THE BOATBUILDING SEQUENCE IN THE GILGAMESH EPIC

AND THE SEWN BOAT RELATION

A Dissertation

by

RALPH KENNETH PEDERSEN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2003

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Approved as to style and content by:

Shelley Wachsmann
(Co-chair of Committee)

Steven Oberhelman
(Member)

George F. Bass
(Co-chair of Committee)

David Carlson
(Head of Department)

Cemal Pulak
(Member)

May 2003

Major Subject: Anthropology
ABSTRACT

The Boatbuilding Sequence in the Gilgamesh Epic
and the Sewn Boat Relation. (May 2003)

Ralph Kenneth Pedersen, B.A., State University of New York
at Stony Brook;
M.A., Texas A&M University

Co-Chairs of Advisory Committee: Dr. Shelley Wachsmann
Dr. George F. Bass

The passage in Tablet XI of the Epic of Gilgamesh relating
the construction of a boat to escape the Deluge has long been
an enigma. Since the 1870s, scholars have offered various
interpretations of the craft, which, without the benefit of
knowledge of ancient ship construction methods, yielded a
confusing narrative. This study presents a new translation
of the pertinent passage and interprets it in relation to two
millennia of sewn boat technology in the Indian Ocean. This
brings clarity to the ancient text and gives nautical
archaeology a new key to understanding Mesopotamian
watercraft.
DEDICATION

For Martha,
Erik,
Grant,
and Kristin

We did it!
ACKNOWLEDGMENTS

I thank the members of my committee—Dr. Shelley Wachsmann, Dr. George F. Bass, Dr. Cemal Pulak, and Dr. Steven Oberhelman— for their efforts and guidance in the writing of this dissertation. I also thank Dr. Filipe Castro for his aid, and Dr. C. Wayne Smith, for his interest in, and enthusiasm for, things Gilgamesh.

I am particularly grateful to Professor Daniel Fleming, my Akkadian professor at New York University where I had the good fortune to study as a visiting student, for his encouragement, suggestions, and patience. Professor Fleming has proofread my translation and made helpful, insightful comments. Any errors are my own. I make no pretenses at being an expert in the Akkadian, or any other language, and I ask the indulgence of those more astute in such studies.

I also extend my thanks to Ms. Noreen Doyle and Dr. Steven Hill for reading this work and making invaluable suggestions. I also thank Dr. John Hale for the many thoughtful discussions regarding sewn boats and their place in the ancient seafaring world.
To Dr. Jerome Lynn Hall, I am especially grateful for his friendship, never-ending encouragement, and his helping hand in times of great need. Such a true and good friend is a rarity.

My parents, Birger and Martha Pedersen, are largely responsible for the completion of this work. Without their undying encouragement and aid through the years, this would never have seen the light of day.

I thank Erik, Grant, and Kristin—my children and little friends—for their good cheer through puzzling times.

Last, but most importantly, I especially thank my wife, Martha, who has made sacrifices far beyond what should be expected of a spouse. She deserves the world.
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CHAPTER I

INTRODUCTION

The study of a once-forgotten, long-dead language is laced with a variety of unknowns, including the pronunciations of words and their meanings in a variety of contexts. The mindset of the people who developed a mnemonic system to record their interests and activities is perhaps the most difficult to discern. When recording an object or process, would a modern man note the same things as an ancient one? Did people in antiquity hold important the same things we do? In many ways, people do not change. Everyone in any period desires the basics of food, shelter, and health. Layered onto these needs, however, are systems of government, traditions, religions, and linguistics that add complexity to societal groups. Bringing modern understanding to ancient cultures often leaves the scholar pondering into the night.

Our understanding of Sumerian and Akkadian, the two primary Mesopotamian languages, is incomplete. Nearly two centuries

This dissertation follows the style and format of the Journal of Near Eastern Studies.
after the discovery of the script we call cuneiform,¹ scholars are still attempting to decipher and define the languages represented by these carved and impressed wedges. Progress has been made, of course. We can now read letters, business and court documents, and legal texts with more than reasonable certainty. Parallels with Biblical accounts, Egyptian diplomatic correspondence, and archaeological finds support our understanding of these texts.

Documents concerning boats and their construction are another matter. There is little archaeological boat material from Mesopotamia to corroborate the texts. To date, aside from pieces of bitumen with impressions of reeds that may have belonged to a boat,² along with some reed-impressed bits of

¹ For an account of Rawlinson’s 1836 decipherment of the cuneiform script found at Behistun see W. Ryan and W. Pitman, Noah’s Flood (New York, 1998), pp. 21-26.

bitumen from Ra's al-Junayz, Oman,\(^3\) no physical remains of ancient Mesopotamian watercraft have been found (see map, Figure 1). Archaeologists are, therefore, forced to rely on supposition. For example, stones from Tell Atij in Syria are believed to be anchors based in part on the associated find of a boat-graffito on a miniature chariot wheel (Figure 2). Yet, we can derive no particulars of the craft or their construction from these finds.\(^4\) The absence of boat remains combined with a European and Mediterranean-centered view of maritime developments, has left a gap in our knowledge of the cradle of civilization. The little information we do have concerning the seafaring aspects of Mesopotamia is currently limited to the texts and iconography.

Representations of boats appear on seals, in reliefs, and in the form of models. Found throughout Mesopotamia and in the lands of the Persian Gulf (Figure 3), seals and models depict

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mostly riverine vessels, but in some cases seagoing ships. Boat models usually lack definitive details and are sometimes confused with bowls. Reliefs show a variety of craft such as reed boats, the round wicker-and-skin quffa, vessels of inflatable skins, and transport vessels and warships. Few representations of any kind depict detailed construction and we can make only the broadest of interpretations.

Cuneiform texts are the other major source of data on Mesopotamian watercraft. Most records concerning boats and their parts consist of lists and receipts. It is unclear from such documents whether the materials are for a single craft or several and whether the parts are even for the same type of craft. We can only theorize what they mean.

There is one text, however, that stands out from the rest: The tale of the Babylonian Ark in Tablet XI of the Epic of Gilgamesh (Standard Version).

According to first-millennium B.C. sources, the Standard Version of the epic is attributable to a middle-Babylonian scribe named Sin-lige-unninni the Exorcist-Priest, who based his composition on earlier versions of the epic. The scribe
also constructed the detailed flood story, which was not part of the original poem, by adding on to similar earlier tales, one of which is now called the Atra-hasis Epic. While other, later editors might have contributed to the Gilgamesh story, Sin-lige-unninni was given credit for the Gilgamesh epic indicating he "made some important, perhaps definitive, contribution to its formulation... a substantial enough influence on the final form to associate his name with it permanently."  

While the Epic of Gilgamesh is an "outstanding philosophical work and ...a masterpiece of Mesopotamian literature," the boat-building sequence that Sin-lige-unninni added in Tablet XI has long been an enigma. Since George Smith first translated the tablet in 1873, many versions of the poem have been published. Some of these translations have been of the popular mien, loosely interpreting the story for easy

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reading. Most translations are scholarly, however, dealing with the minutiae necessary to bring understanding to words and ideas of a culture long vanished.

Scholars have translated the boat-building sequence in a variety of ways, stemming in part from a lack of knowledge of ancient boat construction. This has resulted in confusing translations. Lacking the skills needed to understand the passage in Akkadian, nautical archaeologists have been puzzled by the meaning of the poem. This study attempts to bridge the gap between the two disciplines via re-examination of the section of Tablet XI concerning the construction of the vessel created by Utnapishtim, the Babylonian Noah, on a Mesopotamian riverbank.

The Construction of Ancient Vessels

Understanding the methods of ship construction in antiquity is primary to this study. Ancient vessels were built differently than modern wooden watercraft. It was only in the early 1960s with a growing body of data from underwater and shipwreck archaeology that researchers realized different construction techniques predominated in antiquity. Until the early 1960s it was largely assumed boats of the Classical
period and earlier were built in the technique prevalent in most of modern Europe: erecting a skeleton of frames and then fastening planking to the framework.\(^8\) It was only through the study of wrecks discovered in part by archaeologists that was realized ancient vessels were built in a manner opposite to that of modern wooden craft, that is, shell-first.\(^9\) The first scientifically reconstructed hull from the seventh-century wreck at YASSIADA, Turkey, confirmed that the planking was joined together with mortises and tenons that only could have been crafted before the framework as it was impossible to cut mortise-and-tenon joints with the planking and frames already joined.\(^10\)

This led to a new understanding of hull construction: ancient watercraft were built shell-first, i.e., the shell of planks

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was erected before the framework, and frame-first construction arose only in later times.

Ancient Mesopotamian boats were most probably not constructed frame-first. This method is not known to exist until the early eleventh century A.C.,¹¹ and it is evident that even today many traditional watercraft of the Near East are built shell-first.¹² The technique survives in areas where the time-honored practices have yet to yield to modern methods. For example, some traditional craft of the Persian Gulf first have their planking built up through a system of external temporary support frames.¹³ Only afterward, is the internal framework inserted and fastened to the planking. Nautical archaeologists first noticed this technique in the early 1990s, indicating the paucity of ship-construction research in the region.


¹² In this paper, the term “Near East” excludes the coastal Levant and Anatolia as these areas belong in the Mediterranean tradition of mortise-and-tenon joinery.

¹³ The author witnessed this construction method on Muharraq Island, Bahrain, in 1993.
The unawareness of traditional Near-Eastern boatbuilding extends into the realm of Assyriology, and understandably so. As nautical research in the region has been scanty, one can hardly expect scholars of the Akkadian and Sumerian languages to have access to this information. Thus, no one can be faulted for such inaccurate interpretations, but our knowledge of the boats and related ancient terminology is skewed by the errors produced.

In the 1930s, Armas Salonen translated and analyzed Sumerian and Akkadian documents concerning boats and their construction. 14 This work became the seminal source for the interpretation of Akkadian and Sumerian boat texts. The Chicago Assyrian Dictionary (CAD) relies on Salonen’s work for boat and ship terms, and in archaeological circles his work is a standard reference. Salonen, however, used modern frame-first building as a basis for his analysis as he had no knowledge of the ancient shell-first technique. His interpretations relied on modern Iraqi frame-first construction “taking it for granted that the tradition of the

area continued from ancient times in an unbroken line."\textsuperscript{15}

This method, however, "cannot be proved until after the arrival of the Portuguese in India at the end of the fifteenth century."\textsuperscript{16}

Thus, by interpreting ancient boat texts using the frame-first method as a guide, Salonen produced errors in translation and meaning. These inaccuracies are now ingrained in the corpus of our knowledge of languages and technology of the ancient Near East.

This misunderstanding has led, in part, to erroneous interpretation of the boat-building sequence in the Gilgamesh Epic. Also responsible for the confusion, however, is unawareness of the major boat-building method of the Western

\textsuperscript{15} SSAW, p. 25.

\textsuperscript{16} SSAW, p. 25.
Indian Ocean littoral: the sewn-boat technique.\textsuperscript{17}

Methodology

With no physical evidence of Mesopotamian boats, a case must be made for the continuance of specific technologies over time to create an understanding of the Gilgamesh text. The better that boat-building evidence can be linked over time, the stronger will be the interpretation of the passage. It is more likely that common features shared by boats over the centuries will be recorded than experimental attributes or those limited in region or time. A comprehensive record of boat technology will elucidate these basic features of traditional construction and aid in filtering out the unusual.

\textsuperscript{17} S. Mark claims the term technically should be “laced boat” as lacing infers the threading of string through pre-drilled holes, the technique found on these boats. See by this author Homeric Seafaring, dissertation, Texas A&M University (College Station, 2000), p. 93, n. 52. As J. Hale points out, however, lacing infers a roping method in which the fastenings are repeatedly tightened and untightened (Personal communication, July 2002). The stitching in sewn boats, particularly in the Indian Ocean, was intended to be permanently fixed when properly maintained. Thus, the more traditional term “sewn boat” is used in this work.
Aspects of the science and technology of Mesopotamian civilization are still in use today. Geometry, time measurement, and writing all began in Mesopotamia.\textsuperscript{18} For example, the Sumerian system of sexagesimal place notation continues in use in the measurement of angular distance based on 360 degrees.\textsuperscript{19} It is possible that fundamentals of Mesopotamian boat-building technology also have survived. Some postulate that the sailboat itself, at least in Near Eastern contexts, is a Sumerian invention.\textsuperscript{20}

Boat construction techniques tend to evolve slowly, and changes, particularly local ones, stand out against the standard methods.\textsuperscript{21} Surviving features of Mesopotamian boat construction, therefore, would manifest themselves in

\textsuperscript{18} There is apparently no direct connection between the cuneiform system of Akkadian and the alphabet, although cuneiform was used in alphabetic Ugaritic. See F. M. Cross, "The Invention and Development of the Alphabet," in The Origins of Writing, ed. W. M. Senner (Lincoln, 1989), pp. 77-90.

\textsuperscript{19} S. N. Kramer, The Sumerians: Their History, Culture, and Character (Chicago, 1963), pp. 289-90.

\textsuperscript{20} Ibid., p. 290.

traditional shell-built, sewn watercraft aiding the interpretation of the sequence in the Gilgamesh epic.

This is the approach Adrian Horridge uses in his study of the lashed-lug boats of the western Pacific and their relation to a seventeenth-century manuscript concerning indigenous boat construction:

The "Historia de las Islas e Indios de Bisayas" was originally a manuscript dated 1668 by the hand of Fr. Alcisco Alcina, S.J. ...A preliminary translation into English by Paul Lietz... has circulated among scholars... but the sections on boat construction are incomprehensible without reference to real boats and models.\(^{22}\)

In my experience, the old accounts such as we have are explicable only by reference to real boats, but now at least it will be apparent that great care in translation and interpretation of words is required. I provide a basic description of the lashed-lug type of hull construction which was widespread in the sixteenth century. The evidence suggests that boatbuilding by something like the technique described here goes back far beyond that and was in fact a prehistoric skill of the Austronesian speaking peoples, although before the

arrival of metal tools the planks would be sewn rather than fixed by dowels.\textsuperscript{23}

Relying on modern lashed-lugged boats, models, and a few archaeological finds, Horridge successfully interpreted an otherwise mystifying document. Furthermore, studies in Southeast Asia have "revealed very strong similarities" between archaeological finds and modern ethnographic seafaring material.\textsuperscript{24} In such pursuits, it is "accepted that designs and building techniques would not have been static, but that certain typological and operational relationships between past and present did exist...."\textsuperscript{25} This same approach can be used to interpret the boat-construction sequence in the Gilgamesh epic through the examination of the sewn watercraft of the Persian Gulf and Indian Ocean.

\textsuperscript{23} Horridge, p. 31

\textsuperscript{24} Vosmer, p. 299.

\textsuperscript{25} Ibid., p. 299.
The Ever-Present Technique

Sewn construction was once ubiquitous throughout the Indian Ocean littoral, yet it has been given little attention as it pertains to Mesopotamian craft. Sewing is the construction technique used in Arabian ships collectively known as "dhow" in western literature, as well as of many other boat types from Arabia to Zanzibar, east to India, through Southeast Asia, and into the Pacific.

Indian Ocean sewn watercraft have little connection to the major shipbuilding traditions of other seas. There is even a marked difference between Arab ships of the Mediterranean and


27 Once also called Germs (sing. Germe) and Trankies. See W. Vincent, The Commerce and Navigation of the Ancients in the Indian Ocean, Volume II (London, 1807), p. 170, n. 248, and p. 379. According to A. Moore, "Notes on 'Dhows,'" MM 26 (1940): 206, "[the term 'Dhow'] has the sanction of long use by British seamen and is convenient as a type name to cover baggalas, sambuks and other, but is seems not to be used by the Arabs themselves. It would be interesting to know whether it once denoted an Arabian vessel now extinct or whether it belongs to some other people and language... The English sailor... has fine scorn for the proper application of foreign words...."

those of the Red Sea and Persian Gulf demonstrating the paucity of contact in regard to seamanship:

...a Syrian trading schooner is to all intents and purposes a European vessel and the terms used in the Levant are often of Venetian origin; the Kuwaiti būm has a totally different rig and hull-form and, even more remarkable, a totally different set of terms are used in the Gulf.\textsuperscript{29}

The method of edge joining planks with cordage appears in the historic and ethnographic sources of the Indian Ocean and its tributary seas for at least two millennia. Despite the technique's widespread occurrence, the details of sewn boat construction are poorly recorded\textsuperscript{30} and appear in accounts of disparate quality. The technique was slow to become the focus of major studies by nautical archaeologists as it is

\textsuperscript{29} J. Muir, "Early Arab Seafaring and Rudders," MM 51 (1965): 359. There is, however, a Mediterranean sewn boat tradition that existed from the most ancient times up through the eleventh century A.C. There are some shared characteristics with the Indian Ocean type as well as some distinct differences.

considered a dead end in the development of modern ship
construction.\textsuperscript{31}

The boat builders of the Indian Ocean area exercised an
extreme conservatism, passing down not only boat designs to
their successors, but the boats themselves. Among the Arabs
of the Persian Gulf where boats a century old are young and
changes in design are slow, there is "reason to believe that
similar boats have sailed the same waters for over a thousand
years."\textsuperscript{32}

The widespread occurrence, geographically and temporally, of
sewn boats suggest this construction technique is a good
candidate for the construction method used, if not developed,
for seagoing Mesopotamian boats, first appearing as craft of
palm wood, and later as vessels made of imported Indian
timber, as is the case today.\textsuperscript{33} The littoral of the western
Indian Ocean is a "cultural unity" where evidence from East

\textsuperscript{31} J. R. Steffy, \textit{Wooden Ship Building and the}
\textit{Interpretation of Shipwrecks} (College Station, 1994), p. 40.

\textsuperscript{32} R. Le Baron Bowen, Jr., \textit{Arab Dhows of Eastern Arabia}

88.
Africa and India may be as "significant as that which comes from the Persian Gulf."  

As Vincent states "It is one of the most extraordinary facts in the history of navigation, that this peculiarity (sewn boats) should be one of the first objects which attracted the admiration of the Portuguese upon their reaching the same coast (as did the ancient Greeks), at the distance of fifteen centuries." 

Procedure

This study first establishes the long pedigree of the sewn boat by compiling records of the type from the past two millennia. Then I translate and interpret the text concerning the boat in Tablet XI of Gilgamesh. Various other interpretations of the text from the past century are examined and contrasted to my own. My interpretation is also compared to the knowledge of sewn craft of the Indian Ocean and its tributary seas. Finally, a survey of evidence concerning boats, wood resources, and construction in wood

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34 Ibid.

35 Vincent, p. 169.
from other texts, iconography, and archaeology is presented. The hypothesis of this study is that the text in Gilgamesh relates details of actual Mesopotamian constructional methods, and that these best fit those of the sewn boat of the Indian Ocean littoral, as we currently understand this technique of boatbuilding.
CHAPTER II
THE SEWN BOAT OF THE WESTERN INDIAN OCEAN

This examination covers the sewn boats existing in the western Indian Ocean from the late twentieth century to the classical period. The evidence includes eyewitness descriptions, artistic representations, and the few archaeological finds of such vessels. These accounts are presented in reverse chronological order as an examination of the more detailed recent records aid in the understanding of the older, often sketchy ones.

European explorers, ethnographers, Arab geographers, Christian missionaries, Romans, and Greeks exploring the bounds of their world all took note of the strange sewn watercraft plying the far seas. Modern accounts are the most detailed, of course, as in the past several decades a handful of researchers turned their attention to Indian Ocean watercraft, in some cases recording the boats just as they were vanishing from the scene. The descriptions predating the twentieth century vary in detail and quality. Yet, as a body of data, they demonstrate common and repetitive themes
in the sewn technique that underscore the method’s longevity and unchanging character.

Sewn Boats of the Modern Era

Sewn Survivals in India

Along the Malabar Coast, which comprises the shores of the states of Karnataka and Kerala, sewn boats still ply the seas and inland waterways. In Goa a number of sewn boats were found in 1996. One was an outrigger built on a dugout bottom with two strakes sewn onto either side. Another was a "plankboat" ten meters long whose planking had "been sewn up by lashing and the sewing holes plugged in with tree-nails." Mango wood predominated in the construction, and a mix of tar and wool was used as a "packing material," the precise use of which is not specified.36

Sewn kettuvalloms (sp. var. kettuvallams. Malayalam kettu = rope knots) still journey on the inland waterways of

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36 J. Roque, Glimpses of Traditional Boatbuilding in Goa, India (http://www.abc.se/~ml0354/bld/goa.htm, 1998).
Kerala. These old rice carriers have been converted into tourist cruise vessels, preserving the sewn tradition as repairs to the hulls follow the age-old method. The boats are usually crafted of anjili (Artocarpus hirsutus), a hardwood common to the forests of southern India. Planking is carved and sewn together with coir. Stitching holes are spaced 7.5 cm (3 inches) apart, and 2 cm (.75 inch) from the edges of the planks. The builder first makes "a diagonal stitch to the left, then one to the right, and then... a vertical stitch" using 4 m. lengths of coir rope. The interior and the stitching is coated with fish oils, such as sardine oil, and the outer hull is smeared with cashew oil. With proper maintenance, a kettuvallom lasts generations.


39 Ibid.


The pati, a keel-less boat of Karnataka, is shell-built with sewn planks and lightly framed with only 4 to 6 frames.\textsuperscript{42} Planking edges are grooved to ensure a tighter fit. The strake's upper edge is cut with a v-shaped groove, and the adjoining edge of the next strake is beveled to a point to fit the v-groove.\textsuperscript{43} Holes at intervals of three inches are made along planking edges for the stitching. A wax mixture of Dhupa (Vateria indica)\textsuperscript{44} tree resin and vegetable oil is used with coir fiber for wadding. The coir fiber expands when it contacts water, thereby closing any small holes and gaps. Coir thread is used to sew the planking together. The stitching holes are plugged with wooden pegs. Stem and sternpost are often comprised of several pieces\textsuperscript{45} and are stitched together. The outside of the hull is coated with oil such as cashew, groundnut, vegetable oils, fish and shark oils. Additionally, the inside of the hull is sealed with


\textsuperscript{43} Ibid., p. 136.

\textsuperscript{44} Ibid., p. 138.

\textsuperscript{45} Ibid., p. 125.
any one of these oils in combination with the Dhupa-based wax. The vessel is thus treated every fifteen days.

Seagoing cargo vessels of the area, such as the machuva, Manji, and Phatemara, now of nailed frame-first construction but formerly sewn in the traditional method, are coated below the waterline with a preparation of animal fat, lime, and vegetable oil. Above the waterline, they are coated with paint or coal tar.

On India’s east coast, the Madras, the sewn masula survives among the traditional fishermen. This boat-type is a “deep sided craft built without ribs, the strakes sewn together... and the seams covered by caulking bands of fibre (wadding), laced on.” Stitching holes below the waterline are pegged with wooden pins, and with balls of coconut fiber substituting in the northern coast. The boats have the

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46 Ibid., p. 137.
47 Ibid.
48 Ibid., pp. 140-41.
49 WT, p. 236.
sewing pattern typical of the Indian Ocean sewn boats: the "criss-cross pattern" (Figure 4). On some southern masulas, the criss-cross pattern follows that of the Arabian and African coasts, appearing inside the hull leaving only a series of vertical stitches on the outside. Throughout the coast, however, a widely-used variant results in the criss-cross pattern appearing both inside and outside the hull.  

Wadding underlies the masula’s coir stitching. The wadding is made of grass on the northern coast and coir on the southern. In the case of the former, the wadding is sometimes “waterproofed” by covering it with plastic or bicycle inner tubes. As the grass wadding does not last long, the boats were taken apart annually and resewn.

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51 Ibid., pp. 310-11, and p. 315.
52 Ibid., p. 311.
53 Ibid., p. 313.
54 Ibid., This type then may qualify as a “laced” vessel as the ropework was intended to be undone. Whether the cording was actually untied or simply cut away is unknown.
Sri Lankan Craft

In Sri Lanka, the outrigger fishing canoe oruwa, or ora, is fashioned from sewn planks on a dugout base. The criss-cross lashings overlie wadding along planking seams and along the hooding ends.\(^{55}\) The Sri Lankan madel paruwa also has this sewing style, with a wadding of either coconut leaves or a combination of coir and coconut leaves.\(^{56}\) It is probable that "sewing may be (an) imported trait (although there is no reason to assume that it was not first developed here)."\(^{57}\)

South Arabian Survivals

In Yemen, sewn boats are no longer built, but scattered hulks still lie derelict.\(^{58}\) On these old hulls, criss-cross lashings overlie wadding along plank seams and hooding ends


\(^{57}\) Ibid., p. 44.

(Figure 5). The ends are wadded inside and out. Planking seams are wadded inside only, leaving just vertical stitches visible on the exterior.

Further east in Oman derelicts also lie on the beaches (Figure 6). Yet, some traditional boats are at least partially sewn while one, the *kambari*, is still "a completely sewn craft."\(^{59}\) Others have no sewing whatsoever. The non-sewn vessels are built shell-first, and dowels hammered obliquely across plank seams are used to align plank edges. Temporary cleats hold the shell together until framing is inserted and fastened to the planking by square-sectioned iron nails clenched on the inside.\(^{60}\)

The partially sewn *badan* are "evidence of a gradual transition from sewn to nail technique adopted by local builders."\(^{61}\) Planks are nailed to frames, but strake ends are stitched to the keel, and throughbeams are sewn to the planking. No knees or breasthooks are used, which is

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\(^{60}\) Ibid., pp. 219-20.

\(^{61}\) Agius, p. 186.
"perhaps an echo of when these boats were completely sewn," as sewn vessels were traditionally lightly framed.\textsuperscript{62}

The \textit{kambari} is the last remaining fully sewn vessel still in use on the Southern Arabian coast. The name derives from the Jabbali \textit{kambar}, meaning coconut fibre cordage, while its form and design is reminiscent of the Somali \textit{beden} and the Indian \textit{masula}.\textsuperscript{63} As observed in the early 1990s:

Holes spaced 80-100 mm apart are... drilled along each upper edge of the keel... Matching holes are drilled through the lower edge of the garboards, and the garboards are fitted and temporarily lashed in place. These lashings are made through special sets of holes which are later plugged. Fibrous coir wadding is laid on the outside of the seams between the keel and garboards... Prior to being sewn, each new plank is locked in place by the lashings and several dowels. The hood-ends... are sewn together... Frames and


\textsuperscript{63} Ibid., p. 231.
thwarts are lashed through additional holes drilled in the planking.  

The holes for the stitching were stoppered with coconut fiber or cloth wads, and sealed with a substance made from lime, resin, and vegetable oil.  

All the Omani vessels were smeared with shark liver oil every three months to preserve the wood and iron fastenings. The odor of the substance "is overpowering for many days after the coating is applied, but the oil functions so well that the noxious smell is tolerated."  

Omani kambari seem close in form and construction to their ancient ancestors, as evidenced in local rock art and graffiti, and Vosmer believes studies of these boats may lead

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64 The same method was used on the Sohar, a reconstruction of a medieval boom: "The putty to block the holes was made by melting tree gum... with coconut oil, and then mixing it with very finely crushed... sea shells to produce a mastic applied by hand. On the inside the stitch holes were plugged with tufts of raw fibre pounded home... It is worth noting that on the Malabar coast... the practice is to plug the holes with short pins of hali wood." T. Severin, "Constructing the Omani Boom Sohar," in SPB, p. 285.

65 Ibid.

to a greater understanding of the cross-cultural connections in the region.\textsuperscript{67}

Earlier, in the mid-twentieth century, sewn boats were found from Aden and east along the coast for four hundred miles. Fishermen favored these craft for their flexibility and strength that was superior to nailed vessels, and necessary on the rough and Rocky coast.\textsuperscript{68} The dugout-based sewn plank \textit{huri} on this coast were, like the vessels studied by Vosmer, coated with fish oil as a preservative.\textsuperscript{69}

Le Baron Bowen examined the sewn boat method in South Arabia in the mid-twentieth century, although he did not actually see one being constructed. In this, planks were continuously stitched in the criss-cross pattern, passing through holes 5 to 8 cm. apart, and overlying an internal wadding of palm leaf strips. On the outer hull, stitching was recessed in grooves cut between stitching holes. Additionally, bamboo

\textsuperscript{67} Ibid., pp. 234-35.
\textsuperscript{68} Le Baron Bowen, 1952, p. 201.
\textsuperscript{69} Ibid., p. 199.
treenails were driven obliquely between every other set of stitch holes.\textsuperscript{70}

The Persian Gulf: Bahraini Vessels

In the Persian Gulf, traditional hulls were once sewn in the same manner as those in India and Yemen. By the opening years of the twentieth century, the method had ceased to be used on ocean-going craft and was reserved only for local fishing boats. Prior to this, sewn vessels of up to 200 tons burden sailed the Persian Gulf and Indian Ocean.\textsuperscript{71}

With the demise of sewing, in Bahrain (Figure 7) two techniques have taken its place. The first is a typical frame-first construction in which no plans are used and frames are set up on the keel based on the builder's eye for proportion:

...Every other rib runs through the keel; alternate ribs start on each side of the keel. The planks are put on in more or less logical order, but no attempt is made to fit or splice them... When they

\textsuperscript{70} Ibid., p. 204.

have finished running the planks, there are a lot of little spaces, maybe one inch by six inches, that are filled in with little patches. All planks and patches are nailed on with large-headed hand-wrought iron nails clinched over on the inside of the ribs; these nails stain streaks down the outside of the hull.\(^72\)

The boats were rubbed above the waterline with fish oil “appalling in its pungency,” and below the waterline a “mixture of lime and tallow in a thick paste” was smeared on the hull.\(^73\)

The second technique is a shell-first method using a system of external molds:

- First the keel, stem, and sternpost are erected.
- Next, molds are set up, nailed onto the keel at intervals judged by eye (Figure 8). Most molds are short, single component members. Two “master” molds comprising several components are erected, one forward of amidships and one aft. These master molds outline the shape of the vessel up through the sheer line


\(^73\) Ibid.
(Figure 9). The molds thus create an external "framework" for the planks to follow.

- Next, the garboards are nailed to the keel.
- Planks of the second strake are then fitted to the garboards. The planks are pulled and bent onto the shape created by the molds, clamped in place, and nailed to the molds.
- Once the turn of the bilge is reached, floors are added inside. These are secured from the outside with the few nails needed to hold them in place until shell and framing is complete. The external molds on the hull's bottom are left in place throughout the process.
- More molds of varying length are added forming the shape of the sides and reaching towards the sheer line.
- Planking is added and fastened to the molds, creating the sides. Futtocks are inserted as the sides reach completion.
- Once the shell is finished, holes are drilled through the planking and frames. Large iron spikes are driven through the holes, their ends protruding from the
frames inside. The spike ends are then double-clenched in a herringbone pattern.

- After the planking and frames are firmly fastened together, the external molds are removed from the hull for use on the next vessel to be built. This reuse creates a conservative hull shape among vessels from the same yard, as there is little variation between boats built with the same molds.

- For the finishing touch, after the superstructure and whatever internal utilitarian features are constructed, the outside of the hull below the waterline is smeared with a mixture of lime and fat that acts as a sealant and anti-fouling coating. This layer is properly called a "paying."

Vosmer records a similar method in Oman where cleats held planking together in non-sewn shell-first boats. In Bahrain, however, the timbers used were more than cleats, as some were over two meters long. This system appears to be a solution to the abandonment of sewing and the adoption of nailing while retaining shell-first construction.

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74 Vosmer, 1997, p. 220.
The Red Sea

In the Red Sea, the sewn method appears all but forgotten. In 1896 sewn boats were common in Quseir. As late as 1926 they were seen sailing between Suakin and Halaib, and in 1930 British explorer Bertram Thomas sailed the sea in a sewn banush. Some sewn Red Sea vessels had wood sheathing 2.5 inches thick overlying the hull. Between the two layers there was a sealant of "chunam (lime made from burned seashells) and oil, called galgal."77

In those areas where wooden boats have not been totally displaced by modern fiberglass vessels, watercraft are built frame-first while retaining their traditional shape and appearance. In the boatyards of Massawa, Eritrea, I observed such boats under construction in 1997. Although detailed observations were not possible, it was clear that planking was being fastened with iron nails to a framework to produce a vessel with typical "dhow-like" lines. This vessel, like


77 Moore, p. 207.
the few other wooden craft plying the waters around Massawa, was intended to be powered, not sailed.

Whether boats were being built in the traditional or the modern way along the more remote areas of the coast is unknown. Most boats plying Eritrean waters are open wooden ones equipped with engines. Yet, some traditional boats survive. In March of 1997, I witnessed a lateen-rigged vessel, strikingly similar to an illustration of a zaruk of Massawa as published by Hornell in 1946 (Figure 10), sailing the strait between Black Assarca Island and the mainland’s Buri Peninsula. This may indicate that traditional methods of boatbuilding still exist in the remote villages of the Eritrean coast. Such survivals were suggested by Hornell as a factor for the continuing presence of sewn boats: "...the practice lingers on at... places, usually backwaters of life where old customs persist, or where the people lead a hard and poverty-stricken life on a dangerous and surf-beaten coast."78 Horridge also found that sewn planking tended to survive modern onslaught in "backward places."79 Certainly, this describes the conditions along the Eritrean coast at the

78 WT, p. 236.
79 Horridge, p. 57.
close of the twentieth century where villages exist isolated from the larger world.

East Africa

A well-studied sewn-boat type is the East African mtepe\textsuperscript{80} and the closely related dau, or dau-mtepe (Figure 11). First described in some detail by the explorer Burton in the mid-nineteenth century, these boat types of undefined antiquity\textsuperscript{81} became the object of study by Hornell just as they became extinct in the early twentieth century.\textsuperscript{82} The mtepe and dau-mtepe were built almost exclusively at Faza on Pate/Patta Island in the Lamu archipelago. The Arabian sambuk, frame-

\textsuperscript{80} In one instance, at least, called "matepes" by the explorer Stanley. He noted no features other than their square "mat sails." H. Stanley, Through the Dark Continent (New York, 1906), p. 38.

\textsuperscript{81} R. Adams, Construction and Qualitative Analysis of a Sewn Boat of the Western Indian Ocean, master's thesis, Texas A&M University (College Station, 1985), p. 8.

built and nailed, displaced the sewn boats as they were more economical in labor and materials.\textsuperscript{83}

According to Burton:

The quaintest and freshest local build is to us the Mtepe, which the Arabs call Muntafiyah.\textsuperscript{84} This lineal descendent of the Ploaria Rhapta, that floated upon these seas 20 centuries ago, is a favourite from Lamu to Kilwa.\textsuperscript{85} The shell has a beam one-third of its length... This breadth, combined with elasticity, enables it to stand any amount of grounding and bumping... It is pegged together, not nailed, and mostly, as the old traveler says 'sewn, like clothes, with twine.' ...Necklaced with strips of hide and bunches of talismans, it bears a red head (and) has the round eyes painted white... The 'Mtepe' carries from 12 to 20 tons...\textsuperscript{86}

\textsuperscript{83} Hornell, 1941, p. 55.

\textsuperscript{84} Also mutaifiyah. See W. F. W. Owen, Narrative of Voyages to Explore the Shores of Africa, Arabia, and Madagascar, volume 1 (Farnborough, 1968), p. 416.

\textsuperscript{85} This pedigree was recognized early on by others as well. See, for example, F. Stuhlmann, Handwerk und Industrie in Ostafrika (Hamburg, 1910), p. 82.

Bishop Steere, in 1870 observed that "Mtepe, plur. Mtepe,.." had sharp ends and a prow carved in imitation of a camel’s head and decorated with paint, tassels, and streamers. The boats were rigged with a single square mat sail and "their planking is sewn together and they are built broad and shallow." It was a common belief that coconuts could not be carried on mtepes as they tended to force open the coir-fastened seams. The basis for this superstition is not known.

Hornell’s observations of a mtepe’s construction in the early twentieth century presents the first study of the type:

The frames were sewn to the sides by coir lashings passed through holes in the planking, subsequently plugged with wooden pegs and then cut flush on the outer surface.

...After coir fibre has been hammered into the seam from within, this is held in place by a protective band made up of a series of layers. The first consists of a thick paste made of pounded mangrove bark.... Over this are laid crushed

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88 Ibid.

strips of coconut husk, and, finally, a layer of dried dom palm leaf-stalk strips. When this composite band is complete it is sewn down into position. The twine used is three-ply coir cord with a palmleaf splint woven into the tapered end to serve as the threading-needle. Two men, A and B, work together, one inside, the other outside the hull. The man inside, A, passes the needle through to B on the outside. B pulls the cord through and winds it round a short stick which serves as a lever to draw it taut, the while A hammers the protective band flat, and knocks in a peg to wedge the stitch tight. B then returns the needle through a hole in the edge of the adjoining plank, A pulls it tight, B pegs it... As one stitch follows another, the peg from the preceding hole on the same side is removed and used again for wedging the next hole. (At this stage the pegs are not left in permanently.)

When the sewing is completed, a peg is driven into each hole from the inside and snapped off short. Whatever cord

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The wadding also helped reduce the sharp angle of the stitching, and provided shock absorption of the forces exerted on the stitching by the flexible sewn hull. See R. Adams, “Designed Flexibility in a Sewn Boat of the Western Indian Ocean,” in SPB, p. 292.
shows on the outer side of the hull is then cut away flush with the surface...\textsuperscript{91}

Hornell notes the use of treenails in the construction, in which obliquely driven treenails were hammered across planking seams. These he claims were known only from East Africa, the Upper Nile, Gujarat, and Russia.\textsuperscript{92}

Thus, it appears that treenails were driven diagonally across planking seams to fasten the planks together before the seams were sewn. Robert Adams, however, believes Hornell was mistaken. He claims the obliquely driven nails were either a rarity, or the accidental exposure of aligning dowels during the adzing of the hull’s exterior, resulting in the ovoid profiles of the dowel ends.\textsuperscript{93} According to Adams planking in

\textsuperscript{91} Hornell, 1941, 65. This description has noteworthy similarities to the method of creating a Mesopotamian quffa. As Hornell records in “The Coracles of the Tigris and Euphrates,” \textit{MM} 24 (1938): 155, “As each of these ribs and frames is placed in position, it is sewn with coir cord to the basketry walls. Two men are necessary for this operation, one inside the quffa to pass the cord through the wall of the basketry to his companion on the outside, who, in turn, threads it back to the inside, after hauling it taut.”

\textsuperscript{92} Ibid. For the oblique nailing on the boats of the Upper Nile, see J. Hornell, “The Frameless Boats of the Middle Nile, Part I” \textit{MM} 25 (1939): 417 and 420, and “The Frameless Boats of the Middle Nile, Part II,” \textit{MM} 26 (1940): 139.

\textsuperscript{93} Adams, 1985, p. 31.
sewn vessels was primarily fastened with "dowel tenons" set between the planks, as in some Somali craft, and that sewing was only secondary. As the sewing and not the tenons were visible, this, he claims led to the belief that the vessels depended on stitching for "structural competence." 94

As Hornell states, however, such a method of fastening planking together via obliquely driven treenails does exist on the littoral of the western Indian Ocean. Bowen notes the sewn boats of south Arabia had bamboo treenails obliquely nailed across planking seams. 95 Vosmer also notes this on the non-sewn Omani boats, but not on the sewn kambari. Additionally, in Pakistan the bohatja, the quantel battella, and the darewal battella all exhibit this trait. Although these are non-sewn riverboats, their planks are edge-joined with treenails driven diagonally from outside across the planking seams. The treenail heads appear oval-shaped "because of the angle at which the pins emerge from the plank face." 96

94 Ibid, p. 32.

95 Cf. p. 30.

Oblique nailing and internal dowel tenons was not, however, a standard, or necessary, feature of sewn boat construction. Most of the other Indian Ocean sewn boats of the twentieth century do not exhibit the combination of sewing and oblique treenails or dowel tenons. Indeed, if the combination were an essential aspect of sewn construction, one would expect the continued use of dowel tenons or oblique treenails in localities where sewing has been abandoned but shell-first construction is still followed. This has actually occurred on the non-sewn Omani boats where thin, obliquely driven treenails align the planks.\footnote{Vosmer, 1997, pp. 219-20.} In Bahrain, however, no such doweling or oblique nailing occurs. There is instead total reliance on the temporary external molds to hold strakes in place until framing could be inserted. One would expect that if either the doweling or oblique nailing were standard to the sewing technique, it would have been retained on Bahraini boats to aid in the shell construction.

While the combination for treenails and sewing on the mtepe and dau-mtepe may be an ancient method that has vanished from some later twentieth-century sewn boats and survived on other
boats, it could also be a feature added to strengthen the joints on boats made in areas where rope of poor quality was used. The mtepe was often described as being poorly constructed with rope of little strength. Some features are unique to certain areas. One example found on East African sewn boats but not those of other areas is the caulking rammed into the seam under the wadding. Adams notes that a mangrove-bark paste was used except in Somalia where pitch was substituted.\textsuperscript{98} There is a parallel to this in late eighteenth-century India on frame-built ships where a boiling pitch called dammer was poured into the seams.\textsuperscript{99} Another feature seemingly unique to the mtepe is the stitches cut away from the hull exterior.\textsuperscript{100} In addition, some sewn craft have grooves cut between stitching holes in opposite planks to make the cordage flush with the plank surface, a technique Bowen observed on the coast of Arabia.\textsuperscript{101}

\textsuperscript{98} Adams, 1985, p. 32.


\textsuperscript{100} Le Baron Bowen states that on the sewn boats he observed in south Arabia the stitching was not cut off. See Le Baron Bowen, 1952, p. 204.

\textsuperscript{101} Cf. p. 30.
Another possibility is that oblique nailing is a modern adaptation to the demise of sewing. In this case, the combination of stitching and oblique nails on the mtepe, as well as on the boats Bowen observed, is a transitional form between the fully sewn vessel and the non-sewn shell-first types. This could also be part of what Adams calls "the progression from flexible to rigid hulls,"\(^2\) because the use of either alignment dowels or oblique nailing would undermine the flexibility of the sewn construction.

The sewn kambari has no such nailing, although the other non-sewn Omani boats do. Except for the mtepe, this fastening method occurs on vessel types assumed to have switched from sewing, such as the Pakistani vessels mentioned above. The oblique nailing is also a feature of Sudanese craft, regarded to be "direct descendants" of ancient Egyptian boats,\(^3\) which were fastened with cordage.\(^4\) As oblique nails do not appear in Bahrain, boat builders in some areas but not others seem to have developed this technique. Therefore, oblique nailing

\(^2\) Adams, SPB, p. 301.

\(^3\) Hornell, 1940, p. 136.

\(^4\) Cf. p. 86.
is not an essential aspect of sewn construction. As will be seen, archaeological evidence supports this conclusion.

Other African Craft

The sewn method extended beyond the East African coast into the interior in areas penetrated by Arab traders and slavers. In 1926, Bowen describes the watercraft of the Jinja of Lake Victoria as large and well-built, whose planking was sewn with rafia fiber "passed several times though holes in the adjacent edges bored by a red-hot iron rod."  

Plantain fiber wadding overlaid by Elephant grass covered the seams inside and out. This was "pressed tightly against the joint by the twine which sews the planks together, and which binds in this caulkimg material at the same time." The stitching was further tightened by lightly hammering wooden strips under the stitching on the outside. The stitching holes were plugged to prevent leakage with vegetable fiber poked in with a small pointed stick.

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106 Ibid.

107 Ibid.
Further inland sewn vessels following the Indian Ocean pattern were found on Lake Chad and on the Logon River, southeast of the lake.\textsuperscript{108}

\textit{The Pakistani Hora - A Possible Descendant of Sewn Boats}

While sewn boats no longer exist in Pakistani waters, there appears to be a connection between sewn method and the watercraft known as the \textit{hora}. This term covers a type of fishing boat representing dugouts to "fully framed and planked up" craft found throughout the western Indian Ocean littoral."\textsuperscript{109}

The construction of the \textit{hora} as recorded in the mid-twentieth century has its planks edge joined with galvanized pins hammered into predrilled holes in both edges.\textsuperscript{110} The


\textsuperscript{109} Greenhill, pp. 153-55.

\textsuperscript{110} Ibid., pp. 163-66.
resultant "flimsy" shell has a few temporary floor chocks nailed to it, and a few futtock moulds are used for support. Frames are inserted when the shell is at least two-thirds complete. Galvanized iron spikes, driven from the outside and clenched fasten framing to the shell.\footnote{Ibid.}

Prior to the twentieth century, wooden dowels were used in planking seams and treenails fastened frames to the hull. These, and the iron pins, are different from the fastenings of other Pakistani craft, in which obliquely-driven treenails predominate.\footnote{Ibid., p. 177.} Greenhill suggests this is indicative of "influences on the development of the hora from yet another source."\footnote{Ibid., pp. 163-66.}

The horas are caulked with cotton and smeared with foul-smelling fish oil:

When the fish oil anti-fouling is being renewed it is smeared on with the palm of the hand dipped in the preparation in tin or enamel bowls. The crews sing at this kind of work, and even stop occasionally to dance and skylark.\footnote{Ibid.}
It is inferred here that the hora’s origins lay in the sewn method, but the stitching was abandoned and internal alignment pegs, once wood and now iron, were added to preserve the shell-first construction. Such internal alignment pegs were found on sewn vessels in Somalia, as noted by Adams.\textsuperscript{115} Pegs mortised between plank edges were also found on the sewn oruwa of Sri Lanka.\textsuperscript{116} They also occurred on the Southeast Asian vessels Horridge examined, which, he believes, are descendants of sewn boats.\textsuperscript{117} Indeed, the use of fish oil as a sealant/anti-fouling on the hora is reminiscent of the shark oil used on Omani vessels, in particular the sewn kambari. A further parallel is seen between the chocks and moulds of the hora and the molds and cleats on Bahraini and Omani boats. Additionally, the term hora is related to that for the sewn Sri Lankan outrigger fishing canoe oruwa, or ora, mentioned earlier, as well as linguistically to the Arabic term huri, or hori, meaning a

\textsuperscript{115} Adams, 1985, p. 32.

\textsuperscript{116} Cf. p. 26.

\textsuperscript{117} Cf. p. 13.
plank-extended dugout canoe.\(^ {118} \)

Thus, we see the abandonment of sewing but the retention, or addition, of alignment pegs without the occurrence of oblique nailing. That oblique nailing occurs on other Indus boats perhaps indicates two different solutions to the abandonment of sewing in the same region.

Sewn Vessels and European Travelers

Various European travelers and explorers recorded boats with sewn planking throughout the Indian Ocean littoral. Beside the mtepe and dau-mtepe, Burton notes the East African kidau:

> The Kidau (small dow) is... generally sewn together with coir or rope of cocoa fibre, and caulked with the same. The bottom is paid over with a composition of lime and shark’s-oil, which, hardening under water, preserves the hull from sea-worms. Thus sheathed, ships which have made two feet of

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leakage become tight as if newly coppered.\textsuperscript{119}

In Mozambique, on the Delagoa Bay and Fisher’s River in 1821, Captain W.F.W. Owen observes that the boats there were similar to those in southern India

but on a smaller scale... their planks being sewed together against a wadding of tow, sufficiently elastic to keep them tolerably tight. This method of tying planks seems to be practised (sic) in all the boats and vessels which are, strictly speaking of native manufacture, on this coast. But Delagoa Bay and Fisher’s River are the only points where we saw any of them south of Zanzibar.”\textsuperscript{120}

Most of these Europeans were not trained in observation. Most were “so surprised to find boats whose planks were sewn together that they usually described the boats as being ‘sewn only with fiber’ and gave few if any other details.”\textsuperscript{121} One of these was an eighteenth-century traveler who wrote about sailing in a “crazy Arab ship, built of sewn planks” on the Red Sea.\textsuperscript{122}

\textsuperscript{119} Burton, 1967, pp. 75-6.

\textsuperscript{120} Owen, p. 74.


\textsuperscript{122} Hornell, 1946, p. 235.
Fortunately, some observers were more interested in details. According to G. B. Kempthorne, in the early nineteenth century the boats at Karroon, a small fishing village on the Iranian Coast, were each “made of several small planks nailed or sewn together in a rude manner with cord made from the bark of dato-trees, and called kair, the whole then being smeared over with dammer or pitch.”  

123 These he claims had been unchanged since Alexander’s admiral Nearchus, in 326 B.C., anchored his fleet at Neoptana, believed to be Karroon. Nearchus, however, made no mention of the native watercraft.  

124 Admiral F. E. Paris records sewn boats in Arabia and in India, including details of a sewn beden-seyad in Muscat. This vessel was about 30 feet in length and was constructed without any ribs. The bottom was flat and consisted of a single plank from which the sides (composed of two planks on

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each side) rose at an angle of about 45°. Paris\textsuperscript{125} tells us little of the method of sewing except that "small flat lashings... pierce the planks and press, in the interior, a sausage of oakum impregnated with a resinous composition of which the whole body is covered.\textsuperscript{126}

James Bruce, of Ethiopian adventuring fame, notes in 1800 that at Quseir on the Red Sea, watercraft were sewn together without a single piece of iron in the construction. He recognizes that this design was advantageous to sailing in the region as no damage ensued by hitting a reef or rock due to the flexibility inherent in sewn construction.\textsuperscript{127}

William Vincent, while not having visited the area, draws upon other sources in his early-nineteenth-century tome The Commerce and Navigation of the Ancients in the Indian Ocean. In this, he states that the boats along the African coast were "small, and raised from the bottom of a single piece, by the addition of planks which were sewed together [with the

\textsuperscript{125} Le Baron Bowen, 1952, p. 204.

\textsuperscript{126} Quoted by Le Baron Bowen. Ibid., p. 202.

\textsuperscript{127} Le Baron Bowen, 1949b, p. 107. See also J. Bruce, Travels to Discover the Source of the Nile, II, 2\textsuperscript{nd} edition (Edinburgh, 1805), p. 107.
fibres of the cocoal, and which had their bottoms paid with some of the odoriferous resins of the country."\textsuperscript{128}

At the dawn of the eighteenth century, William Daniel traveled from London to Mocha and back again. When leaving Yemen for Jedda, he noticed the vessel he sailed on had her keel, beams, planks, and rudder ...sowed and tyed together and then pitched, not having one nail or piece of iron in her; her sails being made of date leaves, matted or pleated together, and ornamented with ostriches eggs and feathers, and the vessel's stern very prettily painted.\textsuperscript{129}

A contemporary, Charles Jacques Poncet, also traveling in 1700, embarked from Massawa while avoiding traditional vessels:

I had no mind to hazzard myself in the ships of the country, which appear'd to be very slight and unsafe; the planks, altho' pitch'd and tarr'd, being only fasten'd together with pitiful cords, as

\textsuperscript{128} Vincent, p. 169.

well as the sails, which are only made of mats of the leaves of the dome. Notwithstanding, these vessels, altho' so ill rigg'd out and worse govern'd, carry a great weight....  

The accounts by Daniel and Poncet both mention the pitching of the sewn boats. It is possible they were referring to oiling as noted in many other accounts, as there is no evidence of any sewn boat actually being smeared with pitch. There is no way to be certain of what they meant.

In the 1690s, Gêmeilli Carreri found sewn boats under construction in Bahrain, where instead of nails "they use "chivelles" (pegs) of bamboo or cane, and further join the planks with "ficelles" (strings) made of rushes." 131 Whether he meant framing was fastened to the planking with treenails or if the planking was fastened together with pegs is unclear.

Father Lobo, traveling on the Red Sea in 1622 noticed the gelves, vessels made "almost entirely of the coco-nut


131 Newberry, p. 65.
tree."\(^{132}\) Planking was sawed out of the tree trunks, the cordage fastening the planking together was spun from the bark, and the sails were made from the leaves. Like Bruce two centuries later, Lobo observes that the construction lent itself to the conditions of the sea as its flexibility prevented the boats from breaking up on the reefs and rocks.\(^{133}\)

Not all accounts of indigenous boats note the sewing technique, however. In the early seventeenth century, John Jourdain had an encounter with *pengaos* or *proas* but mentioned nothing about their construction.\(^{134}\) While Jourdain was apparently not interested in the construction of these vessels, John Huygen van Linschoten was curious enough to note what he saw a few years earlier in the late sixteenth century when he encountered *pangaios* "made of light planks, and sowed together with cords, without any nailes" sailing from Mozambique.\(^{135}\)

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\(^ {132}\) Pitt-Rivers, p. 203.

\(^ {133}\) Ibid.


James Lancaster twice notes sewn construction on his Indian Ocean voyage in 1591:

Where during our aboad we sawe divers pangaias or boates, which are pinned with woodden pinnes and sowed together with palmito cordes, and calked with the huskes of cocos shels beaten, whereof they make occam [oakum].

...(W)e came to an anker at Quitangone, a place northward of Mozambique... Here we took a pangaia... which is a vessell like a barge, with one mat saile of coconut leaves. The barge is sowed together with the rindes of trees, and pinned with woodden pinnes.

Whether Lancaster's "woodden pinnes" meant oblique nailing, the pegging of stitching holes, or treenailing of other features, such as decking, is not clear. Lancaster and the others who note the presence of treenails undoubtedly thought they were viewing boats built frame-first. Therefore, it is logical to describe the treenailing first, as they assumed the planking was treenailed to the frames and then sewn. This is aptly illustrated by an account from the 1930s.

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137 Ibid., p. 23.
wherein a Royal Navy Captain named Longsdon took the lines off a Red Sea sambuk at Aden. The vessel, 100 feet long with a 30-foot beam and a sheathing layer with chunam and oil between, had planking that "besides being fastened to the timbers by treenails were held fast to each other by coir cording 'rove through sunken holes and grooves'... and that she was caulked with pulled coconut fibre." 138 Clearly, Longsdon did not understand that the planking was first sewn together and then the framing treenailed to the planking, a common misconception among the Europeans.

During the sixteenth century, sewn-plank boats were not only seen along the African coast but in the Persian Gulf where "Basra-Ormuz" ships of 40 to 60 tons burden had planks fastened together with twine that held small bundles of "canes or straw leaves" over the seams. 139

The arrival of numbers of Europeans by sea in Indian Ocean lands meant the end for traditional boats as Westerners introduced their own techniques to areas they colonized. Major ports were the first areas to abandon indigenous

138 Moore, p. 207.

139 Hornell, 1946, p. 235.
methods, and, during the five centuries from the 1490s to the 1990s, the European frame-first method slowly encroached on the sewn boat. All this began with the arrival in 1497 of the Portuguese seafarer Vasco da Gama.

On his first trip around Africa to India, da Gama encountered sewn craft in Mozambique:

The vessels of this country are of good size and decked. There are no nails, and the planks are held together by cords, as are also those of their boats (barcos). The sails are made of palm-matting.

Clearly, he witnessed at least two sizes of watercraft, small boats and something larger and decked. The cord he called tamiça in Portuguese, which was popularly known as coil-rope. The watercraft he encountered were called Almeidas by the Portuguese. At Melinde, sewn Gujarati ships of 100 tons were seen.

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141 Ibid., p. 26, note 2.

142 Vincent, pp. 169-70.

143 Agius, p. 183.
Underscoring the difference between the western and Indian Ocean construction techniques is the language used by the Arabs to describe the methods brought by the Europeans:

...(D)hows... were probably of considerable size although stitched together with palm fibre instead of nailed to wooden ribs (sic) as at the present day, hence ships with nails are something in a separate class requiring a generic name mismariyāt from mismar "a nail."

...the mismariyāt are mentioned only in connexion with the Ifranj (i.e. Portuguese).... The mismariyāt are certainly ships put together with nails as opposed to the usual Indian ocean method of stitching the planks with palm fibre.\(^\text{144}\)

Pre-Circumnavigation Accounts

Europeans visited the Indian Ocean lands before Da Gama, but unlike him, they entered the region via the Near East and, at least in the Middle Ages, came in small groups or alone. The most famous of these travelers is Marco Polo.

\(^{144}\) Tibbets, p. 47-8.
The Sewn Boats of Marco Polo

As with other Europeans, Marco Polo also encountered sewn boats on his travels. His account of them in thirteenth-century Hormuz is one of the better known:

Their ships are wretched affairs, and many of them get lost; for they have no iron fastenings, and are only stitched together with twine made from the husk of the Indian nut. They beat this husk until it becomes like horse-hair, and from that they spin twine, and with this stitch the planks of the ships together. It keeps well, and is not corroded by the sea-water, but it will not stand well in a storm. The ships are not pitched, but are rubbed with fish-oil. They have one mast, one sail, and one rudder, and have no deck, but only a cover spread over the cargo when loaded. This cover consists of hides, and on top of these hides they put the horses which they take to India for sale. They have no iron to make nails of, and for this reason they use only wooden trenails in their shipbuilding, and then stitch the planks with twine as I have told you. Hence 'tis a perilous business to go a voyage in one of those ships, and many of them are lost, for in the Sea of India the storms are often terrible.\(^{145}\)

Polo’s account is oft quoted but seldom analyzed. There are the usual features of coir twine, sewn planks and fish oil as

\(^{145}\) Yule, 1926, p. 108.
a sealant. Also of import, however, is the statement "they use only wooden trenails in their shipbuilding, and then stitch the planks...." This could mean that trenails were used to assemble the planking and only then was the sewing done. In this case, Polo could be referring to either the trenails used to align planks as in Somalia, or to the oblique nails noted by Hornell. Either possibility would infer that Polo observed the building of a sewn vessel, something not stated. He merely implies that these vessels were owned in Hormuz, and it is unlikely that boats were built there due to a lack of suitable timber.\textsuperscript{146}

It is also possible that he was describing the practice of plugging up the holes for both planking stitches and frame lashings with wooden pegs. These could have been readily observable to someone examining a boat already built, particularly as these are hammered from the inside. Thus, plugs would be more readily observable than features on the outer hull, most likely submerged or coated over. How closely Polo examined the boats cannot be determined.

Polo may also have been referring to the use of treenails to fasten elements of the superstructure or deck. Cabins and decking probably would not have been sewn and, in the absence of iron nails, treenails would have been appropriate.

Yet, it should be noted that Polo recorded first that the rope was made, then the planks were stitched and finished with a rubbing of fish oil. It is possible that, like later Europeans, Polo interpreted the boats as frame-first constructions and confused what he saw. Ultimately, an explanation may rest in Polo’s disconcerting language skills as his “French is very bad indeed... the author is at war with all the practices of French...”\textsuperscript{147}

\textit{Friars on the Sea}

Other Europeans besides Marco Polo visited the Indian Ocean in the middle ages. Some of these were his contemporaries, while others predated him. Like Polo, these Europeans saw sewn vessels in wide use, and the strangeness of these vessels compelled some to make a record of them.

\textsuperscript{147} Ibid., p. 71.
In the 1320s, the friar Odoric traveled throughout the Indian subcontinent, noting, "In this country men make use of a kind of vessel which they call Jase, which is fastened only with stitching of twine. On one of these vessels I embarked, and I could find no iron at all therein."\(^{148}\)

The famed fourteenth-century text *The Travels of Sir John Mandeville* reports

> In that isle be ships without nails of iron or bonds, for the rocks of the adamants, for they be all full thereabout in that sea, that it is marvel to speak of. And if a ship passed by those marches that had either iron bonds or iron nails, anon he should be perished; for the adamant of his kind draweth the iron to him. An so would it draw to him the ship because of the iron, that he should never depart from it, ne never go hence.\(^{149}\)

The idea of magnetic rock destroying nailed ships was well-known among Indian Ocean seafarers. To the northeast of


Mombasa supposedly lay a magnetic mountain that drew ships to their doom. This was related in the late first millennium story "Third Kalandar's Tale" of the Thousand and One Nights:

To-morrow by the end of the day we shall come to a mountain of black stone, high the Magnet Mountain; for thither the currents carry us willy-nilly. As soon as we are under its lea, the ship's sides will open and every nail in plank will fly out and cleave fast to the mountain; for that Almighty Allah hath gifted the loadstone with a mysterious virtue and a love of iron, by reason whereof all which is iron travelleth towards it; and on this mountain is much iron, how much none knoweth save the Most High, from the many vessels which have been lost there since the days of yore.... When the ships were close under its lea they opened and the nails flew out....

Burton believed the myth was based on the strong currents along the coast of Africa as well as "that the myth... arose from seeing craft built, as on the East African Coast, without iron nails." Much earlier, in the first century, Ptolemy included a tale of magnetic islands called Maniolai

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in his geography of the Indian Ocean. Accordingly, these caused people to build iron-less watercraft:

There are said to be other islands here adjoined, ten in number, called Maniolae, from which they say that boats, in which there are nails, are kept away, lest at any time the magnetic stone which is found near these islands should draw them to destruction. For this reason they say that these boats are drawn up on the shore and that they are strengthened with beams of wood.

The flexibility of sewn craft has been well noted, and ancient sailors may have concocted a tale of magnetic islands to explain the preference for sewing over nailing, as sewn craft were better able to survive a rough pounding on the rocks. The real reason for the development of sewn boats, however, was "the lack of these nails at this early period of history; in fact, it seems possible that 'canoes hollowed

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152 These islands have been deduced to possibly be part of the Nikobar island group in the Bay of Bengal or the nearby island groups of Kamorta or Teressa. See G. E. Gerini, "Researches on Ptolemy's Geography of Eastern Asia," JRAS (1909): 420-24.

from single logs' were the earliest form of boats, and that
sewed boats are second only to them in antiquity."\textsuperscript{154}

Yet, there is more here than has been deduced. The relation
of the myth by Ptolemy and its inclusion in the \textit{Thousand and
One Nights} indicates that vessels fastened with iron nails
were known in the Indian Ocean prior to the arrival of the
Portuguese. As will be seen, medieval Arab geographers knew
of the nailed vessels of the Mediterranean. Whether common
sailors knew enough about them to create a myth of a magnetic
mountain is unknown. Early iron-fastened craft seemed to
have existed in India and Sri Lanka, however. According to
one analysis, a first-millennium painting shows nails in the
upper portions of a ship\textsuperscript{155} and in Sri Lanka in the fourth or
third century B.C. sewn and iron-nailed vessels co-existed.
The nails used were double-pointed and known either as
godicahala or duiamunda gujia, meaning both-end-pointed.\textsuperscript{156}

\begin{flushleft}
\textsuperscript{154} W. H. Ingrams, \textit{Zanzibar: Its History and Its People}
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\textsuperscript{155} Nailheads on these ancient Sri Lankan vessels were
soldered to prevent corrosion and boat bottoms were sometimes
sheathed in metal. S. Tripathi, \textit{Maritime Archaeology:
Historical Descriptions of the Seafarings of the Kalingas}
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\textsuperscript{156} Ibid., p. 100.
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The double-pointed nails may refer to staples, called "Patam Loha" or "leaf of iron," found on traditional Bangladeshi boats into the twentieth century.\(^{157}\)

Additionally, the Yuktikalpataru, an eleventh-century Sanskrit text, gives the warning about magnetic rocks in the sea pulling on the iron nails of ships.\(^{158}\) This same text mentions two types of ships, \textit{dirghā} and \textit{unnatā}, distinguished by whether their hulls were sheathed with copper or iron.\(^{159}\)

The inclusion of iron-fastened vessels in folklore stresses their perceived untrustworthiness and underscores the importance of sewn construction to the Indian Ocean builders and sailors. It was only due to the need to carry big, heavy guns beginning in the Portuguese period that sewing was abandoned in favor of frame-first nailed construction, which

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\(^{157}\) Greenhill, p. 75. Staples were also found on the hull of the Kinneret Boat as repairs in the planking. See J. R. Steffy, "The Boat: A Preliminary Study of Its Construction," in \textit{The Excavations of an Ancient Boat in the Sea of Galilee (Lake Kinneret)}, ed. S. Wachsmann, 'Atigot XIX (Jerusalem, 1990), p. 32.

\(^{158}\) Ibid., pp. 93-4.

was better suited to carrying the armament required to
counter the power of the Europeans.\textsuperscript{160}

In 1291, John of Monte Corvino set out from Europe on a
proselytizing journey to China. On the way, he encountered
the sewn ships of the Indian Ocean. He was intrigued enough
to make a record:

Their ships in these parts are mighty
frail and uncouth, with no iron in them,
and no caulking. They are sewn like
clothes with twine. And so if the twine
breaks anywhere there is a breach
indeed! Once every year therefore there
is a mending of this, more or less, if
they propose to go to sea. And they
have a frail and flimsy rudder like the
top of a table, of a cubit in width, in
the middle of the stern; and when they
have to tack, it is done with a vast
deal of trouble; and if it is blowing in
any way hard, they cannot tack at all.
They have but one sail and one mast, and
the sails are either of matting or of
some miserable cloth. The ropes are of
husk.\textsuperscript{161}

\textsuperscript{160} Johnstone, p. 179.

\textsuperscript{161} John of Monte Corvino, "Letter from Friar
Mentillus, A Dominican, Forwarding Copy of a Letter from
John of Monte Corvino," in Cathay and the Way Thither, Being
a Collection of Medieval Notices of China, volume III:
Missionary Friars-Rashiduddin-Pegolotti-Marignolli, ed. and
This account is second in detail to Marco Polo’s for the medieval period, but John makes no mention of treenails on these sewn boats. However, neither man mentions the wadding underlying the stitching that was surely there. Thus, the lack of mention of treenails does not necessarily imply their absence.

Arab Accounts of Sewn Vessels

Arabs recorded sewn construction, noting planks held together with coconut fiber in the fifteenth century.\(^{162}\) At the time of the Portuguese arrival in the Hadramaut, planking there was called *sufarat* and a vessel was poetically described as *sufrah wa-habl kumbár*, literally “a plank and coir-ropes.”\(^{163}\) In 1328 Ibn Battuta noticed sewn vessels such as the Red Sea *jabla* with its ‘fibre like hair, out of which they make ropes, which they use instead of nails to bind their ships together and also as cables.”\(^{164}\) Some Arabs unused to

\(^{162}\) Hornell, 1946, p. 235.


seafaring were afraid to sail in sewn vessels. Ibn Jubayr remarks "(t)heir parts are conformable weak and unsound in structure. Glory to God who contrives them in this fashion and who entrusts men to them."\textsuperscript{165}

We are fortunate to have two thirteenth-century depictions of Indian Ocean sewn vessels, both from the works of al-Hariri. The first of these has been published often and it depicts a sewn "dhow," most likely a boom. Appearing along the seams of planking and hooding ends are pairs of single stitches (Figure 12). These are unlike the single stitches that are found on the typical sewn boat of the western Indian Ocean. Bowen claims that the paired stitching is demonstrative of the evolution of the method and that it spread outward from Indonesia, with the criss-cross pattern developing later:

\begin{quote} 
A clue to the date of the development of continuous stitching might seem to be given in a thirteenth-century miniature of al-Hariri's Maqamat. ...(I)t seems abundantly clear that the stitches are paired lashings. If this were the custom at the time it would seem to indicate that continuous stitching was not common in Arabia until after the thirteenth century.\textsuperscript{166}
\end{quote}


\textsuperscript{166} Le Baron Bowen, 1952, p. 208.
An examination of the other drawing undermines Bowen's implication that paired stitching predominated. This scene (Figure 13), drawn in similar style to the first, depicts a ship in trouble as shown by its broken mast. Close examination of the hull reveals cross-stitching at the forward hodding ends and along the juncture of the two timbers forming the rudder. Whether the same sewing occurs along planking seams cannot be discerned. Nevertheless, this second ship demonstrates that the cross-stitch method is not as new to Arabia as Bowen claimed. The paired stitching on the first ship may be another example of a regional sewing method, or it could represent an Arab-style vessel from the Indonesian area, but it does not preclude either the existence or the commonality of cross-stitching before the thirteenth century.

As mentioned, Arabs knew of the differences between the European/Mediterranean method of nailing ships and the sewn technique of the Indian Ocean. In the tenth century Abu Zayd vouches for the 'fact' that the system of ship construction with planks sewn together is a speciality of the shipwrights of Siraf, whereas the
builders of Syria and Rûm on the contrary nail them together. ...(O)il mixed with other materials... is used to pay the bottoms of sea-going ships to close the holes drilled for the sewing twine and for the caulking of the seams.  

Zayd mentioned no use of treenails.

In the ninth century, Persian Gulf sewn ships were payed, that is, smeared, with whale oil. The fishermen of Siraf in the Persian Gulf cut up whale blubber, extracted the oil, "mixed it with other stuff, and used to rub the joints of the ship's planking." This oily substance was known from Yemen to India and on to China.

There is little other documentation of ship construction from this period. The Yuktikalpataru, the eleventh-century Sanskrit text mentioned earlier, gives some details about sewn boat construction. Other ancient Indian texts mention sewn boats, including the details of plugging the stitch

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167 Hornell, 1946, p. 234.

168 Yule, 1926, p. 117, n. 3.

169 Hourani, p. 97.

170 Cf. p. 68
holes with wax and wool, and note that in an emergency anything would do as a plug including clothes, grass, clay, and "human organ."\textsuperscript{171} Perhaps hair was meant, or even plugging a hole with one's finger.

We are fortunate, however, that archaeology has revealed a shipwreck from the ninth century that reveals more about sewn boats of a millennium ago than all the Arab and European accounts combined.

The Belitung Wreck

A shipwreck discovered in 1998 at Belitung Island, Indonesia, has yielded well-preserved remains of a ninth-century sewn vessel:\textsuperscript{172}

\textit{...(T)he key features of the Belitung Wreck are... cross-stitched seams with wadding inside and out; no dowels used for edge fastening; sharp bow with little rake; stitched in frames; through-beams stitched to the hull...}\textsuperscript{173}

\textsuperscript{171} Tripati, p. 93-4.


\textsuperscript{173} Ibid., p. 211.
Evidence of three through-beams remains... (W)adding and binding... sealed it against the hull outboard... The configuration is remarkably similar to the through-beams on still-extant Omani fishing craft called the batil....

Ethnographic evidence of boatbuilding in Oman shows strong parallels.... The cross-stitching and through-beam attachment are nearly identical on small craft surviving to this day. Even the hull form of the batil qarib... is thought to be similar to the original hull form of the Belitung Wreck.\textsuperscript{174}

While the vessel was constructed from Indian woods, an Arabian origin for the ship is possible, as wood for shipbuilding had long been exported to Arabia.\textsuperscript{175}

What is remarkable about this wreck is that construction particulars differ little from modern sewn boats, demonstrating the long conservative tradition of the technique. The method of sewing is the criss-cross pattern found around the Indian Ocean on all types of craft, as well as in Hariri's thirteenth-century depiction.\textsuperscript{176} The

\begin{flushright}
\textsuperscript{174} Ibid., p. 214.
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\textsuperscript{175} Ibid., p. 216.
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\textsuperscript{176} This wreck further refutes Le Baron Bowen's assertion of the late arrival of the method in Arabia.
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excavator, however, makes no mention of stitch-hole plugs (Figure 14). As Hourani states: "In attempting to reconstruct the Arab type of vessel... we are on fairly safe ground in using evidence down to the coming of the Portuguese. Before that event, there is no reason to believe that ship types changed very much...."¹⁷⁷ As this wreck shows, he was right.

The use of a lime-based sealant, or paying, on the Belitung hull along the planking seams and butt ends of the through-beams¹⁷⁸ further demonstrates the unchanging nature of the sewn technique. As seen in numerous examples over the past millennium the use of a paying of oil, or oil and lime, on the hull is an indicator of sewn boat construction. It has been described on all the sewn vessels examined in this study and on those vessels built in areas where the sewn method once held sway. An oily sealant, often blended with lime and sometimes with an added resin such as dammar, was found

¹⁷⁷ Hourani, p. 88.

¹⁷⁸ Flecker, pp. 206-07.
throughout the Indian Ocean.\textsuperscript{179} Besides the shark, whale, fish and coconut oil already mentioned, mutton, as well as camel, fat was used.\textsuperscript{180} The sealant has been found on the Omani vessels, East Africa boats, Pakistani boats, the dugout-based \textit{horas} with their sewn-on planks, and on the Bahraini boats. One recalls Zayd's tenth-century account of an oil mixture used to seal holes and seams of sewn hulls below the waterline.\textsuperscript{181} Nor should one forget Polo's record that "(t)he ships are not pitched but are rubbed with fish oil."\textsuperscript{182} Hornell found that a mixture of oil, dammar, and lime "continues to be the recognized method of protecting a ship's bottom against the attacks of the shipworm (Teredo) in Arabia and India, but for canoes the occasional application of evil-smelling and rancid fish oil serves sufficiently well...."\textsuperscript{183}

\textsuperscript{179} Shark oil, "kottar" oil, and tar were smeared on the \textit{odam}, a traditional cargo boat of the Lakshadweep Islands. See S. T. Das, \textit{Lakshadweep Islands, India: From Tradition to Modernity} (New Delhi, 1982), pp. 74 and 76.

\textsuperscript{180} A. Villiers, \textit{Monsoon Seas} (New York, 1952), p. 89.

\textsuperscript{181} Cf. p. 72.

\textsuperscript{182} Yule, 1926, p. 108.

\textsuperscript{183} \textit{WT}, p. 234.
The lime and oil mix has been found beyond Arabia and India and throughout the areas where Arab seafarers traded, or where sewn boats of various forms and methods were built. In the Philippines, where a sewing method survived on Luzon into the 1920s,¹⁸⁴ a caulking material called "apo" made of coconut oil and lime was used as late as 1942 to seal the exterior of hulls.¹⁸⁵ In fifteenth-century China, ships were caulked with "silk rags dipped in a mixture of tung oil and lime."¹⁸⁶ Burton also noted the use on Chinese craft of putty and burnt gypsum as well as a substance of lime and Tongshu-tree resin.¹⁸⁷ Although Chinese ships were not sewn, this may indicate the adaptation of the sealing technique via Indian Ocean contacts.

¹⁸⁴ Horridge, p. 61.
Sewn Boats in Classical Sources

Prior to the Arab accounts and the Belitung Wreck there is little evidence of boat construction in the region for several centuries.\textsuperscript{188} Archaeological evidence of hulls is scant. The supposed one-thousand-year-old hull at Thaikkal, Kerala, has yet to have its particulars recorded. The next oldest wreck site, the mid-first millennium shipwreck at Black Assarca did not yield hull remains during the first excavation season.\textsuperscript{189}

Bowen supposes that the combined Persian-Arabian fleet sent against Sind in A.D. 712 was of sewn construction, and the same assumption is given for the Persian battle fleet that sailed down the gulf and along the Arabian coast to Yemen in A.D. 574.\textsuperscript{190} These are safe assumptions given the nearly universal presence of the sewn type on these seas.

\textsuperscript{188} Hornell, 1946, p. 234.


\textsuperscript{190} Le Baron Bowen, 1949a, p. 21.
Procopius, historian of Justinian, recorded in the sixth century:

All the boats which are found in India and on this sea are not made in the same manner as are other ships. For neither are they smeared with pitch, nor with any other substance, nor indeed are the planks fastened together by iron nails going through and through, but they are bound together with a kind of cording. The reason is not as most persons suppose, that there are certain rocks there which draw the iron to themselves (for witness the fact that when the Roman vessels sail from Aelas into this sea, although they are fitted with much iron, no such thing has ever happened to them), but rather because the Indians and the Aethiopians possess neither iron nor any other thing suitable for such purposes. Furthermore, they are not even able to buy any of these things from the Romans since this is explicitly forbidden to all by law...\(^{191}\)

Prior to Procopius, there is no information about Indian Ocean watercraft until the first-century text *Periplus Maris Erythraei*, (the *Periplus of the Erythraean Sea*). This geography of the Red Sea, the Indian Ocean, and the Persian Gulf provides a tantalizing portrait of part of the ancient world little known outside this and a few other classical

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sources. Important to the current study are the records concerning the peculiar vessels found plying the Indian Ocean and its tributaries.

The author of the Periplus, although unknown, had spent a good deal of time at sea, and thus "he is understandably interested in unusual marine matters—boats whose planks are sewn together" being one of them.\textsuperscript{192} His first mention of the type was on the coast of East Africa where the πλοιάρια ράπτα\textsuperscript{193} (pleraria rhapta, sewn boat) were found. So prevalent were these sewn boats that "the very last port of trade on the coast of Azania, (was) called Rhapta ["sewn"], a name derived from the aforementioned sewn boats..."\textsuperscript{194} "Rhapta," a Greek word, is believed to be related to the Arabic "Rabta," meaning "to bind."\textsuperscript{195} Vincent, writing in 1807, extrapolates on the classical account by stating that the "bottoms were paid with some of the odoriferous resins of the country" but


\textsuperscript{193} PME 15:4.30.

\textsuperscript{194} Casson, 1989, p. 61.

\textsuperscript{195} Ingrams, p. 304.
as this only indicates the state of the method at the turn of the nineteenth century.\textsuperscript{196}

Closer to Mesopotamian shores the author of the \textit{Periplus} records that “Omana also takes in frankincense... and sends out to Arabia its local sewn boats, the kind called \textit{madarate.”}\textsuperscript{197} Glaser derives this boat name from the Arabic \textit{muddarra’at} or \textit{madra’at} ultimately originating with \textit{dara’a}, meaning “armored” where “\textit{während dur’a das Mark der Palme ist.”}\textsuperscript{198} This derivation has dissenters. Casson calls Glaser’s line of reasoning “tortured,” without offering an alternative explanation.\textsuperscript{199}

Some sewn vessels, such as the masula and the Belitung wreck, have wadding on the outer seams as well as the inner. The wadding appears as multiple bands running fore and aft along the sides of the hull. If the \textit{madarate} had external wadding, this may have given the boats the appearance of

\textsuperscript{196} Vincent, p. 169.

\textsuperscript{197} Casson, 1989, p. 73.

\textsuperscript{198} E. Glaser, \textit{Skizze der Geschichte und Geographie Arabiens}, volume 2 (Berlin, 1890), p. 190.

\textsuperscript{199} SSAW, p. 181.
reinforcement, and thus armoring. Perhaps the name madarate plays off this. Ingrams, however, states the term derives from the Arabic "muddarra'at" meaning "fastened with palm fiber."\(^{200}\) This yields a simpler, and more logical, explanation.

Whatever the origin of the term, the madarate was certainly a boat of sewn construction widely used and prized in Arabian waters two thousand years ago. Already well developed by the time the Periplus was written, it must have had a long pedigree. This may be particularly true given the high degree of conservatism in sewn boat design and technique throughout the two millennia post-dating the Periplus.

Predating the Periplus are a few depictions of boats from India that have been claimed to represent sewn craft. One of these is found on the Stupa at Sanchi, dated to the late first century B.C., in the scene of the Miracle of the Buddha (Figure 15). This vessel has exterior markings that may be depictions of iron clamps, or staples as found on Bangladeshi craft.\(^{201}\) It has also been interpreted, perhaps erroneously,

\(^{200}\) Ingrams, p. 304.

\(^{201}\) Greenhill, pp. 75-6.
as indicating sewn construction. Yet another explanation is the image represents fish-joinery, a type of dove-tail joint.

Before this, there appear to be no records or evidence for sewn ships for several centuries. This silence is broken, I believe, by the account of the boat of the Deluge in the Gilgamesh Epic.

Analysis and Summation

The body of evidence concerning sewn boat construction on the western Indian Ocean littoral has import for our understanding of ancient Mesopotamian boat construction. As the civilizations of Mesopotamia had seaborne trading relations with the lands along the Persian Gulf and beyond to the Indus Valley, it is natural to conclude that Mesopotamians shared boat construction techniques with the rest of the region. After all, the Persian Gulf is an

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intrusion of the Indian Ocean into the landmass of the Near East, linking the Fertile Crescent to the lands along the ocean. The Tigris and Euphrates then should be viewed as tendrils of the ocean reaching far inland to Anatolia. These waterways are not a barrier to intercultural exchange and communication, but a highway. The Mesopotamians can then be expected to have built and utilized sewn boats like those later examples ubiquitous to the entire region. As already stated, the madarate was a fully developed watercraft two millennia ago and its origin must be placed well into the first millennium B.C., if not earlier. Also, no other widespread method for wooden shipbuilding is known for the western Indian Ocean prior to Portuguese contact in the fifteenth century. Therefore, it is logical that sewing would have been the method of building wooden seagoing vessels in Mesopotamia. Indeed, the Assyriologist Benjamin Foster, in his recent translation of the Gilgamesh epic, assumes that Utnapishtim’s boat is a sewn craft: “The hull is constructed before the interior framing, as was customary in the ancient world, with cordage used to sew the planks

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204 McPherson, p. 18.

together and to truss the hull for strength." This, however, can be a misleading assumption. Consider the case of Egypt. One would expect that, given the widespread use of pegged mortise-and-tenon joinery in Mediterranean shipbuilding reaching back to the late Bronze Age, this construction method would also have been used in Egypt. This expectation is wrong: Egypt had its own methods of constructing wooden boats. On the nearly five-thousand-year-old Khufu boat, the planking was held together by transverse lashings (as opposed to the sewn method that uses longitudinal stitching) with unpegged mortise and tenon joints aligning and reinforcing planking (Figure 16). The boat timbers from Lisht exhibit similar fastenings. A related Egyptian method is the construction found on the Dashur boats using a combination of lashings (Figure 17) and unpegged mortise-and-tenon joinery, without the use of

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internal framework. This method is not found outside of Egypt for boat construction, and so far the Mediterranean method has not been found inside Egypt until the Mataria boat of the late sixth or early fifth century.

It is possible the river-based civilizations of Mesopotamia developed their own methods of building wooden hulls, differing from vessels of the gulf and the Indus. Archaeological evidence is elusive, however, as wood in Mesopotamian sites preserves poorly. Most information on Mesopotamian construction techniques would therefore have to be sought in iconography and epigraphy. Unlike Egypt, where artistic representations of boat construction survive, Mesopotamia has none that can conclusively be claimed to depict boat construction. The numerous depictions of watercraft of the Euphrates and Tigris show us the form and

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function of the craft, but few show hull particulars. Some models exhibit details of framework and other constructional features, but they do not yield information on how timbers were fastened together.\textsuperscript{213} Thus, to determine Mesopotamian boat construction, we must rely on textual evidence combined with the application of prevalent boat-building techniques. As the present study shows, for seagoing boats, the sewn method is the most likely candidate.

In examining the accounts of sewn vessels covered in this study, common features are:

- Shell-first construction
- Sewn planking, stitched with coir overlying wadding made of various pulpy and fibrous material.
- Stitch holes, both for planking seams and frame fastening, plugged with wooden pegs, coconut fiber, or similar to prevent leakage.
- A coating of oil or an oil-and-lime-based sealant/antifouling, properly called a "paying."

\textsuperscript{213} For example, see M. De Graeve, The Ships of the Ancient Near East (c. 2000–500 B.C.) (Leuven, 1981), pl. 110, which shows details in the skin of a guffa, and pl. 19 a boat model from Ischali depicting internal framework.
Non-standard features are:

- Caulking hammered into seams before stitching.
- Mangrove paste applied to seams before the wadding is applied.
- Use of obliquely nailed treenails to fasten planking together.
- Use of alignment treenails mortised inside planking seams.
- Cutting off the stitching from the outside of the hull.
- Grooves cut between stitching holes on the planking's outboard face.

It is noteworthy that all features but the last non-standard one are found on East African craft, and that only the oblique nailing is shared outside that area with vessels of Oman and Pakistan. Perhaps this indicates the influence of African practices being adapted to the sewn technique and spread by Swahili seafarers or even Indonesian seafarers.\(^{214}\)

The common features of sewn boats will aid in the examination of Mesopotamian texts. Except for a clear statement in a text that planks are being sewn together, aspects such as pegging and oiling may be indicative of the technology. While one such feature alone may point to a sewn vessel, two

\(^{214}\) Hornell, 1928, p. 3.
or more in the same text or passage will be a strong indicator that this is indeed the case. As with Horridge's study, the reference to real boats enables an accurate translation and interpretation of texts such as that found in the Epic of Gilgamesh.
CHAPTER III

THE BOAT-BUILDING SEQUENCE IN THE GILGAMESH EPIC

The boat-building sequence in Tablet XI of the Epic of Gilgamesh is perhaps the best, and possibly the best-known, record of the construction of a Mesopotamian boat. The parallels between the flood account in Gilgamesh and that in Genesis have served to popularize this section of the epic more than others. The boatbuilding sequence, however, leaves Assyriologists and archaeologists alike puzzled. For reasons stated in Chapter I, most of the translations make little sense, and the archaeologists themselves have been unable to interpret the sequence. Yet combining knowledge of both Akkadian language and ancient ship construction, the sequence loses its obliqueness and a picture of a real watercraft emerges.

The epic today is mythical, but to the Mesopotamians it was probably considered historical. That is, the story related in the poem must have been real to them, relating events they believed actually happened.\footnote{Ryan and Pitman, pp. 188-201, suggests the event is linked to the rapid flooding of the Black Sea in the mid-sixth millennium B.C., which, in turn sparked a diaspora of Black Sea peoples.} The use of real places such as
Uruk, Shurippak, and Dilmun, gave the story realism, reinforcing its truthfulness and its message.\textsuperscript{216} In writing down the account of Utnapishtim's boat, the author similarly created a layer of realism. He did this, in part, by including details with which people would have been familiar. Thus, the author used "eleppum" (= "boat") throughout the sequence to denote the vessel. Despite the overly large size of Utnapishtim's vessel, the author eschewed grandiose terms such as "eleppu rabītum" found in CBS 13532, line 6, a version of Atra-Ḥasīs. Tablet XI of Gilgamesh derives from this Old Babylonian account, or shares a common origin with it, but did not echo it. The account in Gilgamesh "expands upon and abridges parts of the earlier work and also introduces theological and stylistic changes."\textsuperscript{217} Atra-Ḥasīs does not have the "midrashic elaboration of Gilgameš XI, where the boat is a veritable Titanic (sic) with six

\textsuperscript{216} Shurippak (also Shuruppak) is the ruin known as Fara, a mound on the ancient bed of the Euphrates. The site was occupied from about 3000 to 2000 B. C. when it may have been abandoned due to a shift in the river. See E. M. Meyers, ed., \textit{The Oxford Encyclopedia of Archaeology in the Near East} (Oxford, 1997), pp. 301-03.

floors." The Gilgamesh author also avoided the giš-ma-
gur₄-gur₄ found in Gilg.XI:205 and 208 of the Sumerian flood
tory. Neither of these terms would have been unknown to
him, but by calling the vessel simply a "boat" the author
underscored its normalcy despite its great size. The
simplicity of eleppum, along with several and specific
construction details, as will be seen below, leads to the
conclusion that the vessel was a type to which the
Mesopotamian audience could readily relate.

Presented first is the normalized text of the Akkadian,
followed by my translation of the text. Next is a commentary
and analysis of my translation compared with the translations

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218 W. G. Lambert and A. R. Millard, Atra-Ḥasīs: The

219 See M. Civil, "The Sumerian Flood Story," in Lambert
and Millard, pp. 138-45.

220 As the author of the epic uses the term "boat" for
the vessel, I will also limit my usage to that word and avoid
the term "ship."
of others. Also, pertinent ethnographic and archaeological information is presented to support my translation and conclusions concerning the boat.

Normalization and Translation

Normalization

20 amassunu ušannā ana kikkišu
21 kikkiš kikkiš igār igār
22 kikkišu šimēma igāru ḫissas
23 awil šurippakû mār Ubaratutu
24 uqur bītim bini eleppim
25 muššir ešrū še’i napištu
26 makkūra zērma napišta bullit
27 šulima zēri napšáti kalâma ana libbi eleppim
28 eleppum ša tabannûši atta
29 lû mindudâ minâtûša
30 lû mitṭur rupussa u mûrakša
31 kîma apsî šāši šullilši

(SSA Gilg.XI:32-47 concern Utnapishtim’s promise to Ea to do exactly what he has been instructed. Utnapishtim is also told that he should deceive the city folk so that they do not know what he is doing or that flood is coming to kill them

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221 I chose to use S. Parpola’s transliteration from the cuneiform as the basis of my normalized text. Parpola’s study, cf. n. 6, is considered the new definitive reconstruction of the epic using all manuscripts and fragments of the work known in the mid-1990s. The goal “has been to provide a composite text of the Epic making it possible to read the entire SB recension in class without being constantly forced to restore textual gaps,” (Parpola, p. x). As per Parpola’s suggestion this volume is cited as “SAA Gilg.,” as in “SAA Gilg.XI:20,” which means line 20 of Tablet XI of Gilgamesh as published in Parpola’s compilation. Direct references to the lines from this volume are in this format. However, the general text from Gilgamesh is cited as “Gilg.XI.”
all. Utnapishtim is instructed to inform his city that the
gods do not like him, that he will be henceforth living
outside, and that the gods will shower an abundant harvest on
the citizens. Believing this, the entire community turns out
to help build the gigantic boat.\[^{222}\]

[xxxxxx] ipāḫḫur mā[tum]
[xxxxxx] našī pas[xx]
[xxxxxx] našī a[xxxx]
[xxxxxx] awilū etlū i[xxxx]
bitātum [xxxx] [x]pi[xx]ta
šerrū nāšī kupra
lapnu [xx] ḫišiḫtu ublā
ina ḫanshi ūmī attadi būnāša
išten ikū gamussa 10 nindātam ušaqqā igārātum
10 nindātum imtaḫir kibir muḫḫīša
addī lānšī šāšī eșiršī
urtaggibšī ana 6-šu
aptarassu ana 7-šu
qerbissu aptaras ana 9-šu
sikkāt mē ina libblīša lū amḫassī
amur parīsu telefone addī
3 šar kupri attabak ana kīri
3 šar itṭū [xxxx] ana libbi
3 šar šabū naš sussulūša izabbilū šannā
ezub šar šannim ša ikulū nīqqu
2 šar šamnu [ša] upazzirū malāḫim
ana nīšī utabbiḫ alpī
ašgiš immerī ūmīšamma
sirišu kurunnu šamnu ū karānu
ummānu ištū kima mē nari
isinna ippusu kima ūmī akītimma
apte [xxxxx] piššāti qatī addī
[xxx šamaš ra]bē eleppum gamrat
[xxxxx] šupšuqūma
girmadi uštabbalu eliš ū šaplisū
[xxxxxxx]liku šinipassu

\[^{222}\] See Foster, p. 85.
Translation

20 He repeats their words to his reed house
21 Reed, reed! Wall, wall!
22 Reed house, listen! Walls, understand!
23 Man of Shurippak, son of Ubaratutu,
24 Tear down the house, build a boat!
25 Let go of riches and seek life.
26 Reject possessions to keep life alive.
27 Deliver the seed of all living things into the heart of the boat.
28 The boat that you will build,
29 its dimensions must be measured!
30 Its width and its length must be proportional!
31 Like the Apsu cover the aforementioned.

48 All morning at daybreak
49 the land gathered ......
50 the woodworkers carried.....
51 the reedworkers carried.......
52 ....the youths....
53 the houses.....
54 the children carried bitumen
55 the poor carried anything else required.
56 On the fifth day I laid her features.
57 It took up one field. Her sides rose 120 cubits high.
58 The edge of its upper-most part became proportional to the 120 cubits.
59 I laid its shape, I designed it.
60 I created 6 levels in her
61 I separated her into 7 parts
62 Her interior I divided into 9 sections
63 Indeed, I hammered the water-stoppers into it.
64 I inspected the boat-pole and I laid down the thing needed.
65 3 shar of pitch I poured into the oven
66 3 shar of bitumen ..... into the inside
67 3 shar of oil the basket carriers carried
68 Apart from the shar of oil the oiling consumed,
69 the shipwright stowed away 2 shar of oil.223
70 I slaughtered cows for the people.
71 I slaughtered rams daily.

223 Parpola adds șa before the verb, both in the transliteration and cuneiform text, but this does not seem necessary to the text.
Beer, fine beer, oil and wine\textsuperscript{224} 
the workers drank like river water. 
They made a festival like the akītu day.\textsuperscript{225} 
I op[ened]...... I laid my hand [to] the ointment. 
[By sunset] the boat was complete 
........was difficult and ...... 
the boat's bottom was moved back and forth, above and 
below. 
......it went two-thirds of it.

Commentary and Analysis

The sequence relating to the boat can be divided into five sections:

- The first section SAA Gilg.XI:20-31 concerns the 
  instructions from the gods.

- SAA Gilg.XI:32-47 do not concern the actual construction 
  and, as such, are not discussed here.

- The second section, SAA Gilg.XI:48-55, involves the 
  preparation and gathering of materials for the boat.

\textsuperscript{224} See CAD S/306 and K/579-580 for the distinctions 
between the beer types.

\textsuperscript{225} The akītu was a cultic festival that from MB onwards 
was celebrated at the New Year (see CDA, p. 10). Hence, 
Speiser, p. 67, translates Gilg.XI:74 as "That they might 
feast as on New Year's Day." For an account of the 
Babylonian New Year's Day ritual see A. Sachs "Temple Program 
for the New Year's Festivals at Babylon," in ANET, pp. 331- 
34.
• The third, SAA Gilg.XI:56-64, concerns the design and construction of the vessel.

• The fourth section, SAA Gilg.XI:65-75, involves the sealing of the vessel.

• The fifth and final section, SAA Gilg.XI:76-79, concerns the launching of the boat.

Section 1: The Divine Instructions, SAA Gilg.XI:20-31

20 He repeated their words to his reed house
21 Reed, reed! Wall, wall!
22 Reed house, listen! Walls, understand!
23 Man of Shurippak, son of Ubaratutu,
24 Tear down the house, build a boat!
25 Let go of riches and seek lives.
26 Reject possessions, keep life alive.
27 Deliver the seed of all life into the heart of the boat.
28 The boat that you will build,
29 its dimensions must be measured!
30 Its width and its length must be proportional!
31 Like the Apsu the aforementioned shall be covered.

A Reed Boat?

In these lines, the god Ea imparts to Utnapishtim instructions to rescue life in the face of the impending flood. The god initially addresses the reed house of Utnapishtim, and then instructs him to demolish the house and build a boat. These lines have often been interpreted by
most as meaning the materials from the house are to be used to build the boat, as this "seems to go back to the earliest times when both houses and boats were made of reeds."\textsuperscript{226} Hence, by this, the boat is a reed craft.

Thor Heyerdahl uses Gilg.XI:20-24, along with a translation of Genesis wherein the ark of Noah was also built of reeds,\textsuperscript{227} as justification for his use of a reed ship on his Tigris Expedition, an attempt to demonstrate a sea link between ancient Mesopotamia and Egypt. As Heyerdahl writes, "Obviously, by tearing down a reed house one could only build a reed ship. This is also in conformity with the Hebrew version. The instruction to Noah was: 'Make yourself an ark with ribs of cypress; cover it with reeds...'."\textsuperscript{228} Mark, in his dissertation on Homeric seafaring, also repeats the assertion that Utnapishtim's vessel was made of reed, relying on the interpretation of Gardner and Maier.\textsuperscript{229} Gardner and Maier, in turn, rely upon the conclusions of Heyerdahl:

\begin{itemize}
  \item \textsuperscript{226} R. C. Thompson, The Epic of Gilgamesh, Text, Transliteration, and Notes (Oxford, 1930), p. 86.
  \item \textsuperscript{227} Heyerdahl used the New English Bible.
  \item \textsuperscript{229} Mark, p. 149.
\end{itemize}
...The instruction to dismantle the house and build a ship...may have a very practical purpose. Thor Heyerdahl considered this to be advice on boat-building: use the techniques and materials of building reed-houses...to build a great ship.\(^{230}\)

Thus, the interpretation of a reed craft has become ensconced into the studies of the boat-building sequence.

An examination of ethnographic evidence, however, refutes in part the assertion that Utnapishtim created a boat of reeds. Until the present time the Marsh Arabs of southern Iraq have built reed houses from reed bundles in a manner that appears little changed over the past five thousand years.\(^{231}\) These houses are similar to ones depicted on seals and pottery dating back to the later Uruk period and are considered their "lineal descendants."\(^{232}\) Thus, one can draw conclusions from examining present practices and comparing this to the text in question. Thesiger, whose familiarity with the culture of


\(^{232}\) Potts, pp. 116-17.
Marsh Arabs is unique among westerners, notes that reed houses were torn down when it was time to move, either with the harvests or the seasons.⁴³³ Hence, it is likely that the god is instructing Utnapishtim to tear down his house as it is time to move before the flood comes. Evidence in the remainder of the sequence also refutes Heyerdahl's assertion, as the text attests to a boat of wooden construction.

The Boat as a Cube

The lines of Gilg.XI:28-30 have been puzzling. Speiser translates Gilg.XI:29 as "Her dimensions shall be to measure." Heidel's translation is "Its measurements shall be (accurately) measured." Both of these agree somewhat with my translation of "its dimensions must be measured," but they miss the imperative nature of the line embodied by the particle "lū." The god stresses here that the vessel must have some kind of plan: that haphazard construction will not do. The goal of this instruction is to ensure that the vessel is seaworthy, as this is man's only chance for survival.

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⁴³³ Thesiger, pls. 87 and 89.
Other translations of Gilg.XI:29, such as those by Kovacs and George, stress an equivalency in the dimensions:

Kovacs: Its dimensions must measure equal to each other.\(^{234}\)
George: Her dimensions all shall be equal.\(^{235}\)

However, neither *minduda* from *middatu* meaning "to measure," or *minatu* from *minitu* meaning "dimension," have a quality of "equal."\(^{236}\)

Gilg.XI:30 further adds to the idea of dimensions being equal:

Speiser Equal shall be her width and her length\(^{237}\)
Kovacs its length must correspond to its width\(^{238}\)
Tournay Égales en seront la largeur et la longueur;\(^{239}\)
Heidel Its width and its length shall be equal.\(^{240}\)

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\(^{234}\) Kovacs, p. 98.

\(^{235}\) George, p. 89.

\(^{236}\) CDA, pp. 209 and 210.

\(^{237}\) Speiser, p. 66.

\(^{238}\) Kovacs, p. 98.

\(^{239}\) Tournay, p. 224.

\(^{240}\) Heidel, p. 81.
Pettinato Equali siano la sua lunghezza e la sua
Larghezza
George Her length and breadth shall be the same,

It is here, combined with Gilg.XI:29, that the idea of the
cube-shaped boat takes form. Scholars translate the verb
maḥāru in the Gt form as “being equal to each other.” Kovacs used an alternative meaning of “correspond to.”

Skipping ahead to Gilg.XI:57 and 58, Utnapishtim related
actual dimensions of the vessel:

Speiser One (whole) acre was her floor space,
ten dozen cubits the height of each of
her walls
Ten dozen cubits each edge of the square deck

Kovacs It was a field in area, its walls were each
10 times 12 cubits in height
the sides of its top were of equal length,

241 Pettinato, p. 216.
242 George, p. 89.
243 Ibid., p. 189.
244 A cubit was approximately 50 cm. Heidel, p. 82, n. 173.
245 Speiser, p. 67.
10 times 20 cubits each

Heidel

One iku was its floor space, one hundred twenty cubits each was the height of its walls

one hundred and twenty cubits measured each side of its deck

These lines are interpreted as giving further support to a cubic vessel. The Gt of maḥāru again appears, in Gilg.XI:58, and is translated as "equal" or "each." As Heidel writes: "Utnapishtim's boat...was an exact cube... Tablet XI:30 and 57-58, which instructs Utnapishtim that the length and the width of the boat should be equal and which then gives the exact height of its walls and the exact length of each side of its decks, refers to a quadrangular craft." Speiser also calls the vessel "an exact cube." Kovacs explains the strange craft as evocative of a ziggurat:

The boat as described is clearly a cube, not at all like ordinary Mesopotamian boats... (It) is probably a theological allusion to the dimensions of a ziggurat, the Mesopotamian stepped

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246 Kovacs, p. 99.
247 Heidel, p. 82.
248 Heidel, p. 236.
249 Speiser, p. 67, n. 2.
temple tower. The ziggurat was a massive solid structure with a square base and four to seven levels, the maximum height being the same as the length and width; it served as a monumental platform for a temple that stood on top. 250

Speiser sees a "square deck" in Gilg.XI:58 although this does not exist in the Akkadian text. Others see a top, or a top deck with sides 120 cubits long. The 120 cubits, supposedly the length of the each side of the upper deck, are based on the meaning of maḥāru as "being equal." Thus, by these translations the height of the vessel is equal to its length that is in turn equal to its breadth. The result is a cube.

A cube, however, is an unseaworthy craft. As Steffy states: "...a rectangular box is a barge, which is good only in sheltered waters and on short, slow routes. The open sea would resist the flat sides of the box and make movement and steering difficult. Storms would twist it and pound away its sharp corners and edges." 251 It seems unlikely that the god who instructed Utnapishtim to save the life of the Earth's living creatures would want to entrust this precious cargo to

250 Kovacs, p. 99, n. 3. Gardner and Maier, p. 233, also relate the size of the vessel to a ziggurat.

251 Steffy, 1994, p. 10.
a vessel as dangerous as a cube. Indeed, a cubic boat runs
counter to my assertion concerning Gilg.XI:28-30 that the god
is instructing Utnapishtim to build a seaworthy vessel. A
cube-shaped boat surely would have bewildered the audience
and undermined the veracity of the narrative.

The interpretation of the boat as cube-shaped can be refuted.
Instead of relying on the definition of maḫāru as “being
equal,” there is an alternate meaning of “become
proportionate, symmetric.”

This latter translation is more
fitting to the description of a boat. Boat design rests on
proper proportions in length, breadth, and height in order to
ensure a safe and seaworthy vessel. So, where others
translate “equal” I translate “proportional” as in
Gilg.XI:30, “Its width and its length must be proportional.”

This is in keeping with sound boat-building practice. Also,
I use the same meaning in Gilg.XI:58-59: “It took up one
field. Her sides rose 120 cubits high. The edge of its
upper-most part became proportional to the 120 cubits.” In
this, the 120 cubits that others interpret as the length of
the edges of some upper deck now refer to the height of the

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252 CDA, 189. See also W. Muss-Arnolt, A Concise
Dictionary of the Assyrian Language, volume I (Berlin, 1905),
p. 527.
sides of the vessel. This eliminates the constraints imposed by the term "equal" on an upper-part that can now be proportionately longer that the 120 cubits. Thus, a system of sound, measured, and proportionate dimensions is maintained as commanded by the god in Gilg.XI:28-31.

It should also be noted that the god did not tell Utnapishtim how to build the boat, only that he must build it properly. This implies that Utnapishtim already knew how to build boats. He certainly would not have built something he was unfamiliar with and risked his life, and everyone else's, on something experimental like a cube.

The idea of the cube also relies on the ikû, the "field" the structure took up. This, apparently, would be 120 cubits by 120 cubits, (60 yards by 60 yards)253 thus equaling the length and the height of the walls. Yet, with my more literal translation of gamussa meaning "it used up" there is no indication that the bottom of the vessel was square or that it took up every bit of the field. Simply put, the vessel was so large an entire field was needed as building space.

253 CAD I/68.
There is little else in these lines supporting a cube-shaped boat. Regarding the height of the "walls" (more properly called "sides" as boats have sides, not walls), Speiser, Kovacs, and Heidel all include "each" in their translations. This word, however, does not appear in the Akkadian. Even so, this can imply only two sides to the vessel and not four.

Whether or not muḫḫiša in Gilg.XI:58 refers to an upper deck is unclear. The reference to a deck by Speiser and Heidel appears to be based on the interpretations of Salonen.\footnote{Salonen, p. 96.} George translated the term as "the sides of her roof,"\footnote{George, p. 90.} which could be valid particularly when compared to Genesis 6:16 where the ark is apparently constructed with a roof, but, lacking any evidence in the Gilgamesh text of a cabin, this seems without foundation. Thus, like Kovacs who translates this generically as "top," I translate the term as "upper-part." There is nothing in the text stating that this upper part was square or had four edges.

The idea of a cubic vessel appears to date back to 1926 with the translation of the epic by Hugo Gressman. After his
translation of the building of the interior of the boat, he notes "Dann ware das Schiff ein Wurfel mit Kanten von ungefahr 60 m Lange." Other scholars repeated his interpretation, one of whom, Alexander Heidel, seemingly introduces the idea into English in 1946. Heidel relates the cube to the deck surface based on the Gilg.XI:56-58, "Utnapishtim's boat was an exact cube." This was then repeated in Pritchard's Ancient Near Eastern Texts (ANET) in which the translation by E.A. Speiser appears. Speiser credits Heidel with influencing his translation of the epic and repeats the assertion that "The ship was thus an exact cube." It is after the publication of Speiser's translation that the concept of the flood-boat as a cube becomes fully ingrained in the literature. Subsequent Gilgamesh scholars repeat the cube idea, building elaborate explanations such as the floating-Ziggurat concept.

256 H. Gressmann, Altorientalische Texte und Bilder zum Alten Testament (Berlin, 1926), p. 177, n. a.

257 Heidel, p. 82, n. 173.

258 Speiser, p. 73.

259 Speiser, p. 93, n. 193.

Curiously, early translators of the text render maḫāru as "proportional" and not as "equal." Jensen in 1900 translates Gilg.XI:30 as "Einander entsprechend [so]llen sein Breite und seine Länge." Albert Clay in 1922 sees Gilg.XI:30 as "Let its breadth and its length be proportioned!" and Gilg.XI:59 as "120 cubits was proportioned the length of its upper part." As late as 1928, R. Campbell Thompson translates "Apt be its measure; its beams and its length be in due correspondence" for Gilg.XI:30. I believe the early translations of these lines are more accurate than later ones, as least where the proportional shape of the boat is concerned.

Yet, if the boat were indeed a cube, meant to astonish and fascinate the Mesopotamian listener, one would expect some artistic representations to appear. None are known. We have

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263 Ibid., p. 75.

depictions of reed boats, \textsuperscript{265} guffas, \textsuperscript{266} warships, \textsuperscript{267} and large transport vessels. \textsuperscript{268} We also have boat models of tiradas, and framed vessels such as the Ischali model (see Chapter IV). Nowhere, however, do we have a depiction or model of the awe-inspiring floating cube of Utnapishtim. Berossos, the third century B.C. writer, relates a version of the tale of the flood. In his account, now lost but preserved as a fragment by the ninth-century Armenian monk Syncellus, the vessel "was five stades (1000 yards) and its breadth two (400 yards).\textsuperscript{269}" If Berossos knew of a tradition of a cube, he rejected it in favor of dimensions that are more seaworthy. There are two answers to the absence of a cube-shaped boat in other sources: 1) that after nearly two centuries of excavation we have simply missed all the representations in art while finding depictions of other types of vessels, or 2) that the cubic vessel was unknown to the ancients and is the product of modern translators.


\textsuperscript{266} De Graeve, pl. XLVII, fig. 110.

\textsuperscript{267} Russell, p. 56, fig. 33

\textsuperscript{268} De Graeve, pl. XXXII, fig. 67.

The cube does recall the shape of the Genesis ark with its rectangular shape. The Hebrew word for "ark," הובא, means "box" and appears to be related to the Egyptian ḏבַ't, meaning chest or box.²⁷⁰ It is probable that the Genesis account has influenced modern translators who, struggling to understand a passage about ancient ship construction, relied on the ark of Noah to interpret the boat-building sequence in Gilgamesh. Standing on its own, however, there is no reason to explain the construction of Utnapishtim's vessel as a cube.

Section 2: Preparation, SAA Gilg.XI:48-55

48 All morning at daybreak
49 the land gathered ......
50 the woodworkers carried...
51 the reedworkers carried...
52 ....the youths....
53 the houses.....
54 the children carried bitumen
55 the poor carried anything else required.

Although this section is damaged, it outlines the activities of the first day of Utnapishtim's project where, beginning at dawn, the people of the land mobilized and gathered materials for the construction. The restoration of Gilg.XI:50-53 is

²⁷⁰ Heidel, p. 233. Gressman, p. 176, also uses entsprechend, but derives the cube concept anyway.
speculative due to damage. Speiser did not hypothesize on the lines, noting only that 50-53 are "too fragmentary for translation."\textsuperscript{271} Similarly, Schmökel and Heidel left these lines untranslated. Others read various meanings into this section.

For Gilg.XI:50, a carpenter and his tool are seen:

\begin{tabular}{ll}
Kovacs & The carpenter carried his hatchet\textsuperscript{272} \\
Tournay & Le charpentier apporta sa hache,\textsuperscript{273} \\
Pettinato & [Il falegname] porta la sua as[cia]\textsuperscript{274} \\
George & The carpenter carrying [his] hatchet,\textsuperscript{275} \\
\end{tabular}

The carpenter, \textit{gurgurrū}, is reconstructed, probably from the earlier \textit{Atra-Ḫasīs.III:11} where \textit{na-ga-[ru na-ši pa-as-su]} appears. It is logical that such a tradesman would be employed on the project.

\textsuperscript{271} Speiser, p. 67.
\textsuperscript{272} Kovacs, p. 98.
\textsuperscript{273} Tournay, p. 226.
\textsuperscript{274} Pettinato, p. 217.
\textsuperscript{275} George, p. 90.
For Gilg.XI:51, a reed worker is reconstructed, along with his tool:

- Kovacs: The reed worker carried his [flattening] stone.
- Tournay: L'artisan en roseaux apporta sa pierre.
- Pettinato: [il giuncaio] porta il suo.
- George: The reed-worker carrying [his] stone.

This may be from Atra-Hasis.III:12, where at-ku-up-[pu na-ši a-ba-an-šu] is recorded. The presence of a reed worker raises the question of what role reeds and reed workers played on a wooden boat. If the inclusion of a carpenter in the preceding line implies wooden boat construction, the reed worker can be regarded as an indication of sewn boat construction. It should be recalled, for example, that in the sixteenth century the use of "canes or straw leaves," apparently reeds or similar, were used on the Basra-Ormuz ships. These canes were laid over the planking seams and held on by twine. Thus, the reed workers in Gilg.XI:51 may

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276 Kovacs, p. 98.
277 Tournay, p. 226.
278 Pettinato, p. 217.
279 George, p. 90.
280 Cf. p. 58.
have prepared reeds, through flattening and bunching, to be placed over planking seams prior to the stitching.

Gilg.XI:52 and 53 are highly fragmentary, but while most translators find something to do with "young men" in Gilg.XI:52, George translated it as "[the shipwright bearing his] heavyweight axe," which is something entirely different. Whether this relies on the new evidence George stated he used is unknown.\(^{281}\)

In Gilg.XI:54, the children, or child, carried bitumen, except in George's translation:

<table>
<thead>
<tr>
<th>Translator</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speiser</td>
<td>The little ones [carried] bitumen(^{282})</td>
</tr>
<tr>
<td>Kovacs</td>
<td>The child carried the pitch(^{283})</td>
</tr>
<tr>
<td>Tournay</td>
<td>Le petit enfant trans(porta) le bitume,(^{284})</td>
</tr>
<tr>
<td>Schmökel</td>
<td>Die kinder trugen Erdpech (mir) herbei(^{285})</td>
</tr>
<tr>
<td>Heidel</td>
<td>The child [brought] pitch(^{286})</td>
</tr>
<tr>
<td>Pettinato</td>
<td>Anche I bambini [porta] no pece.(^{287})</td>
</tr>
</tbody>
</table>

\(^{281}\) George, p. xi.

\(^{282}\) Speiser, p. 67.

\(^{283}\) Kovacs, p. 98.

\(^{284}\) Tournay, p. 226.

\(^{285}\) Schmökel, p. 98.

\(^{286}\) Heidel, p. 82.

\(^{287}\) Pettinato, p. 217.
George The rich man was carrying pitch.\(^{288}\)

While it seems odd that a rich man would carry pitch, the important thing here is that pitch is being brought. The use of bitumen/pitch in this boat construction is somewhat difficult, but not impossible, to reconcile. This aspect will be discussed below in the section dealing with sealants and caulking.

*Section 3: The Construction, SAA Gilg.XI:56-64*

56 On the fifth day I laid her features.
57 It took up one field. Her sides rose 120 cubits high.
58 The edge of its upper-most part became proportional to the 120 cubits
59 I laid its shape. I designed it.
60 I created 6 levels in her.
61 I separated her into 7 parts.
62 Her interior I divided into 9 sections.
63 Indeed, I hammered the water-stoppers into it.
64 I inspected the boat-pole and I laid down the thing needed.

\(^{288}\) George, p. 90.
The Exterior Completed

With Gilg.XI:56, the actual construction begins. It has taken four days to prepare for the construction. Now on the fifth day, Utnapishtim begins to build. Gilg.XI:56 has been interpreted in a number of ways:

Speiser  On the fifth day I laid her framework.\textsuperscript{289}
Kovacs  On the fifth day I laid out her exterior\textsuperscript{290}
Tournay  Le cinquième jour, j'esquissa le profil (du bateau).\textsuperscript{291}
Schmökel  Am fünften Tag entwarf (?) ich sein Gerüst\textsuperscript{292}
Heidel  On the fifth day [I] laid its framework\textsuperscript{293}
Pettinato  Al quinto giorno disegnai lo schema della Nave;\textsuperscript{294}
George  By the fifth day I had set her hull in position,\textsuperscript{295}

Gilg.XI:56 relates the beginning of the construction process. The translation by Speiser and Heidel of attādī būnāša as laying out the vessel's "framework" imposes the anachronistic

\textsuperscript{289} Speiser, p. 67.
\textsuperscript{290} Kovacs, p. 98.
\textsuperscript{291} Tournay, p. 227.
\textsuperscript{292} Schmökel, p. 98.
\textsuperscript{293} Heidel, p. 82.
\textsuperscript{294} Pettinato, p. 217.
\textsuperscript{295} George, p. 90.
frame-first construction on the ancient vessel. Kovacs, Tournay, Schmökel, and Pettinato, interpret this correctly, I believe, although I prefer to use "her features" over other translations. George, with "By the fifth day I had set her hull in position," assumes that the hull is already complete by this time.

At issue is how a boat is built. Traditionally, a boat builder begins construction by laying out on the ground the craft's basic dimensions; where the bow and stern will be and how far apart, how wide the vessel will be, where the centerline will run, etc. From this, the builder begins his vessel. An early nineteenth-century parallel to Gilg.XI:56 from Hit on the Euphrates illustrates this process. Here the vessel being built is a "Black boat," a construction of wicker covered in bitumen, but the concept is the same:

The first procedure...is to choose a level piece of ground near the river. Here the boatbuilder traces the figure of the projected boat. In the space thus marked out, (he proceeds to build).²⁹⁶

Thus, the "features" of Utnapishtim's boat were "laid out."

The field taken up by the construction in Gilg.XI:57 was near

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²⁹⁶ Hornell, 1946, pp. 57-8.
the river, as was the plot for the Black Boat, as will be seen in the launching sequence in Gilg.XI:76-79. One might expect that a vessel intended to float away on a flood could be built anywhere. It is logical, however, that a riverine people would construct the vessel on the riverbank where they have always built their watercraft. There would be no compelling reason for them to take the unusual step of building the boat somewhere else.

Gilg.XI:57-58 indicate the building of the hull: "It took up one field. Her sides rose 120 cubits high. The edge of its upper-most part became proportional to the 120 cubits." The sizes demonstrate the result of this constructional phase as the hull has area, height, and length. With these lines, the form of the hull is complete. As the dimensions and meaning of Gilg.XI:57 and 58 have already been discussed, Gilg.XI:59 can next be considered. As with others, Gilg.XI:59 is also open to different interpretations:

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speiser</td>
<td>I laid out the contours (and) joined her Together²⁹⁷</td>
</tr>
<tr>
<td>Kovacs</td>
<td>I laid out its (interior) structure and drew a picture of it (?).²⁹⁸</td>
</tr>
</tbody>
</table>

²⁹⁷ Speiser, p. 67.

²⁹⁸ Kovacs, p. 99.
Although Gilg.XI:57 and 58 indicate that the hull has already been built, translators continue the process of “joining” the hull together, setting “in place her body,” and “fashioning it.” Gilg.XI:59 actually represents a break in the construction process, between the finishing of the outside and the building of the inside. Indeed, by this view, the shell-first process is evident. First, the shell is built, as represented in Gilg.XI:57-58 and the dimensions of the vessel; then, as will be seen in the lines following Gilg.XI:59, the internal structure of the boat is built.

300 Schmökel, p. 98.
301 Heidel, p. 82.
302 Pettinato, p. 217.
303 George, p. 90.
In line 59, I see two phrases. The first addi lanši, I translate as "I laid its shape." The second, šāši eṣiršī, I translate as "I designed it." I avoid the alternative meaning of eṣērum "to draw" as this would imply some form of written plan. While such boat plans are generally unattested in antiquity and only begin to appear in the renaissance,\footnote{See, for example, the designs by Pepys in Steffy, 1994, pp. 142-44.} an Atra-Hasīs text, DT42:13-16, indicates that Ea drew a boat plan on the ground:

13 [ma-]i-ma-a ḡišeleppa ul e-pu-uš x [x]  
14 [ina qaq]-qa-ri e-ṣir ū-[ṣur-tú]  
15 [ū-ṣur]-tu lu-mur-ma ḡišeleppa [lu-pu-uš]  
16 [dē]-a ina qaq qa-ri e-[ṣir ū-ṣur-tu]

13 "I have never built a boat.[.]  
14 Draw the design on the ground  
15 That I may see [the design] and [build] the boat."  
16 Ea drew [the design] on the ground.\footnote{Text and translation by Lambert and Millard, pp. 128-29.}

The difference is Atra-Hasīs claimed not to know how to build a boat, while Utnapishtim appears to be skilled in the art.\footnote{Lambert and Millard, p. 129.} Thus, Utnapishtim would not need a plan to supplement Ea's instructions. Utnapishtim's statement "I laid its shape. I
designed it" has an emphasis of finality about it. It is not a brag, but a statement of accomplishment, of duty done to the god's command to build a boat of good design in keeping with Gilg.XI:28-30.

The Building of the Interior

Beginning with Gilg.XI:60, Utnapishtim describes the division of the inside of the vessel into levels and compartments.

<table>
<thead>
<tr>
<th>Name</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speiser</td>
<td>I provided her with six decks(^{307})</td>
</tr>
<tr>
<td>Kovacs</td>
<td>I provided it with six decks(^{308})</td>
</tr>
<tr>
<td>Tournay</td>
<td>Je superposai six entreponts(^{309})</td>
</tr>
<tr>
<td>Schmökel</td>
<td>Sechs Zwischenböden fügte ich ihm ein,(^{310})</td>
</tr>
<tr>
<td>Heidel</td>
<td>Six (lower) decks I built into it.(^{311})</td>
</tr>
<tr>
<td>Pettinato</td>
<td>Suddivisi la superficie in sei comparti,(^{312})</td>
</tr>
<tr>
<td>George</td>
<td>Six decks I gave her,(^{313})</td>
</tr>
</tbody>
</table>

\(^{307}\) Speiser, p. 67.

\(^{308}\) Kovacs, p. 99.

\(^{309}\) Tournay, p. 228.

\(^{310}\) Schmökel, p. 99.

\(^{311}\) Heidel, p. 82.

\(^{312}\) Pettinato, p. 217.

\(^{313}\) George, p. 90.
I choose to translate urtaggibši ana 6-šu as “I created 6 levels in her” instead of 6 decks. This is because the verb ruggubu and its related form rugbum imply stories of a house or upper rooms.\footnote{CDA, p. 306.} One would not, however, use the term "story" for watercraft. While "deck" is, of course, proper for ships and boats, decks do not have to run from end to end. Decks can be broken, as opposed to continuous, with one deck astern and the other forward and a gap between. Yet, both can be at the same height above the keel and could count as two decks, such as a "stern deck" and a "forward deck." As the verb involved indicates levels as in a house, I use the term "levels," thereby indicating what I believe is the intention of the sequence’s author, that the boat had six continuous levels inside.

The next line, Gilg.XI:61, appears to confirm these levels: it states that the vessel was separated into 7 parts. The uppermost of these parts would be the top deck, and the lowermost, the bilge. On this line, the other translators agree.
In Gilg.XI:62, Utnapishtim divided the interior further into 9 sections:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speiser</td>
<td>Her floor plan I divided into nine Parts[^315]</td>
</tr>
<tr>
<td>Kovacs</td>
<td>The inside of it I divided into nine {compartments}[^316]</td>
</tr>
<tr>
<td>Tournay</td>
<td>je divisai en neuf son interieur[^317]</td>
</tr>
<tr>
<td>Schmökel</td>
<td>Den Grundriß aber teilt' ich neunfach auf[^318]</td>
</tr>
<tr>
<td>Heidel</td>
<td>Its groundplan I divided into nine sections[^319]</td>
</tr>
<tr>
<td>Pettinato</td>
<td>La sua base suddivisi per nove volte.[^320]</td>
</tr>
<tr>
<td>George</td>
<td>Into nine compartments I divided her interior,[^321]</td>
</tr>
</tbody>
</table>

Whether these were compartments, as translated by George and Kovacs, implying the existence of actual bulkheads, or simply a division into areas for work, living, stores, and the

[^315]: Speiser, p. 67.
[^316]: Kovacs, p. 99.
[^317]: Tournay, p. 228.
[^318]: Schmökel, p. 99.
[^319]: Heidel, p. 82.
[^320]: Pettinato, p. 218.
[^321]: George, p. 90.
animals is unknown. The construction of bulkheads within ancient vessels is known from a few archaeological finds in the Mediterranean, so it can be supposed that in Mesopotamia this construction could have also occurred.\textsuperscript{322}

Assyrians were familiar with the idea of multiple decks, as seen in the war and transport galleys depicted in Sennacherib's palace (Figure 18). These seventh-century B.C. representations of Phoenician ships show rowed vessels, each with three decks; the highest for the troops, the second for the upper bank of rowers, and the third for the lower bank of rowers.\textsuperscript{323} Noah's Ark, Genesis 6:16, also had a lower, middle, and upper level demonstrating a parallel between the two versions of the boat of the flood.


\textsuperscript{323} J. M. Russell, The Final Sack of Nineveh (New Haven, 1998), pl. 54.
The sequence of six decks, seven levels, and nine compartments is also a poetic convention.\textsuperscript{324} Such constructions of sequential or ascending numbers are found in Ugaritic poetry, one example of which is found in the "Epic of Kirta" (I:16-21):

A third died in health.  
A quarter by disease.  
A fifth was gathered by Rashap;  
A sixth by the Lad of Yamm.  
A seventh part—  
By the sword it was felled.\textsuperscript{325}

Another more pertinent parallel is in "The Baal Cycle" (V:25-27):

El answers from the seven rooms,  
From the eight enclosures.\textsuperscript{326}

Thus, perhaps the number of decks and compartments are not to be taken too literally and are only meant to represent multiple levels and compartments.

\textsuperscript{324} D. Fleming, personal communication, fall 2002.  
\textsuperscript{326} M. S. Smith, "The Baal Cycle," in Parker, p. 117.
Water-Stoppers, a Signal Construction Feature

Gilg.XI:63 has been one of the more enigmatic lines in the sequence, yet for understanding the text, it is one of the most crucial. It has been translated and interpreted in a number of ways:\(^{327}\)

<table>
<thead>
<tr>
<th>Translator</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speiser</td>
<td>I hammered water-plugs into her.(^{328})</td>
</tr>
<tr>
<td>Kovacs</td>
<td>I drove plugs (to keep out) water in its middle part(^{329})</td>
</tr>
<tr>
<td>Tournay</td>
<td>je lui enfonçai dans le flanc des chevilles marines(^{330})</td>
</tr>
<tr>
<td>Schmökel</td>
<td>Befestigte in ihm auch Wasserstöpsel (?)(^{331})</td>
</tr>
<tr>
<td>Heidel</td>
<td>I drove water-stoppers into it.(^{332})</td>
</tr>
<tr>
<td>Pettinato</td>
<td>Nel suo mezzo infissi pioli per le acque;(^{333})</td>
</tr>
<tr>
<td>George</td>
<td>I struck the bilge plugs into her middle.(^{334})</td>
</tr>
</tbody>
</table>

\(^{327}\) Clay in his 1922 translation derived “water-tanks in its midst I constructed.” Clearly, this has no foundation. See Clay, p. 73.

\(^{328}\) Speiser, p. 67.

\(^{329}\) Kovacs, p. 99.

\(^{330}\) Tournay, p. 228.

\(^{331}\) Schmökel, p. 99.

\(^{332}\) Heidel, p. 82.

\(^{333}\) Pettinato, p. 218.

\(^{334}\) George, p. 90.
Foster, who translates the line as "I drove the water plugs into her," states: "The 'water plugs' have been explained in various ways, for example, as caulking, stabilizers, depth markers, water taps, bilge drains, and drains to let out rainwater when the boat was beached. None of these suggestions is supported by Mesopotamian evidence."\(^{335}\) While this is true, he does not consider the plugs' function in sewn construction.

Kovacs' translation makes little sense. She, as well as George, misses the translation of ina libbiša as simply "within/in(side)"\(^{336}\) whence is simply derived "into it," where "it" is the hull. Schmökel was clearly puzzled by the line as he includes a question mark at the end. He footnotes this with "zum Abdichten?" This, however, is actually the correct assumption. George translates sikkatû as "bilge plugs" but he does not explain how he derives it. Heidel has the correct translation but delves into the bizarre with "(t)his line probably means that he drove wedge-shaped pieces of wood between the seams to help make the boat watertight."\(^{337}\) Heidel

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\(^{335}\) Foster, p. 86, n. 2.

\(^{336}\) CDA, p. 181.

\(^{337}\) Heidel, p. 82, n. 176.
then relates this to Salonen who translates the term as "wasserabdichtende Fügenägel" which is used to caulk the planking seams.\textsuperscript{338} I believe Speiser's translation is correct, but he makes no comment on its meaning.

The nature of the water-stoppers and their mention in the sequence is significant to the interpretation of the text. The wording "Indeed, I hammered the water-stoppers into it" is emphatic as indicated by "lū." Utnapishtim is portrayed as stressing this action to underscore his expertise and attention to detail. In fact, aside from dimensions and internal design, it is the only constructional feature yet mentioned in the sequence. The author mentioned no keel, stem, sternpost, planking, or any framework. Nevertheless, he devoted an entire line to the water-stoppers. Surely the author would not have mentioned them if they were not an important facet of the construction.

On one hand, the author was assured his audience would understand the reference, as many would have been familiar with it, thus underscoring the authenticity of the vessel. As Mark states, "to understand how a ship was built by being

\textsuperscript{338} Salonen, p. 100.
told only one detail of its joinery suggests such vessels were a common sight when a literary work was written...." The question remains, however, as to what the water-stoppers were, and with what method of boat construction they were employed. Such stoppers are not found in mortise-and-tenon joinery. Whereas the mortise-and-tenon joints were locked in place with wooden pegs on many ships, the pegs were not intended to prevent leakage. The holes they filled were made solely for the pegs to lock together the joint. Nor are water-stoppers found in Egyptian methods of boat construction. Water-stoppers, or water-plugs, are, however, found in sewn-boat construction. Of the known ancient construction methods for watercraft they are found only in this technique and they are crucial to the sewn method.

As seen in Chapter II, in the sewn-boat technique the planking has numerous holes bored, or drilled, through it for

\[339\] Mark, p. 149.

\[340\] Steffy, 1994, p. 46.
the stitching.\footnote{Stitch-hole pegs are found in Mediterranean sewn boats. (P. Pomey, "Les épaves grecques de VI\textsuperscript{e} Siècle av. J.-C. de la Place Jules-Verne à Marseille," Archaeonautica 14 [1998]: 147). On the Bon-Porté wreck, pegs were found in some stitching holes, although these are viewed as locking the stitching and thus are not "water-plugs." (Steffy, 1994, p. 40. See also P. Pomey, "L'Épave de Bon-Porté et les Bateaux cousus de Méditerranée," MM 67 [1981]: 244). The wreck at Giglio, Italy and the archaic Greek wreck at Gela, Sicily also have stitching holes plugged with treenails, (A. J. Parker, 1992, Ancient Shipwrecks of the Mediterranean, BAR International Series 580, p. 189. See also A. Freschi, "Note tecniche sul relitto greco arcaico di Gela," in Atti della IV Rassegna di Archeologia Subaquea [Naxos, 1989], p. 201) as does the first century B.C. Comacchio wreck in the Po River delta. (M. Bonino, "Sewn Boats in Italy: suture naves and barche cucite," in SPB, p. 91). Also of note is the fifth century B.C Ma'agan Mikhael wreck, which had garboards sewn to the keel and the strake ends sewn through the posts. See See Y. Kahanov, English summary, "'Sewing Systems' in the Hull Construction of the Ma'agan Mikhael Shipwreck: A Comparative Study with Mediterranean Parallels," (Ph.D. diss., University of Haifa, 1998), n. p.} Once planks are sewn, the holes must be plugged to prevent leakage. The holes are stopped up with small pegs of wood, wads of fiber, or a similar material. Such plugs were found on the mtepe and dau-mtepe where the planking was connected by "sewing and pegging,"\footnote{Hornell, 1941, p. 57.} and once the frames were inserted, they were "sewn to the sides by coir lashings passed through holes in the planking... subsequently plugged with wooden pegs...."\footnote{Hornell, 1941, p. 60.}
of Lake Victoria had its stitch holes plugged,\textsuperscript{344} as did the Somali \textit{beden}.\textsuperscript{345} The boats of Karnataka and Kerala have their stitch holes stopped with wooden pegs (Figure 19).\textsuperscript{346} The \textit{masula} had water-stoppers of wood or fiber.\textsuperscript{347} The Omani \textit{kambari} had its holes plugged with coconut fiber or wads of cloth.\textsuperscript{348}

One of the best descriptions of the function of the water-stoppers is found in an account of the modern construction of a large seagoing Dhow in Oman:

A dozen of the ropeworkers, walking in single file, were carrying on their shoulders... a 52-foot-long thin sausage made of coconut husks, pounded out, placed end to end, and then wrapped around with string to make a sort of wadding about the thickness of a firehose. This ‘python’ they placed into the angle between the keel and the first plank, on the inside of the hull. Then they stretched thick coir string\textsuperscript{349}

\textsuperscript{344} Cf. p. 46.


\textsuperscript{346} Cf. p. 23.

\textsuperscript{347} Cf. p. 24.

\textsuperscript{348} Vosmer, 1997, pp. 232-33.

\textsuperscript{349} 32 strands. Severin, \textit{SPB}, p. 283.
up and down the length of the python, covering it entirely.... (T)he senior ropeworker... divided his men into pairs, an inside man and an outside man. Each pair worked at passing a strand of the finest-quality coir cord out through a hole in the plank, back through the opposite hole in the keel, round the python, and out again. There the outside man took a turn of the cord around his lever of stout wood... his partner... pounded on the python with a mallet to compress the coconut fibres.... The stitch was temporarily locked with a light wooden peg, and then the whole process began all over again with the next pair of holes. Three times, stitch and overstitch, they lashed together plank, keel and python until finally the last stitches were plugged with little tufts of raw coconut fibre.

...The ribs, too, were stitched into place... (A)nd the ...men, finished with all the stitching, spent a week stuffing coconut fibre plugs in the stitch holes in the planking, a tedious but essential task. I estimated that we had drilled more than 20,000 holes in the planking, and if these holes were not pegged properly the ship would leak like a huge sieve. (my italics)

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350 This was a four-ply, \( \frac{1}{4} \)-inch cord. Severin, SPB, p. 283.

351 Grooves were cut between pairs of holes on the outer hull into which the stitching was recessed. This was to protect the stitching from chafing. Severin, SPB, p. 283.

In this account of the building of the large seagoing dhow Sohar, both the stitching holes in the planking and the lashing holes in the planking for the frames are stopped with coconut fiber plugs.\textsuperscript{353} Severin clearly points out that these were intended to prevent severe leakage in the hull. I believe these same kinds of plugs are the water-stoppers in Gilg.XI:63. They may be of different material, perhaps wood or another fiber, but the function is the same. Coming as it does after the internal structure is built, it is possible that the water-stoppers in Gilg.XI:63 are for the framing lashings rather than the planking. This, however, is a minor point as it is the presence of the water-stoppers that is important. They appear nowhere else in the forms of ancient ship construction with which we are presently familiar.

Of further consideration are the ropeworkers in Severin’s account. These can be compared with the reed workers in Gilg.XI:51. The reed workers may have served a similar function of creating from the reeds, through pounding,

\textsuperscript{353} Severin also notes that on the outside the holes are blocked with putty made from tree gum (chundruz), coconut oil, and finely crushed seashells. On India’s Malabar coast, the holes are plugged inside with wooden pins of hali wood. See Severin, \textit{SPB}, p. 285.
flattening, and laying end to end the wadding to cover the seams prior to sewing as stated above.

Thus, the water stoppers are a strong indication that the Gilgamesh epic describes the construction of a sewn boat.

Boat Poles

Gilg.XI:64 (Gilg.XI:65 for George) completes the construction of the hull with Utnapishtim inspecting the vessel:

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Speiser</td>
<td>I saw to the punting poles and laid in supplies.⁵⁴</td>
</tr>
<tr>
<td>Kovacs</td>
<td>I saw to the punting poles and laid in what was necessary.⁵⁵</td>
</tr>
<tr>
<td>Tournay</td>
<td>je prévis des perches et mis en place le matériel nécessaire.⁵⁶</td>
</tr>
<tr>
<td>Schmökel</td>
<td>Besorgte Ruderstangen, schaffte Vorrat.⁵⁷</td>
</tr>
<tr>
<td>Heidel</td>
<td>I provided punting poles and stored up a supply.⁵⁸</td>
</tr>
<tr>
<td>Pettinato</td>
<td>scelsi le pertiche e approntai tutto ciò che serviva alla sua costruzione.⁵⁹</td>
</tr>
</tbody>
</table>

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⁵⁴ Speiser, p. 67.
⁵⁵ Kovacs, p. 99.
⁵⁶ Tournay, p. 228.
⁵⁷ Schmökel, p. 99.
⁵⁸ Heidel, p. 83.
⁵⁹ Pettinato, p. 218.
George I saw to the punting-poles and put in the tackle\textsuperscript{360}

There is not much variation in the translation of this line, all similar to Speiser’s “I saw to the punting poles and laid in supplies.” George, however, translates “supplies” as “tackle,” which introduces an additional element not present in the text.

Parīsu as “punting poles” is what one would expect to find on a boat on the Mesopotamian rivers. On the lower Euphrates and Tigris today

(b)oat poles are made from large reeds or imported bamboo. Moving any of the boats at speed puts great stress on the pole. Even the most skillful boatman is likely to fracture the more friable reed pole. As a result, the stronger bamboo pole is more often used by those who make a living from their boats. Those who use reeds select them very carefully and always carry two or three replacement poles with them except on the shortest trips...\textsuperscript{361}

\textsuperscript{360} George, p. 90.

Alternate definitions for parīsu are “boat-poles” a generic term that could mean poles for punting, and “rudder.” Schmőkel translates the term as “Ruderstangen,” literally “rudder-poles.” By this interpretation, the parīsu could be the pair of steering oars, the steering device that predominated in the ancient world until the invention of the stern-mounted rudder during Europe’s medieval period.\(^{362}\) I choose, however, to use the generic “boat-poles” to avoid supporting either of the more specific translations.

Section 4: Sealing and Caulking, SAA Gilg.XI:65-75

65 3 shar of pitch I poured into the oven
66 3 shar of bitumen ..... into the inside
67 3 shar of oil the basket carriers carried
68 Apart from the shar of oil the oiling consumed,
69 the shipwright stowed away 2 shar of oil.
70 I slaughtered cows for the people.
71 I slaughtered rams daily.
72 Beer, fine beer, oil and wine
73 the workers drank like river water.
74 They made a festival like the akītu day.
75 I op[ened]...... I laid my hand [to] the ointment.

This section concerns sealing the vessel with various liquid and semi-liquid substances. In keeping with the sequence of building a sewn boat, it comes after the vessel is

\(^{362}\) L. V. Mott, The Development of the Rudder (College Station, 1997), p. 3.
constructed and pegged with the water-stoppers. In these lines, Utnapishtim prepared sealants and applied them to the vessel. These lines exhibit little variation in translation, except that some see six *šar* of bitumen and pitch instead of three, and Speiser translates Gilg.XI:66 as "asphalt," a minor point.

Of particular interest in Gilg.XI:65-66 is that two types of materials are listed. Why two different substances were needed to create a sealing substance is not known, but two sealing substances are recorded in the account in Exodus 2:3 of the basket of bulrushes the infant Moses floated in on the Nile. In Gilgamesh, the bitumen and pitch were mixed together in a furnace, and, appearing as they do in the sealing sequence, the resultant substance must have had some waterproofing or preservative function.

Mediterranean ships have a history of sealing both the inside and outside of the hull. The seventh-century wreck at Yassiada, for example, was coated with pitch inside and out. This is also found in the account of Noah's ark in Genesis 6:14-16: "Make thee an ark of gopher wood; rooms

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363 Steffy, 1982, p. 60.
shall thou make in the ark, and shalt pitch it within and
without with pitch." Some Mesopotamian vessels such as the
wicker "Black Boat" made extensive use of bitumen as it was
completely coated with the substance. Strabo (16, 1, 15)
noted similar vessels "woven with reeds and... plastered with
asphalt." The twentieth-century tirada, a wooden frame-
first craft of the lower Mesopotamian marshes, had its
planking coated externally with bitumen. Additionally,
recently discovered reed-impressed bitumen pieces in Kuwait
are claimed to be remains of a reed boat. Reed boats in
Egypt were similarly sealed. Yet, the sewn boats of the
Indian Ocean littoral do not use pitch or bitumen on their
hulls. These boats traditionally use different methods of
sealing, both internally and externally, based on oil.

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364 King James Version.
365 Hornell, 1946, p. 58.
366 H. L. Jones, The Geography of Strabo, vol. 7
367 Thesiger, pl. 75.
368 Weekes, http://www.telegraph.co.uk.
369 Hornell, 1946, p. 229.
The Oil and Its Purpose

In Gilg.XI:67-69 Utnapishtim introduces oil into the equation: "3 shar of oil the basket carriers carried. Apart from the shar of oil the oiling consumed, the shipwright stowed away 2 shar of oil." These lines have been another source of confusion, although the translations are similar:

Gilg.XI:67

Speiser       Three sar of oil the basket-bearers
Carried\(^{370}\)
Kovacs        There were three times 3,600 porters
of casks who carried (vegetable) oil\(^{371}\)
Tournay       Pour l'huile, les porteurs de seau en
Apportèrent quatre-vingt-dix hectoliters\(^{372}\)
Schmökel      Korbträger brachten drei Sar Öl herbei\(^{373}\)

Heidel        Three shar of oil the basket-carriers
brought:\(^{374}\)
Pettinato     La gente che portava i canestri erano
Tre sar, essi portavano l'olio: \(^{375}\)
George        Three myriad of oil fetched the workforce
Of porters:\(^{376}\)

\(^{370}\) Speiser, p. 67.

\(^{371}\) Kovacs, p. 99.

\(^{372}\) Tournay, p. 228.

\(^{373}\) Schmökel, p. 99.

\(^{374}\) Heidel, p. 83.

\(^{375}\) Pettinato, p. 218.

\(^{376}\) George, p. 90.
Gilg.XI:68

Speiser  Aside from the one sar of oil which the
Calking consumed

Kovacs  Apart from the 3,600 (units of) oil which
they consumed (?)

Tournay  À côté de trente hectolitres d'huile
(que) consomma le calfatage

Schmökel  Dazu ein Sar zum Schmieren [für die
Stöpsel(?)]

Heidel  Besides a shar of oil which the saturation
(of the water stoppers) consumed

Pettinato  Tranne un sar di olio che i ... hanno
consumato,

George  Aside from the myriad of oil consumed
In libations,

Gilg.XI:69

Speiser  And the two sar of oil [which] the
Boatman stowed away

Kovacs  And two times 3,600 (units of) oil
which the boat man stowed away

Tournay  Ce furent soixante hectolitres que
Le batelier mit en reserve

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377 Speiser, p. 67.
378 Kovacs, p. 99.
379 Tournay, p. 228.
380 Schmökel, p. 99.
381 Heidel, p. 83.
382 Pettinato, p. 218.
383 George, p. 90.
384 Speiser, p. 67.
385 Kovacs, p. 99.
386 Tournay, p. 228.
Schmökel  Und weitre zwei als Vorrat fur den Schiffer\textsuperscript{387}
Heidel  Two shar of oil [which] the boatman stowed away.\textsuperscript{388}
Pettinato  Due sar di olio sono stati messi da parte dal marinaio\textsuperscript{389}
George  There were two myriad of oil stowed away by the boatman.\textsuperscript{390}

Gilg.XI:67 presents no problems, but Gilg.XI:68 is puzzling. George includes "libations" here, an idea also supported by Tournay and Schaffer who, although they believe the oil was for caulking, relate nîqqu to a libation ritual, "Il s'agit ici d'une opération quasi liturgique que l'on va célébrer par une fête..."\textsuperscript{391} One-third of the oil supply was used up by the action related in this line. According to Speiser, a shar is 8,000 gallons.\textsuperscript{392} This is a vast amount of oil to use up in a libation ritual or a christening of the boat. Additionally, there was no reason to anoint the workers with this much oil. While the anointing of people is found in Near Eastern

\textsuperscript{387} Schmökel, p. 99.
\textsuperscript{388} Heidel, p. 83.
\textsuperscript{389} Pettinato, p. 218.
\textsuperscript{390} George, p. 90.
\textsuperscript{391} Tournay, p. 229, n. y.
\textsuperscript{392} Speiser, p. 67, n. 3.
traditions and is recounted in the Bible several times, at no
time do large amounts appear to be used.

Research reveals no ethnographic or historical example for
the use of oil to bless a ship in Mesopotamia or the Indian
Ocean. There is, however, evidence of libation of blood.
Boats in the Near East have historically been blessed with an
animal sacrifice.\textsuperscript{393} The practice continues to the present
day in some areas. I witnessed such an animal sacrifice near
Bodrum, Turkey, in 1988. The boat, a typical goulet or
"Bodrum Boat," had its hull completed and still lay on its
chocks on the beach. A small crowd of people had gathered
for the blessing ceremony. The carcass of a freshly killed
goat lay nearby. The blood from the slit throat of the
creature had been collected in a bucket. A man took a swab
of what appeared to be wool wrapped around a stick, dunked it
into the blood and then smeared it on the starboard bow of
the ship in two sweeping motions, almost creating an "X."

\textsuperscript{393} This may ultimately derive from human sacrifice, as
seen in the vestigal practice in India of crushing a
vermilion-filled pumpkin, representing a human head, under
the keel of a new masula as it is dragged down the beach.
See J. Hornell, "The Prow of the Ship: Sanctuary of the
Sacrifice of a caprid was also the method by which boats were blessed prior to launching in Arabia and in India. After the head was cut off and impaled or hung on the stem, the carcass was skinned and the hide was strapped hairy-side out over the stemhead. In 1900, boats in Bahrain had a figurehead that was covered by the skin of a sheep or goat that had been sacrificed for the vessel’s launching.\textsuperscript{394} This was done out of the belief that the sacrificed animal’s characteristics were then transferred to the boat or simply to please a water god or spirit.\textsuperscript{395} In southern India in the nineteenth century up to five sheep were slaughtered and their heads hung from the stem so the blood ran down it. In later times, burlap was often substituted.\textsuperscript{396} Le Baron Bowen related the black

\textsuperscript{394} Ibid., p. 176.

\textsuperscript{395} R. Neyland, “The Seagoing Vessels on Dilmun Seals,” in Underwater Archaeology Proceedings from the Society for Historical Archaeology Conference, ed. D. H. Keith and T. L. Carrell (Kingston, 1992), p. 71. Neyland, p. 72, also offers an alternate explanation for the birds on seal 351, that they are shore-sighting birds. This is supported by the account in Genesis 8:7-12 wherein Noah releases birds from the ark in an attempt to find land, and it is also present in Gilgamesh in Gilg.XI:149-159 wherein Utnapishtim releases a bird to locate land. Also, this method is pre-supposed for the Canaanites, as per R. D. Barnett, “Early Shipping in the Near East,” Antiquity 32 (1958): 230. See also J. Hornell, “The Role of Birds in Early Navigation,” Antiquity 20 (1946): 142-49.

tips and eyes found on Persian Gulf vessels to the practice, despite their bird-like appearance (Figure 20):

It seems that the black tip on the extended stem of the Persian Gulf bhum (and sambuk) is symbolic of the black skin which used to be placed there... There are certain boats in the Persian Gulf whose design indicates that an animal head was also... placed at the stern of the vessel. ...There are numerous medieval Arab manuscripts showing corroborative evidence which leaves little doubt that these raised sternposts once carried animal heads.... Similar decoration of boats can be traced right back to ancient Babylonia, for heads are shown on both raised prows and sterns in Mesopotamian seals.\(^{397}\)

According to an interpretation of Dilmun seals from Failaka by Paul Johnstone, an enigmatic form on the stem of the boat in seal 264\(^{398}\) is a goat head, and the birds appearing on seal 351 (Figure 21) follow the pattern of mounting the sacrificed animal on a vessel’s posts.\(^{399}\)

\(^{397}\) Ibid.


The mtepe also sported an animal part, namely a camel's tail hung off the top of the sternpost. While Adams connects its presence with a possible function of counterbalancing the tiller or moving the center of mass of the rudder, its votive or cultic symbolism as a reminder of blood sacrifice cannot be ignored. The mtepe also had "a long prow made to resemble a camel's head," harkening to the days of animal sacrifice. The red color and the eye on the mtepe commemorate a narration in the Koran in which a she-camel is sent to the Thamud tribe of Arabia, who then killed it, rejecting the divine gift.

Europeans have recorded tassels hanging from the stems of various ships and boats of Arab origin over the past several centuries. These tassles are "suggestive of the bridle ornaments of the Arab's camels... and it is most probable that the resemblance is no mere matter of chance." Features on the ends of the craft of seals 264 and 351 (Figure 21) appear

400 Adams, *SPB*, pp. 300-01.

401 Ingrams, p. 304.

402 Cf. p. 38.

403 Pearce, p. 29, n. 1.

to be tassles of some sort. On the Upper Nile, boats often sported on the ends of their yards goat skins, heads and wings of birds, and sheep jawbones.\textsuperscript{405}

Clearly, animal sacrifice, either real or symbolic, has a long and wide history in the Near East and Indian Ocean lands. Thus, the use of the oil in Gilg.XI:67-69 for a religious purpose can be discounted. It then must have some function in the construction of Utnapistim's boat. As the oil appears with other lines concerning sealing, it was probably used for that purpose. Heidel, Schmökel, and Speiser come closest to the reason, such as with Heidel's, "Besides a shar of oil which the saturation (of the water stoppers) consumed." However, Heidel refers back to Salonen who sees the saturation as part of caulking the planking seams, such as in modern Iraq where seams on frame-first boats are caulked with cotton soaked in sesame oil: "...dafür heute im Iraq den Gebrauch von šireg 'Sesamo', mit dem die Baumwolle, die die Plankenfugen dichtet...."\textsuperscript{406} Salonen, however, relies on the work of Ritter, who conducted an ethnographic

\textsuperscript{405} Hornell, 1940, p. 131.

\textsuperscript{406} Salonen, p. 150.
study of Iraqi boats in the early twentieth century.

According to Ritter:

Die Spanten werden von außen mit Planken (löh) benagelt (raggam). Die Fugen werden mit mit Sesamöl (šireg) getränker Baumwolle, die mit Hammer und Meißel (mingār) hineingetrieben wird, gedichtet (kalfatert).... Die Innenseite des Schiffes wird mit Tran (syl) Bestrichen.⁴⁰⁷

The planking seams are caulked with oil-soaked cotton rammed into the joints, while the inside of the vessel is smeared with fish oil. While the first part of Ritter’s record is clearly connected with frame-first construction, as caulking cannot be hammered into the seams of edge-joined planks, the soaking of the interior with fish oil is reminiscent of the oiling of sewn boats around the Indian Ocean.

The oiling is actually another step in the construction of the sewn boats. To return to Severin’s Sohar:

Finally the men climbed back inside the hull. Tins of vegetable oil were lowered down to them, and using mops and brushes they swabbed oil on to the stitching of the pythons. The coconut

fibre soaked up the oil. The ropeworkers told me how important it was to keep the rope oiled if the ship were to survive. If the rope was treated with oil once every four or six months, they said, they would guarantee the ship to last sixty years, or even a century. I did not doubt them. I had seen the planks of a sixty-year-old sewn ship and inspected its stitching: between the planks the original coconut rope was as good as new."^408

Thus, the "shar of oil the oiling consumed" may refer to the saturation of the planking stitching and frame lashings of sewn boat construction. On a boat as large as described in this poem, 8,000 gallons would have been a reasonable amount for a thorough soaking. The two shar stowed away by the shipwright also has its parallels to sewn boat construction. As seen on the Sohar, the stitching and lashings had to be periodically retreated. It is good, sound seamanship for Utnapishtim and his shipwright to keep on board an oil supply for two further soakings, particularly as they faced an unknown time on the floodwaters. Far from being a quasi-liturgical exercise, the oiling is basic sewn boat procedure and no religious explanations are necessary.

^408 Severin, p. 68.
The Paying: An External Sealing and Anti-Fouling Mixture

It is possible that the bitumen-pitch mixture in Gilg.XI:65-66 was for sealing the outside of the boat’s hull, but, again, this is unattested for sewn-boats of the Indian Ocean. What was, and still is, used on traditional sewn and non-sewn western Indian Ocean vessels is either a mixture of oil and lime or just plain fish oil. This leads to yet another enigmatic line, Gilg.XI:75: “I op[ened]...... I laid my hand [to] the ointment.”

Appearing after several lines narrating a feast given by Utnapishtim, Gilg.XI:75 signifies the final stage of the vessel’s construction. It has been translated in two ways: either Utnapishtim is applying an ointment to his hands, or he is oiling something:

Speiser  I op[ened...] ointment, applying (it) to my hand
Kovacs  ...and I set my hand to the oiling (?)  

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410 Speiser, p. 67.

411 Kovacs, p. 99.
The connection of the ointment with an oil or fatty substance has long been recognized, as has the finality of the act described. Speiser saw Utnapishtim as opening a container of ointment and then rubbing it on his hand. Kovacs has Utnapishtim oiling something with his hand, as does Schmökel and George. Tournay and Schaffer again rely on a religious explanation: "Il peut s’agir d’onction rituelle d’huile pour consacrer les bâtiments, ou plutôt de distribution d’huile

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412 Tournay, p. 228.

413 Schmökel, p. 99.

414 Heidel, p. 83.

415 Pettinato, p. 218.

416 George, p. 91.

417 For example, "Stelle zum Salben... auch aus Holz, wenigstens auch aus anderem Stoff wie aus Ton, und zwar für Öl oder fett," and in "‘Legt er die Hand hin,’ weil er fertig ist?" See Jensen, pp. 490-91.

418 Gardner and Maier also support this view, p. 231.
aux travailleurs pour se nettoyer et se parfumer."  This, however, calls to mind the anthropological adage "if you can't explain it, it must be 'cultic.'" Also, while the picture of Utnapishtim applying an ointment to his hands after several days of hard work is attractive in its humanness, I believe it is more likely this line refers to yet another step in the sewn-boat technique.

One recalls the oils and oil and lime mixture applied to sewn hulls around the Indian Ocean for centuries. For instance, Abu Zayd in the tenth-century mentions an oil mixture was used to seal the holes and seams of sewn hulls below the waterline. Hornell found that this mixture to be the standard sealant for sewn hulls. Marco Polo also mentions "the ships are not pitched but are rubbed with fish oil". Indian boats used oil, or on the seagoing ones, the lime and oil mix, as did Pakistani boats that are no longer sewn.

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419 Tournay, p. 229, note b.
420 Cf. p. 72.
421 Cf. p. 77.
422 Cf. p. 61.
424 Cf. p. 47.
The paying of a lime and oil mix has been found throughout the Indian Ocean and beyond to the areas where Arab seafarers traded and spread Islam. As seen in Chapter II, in the Philippines, a compound of coconut oil and lime was used into the mid-twentieth century.\textsuperscript{425} A similar mixture was used in China,\textsuperscript{426} and Polo also noticed the practice of caulking junks with "lime and chopped hemp, kneaded together with wood-oil."\textsuperscript{427} Whether these far-flung occurrences have any connection with the Arab method on sewn boats is a matter of speculation. Yet, it is interesting that areas with an early and long contact with Arabian seafarers used a similar anti-fouling and sealing substance.

Returning to the Sohar, the same lime and oil mixture is used on the outside of its hull:

\begin{quote}
In the final week before launch we applied a coat of anti-fouling to the outside of the hull to protect it from being attacked and eaten by shipworms. The anti-fouling was strictly traditional, a coating of lime mixed
\end{quote}

\textsuperscript{425} Cf. p. 78.

\textsuperscript{426} Cf. p. 78.

with mutton fat and smeared on by hand. We boiled up lumps of fat which we purchased in the sug, stirred in the lime powder and set to work. ...Forty young Omanis... set to work smearing on the evil-smelling sticky mutton fat; when it dried it gave the underside of the ship a smart white finish."\textsuperscript{428}

This anti-fouling substance was applied not with a brush but smeared on by hand as it is too viscous to be applied with a brush. It was also not solid enough to apply with a blade or rollers. As I have observed in Bahrain, where watercraft are still smeared with a similar lime-oil substance, the substance has a vaseline-like, or an ointment-like, consistency (Figure 22).

Traditional ships in Kenya continue to be payed with a lime and fat mixture. Called shahamu, (cf. Akk. šamnu), this substance is applied to the outside of hulls by hand (Figures 23 and 24) and is accompanied by music echoing the festivities in Gilg.XI:70-75:

The ship’s underwater timbers are... coated with a paste consisting mainly of lime and beef fat.... The Nakhodas prefer camel fat to beef fat but the former was

\textsuperscript{428} Severin, 68-9. Severin’s team also used the paying to plug a garboard leak from the outside while the seam was underwater. Severin, SPB, p. 287.
difficult to obtain.... This paste is applied by hand and not by brush, and it is pressed into any crevices or other irregularities. While anything up to a dozen men are carrying out this work, an African drummer or two will beat out a rhythm to which the crew chant a shanty. It is all made to seem a happy occasion and shows us that “music while you work” is a very ancient idea.\textsuperscript{429}

As already seen,\textsuperscript{430} the hora of Pakistan undergoes a similar paying with fish oil, applied by hand and accompanied by festivities:

When the fish oil anti-fouling is being renewed it is smeared on with the palm of the hand dipped in the preparation in tin or enamel bowls. The crews sing at this kind of work, and even stop occasionally to dance and skylark.\textsuperscript{431}

In Iraq, festivities are also found in conjunction with the sealing of the outside of the hull. Ochsenschlager recorded the construction of a tirada, the traditional high-ended narrow boat of the Marsh Arabs. While not a sewn boat, and


\textsuperscript{430} Cf. p. 47.

\textsuperscript{431} Greenhill, pp. 163-66.
although the substance being applied is bitumen and not the oil/lime paying, the process parallels the sewn boat:

...The most interesting part of bitumen application is the semi-carnival atmosphere that prevails. ...This is for them an excellent opportunity to cement friendships and their positions in the community...

...The importance of this... in building and maintaining a sense of community should not be underrated. The role of village crafts in promoting community cohesiveness has always been a large one.

It is on the basis of this combined evidence that I conclude Gilg.XI:75 refers not to a ritual or to relief of sore hands, but to the final step in sewn-hull construction of which the feasting is part and parcel: the sealing and protecting the hull by hand with a lime-and-oil, ointment-like, anti-fouling paying.\footnote{The phrase “qatī addi” can be translated as “laid a hand,” or “laid hands on.” In conjunction with piššātu, according to the CAD N/94 it means “to touch (sacrilegiously). What, if anything, was sacrilegious about this process is unknown, but the nature and odor of the paying may have made it “unclean.”}
The Bitumen-Pitch Mixture

The question of the bitumen-pitch mixture still needs resolving. Obviously, one would not apply this substance to a sewn boat’s interior as it would make the maintenance of the stitches impossible. As already seen, the outside of sewn boats was smeared with a different substance, which is mentioned in the Gilgamesh. This precludes the use of the bitumen and pitch at least on hull parts below the waterline. While a definitive answer for the use of the bitumen-pitch mixture remains elusive, one can postulate on its use.

The decks comprising the six levels would have been somehow sealed. It is unknown whether decking planks were sewn together or treenailed to underlying beams. If they were not sewn, and I suspect they were not as foot-traffic would quickly wear away the cordage, then the decks could have been made waterproof with the bitumen-pitch mixture. All the decks, not just the upper one exposed to the weather, may have been sealed. This would have prevented water from getting into the bottom of the vessel and accelerating the rotting of the hull stitching. Likewise, on a vessel intended to carry animals, one would not want urine and fecal
material to seep down into the boat’s bottom. Thus coated, the decks would have been somewhat sticky, particularly in hot weather, but that could be avoided by laying down dunnage, such as hay or reeds, to protect the feet of both people and animals.\(^{433}\)

Such application of bitumen to boards is attested to archaeologically. Fragments of bitumen showing the impressions of boards laid side by side have been found in the third millennium excavations at Umm-an-Nar in the United Arab Emirates. The fragments were found in a warehouse, and the excavators believed that they were either from the building itself or imported for other construction including boats. The impressions do not show any fastenings between the boards.\(^{434}\) Other board-pressed bitumen fragments come from Qala’at al-Bahrain, dating to Periods I and II (third and second millennium).\(^{435}\) Here, pieces have been found indicating palm wood boards tied together with cord. Also,

\(^{433}\) Mark, p. 169.


bitumen from the top of a planked-lid coffin show boards
lying side by side, and pieces from the side of the coffin
show plank impressions in association with cordage 3 to 6 mm.
in diameter. The function of the cords and their relation to
the planks is unclear.\textsuperscript{436} Further evidence may be found at
Ra's al-Junayz, where some pieces of bitumen dating to the
second half of the third millennium appear to show
impressions of wooden planks.\textsuperscript{437}

Section 5: The Launching, SAA Gilg.XI:76-79

76 [By sunset] the boat was complete
77 ..........was difficult and .......
78 the boat's bottom was moved back and forth, above and
    below.
79 .....it went two-thirds of it.

This final section of the boat-building sequence does not
include actual construction, but it does concern the
launching of a large vessel. The lines present a graphic
illustration of the difficulties in launching a large, heavy
wooden craft through what was undoubtedly semi-soft riverbank
soil. The launch occurs before the flood, indicating that

\textsuperscript{436} Højlund and Andersen, pp. 409-12.

\textsuperscript{437} Cleuziou and Tosi, pp. 745 and 750.
the vessel was built on, or near, the river bank, as appears to be the common practice until the present.\textsuperscript{438}

As with many lines in the sequence, the launching has its various interpretations, most importantly Gilg.XI:78:

\begin{tabular}{|l|l|}
\hline
Speiser & So that they had to shift the floor planks Above and below\textsuperscript{439} \\
Kovacs & They had to keep carrying a runway of poles front to back\textsuperscript{440} \\
Tournay & On disposa des vaigres de l'arriere a l'avant\textsuperscript{441} \\
Schmökel & Sie mußten oben es und unten [stoßen(?)]\textsuperscript{442} \\
Heidel & ...above and below.\textsuperscript{443} \\
Pettinato & Cordo per il varo furono lanciate sopra e sotto;\textsuperscript{444} \\
George & From back to front we moved poles for the slipway,\textsuperscript{445} \\
\hline
\end{tabular}

\textsuperscript{438} Cf. the Black Boat at Hit, p. 118.

\textsuperscript{439} Speiser, p. 67.

\textsuperscript{440} Kovacs, p. 99.

\textsuperscript{441} Tournay, p. 228.

\textsuperscript{442} Schmökel, p. 99.

\textsuperscript{443} Heidel, p. 83.

\textsuperscript{444} Pettinato, p. 218.

\textsuperscript{445} George, p. 91.
The term *girmadi*, from *germadu*, is defined as "floor timbers (of ship)?" On this basis, Speiser derives "floor planks," an unconventional nautical term the meaning of which is unclear. Both these definitions may themselves derive from Salonen's interpretation wherein he translates *germadu* as "Bodenplanken (?)" meaning "garboard strakes," although he was uncertain of this. Obviously, the theme here concerns the bottom of the vessel. As the boat is already completed, it would make little sense to translate the term as floor timbers because these were inside the vessel and firmly in place. One would not be tugging or pushing on these to launch a vessel. Salonen's definition as "garboard strakes" is too specific, at least in this instance, as all of the bottom planking was involved here. Hence, I propose a broader definition of "boat's bottom" for *germadu*. Together with the Št form of *wabadum* (= back and forth), I derive "the boat's bottom was moved back and forth." The idea of moving poles back and forth, thereby creating a system of rollers to launch the craft as suggested, for example, by Kovacs and

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446 CDA, p. 91.

447 Salonen, p. 93.

George, is not supported by the text. The suggestion of skids would not, however, be alien to the launching, as without them the hull would plow deeper into the ground. Skids, however, are just not in the text.

The remainder of the line, eliš ů šapliš, also reinforces the idea that the boat was being jimmied into the river. The term is translated as "above and below,"^{449} but given the nature of the words and the situation of rocking the boat in an attempt to get it into the river, one is tempted to render it as "up and down." This yields "the boat's bottom was moved back and forth, up and down," presenting a vivid picture of the boat-builder and his crew rocking, pulling, pushing, and inching this massive vessel slowly down the riverbank. A parallel to this is found, once again, with the Sohar:

"We strapped a cradle under the hull, knocked away the keel blocks, and shackled up a tractor to tow our creation to the water's edge. Under the skids of the cradle we laid the last of our timber...greased with mutton fat... We tried again and again, ...with levers from astern, and with telegraph poles tucked under each side of the ship and fifteen (men) dangling from them like

^{449} CDA, p. 69.
monkeys, in an attempt to unstick the hull.

"...We had to cut away the gravel platform and remove enough earth to make a downhill slope for the vessel. We shifted ton upon ton of earth. Inch by inch we dragged the ship forward. By the time the sun rose we had hauled the ship on to the sand flats of low tide."\textsuperscript{450}

The boat of Utnapishtim was ultimately moved two-thirds of the way into the water. At this point, the cargo could be loaded and personnel could board without getting wet. From this arises, however, the question of why launch a vessel that is destined to float away on a flood. Again, I believe the answer lies in the realism of the passage. An ordinary boat would have been launched and loaded in just this way and the audience could relate to this.

\textsuperscript{450} Severin, p. 69.
CHAPTER IV
SUPPORTING EVIDENCE

It is important to the interpretation of Utnapishtim's craft as a sewn boat whether Mesopotamians had the resources and knowledge to construct such vessels. An examination of wood supplies, wood working techniques, and the art and literature of boats from Mesopotamia reveals more than initially expected.

Wood Supply

The availability of wood for building ships is of paramount importance. Without a supply beyond luxury item status, wooden boats would be impossible for ordinary use. The typical view is that Mesopotamia lacks timber resources. Potts calls this "patently incorrect" as Mesopotamia had "a rich and variegated material culture in wood,"^451 yet it is "easy to underestimate its availability and the intensity and range of its use."^452

^451 Potts, pp. 109 and 113.

While the valleys of the Tigris and Euphrates are considered to be among the most fertile regions in the world, Mesopotamia is not arboreal. Due to dry seasons between periods of flooding, it is only through the manipulation of water sources via canals and catchment basins that much of the valley was viable year-round.\footnote{I. M. Price, "Transportation by Water in Early Babylonia," \textit{American Journal of Semitic Languages and Literatures} 40 (1923-24): 111.} Wood has traditionally been a building material of choice in the region, replaced only recently by modern materials such as cement and blocks.\footnote{Moorey, p. 347.}

In the era immediately after the Ice Age, ten to fourteen thousand years ago, the region experienced a climate change that favored the expansion of forested areas and culminating about five thousand years ago, a date coinciding with the birth of the city-states.\footnote{G. Willcox, "Timber and Trees: Ancient Exploitation in the Middle East: Evidence from Plant Remains," in \textit{TTM}, p. 3.}
Mesopotamians exploited timber resources from an early date. Beginning with the Sumerians, crews of foresters were a regular component of the workforce harvesting wood for a variety of purposes. Carpenters were always numerous, fashioning furniture, wheeled vehicles, and boats.\textsuperscript{456} Records of the exploitation of the western forests, i.e., the ones in the Amanus and Lebanon ranges appear as early as the late third millennium. Sargon of Akkad (2334-2279) claimed divine suzerainty over upper Mesopotamia, particularly via his control of Mari on the Euphrates and Ebla in northern Syria\textsuperscript{457} as far as the cedar forest, as did his grandson Naram-Sin decades later.\textsuperscript{458} Gudea of Lagash, in the twenty-second century, claimed all the trade routes from the Mediterranean to the Persian Gulf. He boasted of cutting cedar logs 60 cubits long in the Amanus, along with the gathering of bitumen, stone, copper and other timber from various places:

In the Amanus, the Cedar Mountain, he formed into rafts cedar logs 60 cubit long, cedar logs 50 cubits long (and) KU-wood logs 25 cubits long, and brought

\textsuperscript{456} Kramer, p. 101.


them (thus) out of the mountain... In the town Ursu in the mountain of Ibla, he formed into rafts the timber of the mountain region: zabalum -logs, great Ū.KU-wood logs and tulubum -logs.... He imported esi -wood from the mountains of Meluhha.... He (also) imported abri, he imported willow logs from Gubin in the Willow Mountains....

Another text concerning Gudea relates:

Magan and Meluhha collected timber from their mountains, and... Gudea brought these together....

...they brought great willow-logs, ebony-logs, together with abba-logs to the ensi, the temple-builder. Gudea... made a path in(to) the Cedar Mountain... he cut its cedars with great axes.... (Like) giant snakes, cedar rafts were floating down the water from the Cedar Mountain, pine rafts from the Pine Mountain, zabalum -wood rafts from the zabalum -wood Mountain, and with them were floating down large rafts with great logs of Ū-wood, tulubum wood and of eralum -wood, in the main quay of Kasurra.


\[^{460}\] Oppenheim, p. 268.
The logs were fashioned into rafts and, along with boats carrying other goods, were floated down river for 1500 kilometers to Lagash indicating the practical aspects of water-borne shipping.461 According to Kramer, one boat of five tons could haul one hundred minas of cargo.462 Local and nearby timber resources were harvested from various locations known by their dominant wood types around the river basins. The term "Cedar Mountain" indicated the Amanus in the first example, but it also was a "mytho-geographic" term for regions to the east of Mesopotamia.463

Oaks were the dominant species in the highlands around northern Mesopotamia. They were rarely mentioned in royal texts, however. One possible explanation for this is that oak was so readily accessible and in general use that the wood was not a prestige item worthy of mention or acquisition by royalty.464

461 Moorey, p. 351.
462 Kramer, p. 104.
463 Oppenheim, p. 268, n. 1.
Local date palms were widely exploited, particularly in the southern regions. A rapidly growing tree with bark easily stripped, it is the "only timber universally used in the Near East for building."\footnote{Moorey, p. 348.} Not only could the trunks be split for planks to construct items such as doors, but also they were used for supports and beams in common houses.\footnote{Ibid., p. 348.} The mid-rible of the leaves were used for door and table spines. One Ur-period text also notes date-palm use in boat construction, although the meaning is unclear.\footnote{M. Van De Mieroop, "Wood in the Old Babylonian Texts from Southern Babylonia," in TTM, p. 158.} This recalls the Red Sea sewn craft built entirely of palm material.\footnote{Cf. p. 55.} Another Ur III text (Amherst 66) relates the use of 11,787 pieces of locally available wood for use in boatbuilding.\footnote{Potts, p. 126.} Thickets of trees along the river and marsh banks are common in Mesopotamia, with poplars (Populus euphratica) and willows (Salix acmophylla) predominating. Both of these trees can be coppiced, ensuring continual supply. The wood of the poplar
(Sum.  않는 asal₂, Akk. sarbatu) was, and still is, commonly used for boatbuilding.⁴⁷⁰

Imports via the Sea

Timber was imported by sea into Mesopotamia as early as the Early Dynastic III period (c. 2500 BC).⁴⁷¹ Magan and Meluhha, widely accepted as being located in what is now Oman and India respectively, long had an active maritime aspect.⁴⁷² Indeed, Sargon boasted of his power by proclaiming that he made ships of Magan and Meluhha, and Dilmun as well, tie up at his wharf:

Sargon, king of Kish, 34 Campaigns won, the walls he destroyed as far as the shore of the sea, the ships of Melukha, the ships of Magan, the ships of Dilmun, at the wharf before Agade he moored.⁴⁷³

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⁴⁷¹ Moorey, p. 351.


⁴⁷³ Barton, p. 109. See also ANET, p. 268.
Thus, by Sargon’s reign ships were sailing the Persian Gulf and Indian Ocean as far as the Indus Valley and probably had been doing so for some time.

Wood imported from Dilmun/Bahrain might have included Mangrove (Avicennia marina) or Acacia (Acacia spp). Bahrain Island, and its smaller neighbor Muharraq, once had extensive Mangrove areas, as did other areas around the gulf such as the United Arab Emirates where such groves still survive.\textsuperscript{474} Androthenes mentioned Bahrain ("Tylos" to the Greeks) as a source of a wood used for shipbuilding.\textsuperscript{475} Theophrastes described at some length the large trees in Bahrain that grew in the tidal zone.\textsuperscript{476} These trees and the wood harvested from them have been interpreted as mangrove.\textsuperscript{477} Others believe the wood source was acacia,\textsuperscript{478} which also once grew more

\textsuperscript{474} As witnessed by the author, October 1993.

\textsuperscript{475} Androthenes V, 4, 7, as quoted in H. Bretzl, Botanische forschungen des Alexanderzuges, von Hugo Bretzl, mit elf abbildungen und vier kartenskizzen; gedruckt mit unterstützen der Kgl. Gesellscahft der wissenschaften zu Göttingen (Leipzig, 1903), p. 132.


\textsuperscript{477} Bretzl, pp. 39 and 132.

\textsuperscript{478} Willcox, p. 5.
extensively in the islands but has been always scarce in the
greater region.\textsuperscript{479} Its range in Bahrain is now limited to
remote places (Figure 25).

Other woods possibly imported into Mesopotamia include
several species of Acacia, \textit{Dalbergis sissoo} from the Indus
and India,\textsuperscript{480} and from Magan/Oman/South Arabia \textit{Acacia} \textit{spp.},
\textit{Maerua crassifilia}, \textit{Prosopis cineraria}, \textit{Zizyphus spina-
christi}, \textit{Tamarix aphylla}, \textit{Juniperus polycarpos}, \textit{Olea sp.}, and
\textit{Teucella sp.}\textsuperscript{481}

While some of these woods may not be what we consider ideal
for boatbuilding, builders of the period may have utilized
anything they could within reason. A good example of this is
the first century A.C. boat from Lake Kinneret (the Sea of
Galilee), in which the builder used wood of various types
including sidder/jujube (\textit{Zizyphus spina-christi}), willow
(\textit{Salix}), redbud (\textit{Cercis siliquastrum}), and hawthorn

\textsuperscript{479} Theosphrastes, IV, 7, 1.

\textsuperscript{480} Willcox, p. 9.

\textsuperscript{481} Ibid., p. 10.
(Crataegus) along with the usual cedar and pine.\textsuperscript{482} The Zizyphus, a "very hard wood,"\textsuperscript{483} was used as the after part of the keel on the Kinneret boat. Willow, redbud, and hawthorn were used on the vessel for frames, and the willow was a particularly "readily available" wood found on the shores of the lake.\textsuperscript{484} Some of the wood was recycled material from at least one other vessel.\textsuperscript{485} Wood was, of course, reused in Mesopotamia to make up for any deficiencies in supply.\textsuperscript{486}

\textit{Zizyphus spina-christi} may be a more common wood on boats than expected. It was used for the tenons on the Khufu boat twenty-seven centuries before the Kinneret boat was built,\textsuperscript{487} as well as for tenons on the Mataria vessel.\textsuperscript{488} Thus, as one of the woods possibly being imported into Mesopotamia, its


\textsuperscript{483} Werker, p. 75.

\textsuperscript{484} Ibid., p. 75.

\textsuperscript{485} Steffy, p. 37.

\textsuperscript{486} Kramer, p. 103.

\textsuperscript{487} Werker, pp. 73 and 75.

\textsuperscript{488} Haldane, p. 244.
use as a ship building material must not be precluded. Also, the use of willow on the Kinneret boat recalls its use as one of the primary boat woods used in southern Iraq. 489

Plantings

Wood was grown in arboretums or plantations from Sumerian times: “Among the duties of Šamaš-hāzir was the supervision of a plantation with various types of trees.... trees were grown for their wood; in one text (TCL 11 159) a total of 590 beams was accounted for... 202 are listed under boards (giš mi-ri-za)...” 490 Much later, in the eleventh century B.C., Tiglath-Pileser I “reveals in his inscriptions a clearly utilitarian interest in establishing gardens outside his capital at Assur to cultivate foreign trees for timber and fruit.” 491 Assurnasirpal II, in the ninth century, “recorded the trees, seedlings, and plants which he... imported for planting in the irrigated gardens... in his new capital at Kalah (Nimrud).” 492

489 Cf. p. 169.

490 Van de Mieroop, p. 156.

491 Moorey, p. 349.

492 Ibid., p. 349.
Species

Over a dozen tree species have been attested archaeologically in Mesopotamia, including, ash, box, oak, mulberry, cedar, Zizyphus, palm, pine, willow, walnut, tamarisk, poplar, cypress, and fig. Unfortunately, species are not very well documented, and it is unclear which types of wood were used for specific purposes. Additionally, the wood type used to create an item is not often mentioned: "A chair will usually be referred to as a chair, not as a chair of poplar or cedar." Inconsistent nomenclature further confuses the issue. "A single species may have borne more than one name, either at different times and in different dialects, or in the same time and place," and texts concerning timber "hardly ever specify the type of tree from which the material derives." Also, scribes might have further confused the issue, as they would not have "recorded timber with quite the same precision that comes naturally to expert timber

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493 Potts, p. 107.


495 Postgate, p. 177.

merchants, foresters, or carpenters..." While we may not be able to ascertain all the details of wood exploitation and use, it is clear that ample wood supplies were available to the Mesopotamians from the wild, purposeful plantings, imports, as well as from reuse.

Wood Construction

Wooden artifacts from Mesopotamian sites preserve poorly. The little wood remaining from antiquity consists mostly of imprints, "ghosts," and charred remains, such as in the burned palaces at Mari, Uruk, Khorsabad, and Nimrud. In some cases, as, for example at Abu Salabikh, plasters and wasp nests can preserve the diameters of roofing beams, giving us details otherwise lost. An exception is the remains of a

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497 Moorey, p. 347.
499 Ibid., p. 347.
door from Nimrud constructed of cylinders of wood and ivory joined to wooden two-ply panels with mortises and tenons.\textsuperscript{501}

Other noteworthy exceptions come from the Royal Cemetery at Ur, where pit graves have yielded data on the woodworking techniques of the third millennium. These data derive from stains, impressions, and hollows, subsequently cast, of wooden and wood-framed coffins and wheeled vehicles interred in the graves.

Woolley found three kinds of coffins: mud, wickerwork overlying a wooden frame, and wood planked. There were two types of wood-planked coffins: one with planks fitted into slotted frames, such as in Pit Grave 389(PG/389); the other was a box in which the bottom "must be mortised into the sides" as in PG/381. On the wooden boxes, however, nothing of the construction could actually be seen.\textsuperscript{502} Wooden coffins had either a gabled roof or, more commonly, a flat lid in which planks of up to 40 cm. wide were fixed on a framework of battens. The width of these planks indicates fairly large


\textsuperscript{502} Ibid., p. 383.
trees were cut for this. Little metal was used in the construction of the coffins. Woolley supposes that with the "absence of metal nails" the planking was edge joined through a system of mortises, tenons, and "wooden studs"$^{503}$ although this method was not seen on anything but the cast of a wooden lyre.$^{504}$

Four-wheeled vehicles were also found in the graves. The wood of these chariots and wagons had vanished leaving only hollows and imprints to be cast with plaster. The wheels of the vehicles are the most pertinent. These, with diameters of 60 and 80 cm., were each comprised of three components with a tire of leather around the whole.$^{505}$ Wheel components appeared to be fastened together with cleats. While metal nails had fastened the wagon body to the axles, no metal held the wheels together, raising the possibility for the use of treenails. Woolley calls the wheels "good examples of the joiner's work,"$^{506}$ but the precise assembly method is unclear.

$^{503}$ Ibid., p. 137.

$^{504}$ Ibid., p. 383.

$^{505}$ Ibid., p. 64.

$^{506}$ Ibid., p. 383.
Models and Depictions

Boat models and depictions of vessels on seals and reliefs provide some evidence of wooden boat construction in Mesopotamia, despite few constructional details. Forms of boats are taken to represent wooden vessels based on comparisons with later Arab watercraft: "Several instances of correspondence between boat forms in ancient representations and modern examples of wooden craft can be adduced to suggest that the ancient forms may have been wooden craft."\textsuperscript{507}

Qualls, in her dissertation on Mesopotamian boats models, claims that many of these represent what she calls "frame boats," that is boats constructed on a wooden frame and covered with a skin or a layer of reeds.\textsuperscript{508} The quaffa, built like a basket and covered with skins in antiquity and with bitumen in the modern era, is the only known vessel type that comes close to Qualls' definition. The other vessels, represented by long boat-shapes, are most likely wooden vessels, a possibility Qualls admits: "Because the explanation of the representations as frame boats makes so


\textsuperscript{508} Ibid., p. 260.
many details in turn susceptible to explanation, I think of most of the boats represented in the Catalogue as frame boats. However, there is another possibility for some representations.\textsuperscript{509} By this, she means wooden boats, particularly those with high, vertical ends, as this is not a feature of "frame boats" but of wooden ones, like the *Tarada*\textsuperscript{510}.

Bitumen models, common in Sargonid age burials,\textsuperscript{511} found by Woolley at Ur in the pit graves of the Royal Cemetery give indications of wooden construction. Qualls, however, sees them as supporting her "frame boat" theory based on the construction of some of the larger models, two meters or more in length, on a framework of withies.\textsuperscript{512} This may indicate the models were a literal representation of a construction technique, such as that proposed by Vosmer for his Magan boat wherein a framework of reed bundles is first erected and a layer of a mixture of bitumen, oil, and lime is applied to

\footnotesize
\begin{itemize}
\item \textsuperscript{509} Ibid., p. 264.
\item \textsuperscript{510} Ibid.
\item \textsuperscript{511} Woolley, p. 145.
\item \textsuperscript{512} Qualls, p. 262.
\end{itemize}
the outside of the hull.\textsuperscript{513} Only the larger pit-grave models, however, had the withy framework; the smaller models did not. According to Woolley: "The smaller examples are made of a mixture of bitumen and earth and are roughly modelled by hand; the larger are modelled in the same material on a framework of withies...."\textsuperscript{514}

I propose the withy framework was included on the larger models not to represent a constructional technique but as the modeler's method of imparting strength to objects. The smaller models were stable enough without the withies, but the long ones without them would have distorted and broken during transport into the grave. It should not be supposed that these models were built to represent exact construction techniques; otherwise the silver model of a boat found in one of the graves could be proposed to represent a real boat made of silver.

What the models do represent, however, is the form of the boats and their pertinent features. Thus, the high ends of the bitumen and silver models (Figure 26), along with the

\textsuperscript{513} T. Vosmer, personal communication, Dec. 2002.

\textsuperscript{514} Woolley, p. 145.
thwarts/benches and punting poles, represent actual features seen on real boats of the time and that have continued in use in southern Iraq up to the present.515 One model, in PG/721, was

...unusually long, 2.45 m., with a width of 0.45 m. It had had three wooden seats whose position was clearly shown by the marks in the sides where the wood had been pressed into the still soft bitumen, and in front of the bow seat there was a ridge in the bottom of the boat which had all the appearance of a thwart.... Lines of white paint running longitudinally along the bottom of the craft imitated planking, and near the bows there were on the outside traces of red paint, but no recognizable design; there was red paint amidships, also on the outside of the bulwark. Against the side of the boat, much bent by the weight of the soil, were two long copper punt-poles, each 0.50 m. long...516

The lines of white paint inside the model indicate wooden construction, if not planking, then a ceiling. Whether the planking lines on the models are intended to represent sewn planks or the mortise-and-tenon joined ones as proposed by Casson,517 cannot be determined.

515 Ibid., and pls. 19b and 20a.
516 Ibid., p. 154.
517 SSAW, p. 27 and Qualls, p. 264.
Other clay models exist from various sites in Mesopotamia and the Persian Gulf. Most of these depict low, almost tub-like vessels.\(^{518}\) One from Eridu dating to the mid-fourth millennium is believed to represent a sailing boat,\(^{519}\) although some prefer to see the model as a spinning bowl.\(^{520}\) Other, less debatable models show evidence of thwarts,\(^{521}\) and what is perhaps a small deck at one end.\(^{522}\) Aside from sharing a parallel through features such as the small deck area in the prows of modern Arab watercraft, such as the jalbhut, ballam, and shewe, there is little to indicate wooden construction on any of these models.\(^{523}\) There are, however, two exceptions to this featurelessness: The boat models from Ischali, ancient Neribtum (Figure 27).

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\(^{518}\) For example, see the Babylonian boat models in De Graeve, pl. XLIV, nos. 96 and 97; and the model fragments from Bahrain in Højlund, p. 369.

\(^{519}\) Barnett, p. 221.


\(^{521}\) De Graeve, pl. XLIV, no. 98; pl. XLV, nos. 102, 103, 104.

\(^{522}\) Qualls, pp. 59–60, and p. 326, fig. 107.

\(^{523}\) For examples of these craft see Le Baron Bowen, 1949b, p. 103, fig. 8, p. 104, fig. 10, and p. 110, fig. 10.
Located on the Diyala plains not far from Baghdad, Ischali was established with the subjugation of the region by Sargon the Great and his successors. Under the administration of the city of Eshnunna, Ischali was but one of several cities in the region. A number of building inscriptions and archives dating to the Third Dynasty of Ur enlighten us to the active political and commercial life of the Diyala and its place in the Mesopotamian world.\footnote{R. McC. Adams, \textit{Land Behind Baghdad: A History of Settlement on the Diyala Plains} (Chicago, 1965), p. 46.} During excavations, several boat models were found dating to 2200 to 1800 B.C.\footnote{A. Göttlicher, \textit{Materialien Für ein Corpus der Schiffsmodelle im Altertum} (Mainz am Rhein, 1978), p. 29.} At least two of these models include details of the internal structure of boats unique in the corpus of archaeological material. The features are easily recognizable. Along the bottom of each fragment there is a central longitudinal feature representing a keel or keelson. Lying somewhat perpendicular to this are numerous lines in relief reaching from the longitudinal "keel" through a hard chine, and up towards the sheer. These timbers are all alike in their dimensions, and their spacing is more or less regular throughout the fragment. Clearly, this is a representation of the frames and keel, keelson, or similar longitudinal

timber. The second fragment exhibits the same features. There is no detail of planking on either model. The high end of the model, associated with the first fragment, provides an interpretation that similarly shaped models, while not displaying the same internal detail, may well represent wooden, or at least wooden framed, vessels.

One other object of note is a terracotta plaque found at Susa, now in the Louvre (Figure 28). Dating to 1900–1700 B.C.,526 and possibly found at Warka,527 the plaque depicts a carpenter adzing a curved timber. The timber rests on a block and is held in place by two bands. According to one interpretation, the man is fashioning a chair leg.528 Yet, unless the man is a dwarf, the chair for which the leg is intended would be huge. Also, the style of the leg is highly unusual as most chair legs in other illustrations are straight. This depiction, therefore, is better interpreted as the carving of a boat part, possibly a frame, intended for

526 Moorey, pl. 1b.


528 Moorey, p. 354.
a vessel with a hard chine, barring some unknown use in building or furniture construction. Such a frame would fit well in the construction of flat-bottomed boats such as that represented by the Ischali models. The scene is also comparable to a late second, or early third, century Roman relief depicting a shipwright carving a frame for a boat.\textsuperscript{529}

Neighboring Ischali is Khafajah where House D in the Temple Oval offers some circumstantial support for aspects of sewn, or wooden, construction.

A kiln for burning lime was found in the house.\textsuperscript{530} While that in itself is not indicative of boats, associated finds raise intriguing possibilities. In the neighboring Room II, there was a heap of mussel shells with a nearby pile of charred seeds from Crucifer (\textit{Brassica} or \textit{Sinapis}).\textsuperscript{531} The excavators speculated that the shells might have been part of a meal and

\textsuperscript{529} SSAW, fig. 163.


\textsuperscript{531} Ibid., p. 91.
the seeds for making oil for either cooking or lighting.\textsuperscript{532} In Room IX (K43:3), a pile of sea snail shells was found with a quantity of charred flax seeds close by, possibly suggestive of linen or oil production.\textsuperscript{533}

A mass of shells and a heap of seeds may be just that and nothing more. Yet, these two items are the ingredients for the paying layer on sewn hulls found throughout the record of sewn construction. Could the inhabitants have been manufacturing such a substance with the use of the kiln to burn the shells for their lime? This possibility is underscored by the connection of the house and its inhabitants with aquatic subsistence as indicated by the find of a fishing net in room L43:7.\textsuperscript{534} The net, although burned in the fire that destroyed the house, had ceramic weights and

\textsuperscript{532} Ibid.

\textsuperscript{533} Preusser, p. 98, and Delougaz, p. 54. Delougaz believes linen production more likely.

\textsuperscript{534} P. Delougaz, The Temple Oval at Khafajah (Chicago, 1940), p. 55.
the remains of a wooden float. If the excavators had been aware of the constructional methods of boats, would they have drawn the conclusion that the seeds and shells were related to the maintenance of watercraft?

Textual Evidence

Evidence of wooden boats and their components is scattered throughout the corpus of known texts. A detailed examination of the texts and associated boat-related terms is beyond the present work, and much of what has already been determined needs reinterpretation in the light of what is now known about ancient boat construction. Nevertheless, a general analysis of those texts believed related to the sewn technique reveals intriguing data.

Of the texts that appear to be associated with sewn boat construction, perhaps the best date from the Ur III period. These texts list vast quantities of rope for use in shipyards along with timbers, oil, bitumen and other materials for boat manufacture. One text (UET V 468) records the employment of

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535 Preusser, p. 92, fig. 41 and p. 93, fig. 42.
186 laborers in one shipyard for rope manufacture. Another, CT 7, lists

178 big date-palms
1400 big pines
36 big tamarisks
32 big še-hi trees
10 tamarisks of 3 cubits each
276 talents palm fiber ropes
34 talents palm-leaf ropes
418 talents of rushes
207 talents of fish-oil
300... 
4260 bundles of ...-reeds
12,384 bundles of dried reeds
3170 gur of purified bitumen
for caulking Magan boats.\textsuperscript{536}

The 276 talents (8.28 tons) of palm-fiber rope, the 34 talents (1.02 tons) of palm-leaf rope, and the 207 talents of fish oil are reminiscent of the sewing technique with its reliance on waterproofing through oiling. Potts, however, speculates this “probably represent(s) an anti-fouling agent used on the rope as opposed to the hull.”\textsuperscript{537} There is no means to be certain.


\textsuperscript{537} Potts, p. 127.
While reed boats needed large amounts of ropes, as does any sailing ship sewn or not, the texts raise the possibility of sewn boat construction as one is reminded of the 400 miles of cordage used to fasten the planking and framework of the Sohar. As Potts states:

The tons of palm-fibre rope called for in this text suggest that some of the watercraft of the Ur III period must have been sewn or stitched vessels, a possibility to which scant attention has ever been paid in the literature on Mesopotamian watercraft.\textsuperscript{538}

Treenails also appear in cuneiform texts relating to boats and boatyards. For example, a text (JMEOS 12 [1926] 37 3471) concerning the Ur-III-period boatyards at Umma lists the receipt of 59,290 treenails (\textit{g}\textit{il} \textit{gag}) of manu-wood along with 810 boat “ribs” (\textit{g}\textit{il} \textit{umbin má}).\textsuperscript{539} Manu-wood is usually associated with sticks and bundles of such. Identifications include laurel, dogwood, ash, and willow.\textsuperscript{540} Whether these are for fastening timbers or for plugging the stitching holes of sewn craft is unknown, but the association with the need

\textsuperscript{538} Potts, p. 126.

\textsuperscript{539} Steinkeller, p. 112, s.v. 47.

\textsuperscript{540} Steinkeller, pp. 91-2.
for numerous treenails in sewn-boat construction should not be ignored.

Summary

Ample supplies of wood were available for boat construction. The language and texts indicate wooden construction, as do models from Mesopotamia and the Gulf, and the Old Babylonian plaque from Susa I believe most likely depicts the fashioning of a boat timber. Manufacturing capabilities include those necessary for sewn boats. The finds at Khafajah's House D indicate that the production of oil and lime paying was at least possible. While there is little solid evidence in the textual or archaeological record of sewn-boat construction in Mesopotamia, there is enough to support the hypothesis. There is certainly nothing to preclude its existence or to invalidate the interpretation of Utnapishtim's craft as a sewn boat.
CHAPTER V

SUMMARY AND CONCLUSIONS

Two thousand years of evidence of sewn boats on the Indian Ocean and its tributaries have yielded constructional aspects that are mostly unchanging. In the absence of factors to propel evolution in types and methods, the sewn watercraft plying the waters at the beginning of the twenty-first century are not appreciably different from those of antiquity. This determination aids in the translation of the Gilgamesh text.

Examination of the boat-building sequence in Tablet XI has yielded a portrait of a sewn boat and its construction process. In summary, there are six indications of this method of boatbuilding:

1. The water-stoppers: This feature is the strongest indicator of sewn construction in the sequence. The stoppers are unique to this technique and, excepting some boatbuilding method yet unknown, are highly indicative that the text describes a sewn boat.

2. The oiling: While religious libations of oil are not unknown, the quantity and context of this action in a
boat-construction sequence indicates the oil had a practical purpose. In the sewn-boat technique, the oil is used for saturating and preserving stitching and lashings.

3. The ointment: The occurrence in the context of boatbuilding argues that this is also part of the construction. As the traditional method of sealing sewn boats is with a semi-viscous substance, the sewn technique is again indicated. The combination of the process with festivities of varying degrees is attested to ethnographically and further underscores the interpretation of the piššāti as a paying for hull preservation.

4. The inclusion of the reed worker and the carpenter: A reed boat may not necessarily need a carpenter, but a sewn wooden boat would need a reed worker to create the wadding, if not the twine. The other types of ancient construction, the mortise-and-tenon system and the Egyptian techniques, are not known to have utilized reeds.

5. The sequence of the aspects of sikkātu, šamnu, and piššāti appear in the proper order in Gilgamesh for the construction of a sewn boat of the western Indian Ocean.

6. The text also indicated shell-first construction. The sequence related that the shell, or hull, was constructed
first, and then the interior was crafted, as illustrated by the creation of levels and divisions. This is indicative of the construction of a traditional vessel built shell first, as were sewn boats.

Also addressed was the shape of Utnapishtim's vessel. The cubic form espoused by some scholars was demonstrated to lack foundation; rather Utnapishtim built a craft of sound proportions. The textual elements purported to support a cube are either unattested, or translatable to yield a boat of normal shape. If the vessel were intended to be purely mythical, to astound the audience, the long presentation of construction, from the laying out of the design to the sealing of the hull with paying, would have been unnecessary. The combination of the specific references to constructional features served to create images in the audience's mind of an actual and familiar boat type.

The idea of Utnapishtim's boat being reed-built has also been challenged. Previously, circular reasoning and unawareness of ethnographic material combined to produce the notion of a reed-built craft. The evidence of shell-first sewn construction demonstrates the vessel was of wood, not reed.
Past translations and interpretations did not present a clear explanation of what transpired in the sequence. None presented a cohesive, realistic account of a boat, only unusual methods of construction with added rationalizing elements.

The explanation presented here yields a concise and progressive description of a boat from its initial concept, to its design and construction, to its sealing and preservation, and finally to its launching as a finished vessel. This construction is in keeping with the method of sewn-boat building along the Indian Ocean littoral as has been recorded for two thousand years.

With my translation and analysis, the history of sewn-boat construction can now be pushed beyond the limits of the *Periplus Maris Erythraei* to at least the seventh century B.C., when the copies in our possession of the standard version of the Gilgamesh epic were made. Indeed, if Sin-lige-unninni gave the epic its final, or even near-final form, the known record of sewn boats can be extended to his
lifetime, sometime in the thirteenth to eleventh centuries before Christ.\textsuperscript{541}

This interpretation is pertinent to continuing studies of Mesopotamian seafaring, as it gives scholars a new prism through which to view the texts and iconography of the civilizations at the core of world culture. Archaeological finds of material in years past can be re-examined and newly interpreted. The interpretation of models and boats on seals as wooden, and as sewn, is now strengthened. Texts suggested to be possibly indicative of sewn-boat construction reaching back into the third millennium can now open to clearer decipherment.

\textsuperscript{541} George, pp. xxiv-xxv.
ABBREVIATIONS

Tablet Signatures


CBS  Catalog of the Babylonian Section, University Museum, Philadelphia.

CT  Cuneiform Texts from Babylonian Tablets in the British Museum.

DT  Daily Telegraph.

UET  Ur Excavations, Texts.

Publications


BAR  British Archaeological Reports.

CAD  *Assyrian Dictionary of the Oriental Institute of the University of Chicago* (Chicago, 1956).


CSMS  *Bulletin of The Canadian Society for Mesopotamian Studies.*


Gilg.  Gilgamesh.
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<thead>
<tr>
<th>Author/Reference</th>
<th>Description</th>
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<tr>
<td>IJNA</td>
<td><em>International Journal of Nautical Archaeology</em>.</td>
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<td>INAQ</td>
<td><em>INA Quarterly</em>.</td>
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<tr>
<td>JEA</td>
<td><em>Journal of Egyptian Archaeology</em>.</td>
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<tr>
<td>JMEOS</td>
<td><em>Journal of the Manchester Egyptian and Oriental Society</em>.</td>
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<tr>
<td>JRAS</td>
<td><em>Journal of the Royal Asiatic Society</em>.</td>
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<td>JRGS</td>
<td><em>Journal of the Royal Geographic Society</em>.</td>
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<td>MM</td>
<td><em>The Mariner’s Mirror</em>.</td>
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<td>PME</td>
<td><em>Periplus Maris Erythraei</em>.</td>
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TTM  *Trees and Timber in Mesopotamia. Bulletin on Sumerian Agriculture VI.*

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Figure 1. Map of the Indian Ocean. Drawing by author.
Figure 2. Mid-third-millennium boat graffito from Tell 'Atij, Syria. After Fortin, p. 48, fig. 19.
Figure 3. Map of Mesopotamia. Drawing by author.
Figure 4. A method of the criss-cross pattern. After Kentley, fig. 19.7, p. 310.
Figure 5. A sewn boat on a Yemeni beach. Note the three stitches on the exterior of the hull and the wadding held onto the hoisting ends by the criss-cross stitching. After Roberts, p. 124.
Figure 6. The interior of a derelict sanbuk in Dhofar, Oman. After Agius, pl. IX.
Figure 7. A map of northern Bahrain. Drawing by author.
Figure 8. External molds nailed to keel and sternpost of a boat under construction in Bahrain, 1993. Photograph by author.
Figure 9. A view inside the hull in figure 8. Note the large compound mold reaching to the height of the sheerstrake. Note also the numerous short molds along the outer hull. View towards the bow. Photograph by author.
Figure 10. A zaruk off Massawa, Eritrea in the mid-twentieth century. After WT, fig. 49.
Figure 11. A mtepe. After M. Horton, "The Swahili Corridor."
Figure 12. A depiction of a thirteenth-century ship. The vessel, probably a boom, has pairs of stitches appearing outside the hull and on the rudder. After Le Baron Bowen, 1952, fig. 12.
Figure 13. The second "boom" by al-Hariri with cross-cross stitching on the hull and rudder. After F. Moll, Das Schiff in der Bildenden Kunst (Berlin, 1929), taf. A/III.1
Figure 14. Criss-cross stitching over one thousand years. 
Figure 15. A boat from the Stupa of Sanchi. After Rao, p. 104, fig. 4.
Figure 16. Detail of the lashing technique on the Khufu boat. After Lipke, p. 75, fig. 48.
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Figure 21. Boats depicted on Dilmun seals. Number 351, top; number 264, bottom. After Kjærum, pp. 143 and 113.
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Figure 23. A large boom being repayed in Mombasa, Kenya in the 1970s. Photograph courtesy of Robin C.M. Percy, The Mombasa Wreck Excavation: The Santo Antonio de Tanna, Institute of Nautical Archaeology.
Figure 24. A paying of shahamu. The lime and oil mixture is applied by hand, as seen in this depiction of the process in Mombasa in the 1960s. After Jewell, p. 15.
Figure 25. The "Tree of Life" near the center of Bahrain Island. An acacia of unknown age, it is indicative of the trees that were once more widespread in the region. This tree survives by tapping an unknown water source. Local legend says it stood at the center of the Garden of Eden. Photograph by author.
Figure 26. Boat models from the graves at Ur. Top: the 2.45 m. long bitumen model from PG/721. The lines in the bottom indicate either planking or a ceiling. Bottom: A model of silver, 60 cm long. After Wooley, pls. 20a and 169 a.
Figure 27. A boat model fragment from Ischali. After Gottlicher, pl. 7, fig. 94.
Figure 28. Frame carving. Top left: Babylonian terracotta plaque with a carpentry scene. After Barrelet, pl. LXXVI, fig. 779. Top right: Roman relief of the second of third centuries depicting the adzing of a frame for a boat. After SSAW, fig. 163. A: Folding chair, and B: Chair, reliefs from Tel Asmar, early second millennium. After Barrelet, pl. LXXV, figs. 775, 776. C: Chair of the scribe Dudu, statue from Girsu (?), 2400 B.C. After P. Amiet, Art of the Ancient Near East (New York, 1980). D: Seat depicted on a cylinder seal, Ur, c. 2500 B.C. After Amiet, fig. 757. E: Chair on a cult basin, Ebla, c. 1900 B.C. After Amiet, fig. 448.
LETTER OF PERMISSION

12/27/2002

Hi Robin,

I hope all is well. I am doing fine and getting the dissertation done for graduation next semester, inshallah.

I would like to use one of the Mombasa pictures in my dissertation. Normally, as archivist, I am the one to ask about these things, but in this case I would have to ask myself and then give myself permission. As that is a bit weird, I will have to ask you as project director.

So: I would like your permission to use the attached photograph of a boat on the beach being re-payed. Credit would of course be to your project (and the photographer if you know who took it).

Thanks!

Ralph

Ralph K. Pedersen, MA, ABD
INA Archivist/Webmaster
INA Research Associate
& Project Director
rkpedersen@tamu.edu

http://ina.tamu.edu
phone: 979.847.9259
fax: 979.847.9260
mail: INA Archives/Web Services
P.O. Drawer HG
College Station, TX 77841.5137

Hello there and a happy xmas!
In case I did not reply to this earlier as I'm traveling at the moment please feel free to use the picture. Unfortunately I'm not sure who took the picture so a credit to the project would be fine. Maybe in the future we shall be able to have the credits organised but at present that is rather lower priority!

Best wishes.

ROBIN
VITA

Ralph Kenneth Pedersen
84 Barrister Road
Levittown, Long Island, NY 11756 USA
rkpedersen@yahoo.com

Education:

Bachelor of Arts, with Honors. Major, Anthropology; minor, Linguistics. 1984, State University of New York at Stony Brook.

