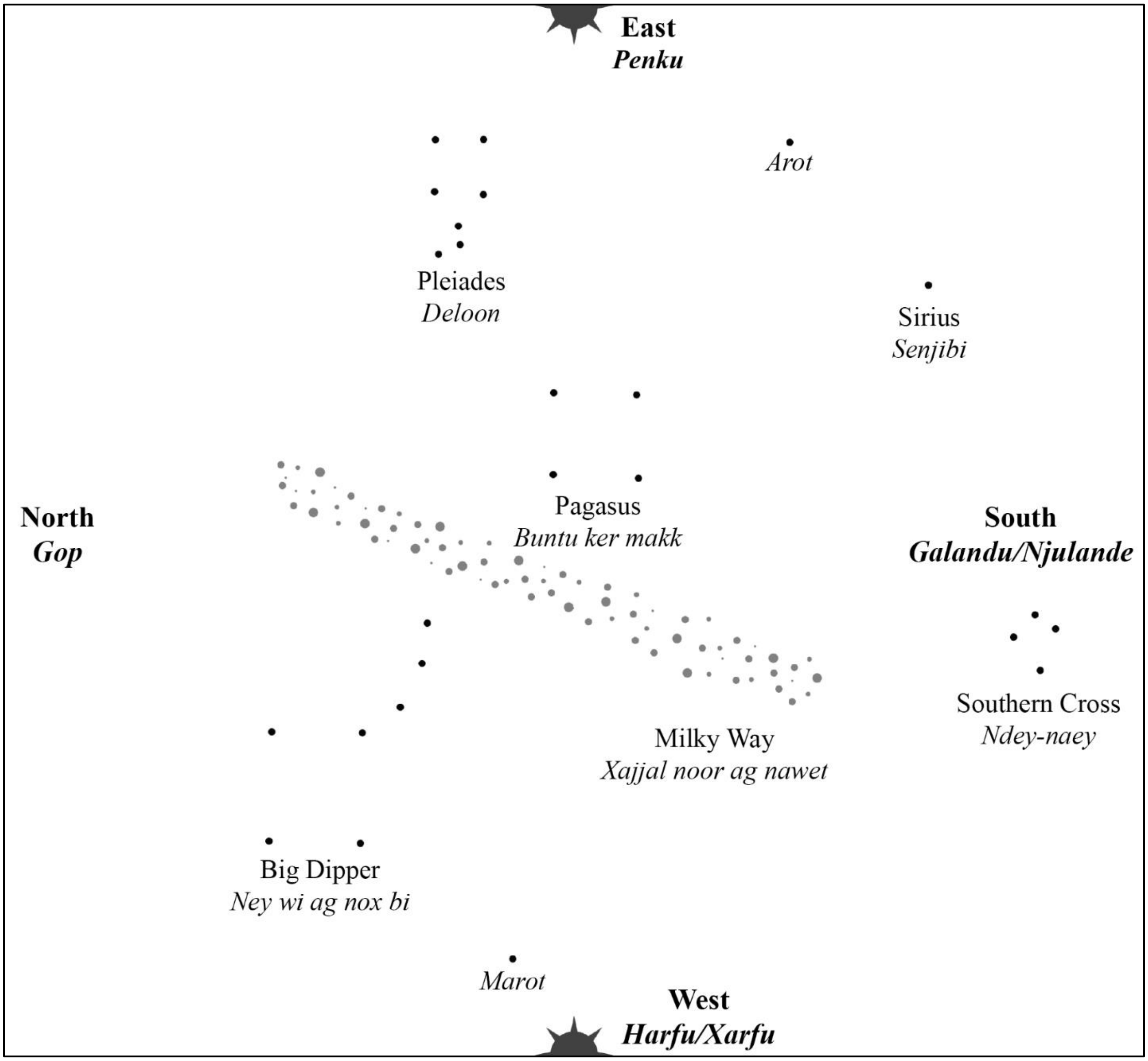


Figure 5.7.3: Stars map according to an old man from the Cape Verde Peninsula	Adapted from (Gueye 1977:36)

5.7.3 Winds around the Cape Verde Peninsula

A 1977 study described the winds around the Cape Verde Peninsula (Map 5.7.3.1) (Gueye 1977:37–39).

- Seasons

"noor" season: January, February, March

"coroon" season: April, May, June

- Kanan/Kasan and Barisu Peen: The Trade Winds

Two winds that blow from the North, in the "noor" season from January to April. Correspond to the northeasterly trade winds, which blow from north to south towards the equator and also moves east to west with the spin of the earth.

  - Kanan/Kasan: "Faraxaan"

Diurnal (daily) wind, that came more from the northeast, and blows mostly during the day. The wind causes small swells and upwelling. Fishers reported that when this wind blows and the sky turns red it was a sign of impending danger due to rough seas.

  - Barisu Peen

Diurnal (daily) wind, that came more from the northwest. The wind creates large swells. This wind seemed to be related to "hegg", which seem to be off season rains.

- Baris: Breeze

Wind from the west. Described as sometimes coming from the southern end of a thalweg (the line of lowest elevation within a valley or watercourse). In the dry season the wind came from the southwest and was deflected by the air over the Cape Verde Peninsula. During the wet season the effects of the wind were more strongly felt as it hits the coast. When this wind begins to blow it was very strong and was termed the "baris bu bess" meaning new breeze, and if it weakens it was called the "baris bu maget: meaning old breeze.

- Mboya: Harmattan

A hot and dry wind carrying dust coming from the east. Only lasts for part of the day, from the morning to the beginning of the afternoon, from December to June.

- Garen: Tornado/Squall wind

Violent sudden squalls that could last sometimes for an hour accompanied by strong winds and rain that occurred around the wet season. Typically from the southeast, reverse the normal prevailing winds. Described as coming from the same direction as the clouds. Very dangerous for boats caught in the open.

- Sambaraax: Monsoon

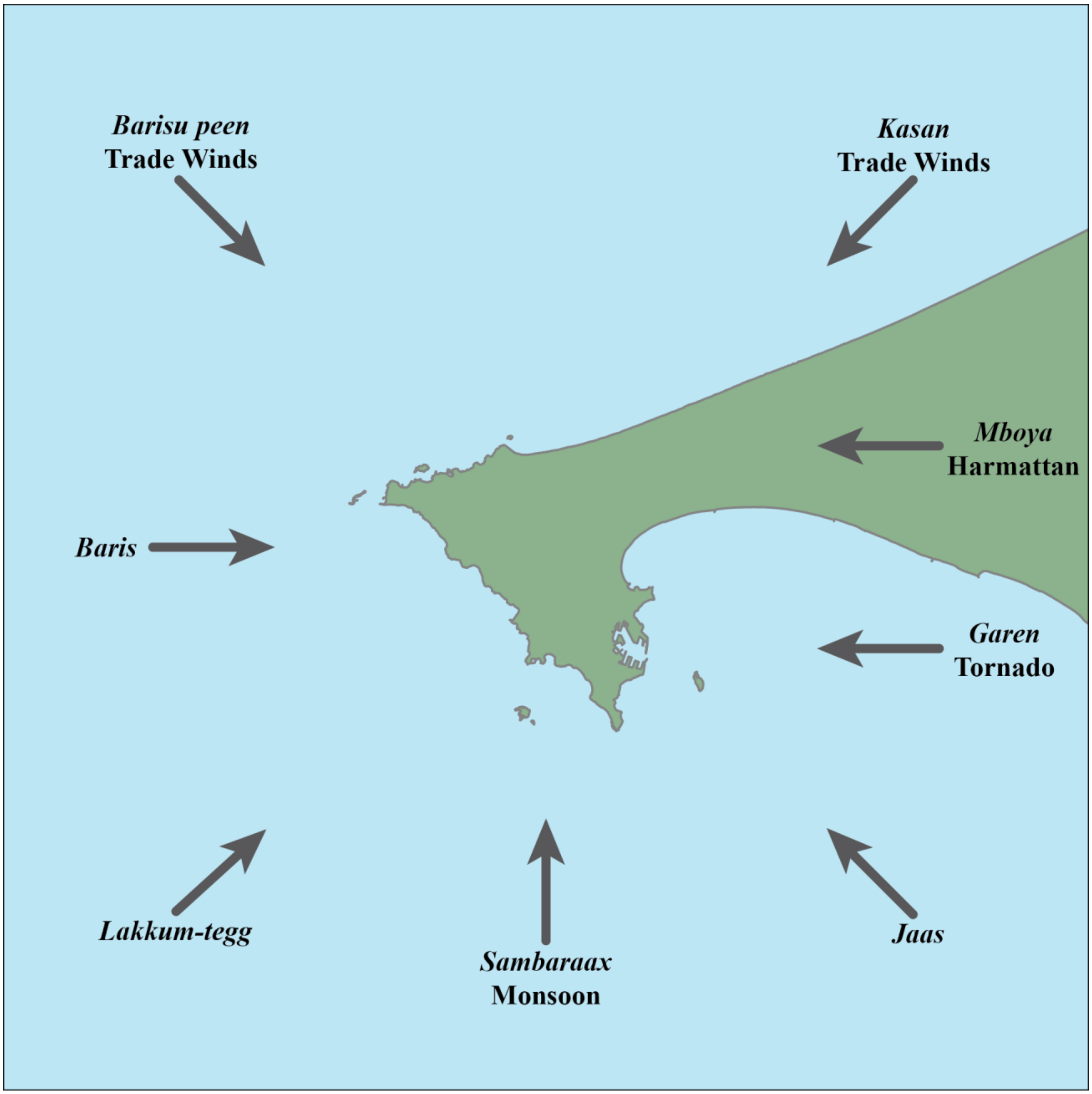
Very humid wind from the south, in the wet season could blow at any time with variable intensity. Carried lots of salt and so could dry out trees and crops. Favorable wind for sailing, could be anticipated by the generation of many waves and small waves.

- Lakkum tegg

Wind that came from the southwest, frequently occurs during the wet season. Dangerous for boats.

- Jaas

Wind that came from the southeast, around the beginning and end of the wet season.



Map 5.7.3.1: Winds around the Cape Verde Peninsula	Adapted from (Gueye 1977:42, Map 4)

5.7.4 Currents around the Cape Verde Peninsula

A 1977 study described the currents around the Cape Verde Peninsula (Map 5.7.4.1) (Gueye 1977:39–43).

- Ocean currents

Two currents were present along the Senegambian coast, the Canary Current "xiiru gopp" and the Canary Current "xiiru kaw". The cold Canary Current dominated around the peninsula around December to April, it traveled north to south. The warm Equatorial Counter Current became stronger in May and over the Wet Season, it traveled from south to north.

- Tidal currents

It was known to the sailors of the Senegambian coast that the moon and tide were connected. During spring tides "waame" on fifteenth day of the lunar cycle the sea was known to be rougher. The neap tide "caal" around the fifth to tenth day of the lunar cycle was associated with a calm ocean. The currents kayai, xiir bu mag, ponc, ceendin, and reen interacted with these tides.

- Kayaf

Present at high tide, travels north, stronger in the wet season. Disappeared at low tide. Around thirty minutes to an hour after it disappeared the “reen” current appeared.

- Xiir bu mag: “xiiru suuf”

Brakes off from the Kayaf current when it loses strength and traveled more westward. More frequent during the wet season and “coroon” season.

- Reen: “ndaw tank”

Appeared at low tide and traveled south. Very important during the “noor” season.

- Ceendin

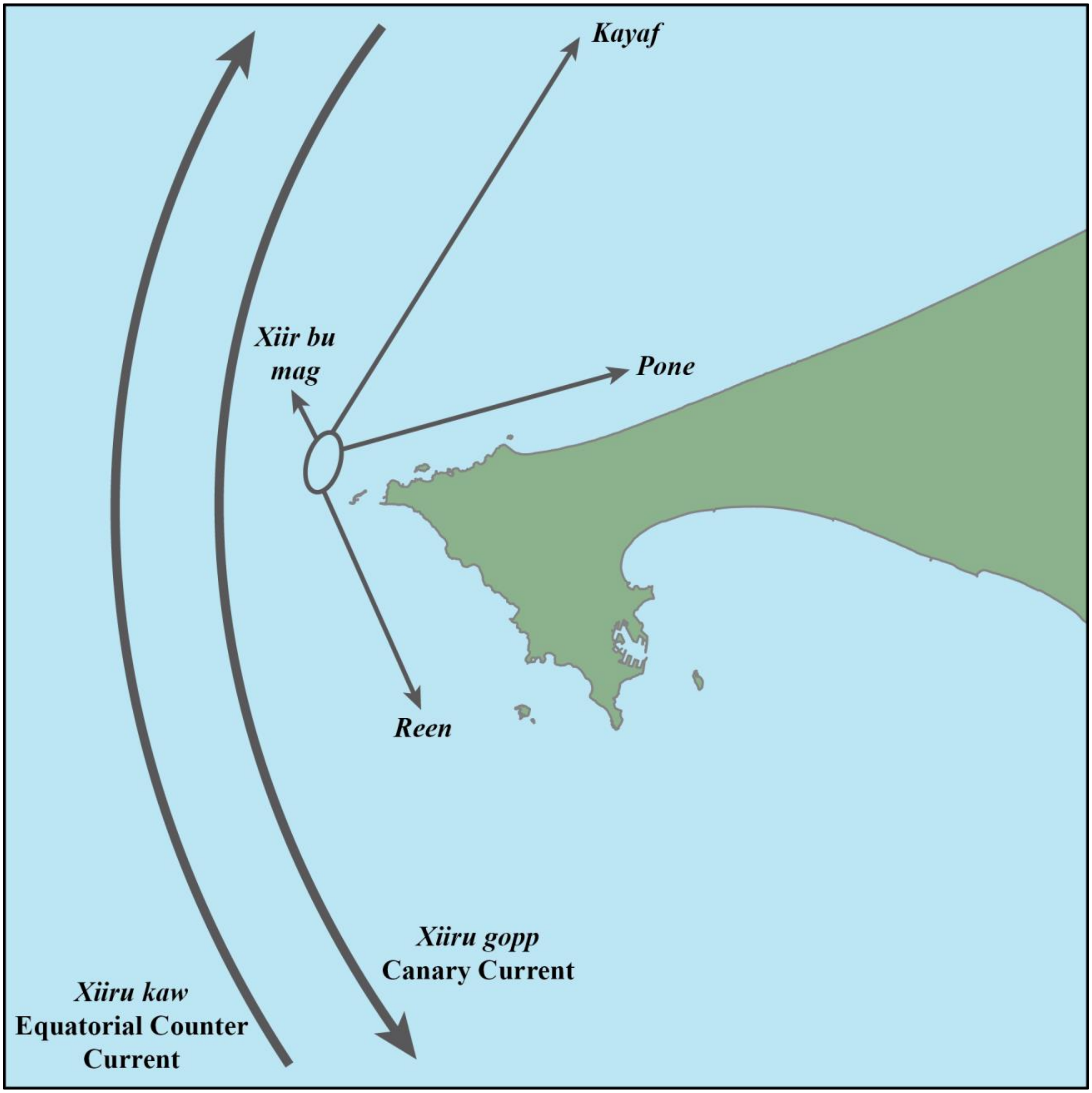
Appeared as the “reen” current was about the disappear, traveled east.

- Pone

Seemed to most often have appeared on the second or third day after the moon begins waxing, just before the neap tide. Senegambian sailors also described superimposed countercurrents, particularly on the south coast, these were called "nelaw bu nguri" and occurred mostly during the new moon. These could be observed by the movement of lines which went in the opposite direction of surface currents.

- "gannax": swell

The swell was variable depending on season. In the “noor” season the swell goes from north to south. In the "coroon" season the swell travels north. Senegambian sailors use the direction of the swell to orientate themselves.



Map 5.7.4.1: Currents around the Cape Verde Peninsula	Adapted from (Gueye 1977:42, Map 5)

5.7.5 <u>Talismans</u>

The people of the Cape Verde Peninsula were known to attach talismans to the front of their boats. These talismans were commonly referred to as “gris-gris" but in the Cape Verde

Peninsula, they were called “galat-gal” or “galaju-gaal” literally boat talismans (Balandier and Holas 1946:20; Gueye 1977:26). The only reference to these attached to boats before the twentieth century came from an 1875 source that described two hanging off carved ends of the front cover of a boat. These could be seen in the accompanying illustration (Illustration 3.2.26) (Anonymous 1875:126).

An 1865 source that discussed the Gambia mentioned the sale of wearable talismans (Photograph 5.7.1) which protect against drowning. There were two kinds, one for protection on the river, and another for protection at sea (Ministère de la marine et des colonies 1865:229)

Photograph 5.7.1: Fishers on the Petite Côte some of whom were wearing talismans. left necklace, right armband	From (Labitte 1930)

5.7.6 Spirits

The various aspects of Senegambian boat and water related religious belief recorded in primary sources were limited and spread over a wide region and many culture and separated by large amounts of time. It appeared many beliefs included the concept of spirits who resided in various locations, objects, and animals. These spirits often needed to be placated by ceremonies.

The most widely recorded spirit and associated ceremony was the spirit of Mamayungebi hill (Chart 5.7.6.1) (also referred to as Manidungabi and Manidungahy in sources) on the upper Gambia, Mama Yunkume. This ceremony seemed to have varied but always included the bearing of the exposed butts of the passengers and crew of passing vessels towards the hill. Sometimes over the side of the boat, sometimes dancing, singing, bowing, clapping their hands, or reciting lines "to the effect that he has inherited this part of his body from his father and mother (Reade 1864:332)". Both men and women preformed this and Europeans often did as well although it seemed the sometimes hired others to do it in their place. It was recorded as early as 1684 and through the nineteenth century. To not perform the ceremony was to invite the wrath of the spirit, one story was told about how a man who neglected the ritual was never able to sit down again. Another was that those that would not would die, a third that the spirit would inflict terrible stomach pain (Moore 1738:263; Poole 1850:146–148; Reade 1864:332; Morgan 1864:100–101; Mitchinson 1881:455; Gamble 1967:103; Coelho 1985:Chapter 2, 20; Brooks 1993:18).

Similarly to the hill in the Gambia, Cape Naze (Chart 5.7.6.2), half way between Rufisque and Mbor had the spirit Kurnba Tyupan who also had a ceremony of exposing the sailors butt to the cape to appease the spirit to prevent it from ruining their voyage. In addition, other notable spirits occupied other parts of the Senegambian coast. These were the female spirits Mame Cournba Castel at Goree and Mame Cournba Lambaye at Rufisque as well as the male spirit Leuk Daour M'Baye at Cape Verde. Sangomar Point (Chart 5.7.6.3), a dangerous area at the mouth of the Sine-Saloum Delta was believed to host a whole community of spirits (Gamble 1967:103; Brooks 1993:16, 18).

A source from 1919 on the people of Fadiout described the “Tyahanora”, perhaps a matrilineal group, who were “lords of the sea” and from them a “king” was chosen to make sacrifices to the sea spirit, the spirit was in the form of a lizard living in a hollow baobab tree, and attract fish to the coast. If the “king” failed to attract fish they could be deposed (Gamble 1967:102–103).

A 1785-1788 source from around the Petite Côte described that after the death and burial of a famous fishermen or hunter they were unsuccessful in fishing and hunting that their misfortune was the result of angry spirits of the dead. If after prayers their misfortune persists they go into tombs and seek to break the curse with spells (de Villeneuve 1814b:130–131). A 1805 source recorded a belief that nobles under a curse due to a tree spirit if they set foot on a ship or island believing that it would sink, others that they would die if they saw salt water (Spilsbury 1807:14). An 1859 source recorded the belief in Rufisque that shells on the beach were inhabited by ancestral spirts, seemingly those sailors lost at sea gone to join the spirits under the ocean, whose complaints and songs could be heard when holding them to the ear. The people appeared to have not allowed people to take shells from this beach for that reason. Sailors who go missing were though to be visiting with the spirits under the sea in their underwater palaces from which they rarely returned. The people of the area appeared to have held the ocean spirits in veneration (Charton 1860:34).

A belief among the inhabitants of Saint Louis was that throwing waste into the sea would anger the spirts who would destroy their homes and drown their sailors (Gruvel 1908:72). Okhem, okenim or okhes (Illustration 5.7.1), places of offering, enclosures made of branches surrounding stakes with the skulls of what were likely dolphins and filled with fishing related detritus such as the remains of sea creatures like fish, crustations, and the bones as well as rope and fiber rings. This was seemingly done to placate the spirits of the ocean (Corre 1883:18; Corre 1964:17). Presumably this was how waste was properly disposed of as throwing it into the water would bring the wrath of the spirits on them as the people of Saint Louis also believed.

Illustration 5.7.1: Okhem, place of offering to the spirits of the sea	1876-1877, from (Corre 1883:17)	Drawn from firsthand observations

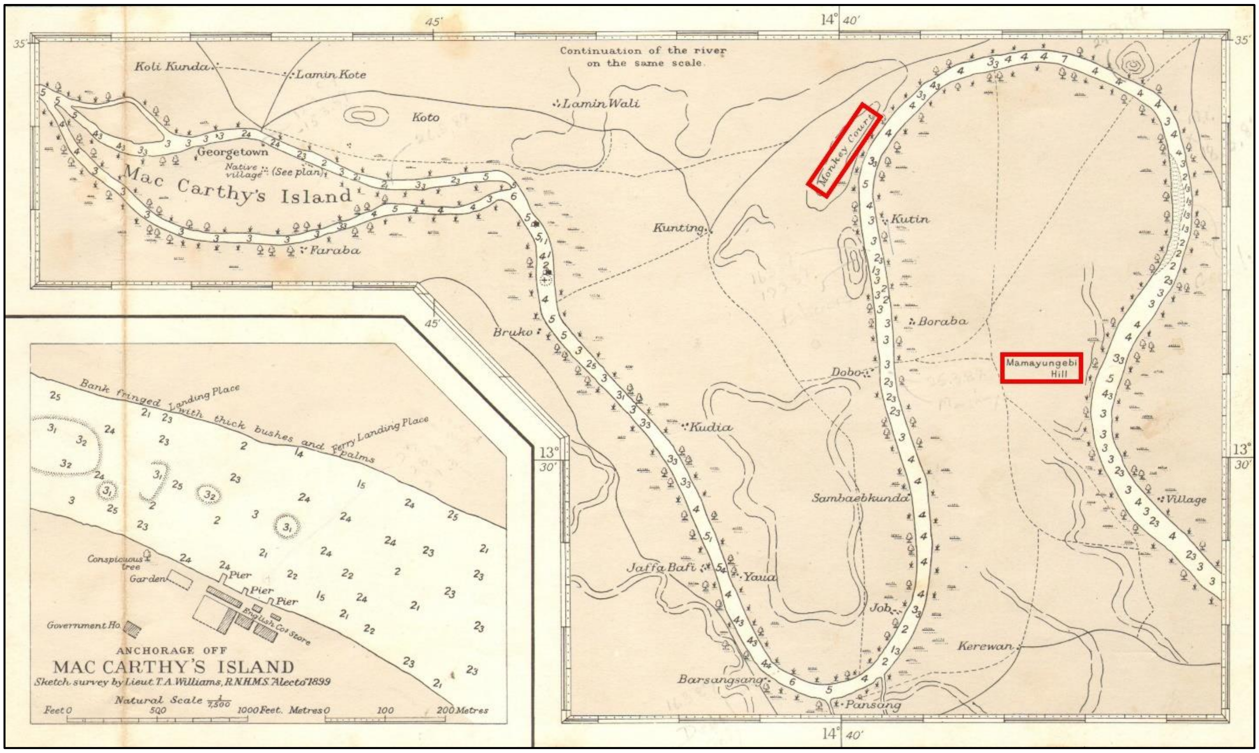


Chart 5.7.6.1: Upper Gambia River	From (British Admiralty 1942b)

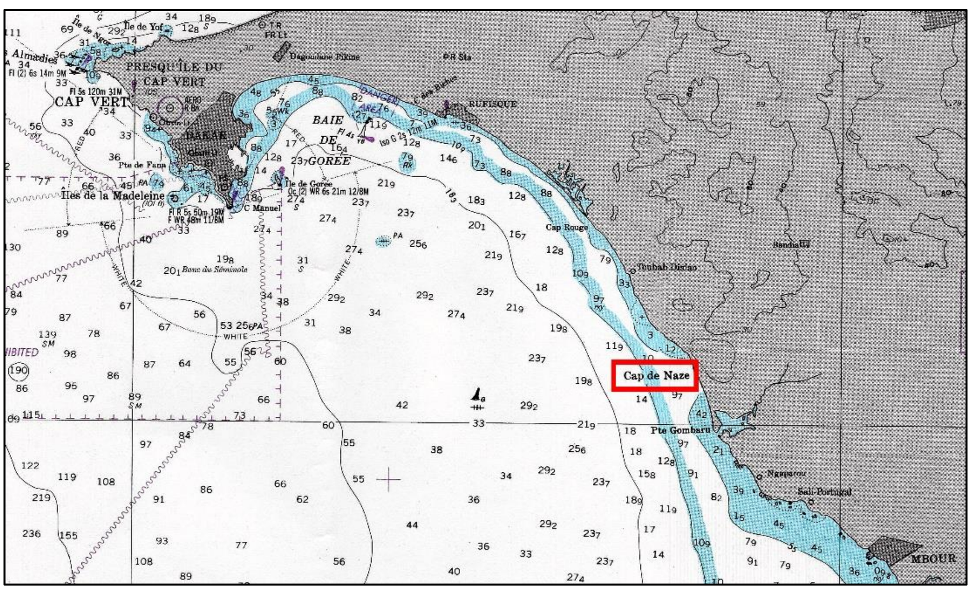


Chart 5.7.6.2: Cape Naze, Petite Côte	From (Defense Mapping Agency Hydrographic Center 1996)

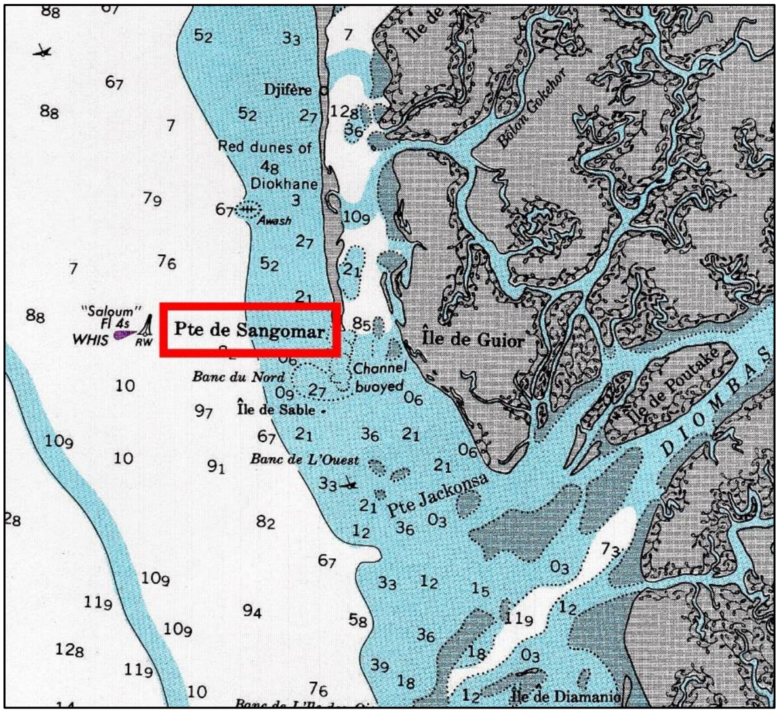


Chart 5.7.6.3: Sangomar Point, Sine-Saloum Delta	(Defense Mapping Agency Hydrographic Center 1996)

5.7.7 Superstitions and ceremonies, and death

An 1881 source described a hill on the upper Gambia, near Mamayungebi hill, which was inhabited by large amounts of monkeys (baboons) who gathered there which was called Majombo-me, "monkey hill" (Chart 5.7.6.1). Similar to Mamayungebi hill people danged in front of it when passing

(Mitchinson 1881:455–457).

A 1620-1621 source recorded a marabout providing protection from a dangerous crocodile (Purchas 1625a:288). A 1723 source recorded a religious ceremony on the Gambia involving among others things the paddling of boats (Moore 1738:22). Around the Cape Verde Peninsula around 1845-1848 a funeral procession was recorded as the coffin was transported by boat followed by other boats (de Pina 1972:249). In a 1881 a marriage procession was also record to have taken place on the river (Mitchinson 1881:208–209). A 1785-1786 recorded a tradition among the people of Goree and Saint Louis where when a man embarked on a crossing of the ocean his wife would follow him to the shore and sometimes swim out in the water to follow the ship. When she returned to shore she would gather the sand that his last footsteps were made on in a cotton cloth which was then placed at the foot of her bed (Durand 1806:117).

A 1606-1609 source asserted that the people of the Cape Verde Peninsula believed that the dead turned white and returned in ships in order to trade and visit friends but did not want to be recognized due to being rich (Thilmans and De Moraes 1977:488). Another source talked about the often repeated description of the bodies of dead griots as if buried in the ground or sea as poisoning the area and so they were put in trees (Raffenel 1846:19). A 1935 study described the Saint Louis fishermen's cemetery (Photograph 5.7.2) as covered with fishing nets, the reason the residents gave was to protect the graves from animals. They also described the "Sefali/Safali" and the "Sorah/Sohor" ceremonies. They to have been rather complex and intended to ensure the safety of fishers (Leca and Labouret 1935:105–106). A translation of the description of the ceremony was provided below:

> The ceremony of Sefali or Safali had fallen into disuse around 1928. But in 1932, accidents occurred at sea - the fishermen interpreted them as divine sanctions - and they considered it opportune to re-establish the custom. However, it has lost its absolute character from the past, when all fishing was prohibited from November to February. The sailors take out their boats, but do not stray too far from the coast, so that they take few large fish (dyâkhofèt, rur). They did not work safely and successfully on the high seas until after the campaign had opened.
>
> It is in February that three or four notables, at the request of the fishermen, will notify the chief of the Lodo district, Abdullah Gaye, of the opportunity of the moment. The latter then goes to the Gaye family, whose members have the social function of performing the rites of the ceremony; the oldest among them, still capable of leading a crew, sets the date for the nearest Monday or Thursday; he

receives 20 to 25 francs from the district chief for the purchase of millet (dugup u suno). His sister, but not his wife or wives, share the right to receive cash or proceeds in kind. It is she who entrusts the millet to pre-pubescent girls (halèlbu dyi sogul dèrat, who have not yet had blood) to be, by double pounding, freed of the bran and reduced to flour after washing. It is also she who prepares, on a pot with holes, the coarse cous-cous or karaw whose lumps are similar to large lentils, and to which honey and curdled milk are added. However, the day before the ceremony, the marabout wrote down on his tablets (aluo) some verses from the Koran.

He washes them in water, then collects the liquid (safro), leaves it to stand overnight. In the morning, at the northern end of the beach, in a calabash that has never been broken or repaired, the safro is brought. The four fishermen wash their hands and foreheads, the youngest of the crew takes a handful of the meal from the second calabash, eats it, then another, which he throws into the sea. south, and about every five steps, it starts again. After having walked along the entire shore in front of the village, he carries the rest of the food that is finished by the young children back into the boat.

The marabout's water is thrown over the canoe, from front to back.

Everything is ready. The boat leaves alone. The catch is distributed on the way back, and the next day, the Guet Ndar fleet sets sail.

Sorah or Sohor is on the river the counterpart ceremony of the preceding one.

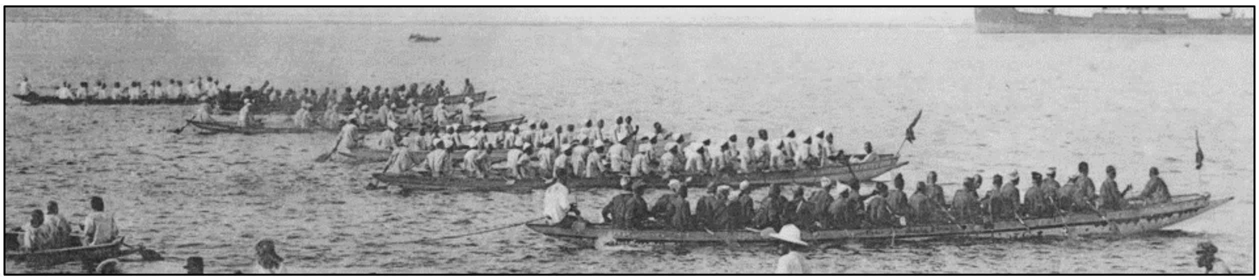
In a first investigation, participated old men and a woman, called Syèn, in whose family we perform the ritual operation. The old men claimed that Lut was happening as if at the sea. The woman said the opposite, though she refused to speak. Details obtained below suggest that the ceremony does not take place on a specific date; in addition, there is no intervention by the neighborhood chief or the marabout. It is a woman alone who acts, after preparation of the millet by the pre-pubescent girls. The avowed aim of all this is to avoid accidents, loss of material, drownings, etc. Another version confirms these general features but adds that, in order to be effective, millet must be continuously pounded by young girls; on the other hand, the "meal" consists of lumps of curdled milk and sugar; finally, the ceremony takes place during the rainy season "when the river has fresh water", at sunrise, in a boat, without a special formula being pronounced. According to this informant, the families of the fishermen were once "in the river", and once again, the ceremony is intended to avoid any possibility of accidents. (Leca and Labouret 1935:105–106)

Photograph 5.7.2: Fisher’s cemetery in Guet Ndar, Saint Louis	(Bonnardel 1985:26h, Plate 24)

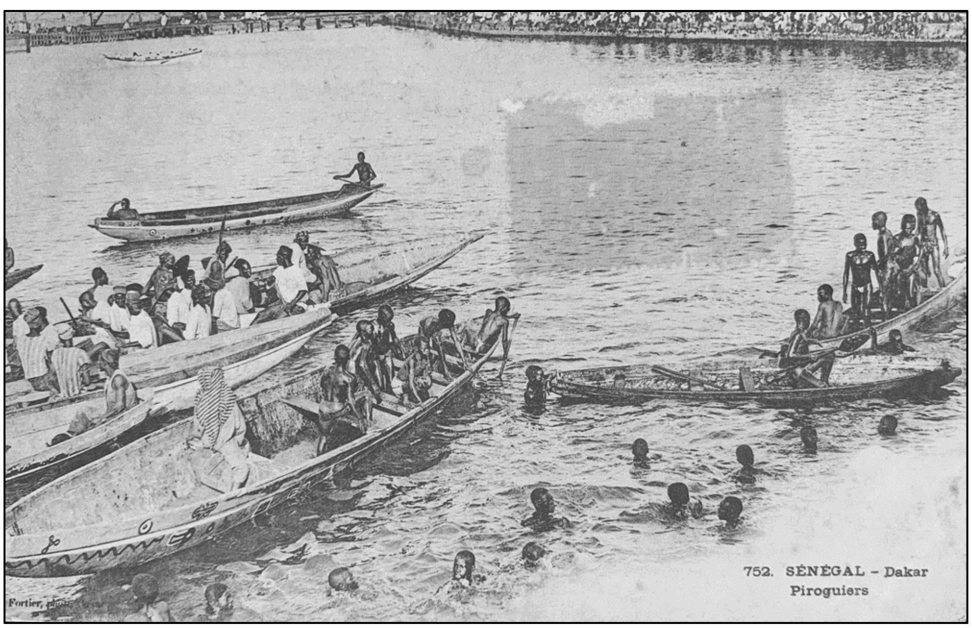
5.8 *Recreation landscape*

The information on recreational use of boats in the past was scarce but several kinds could be observed in the nineteenth, twentieth, and twenty-first centuries. Watercraft races (Photograph 4.3.16, Photograph 4.4.1) appeared to have been around from at least 1865 around the Cape Verde Peninsula and around the Senegal River (Anonymous 1865b:140). This racing tradition continued into the present. Boats appeared in many photos to have also been used for recreation and gathering in the water where swimming also took place (Photograph 4.5.7, Photograph 4.4.2, Photograph 4.4.3). Children were also frequently seen in boats and child sized boats playing and learning how to paddle watercraft (Photograph 5.8.5, Photograph 5.8.6, Photograph 5.8.7, Photograph 5.8.8, Photograph 5.8.9, Photograph 5.8.10, Photograph 5.8.11, Photograph 5.8.12, Photograph 5.8.13).

Photograph 5.8.1: Racing boat around St. Louis	From (Tacher Unknown)

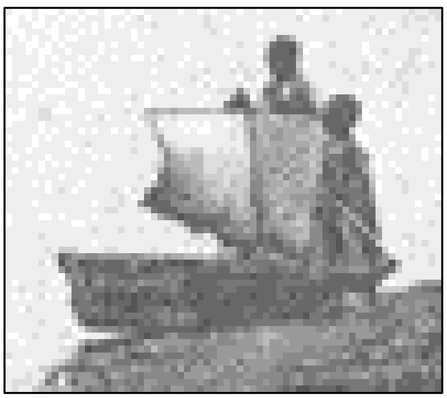


Photograph 5.8.2: Racing boats around the Cape Verde Peninsula	From (Edmond 1909s)

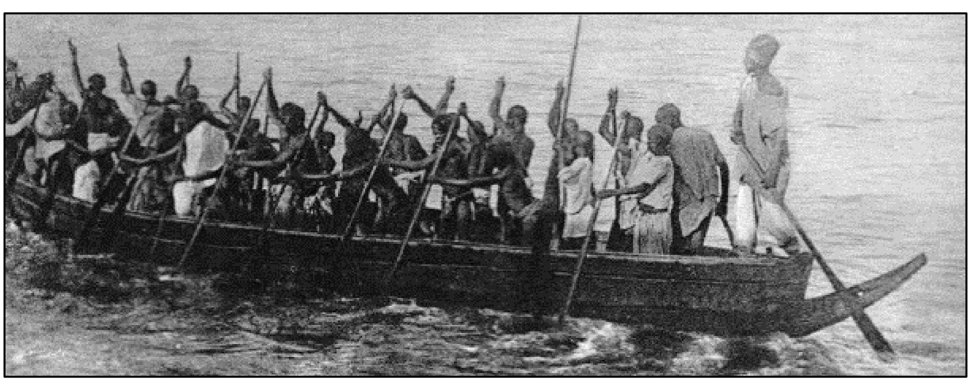


Photograph 5.8.3: Boats and swimmers around the Cape Verde Peninsula	From (Edmond 1902n)

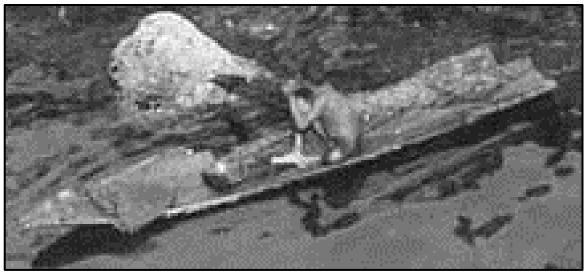
Photograph 5.8.4: Boats around the Cape Verde Peninsula	From (Edmond 1902l)

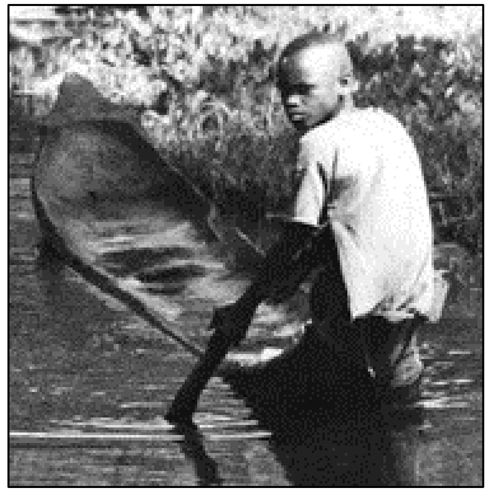


Photograph 5.8.5: Children next to a small boat with a sail, Senegal River	Photograph 5.8.6: Child on a boat, Cape Verde Peninsula
From (Edmond 1902a)	From (Edmond 1909t)



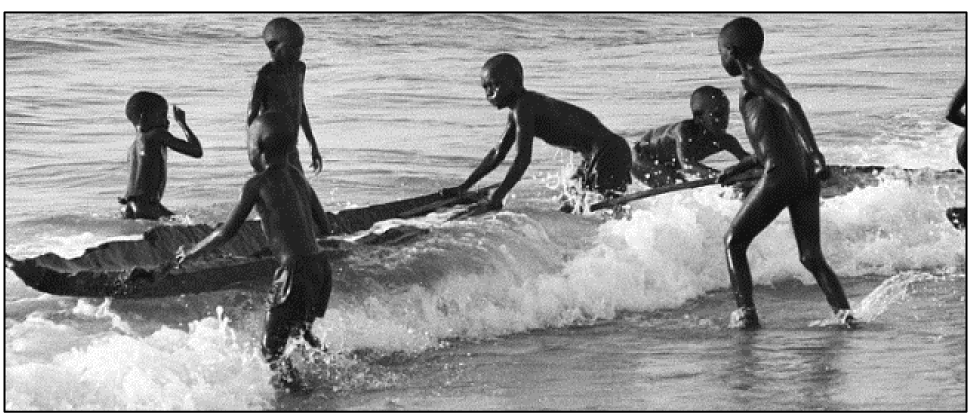
Photograph 5.8.7: Children paddling a boat, uncertain location	From (Unknown Unknown)





Photograph 5.8.8: Child on a rough boat in the Gambia	Photograph 5.8.9: Child on a boat in the Gambia
From (Brinkmann 1906)	From (Martinsson 1968b)

Photograph 5.8.10: Children on boats, Senegal River	From (Staatliche Mussen zu Berlin 1911)



Photograph 5.8.11: Children on a rough boat	From (Elisofon 1970c)

Photograph 5.8.12: Children in boats in the Cape Verde Peninsula	Photograph 5.8.13: Child on a boat, uncertain location
From (Elisofon 1970d)	From (Hartmann 1961)

CHAPTER 6: CONCLUSIONS

The primary objective of this research was synthesizing existing data on Senegambian watercraft tradition and describing what the tradition was, how it changed, and why. This objective was successful but by the necessity of length limitations and available data was not able to describe the whole tradition in equal detail and was unable to locate sufficient data on the emphasis area of The Gambia to answer all questions about the tradition and landscape there. The boats of the Senegal River received far less attention than coastal boats and the boats of the Gambia River due to the impracticality of describing entirely different methods of construction and design within the limits of this thesis.

The most important section of this thesis and the section intended to serve as the foundation of future research was the comprehensive description of Senegambian boat design and construction and the synthesis of data on Senegambian boats. This section along with the study of maritime cultural landscape were the more successful parts of this research.

The study of watercraft in Africa, in general, was limited and this research should serve as an important contribution to the existing literature. The is research in answering many questions has also shown that many more exist and needed investigation. These include topics such as the construction of Senegal River frame-based watercraft, the origin and purpose of Gambia River shell-based watercraft, and the evolution of Senegambian watercraft in the twentieth century. Also in need of investigation were the maritime cultural landscape of parts of Senegambian outside the Gambia River, and more investigation into the Gambia Rivers maritime cultural landscape. Outside of this Senegambian watercraft also needed detailed analysis in the context of other factors outside the maritime cultural landscape such as economic and political contexts. In addition, far more work needs to be done recording existing Senegambian watercraft and artifacts in museum collections and studying modern Senegambian watercraft in Senegambia. Work also needs to be done studying the archives and collections in Senegambia and gathering information from boatbuilders there. More study will always reveal more questions in need of answering.

There were sources that were discovered too late to integrate into this research. This includes the manuscript “Voyage à Joal” which contained illustrations of mid nineteenth century boats from the Cape Verde Peninsula to the Sine-Saloum Delta and unknown information in hand written French text (Boilat 1846). This manuscript does not change interpretations already presented but does reinforce them. Also the book U*ndercurrents of Power Aquatic Culture in the African Diaspora* which provided an overview of African and African diaspora maritime technology and culture which touched on many points discussed in this research but often less depth and over a broader region (Dawson 2018). The report *A Preliminary Account of Attempts to Introduce Alternative Types of Smallcraft Into West Africa* was the source of information from *Canoes in Ghana* and contains additional information on Senegambian watercraft (FAO 1985). A largely unexplored avenue of inquiry was linguistics and historical grammars which systematic review of could reveal connections.

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APPENDIX A

This appendix contains data, diagrams, and images of paddles for reference.

Paddles from: (Leca and Labouret 1935:57–58)

Provenance: Saint Louis

<u>Large steering oar (watu-lahu)</u>

- Shape: Kite
- Total length: 1.72 m
- Blade width: 24 cm
- Shoulder taper: 70 cm
- Tip taper 16 cm
- Blade thickness: 1.5 cm
- Shaft length: 86 cm (equal to blade length)
- Shaft thickness at blade: 8 cm
- Shaft thickness at end: 3 cm

<u>Paddle (watu-dyou)</u>

- 1/2 or 2/3 size of steering oar (86 cm to 1.15 m)
- Notes: Steering oar shafts could be extended by lashing more handle on with cord. Highly variable dimensions.

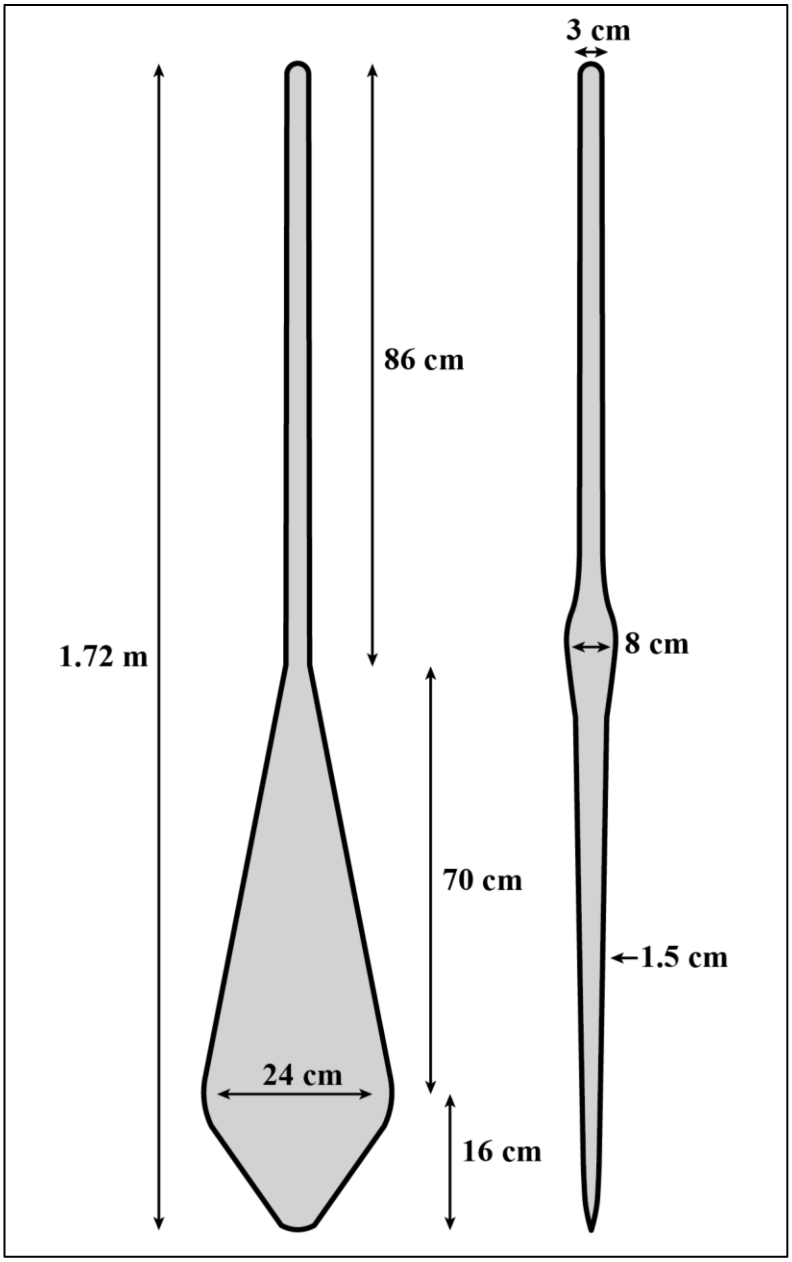


Diagram of paddle with mesurments	Adapted from (Leca and Labouret 1935:58), not to scale

Paddles from: (Postel 1950a:124)

Provenance: General Senegal

<u>Steering oar</u>

- Shape: narrow and straight bladed with short shaft

<u>Paddle</u>

- Blade shape: Leaf blade
- 1m to 1.10m long

Paddles from: (Balandier and Mercier 1952:157)

Provenance: Cape Verde Peninsula

<u>Large steering oar (dyéir)</u>

- Shape: kite blade with shaft and blade same length
- Length: 1.75 m
- Blade width: 25 cm
- Note: Measurements for steering oar were almost identical to Leca and Labouret and so may be borrowed (1935:57–58)

<u>Paddle (dyu)</u>

- Shape: Leaf blade

- Total length: 1 m to 1.2 m
- Shaft length: 70 to 80 cm
- Blade length: 30 to 40 cm

Paddles from: (Diop 1963:39)

Provenance: Saint Louis, possibly Cape Verde Peninsula

- Both steering oar and paddle
- Shapes: Kite

Paddles from: (Gueye 1977:28)

Provenance: Cape Verde Peninsula

<u>Steering oar (jayir)</u>

- Shape: Narrow bladed
- Total length: 4.50 m
- Shaft length: 1.50 m
- Blade length: 2 m
- Throat: 1 m (estimated but not included in study)

<u>Paddle (jowu-tog)</u>

- Shape: leaf blade

- Total length: 1.30 m

Paddle from: (Quai Branly Museum 1931f)

- Shape: Leaf blade
- Total length: 152/154.5 cm
- Blade width broken: 17.5 cm
- Blade width reconstructed: 22 cm
- Blade length: 49 cm (measured by picture)
- Shaft diameter: 3.5 cm
- Weight: 1.251 kg
- Material: Rosewood (*pterocarpus erinaceus*)
- Provenance: Cape Verde Peninsula
- Notes: Broken blade, Outline added

Paddle from: (Museum Volkenkunde Unknown)

- Shape: Leaf blade
- Total length: 146 cm
- Blade width 17.5 cm
- Blade length: 40 cm (measured by picture)
- Shaft diameter: 3 cm (measured by picture)
- Weight: Unknown
- Material: Unknown wood (probably rosewood)
- Provenance: Sine-Saloum Delta
- Notes: Painted blade

Steering Oar from: (Quai Branly Museum 1931e)

- Shape: Narrow blade
- Total length: 2.75 m
- Blade width: 16 cm
- Blade length: 176 cm
- Shaft diameter: 9.5 cm
- Weight: 4.525 kg
- Material: likely rosewood (probably misidentified as oak)
- Provenance: Cape Verde peninsula
- Notes: Very damaged. Appeared to be assembled from two separate pieces of wood held together by a rectangular piece of wood inserted into a carved-out slot and nailed. A square of lead tacked onto bottom. Paddle appeared to have multiple holes drilled in it of unknown purpose and was cracked at the hole drilled through the shaft.

Digital assembled to show shape, blade mirrored and so was showing the opposite side.

Paddle from: (Labouret 1933b)

- Shape: Between a kite and leaf blade shape
- Blade width: 5.5
- Blade length: 18.8 cm
- Blade thickness: .5 cm
- Weight: 12 g
- Material: Wood (unknown type)
- Provenance: Saint Louis
- Notes: Missing shaft, was likely a separate piece attached with cord by overlapping the protruding tang. Weight seemed extremely low, possible very worn.

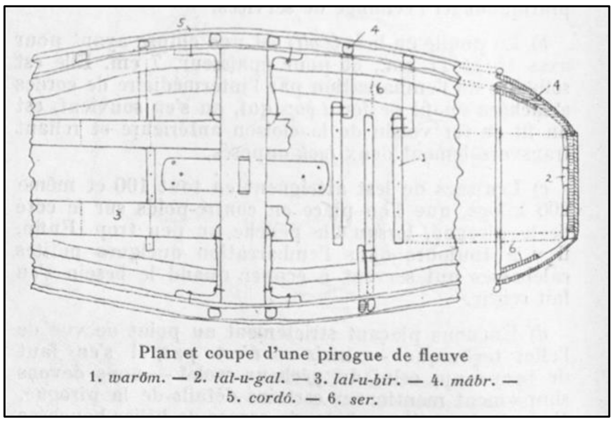
Paddle (unknown type, likely steering oar) from: Gambia National Museum

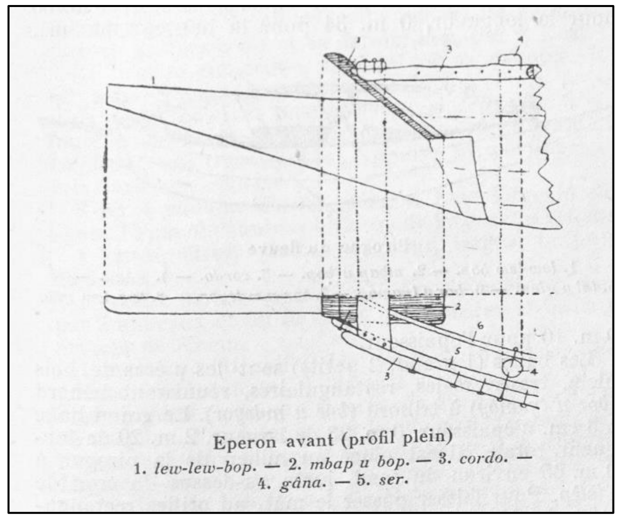
- Shape: Narrow blade
- Material: Wood, iron, cord
- Provenance: Gambia
- Notes: Damaged. On display at the Gambia National Museum. Blade bound to shaft with two wrapped cords. Tip reinforced with iron and tacked on, possibly for weight.

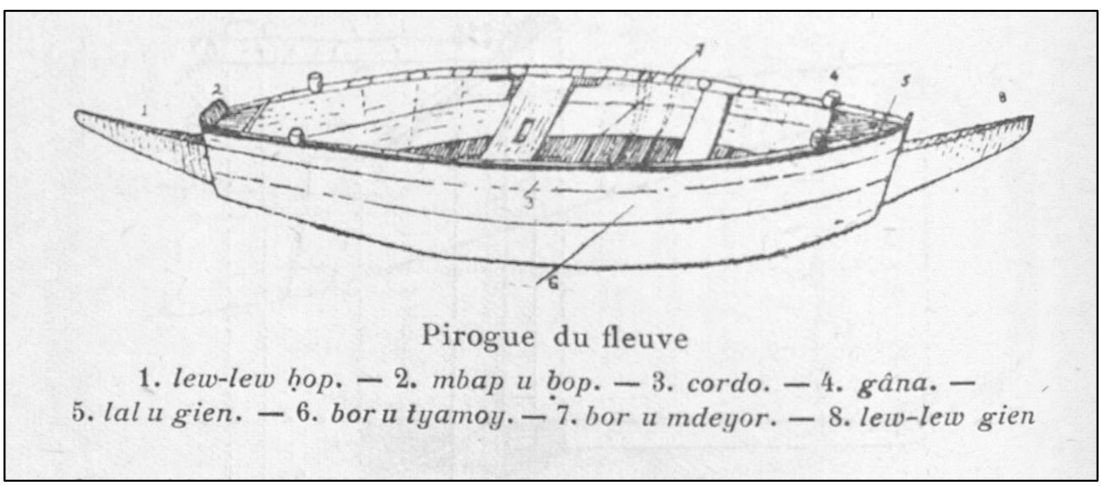
APPENDIX B

This appendix contains scantling tables, information, and diagrams from studies some of which were used in this research. This collection of tables and diagrams are not intended to be comprehensive and is presented here for reference.

Les pêcheurs de Guet N'Dar, avec une note ur les Wolof, leur parler, les langages secrets (Leca and Labouret 1935)								**1935**	**Saint Louis**
Type	Length+cutwaters	Length	Beam amidships (top)	Beam amidships (middle)	Beam amidships (bottom)	Depth	Strakes	Cutwaters	Length-Width Ratio
Coastal Extended Logboat	15 m	10 m	1.7 m	1.3 m	.9 m	.6 m	2	1.96 m (x2)	1 to 8.8
Senegal River Frame Based	9-11 m	8-6 m	2.2 m	1.95 m (estimate)	1.7 m	.65 m	3	1.5 m (x2)	1 to 4.1



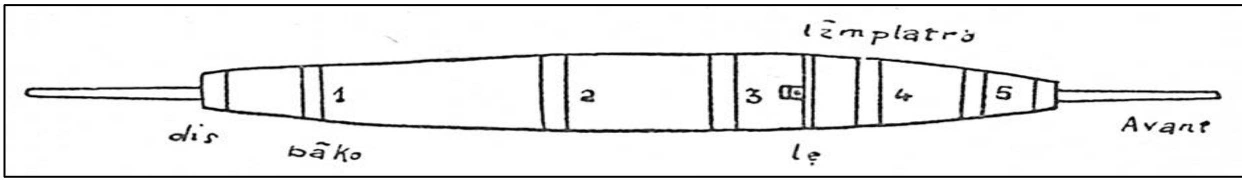


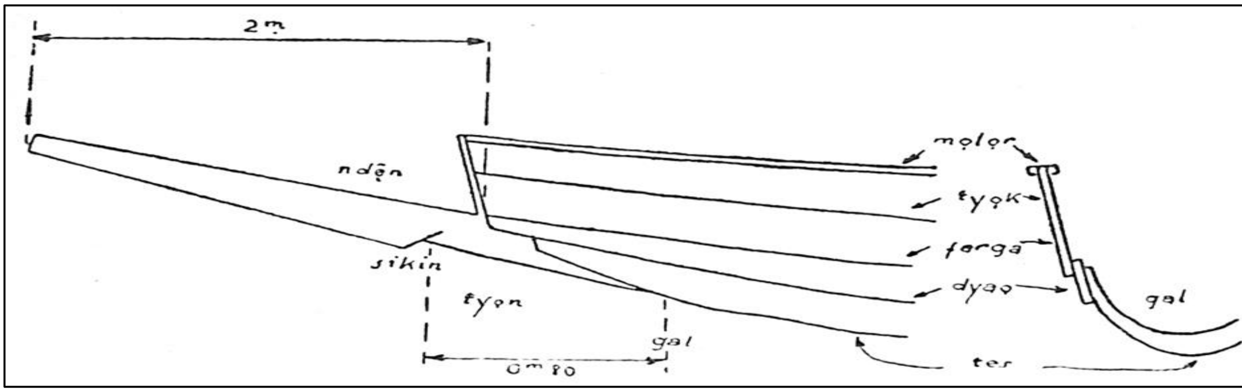


Frame based Senegal River boat diagrams	Top left (Leca and Labouret 1935:64), top right (Leca and Labouret 1935:65), bottom (Leca and Labouret 1935:66)

La pêche au Sénégal (Postel 1950a)	**1950**	**Senegal General**				
Type	Length+cutwaters?	Width	Depth	Crew	Length-Width Ratio	Length-Depth Ratio
Small extended logboat	6-7 m	.8 m	.5 m	1	1 to 7.5 / 1 to 8.76	12-14
Medium extended logboat	8-10 m	.8 m	.6 m	4.5	1 to 10 / 1 to 12.5	13.3-16.7
Large extended logboat (Transport boats)	15 m	?	?	?	?	?

Les pêcheurs Lebou du Sénégal particularisme et évolution (Balandier and Mercier 1952)			**1952**	**Cape Verde**
<u>Type</u>	<u>Length+cutwaters?</u>	<u>Beam</u>	<u>Depth</u>	<u>Length-Width Ratio</u>
Small Coastal Extended Logboat	10 m	1.1 m	?	1 to 9.1
Large Coastal Extended Logboat	14 m	1.4 m	.6 m	1 to 10





Diagrams of a large Senegambian boat from the Cape Verde Peninsula	Top (Balandier and Mercier 1952:153), Bottom (Balandier and Mercier 1952:155)

La peche maritime au Senegal (Diop 1963)			**1963**	**Petite-Cote**		
Type	Length+cutwaters?	Length	Cutwaters	Beam	Width at bottom	Depth
Light Boat	6.80 m	?	?	0.80 m	0.50 m	0.70 m
Heavy Boat (9-14 m class)	11.00 m	?	?	1.70 m	1.67 m	0.85 m
Boat Diagram	9.80 m	7 m	1.55 m (x2)	0.90 m	?	0.60 m

Capacity	Total weight	Sheer (height/length)	Height of Strakes	Draft	Length-Width Ratio	Length-Depth Ratio
600 kg	300 kg	0.15/3.4 m	0.35 m	0.10 m	8.5	13.6
1,200 kg	650 kg	0.40/5.5 m	?	0.15 m	6.5	12.9
?	?	?	?	?	10.9	16.3

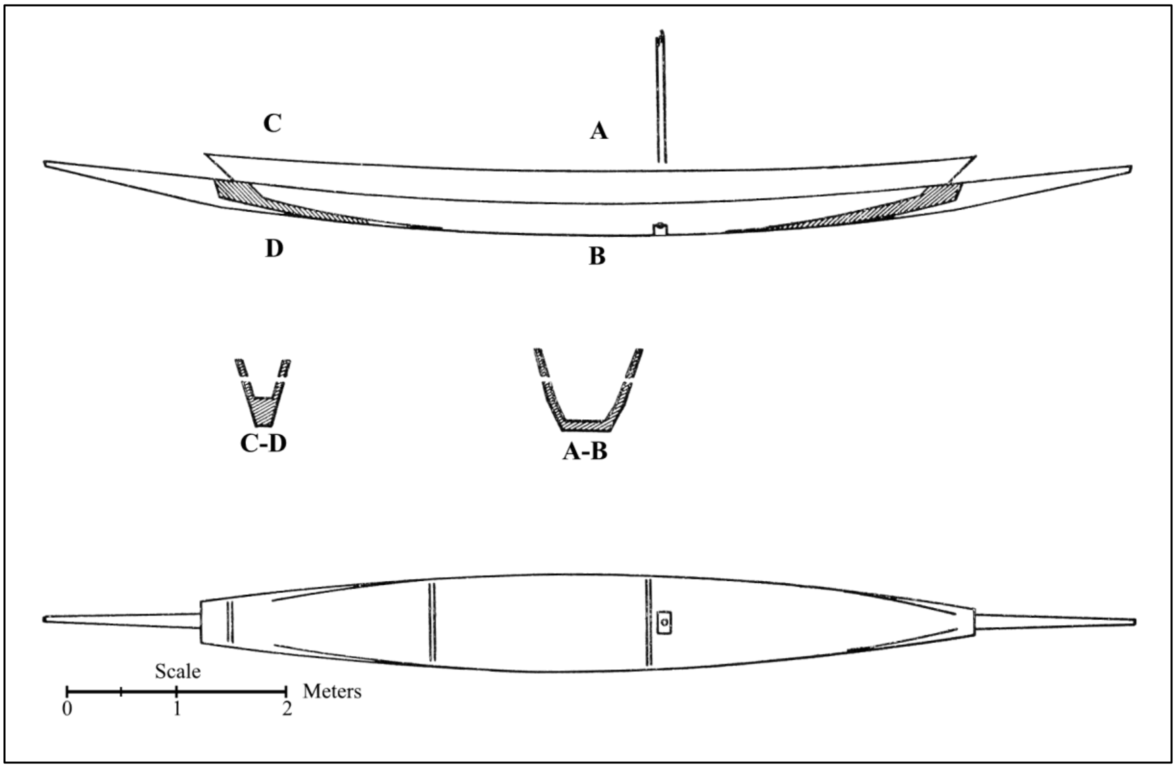
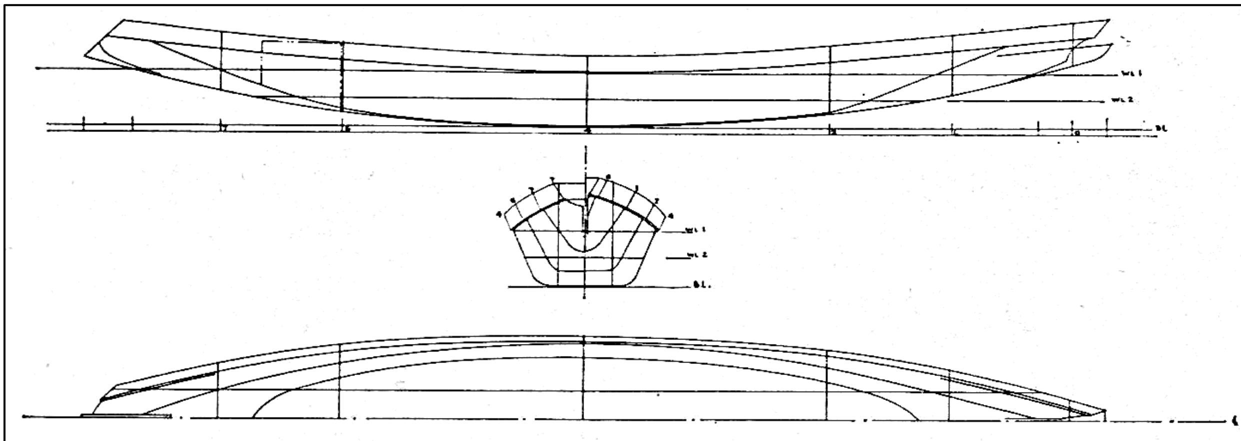


Diagram of large Senegambian boat	Translated, From (Diop 1963:38)

The Location and Shape of Engine Wells in Dug-out Canoes (Gillmer and Gulbrandsen 1967)					**1967**	**Cape Verde Peninsula**
Type	Length+cutwaters	Length	Beam	Depth	Length-Width Ratio	Length-Depth Ratio
Coastal Extended Logboat	9.5 m	8.7m	1.34 m	0.48 m	1 to 6.5	19.8



Lines of Senegambian boat from the Cape Verde Peninsula	From (Gillmer and Gulbrandsen 1967:335)

Catalogue des engins de pêche artisanale du Sénégal (Seck 1980)						1980	Petite-Cote
Type	Length+cutwaters	Length	Beam	Depth	Cutwaters	Width at bottom	Sheer
Cutter	15.30 m?	?	2.30 m	1.00 m	?	0.60 m	0.40 m
Boat Diagram (Cutter?)	13.37 m	9.37 m	1.58 m	0.80 m	2 m (x2)	0.27 m	0.30 m

	-						
Keel thickness	Height of Strakes	Total weight	Draft	Capacity	Engine	Length-Width Ratio	Length-Depth Ratio
0.07 m	0.44 m	900 kg	0.2	2,500 kg	20 to 25 hp	6.65	15.3
?	0.54 m	?	?	?	?	8.5	16.7

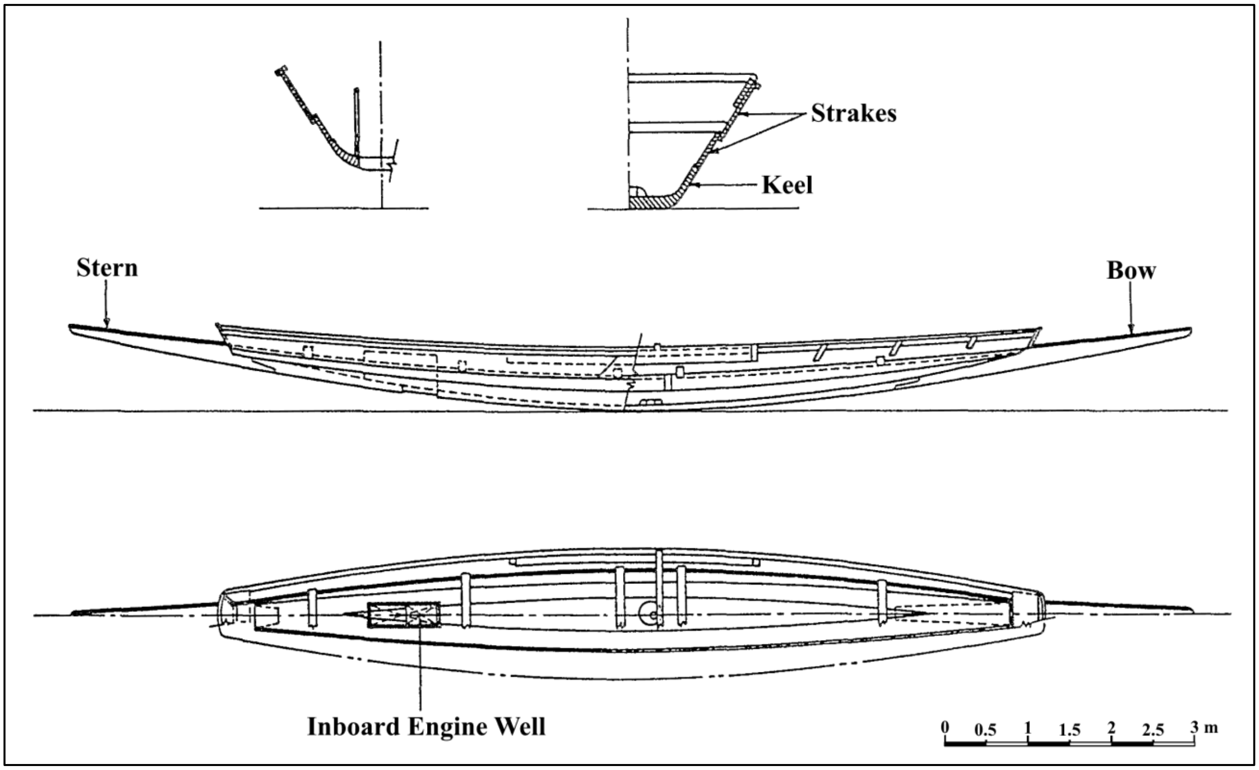


Diagram of a large Senegambian Cutter type boat	Translated, (Seck 1980)

La pêche piroguiére maritime au Sénégal, son évolution son introduction dans l'économie du marché (Lleres 1986)			1986	Niominka and St-Louis				
Type	Length+cutwaters	Length	Cutwaters	Bottom width (interior)	Beam (overall)	Depth	Length-Width Ratio	Length-Depth Ratio
Niominka Boat	16.80 m	?	?	0.46 m	2.05 m	0.90 m	8.1	18.6
St-Louis Boat	16.20 m	?	?	0.65 m	2.70 m	1.30 m	6	12.4
Small Boat 1	8.70 m	5.70 m	1.5 m (x2)	0.26 m	1.25 m	0.60 m	6.9	14.4
Small Boat 2	7.30 m	5 m	1.15 m (x2)	0.40 m	1.10 m	0.60 m	6.6	12.1
Carrier boat (purse seine) 1	21.66 m	18.20 m	1.73 m (x2)	0.72 m	2.56 m	1.34 m	8.4	16.1
Carrier Boat (purse seine) 2	22 m	?	?	0.90 m	3.60 m	1.5 m	6.1	14.1
Net Boat (purse seine) 1	19.80 m	16.50 m	1.67 m (x2)	0.72 m	2.13 m	2.22 m	9.2	16.2
Net Boat (purse seine) 2	18.20 m	15.50 m	1.60 m (x2)	0.60 m	1.80 m	1.10 m	10.1	16.5

Canoes in Ghana (Gulbrandsen 1991)				**1991**	**Senegal General**				
Type	Length+cutwaters	Length	Beam amidships (top)	Depth	Cutwaters	Strakes	Crew	Weight	Engine
Cutter (diagram)	18.9 m	16.2 m	2.85 m	1.13 m	1.35 m (x2)	3	15	3 tons	25-40 hp

Length-Width Ratio	Length-Depth Ratio
6.6	16.7

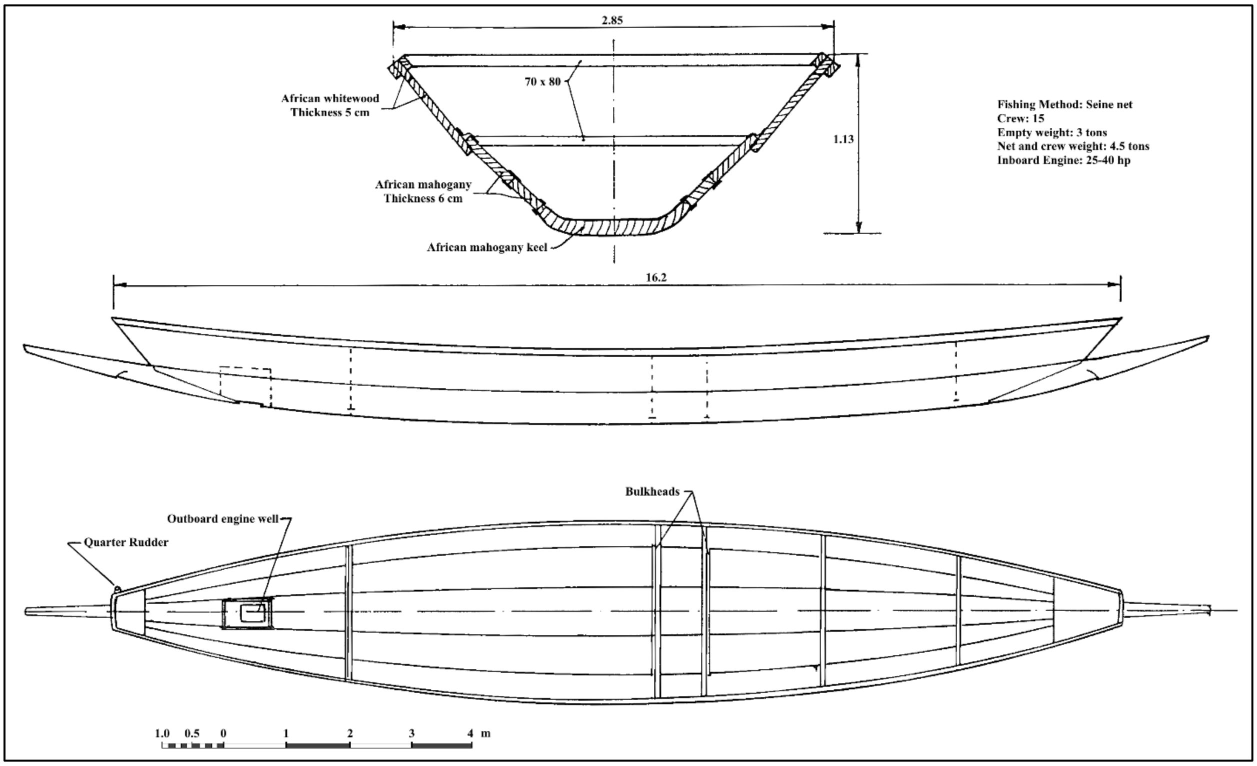
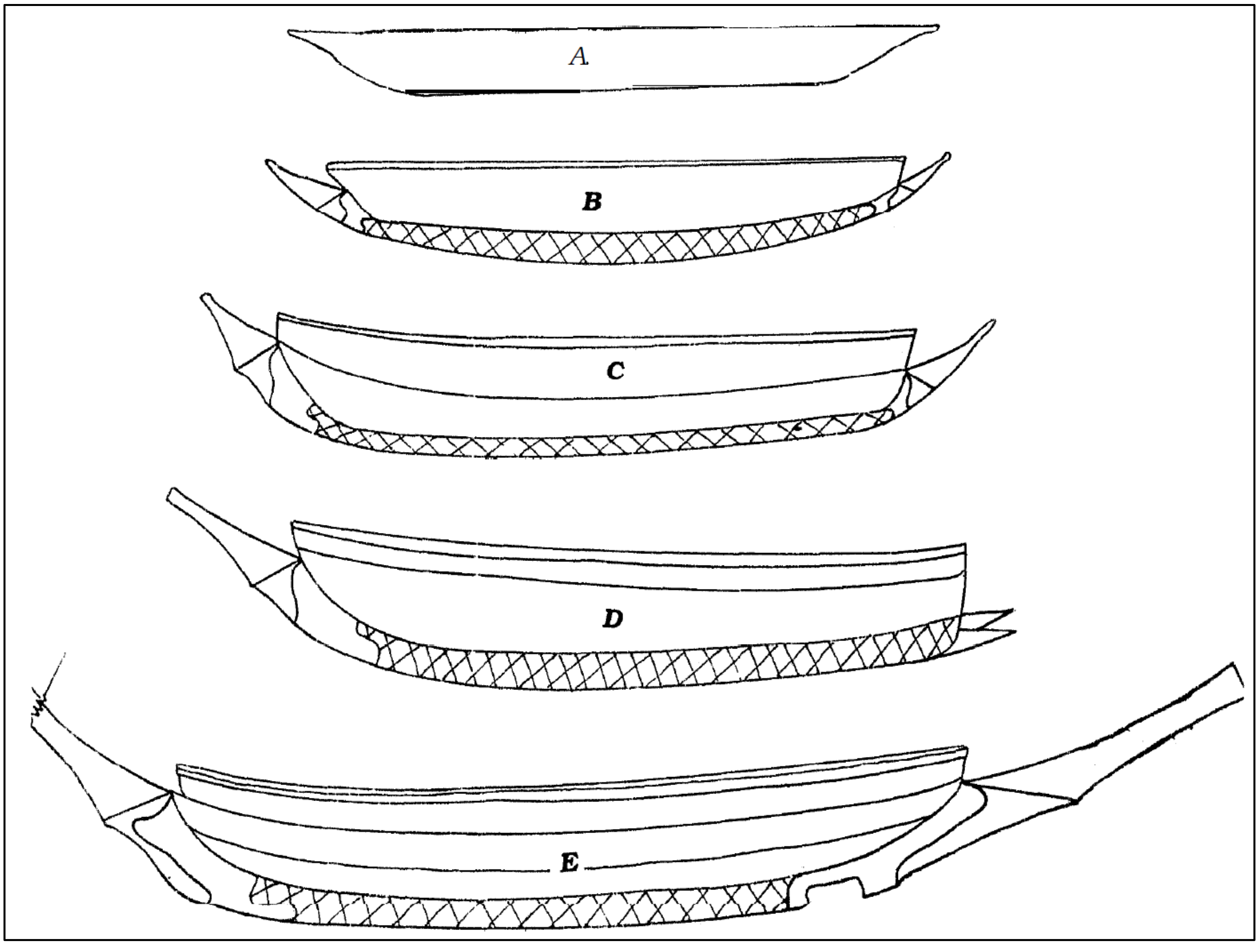


Diagram of large Senegambian Cutter type boat	Translated, from (Gulbrandsen 1991:35)

Typologie des engins et techniques de peche artisanale utilises au Sine-Saloum (Senegal) (Bousso 1994)							1994	Petite Cote	
Type	Length+cutwaters?	Beam	Depth	Capacity (tons)	Crew	Strakes	Engine	Length-Width Ratio	Length-Depth Ratio
Logboats and extended logboats (A)									
Average	7 m	0.7 m	0.8 m	1?	5-10	0-1	?	10	8.8
small	5 to 7 m	0.5 m	0.70 m	1?	5	0-1	?	10/14	7.1/10
large	8 to 9 m	0.90 m	1 m	1?	10	0-1	?	8.9/10	8/9
Isik sibong (B)	-	-	-	-	-	-	-	-	-
Average	9 m	1.5m	1 m	1-2	4-5	1	?	6	9
Small	8 m	0.5 m	.8 m	1	4	1	?	16	10
Large	10 m	1.8 m	1.2 m	2	5	1	?	5.56	8.3
Immanding (C)	-	-	-	-	-	-	-	-	-
Average	12 m	2 m	1.5 m	3-4	5-12	2	8-15 hp	6	8
Small	10 m	1.8 m	1.2 m	3	5	2	8-15 hp	5.6	8.3
Large	13 m	2.1 m	1.8 m	4	12	2	8-15 hp	6.2	7.2
Illebou (D)	-	-	-	-	-	-	-	-	-
Average	10 m	1.5 m	0.8 m	3? 1?	10? 3-5?	1+2 "beams"	6-8 hp	6.7	12.5
Small	9 m	1.2 m	0.7 m	?	?	1+2 "beams"	6-8 hp	7.5	12.9
Large	11 m	1.6 m	0.9 m	?	?	1+2 "beams"	6-8 hp	6.9	12.2
Ngueth (E)	-	-	-	-	-	-	-	-	-
Average	15 m	2 m	1.5 m	10-15	20-30	3 to 4	8-40 hp	7.5	10
Small	12 m	1.8 m	1.3 m	10	20	3	8-40 hp	6.7	9.2
Large	18 m	2.6 m	2.8 m	15	30	4	8-40 hp	6.9	6.4
Mbandory	-	-	-	-	-	-	-	-	-
Average	19 to 20 m	4 m	1.5-2 m	20-30	30 or more	4-5+	?	5	12.7/10



Diagrams of boat from the Sine-Saloum Delta	Rearanged, from (Bousso 1994:93)

APPENDIX C

This appendix contains tables of data for timber and other organic materials uses for nautical purposes in Senegambia. This collection of tables and diagrams are not intended to be comprehensive and is presented here for reference.

Timber	Scientific Name	Botanical Author Citation	Old Alternate Scientific Names	English Names
1	*Khaya senegalensis*	(Desr.) A.Juss.		African/Senegal/Gambia mahogany, Dry zone mahogany
2	*Ceiba pentandra*	(L.) Gaertn.	*Eriodendron anfractuosum*	Kapok, Silk-cotton
3	*Bombax costatum*	Pellegr. & Vuillet	*Bombax andrieui, Bombax houardii*	Red-flowered silk-cotton, Red kapok, Gambia silk-cotton
4	Likely *Picea* or *Abies genus*			Fir, Pine, Spruce
5	*Daniellia oliveri*	(Rolfe) Hutch. & Dalziel		West African copal, African copaiba balsam, Ilorin balsam, Accra copal, Benin gum copal
6	*Faidherbia albida*	(Delile) A.Chev.	*Acacia albida*	Apple-ring acacia, Winter-thorn, White-thorn, Ana
7	*Antiaris toxicaria*	Lesch.	*Antiaris africana*	Antiaris, Bark cloth tree, False iroko
8	*Milicia regia*	(A.Chev.) C.C.Berg	*Chlorophora regia*	Iroko, Rock elm, African teak, African oak
9	*Detarium senegalense*	J.F.Gmel.	*Detarium heudelotianum*	Tallow tree, Dattock, Detah, Ditakh
10	*Afzelia africana*	Sm. ex Pers.		Afzelia, Lucky-bean tree, African oak
11	*Mitragyna inermis*	(Willd.) Kuntze		
12	*Bambusa vulgaris*	Schrad. ex J.C.Wendl.		Bamboo, Common bamboo
13	*Oxytenanthera abyssinica*	(A.Rich.) Munro		Savanna bamboo, Bindura bamboo, West African bamboo
14	*Acacia nilotica*	(L.) Willd. ex Delile	*Acacia arabica, Acacia scorpioides*	Babul acacia, Scented thorn, Scented-pod acacia
15	*Pterocarpus erinaceus*	Poir.		Barwood, African/Senegal rosewood, Madobia, African kino, African teak
16	*Entandrophragma cylindricum*	(Sprague) Sprague		Sapele/Sapelli mahogany, Scented mahogany, West African cedar, Aboudikro, Assi, Assie, Muyovu
17	*Triplochiton scleroxylon*	K.Schum.	*Triplochiton nigericum*	African whitewood, African maple, Ayous, Obeche, Wawa
18	*Quercus* genus			Oak
19	*Albizia ferruginea*	(Guill. & Perr.) Benth.		West African albizia
20	*Terminalia superba*	Engl. & Diels		Black limba, Limba, Congo walnut
21	*Cocos nucifera*	L.		Coconut palm

French Names	Portuguese Names	Diola Names	Fula Names	Serer Names	Lebu Names
Bois rouge, Acajou caïlcédrat, Acajou du Sénégal	Acaju do Senegal, Bisselon, Mogno de Africa	Bu ririt, Bu kay	Kahi	Ngariñ	Xay
Fromager, Ouatier, Kapok	Mafumeira, poilão, Mufuma, árvore da sumaúma, Kapoc	Bu sana	Baŋtani, Bantan	Mbuday	Benteñe
Kapokier à fleurs rouges, Fromager, Kapokier rouge, Faux kapokier, Kapokier de forêt	Poilão foro, Polóm fidalgo, Polóm fôro, Sumauma	Bu dimb	Bumbuwi, Bunbuvi, Buboli, Kuruhi, Kuruhy,	Ndondol, N'Dodol	
Sapin					
Arbre à vernis	Pau-incenso	Du balin, Bu timfi	Kayerhahi	Sambam	Santan
Arbre blanc, Cad, Kad, Faidherbier	Espinheiro de Angola	Bu bilik	Chaski, Taiki	Saas, Sas	Kàdd
Ako	Pó de bitcho, Pó de leite	Bu fo		Mbayo, Gétan	Tomboyeri
Iroko, Teck d'Afrique, Teck kambala	Amoreira, Moreira, Tumbiro	Bu lékèn			Tomboyeri
Grand détar		Bu gãgund		Ndo'oy	
Doussié, Lingué	Chanfuta, Uvala, Mussacossa				
		Gi pey, Pure	Koondie, Kooli, Koili, Koeli, Koéli, Koli, Kolé,	Ngaul, Raoul, Klaul	
Bambou, bambou de Chine	Bambu vulgar				
	Bambu africano				
Gonakié/Gonaquier, Babla, Gommier rouge, Nebneb	Tchanga, Goma da Índia				
Benténier, Vène, Ven, palissandre du Sénégal, Kino de Gambie, Santal rouge d'Afrique (hérissé)	Pau sangue	Bu kon	Bani, Banibaley	Ban, Baan	
Sapelli, Cédrat d'Afrique	Sapelli				
Ayous, Obeche, Samba					
Chêne					
Mufufuta, Kambala escura			Buyay		
Limba, Fraké, Noyer du Mayombe	Limbo		Ibane, Ibanez		
Cocotier	Coqueiro				

Wolof Names	Mandinka Names	Observed Flotation of Overturned Watercraft	Density in kg/m³ at 12% moisture content
Hey-ye, Xaay, Kaĭ, Hay, Cail	Baaberlll wu-len, Jalo, Jáloo	Will quickly sink	(620-) 710-810 (-900)
Bantango, Benten, Bentine, Béntéñe/Bèntéñé, Bènténé	Bantan-ngo, Bántango	Very buoyant and will not sink	(200-) 240-380 (-450)
Garabu lawbe, Garab, Dundul, Guy jeeri, Garablaobe, Kattupa	Bun-kung/Bunkungo	Float	380-500
Santang, Sãtã	Santan-ngo, Santango	Float	510-680
Kàdd, Kadd, Kad, Cad	Barang-sango, Bàransango	Float	580-710
Kan, Man	Jaffo, Jafo		370–480 (–660)
	Tumbu-yirow Fingo (female), Tumbu-yirow koyo (male)		560-710
Detar, Ditax, Detah, Detakh, Ditah	Tallo, Talo, Taloo		(600-) 710-850 (-900)
Folk, Fok	Lenko		720–850
Hoss, Ḥos, Xos, Xoos, Khos	Dyun, Jun, Ko baro, Diou, Dioum		
	Bong		0.63 g/cm³
	Bong, Bongho		0.7–0.9 g/cm³. At 47% moisture content
Neb neb (*Nilotica adansonii*), Gonake (*Acacia nilotica tomentosa*)			650-830 at 15%
Wén, Wéén, Win, Vèn, Ven, Vene	Kèenoo		(560-) 800-890 (-940)
			560-750
			320–440(–490)
Sen			
	Banetto, Baneto		

Stability in Service	Durability	Description	Range in Senegambia
Fairly stable	Durable	The heartwood is pinkish brown, darkening to reddish brown with a purplish tinge upon exposure	Common in savanna woodland
Stable	Low durability	The wood is creamy white, streaked with yellow, brown, pink, and/or grey	
	Low durability	The wood is pale yellow to whitish with an orange lustre when newly felled, but soon turns grey when exposed to sunlight.	Savannas and dry woodlands of the Sudanian zone
		Recycled from European buildings or imported	
Moderately stable	Low durability, Low resistance to marine borers	The heartwood is red-brown, grey or red with dark streaks	
Moderately stable	Low durability	The heartwood is whitish to pale yellow or pale yellow-brown	
Small	Very durable, slightly susceptible to marine borers	The heartwood is pale yellow to brown, darkening on exposure	
Moderately stable	Durable, moderately resistant marine borers	The heartwood is pale yellow, becoming reddish brown towards the centre of the bole	
Very stable	Durable, liable to marine borers	The heartwood is orange-brown to golden brown, becoming red-brown upon prolonged exposure, sometimes with darker streaks	
		glossy green, yellow, or yellow with green stripes, internodes 20–45 cm long, with appressed dark hairs and white waxy when young, becoming glabrous, smooth and shiny with age	
	Very durable	The heartwood is pale red to pinkish brown, often darkening upon exposure	
Stable	Durable	The heartwood is yellowish brown to reddish brown, often with purplish brown streaks	
Moderately stable	Moderately durable, Low resistance to marine borers	The heartwood is pinkish brown when freshly cut, darkening upon exposure to reddish brown or purplish brown	
Stable	Low durability	The heartwood is whitish to pale yellow	None
		Heavily-grained wood and the same cut can vary in color from ash to deep red. (only wood that fits this description, although the range is off)	

Used for	Tree Size	Assigned Sex Used (Mandinka)	Biological Sex
Logboats, logboat keels, keels, planks	Medium-sized tree up to 30(–35) m tall; bole branchless for up to 10(–16) m but often much shorter and crooked, up to 100(–250) cm in diameter		Monoecious (M/F)
Logboats, logboat keels, ke	Very large, tree up to 60 m tall, bole branchless for up to 35 m, straight, usually cylindrical, up to 200(–240) cm in diameter	Female	Monoecious (M/F)
Logboats, Logboat keels?, keels, planks, Carved ornaments	Small tree 3–15(–30) m tall; bole straight, up to 60(–100) cm in diameter		Monoecious (M/F)
Planks			
Logboats	Medium-sized tree up to 25(–35) m tall; bole straight and cylindrical, up to 200 cm in diameter	Female	Monoecious (M/F)
Logboats	Medium-sized to fairly large tree up to 20(–30) m tall, with bole up to 100(–150) cm in diameter	Female	Monoecious (M/F)
Logboats	Small to large tree up to 45(–60) m tall; bole straight, branchless for up to 25(–33) m, up to 180 cm in diameter		Monoecious (M/F)
Logboats	Large tree up to 35(–45) m tall; bole usually straight and cylindrical, often branchless for more than 20 m, up to 2 m in diameter	Male, Female	Dioecious (M or F)
Logboats	Medium-sized to fairly large tree up to 35(–40) m tall; bole branchless up to 12(–15) m, straight or irregular, cylindrical, up to 60(–100) cm in diameter	Male	Monoecious (M/F)
Logboats	Small to fairly large tree up to 40 m tall; bole branchless for up to 20 m, usually straight and cylindrical, up to 150(–200) cm in diameter	Male	Monoecious (M/F)
Masts	A tree 16 m high, bole to 60 cm diameter		
Yards	Up to 20 m tall, up to 12 cm in diameter		
Yards	5–10(–15) m tall and 3–8(–10) cm in diameter, internodes 15–30(–40) cm long		
Frames	Tree up to 15(–25) m tall, trunk straight, up to 100 cm in diameter		Monoecious (M/F)
Paddles	Small tree up to 15(–25) m tall; bole straight, cylindrical and branchless for up to 10 m under good conditions but often twisted, fluted and low-branched under poorer conditions		Monoecious (M/F)
"Planking and decking"	Large tree up to 55(–65) m tall; bole branchless for up to 40 m, straight and cylindrical, up to 200(–280) cm in diameter		Dioecious (M or F)
Thwarts, planks	Large tree up to 50 m tall; bole straight, branchless for up to 30 m, up to 150(–210) cm in diameter		Monoecious (M/F)
Paddles			
Logboats			
Carved ornaments			
Logboats			

Size of Dugout	Notes
	The Lebus distinguish two species of "xay": xay bu weex" literally the white "xay"and "xay bu nul" meaning the black "xay". The white "xay" can float if the canoe turns over while the black "xay" sinks. The wood splits easily.
Current trees can allow of a 12 meters long and 1 meter wide boat.	The wood does not split and is easily to work with.
	It is considered inferior to "ibane" for carved ornaments.
	Any coniferous tree of the genus Picea, any of various evergreen trees of the genus Abies. Imported from Europe, Possibly France itself depending on time.
Most trees of his type allow for a canoe 7 meters long and less than 1 meter wide.	
Most trees of his type allow for a canoe 7 meters long and .5 meters wide.	
	Tumbu-yirow fingo (female), Tumbu-yirow koyo (male). Fingo means black and koyo means white.
	Cited as used to make masts in Saint-Louis.
	Sometimes in sources bamboo refers to raffia plam leaf midribs
	Sometimes in sources bamboo refers to raffia plam leaf midribs
	Used only in Senegal river frame based boats.
	Hard and difficult to carve. Can be used for canoes
	Likely is only used in Non vernacular watercraft. Only reference is from *Canoes in Ghana*.
	Imported into Senegambia.
	Wood sometimes used to make Dugout canoes.
	Specificly black varient

Plant Resources of Tropical Africa Database Link:
https://www.prota4u.org/database/protav8.asp?g=pe&p=Khaya+senegalensis+(Desr.)+A.Juss
https://www.prota4u.org/database/protav8.asp?h=M4&t=Ceiba,pentandra&p=Ceiba+pentandra
https://www.prota4u.org/database/protav8.asp?h=M4&t=Bombax,costatum&p=Bombax+costatum
https://www.prota4u.org/database/protav8.asp?h=M26,M27,M36,M4&t=Daniellia,oliveri,DANIELLIA&p=Daniellia+oliveri
https://www.prota4u.org/database/protav8.asp?h=M4&t=Faidherbia,albida&p=Faidherbia+albida
https://www.prota4u.org/database/protav8.asp?h=M4&t=Antiaris,africana&p=Antiaris+toxicaria
https://www.prota4u.org/database/protav8.asp?h=M4&t=Chlorophora,regia&p=Milicia+regia
https://www.prota4u.org/database/protav8.asp?h=M4&t=Detarium,senegalense&p=Detarium+senegalense
https://www.prota4u.org/database/protav8.asp?h=M4&t=Afzelia,africana&p=Afzelia+africana
https://www.prota4u.org/database/protav8.asp?h=M4&t=Mitragyna,inermis&p=Mitragyna+inermis
https://www.prota4u.org/database/protav8.asp?h=M4&t=Bambusa,vulgaris&p=Bambusa+vulgaris
https://www.prota4u.org/database/protav8.asp?h=M4&t=Oxytenanthera,abyssinica&p=Oxytenanthera+abyssinica
https://www.prota4u.org/database/protav8.asp?h=M4&t=Acacia,nilotica&p=Acacia+nilotica
https://www.prota4u.org/database/protav8.asp?h=M4&t=Pterocarpus,erinaceus&p=Pterocarpus+erinaceus
https://www.prota4u.org/database/protav8.asp?h=M4&t=Entandrophragma,cylindricum&p=Entandrophragma+cylindricum
https://www.prota4u.org/database/protav8.asp?h=M4&t=Triplochiton,scleroxylon&p=Triplochiton+scleroxylon
https://www.prota4u.org/database/protav8.asp?h=M4&t=Albizia,ferruginea&p=Albizia+ferruginea
https://www.prota4u.org/database/protav8.asp?h=M5&t=black,Limba&p=Terminalia+superba
https://www.prota4u.org/database/protav8.asp?h=M4&t=Cocos,nucifera&p=Cocos+nucifera

Fiber	Scientific Name	Botanical Author Citation	Old Alternate Scientific Names	English Names
1	*Adansonia digitata*	L.		Baobab, Monkey-bread tree, Dead-rat tree, Cream-of-tartar tree
2	*Grewia bicolor*	Juss.		Bastard brandy bush, false brandy bush, donkey berry, two-coloured grewia, white raisin
3	*Piliostigma reticulatum*	(DC.) Hochst.	*Bauhinia reticulata*	Camel's foot
4	*Saba senegalensis*	(A.DC.) Pichon		
5	*Sansevieria senegambica*	Baker	*Aloe guineensis*	African bow-string hemp, African flax, Bowstring Hemp, leopard lily
6	*Gossypium herbaceum*	L.		Cotton, Arabian cotton, Levant cotton
7	*Hibiscus cannabinus*	L.		Kenaf, Vegetable kenaf, Guinea hemp, Deccan hemp
8	*Raphia hookeri*	G.Mann & H.Wendl.		Raphia palm, wine palm, Ivory Coast raphia palm
9	*Raphia sudanica*	A.Chev.		Northern raphia, King bamboo palm, Raffia
10	*Raphia vinifera*			Bamboo palm, king bamboo palm, raphia palm
11	*Agave sisalana*			Sisal
12	*Laccosperma secundiflorum*	(P.Beauv.) Küntze		Large rattan, African climbing palm, African rattan palm
13	*Combretum micranthum*	G.Don		
14	*Cocos nucifera*	L.		Coconut palm

French Names	Portuguese Names	Diola Names	Fula Names	Serer Names	Lebu Names
Baobab, Calebassier du Sénégal, Arbre de mille ans	Baobab, Molambeira, Imbondeiro, Calabaceira, Cabacevre	Bu bak	Ɓohi, Laali	Ɓaak	Guee, Guy
Greuvier, grévier bicolore, nogo blanc	Mfukufuku, mkone, mkole				Kell, Kel
Pied de chameau, semellier	Musacanca				
Chanvre d'Afrique, Sansévière					
Coton, cotonnier, cotonnier herbacé, cotonnier d'Asie, cotonnier africain	Algodoeiro, algodoeiro asiático				
Kénaf, chanvre de Guinée, chanvre de Bombay, da	Nacacha, nhacandora, cânhamo brasileiro		Folérébadi	Basap	
Raphia	Ráfia		Baŋei		
Palmier raphia, raphia			Baŋei		
			Baŋei		
Palmier-asperge					
Cocotier	Coqueiro				

Wolof Names	Mandinka Names	Type	Used for	Fibre Description	Notes
Guy, Gwi	Sita	Bark	Rope	The fibers from the inner bark are soft, durable, moderately strong and 90–120 cm long.	
		Bark	Rope		
Nguisguis		Bark	Rope		
	Kaba	Bark	Rope		
		Aloe leaves	Rope		Resistant to water rot. bahural, bayé lay, bugagu, busata, and diéhuro in various Senegambian languages
		Cotton fiber	Rope		
Bisap, Pondore	Da, Dah	Plant leaves	Rope		
	Bàngo	Tree leaves	Rope		Leaves can be refered to as rushes or straw
	Bàngo	Tree leaves and bark	Rope		Leaves can be refered to as rushes or straw. Stems of leaves can also be used to make rope, fire to soften them to be braided.
	Bàngo	Tree leaves	Rope		Leaves can be refered to as rushes or straw
			Rope		Might be imported, might be confused with other aloe type fiber
			Rope		
			Rope		Kinquéliba
			Rope		

Plant Resources of Tropical Africa Database Link:
https://www.prota4u.org/database/protav8.asp?h=M5&t=baobab&p=Adansonia+digitata
https://www.prota4u.org/database/protav8.asp?h=M4&t=Grewia,bicolor&p=Grewia+bicolor
https://www.prota4u.org/database/protav8.asp?h=M4,M6&t=Bauhinia,reticulata,Senegal&p=Piliostigma+reticulatum
https://www.prota4u.org/database/protav8.asp?h=M4&t=Saba,senegalensis&p=Saba+senegalensis
https://www.prota4u.org/database/protav8.asp?h=M4&t=Aloe,guineensis&p=Sansevieria+senegambica
https://www.prota4u.org/database/protav8.asp?h=M4&t=Gossypium,herbaceum&p=Gossypium+herbaceum
https://www.prota4u.org/database/protav8.asp?h=M4&t=Hibiscus,cannabinus&p=Hibiscus+cannabinus
https://www.prota4u.org/database/protav8.asp?h=M4&t=Raphia,hookeri&p=Raphia+hookeri
https://www.prota4u.org/database/protav8.asp?h=M4&t=Raphia,sudanica&p=Raphia+sudanica
https://www.prota4u.org/database/protav8.asp?h=M4&t=Raphia,vinifera&p=Raphia+vinifera
https://www.prota4u.org/database/protav8.asp?h=M4&t=Agave,sisalana&p=Agave+sisalana
https://www.prota4u.org/database/protav8.asp?h=M4&t=Calamus,secundiflorus&p=Laccosperma+secundiflorum
https://www.prota4u.org/database/protav8.asp?h=M25,M26,M27,M36,M4&t=Combretum,micranthum&p=Combretum+micranthum
https://www.prota4u.org/database/protav8.asp?h=M4&t=Cocos,nucifera&p=Cocos+nucifera

Floats	Scientific Name	Botanical Author Citation	English Names	French Names	Portuguese Names	Type	Used for	Notes
1	*Aeschynomene elaphroxylon*	(Guill. & Perr.) Taub.				Root cluster	Improvised float	Billeur
2	*Lagenaria siceraria*	(Molina) Standl.	Bottle gourd, Calabash gourd, Common gourd, White-flowered gourd	Gourde, Calebasse, Courge bouteille	Cabaceiro, Cabaça, Abóbora carneira, Colombro	Calabash	Improvised float	
3	*Crescentia cujete*	L.	Calabash tree			Calabash	Improvised float	

Plant Resources of Tropical Africa Database Link:
https://www.prota4u.org/database/protav8.asp?h=M4&t=AESCHYNOMENE,elaphroxylon&p=Aeschynomene+elaphroxylon
https://www.prota4u.org/database/protav8.asp?h=M4&t=lagenaria,siceraria&p=Lagenaria+siceraria
https://www.prota4u.org/database/protav8.asp?h=M4&t=Crescentia,cujete&p=Crescentia+cujete

APPENDIX D

This appendix contains scantling tables and measurements from the Senegalese boat in the collection of the Field Museum along with notes and transcribed notes. Includes to scale drawings.

Information:

Catalog Number: 221653

Date: 1968

Area: Dakar, Senegal

Collected by: Francis Brenton

Link: https://collections-anthropology.fieldmuseum.org/catalogue/1127810

Acquisition recorded in:

Brenton, Francis

1969 *The Voyage of the Sierra Sagrada; Across the Atlantic in a Canoe*. Regnery, Chicago.

Boat Name: Wolof Canoe

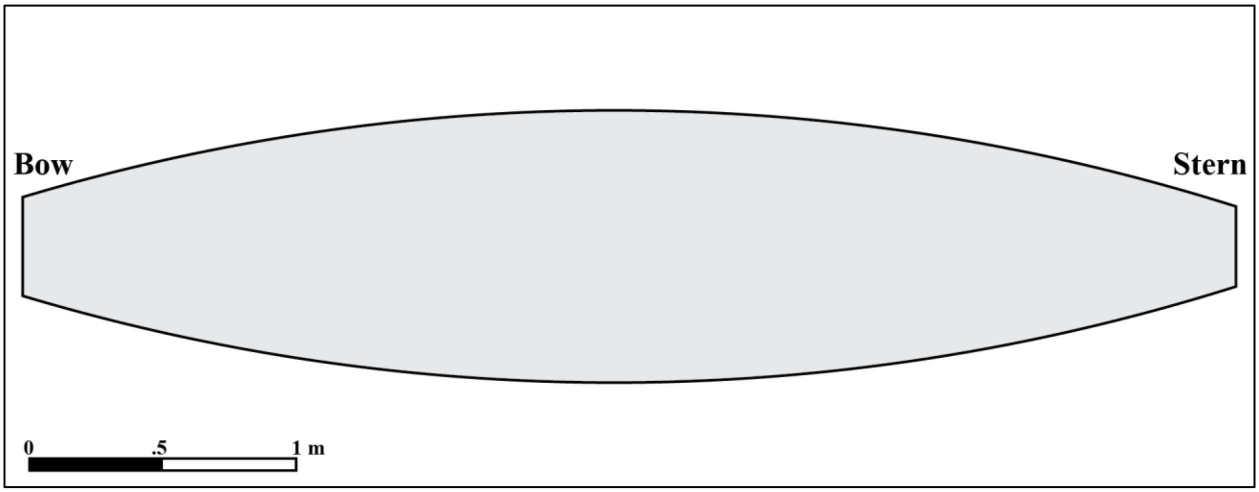
Recorder: Trenton Zylstra

Recording Date: August 10, 2021

- Baseline measured from the bow.
- Overall length of boat: 5.78 m (4.72 m without cutwaters)
- Maximum beam: 1.02 m

Plan View

View from above showing outline of hull not including cutwaters. Measured on top of cover nailed to the top of the boat.

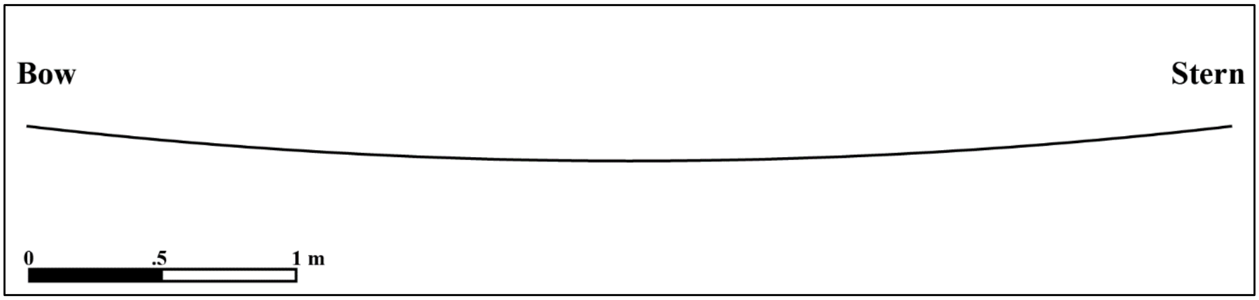


Plan view of boat excluding cutwaters, to scale

STATION	OFFSET
On Baseline	Distance across beam
10 cm	37 cm
50 cm	58 cm
1.0 m	76 cm
1.5 m	91 cm
2.0 m	1.01 m
2.5 m	1.01 m
3.0 m	98 cm
3.5 m	87 cm
4.0 m	67 cm
4.5 m	37 cm
4.65 m	30 cm

Profile View

View from the side showing the sheer of the top edge of the hull. Does not include lower hull as it was not recorded due to lack of time.

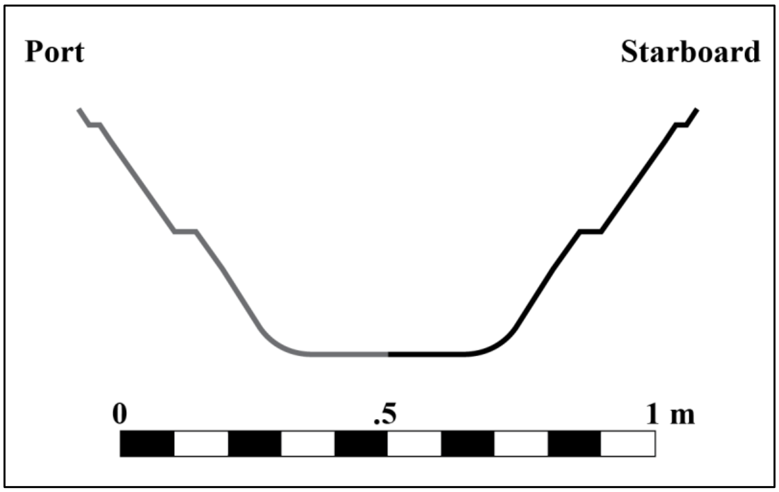


Profile view of boat showing sheer, to scale

STATION	VERTICAL OFFSET
On Baseline	Baseline to Gunwale
15 cm	1 cm
50 cm	3.5 cm
1.0 m	7 cm
1.5 m	11 cm
2.0 m	13 cm
2.5 m	14 cm
3.0 m	12.5 cm
3.5 m	10 cm
4.0 m	6.5 cm
4.5 m	2 cm
4.67 m	1 cm

Exterior Cross Section

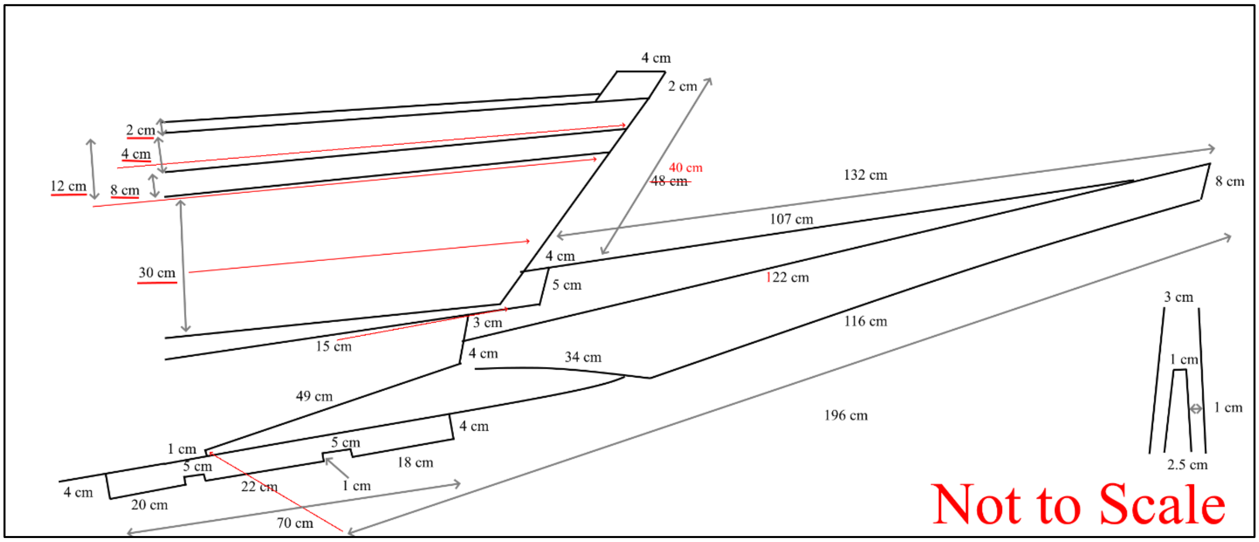
Cross section of the starboard exterior hull at amidships. Does not include port side measurements resulting in mirrored cross section not being the same as the measured beam of the boat. It appears likely that there is a notable variation in the angle of the port side compared to the starboard side resulting making the boat slightly asymmetrical and the beam smaller then it would be in a symmetrical boat. A plan view of bottom width would be advantageous.



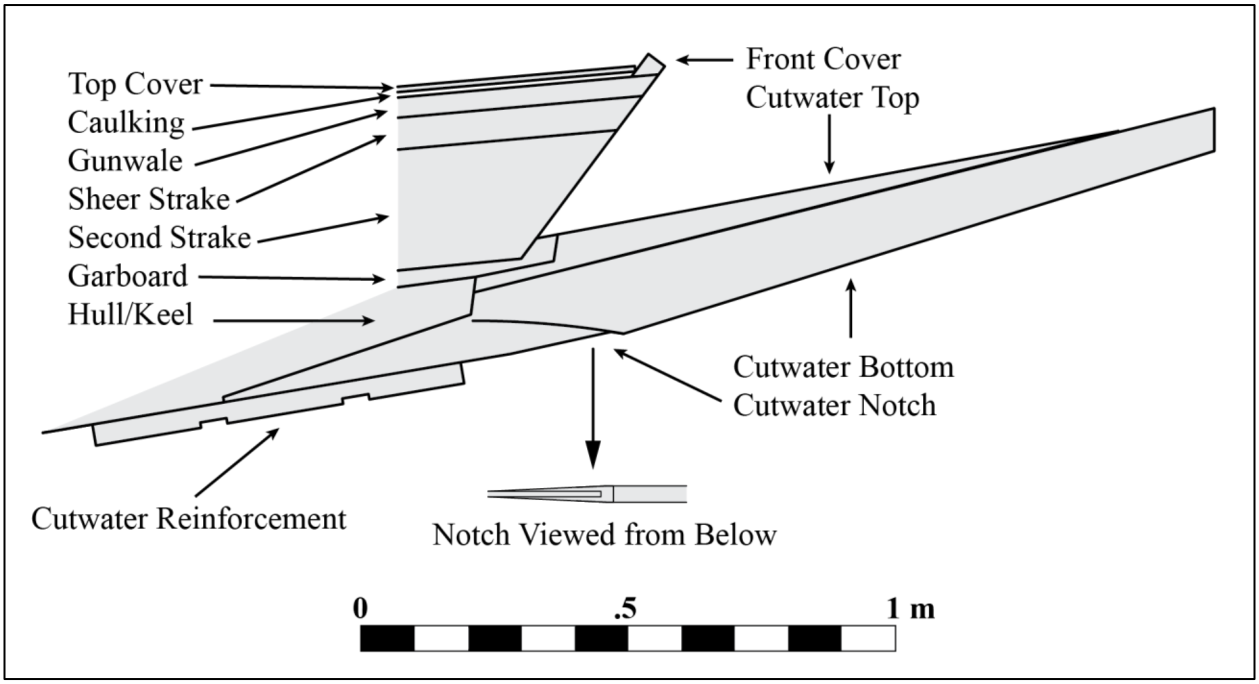
Cross section amidships, to scale

STATION On Mini Baseline	OFFSET Vertical gunwale to base	Hull position
4 cm	0 cm	Gunwale
7 cm	2 cm	End of gunwale
7 cm	4 cm	Start sheer strake
10 cm	6 cm	End sheer strake, start second strake
27 cm	18 cm	End second strake
27 cm	22 cm	Start garboard
34 cm	27 cm	End garboard, start hull
40 cm	31 cm	Hull
45 cm	34 cm	Hull
50 cm	44 cm	Bottom
Flat Bottom 28 cm wide		Bottom

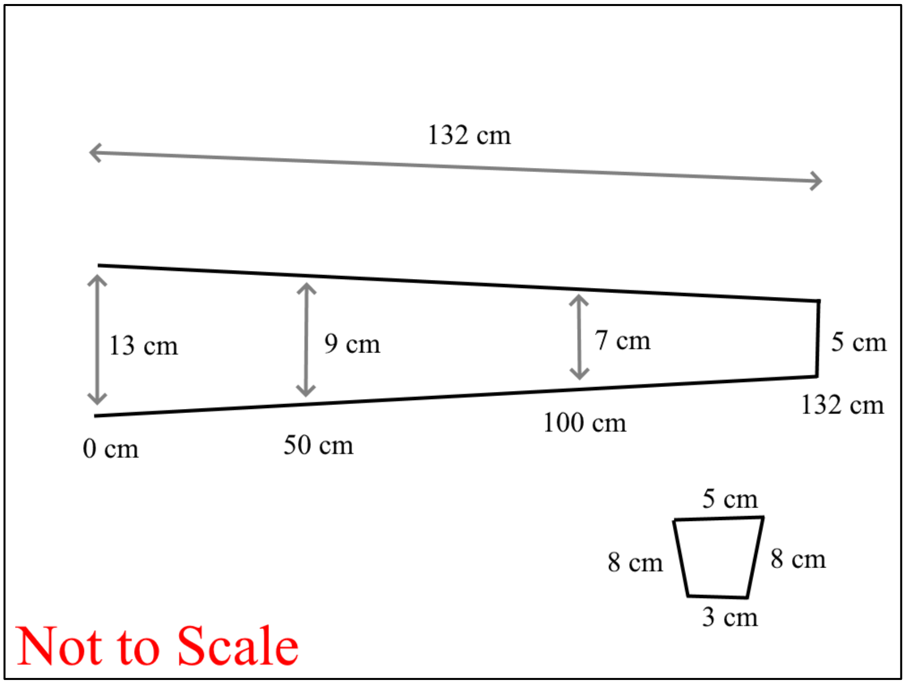
Stern Measurements



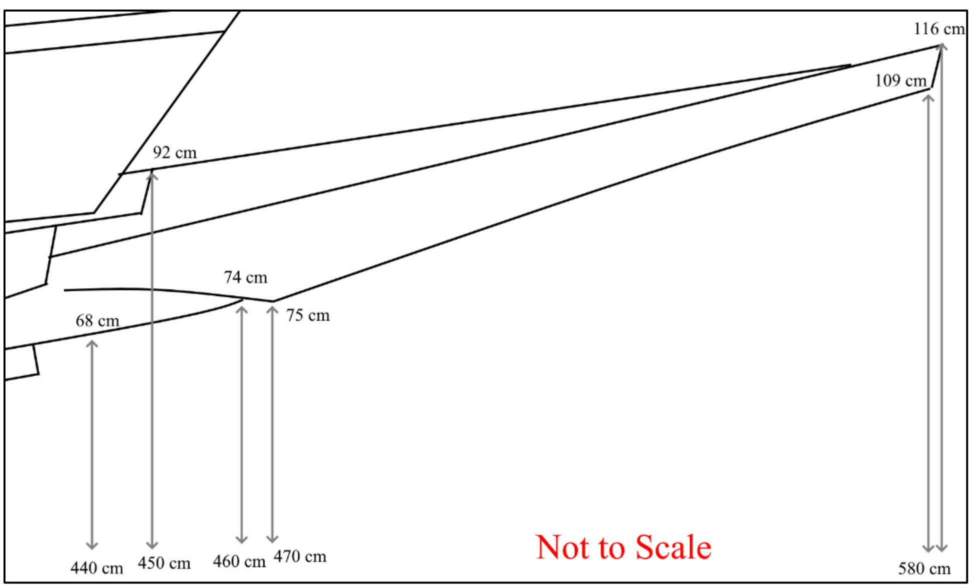
(Top) Port side, stern projecting cutwater profile view, (Bottom right) Cutwater notch bottom view, top is front facing towards the front, not to scale



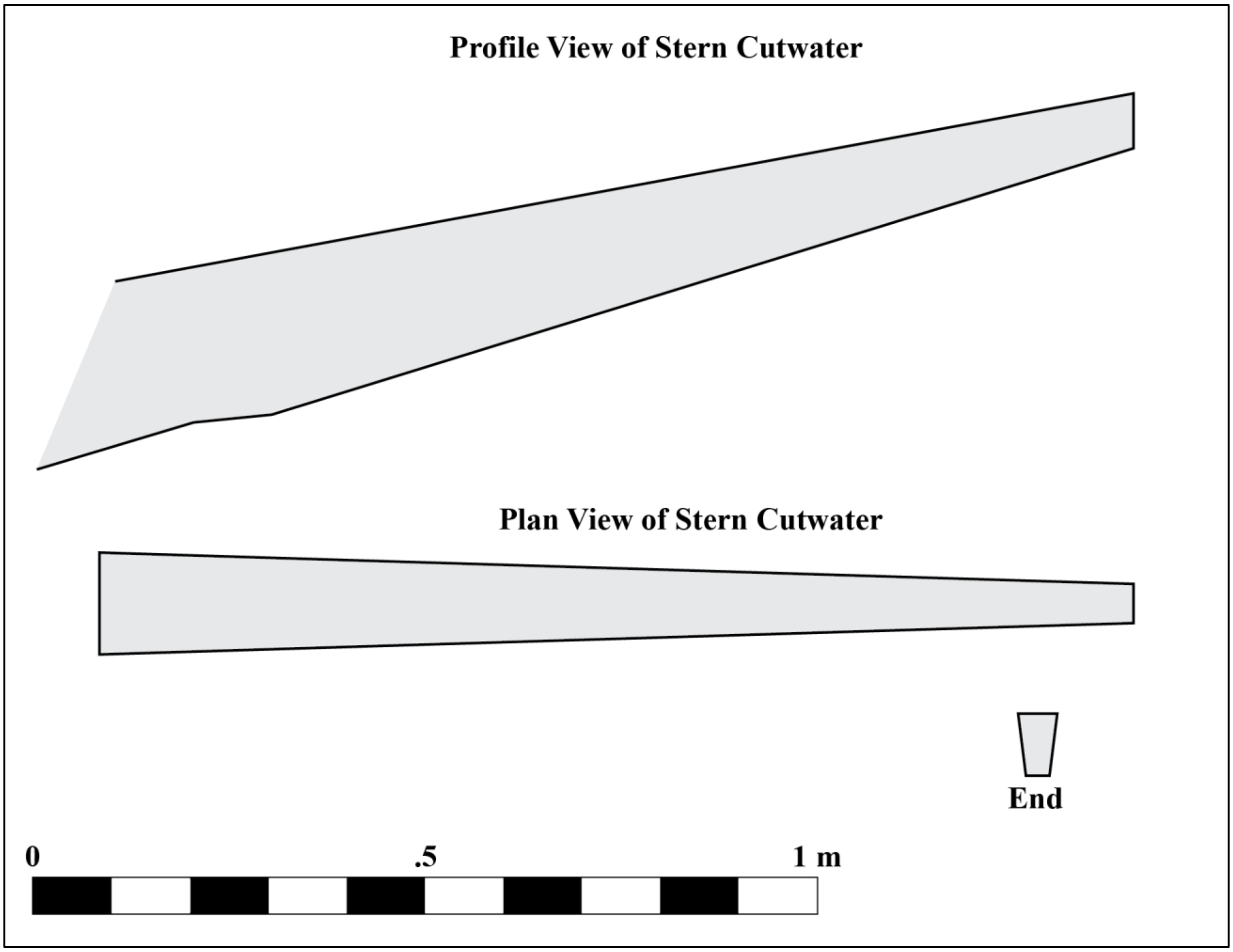
Stern details, to scale



(Top) Top view, stern projecting cutwater, (Bottom) End view, stern projecting cutwater, (Bottom right) width of cutwater 3 cm until notch, not to scale

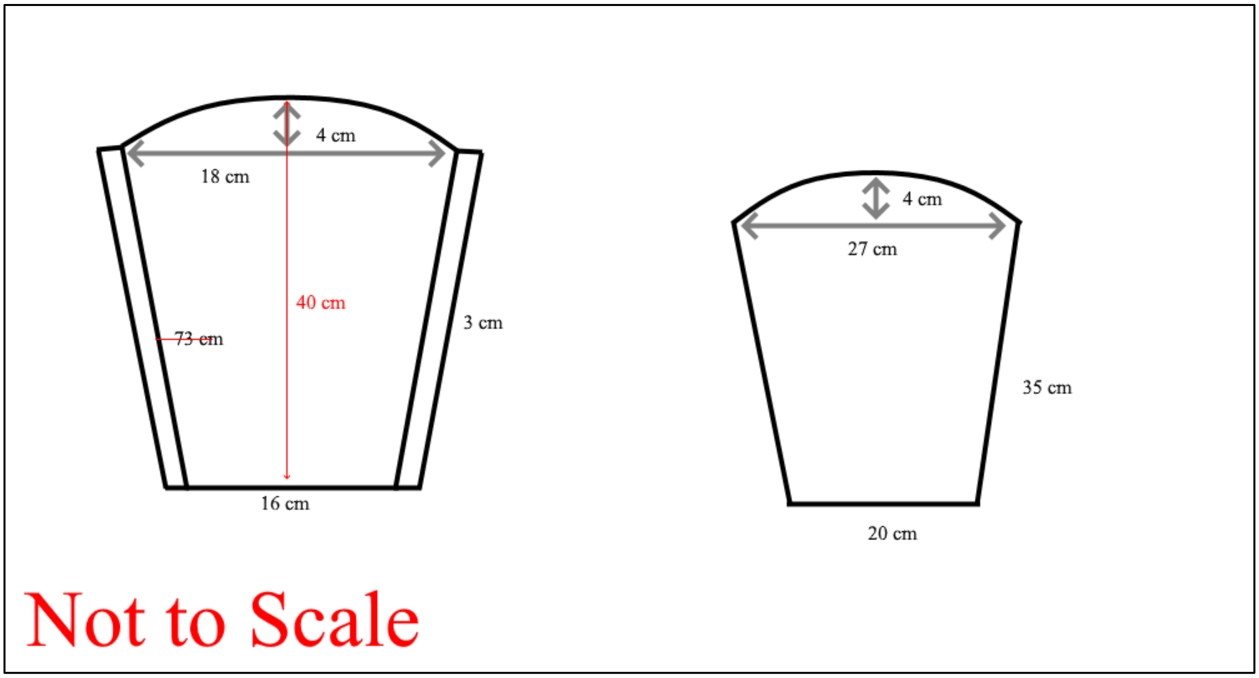


Projecting cutwater angle, Top numbers distance vertical from baseline, Bottom numbers distance along baseline, not to scale

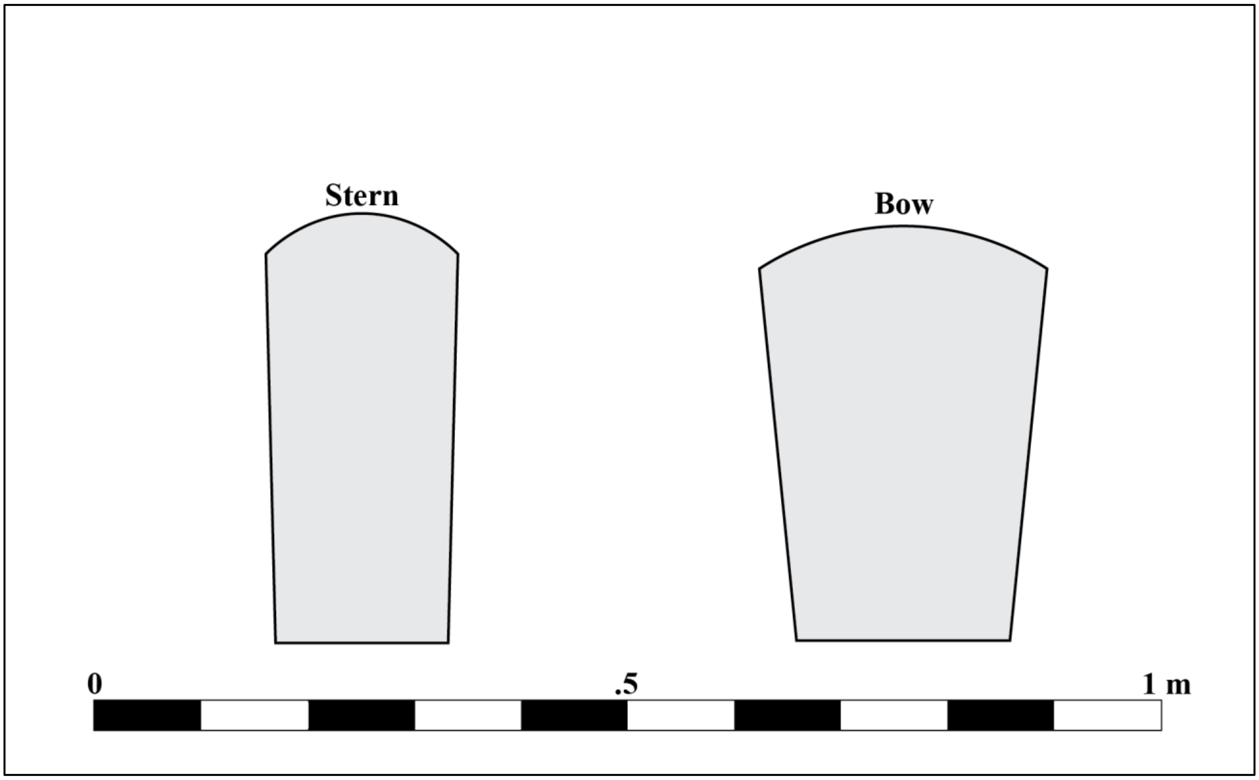


Profile, plan, and end view of stern cutwater, to scale

Note: Only intended for basic shape and does not contain details or wear. Nature of measurement of profile view increases error so it should only be taken as general angles that should not overwrite more detailed measurements.



End covers, (Left) Stern, (Right) Bow, not to scale



Bow and stern end covers, to scale

Note: These numbers should be double checked if possible due to number discrepancies

<u>Transcribed notes</u>

- **Stern Cutwater:**
  - **Stern projecting cutwater top section**
    - Attached with nails.
    - Appears to sometimes be in a rough offset double row with larger nails on the thicker sections and small nails on the thin sections. The top section is broken off at the end unevenly.
    - The section appears to be straight with no curves.
  - **Stern projecting cutwater bottom**
    - The section is lightly curved on the bottom
  - **General**
    - The fit of the projecting cutwater to the hull and sections together does not appear very flush which may be due to pulling apart due to use or wood shrinkage it is difficult to tell. The seams can be looked into due to the separation.
- **Bow Cutwater:**
  - The projecting cutwater appears to have been totally torn off, possibly by wave action.
  - It may have been put inside the boat as a pit of a timber piece that appears to be painted is partially visible inside the boat through the hole in the bow.
- **Added Exterior:**

- The exterior was covered with a coating of what appears to be tar and red paint, black trimming was added around the sheer strakes edges, all of this appears to have been added by Brenton.
- Much of this covering on the top section appears to have come off during the boats voyage revealing the original paint.
- The bow cover appears to have also had a layer of fabric nailed along the top with larger nails and along the side by small nails, added by Brenton. It is half peeled off.
- The bottom of the stern appears to have had a piece of wood nailed onto it seemingly to reinforce the projecting cutwaters attachment to the hull probably added by Brenton.
- A top cover added by Brenton covers the whole top and is nailed and caulked on. The caulking had a greenish brown color.

- **Caulking:**
  - Much of it was not visible as the caulking appears to have been done inside for the most part.
- **Sides:**
  - Port stern, what appears to be an indent in the side possibly as a result of the removal of a bole during the construction of the boat.
  - Starboard bow, triangular piece replacing part of the bottom hull, possibly a repair or due to removal of flawed timber during construction.
  - Starboard center, trapezoidal piece replacing part of the bottom hull, possibly a repair or due to removal of flawed timber during construction.

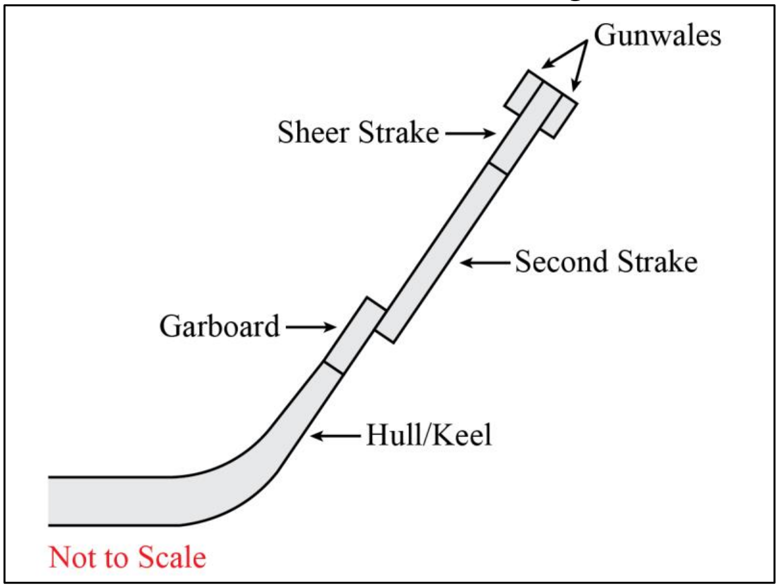
- Port front, very long trapezoidal piece replacing part of the bottom hull, possibly a repair or due to removal of flawed timber during construction.

- **Hull:**
    - Bottom of the hull was painted blue originally
    - Sheer strakes are elaborately painted with designs and words which appear to be totally intact but covered in some areas by Brenton's added paint.
    - The words on the starboard hull have guidelines visible and a letter that appears to have been removed
    - The paint on the flat bottom of the hull is totally eroded off revealing the wood
- **Bow Cover:**
    - Heavily split
- **Scarfs:**
    - Bow port gunwale, butt scarf
    - Bow starboard gunwale, two diagonal scarfs
    - Sheer strake, diagonal scarfed at stern on both sides
- **Fastening:**
    - Difficult to tell fastening style
    - The garboard looks like beveled lapstrake nearer the center but like edge join closer to the ends so it is uncertain what method it uses

<u>Other Notes:</u>

- **Strake measurements:**
    - **Gunwale (exterior)**

    - 4.5 cm wide
    - 2 cm thick
  - **Sheer strake**
    - 10 cm wide
    - 2.5 cm thick
  - **Second strake**
    - 22 cm wide
    - 2.5 cm thick
  - **Garboard**
    - 8 cm wide
    - 2 cm thick
- **Other:**
  - **Bow cutwater nails**
    - Large nail, .5 cm diameter, 8 cm sticking out
    - Small nail, .2 cm diameter, 3 cm sticking out



Rough diagram of boat sections combining measurements and images, not to scale

Later observations

Notes:

These measurements are likely not consistent along the whole length. Thickness is difficult to measure except at ends. Can be difficult to measure too due to wear and paint. Garboard appears to taper at the end so determining width is difficult. Most measurements measured to the centimeter, some error expected due to nature of measurement taking with folding tapes, tape roles, and plum bob. Other tool used included clamps with padding taped to their grips. Longer measurements more inaccurate.

Issues, restrictions, observations:

- It was not possible to get inside the boat due to the nailed on cover or get more then a few photographs inside the boat through the bow opening.
- The boat has not been conserved and so delicate and handling is also restricted.
- The boat could be moved off the shelf but the rack that held it and the lifts used to move it restricted some measurements and areas.
- Time was limited and an observer also needed to be in the area.
- The concrete floor was very uncomfortable to work on.
- The bow cutwater appears to be inside the sealed boat and not accessible at this time.
- It was also not possible to utilize a photographic scale at the same time as operating the camera by myself. Recommended at least two people for work or assistive device.
- Upon analysis the boat appears to be slightly asymmetrical between sides so mirroring is not necessarily accurate.

- Initial survey and analysis of the boat before mesurments took half the time available due to complexity.
- Paint applied to the outside of the boat by the buyer covered many details of the construction and the original paint decoration.
- In retrospect additional measurements of some areas not measured would have been useful and a few minor errors were encountered when analyzing data. The stern cutwater height appears to be the most notable one. Some angles were challenging to work with.
- Better cameras and camera stands would be useful for getting better photographs and angles.
- There was almost no documentation information on the boat available in the archives
- The boat was located a large distance away from the entrance where additional equipment and such needed to be left. Also, far away from bathroom facilities.
- Joints in hull can be large and piece ill-fitting or pulled apart possibly from warping, wear also obscures shape and size.
- Very few images of the boat in use by the Brenton were found to use as reference but are known to exist.

Additional work that could be done:

- Recheck some measurements and get additional measurements of some areas looked at
- Complete cross sections for other areas of the boat and for both sides
- Detailed measurements of the bow
- Measure the full lines of the boat

- Detailed recording of boat details such as apparent repairs to hull
- 3D model
- Gain access to inside of boat
- Conservation of boat and removal of cover and additional paint
- Cleaning of inside of boat which is coated in marine sediment and dust especially around bow
- Investigation into objects inside boat, mast thwart, probable mast, probable bow cutwater, and tarp, possible other items hidden inside
- Recording cross section of the inside of the boat
- Investigation of fastening methods used on hull
- Add permanent catalog number to boat so it does not get lost in the collection again
- Work with boats in other collections to compare
- Compile standalone report for publication