HOMERIC SEAFARING

A Dissertation

by

SAMUEL EUGENE MARK

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 2000

Major Subject: Anthropology

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Approved as to style and content by:

George F. Bass
(Chair of Committee)

Shelley Wachsmann
(Member)

Thomas A. Green
(Member)

Steven M. Oberhelman
(Member)

David L. Carlson
(Head of Department)

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ABSTRACT

Homeric Seafaring. (May 2000)

Samuel EuGene Mark, B.A.; B.S., Ball State University;

M.A., Texas A&M University

Chair of Advisory Committee: Dr. George F. Bass

Scholars have written hundreds of books and articles on various aspects of Homer's epics. A list of such publications gives an impression that every imaginable aspect of these poems has been explored in depth. Curiously, Homeric seafaring has not received the same attention as other Homeric topics. It is relatively easy to find articles that do review or discuss limited aspects of Homeric seafaring or, at most, a few books that attempt to cover this topic in a chapter or two. Most information is therefore scattered among various publications making it difficult to study Homeric seafaring as a coherent subject. My goals in writing this work are to try to draw together the pertinent sources into one volume making them more accessible to those interested in this subject. Furthermore, by consolidating the various aspects of seafaring in one work, we may be able to see various currents and eddies that would normally escape us.

DEDICATION

To my parents.

ACKNOWLEDGMENTS

I am indebted to George F. Bass. Thomas A. Green. Steven M. Oberhelman. and Shelley Wachsmann for taking the time to carefully read and comment on this manuscript.

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CHAPTER I

INTRODUCTION

Few works of art have touched men as deeply and inspired western literature as have the *Iliad* and the *Odyssey* of Homer. As a result, scholars have written virtually hundreds of books and articles on various aspects of both epics. A list of such publications gives an impression that every imaginable aspect of these poems has been explored in depth. Curiously, Homeric seafaring has not received the same attention as other Homeric topics. It is relatively easy to find articles that do review or discuss limited aspects of Homeric seafaring or, at most, a few books that attempt to cover this topic in a chapter or two. Most information is therefore scattered among various publications making it difficult to study Homeric seafaring as a coherent subject. My goals in writing this work are to try to draw together the pertinent sources into one volume making them more accessible to those interested in this subject. Furthermore, by consolidating the various aspects of seafaring in one work, we may be able to see various currents and eddies that would normally escape us.

To properly evaluate Homeric seafaring it is necessary to place it within the proper cultural context. My study therefore begins with a short review of the different periods that the *Iliad* and the *Odyssey* are thought to describe.

This dissertation follows the format of the *American Journal of Archaeology*.

CHAPTER II

THE CULTURAL CONTEXT OF THE *ILIAD* AND THE *ODYSSEY*

The *Iliad* and *Odyssey* describe life in Greece in a detail that is not seen again until the Classical period. To the archaeologist and historian, this is both a blessing and a curse. The blessing is obvious to all; the curse is our inability to define what period is best represented by these two epics. This curse is illustrated by the divergent opinions held by Homeric scholars as to which period the Homeric epics most faithfully reflect. It is difficult to discern whether the poetic tradition, which forms the basis of these epics, extends back to the Bronze Age, and preserves much of Mycenaean culture, or whether Homer fashions both works to represent his own time. Most scholars do seem to agree that Homer has taken ancient songs and stories of heroes and created two epics that portray different aspects of life from different periods. If this is true, we must try to separate each item of this amalgam and place it in its correct cultural context. We can, of course, finesse this problem by proposing that the *Iliad* and the *Odyssey* portray an "Heroic Age," but, by doing so, much of the historic value is lost. Defining the period or periods represented in both works is in fact the most difficult part of this study. This is such a contentious and complex subject that a thorough review requires a separate dissertation. In this chapter, therefore, I will only describe the available evidence, the drawbacks to such evidence, and how it influences the structure of this study.

One of the methods Homeric scholars use to place the *Iliad* and the *Odyssey* in a specific period is to list artifacts, social practices, people, and places that are known to exist *only* in one period. In regard to artifacts, the boar's tusk helmet, greaves, and Ajax's "tower" shield are commonly cited as objects existing only in the Bronze Age.[1] Such arguments appear convincing, but they have been challenged.[2] One of the main drawbacks to relying on such evidence is addressed by A. M. Snodgrass. He points out that any inferences we might make about the Dark Age is open to argument due to the paucity of archaeological and representational evidence. Furthermore, he states that "we do not know, and may never know, how far backwards in time we may extend this eighth-century picture, nor how far forwards that of the late Mycenaean period."[3] His point of view is supported by a review of the literature on the boar's tusk helmet. This type of helmet is one of the few items that most scholars agree represents only

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[1] D. Page, *History and the Homeric Iliad* (Los Angeles 1963) 218–19 [helmet], 233 [shield], 245 [greeves]; M.P. Nilsson, *Homer and Mycenae* (New York 1968) 138 [helmet], 142–50 [shield]; J.V. Luce, *Homer and the Heroic Age* (New York 1975) 102–06 [all].

[2] J.D. Muhly, "Homer and the Phoenicians," *Berytus* 19 (1970) 19–64; M.I. Finley, *The World of Odysseus* (New York 1978) 45.

[3] A.M. Snodgrass, *Arms and Armour of the Greeks* (Ithaca, New York 1967) 35, 47.

the Mycenaean period.[4] H. L. Lorimer asserts that the boar's tusk helmet did not survive into the Late Helladic IIIC period. She declares that "the final state of LH III was a period of impoverishment and degeneration in which neither the thirty or forty pairs of tusks required for such a helmet...nor the skill necessary to produce it were likely to be forthcoming."[5] Yet, shortly after this statement was made, the remains of a boar's tusk helmet was recovered from a grave in Kallithea dating to the LH IIIC period (1200–1100 B.C.).[6] More recently, Hector Catling dates the remains of another helmet from Crete to about 1050 B.C.[7] According to J. K. Anderson, these later finds raise the possibility that such a helmet could have survived to the eighth century as an heirloom.[8] If nothing else, these new discoveries do leave in doubt any definitive dating for this type of helmet.

As previously stated, our task of securely dating artifacts in the *Iliad* and the *Odyssey* is impeded by a lack of archaeological evidence from the Iron Age. This is because most of the artifacts discussed are made from perishable materials. Metals corrode, or are recycled, and fabrics rot, and neither usually survives under normal circumstances. This situation is exacerbated by the partial replacement of inhumation with cremation by the Iron Age. Furthermore, Bronze Age sites are far richer in archaeological material than Iron Age sites, but even so, most of the "Mycenaean" items mentioned in the epics are rarely recovered from Bronze Age sites. Since we lack a representative sample of these artifacts, even from Bronze Age sites, we are therefore basing our arguments on negative evidence. This is, at best, a dubious methodology. Moreover, we are hindered by a lack of representations from the Iron Age. Much of what we know of Homeric parallels for the Bronze Age are based on artistic representations. Representations are more common by the Geometric period, but these are silhouette paintings lacking the detail necessary to discern a warrior's accouterments. Unfortunately, what little information we can glean from Iron Age art is disputed. Both Georg Lippold and Gerard Else claim that body shields are represented on Geometric pottery, but Martin Nilsson denies their existence.[9]

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[4] Finley (supra n. 2) 29.

[5] H.L. Lorimer, *Homer and the Monuments* (London 1950) 213–14.

[6] Snodgrass (supra n. 3) 32.

[7] H. Catling, "Heroes Returned? Subminoan Burials from Crete," in J.B. Carter and S.P. Morris, eds., *The Ages of Homer: A Tribute to Emily Townsend Vermeule* (Austin, Texas 1995) 123, 125.

[8] J.K. Anderson, "Wars and Military Science: Greece," in M. Grant and R. Kitzinger, eds., *Civilization of the Ancient Mediterranean: Greece and Rome* I (New York 1988) 681.

[9] See respectively, G. Lippold, "Griechische Schilde," in *Münchener archäologische Studien dem Andenken A. Furtwänglers gewidmet* (Munich 1909) 417–18; G.E. Else, "Homer and the Homeric Problem," in D.W. Bradeen, C.G. Boulter, A. Cameron, J.L. Caskey, P. Topping, C.R. Trahman, and J.M. Vail, eds., *Lectures in Memory of Louise Taft Semple* (Princeton 1967) 326; Nilsson (supra n. 1) 145–46.

Even the more detailed representations from the Bronze Age are not conclusive, and much of what we know of boar's tusk helmets are based on such representations. Snodgrass maintains that later Mycenaean depictions thought to portray such helmets actually portray "built-up" helmets. "Built-up" helmets are designed on the pattern of a boar's tusk helmet but are made from different materials, possibly strips of leather.[10] Finally, Nilsson raises a curious literary point concerning the antiquity of some artifacts. Some "Mycenaean" elements in the *Iliad*, like Hector's body shield and the boar's tusk helmet, are commonly placed in the latest "strata of the poems."[11]

The use of social practices, like artifacts, are poor indicators to define the age of Homer's works. Cremation is a common social practice mentioned in both works and is associated with the Iron Age.[12] Lorimer agrees with this view, but qualifies it by raising the possibility that Mycenaean warriors may have adopted the practice of cremation from the Trojans during the siege of Troy. She points out that cremation was the standard burial practice at Troy as early as level VI (ca. 1300 B.C.), and the Achaeans may have found this practice to be more suitable during a protracted siege far from home. Cremation may therefore be a Mycenaean custom used only while at war on foreign soil.[13]

Like cremations, Homer's descriptions of Phoenicians sailing and trading throughout the Aegean have been thought of as a late addition to both epics, and are most commonly associated with the eighth century B.C.[14] Unfortunately, conclusions based on this evidence may be flawed. Rhys Carpenter claims that Phoenicians best represent a period between the latter years of the eighth century B.C. and earlier years of the seventh century B.C.[15] Yet, again, others have proposed different dates. W. F. Albright proposes a date of about 950 B.C., and J. D. Muhly proposes that Homer's Phoenicians reflect a span of time from 1000 to 700 B.C.,[16] while Frank Stubbings believes the Phoenicians are representative of the Mycenaean Age.[17] George Bass supports Stubbings by arguing cogently that recent archaeological discoveries on land

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[10] Snodgrass (supra n. 3) 26.

[11] Nilsson (supra n. 1) 159.

[12] Nilsson (supra n. 1) 153–54; Muhly (supra n. 2) 52; Finley (supra n. 2) 45.

[13] Lorimer (supra n. 5) 103–10; see also, Luce (supra n. 1) 95.

[14] Lorimer (supra n. 5) 67; Nilsson (supra n. 1) 135–36; Luce (supra n. 1) 68; Finley (supra n. 2) 158.

[15] R. Carpenter, "Phoenicians in the West," *AJA* 62 (1958) 35.

[16] See respectviely, W.F. Albright, "Some Oriental Glosses on the Homeric Problem," *AJA* 54 (1950) 173; Muhly (supra n. 2) 63–64.

[17] A.J.B. Wace and F.H. Stubbings, *A Companion to Homer* (New York 1962) 542–43.

and under the sea indicate that Syro-Canaanites or early Phoenicians were sailing and trading in Greek waters as early as Mycenaean times. In addition, these discoveries have provided evidence for earlier dating of some items, such as dyptichs, that were once thought to be anachronisms in a Bronze Age society.[18]

A similar pattern, not too surprisingly, is seen in regard to the Catalogue of Ships. According to Denys Page, this catalogue was originally "a list of contingents assembling for an expedition overseas," and, for the most part, is an inheritance from the Mycenaean period.[19] R. Hope Simpson and J. F. Lazenby have undertaken the most meticulous study of this catalogue. They conclude that the Catalogue of Ships embodies a number of smaller catalogues that do seem to reflect the Mycenaean period.[20] Both arguments are based on the premise that many of the sites in this catalogue were abandoned at the end of the Bronze Age and could not be identified by historic Greeks. Anderson challenges this premise by arguing that although many sites were abandoned at the end of the Bronze Age, in most cases, it is only conjecture that they bore the same names as those that appear in the Catalogue of Ships. Furthermore, he points out that just because a site is abandoned does not mean it disappears. Local stories and traditions were probably attributed to nearby ruins. If the Catalogue of Ships was a compilation of local stories by a traveling poet, then the mention of such sites would be "real" but would not represent an historic document. Anderson, therefore, proposes that a late-eighth-century Boiotian poet traveled throughout Greece, collected stories of ruins, and then fashioned the Catalogue of Ships based on his travels.[21] This argument does not appear too unlikely when we consider that a number of scholars date this catalogue to the seventh century B.C.[22] Finally, Albert Bates Lord, after a detailed study of catalogues in modern epics, asserts that no evidence exists to suggest that such catalogues are historic documents. He agrees with Page that the Catalogue of Ships is evidence of a war that took place at some time in the past, but to say more overstates the

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[18] G.F. Bass, "Beneath the Wine Dark Sea: Nautical Archaeology and the Phoenicians of the *Odyssey*," in J.E. Coleman and C.A. Walz, eds., *Greeks and Barbarians: Essays on the Interactions between Greeks and Non-Greeks in Antiquity and the Consequences for Eurocentrism* (Bethesda, Maryland 1997) 71–101.

[19] Page (supra n. 1) 134, 137.

[20] R. Hope Simpson and J.F. Lazenby, *The Catalogue of the Ships in Homer's Iliad* (Oxford 1970) 166–67.

[21] J.K. Anderson, "The Geometric Catalogue of Ships," in J.B. Carter and S.P. Morris, eds., *The Ages of Homer: A Tribute to Emily Townsend Vermeule* (Austin, Texas 1995) 184–88.

[22] A. Giovannini, *Étude historique sur les origines du Catalogue des Vaisseaux* (Bern 1969) 7–42, 50; C. Habicht, *Pausanius' Guide to Ancient Greece* (Los Angeles 1985) 35; W. Kullman, "Festgehaltene Kenntnisse im Schiffskatalog und im Troerkatalog der *Ilias*," in W. Kullman and J. Althoff, eds., *Vermittlung und Tradierung von Wissen in der griechischen Kultur* (Tübingen 1993) 133–36.

evidence.[23]

The above arguments are frustrating for a number of reasons. In regard to artifacts, it is impossible to make definitive statements about how long an object was in use when we lack a representative sample of an object for the periods being studied. Homer, himself, exacerbates this problem because he is creating poetry, not a detailed study of artifacts, social practices, and geography.[24] Furthermore, he infuses much of his work with rather mundane aspects of life, aspects that transcend the centuries. Finally, Homer is creating an heroic world that, for the most part, never really existed. Under these circumstances both epics are vague in regard to specific details and cultural context. To add further confusion, we tend to underestimate the influence of Homer's works.

The *Iliad* and the *Odyssey* can easily become a siren's song to an archaeologist or historian. As seen above, it is easy to interpret the archaeological evidence to fit a preconceived view of the epics, instead of using the archaeological evidence to clarify them. The dating of level VIIa at Troy is such an example. Carl Blegen assigned a period of only thirty-five years to this level because otherwise it would end after the destruction of "Nestor's Palace" at Pylos; he makes the evidence fit the chronology of Homer.[25] If such a skilled and conscientious archaeologist can fall prey to Homer's siren song, then we all can.

Using only archaeological evidence to date Homer's works has many pitfalls. A more objective method may be to study the medium Homer uses to create the *Iliad* and the *Odyssey*. The prevailing view is that Homer was an oral-traditional poet. This view is based mainly on the works of Milman Parry and Albert Bates Lord who developed the oral-formulaic theory. The essence of this theory is that an oral-traditional epic is distinguished most readily by its repeated phrases and lines, or formulae, and by its repeated incidents and descriptions, or themes. Parry and Lord emphasize that such poets do not memorize songs but create a new song during each performance. A singer is able to create long epics without memorization by using formulae and themes. Formulae are groups of words that are repeatedly used in the same metrical contexts to express an idea and allow a singer to rapidly construct lines of poetry during a performance. A singer will have only one metrically-equivalent formula to express an idea, and by doing so, a singer is considered "thrifty" or "economic."[26]

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[23] A.B. Lord, "Homer, the Trojan War, and History," *Journal of the Folklore Institute* 8 (1971) 85–91.

[24] For further examples see, B. Powell, *Homer and the Origin of the Greek Alaphabet* (New York 1991) 191–206.

[25] S. Hood, "The Bronze Age Context of Homer," in J.B. Carter and S.P. Morris, eds., *The Ages of Homer: A Tribute to Emily Townsend Vermeule* (Austin, Texas 1995) 30.

[26] A.B. Lord, "The Poetics of Oral Creation," in W.P. Friederich, ed., *Comparative Literature: Proceedings of the Second Congress of the International Comparative Literature Association* (Chapel Hill 1959) 1; A.B. Lord, *The Singer of Tales* (Cambridge 1960) 30–67.

Themes are groups of ideas that are repeatedly used in a formulaic style. These groups of ideas are, in effect, compartmentalized to allow a singer to change the length of a song to fit different occasions or the mood of an audience without significantly changing a story. Themes allow a singer to perform a song by learning a basic story, the names of heroes, and places. A singer uses this device to compose songs in much the same way as he uses formulae.[27]

According to Parry and Lord, an oral singer can use both elements to construct long and complex songs like the *Iliad* and the *Odyssey* without the aid of writing. They continue by pointing out that Homer's works have all the typical elements of orally-composed poetry.

This theory, at first, met strong resistence, most coming from classicists. Some classical scholars charge that it removes the creative poet from the *Iliad* and the *Odyssey*. This criticism is called Parry's paradox, and it is based upon a quote of his that states: "at no time is he seeking words for an idea which has never before found expression." This implies that an oral singer is bound by formulae and themes, and he is not permitted to deviate from them. Lord responds by showing that formulae and themes are neither ossified nor sacrosanct. The stability of these tools comes from their utility, not from a feeling on the part of a singer that they cannot or must not be changed. Lord's field work shows that considerable formulaic deviation exists. Each singer has a core of formulae on which he bases his style, and these formulae seldom change. A singer can, however, modify them to create others. It is a singer's ability to create and utilize formulae and themes that separates a good singer from a great singer. Lord maintains that the oral-formulaic technique evolved to serve singers not to enslave them.[28]

Another criticism directed against the oral-formulaic theory is that it does not explain the difference in quality between the Homeric poems and oral epics. Lord countered by arguing that the culture that produced the Homeric poems is "richer" than any of the cultures that produce oral epics today.[29] Yet, there is a major flaw in his reasoning.

According to Lord, some terms like "authentic" must be abandoned because they represent an attitude that is neither scholarly nor critical. He asserts that "any term that is used to designate oral narrative poetry in an attempt to distinguish it from written poetry must contain some indication of the difference in form."[30] Using such terms as "quality" and "richness" violates his own dictum. When we are evaluating and trying to understand the poetry of a different culture, these terms have no meaning. What we should

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[27] Lord (supra n. 26) 68–98. This and all succeeding "supra n. 26" citations refer to the 1960 publication.

[28] A.B. Lord, "Homer's Originality: Oral Dictated Texts," *TAPA* 84 (1953) 126.

[29] A.B. Lord, "Homer, Parry, and Huso," *AJA* 52 (1948) 42.

[30] Lord (supra n. 26) 7.

be asking is whether any specific differences exist between different types of poetry and why.

The most thorough study of this problem has been done by Ruth Finnegan. She has cited numerous examples of oral-traditional poetry to show its diversity of construction. At one end of the spectrum is South-Slavic poetry studied by Parry and Lord. This is one of the purest examples of oral-formulaic poetry, but Finnegan points out that Parry and Lord fail to mention the importance of memorization in this genre. Although a singer does create formulae and themes, he must memorize a large number of these building blocks to create his epic poem.[31] At the other end of the spectrum, Finnegan describes how an Eskimo goes off by himself to meticulously construct a song. He will take great pains in putting the words together so there is a melody in them and, at the same time, they are pertinent in expression. This is a process that can last for days. Once a song is completed, it is memorized and sung as it was originally created. Though spontaneous composition is known, it is rare.[32] A similar type of oral poetry is found among the Ila and Tonga women of Zambia in West Africa, and the men of the Gilbert Islands of the South Pacific. The men of the Gilbert Islands diverge somewhat from the previously mentioned peoples. When a singer has finished his song, he calls all his friends together and recites it. His friends then analyze and critique it, sometimes spending all day with him. Finally, they leave him alone to ponder their advice and complete his song.[33] Another variation of oral creation is found in Hawaii. A group proposes a theme for longer and more important songs. Once a theme is accepted, each member proposes a line or a single composer presents his song, line by line, to the group. The song is then offered for criticism, and, once it is deemed perfect, it is memorized by the group, thus insuring against its loss.[34] These are only a few of the examples cited by Finnegan. She clearly shows that oral-traditional poetry can be created and expressed in many different ways and can vary from spontaneous to meticulously-crafted memorized poems. Of course, the poetic examples cited by Finnegan are much shorter than the epics of Homer or the Slavic epics cited by Lord.

Some of Lord's observations do support Finnegan's views. His field work shows that the shorter a song the more stable it is. A short song that is sung often will become so stable that it will not change from one performance to the next.[35] Length seems to be an important factor in the stability of oral poetry.

The works of Parry and Lord survived this initial criticism, and most Homeric scholars now accept the

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[31] R. Finnegan, *Oral Poetry* (Cambridge 1977) 58–73.

[32] Finnegan (supra n. 31) 81-82.

[33] Finnegan (supra n. 31) 82-83.

[34] Finnegan (supra n. 31) 85; for other examples see, J. Vansina, *Oral Tradition as History* (Madison, Wisconsin 1985) 12.

[35] Lord (supra n. 26) 100.

idea of Homer as an illiterate bard who created his epics using oral-formulaic techniques. Yet, a closer examination of the *Iliad* and the *Odyssey* suggests it is premature to accept this image.

According to Lord, when oral-formulaic singers learn to read and write they will break the formulaic patterns in which they have thought all their lives. They will abandon such traditional verse as, "Once in the days of old, when Sulejman held empire," for "In the bloody year of 1914, on the sixth day of the month of August, Austria, and all Germany were greatly worried."[36] Lord undoubtably oversimplifies this process. Rosalind Thomas points out that, based on ethnographic evidence, not all oral poetry is formulaic while some written poetry is formulaic.[37] Furthermore, Adam Parry suggests that traditional singers felt that published texts represented a superior culture, and it is for this reason they integrated lines from newspapers and textbooks into their songs. He argues that no such influence would have existed in Homeric Greece.[38] In a later article, Lord does concede that Adam Parry was probably correct, but that such an influence may have come from the Near East.[39]

Another factor Lord fails to consider is the type of reading and writing being learned. The singers he studied learned to read and write in prose, and the lines he cites indicate that Slavic singers were influenced by prose writing. If Homer learned to read and write only in hexameter and continued to think in hexameter, the act of writing would have little initial influence on the style of his verse.

If we restrict our discussion to epic poetry, Lord's observations have practical merit because writing removes a performer's need for devices like formulae and themes. According to Lord, such devices relieve a singer from having to remember too many details and allow him to plan his song.[40] Consequently, when an epic singer begins to write his verse, these traditional elements will eventually disappear because a poet no longer creates before an audience and has more time to think and reflect. Under such circumstances, a singer may start breaking patterns that were required for creating during a performance, not because he loses the ability to think in those patterns, but because he no longer needs them. Devices, such as formulae, will gradually be replaced by longer and more complex elements that are added to emphasize a story, not to aid a singer. In addition, themes will slowly be connected and then replaced by a well-developed plot.

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[36] Lord (supra n. 26) 129.

[37] R. Thomas, *Literacy and Orality in Ancient Greece* (Cambridge 1992) 42–43, 49–50.

[38] A. Parry, "Have we Homer's *Iliad*," *The Language of Achilles and other Papers* (New York 1989) 136–38.

[39] A.B. Lord, "The Influence of a Fixed Text," in *To Honor Roman Jakobson: Essays on the Occasion of His Seventieth Birthday (11 October 1966)* II (The Hague 1967) 1199–1206.

[40] Lord (supra n. 26) 86.

A comparison of the *Iliad*, the *Odyssey*, and *The Wedding of Smailagic Meho*,[41] a Yugoslavian oral-traditional epic, reveals some of these changes. All three poems are long and constructed to a certain extent with formulae and themes.[42] Milman Parry believes that both Homeric epics are completely formulaic.[43] Lord states that Slavic epics are 100% formulaic and Homeric epics are 90% formulaic.[44] These findings have been challenged. David Shive, in a detailed analysis of the *Iliad* and the *Odyssey*, contends that Parry's work is flawed, and his formulaic estimates are overstated.[45] In addition, Maurice Pope points out that 2,000 of the 6,000 words used by Homer do not recur. This is slightly less than the works of Shakespeare (45%), more than those of Ovid (20%) and Virgil (15%), and about the same as Euripides (37%) and Sophocles (33%). Pope claims that these results are not consistent with oral composition.[46] Unfortunately, both works have had little impact on Homeric studies, possibly because formulae are not as common as originally thought in oral poetry and not as rare in written poetry. Furthermore, disagreement exists as to what constitutes a formula. Statistical analyses of the same formulaic works can therefore vary significantly depending on the view of the researcher.[47] Under these circumstances, formulae cannot be a definitive indicator of an oral epic.

These diverse opinions are best exemplified by Thomas who points out that Homer creates two levels of composition in the *Iliad*. The first level is the narrative, which conforms to the oral-formulaic structure. The second level of composition consists of speeches. Thomas asserts that Homeric speeches are too unique and complex to be improvised anew at each performance.[48] She illustrates her point by citing the speech of Achilles in Book 9, part of which states "...that you may not come one after another, and sit by me, and speak softly. For as I detest the doorways of Death, I detest that man, who hides one thing in the

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[41] Henceforth it is referred to as the *Meho* epic.

[42] The *Iliad* consists of 15,693 lines, the *Odyssey* of 12,110 lines, and *The Wedding of Smailagic Meho* has 8,000 lines.

[43] M. Parry, *L'épithète traditionnelle dans Homère: Essai sur un problème de style homérique* (Paris 1928) 1–19.

[44] Lord (supra n. 26) 142–44.

[45] D. Shive, *Naming Achilles* (New York 1987) 3–139.

[46] M. Pope, "A Nonce-Word in the *Iliad*," *CQ* 35 (1985) 3–4, 8.

[47] Thomas (supra n. 37) 41.

[48] Thomas (supra n. 37) 36–38.

depths of his heart, and speaks forth another."[49]

She claims that these speeches are similar in structure to the previously mentioned oral poetry created by Eskimos and the men of the Gilbert Islands. Based on this observation, Thomas sees these speeches as large formulae that Homer created and refined between performances. He would then memorize them and insert them at an appropriate place in a song during a performance.[50] Thomas makes an important observation, but her hypothesis is untenable. It is true that memory is important, but we lack parallels for this type of memorization in long epic poems and for good reason. The oral-formulaic system is effective because of the repetitive pattern of formulae and themes. These speeches are too numerous and irregularly spaced to be used as Thomas suggests. This is especially so when we consider that sections of narrative are as unique and complex as any speech. *Iliad* 8.553–565 is one such example: "So with hearts made high these sat night-long by the outworks of battle, and their watchfires blazed numerous about them. As when in the sky the stars about the moon's shining are seen in all their glory, when the air has fallen to stillness, and all the high places of the hills are clear, and the shoulders out-jutting, and the deep ravines, as endless bright air spills from the heavens and all the stars are seen, to make glad the heart of the shepherd; such in their numbers blazed the watchfires the Trojans were burning between the waters of Xanthos and the ships, before Ilion. A thousand fires were burning there in the plain, and beside each one sat fifty men in the flare of the blazing firelight. And standing each beside his chariot, champing white barley and oats, the horses waited for the dawn to mount to her high place." This type of poetry has its closest parallels in short, memorized poetry and in written poetry. In contrast, we lack any parallels for such complex, structured verse in oral epics.

Thematic differences are more obvious. In Yugoslavian epic, the main character repeats his previous adventures to characters who appear in later themes. Thus, parts of earlier themes or whole themes can be integrated into later themes. This technique has two advantages when creating epics. It helps a singer connect self-contained themes into one long epic and helps inform the audience. Since a long epic is never the same twice, and it can take up to two weeks to recite, this technique informs patrons who missed previous performances what has come before.[51] Such a technique, however, makes it difficult to create a well-developed plot.

Themes in the *Meho* epic are similar to those in the *Iliad*, but a critical difference between these epics is

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[49] *Il.* 9.310–313. To maintain a high and uniform level of poetic translation, I am citing translations of the *Iliad* by R. Lattimore (Chicago 1961) and the *Odyssey* by R. Lattimore (New York 1991) throughout this chapter. I am responsible for all translations in all succeeding chapters except where other translations are cited.

[50] Thomas (supra n. 37) 39–40.

[51] Lord (supra n. 26) 14–17.

that the themes of the *Iliad* are connected by a developed plot. The *Odyssey*, which is thought to have been created after the *Iliad*, has an even tighter plot.[52] A developed plot requires the appearance of a number of unique and interrelated elements in different themes throughout a song. These elements interconnect themes producing a more rigid structure and making it difficult, if not impossible, for a singer to drop and add themes to fit each performance and still maintain the integrity of a song. This is not to say that an oral epic cannot have a developed plot, but to do so would probably impose other restrictions, like shorter lines, shorter length, and a reduction of other elements, such as similes and ornamentation.

Similes and ornamentation are two other elements common to Slavic epics that are found in the *Iliad* and the *Odyssey*, but differences exist between these elements. Similes are very common in the *Meho* epic and the *Iliad* but are relatively rare in the *Odyssey*.[53] The types of similes are also different in these works. In the *Meho* epic, similes are short, repeatable formulae that a singer uses to construct his epic. A common type of simile is "The horse was like a mountain villa."[54] In contrast, similes in the *Iliad* are of two types. The first is much like those in the *Meho* epic and consists of two or three words: "like a storm-wind" or "like man-slaying Ares." The second type is longer and more complex containing a short simile that is integrated into a longer figurative description: "As is the generation of leaves, so is that of humanity. The wind scatters the leaves on the ground, but the live timber burgeons with leaves again in the season of spring returning. So one generation of men will grow while another dies."[55]

Homer constructs this same type of simile but fewer of them in the *Odyssey*. Long similes are usually unique in wording and content, and the wording is mostly nontraditional. Furthermore, in the Homeric epics, the obvious intent of comparison can overlie a more symbolic one.[56] Achilles's armor is "like the star which comes on in the autumn and whose conspicuous brightness far outshines the stars that are outnumbered in the night's darkening, the star they give the name of Orion's Dog, which is brighter among the stars, and yet is wrought as a sign of evil and brings on the great fever for the unfortunate mortals. Such was the flare of the bronze that girt his chest in his running."[57] Besides being a simile, this passage also symbolizes the rising of Achilles who after his hiatus will bring evil to the Trojans. This type of simile is so unique and complex that it no longer functions as a repeatable building block.

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[52] J. Scott, *Homer* (New York 1931) 56–67.

[53] J. Scott, *The Unity of Homer* (Berkeley 1921) 124.

[54] A. Mededović, *The Wedding of Smailagić Meho* (Cambridge 1974) 106.

[55] *Il.* 6.146–150.

[56] M.W. Edwards, *Homer, Poet of the Iliad* (Baltimore 1987) 102–03.

[57] *Il.* 22.26–32.

A reader of the *Meho* epic will quickly notice the large quantity of ornamentation, which are descriptions using adjective-noun combinations. This device is most commonly used to describe objects, such as clothing and weapons, especially when a warrior is preparing for battle.[58] Clothing and weapons are commonly ornamented with rare metals and jewels. When Meho dresses for battle he wears "...his silken breeches, of Damascus make, all embroidered with gold, with serpents depicted up in his thighs, their golden heads meeting beneath his belt and beneath the thong by which his sword was hung...his two small Venetian pistols, forged of pure gold; the sights were diamonds and the ornaments were of pearl..."[59]

Ornamentation is also common in the Homeric epics. When Agamemnon dresses for battle he wears: "...this corselet. Now there were ten circles of deep cobalt upon it, and twelve of gold and twenty of tin. And toward the opening at the throat there were rearing up three serpents of cobalt on either side...And he took up the man-enclosing elaborate stark shield, a thing of splendor. There were ten circles of bronze upon it, and set about it were twenty knobs of tin, pale-shining, and in the very center another knob of dark cobalt. And circled in the midst of all was the blank-eyed face of the Gorgon with her stare of horror, and Fear was inscribed upon it..."[60]

Ornamentation is an important device because it allows a singer to change the length of a song by adding or deleting adjective-noun combinations. If the *Iliad* and the *Odyssey* were orally-composed songs, we would expect that all weapons and accouterments would be consistently described in this manner. Yet, Homer breaks this pattern. We see this when Hephaestus is making a new shield for Achilles: "On it he wrought in all their beauty two cities of mortal men. And there were marriages in one, and festivals. They were leading the brides along the city from their maiden chambers under the flaring of torches, and the loud bride song was arising. The young followed the circles of the dance, and among them the flutes and lyres kept up their clamor as in the meantime the women standing each at the door of her court admired them. The people were assembled in the market place, where a quarrel had arisen, and two men were disputing over the blood price for a man who had been killed. One man promised full restitution in a public statement, but the other refused and would accept nothing. Both then made for an arbitrator..."[61]

Like similes, ornamentation is used less in the *Iliad* than the *Meho* epic and even less in the *Odyssey* than the *Iliad*. Furthermore, descriptions of some items, like Achilles's shield, are far more complex than those seen in oral epics. In his portrayal of this shield, Homer has discarded a simple descriptive device

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[58] Lord (supra n. 26) 86–91.

[59] Mededović (supra n. 54) 101.

[60] See respectively, Lord (supra n. 26) 87 and *Il.* 11.23–37.

[61] *Il.* 18.490–501.

for a more subtle one, symbolism. What Hephaestus creates on this shield is a picture of life; the life that Achilles will forfeit if he uses this shield against the Trojans.

Symbolism and irony are common in the Homeric epics but rarer in oral epics. Moreover, they are used differently. In oral epics, both devices are short, simple, and self-contained,[62] but in the Homeric epics, they become longer, more complex, and unique. The immortal armor of Achilles embodies these two devices. The irony is that all who don this armor, Patroclus, Hector, and eventually Achilles, will die.[63] This armor also symbolizes the *hubris* of men.[64] Although it is impervious to weapons, it cannot protect a man from his destiny.[65] In effect, immortal armor is reduced to nothing more than an ineffective status symbol. One of the reasons irony and symbolism are such powerful elements in the Homeric epics is, instead of being self-contained elements, Homer builds on these elements throughout his song, which interconnects the various themes.

If the *Meho* epic represents the purest form of oral epic, then it appears as if the Homeric epics have evolved away from this pure form. Furthermore, an increasing complexity in structure, ornamentation, themes, similes, and development of plot suggests that some type of evolution is occurring. This evolution is the breaking of oral-formulaic patterns that Lord predicted would happen when a singer learned to write. We see further differentiation between Slavic and Homeric epics in the complexity and usage of character development, word play, ambiguity, and personification, to name a few devices. Unfortunately, space does not allow a full study of all pertinent elements. Yet, the evidence of considerable structural differences between oral-traditional and Homeric epics is compelling. We cannot, therefore, blindly accept the notion that Homer was an illiterate bard who created his epics in the oral-formulaic tradition. There are, however, two variations to the oral-formulaic tradition that are important to this study.

Gregory Nagy, in effect, removes Homer and replaces him with an Homeric-epic tradition. He maintains that such a tradition had a formative stage extending from the mid-eighth to the mid-sixth century B.C. During this stage, epic poetry becomes increasingly less fluid and more stable until it reaches a relatively static phase. Oral epics become less fluid because of an early diffusion of the *Iliad* and the *Odyssey* throughout the Greek speaking world. This diffusion is part of a pan-Hellenism that is especially pronounced in archaic Greece of the eighth century. He defines pan-Hellenic traditions as those that are common to most locales but are peculiar to none. The early proliferation of these two epics

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[62] Lord (supra n. 26) 66.

[63] See respectively, *Il.* 16.786–861, 22.297–367, 19.409–18.

[64] See also, Edwards (supra n. 56) 115–16.

[65] *Il.* 22.208–13.

is a result of this trend.

Nagy feels that the process of composition in performance is directly influenced by the extent of diffusion. He claims that a continuously wider diffusion results in fewer opportunities for performing. Therefore, to maintain the widest possible reception at such performances, singers adhered to a more homogenous version of both epics.[66] The type of audience is also a factor. He claims that the social context of pan-Hellenism suggests that the songs listened to by audiences were different from the after-dinner songs performed by a singer of tales. The foundation for this theory is based on the earliest known context for the performance of Homeric epics, which is the festival where rhapsodes recite from a fixed text.[67] The diffusion and performing at such Panathenaic festivals of Athens or the Panionian festival of Delos gradually "froze the dynamic element of composition into the static works that we know as the Homeric epics." Homeric texts may, therefore, have evolved without the need of writing. Yet, once frozen, the Homeric poems were kept frozen by writing them down.[68] Nagy supports his interpretation by asserting that the diffusion of the *Iliad* and the *Odyssey* throughout the Greek world as early as the fourth quarter of the seventh century B.C. cannot be explained by a plethora of manuscripts because a lack of writing materials and the length of both works make this impossible. Finally, the rudimentary status of writing would impede such a diffusion.[69]

By the middle of the sixth century B.C., the continuing static condition of epics reaches a near-textual status. Before the *Iliad* and the *Odyssey* could then be transcribed, it was necessary for written texts to have an equivalent authority to oral performances. Nagy proposes that it is only after 550 B.C., when we see the first examples of manuscripts, that a text could be produced in manuscript form. This interpretation is based on a similar pattern of diffusion of Indian works. These works include the *Mahābhārata* and the *Rāmāyaṇa*; the first was composed between 400 B.C. and A.D. 400 and the second from between 200 B.C. and A.D. 200.[70]

There are a number of difficulties with Nagy's interpretation. Fluidity is a cornerstone of oral-formulaic theory, and he fails to describe any specific mechanism that enables an epic singer to "freeze," or more accurately to gradually memorize, a song. How does an epic singer begin to memorize such long poems

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[66] G. Nagy, *Homeric Questions* (Austin 1996) 39–40.

[67] G. Nagy, "An Evolutionary Model for the Text Fixation of Homeric Epos," in J.M. Foley, ed., *Oral Traditional Literature: A Festschrift for Albert Bates Lord* (Columbus, Ohio 1980) 392.

[68] Nagy (supra n. 67) 393.

[69] Nagy (supra n. 66) 32.

[70] G. Nagy, *The Best of the Achaeans* (Baltimore 1979) 6—9; Nagy (supra n. 67) 391; G. Nagy, *Pindar's Homer* (Baltimore 1990) 53; Nagy (supra n. 66) 29–112.

that change with every performance? Even if this were possible, and no evidence exits to support it, after a period of gradual memorization that continued for two hundred years, such a song would bear little resemblance to an oral epic. As previously mentioned, formulae, themes, ornamentation, and simple similes are merely devices an oral-epic singer needs to create long epics. All of these devices would completely disappear during a 200 year period of gradual memorization. In addition, Nagy's theory is based in part on the premise that a direct correlation exits between the area of diffusion and the stability of an epic, but he fails to show conclusively that a cause and effect relationship connects diffusion and stability.

His interpretation is also based partly on his opinion that to maintain the widest possible reception at festivals, singers adhered to a more homogenous version of both epics. Yet, such festivals were competitions.[71] Competing before audiences would influence singers to outdo one another, which would lead to more innovation than stability. Furthermore, whether a rhapsodist receives any money is dependent on the reaction of his audience.[72] Logic dictates that rhapsodes would need to learn and perfect their art in front of audiences before performing at festivals. Prestigious and lucrative festivals should therefore result in an increase of performances by those trying to learn or maintain their art. Such a situation would suggest that diffusion should result in a plethora of variations, not stability. Finally, Lord states that epics like the *Iliad* and the *Odyssey* must have been sung often,[73] not infrequently as proposed by Nagy.

If stability, as described by Nagy, did take place, singers must have had some set pattern to follow to replace the fluidity of their epic songs. No evidence of this type of stability exists in oral-formulaic epics. As Finnegan points out, even short memorized songs fail to maintain a stable form for long periods. The evidence suggests that few works, even very short ones, seldom last for over a 100 years. In addition, Finnegan raises doubts as to the oral stability of Indian works. She points out that there is no way to be certain that these oral texts were accurately transmitted over the centuries because we lack corroborating texts to check the form and content of such works. On the other hand, if written versions did exist, how could anyone be sure that writing did not play some part in the process of transmission.[74] She points out that shorter works like ballads are most stable over long periods if a written text exists for a singer to refer

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[71] Plato, *Ion* 530A.

[72] Plato, *Ion* 535E.

[73] Lord (supra n. 26) 151.

[74] Finnegan (supra n. 31) 151.

to.[75] Nagy concedes that writing did exist during the formative stages for the Indian works he cites.[76] In addition, J. D. Smith points out that the long, *Vedic* works that are performed orally are actually learned from songbooks.[77] It is a pattern that appears to be similar to that of the rhapsodes. It, therefore, appears that it is the appearance of writing in India and Greece instead of diffusion that stabilizes oral poetry. In addition, a written text would allow the accurate diffusion of such works over a wide area. Therefore, stability and diffusion may be the result of the introduction of writing in these regions.

Nagy's argument that a plethora of written texts dating to the last quarter of the seventh century are impossible due to a lack of writing materials and the great length of both works also lacks merit. First, we really have little idea as to how pervasive writing was for other needs, like business. It is therefore possible that the raw materials for writing did indeed exist. Furthermore, fewer and strategically located texts at festival sites may have eliminated the need for a large number of privately owned texts. This scenario does not violate Nagy's theory and is more amenable to the ethnographic evidence. He concedes that "it is not so much that the use of a text as a prompt for performance is unimaginable, once a text exists."[78] Therefore, if Homer did indeed write his epics, it would satisfy the evidence. But Barry Powell proposes a slightly different interpretation for the creation of the Homeric epics.

At some time around 800 B.C., a man was so moved by an oral performance by Homer that he was determined to preserve Homer's epics. To do so, he created a Greek alphabet based on the Phoenician one and then transcribed the *Iliad* and the *Odyssey*.[79] The actual dictation of both works probably took place between 800 and 775 B.C.[80] This is the scenario that Powell constructs. He dismisses the idea that Greek writing was developed to keep accounts and only later evolved to record poetic texts. He feels the Greek alphabet was designed specifically in order to record hexametric poetry.[81] Powell bases his argument on a number of observations. First, a date for the introduction of the Greek alphabet of about 800 B.C. is indicated by a growing number of Greek inscriptions dating to the second quarter of the eighth

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[75] Finnegan (supra n. 31) 140.

[76] Nagy (supra n. 66) 45.

[77] J.D. Smith, "Worlds Apart: Orality, Literacy, and the Rajasthani Folk-*Mahābhārata*," *Oral Tradition* 5 (1990) 18.

[78] Nagy (supra n. 66) 34

[79] Powell (supra n. 24) 231–37.

[80] Powell (supra n. 24) 218–20.

[81] Powell (supra n. 24) 109–18, 183–86.

century B.C.[82] Secondly, all early inscriptions are in hexametric poetry. This observation leads him to point out that the coincidence between the appearance of Homer's epics and the transmission of literacy suggest that the Greek alphabet was probably invented to record Homer's works. He states that "we cannot separate the invention of the alphabet from the recording of early hexametric poetry. We cannot separate the recording of early hexametric poetry from Homer. For extraordinary events we seek extraordinary causes. Homer sang his song and the adapter took him down."[83]

Powell is not the first person to propose that the Greek alphabet was invented to write down Homer's poetry. It was originally suggested by H. T. Wade-Gery.[84] Yet, Powell marshals a convincing amount of evidence to suggest that the Greek alphabet was developed for writing hexametric poetry, and the earliest inscriptions suggest the Greeks only knew how to write hexameter verse.[85]

The strongest part of Powell's argument is that hexametric poetry had a profound influence on the development of Greek writing. His argument is weak in two other areas. The first is his assertion that writing was confined to poetry. The only reason hexametric poetry survives is because it is written on rather imperishable materials, such as pottery. In contrast, it is unlikely that a merchant would do his accounts on such material. Accounts could have been written on more perishable materials like papyrus, leather, wax in a diptych, or possibly even some type of tree bark.[86] As John Chadwick points out, if the Linear B tablets had not been accidentally baked, no trace of writing would survive from Bronze Age Greece.[87] Therefore, similar documents from the ninth or eighth century may not have survived.

A second problem with Powell's thesis is explaining the motivation for creating the alphabet. The idea of writing down an epic poem in order to preserve it for posterity is a concept that lacks an ethnographic or historic parallel in such societies. In addition, to create an alphabet, a grammar for using the alphabet, and then becoming proficient in dictating oral poetry would have taken years. When we consider that an oral-epic singer did not mature as a singer until after the age of forty-six,[88] by such a time, Homer would probably have been in creative decline or dead.

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[82] Powell (supra n. 24) 18–20.

[83] Powell (supra n. 24) 236–37.

[84] H.T. Wade-Gery, *The Poet of the "Iliad"* (Cambridge 1952) 11–14.

[85] Powell (supra n. 24) 68–186.

[86] B.G. Trigger, *A History of Archaeological Thought* (Cambridge 1992) 230 [bark as a writing material].

[87] J. Chadwick, *Linear B and Related Scripts* (Berkeley 1987) 33.

[88] Lord (supra n. 26) 94.

Finally, Powell underestimates the difficulty of dictating an epic. Although Lord advocates the dictation theory, he feels that the process of dictating, even under the best of conditions, degrades the quality of an epic song, and Nagy concurs.[89] Furthermore, Nagy points out that the alphabet may have been invented to record poetry as Powell claims, but it could have been developed to record epigraphic poetry instead of epic poetry.[90] All of the poetry that Powell cites are indeed short lines of poetry. He insists that the men at Pithekoussai who inscribed "Nestor's Cup" were thinking specifically of *Iliad* 11.632–37, rather than of a general tradition of heroic stories. Yet, nothing exists in Powell's evidence that precludes the possibility that writing was confined to the short lines of poetry he cites. Such poetry may indicate the popularity of heroic poetry during the eighth century, the same type of poetry that influenced Homer.

If we accept the possibility that hexameter poetry had a strong influence on the development of writing, we may be able to understand this influence by looking at shorter memorized verse. As previously mentioned, the Ila and Tonga women of Zambia in West Africa, the men of the Gilbert Islands of the South Pacific, and the Eskimos all rely on various techniques to create complex, short poems that are memorized when finished. Thomas notices the similarity between this type of poetry and the speeches in the Homeric epics. Writing, like memorization, is just a tool. It is therefore possible that writing was adopted by poets to help craft their short poems. In this situation writing would be seen as an extension of memorization. Such techniques may have been adopted even before Homer's time. Homer appears to be a master of both short verse and epic poetry, which is suggested by the two different levels of composition proposed by Thomas. Homer may have written the *Iliad* and the *Odyssey* because it was the only way of integrating these two different types of poetry.

I am not so naive as to believe my interpretation of the evidence will be readily accepted. Regardless of the final agreement on the medium Homer used to create both epics, it is obvious that Homer drew on oral-formulaic poetry to create his epics. The continued use of formulae, short similes, and themes support this interpretation.

One of the most important features of oral epics is fluidity, which results from a singer creating a new song with each performance. Under these circumstances, how long before all Mycenaean elements of a song disappear? Adam Parry argues that our text of the *Iliad* only came into existence when it was written. He feels that a song of such length changes so much with each performance that "Homer" must have been the singer who sang it when it was transcribed.[91] G. S. Kirk disagrees; he feels that these songs

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[89] Lord (supra n. 26) 124–26; Nagy (supra n. 66) 34 n. 22.

[90] Nagy (supra n. 66) 37.

[91] Parry (supra n. 38) 108.

are relatively stable and a reasonably accurate oral reproduction is possible.[92] Based on this interpretation, Kirk regards scenes of setting sail as belonging to a body of "pre-existing material."[93] Furthermore, this view of stability has influenced the works of others. Frank Stubbings notes that there is no reason to doubt "that the Homeric descriptions of nautical procedure, both sailing and rowing, are true to their period," but he cautions that several of Homer's formulaic lines portraying ships and seafaring "may well have been traditional in epic for centuries."[94] Page proposes that it may be worthwhile to examine some of these formulae more closely because the law of economy is usually strictly observed, and, therefore, some of Homer's seafaring details may have been "fossilized" in formulae from Mycenaean times.[95] J. S. Morrison and R. T. Williams propose a different view by arguing that it would be unlikely for poets, putting together stock material in the eighth century, to use descriptions which did not apply to contemporary ships.[96] Nevertheless, they dismiss this problem by noting that, while inconsistencies may be expected, the main features of Mycenaean ships carry over into ships of the Geometric period.[97] They suppose that Homeric descriptions apply in general to ships of the Geometric world but may contain material derived from Mycenaean times that is indistinguishable.

Kirk bases much of his argument on his belief that Homer's works, due to their massive size, were "assimilated with unusual care" and changed little until being written down in the seventh century B.C.[98] Adam Parry refutes this argument by pointing out that Kirk fails to produce any evidence for such a theory, and all evidence indicates that epic poetry is very fluid. He continues by showing that the song "Alija Rescues Alibey's Children," which Kirk cites for its stability over a period of seventeen years, has actually changed by 26% between the two times it was transcribed. If a song changes by 26% in only seventeen years, how much in 100 or 200 years? Furthermore, this poem is much shorter than the *Iliad* and the *Odyssey*; both versions were less than 1500 lines. Parry maintains that the massive size of

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[92] G.S. Kirk, *The Songs of Homer* (Cambridge 1962) 100, 302.

[93] Kirk (supra n. 92) 327.

[94] Wace and Stubbings, (supra n. 17) 541.

[95] See, Page (supra n. 1) 224–30, 266 n. 10.

[96] J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* (Cambridge 1968) 44.

[97] Morrison and Williams (supra n. 96) 44.

[98] G.S. Kirk, "The Homeric Poems as History," in I.E.S. Edwards, C.J. Gadd, N.G.L. Hammond, and E. Sollberger, eds., *The Cambridge Ancient History*, Third Edition, Volume II, Part 2 (Cambridge 1975) 825–26.

Homer's epics make them less stable, and the stability proposed by Kirk is impossible.[99] Lord concurs; he argues persuasively that fluidity is a keystone of oral epics, and he rebuts the type of stability proposed by Kirk because it is incomprehensible to epic singers.[100]

In a later work, Lord discusses whether it is possible for historical fact to be transmitted via oral poetry over long periods of time. He examines songs that are set during the reign of Suleiman the Magnificent, about 500 years ago. Lord compares names, places, and events in the songs with those in the historical record. In all cases but one, none of the songs accurately reflect past events. In one of the songs the name of an obscure leader is correct, but the singer of this song was the most widely traveled of the group and had possible contact with people versed in the history of the area. Another possibility is that his choice of names was coincidental.[101]

All of the evidence indicates that oral epics seldom retain their original form and content. In addition, Finnegan concludes that even with shorter memorized poems "as one looks hard at the notion of exact verbal reproduction over long periods of time, it becomes clear that there is very little evidence for it."[102] She is supported by Jan Vansina who concludes, from his fieldwork, that, although memorized poems can last for considerable periods, it is rare. Most poems usually disappear after about century.[103]

Vansina's fieldwork may explain why oral and even memorized poetry disappear or change significantly after 100 years. He notes that oral traditions reflect both the past and the present. Historical consciousness is similar in that it is perceived in two ways, both as a "time of origin" and "recent times." The time of origin moves with the passage of generations. For the Tio, of the Congo, recent times extended back about 80 years.[104] The evidence presented by Vansina suggests that once a generation of grandparents dies off, their knowledge recedes into the time of origin. The mechanism for this recession appears to be that knowledge can no longer be verified and becomes difficult to maintain. A period of three generations, or about 100 years, is the span of time knowledge appears to remain stable in a family or society. This information is pertinent to our understanding of anachronisms.

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[99] Parry (supra n. 38) 112–15.

[100] Lord (supra n. 26) 4, 22, 26–29, 78–79, 99–106; A.B. Lord, "Traditon and the Oral Poet: Homer, Huso, and Avdo Medjedović," in E. Cerulli, ed., *Atti del Convegno Internazionale sul Tema: La Poesia epica e la sua formazione* (Rome 1970) 16–18.

[101] A.B. Lord, "History and Tradition in Balkan Oral Epic and Ballad," *Western Folklore* 31 (1972) 53-60; see also, Vansina (supra n. 34) 11–12.

[102] Finnegan (supra n. 31) 140.

[103] Vansina (supra n. 34) 16.

[104] Vansina (supra n. 34) xii, 24.

Anachronisms are an important aspect of Homeric scholarship. It is generally thought that Homer wished to avoid the inclusion of anachronistic items in his epics.[105] For this reason, the Achaeans only use bronze accouterments. Although iron weapons are rarely mentioned by Homer, they do appear in both epics. Pandorus uses iron-tipped arrows; Areïthous wields an iron mace; Achilles has either an iron sword or knife; Hera's chariot has an axle made of iron;[106] Hephaestus needs tongs to hold the metal while hammering out Achilles's shield, a tool and technique that are consistent with iron-making;[107] and the word iron can be a collective description for weapons or implements.[108] In addition, Odysseus shoots an arrow through a row of iron axes.[109] Among Homeric weapons or implements, axes are most commonly made of iron.[110] Most of these items appear to be anachronisms in a heroic world and are considered instances of "Homer nodding."[111] This is a possible, but unlikely, interpretation.

Nothing in the oral-formulaic literature suggests that epic singers make a conscious effort to avoid anachronisms. According to Lord, "tradition is not a thing of the past but a living and dynamic process which began in the past, flourishes in the present, and looks forward into the future as well. While it does not seek novelty for its own sake, it does not avoid the new in the life around it. In the *Odyssey* Phemius sang the newest songs for the suitors in Ithaka."[112] Walter Ong concurs with this view by stating that "oral societies live very much in a present which keeps itself in equilibrium or homeostasis by sloughing off memories which no longer have present relevance" and that "oral traditions reflect a society's present cultural values rather than idle curiosity about the past."[113] Finally, Finnegan points out that "an oral poem is an essentially ephemeral work of art, and has no existence or continuity apart from its

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[105] F.H. van Doorninck, "Protogeometric Longships and the Introduction of the Ram," *IJNA* 11 (1982) 284; L. Casson, *Ships and Seamanship in the Ancient World* (Baltimore 1995) 43.

[106] See respectively, *Il.* 4.123, 7.141, 18.34, 5.723.

[107] *Il.* 18.476–77.

[108] *Il.* 23.261, 23.850; *Od.* 19.13; R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman, Oklahoma 1988) 360, s.v. σίδηρος.

[109] *Od.* 19.587, 21.97, 21.114.

[110] *Il.* 4.485, 23.850 (there is some dispute on this translation); *Od.* 9.393 (an axe and an adze).

[111] Luce (supra n. 1) 60.

[112] A.B. Lord, "Characteristics of Orality," *Oral Tradition: A Festschrift for Walter J. Ong, S.J.*, A Special Editon 2 (1987) 63.

[113] W.J. Ong, *Orality and Literacy: The Technologizing of the Word* (London 1982) 46, 48.

performance."[114] By labeling oral epics as traditional poetry, we fail to differentiate between the structure of a song and its content. The structure and general story endures, but the singer continually changes and reworks details of a song. In the *Meho* epic, which is set during the reign of Suleiman the Magnificent, people travel on steamships.[115] This is an obvious anachronism, but such a detail does not concern a singer because it does not influence his story.

Of course, if this is true, why does Homer outfit his heroes with bronze accouterments. It is impossible to say what was in Homer's mind, but alternative interpretations to anachronisms can be proposed. One possibility is that Homer perceives bronze as a superior metal to iron. Iron replaces bronze not because it was superior but because it was more easily accessible. Supplies of copper and tin began to disappear in the Aegean region with the collapse of Bronze Age societies. By the eighth century, bronze working does become more common again, and bronze armor begins to reappear.[116] Furthermore, bronze makes a superior sword. As Luce points out "a well-hammered bronze blade can be as hard as mild steel, and it is difficult to surpass this degree of hardness in iron without rendering the metal extremely brittle."[117] Homer may have outfitted his heroes in bronze solely because it was still known as a superior metal, which was befitting heroes of an Heroic Age.

Another possible example is the boar's tusk helmet. Homer may not have had any idea that this type of helmet was worn centuries earlier. The popularity of such a helmet may have resulted in its rarity. If thirty or forty pairs of tusks were necessary to make one helmet, it is possible that the desire for such a headpiece resulted in a dwindling number of boars from over hunting. By Homer's time, too few boars survived to make many of these helmets. I am not saying that these are definitive answers, but our perception of anachronisms in the Homeric texts may be a result of our ignorance of his society. The proposition that anachronisms were to be avoided by epic singers may be nothing more than a rationalization of our inability to understand the differences between what we read in Homeric epics and our preconceived notions of what Homer was attempting to portray.

In any event, the evidence suggests that 100 years after an item disappears from use, it will disappear from oral literature, and, as such, the details in the *Iliad* and the *Odyssey* best encompasses a 100 year period before both works were created. It can be argued that, since Homer is creating an heroic world, many details only existed in his imagination. This is possible, but should have no influence on this study. As Page suggests, Homer was a skilled storyteller. He was so because he was careful to make his

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[114] Finnegan (supra n. 31) 28–29.

[115] Mededović (supra n. 54) 243.

[116] Snodgrass (supra n. 3) 41–45;

[117] Luce (supra n. 1) 59.

characters and events as lifelike as possible. One reason his tales seemed credible to a reader or listener was because the adventurous aspects overlay a background of the real world that his listeners could relate to.[118] The types of ships sailed, and the routes they sailed would be as authentic as possible because they are part of this background that made the fictional aspects more real to an audience. We therefore need to know when Homer lived to anchor down the 100 year period that his epics describe.

Most, but not all, ancient writers believed that a single poet named Homer wrote both the *Iliad* and the *Odyssey*. Unfortunately, they did not or could not tell us any details of his life. It was, however, thought that he was from either Smyrna or Chios, but these claims are not certain. After the time of Wolf (1795), there was strong disagreement on the unity of authorship of each poem. This movement was based on a number of perceived difficulties in both works. The oral-formulaic theory appears to have resolved these difficulties, and now a single poet for at least each epic is accepted by most scholars. Most also seem to accept the idea of one poet named "Homer" for both epics. Although the number of poets has no real bearing on this work, I will adhere to this idea of a single poet throughout this dissertation.

Ancient authors also disagreed on when Homer lived. He has been dated from as early as the Trojan War to 500 years later. Today most scholars seem to place Homer in the middle of the eighth century. According to Herodotus, Homer and Hesiod lived not more than four hundred years before himself, which is no earlier than about 850 B.C.[119] Of course, as Ian Morris points out, Herodotus appears to have used a forty-year generation span. It is therefore possible to move Homer's time to as late as 750 B.C.[120] Richard Janko, has studied the language of the works of Homer and Hesiod and concludes that the *Iliad* was composed between 750 and 725 B.C., the *Odyssey* between 743 and 713 B.C., and Hesiod's *Theogony* from 700 to 665 B.C.[121] As Morris points out, this coincides well with the introduction of writing into Greece at the beginning of the eighth century B.C.[122] It would appear then that the *Iliad* and the *Odyssey* describe primarily a period from about 850 to 750 B.C. It is possible that some formulae do survive for longer periods, but these will be rare. Most formulae will survive because they continue to describe features that do not change with time, such as the sea.

As I stated at the beginning of this chapter, placing Homer's works in a specific cultural context is the most difficult and contentious part of this study, and I am not naive enough to believe that those who hold different opinions will accept my conclusions. So, I have tried to divorce most chapters of this work from

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[118] D. Page, *Folktales in Homer's Odyssey* (Cambridge 1973) 4–5.

[119] Hdt. 2.53.

[120] I. Morris, "The Use and Abuse of Homer," *ClAnt* 5 (1986) 92.

[121] R. Janko, *Homer, Hesiod, and the Hymns* (Cambridge 1982) 231.

[122] Morris (supra n. 120) 93.

any specific chronological framework. Parts of a few chapters, such as those on geography and warfare, do require such a framework, which I will place in this 100 year span. The following chapter also provides a framework, but it is a framework that allows those ignorant of ships and their construction to better understand such aspects of Homer's works.

CHAPTER III

HISTORY OF SHIP CONSTRUCTION

Most scholars who have tried to interpret nautical details from the *Iliad* and *Odyssey* have relied mainly on etymological studies. Unfortunately, they tend to lack or ignore the accumulated knowledge of ship construction that has been revealed by archaeology, and, as a result, their interpretations of these texts suffer from this limited methodology. We can better understand Homeric seafarers and shipwrights if we see them as people representing a specific culture. To do so, we must be cognizant of the archaeological and ethnographic evidence and what both can tell us of the many aspects of Homeric ships. This evidence allows us not only to better understand the types of ships being built during Homer's time, but also why different techniques of construction may have been chosen.

We often fail to understand these aspects because we assume that ship construction only evolves in a simple linear fashion. Many scholars seem to assume that early shipwrights built only small and "primitive" vessels and, as technology progresses, a clearly superior technique always replaces an inferior one. Earlier vessels are supposed to be smaller, weaker, and simpler and are therefore replaced by larger, stronger, and more sophisticated ones. Conversely, if we see little change over time, it is due to a shipwright's inherent conservatism or his blind adherence to tradition. It is impossible to understand ancient seafaring and ship construction by maintaining such a narrow viewpoint.

This simple evolutionary pattern is commonly imposed on the development of Mediterranean vessels of the Bronze and Iron Ages. During this time, two traditions of ship construction are recognized, planked ships joined with cords and those with pegged mortise-and-tenon joinery (figs. 3.1 and 3.2). Ships built with cords, or laced ships,[1] are thought of as poorly-built little vessels that constantly leak, require considerable repair, and are able to carry only a limited amount of cargo. This view is in part the result of a few descriptions of such vessels published by early European travelers. One of the most commonly cited examples of a laced ship is the *mtepe*, a ship built in East Africa that continued to be sailed as late as the early twentieth century.[2]

African shipwrights built *mitepe* by first laying a keel to which garboard strakes were edge joined with dowels. Approximately 12 strakes or runs of planking were then erected in the same manner. Wadding was laid on top of each seam and tied in place by small pieces of coir twine, a twine made from coconut

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[1] Vessels built with ligatures or cords are commonly referred to as either sewn, laced, or lashed. I will use the term laced in this work. For more detailed information, see the following chapter.

[2] J. Hornell, *Water Transport: Origins and Early Evolution* (Newton Abbot, England 1970) 235.

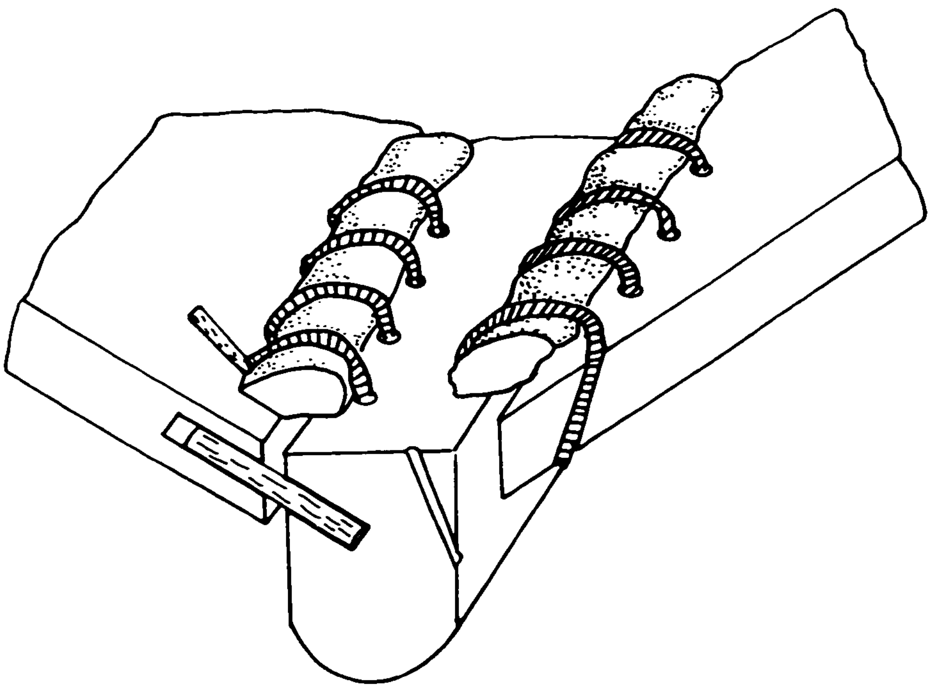

Fig. 3.1. Laced construction. (After P. Pomey, "L'épave de Bon-Porté et les bateaus cosus," *MM* 67 [1981] fig. 7)

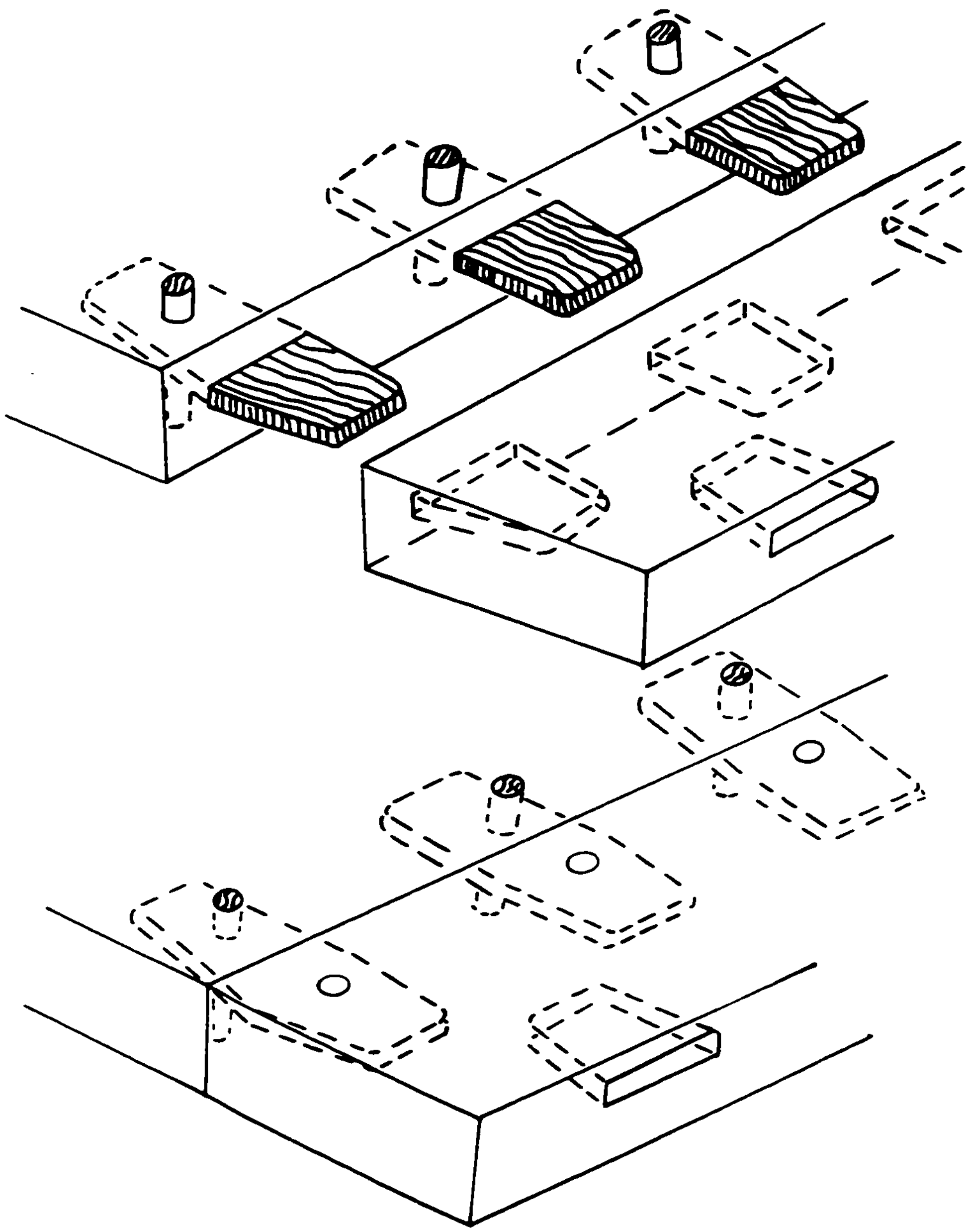

Fig. 3.2. Pegged mortise-and-tenon construction. (After L. Casson, *The Ancient Mariners*, Second Edition [Princeton 1991] fig. 3)

husks. The hull planking was then bound together by more coir twine. The lacing was done by two men, one on the inside and the other on the outside of the hull. These men passed the twine back and forth through previously drilled holes on opposite sides of each seam. Once the lacing was complete, crewmen hammered wooden pegs into the holes to fasten the twine. After the twine was securely pegged in place, a sailor cut away all the twine and protruding pegs on the outside of the hull. Only the twine along the keel and at the extremities was left in place because stress on the seams was greatest at these areas. As a result, most of the planks were held together only by the interior twine. Shipwrights were willing to sacrifice some hull strength to reduce surface friction on the hull.

Shipwrights did not use wales or metal fasteners to stiffen a vessel. Instead, only widely spaced frames and five-to-seven pairs of through-beams were necessary. All of these timbers were secured with only a few lashings of twine to bind each to the hull. A shipwright could build a *mtepe* in only two to three months, including the time it took to acquire the timber. Timber, which was relatively inexpensive, was cut from locally grown mangrove forests.[3] An important peculiarity of *mitepe* was a very short lifetime of only three or four years.[4]

Mitepe do fit the stereotype of a laced ship. They leak so much that two crewmen must constantly bail. Bailing is such an important facet of running a ship that each crewman must be able to lift a bailing basket full of water above his head. In addition, *mitepe* require a considerable amount of repair because the working of planks wears out the twine. Consequently, all pegs, twine, and wadding must be replaced once a year.[5]

European travelers, like Marco Polo, have done much to validate this stereotype. He states that such vessels "are wretched affairs, 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...Hence 'tis perilous business to go a voyage in one of those ships, and many of them are lost, for in that Sea of India the storms are often terrible."[6]

John of Monte Corvino, who lived during the fourteenth century A.D., expressed similar sentiments by stating that "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! Once

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[3] J. Hornell, "The Sea-Going *Mtepe* and *Dáu* of the Lamu Archipelago," *MM* 27 (1941) 59–62; R. Bowen, Jr., "Arab Dhows of Eastern Arabia," *American Neptune* 20 (1949) 87–132; Hornell (supra n. 2) 235; R. Adams, *Construction and Qualitative Analysis of a Sewn Boat of the Western Indian Ocean* (M.A. thesis, Texas A&M University 1985) 74.

[4] C.J.W. Lydekker, "The *Mtepe* Dhau of the Bajun Islands," *Man* 19 (1919) 91.

[5] Hornell (supra n. 2) 62.

[6] H. Yule, *The Book of Ser Marco Polo, the Venetian*, Book 1 (London 1875) 111.

every year therefore there is a mending of this, more or less, if they propose to go to sea."[7]

In contrast to this rather bleak portrayal of laced ships, ships built with pegged mortise-and-tenon joinery are thought of as larger, stronger, and watertight. It is also assumed that they can carry heavier cargos. The vessel most commonly cited as an example of this tradition is the Kyrenia ship, a Greek ship that sank off the coast of Cyprus near the end of the fourth century B.C. The hull planking of this ship is of Aleppo pine (*Pinus halepensis*), and all tenons and tenon pegs are made from Turkey oak (*Quercus cerrus*). Shipwrights edge joined the planks with closely spaced mortise-and-tenon joints (fig. 3.2).[8] These pegged tenons act as internal frames, and their size and proximity add considerable stiffness and integrity to hull planking. Shipwrights carved tenons from a hardwood to reduce distortion, cutting, or breaking of joints because seams will try to shift under the strain of heavy cargoes or turbulent seas. The broad and rounded hull and soft curvatures of the Kyrenia ship also minimized these strains.[9] The hull planking is reinforced with 41 alternating floor timbers and half frames, all with an average room and space of 25 centimeters (fig. 3.3). The framing is secured with oak treenails; copper nails are driven through these treenails and then double clenched.[10] Longitudinally, the ship is stiffened by wales, a shelf clamp, and ceiling planking (fig. 3.4).[11] The Kyrenia ship was a graceful and watertight merchantman that carried considerable tonnage for many years.

We perceive a disparity between these two traditions of ship construction because we compare the simplest type of laced vessel with one of the more sophisticated vessels built with pegged mortise-and-tenon joinery. Another important factor is the misconception that pegged mortise-and-tenon joinery is inherently stronger than fasteners made from twine or other ligatures, but experimental tests do not support this concept.[12]

Lionel Casson claims that the replacement of laced vessels by those built with pegged mortise-and-tenon

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[7] H. Yule, *Cathay and the Way Thither* (Millwood, New York 1967) 66–67.

[8] J. Richard Steffy, *Wooden Ship Building and the Interpretation of Shipwrecks* (College Station, Texas 1993) 43.

[9] Steffy 1994 (supra n. 8) 46.

[10] Steffy 1994 (supra n. 8) 46.

[11] Steffy 1994 (supra n. 8) 46, 49, 51, 52.

[12] I am also guilty of this misconception. See S. Mark, "*Odyssey* 5.234–53 and Homeric Ship Construction: A Reappraisal," *AJA* 95 (1991) 441–45; S. Mark, "*Odyssey* 5.234–53 and Homeric Ship Construction: A Clarification," *IJNA* 25 (1996) 46–48.

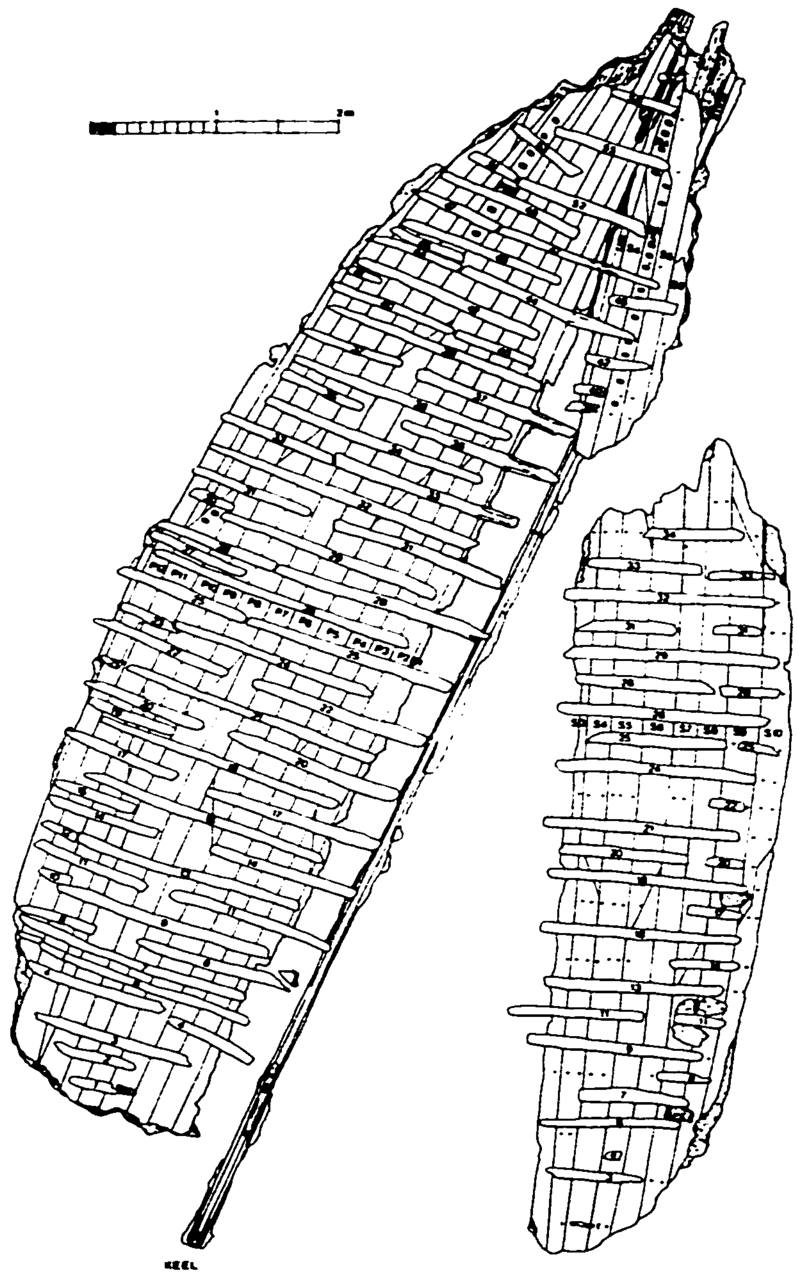

Fig. 3.3. Framing pattern of Kyrenia shipwreck. (From J. Richard Steffy, "The Kyrenia Ship: An Interim Report on Its Hull Construction," *AJA* 89 [1985] ill. 2)

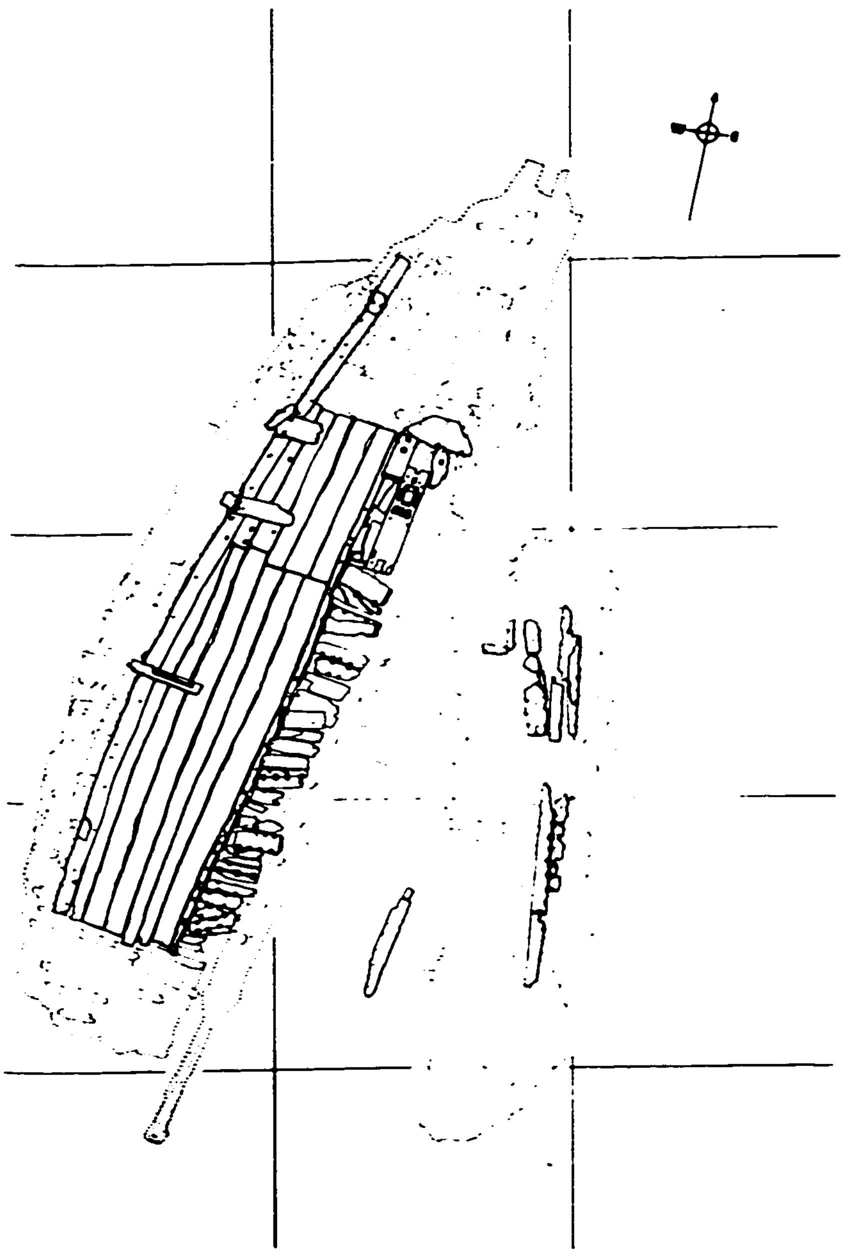

Fig. 3.4. Arrangement of the ceiling, beams, and mast step complex of the Kyrenia shipwreck. (From J. Richard Steffy, "The Kyrenia Ship: An Interim Report on Its Hull Construction," *AJA* 89 [1985] ill. 1)

joinery was a "great forward step."[13] When we accept such general concepts, it blinds us to variations in ship construction both within and between the two different traditions discussed above. Instead of seeing variations and trying to understand their function, we see only shipwrights who are constrained by technology and tradition. In fact, few structures built by man contain as many compromises as a ship. A shipwright may be forced to compromise because he has few tools or materials to work with. Furthermore, his choice of hull shape, size of ship, and type of joinery will be influenced by the cargo a vessel hauls and the waters in which it sails. The framework for all these compromises is the society in which a shipwright learns his craft.

We can better understand some of these compromises by comparing an African *mtepe* to an Arabian *boom*. A *boom* was built to sail on long voyages from the Persian Gulf to India. It was built of teak instead of mangrove, which is resistant to teredo worms. *Booms* were sailed for fifty to a hundred years before being abandoned or broken up, instead of the three or four years for a *mtepe*. Shipwrights still used coir twine to lace the seams of a *boom*, but it was a more expensive and higher quality twine that was imported from the Laccadive Islands. Lacings lasted for several years if crewmen properly oiled them every few months during a voyage. Oiling therefore resulted in lower operating costs.

Unlike a *mtepe*, a *boom* was virtually watertight. This was a result of better materials and more time invested in crafting tighter seams and joinery. Shipwrights spent nearly a year to build a *boom* as opposed to the two to three months for a *mtepe*. A *boom* was also the stronger of the two vessels because the exterior twine was not cut away. Leaving this exterior twine would normally result in increased hull friction, but this problem was resolved by cutting grooves between opposing holes that allowed the twine to lie flush with the hull surface.[14] Although carpenters must spend many extra hours cutting these grooves, the ship was able to carry heavier cargoes and weather rougher seas without increasing the friction on the hull surface. In effect, a well built *boom* was a long term investment; the more time invested in the initial construction resulted in a much longer sailing life and lower operating costs.

In the 1940's, Robert Bowen reported that it was common to see laced ships that were at least a hundred years old in Arabia.[15] This longevity was due partly to the teredo resistance of teak.[16] Arab shipwrights also coated the exterior of teak hulls with a mixture of lime and tallow, making a ship even more teredo resistant. This coating was applied because teak had to be imported and was very expensive. The largest

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[13] L. Casson, *Ships and Seamanship in the Ancient World* (Baltimore 1995) 202.

[14] T. Severin, "Constructing the Omani Boom Sohar," in S. McGrail and E. Kentley eds., *Sewn Plank Boats*, BAR International Series 276 (Oxford 1985) 280–85. See also Bowen (supra n. 3) 107–109.

[15] Bowen (supra n. 3) 108.

[16] Bowen (supra n. 3) 108; F.H. Titmuss, *Commercial Timbers of the World* (London 1965) 243.

repairs consisted of replacing rotting planks and timbers.[17] Shipowners were therefore willing to invest considerable time in the construction of seagoing ships because wood was so rare in Arabia and because teak was so expensive, durable, and resistant to teredo worms. In contrast, the relative abundance of inexpensive timber in East Africa meant that the impetus was to build a *mtepe* as quickly and as cheaply as possible. We must, therefore, be aware of the different influences on owners and shipwrights when building ships and the various compromises that they adopt.

It can still be argued that ships built with pegged mortise-and-tenon joinery produce a superior hull in size, carrying capacity, and strength because they are more rigid. Curiously, the evidence does not support this impression. Each type of joinery does have inherent limitations. Unfortunately, we know little of these limitations due to a dearth of working vessels built with either type of joinery. J. F. Coates, however, estimates that a laced seam may be as strong as one joined with pegged mortise-and-tenons, but not as rigid.[18] In addition, we know that large laced vessels can be built. *Mitepe* were approximately 16 to 30 meters long,[19] and the *boom* Sohar was 30 meters long.[20] The largest of the ocean-going dhows was a *baghla*. A *baghla* measured in length from approximately 30 to 42 meters and had average displacements of 150 to 400 tons. A few, of unknown length, had displacements of 500 tons.[21] In regard to carrying capacity, laced vessels that sailed the Persian Gulf had 40 to 60 tons burden.[22] Larger ocean-going vessels had reported carrying capacities of 200 tons.[23]

Charles Jaques Poncet was surprised by such vessels after returning from the capital of Abyssinia early in the eighteenth century. He stated that "I had no mind to hazard 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... Notwithstanding, these vessels...carry a great weight, and...they are of great

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[17] Bowen (supra n. 3) 108–09.

[18] J.F. Coates, "Some Structural Models for Sewn Boats," in S. McGrail and E. Kentley eds., *Sewn Plank Boats*, BAR International Series 276 (Oxford 1985) 18.

[19] Hornell (supra n. 3) 55; E. Gilbert, "The *Mtepe*: Regional Trade and the Late Survival of Sewn Ships in East African Waters," *IJNA* 27 (1998) 46.

[20] Severin (supra n. 14) 279.

[21] Bowen (supra n. 3) 101.

[22] Hornell (supra n. 2) 235.

[23] Yule (supra n. 6) 119.

use in all that sea."[24] In contrast, the Uluburun ship (ca. 1300 B.C.), which is the earliest known vessel built with pegged mortise-and-tenon joinery, is estimated to have had a length of 15 to 16 meters and could carry at least 20 tons.[25] The Kyrenia ship was nearly 15 meters long and could carry over 20 tons of cargo.[26] Finally, the Alonnesos ship, which is the largest known ship from the Classical period (ca. 400 B.C.), was able to carry in excess of 120 tons of amphorae.[27] This great weight is, however, less than the 200 ton capacity for laced ships mentioned above. These vessels are probably representative of most merchant ships that sailed the Mediterranean before the fourth century B.C. This suggests that ancient shipwrights could easily have built laced ships large enough to carry the types of cargoes being shipped from the Bronze to at least the early Classical period.

Pegged mortise-and-tenon joinery does appear to have one advantage over laced joinery; it produces a stiffer hull which allows sailing in rougher seas. This is not to say that laced ships cannot weather storms. Although Marco Polo says many laced ships were lost in the "terrible" storms of the Indian Ocean, it is also true that these early sailors were traders, not suicidal zealots. Weathering such storms was merely one of the risks of trading in the East, and for all the ships that were lost many more completed their voyages. Arabs continued to sail laced ships across the Indian Ocean, even as far as China, for several centuries.[28] In contrast, the Greeks were loath to sail on the Aegean Sea during the stormy winter months—even on board ships built with pegged mortise-and-tenon joinery.[29] Nevertheless, with all else being equal, there is little doubt that more laced ships would be lost in storms at sea than those built with pegged mortise-and-tenon joinery. Of course, the loss of ships could be minimized by hugging the coast when possible and running for a safe haven at the first sight of a storm.

Just as the rigidity of a hull built with pegged mortise-and-tenon joinery has some inherent advantages, so too does the flexibility imparted by a laced hull. If a ship with a rigid hull hits a reef, it is likely that the

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[24] C.J. Poncet, "A Voyage to Aethiopia in the Year[s] 1698, 1699, and 1700," in J. Pitts, ed., *The Red Sea and Adjacent Countries at the Close of the Seventeenth Century* (London 1949) 156.

[25] C. Pulak, "The Uluburun Shipwreck," in S. Swiny, R.L. Hohlfelder, and H.W. Swiny, eds., *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity* (Atlanta 1997) 249, 257.

[26] Steffy (supra n. 8) 12, 43.

[27] E. Hadidaki, "The Classical Shipwreck at Alonnesos," in S. Swiny, R.L. Hohlfelder, and H.W. Swiny, eds., *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity* (Atlanta 1997) 125, 128, 132.

[28] G.F. Hourani, *Arab Seafaring* (Princeton 1995) 3–114.

[29] Casson (supra n. 13) 270–72.

impact will damage the hull. In contrast, if a laced ship hits a reef under the same conditions, there is less chance of damage. James Bruce describes this attribute: "the planks of the vessel were sewed together, and there was not a nail, nor a piece of iron, in the whole ship; so that, when you struck upon a rock, seldom any damage ensued."[30]

Bruce expresses this opinion after surviving a sailing accident in the Red Sea. One night, his ship hit a large shoal while under full sail. The impact lifted the bow out of the water requiring considerable effort to free it. Bruce writes: "I had always some fears a plank might have started; but we saw the advantage of a vessel being sewed, rather than nailed together, as she was not only unhurt, but made very little water."[31]

Bertram Thomas mentions a similar situation while sailing in an Arab dhow. He describes a beach along the southern coast of Arabia where: "A ground swell, even in the mildest weather, runs vigorously along these gentle shelving beaches, and sends huge rollers crashing inshore. A whaler or other English-built boat would surely capsize and break up, but the local *banush* (of sewn timbers), craftily handled by the fisherfolk, comes riding safely through, despite moments when it seems to stand giddily on end and one looks on apprehensively, knowing that the sea, a boiling cauldron in the vicinity, would show small mercy to a swimmer."[32] Therefore, vessels sailing in waters with many reefs, shoals, and sandbars would risk less damage if laced. Yet, joinery is only one factor that influences the flexibility of a hull. Other factors include planking thickness and the number of internal timbers in a vessel.

We are now able to look at laced ships from a more practical perspective because we better understand some of the limitations, advantages, and how they were built. This perspective allows us to better understand the construction of ancient ships and how they evolved.

The Egyptians have left the earliest written records of seagoing vessels in the Mediterranean. Ships of 40, 60, and 100 cubits or approximately 20, 31, and 52 meters are listed in texts dating to the reign of Snefru (ca. 2613–2589 B.C.).[33] These lengths are comparable to those of the previously mentioned laced vessels. Unfortunately, we lack archaeological evidence of seagoing ships from ancient Egypt. But, an examination of the Cheops I vessel, which dates to about 2566 B.C., can enlighten us as to how the Egyptians built large vessels at this time.

The Cheops vessel, or more properly Khufu vessel, was discovered in a boat pit in 1954 next to the Great Pyramid of Giza. It is a large and heavy hull that is 43.63 meters long, has a maximum beam of

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[30] J. Bruce, *Travels to Discover the Source of the Nile*, Volume II (London 1805) 107.

[31] Bruce (supra n. 30) 236.

[32] B. Thomas, *Arabia Felix: Across the Empty Quarter of Arabia* (London 1936) 2–3.

[33] R. Faulkner, "Egyptian Seagoing Ships," *JEA* 26 (1940) 3.

5.66 meters, a depth amidships of 1.78 meters, and a deckhouse 9 meters long; it is built from nearly 38 tons of cedar.[34]

This vessel has a flat bottom that consists of eight planks. The remainder of the hull is made up of two nearly symmetrical sets of planking, thirteen planks to port and twelve to starboard. The planks are large, 7 to 23 meters in length and 12 to 15 centimeters in thickness. Much of the strength of the hull is the result of the shape of the planking and the joggled plank edges. These joggled edges prevent longitudinal shifting and help to prevent the ends of the vessel from sagging (fig. 3.5).[35]

The planking is edge joined with rather widely spaced mortise-and-tenon joints. Along uninterrupted sections of planking edges, the spacing appears to range from 30 to 60 centimeters.[36] Much of this variation is due to the fact that shipwrights could only place these joints between rows of lacing holes (fig. 3.5). Both joints and lacing holes are centers of stress. Placing one above the other results in an area with less wood and more stress, which produces an area of weakness in the hull. Avoiding this type of placement seems to be common in all laced ships. The spacing of joints also appears to be influenced by the location of joggled edges and possibly knots in the planking (fig. 3.5).[37]

As already mentioned, the hull planks are held together with lacings;[38] lacing holes are spaced approximately every 25 centimeters longitudinally and every 10 centimeters transversely. Due to the careful alignment of over 4,000 of these holes, a line could be passed through them from rail to rail.[39]

Once the hull planks were in place, sixty-six deck beams were set in notches cut into the sheer strakes. A notched central girder and side girders were then fitted to the deck beams (fig. 3.6).[40] The central girder is notched to receive forty-two deck beams and is lashed to the underside of fifty deck beams. It was supported by sixteen stanchions that were seated on the center of each frame. The two side girders are

[34] Steffy (supra n. 8) 24, 27.

[35] Steffy (supra n. 8) 28.

[36] This range is based upon measurements taken from figure 3.5. Of course, the accuracy of these measurements is based on the assumption that the drawing is to scale.

[37] For a detailed discussion of mortise-and-tenon joints in this vessel see C. Haldane, *Ancient Egyptian Hull Construction* (Ph.D. dissertation, Texas A&M University 1992) 99–104.

[38] Lacings describe cords passing through a hole one time, whereas lashings pass through a hole more than once. As we lack any direct evidence as to whether lacings or lashings were used in ancient vessels, I will use the term lacings throughout this paper as a generic term to indicate that some type of cord or ligature was used to secure the hull planking of a vessel.

[39] P. Lipke, *The Royal Ship of Cheops*, BAR International Series 225 (Oxford 1984) 78-79.

[40] Lipke (supra n. 39) 78.

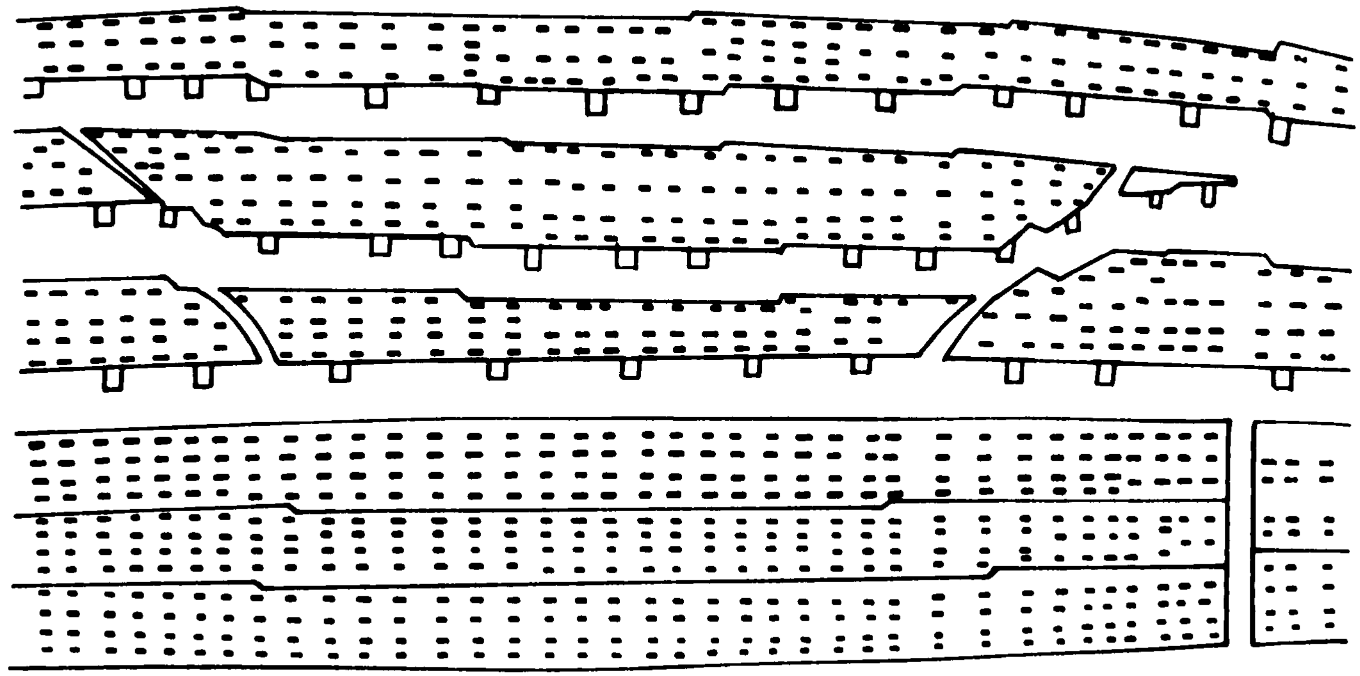

Fig. 3.5. Section of planking from the Cheops vessel. (After P. Lipke, *The Royal Ship of Cheops*, BAR International Series 225. [Oxford 1984] fig. 44)

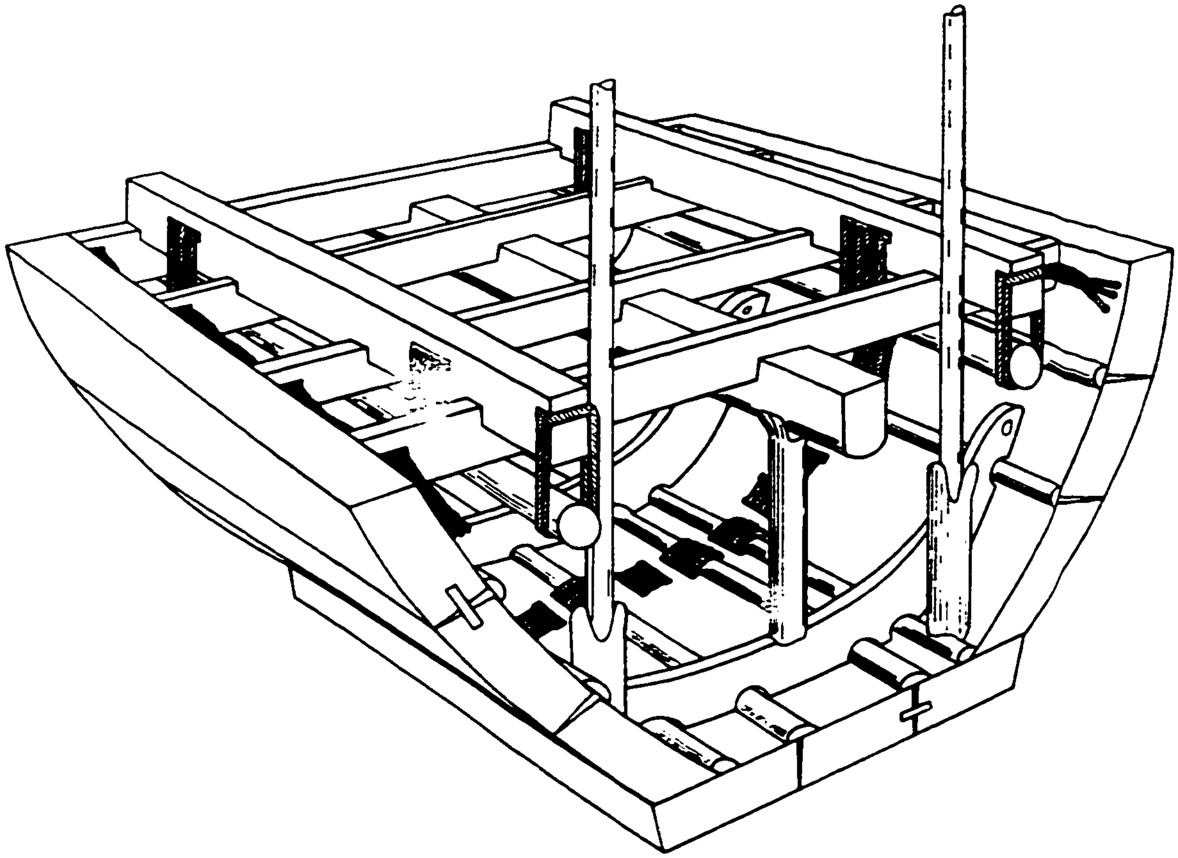

Fig. 3.6. Cross-section of the Cheops vessel. (After P. Lipke, *The Royal Ship of Cheops*, BAR International Series 225 [Oxford 1984] fig. 11)

notched and fitted on top of forty-nine deck beams. The girders are tied to long, round poles set against the lower faces of the deck beams. (fig. 3.6).[41]

The sixteen one-piece frames are of naturally curving timber, consisting of eight full-length and eight three-quarter length pieces. Dimensions of the frames have yet to be published, but, based upon scale drawings (fig. 3.6), the frames appear to be sided (width) about 8 centimeters and molded (high) about 19 centimeters with a spacing throughout the hull of not less than 2 meters.

As previously mentioned, these frames are bases for sixteen stanchions that support the central girder.[42] The frames offer little in the way of strengthening by their placement and size because the average molded measurement of these frames is close to the thickness of the planking. In addition, the average sided measurement is considerably smaller than the molded dimension, and even the full length frames only cross the third seam on each side of the hull (fig. 3.6). Finally, there are only sixteen frames for a vessel that exceeds 40 meters in length.[43]

This suggests that the importance of framing was neither in structural strength nor in maintaining hull shape but in distributing stress from the central girder more evenly throughout the hull. This review suggests that the various structural timbers of this vessel make up a well balanced unit. Tenons, lashings, girders, and planking strength provide longitudinal support. The shape of the planking, its extra thickness, the way it is sculpted and rockered, and the locking effect provided by the joggled plank edges supply a major portion of the hull's strength.[44] All structural features of this vessel were designed as an integrated unit.

According to J. Richard Steffy, Egyptian shipwrights not only developed the ability to plan and construct such a vessel, they were able to do so by shaping each plank and plank edge to exactly the proper configuration in order to arrive at the desired hull form and dimensions. Such expertise could only have been acquired through many generations of boatbuilding.[45]

Archaeological evidence of general carpentry supports this interpretation. As early as the First Dynasty (ca. 3100 B.C.), Egyptian carpenters used large timbers to build complex tombs. In addition, they had developed all of the principle types of joinery, including the pegged mortise-and-tenon joint. Their rather

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[41] Lipke (supra n. 39) 82, 107.

[42] Lipke (supra n. 39) 107.

[43] Haldane (supra n. 37) 105–106; Steffy (supra n. 8) 26

[44] Steffy (supra n. 8) 27-28.

[45] Steffy (supra n. 8) 28-29.

early mastery of joinery may have been a result of a dearth of long lengths of wood.[46] Even the tools they used would not change until the addition of the plane during Roman times.[47] Egyptian carpentry had already reached its finest level by the time the Cheops vessel was built in the Fourth Dynasty.[48]

Although the length to breadth ratio of the Cheops vessel (7.7:1) cannot compare with commercial vessels of the time, this vessel has many features in common with them. Indicators within this structure reveal that the woodworking techniques used must have been standard-maritime technology in ancient Egypt. The hundreds of mortises, the complex planking shapes, and the elaborate methods of lacing as a primary fastening system all attest to this being a labor-intensive hull. Yet, the quality of workmanship indicates that such work must have been standard practice in many Egyptian hulls at this time. This vessel shows that in the third millennium B.C., Egyptian shipwrights could build large hulls with a thorough understanding of the strengths and weaknesses of their construction.[49]

Although we lack the remains of Egyptian seagoing ships, a few depictions do survive. The earliest known depictions date to the reign of Sahure (ca. 2487–2475) in the Fifth Dynasty (fig. 3.7).[50] The hull of each vessel appears to have an exaggerated curve and a rather shallow draft. Lacing runs the length of the hull at the lower edge of the planksheer. Different scholars have proposed different functions for this lacing: it adds additional rigidity to the hull; it is used to attach the planksheer to the hull; or it hides the ends of the deck planking.[51] A later relief depicting two Egyptian ships also survives from the causeway of Unas's burial temple.[52] Both ships are similar to those of Sahure but, unfortunately, lack the same detail and quality.

The hogging truss is the most conspicuous aspect of all ships. It is a device that adds longitudinal support to a hull, and it prevents a hull from breaking up when sailing in moderate to high seas. A truss is thought necessary on Sahure's ships because they lack a well-developed keel, adequate framing, and have

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[46] A. Lucas, *Ancient Egyptian Materials and Industries* (London 1962) 451–52.

[47] W.B. Emery, *Archaic Egypt* (Baltimore 1961) 182–91, 216, 219, 221.

[48] Lipke (supra n. 39) 117.

[49] Steffy (supra n. 8) 28-29.

[50] Faulkner (supra n. 33) 5–6; C.V. Sølver, "Egyptian Sea-Going Ships, about 2600 B.C.," *MM* 47 (1961) 26; L. Borchardt, *Das Grabdenkmal Des Königs Saꜣhu-reꜥ*, Band II: *Die Wandbilder*, Text (Osnabrück 1981) 25–28; S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* (College Station, Texas 1998) 14. For a dissenting opinion that seagoing ships are depicted see, A. Nibbi, "Some Remarks on the Assumption of Ancient Egyptian Sea-Going," *MM* 65 (1979) 201–08.

[51] Faulkner (supra n. 33) 5–6; Sølver (supra n. 50) 1961: 26; Wachsmann (supra n. 50) 14.

[52] S. Hassan, "The Causeway of Wnis at Sakkara," *ZÄS* 80 (1954) 138, Tafs. 12–13.

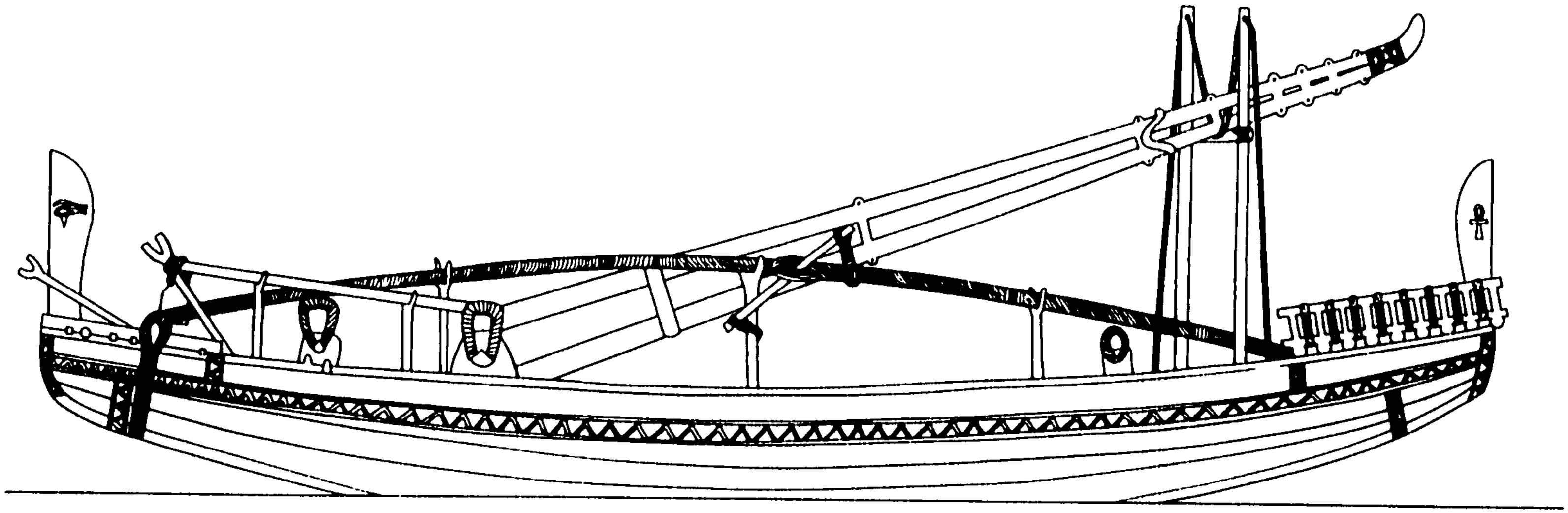

Fig. 3.7. Composite drawing of a ship from the tomb of Sahure. (After L. Borchardt, *Das Grabdenkmal Des Königs Sa^{3}hu-re^{c}*, Band II: *Die Wandbilder*, Text [Osnabrück 1981] pls. 11–13)

too much overhang at the extremities.[53] Unfortunately, tomb paintings tell us nothing of the internal structures of Egyptian ships. Furthermore, it is difficult to accept this interpretation in light of what we know of Egyptian shipwrights of this period. Sahure's carpenters and shipwrights had a complete tool kit, a knowledge of all types of joinery, and were masters of their craft. Their ancestors had already built a magnificent vessel like the Cheops boat, but they were still unable to build a seagoing ship without a hogging truss. As a matter of fact, the Egyptians appear to be the only people in recorded history who could not build a seagoing-merchant ship without this device. The archaeological evidence gleaned from the Cheops vessel can clarify this enigma.

In evaluating these vessels, scholars overemphasize the importance of framing. Widely-spaced frames are rather common in laced ship construction. Scholars also minimize the importance of hull planking in Egyptian vessels as a structural feature. Egyptian shipwrights relied more on carving thicker planking to the necessary curvature and shape than other ancient shipwrights.[54] Sculpting thick planks results in a stiffer and a stronger hull; this strength is supplemented by the intricate joggled edges of the planks.[55] These intricate edges increase the amount of surface area at the ends of each plank, which reduces slippage.

The exaggerated shape of these hulls may also have supplemented hull strength. The strength of such a hull is similar in theory to an arch, except that instead of a weight pressing down to hold it in place, the pressure of water pressing on the hull does so.[56] Eric Marx believes that this arch consists of a continuous curve from bow to stern that is broadest and deepest in the middle and then tapers off at each end. A central longitudinal girder that joins the bow and stern of the hull is the base of this arch and binds the structure into a firm unit (fig. 3.6).[57] Marx proposed his interpretation several years before the discovery of the Cheops vessel.

The longitudinal girders and deck beams in the Cheops vessel act as a base for this arch. They are also important for another reason. The weight of a hull above the waterline acts as a force of gravity, which is opposed by the force of water or buoyant force on the submerged part of a hull. The placement of girders and deck beams higher in a hull more effectively adds weight to the force of gravity pushing down on the

[53] Faulkner (supra n. 33) 4; Sølver (supra n. 50) 27; Wachsmann (supra n. 50) 14.

[54] Steffy (supra n. 8) 27–28; see also F. Brewster, "The Raft of Odysseus," *HSCP* 37 (1926) 50.

[55] Steffy (supra n. 8) 27–28.

[56] C.D.J. Bell, "Ancient Egyptian Ship Design; Based on a Critical Analysis of the XIIth Dynasty Barge," *Ancient Egypt and the East* December, Parts III, IV (1933) 101.

[57] E. Marx, "The First Recorded Sea Battle," *MM* 32 (1946) 244.

hull and makes the hull more competent. The lacing on Sahure's ships, which runs the length of each vessel at the lower edge of the planksheer, appears to be at the same level as the deck beams and longitudinal girders. As previously mentioned, lacings on the hulls of *mitepe* were not cut away at areas with the highest concentration of stress. The lacings on Sahure's ships may, therefore, have been needed to reinforce girders and deck beams because stress was concentrated in this area. In addition, timbers at deck level are suggested by the use of a bipod mast in this depiction (fig. 3.7). A bipod mast would allow a girder to run the length of a vessel at deck level. This may also explain why the bipod mast continued in use for such a long period after the introduction of the centerline or pole mast, which appears at least as early as predynastic or early dynastic times.[58] These features would produce a well-integrated and strong hull.

When we look at the Cheops boat, we have nearly all the basic elements necessary to build a seagoing laced ship. To build a hull without a truss would only require a few modifications. Shipwrights would need to decrease the length-to-breadth ratio, and a length-to-breadth ratio of 3:1 appears to be rather common for Pharaonic merchant vessels.[59] They would also need to use larger mortise-and-tenon joints. The hull should have a nice gently curving cross section instead of a flat bottom, and, probably, the thickness of the keel plank increased. Finally, lacings must be pegged instead of tied. This at first may sound like a large number of changes, but in comparison to what Egyptian shipwrights had already accomplished, this is basic carpentry. All that is required is changing the number, size, and spacing of some elements and adding some pegs.

Another way to attain the necessary rigidity in a hull would be to peg the mortise-and-tenon joints. Since mortise-and-tenon joints were already being used, most difficulties in cutting, spacing, and placement of this joinery must have been understood. In most situations, a shipwright would also need to learn the intricacies of a stiffer hull. This does not pose a problem for Egyptian shipwrights because the way in which they sculpted their planking already produced a hull stiffer than most laced ships but not as stiff as a hull built with pegged mortise-and-tenon joinery. The actual pegging of a mortise-and-tenon joint is the simplest aspect of the process, and the Egyptians had been doing so for a long time.[60]

A pegged mortise-and-tenon joint would also make a hull less labor intensive. Although shipwrights would need to make larger and probably more joints, this is more than compensated for by the elimination of 4,000 lacing holes. The removal of these holes also allows a shipwright to be more flexible in the

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[58] S. Mark, "The Earliest Mast Step," *The INA Quarterly* 25.2 (1998) 24—25.

[59] S. Vinson, "Dimensions and Proportions of Pharaonic Ships in Literary, Monumental and Archaeological Material," *AFP* 43 (1997) 69–70.

[60] Emery (supra n. 47) 221.

placement of mortise-and-tenon joints because he no longer needs to worry about spacing these joints in relation to the 4,000 lacing holes. As previously mentioned, mortises cannot be cut beneath lacing holes because both are centers of stress and to place one above the other concentrates stress at a point with the least wood. Pegging mortise-and-tenon joints therefore allows for more joints in a hull.

The fact that Egyptian shipwrights did not peg the joints in their seagoing ships is unusual in that not only was this joint known by the Fourth Dynasty, but it was one of the most commonly used joints at this time.[61] The reason they did not peg joints to secure their hull planking was probably based on the same reason for using a hogging truss, they were forced to make a compromise, as I will try to show.

Many of the compromises Egyptian shipwrights made were the result of a shortage of long lengths of timber from native timber stands. The lack of such wood made them masters of joining small pieces of wood into larger pieces.[62] It is this scarcity of long lengths of wood that made the importation of cedar so important. Cedar is commonly used for boatbuilding and is well suited for this purpose. It shrinks little and seasons with negligible distortion and degradation; it is easily worked and has little dulling effect on tools.[63] It also appears to be resistant to decay.[64] The disadvantage of using cedar was that ships were built from one of Egypt's most valuable imports. Every precaution would therefore have been taken to ensure the use and reuse of such wood. In seagoing ships, however, teredo worms, rot, and accidental damage would eventually result in necessary repairs or replacement of timbers. Such repairs and general maintenance may have imposed two compromises that required the use of a hogging truss. The first was that all lacing was tied instead of pegged into place. Since lacing holes do not extend to the exterior of a hull, pegs must be drilled or chiseled out when lacings were removed. The continual removal of lacing pegs would lead to the enlargement and possibly damage to a plank. To minimize the possibility of such damage, all cordage was lashed into place instead of pegged. Cutting 4,000 mortises for lacings is much more difficult than drilling holes through to the exterior surface of a hull, but it does have advantages. As previously mentioned, a lack of cordage on the exterior of a hull reduces drag and results in a faster vessel. Keeping cords intact, especially with transverse lacing, will result in a stronger hull. Finally, it may also result in a more watertight hull. In contrast, the greatest disadvantage to this technique is its labor intensiveness, but in a country where labor appears to have cost the Pharaoh little, this was probably not an important factor. Therefore, a hogging truss may have been required more to regulate tension on

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[61] Emery (supra n. 47) 221.

[62] Lucas (supra n. 46) 452

[63] Titmuss (supra n. 16) 59; Steffy (supra n. 8) 27.

[64] Theoprastus, *Hist. Pl.* 5.7.6; Steffy (supra n. 8) 27.

the lacings than to reinforce the timbers.

A second possible compromise in using a hogging truss was the fit of the tenons in the mortises. In Lipke's publication of the Cheops vessel, the size of tenons were mentioned but not the size of mortises. In an earlier publication, it was reported that a few small pieces of wood did have mortise-and-tenon joints *in situ*. Tenons were smaller than mortises and were fixed into position with a paste (fig. 3.8).[65] We see a similar arrangement in regard to the Lisht timbers. These timbers were found around the pyramid of Senwosret I (c. 1950 B.C.). The vessel or vessels from which they came are believed to have belonged to a freight vessel. Spaces of about one centimeter are commonly seen on one or both sides of some tenons. In other mortises wooden shims are in the spaces beside the tenon. In contrast to the width, the tenon thickness corresponds so closely with mortise width that the tenons fit tightly. The tenons taper from a maximum width of approximately 6.5 centimeters at the midpoint to a width of approximately 4.5 centimeters at the tips (fig. 3.9).[66]

Cheryl Haldane proposes that shims, like the intricately joggled plank edges, may have been intended to fight longitudinal slippage along plank seams.[67] If the tenons were rectangular, this may be a valid interpretation, but they are widest at the center. This means that the shims only come into contact with the tenon at one point along the length of a tenon (fig. 3.9). Under such circumstances, all of the stress will be placed on one point of a shim, which, if the stress is truly as great as proposed, would quickly pulverize a shim at the point of contact. It appears more likely that shipwrights used shims, like the previously mentioned paste, to help align tenons and keep them in place while planks were fitted to the hull.

Using narrower and tapering tenons allows a carpenter to fit planks more easily, remove tenons more easily, and reduces the possibility of gouging or damaging mortises during both operations. At the same time, to make these joints as strong as possible, tenons are cut as thick as possible for the tightest possible fit. This technique is important especially when we consider how much of the plank has been cut away for mortises and lacing holes. As previously mentioned, shipwrights avoid cutting mortises beneath lacing holes. This arrangement allows a shipwright few choices when cutting a new mortise or repairing a broken one. The need to preserve the integrity of a plank may also explain why the Egyptians used mortise-and-tenon joints instead of dowels. It takes less time to make a dowel and drill the necessary holes in the edge of a plank, but, since a dowel is circular, it must fit tightly around its circumference making it difficult to remove. In contrast, a rectangular tenon can fit tightly on the widest faces for strength and leave space at each extremity so it may be more easily removed. A drawback to leaving

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[65] M. Nour, M. Osman, Z. Iskander, and A. Moustafa, *The Cheops Boats* (Cairo 1960) 55.

[66] Haldane (supra n. 37) 172, 175, 183.

[67] Haldane (supra n. 37) 184.

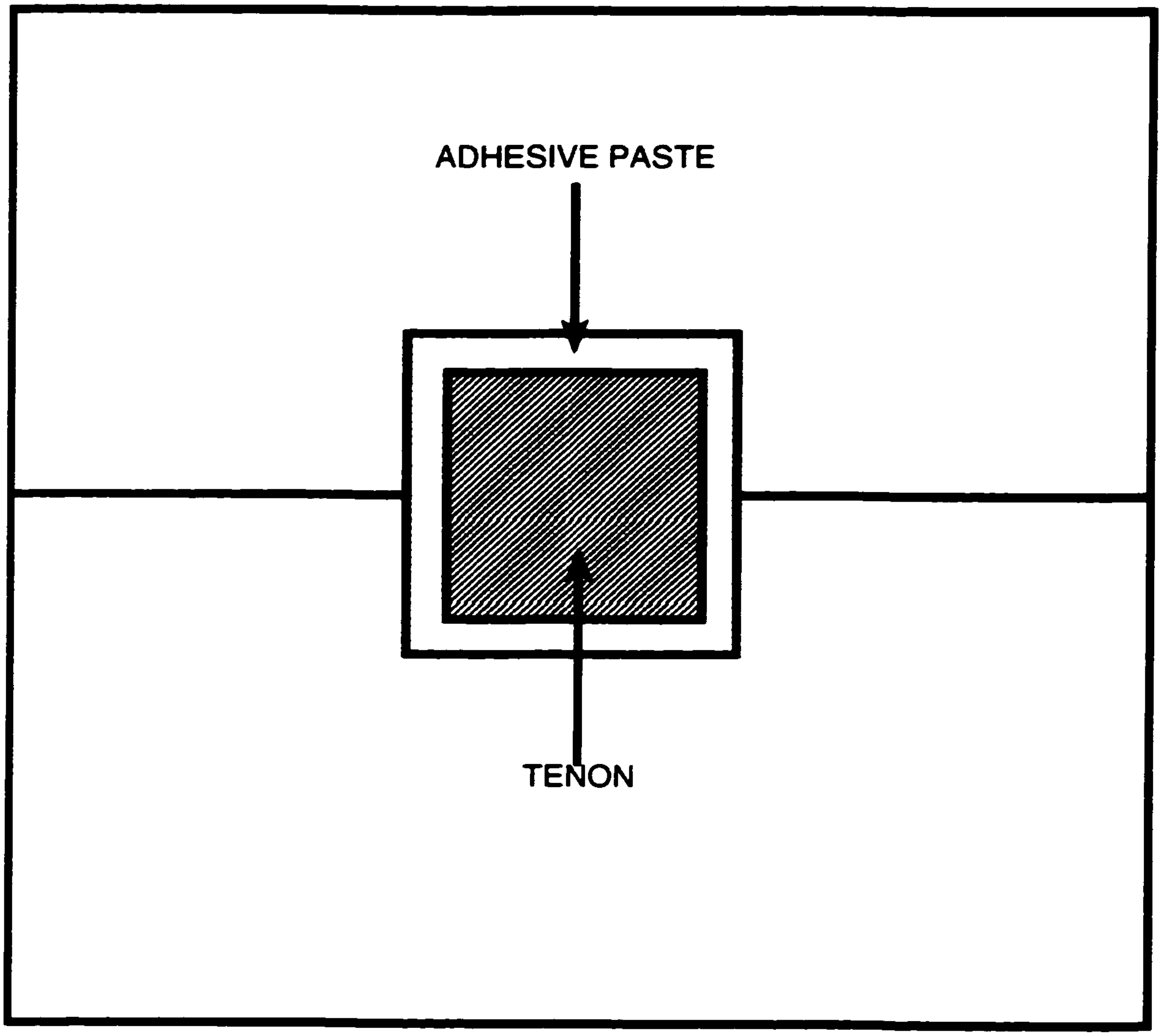

Fig. 3.8. Mortise-and-tenon joint from the Cheops barge. (After M. Nour, M. Osman, Z. Iskander, and A. Moustafa, *The Cheops Boats* [Cairo 1960] fig. 21)

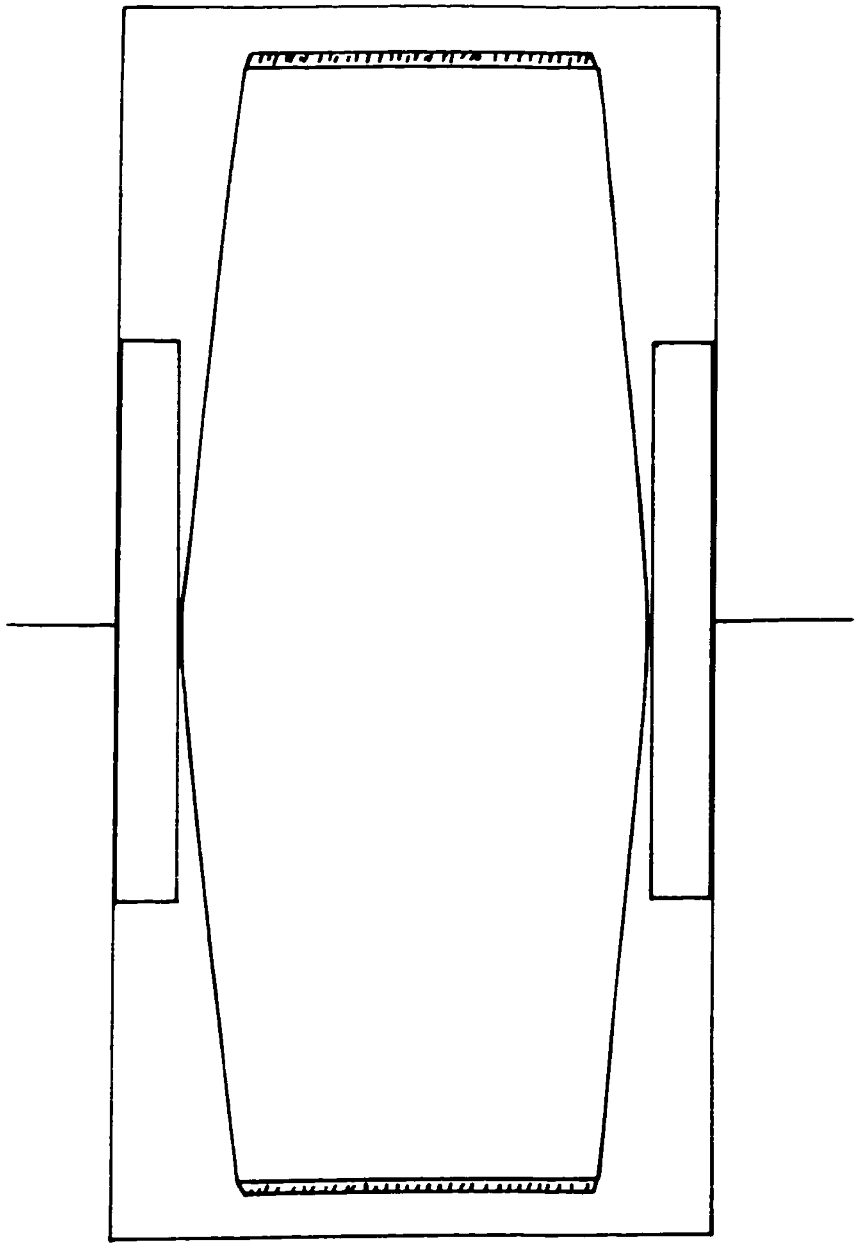

Fig. 3.9. Mortise-and-tenon joint from Lisht vessel. (After C. Haldane, *Ancient Egyptian Hull Construction* [Ph.D. dissertation, Texas A&M University 1993] fig. 8)

space at each extremity of this type of joint is a weaker joint and as a consequence a weaker hull. A hogging truss may have been used on such a hull to compensate for the weak joinery. It is therefore unlikely that the Egyptians used a hogging truss because they were unable to build a hull strong enough to sail without one, but is instead the result of compromise, not ignorance. The advantage of such a compromise is that it allows for the continued reuse of timbers, but the disadvantage is that it results in a weaker hull.

The only other known depiction of Egyptian seagoing ships portrays those that Queen Hatshepsut (ca. 1473–1458) sent to Punt (fig. 3.10). These vessels are believed to be laced, and like Sahure's ships, Queen Hatshepsut's ships have hogging trusses. There are some differences between the ships of Sahure and Hatshepsut. The exterior lacing disappears, and the hull seems fuller and more substantial on Hatshepsut's ships. Thus, there may have been internal improvements. It has been proposed that one of these improvements is some type of a keel plank or proto-keel.[68] Another possibility is the use of a keelson-like timber similar to what is thought to have been used on the Lisht vessel (fig. 3.11).[69] Of course, even with all these structural improvements, the hogging truss still remains.

One of the main features that makes this type of vessel so valuable is the ability to dismantle it, carry it across the desert, and rebuild it on the Red Sea coast, then repeat the sequence on the return journey from Punt or the Sinai. Under these conditions having lacing that is lashed instead of pegged would be a definite advantage. Furthermore, tenons that are relatively easy to pry out of a mortise are preferable to those that must be chiseled out. Therefore, the same compromises still exist.

Other economic pressures can also influence the type of techniques used by shipwrights. Queen Hatshepsut's ships were assembled and taken apart in a desert. This means that food and water must be provided for all workers. Therefore, the faster this task can be accomplished with the fewest number of men is of the utmost importance. So even if the Egyptians were pegging their lacings or mortise-and-tenon joints on Mediterranean ships, such a practice would not be cost effective in a desert where extra men and time were necessary to remove thousands of pegged fastenings as opposed to tying and untying lacings.

Considerable conjecture also exits concerning the introduction of pegged mortise-and-tenon joinery and the keel in ship construction. Unfortunately, little definitive evidence survives to support any particular theory.[70] The earliest conclusive evidence for both is found on the Uluburun shipwreck.

The Uluburun ship sank near the peninsula of Uluburun, Turkey (ca. 1300 B.C.). It was approximately

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[68] Wachsmann (supra n. 50) 241–42.

[69] Haldane (supra n. 37) 187.

[70] Both topics are discussed by Wachsmann (supra n. 50) 239–41, 414 [joinery], 241–46, 412 [keel].

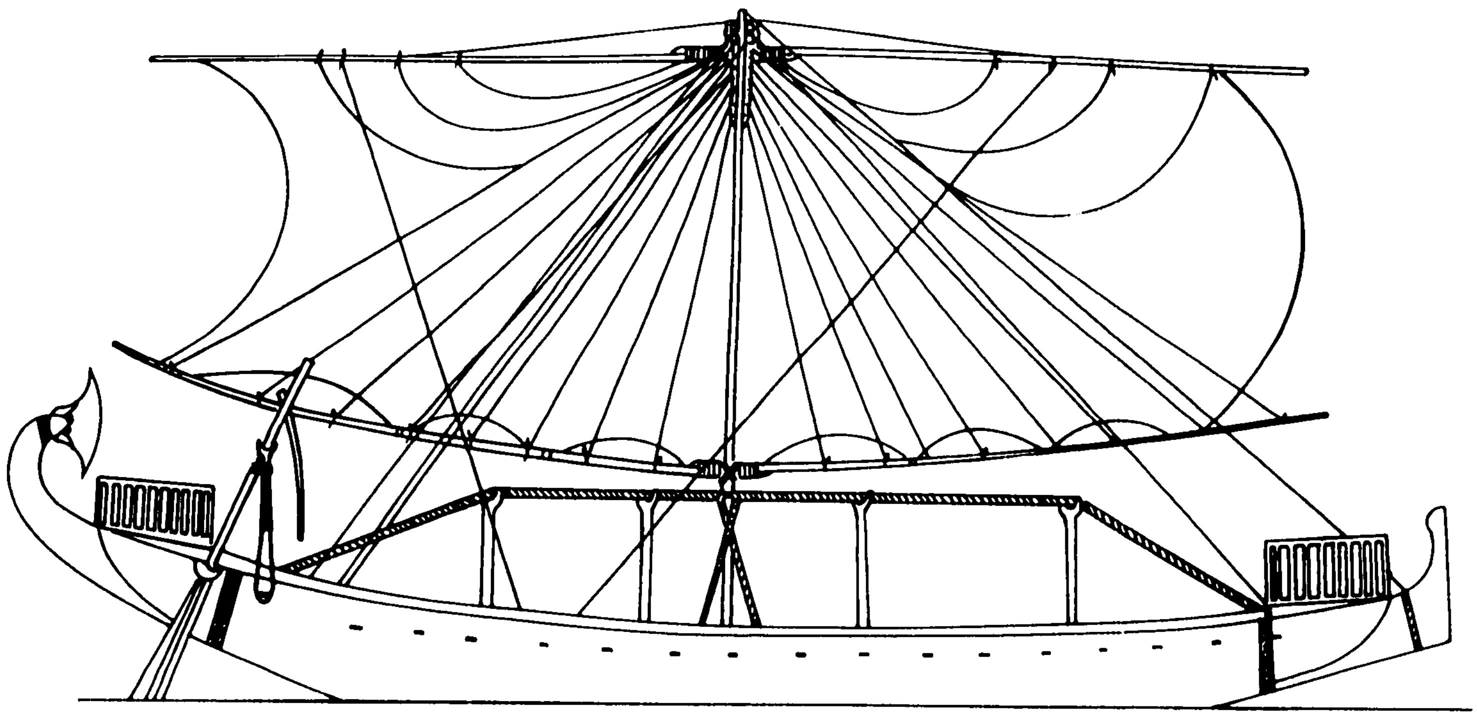

Fig. 3.10. A Punt ship from the time of Hatshepsut. (After É. Naville, *The Temple of Deir el Bahari: End of Northern Half and Southern Half of the Middle Platform*, No. 16, Part 3 [London 1898] pl. 75)

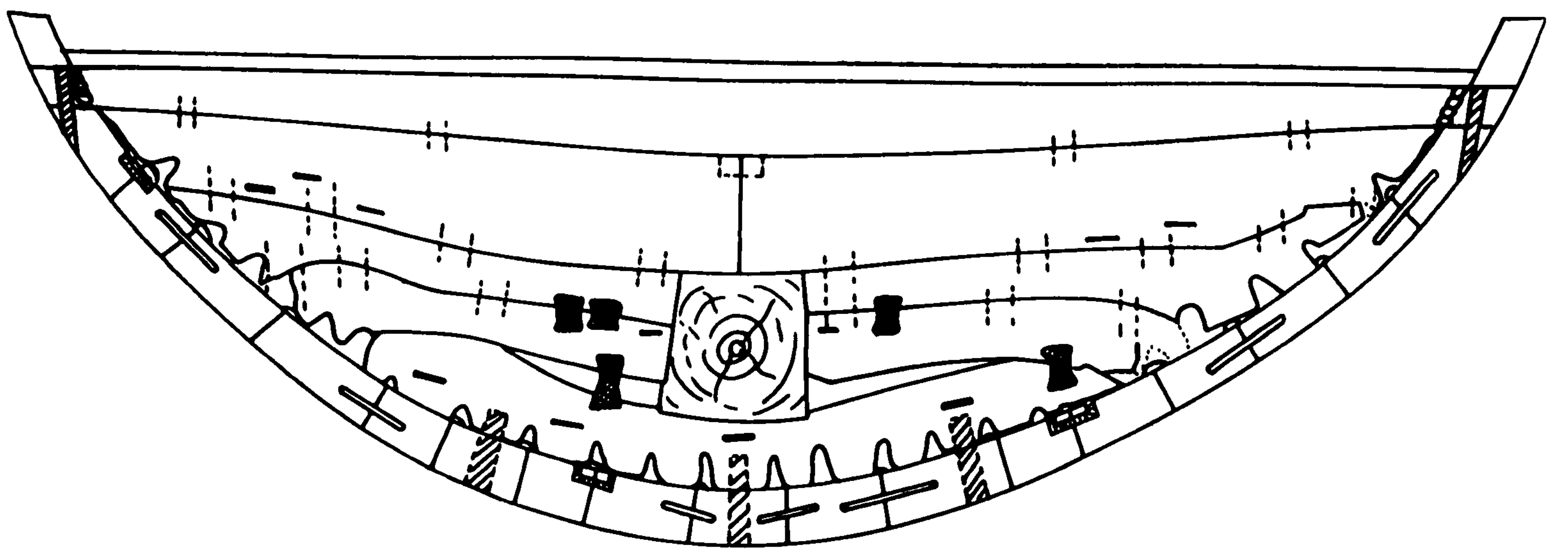

Fig. 3.11. Proposed reconstructed cross-section of a Lisht hull. (After C. Haldane, *Ancient Egyptian Hull Construction* [Ph.D. dissertation, Texas A&M University 1992] fig. 8-20)

15 to 16 meters in length and carried a minimum of 20 tons of cargo.[71] Unfortunately, only three small sections of hull planking survive. Planking is fastened with widely-spaced pegged mortise-and-tenon joints. The center-to-center distance between pegs in adjacent tenons ranges from 24 to 26 centimeters, but these joints are also unusually large. The mortises are 1.5 to 2 centimeters thick, about 7 centimeters wide, and from 13 to 15 centimeters deep in planking about 6 centimeters thick. In contrast, the planking of the Cheops vessel is 12 to 15 centimeters thick. The joints of the Uluburun ship are so large that mortises on the upper edge of the plank were cut into part of the previously pegged tenon on the opposite edge of the plank (fig. 3.12). The large size of these joints and the way they line up lends credence to the idea that mortise-and-tenon joints act as internal frames. Wooden pegs approximately 2 centimeters in diameter secure these joints.[72]

The planking that survives consists of a keel plank or proto-keel, garboard strakes, and a variable number of planking pieces. The keel plank is 28 by 22 centimeters, and it appears to have only extended below the garboard strakes by, at most, a few centimeters (fig 3.12). The planking and keel plank are of cedar, and the tenons are of oak. One of the more interesting aspects of this wreck is a lack of evidence for framing, bulkheads, or any evidence for fastening them to the hull planking. It has been proposed that the preserved section is neither long nor wide enough to include them. In contrast, sections of planking survived because they were covered by copper ingots. In addition, the dunnage of thorny burnet that covered the planking also survived.[73]

Even if the sections of planking were not wide enough for evidence of fasteners to survive, it seems unlikely that all traces of framing would have disappeared. Some evidence of framing should have survived in these areas, especially since dunnage did survive. At the very least, we would expect to see some compression scarring on the upper faces of the planking, especially considering the weight of so many ingots stacked in these areas. A more likely explanation is that the cargo was stacked between the framing. Under these circumstances, copper ingots would not cover and protect them, leaving them vulnerable to decay and destruction by teredo worms. One of the best preserved remnants of the hull is 1.8 meters long,[74] suggesting that the frame spacing was at least this wide. This spacing is slightly smaller

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[71] Pulak (supra n. 25) 249.

[72] G.F. Bass, "The Construction of a Seagoing Vessel of the Late Bronze Age," in H. Tzalas, ed., *Tropis* I (Athens 1989) 25; C. Pulak, "1994 Excavation at Uluburun: The Final Campaign," *INA Quarterly* 21.4 (1994) 11–13; M. Fitzgerald, "Laboratory Research and Analysis," *INA Quarterly* 23.1 (1996) 8–9.

[73] Pulak (supra n. 72) 11–13; Fitzgerald (supra n. 72) 8–9.

[74] C. Pulak, "The Shipwreck at Uluburun: 1993 Excavation Campaign," *INA Quarterly* 20.4 (1993) 7; Pulak (supra n. 72) 8.

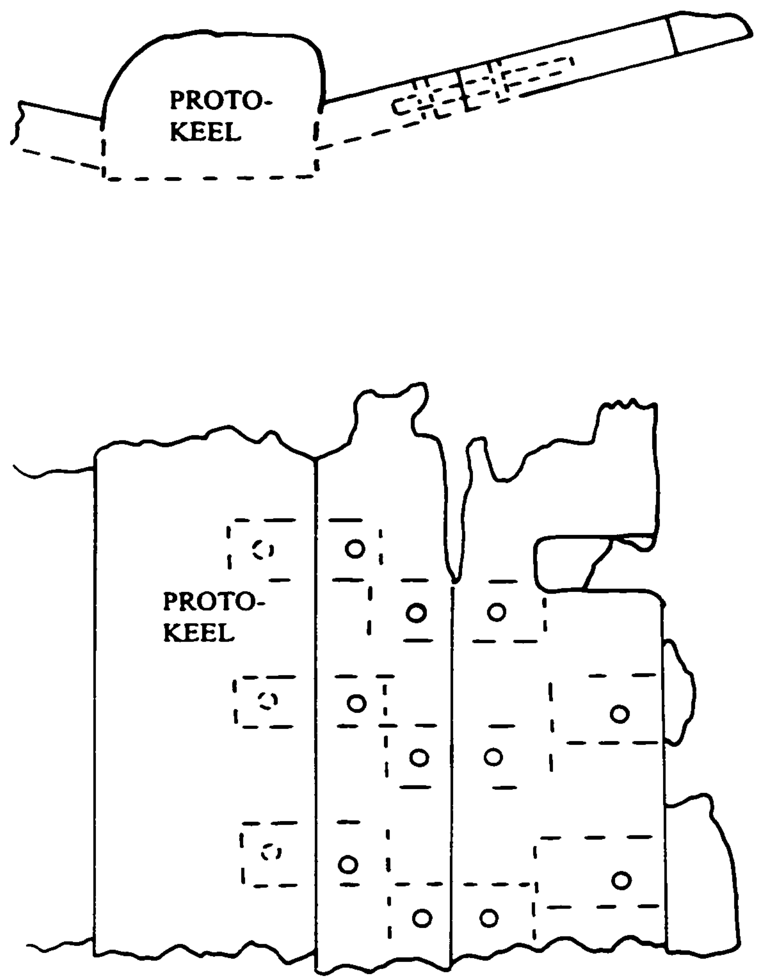

Fig. 3.12. Section of Uluburun hull. (After G.F. Bass, "The Construction of a Seagoing Vessel of the Late Bronze Age," in H. Tzalas, ed., *Tropis* I (Athens 1989) fig. 3; and adapted based on information from C. Pulak, "1994 Excavation at Uluburun: The Final Campaign," *INA Quarterly* 21.4 (1994) 11–13; M. Fitzgerald, "Laboratory Research and Analysis," *INA Quarterly* 23.1 (1996) 8–9.

than that on the Cheops vessel.

The manner in which the keel plank is recessed into the hull suggests that any framing must have been notched at the base to fit over this timber (fig. 3.12). It also suggests that whatever frames existed must have been rather large to be notched so deeply at the base and still have enough wood remaining to give any structural support to the hull. One possible exception is if the purpose of the framing was to distribute stress from a central girder. In such a situation, we would expect the framing to be more widely spaced.

This ship probably represents the best technology of the time because such a rich cargo would only be entrusted to the most seaworthy of ships. It is therefore possible that this ship is similar to the Syro-Canaanite ships portrayed on the tombs of Kenamun and Nebamun (figs. 3.13 and 3.14). The artist does not depict these vessels with keels. If, however, these ships have timbers like the heavy keel plank on the Uluburun wreck, the artist probably would not have depicted it because the few centimeters of wood that would protrude below the hull would be difficult to distinguish from the hull planking. This type of keel plank could even have been used on the Sahure ships and not be detectable in the depictions, but we have no way of proving or disproving this interpretation.

The stacking of the cargo also gives some important indications of the ship's structure. As previously mentioned, the hull of a ship can be strengthened with the use of internal stringers. Egyptian shipwrights commonly had longitudinal timbers running the length of a vessel at deck level (fig. 3.5). The earliest evidence of a possible keelson-like timber dates to the Middle Kingdom site of Lisht (fig. 3.11). But the way in which the copper ingots were stacked across the breadth of the Uluburun hull and the number of layers of ingots (fig. 3.15) precludes the possibility of any longitudinal stringers being located below the ingots. Therefore, if such stringers existed, they must have been located above the ingots, suggesting that such stringers may still have been at or near deck level as seen on early Egyptian ships.

The use of pegged mortise-and-tenon joinery on this vessel supports Shelley Wachsmann's argument that such items as laced ships depicted on the walls of Kenamun's tomb are artistic conventions.[75] Yet, it can also be argued that pegged mortise-and-tenon joinery may have only slowly replaced lacing in certain areas of a ship and composite vessels were in use for long periods of time. We have archaeological parallels that will be discussed later in this paper.

What are believed to be the remains of a second Syro-Canaanite ship were discovered off Cape Gelidonya, Turkey. This vessel, which sank about 1200 B.C., was a merchantman carrying primarily copper and bronze.[76] Little survives of this hull, but enough to suggest that this vessel was built with

[75] Wachsmann (supra n. 50) 44.

[76] G. F. Bass, *Cape Gelidonya: A Bronze Age Shipwreck* (Philadelphia 1967) 164.

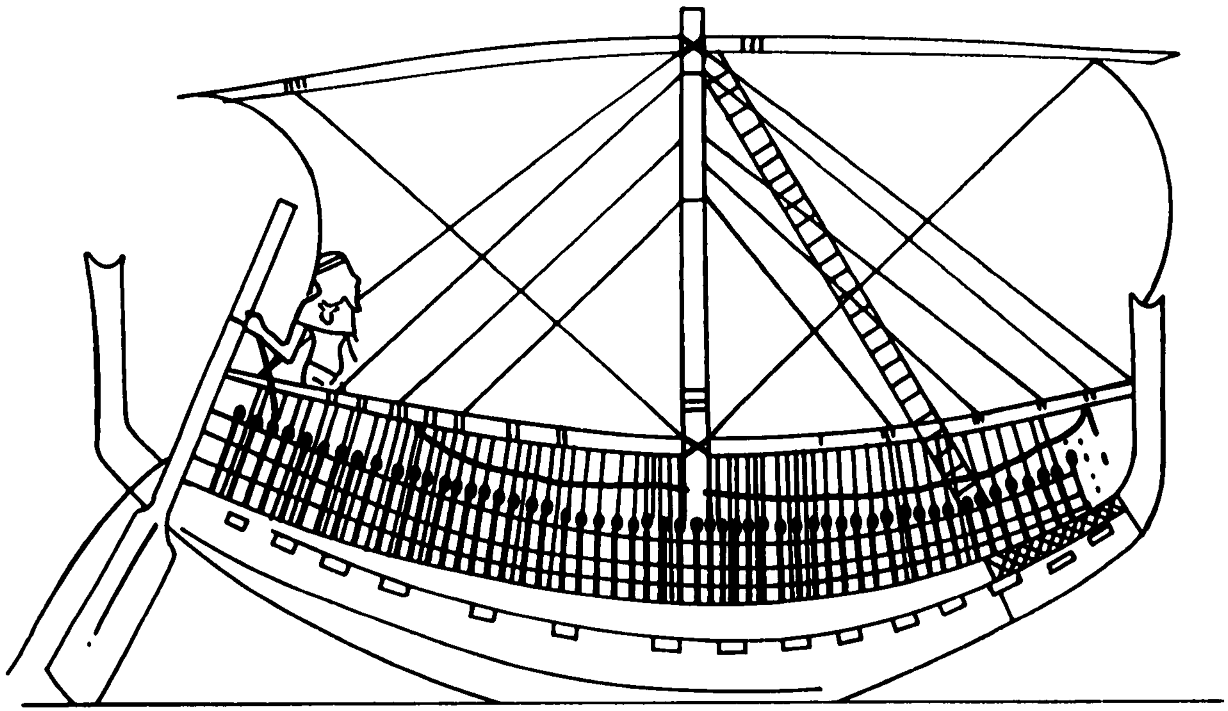

Fig. 3.13. Composite drawing of a Canaanite ship from the tomb of Kenamun. (After N. de G. Davies and R. Faulkner, "A Syrian Trading Venture to Egypt," *JEA* 33 [1947] pl. 8)

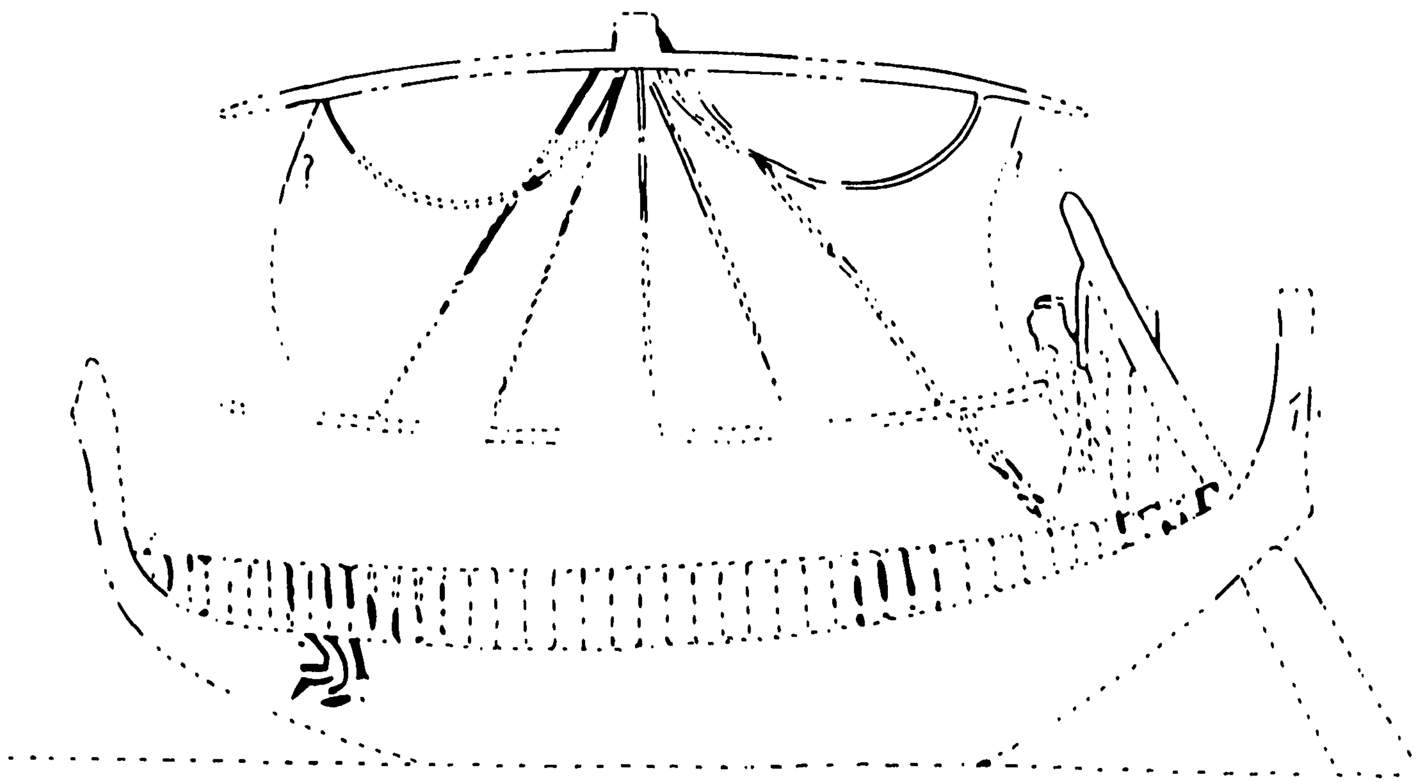

Fig. 3.14. Ship from the tomb of Nebamun. (After T. Säve-Söderbergh, *Four Eighteenth Dynasty Tombs* [Oxford 1957] pl. 23)

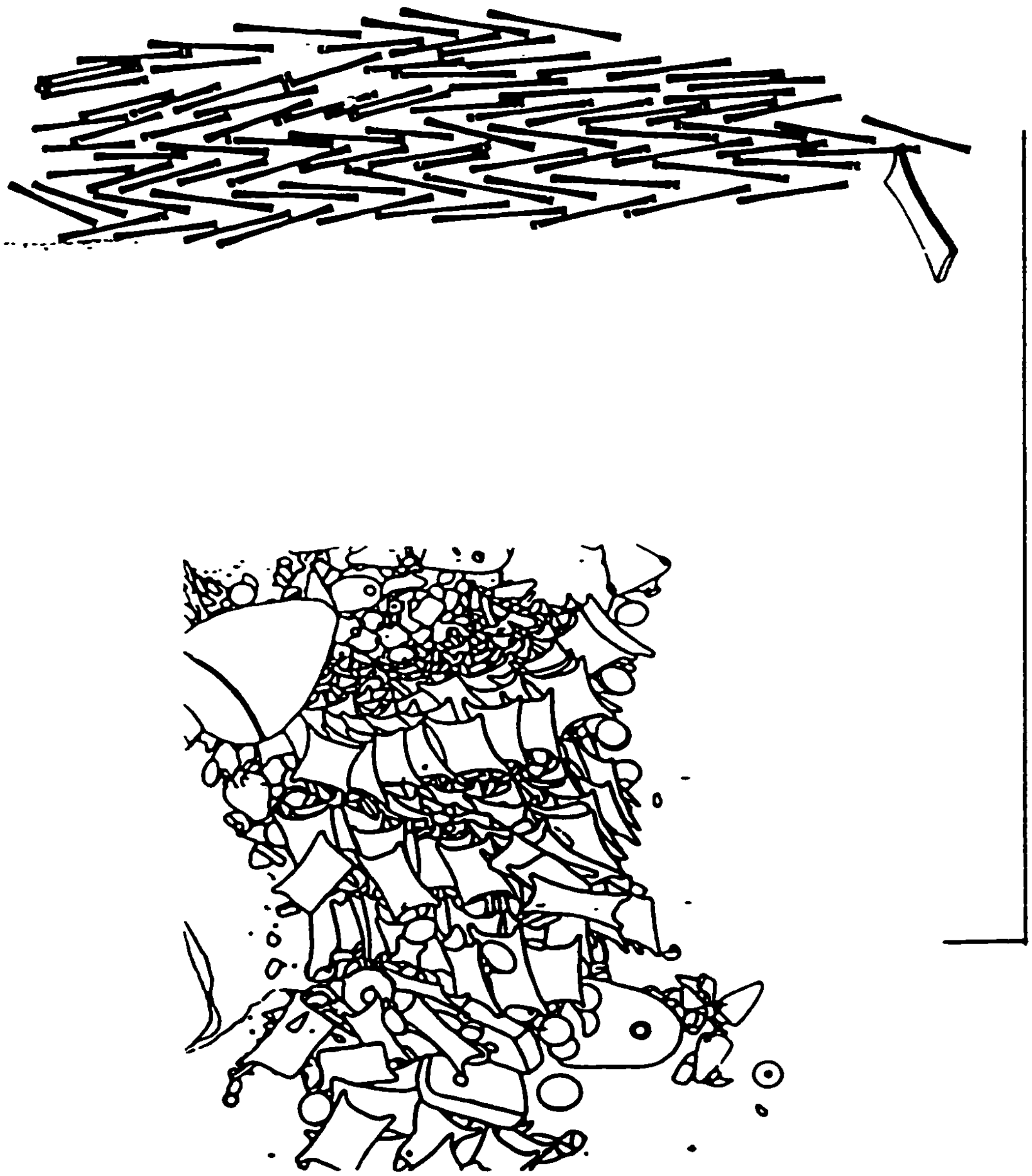

Fig. 3.15. Ingot cross section and spread on the Uluburun site. (From C. Pulak, "The Shipwreck at Uluburun, Turkey: 1992 Excavation Campaign," *INA Quarterly* 19.4 [1992] fig. 1)

pegged mortise-and-tenon joinery of a similar size to that on the Uluburun wreck.[77]

A considerable period of time elapses before another wreck with hull planking is discovered. What has been described as a Phoenician wreck dating to the seventh century B.C. was discovered at Mazaron, Playa de la Isla, Spain. Only general details of the hull and a sketch of the hull remains that appears to be drawn to scale have been published (fig. 3.16).[78] This ship was built with pegged mortise-and-tenon joinery, but these joints appear to be only about 4 centimeters wide, considerably smaller than those of the Uluburun vessel. The frames are circular, approximately 6.5 centimeters in diameter, are laced to the hull, and appear to be spaced 50 centimeters center to center. The hull planking appears to be 12 to 20 centimeters in width and is covered with resin on the interior surface. This ship, like the Uluburun ship, has a keel plank instead of a fully developed keel. It is 10 centimeters molded (high) and 17 centimeters sided (wide). Unlike that of the Uluburun ship, it appears to be of a harder wood than the planking and frames, and its upper face appears to be flush with the interior surface of the planking.[79] The most important aspects of this wreck relate to the fact that this ship was Phoenician.[80] It appears, therefore, that an unbroken tradition of building ships with pegged mortise-and-tenon joinery extends from the end of the Late Bronze Age to the seventh century B.C. Curiously, even after such a long time, the frames are small, widely spaced, and, most important, are tied in place instead of treenailed to the hull. This suggests that hull strength continued to be concentrated in the hull planking and supports the possibility of a similar framing pattern in the earlier Uluburun ship. The frame spacing, however, appears to be about 50 centimeters center to center, considerably smaller than what I suggest for the Uluburun ship. An increase in framing probably results in thinner planking, smaller mortise-and-tenon joints, and a change in the placement of mortise-and-tenon joints throughout the hull. Furthermore, the fact the frames were secured with lacings so late supports the possibility that the lacings portrayed on the Kenamun ships did indeed

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[77] Pulak (supra n. 25) 249.

[78] I. Negueruela, J. Pinedo, M. Gómez, A. Miñano, I. Arellano, and J.S. Barba, "Seventh-Century BC Phoenician Vessel discovered at Playa de la Isla, Mazarron, Spain," *IJNA* 24 (1995) 196, fig. 12. I calculated this scale from measurements published in C. Azipurua and J. Méndez, "Extracción y tratamientos del barco Fenicio (barco 1) de La Playa de La Isla (Puerto de Mazarrón, Mazarrón)," *Cuadernos de arqueología marítima* 4 (Cartagena 1996) 219. After searching for and reading a large number of articles on various aspects of this wreck, I found the above article by Azipurua and Méndez, which reported the diameter of the frames and size of the keel. The frames and keel on the sketch appear to be roughly proportional to the cited measurements. I therefore assume that all other elements are proportional and to the same scale. For this reason, however, measurements taken from the sketch are qualified by "appears to be"in the above text.

[79] Azipurua and Méndez (supra n. 78) 219.

[80] Negueruela, Pinedo, Gómez, Miñano, Arellano, and Barba (supra n. 78) 189–97.

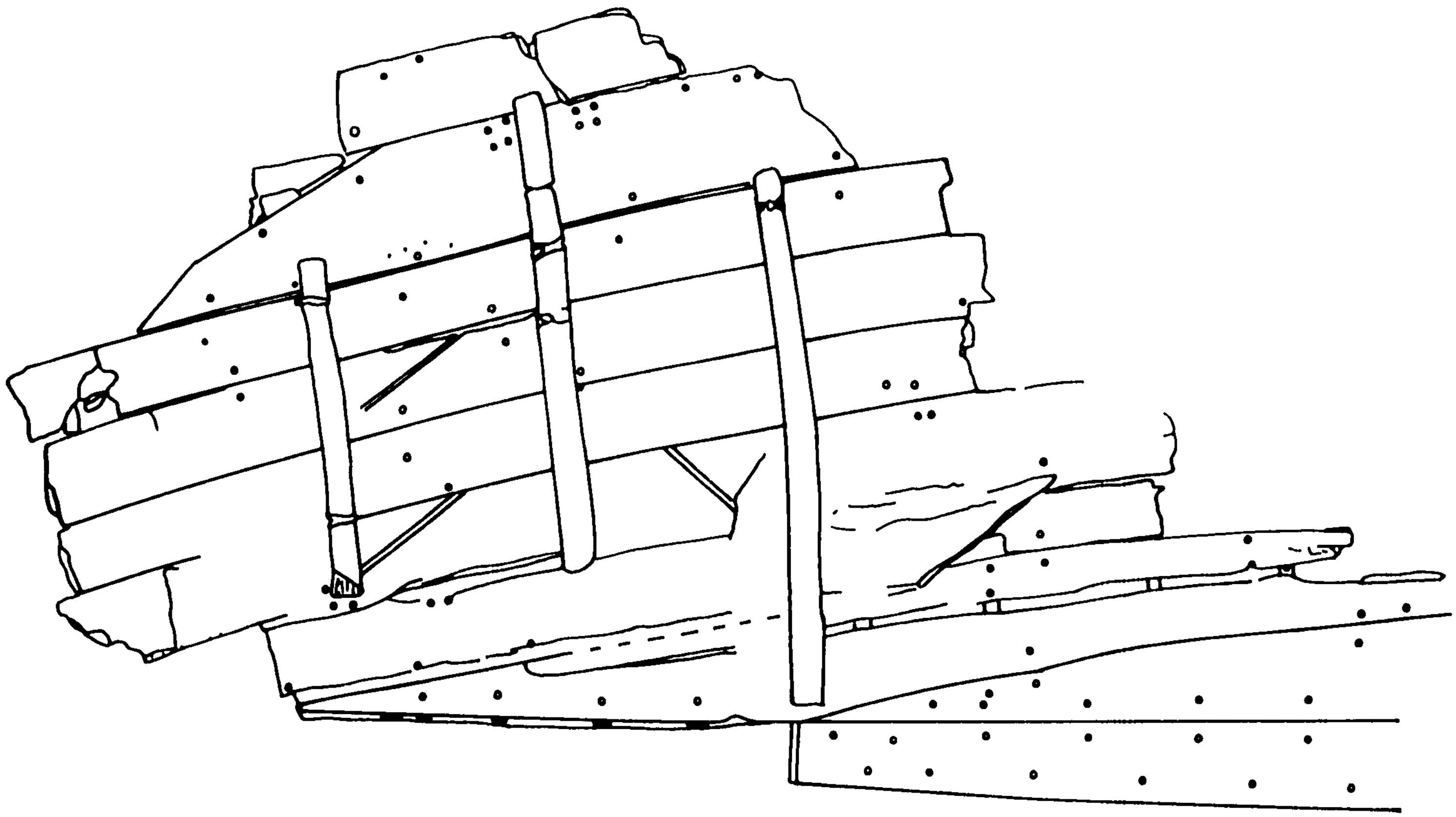

Fig. 3.16. Mazarron hull. (After I. Negueruela, J. Pinedo, M. Gómez, A. Miñano, I. Arellano, and J.S. Barba, "Seventh-Century BC Phoenician Vessel Discovered at Playa de la Isla, Mazarron, Spain. *IJNA* 24 [1995] fig. 11)

represent a contemporary aspect of Syro-Canaanite ships.

Unfortunately, these three wrecks are all that we have to represent the shipwrights craft from the Levant. All of the remaining wrecks appear to be the product of a Greek shipbuilding tradition.

Prior to the discovery of the Bon Porté I wreck, it was assumed that shipwrights as early as Homer's time had replaced laced construction with pegged mortise-and-tenon construction.[81] In his analyses of the Bon Porté I wreck and in a later study of laced ships, Patrice Pomey argues persuasively that ships constructed with ligatures were more common during classical times than originally thought. In addition, he feels that the Bon Porté I wreck reflects a second tradition that is characterized by the use of triangularly notched lacing holes (fig. 3.17). He proposes that this type of construction was almost certainly Etruscan.[82] His position was supported by the study of the Giglio wreck by Mensum Bound.[83] The general acceptance that this lacing technique indicates Etruscan instead of Greek construction appears to have been influenced by the belief that the Greek people had an ancient tradition of building ships with pegged mortise-and-tenon joinery.[84] The discovery of the Gela and Ma'agan Michael wrecks and of two wrecks in the ancient harbor of Marseille has added to our understanding of such vessels and allows for a different interpretation of ship construction by the ancient Greeks.

The oldest of these seagoing laced ships is the Giglio wreck, which was found in Campese Bay, Giglio island, Italy, and dates to about 600 B.C. (fig. 3.18).[85] Bound proposes that this wreck is probably Etruscan based on its location, cargo, and the type of construction used to build the hull. In regard to its location, he argues that the island of Giglio was well within the "jealously guarded waters" of Etruria and that foreign ships would not have been permitted to travel in this region.[86] Yet, Bound fails to cite any evidence to show that Greek merchantmen were forbidden to sail on the Tyrrhenian Sea during the

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[81] L. Casson, *The Ancient Mariners* (Princeton 1991) 27–28; Casson (supra n. 13) 202–203.

[82] P. Pomey, "Mediterranean Sewn Boats in Antiquity," in S. McGrail and E. Kentley, eds., *Sewn Plank Boats*, BAR International Series 276 (Oxford 1985) 38.

[83] M. Bound "Early Observations on the Construction of the Pre-Classical Wreck at Campese Bay, Island of Giglio: Clues to the Vessel's Nationality," in S. McGrail and E. Kentley, eds., *Sewn Plank Boats*, BAR International Series 276 (Oxford 1985) 51, 61; Steffy (supra n. 8) 39; A.J. Parker, *Ancient Shipwrecks of the Mediterranean & the Roman Provinces*, BAR International Series 580 (Oxford 1992) 192.

[84] Pomey (supra n. 82) 38; also, see resectively Casson (supra n. 13) 217–219; Mark (supra n. 12) 441–445; Casson, "Odysseus' boat (5.234–53)," *IJNA* 21 (1992) 73–74; Mark (supra n. 12) 46–48. This view will be discussed in detail in the next chapter.

[85] Bound (supra n. 83) 49.

[86] Bound (supra n. 83) 51.

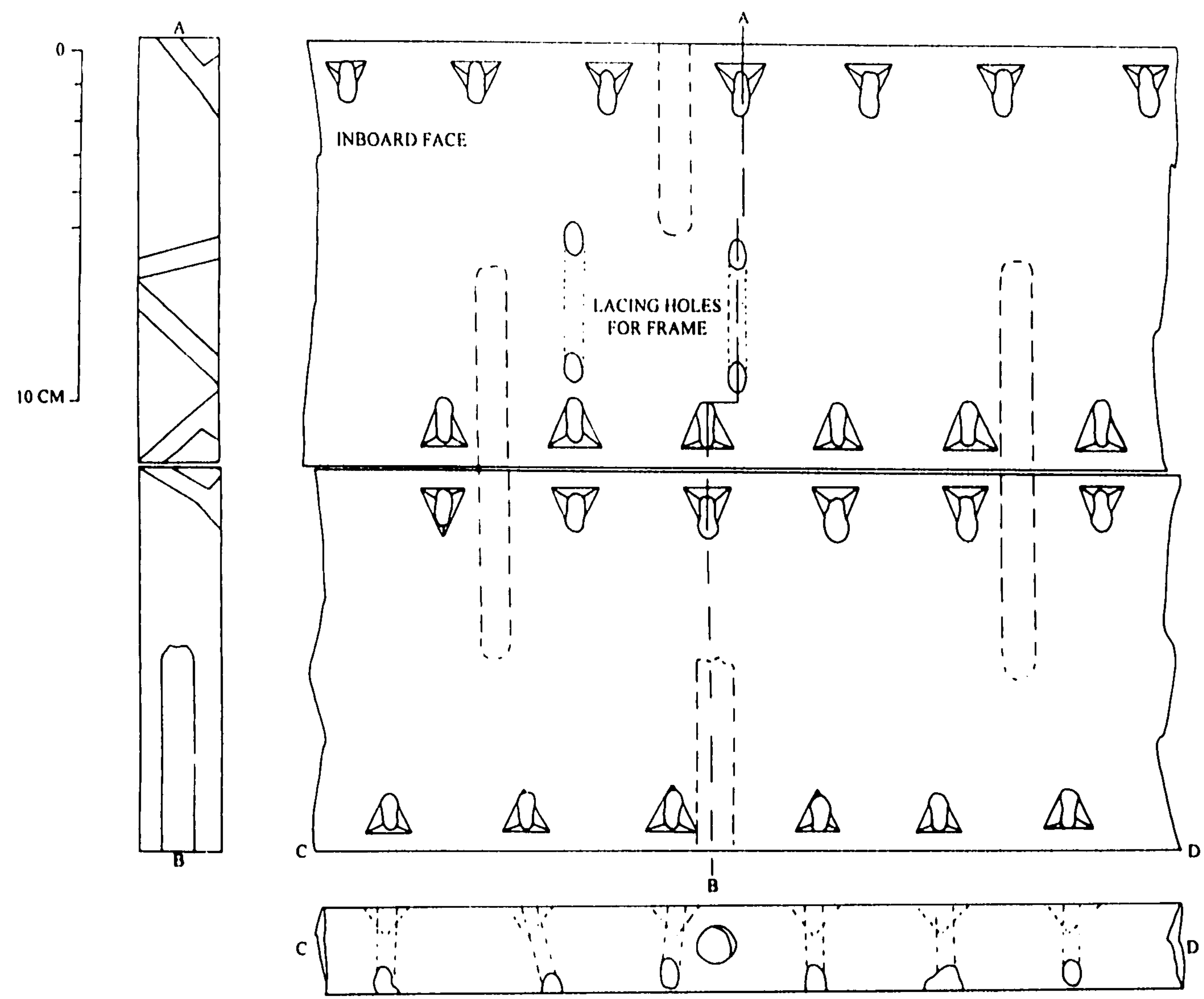

Fig. 3.17. Remains of the Bon Portè wreck. (After J.P. Joncheray, "L'èpave grecque, ou ètrusque, de Bon Porté," *Cahiers d'archèologie subaquatique* 5 [1976] 29)

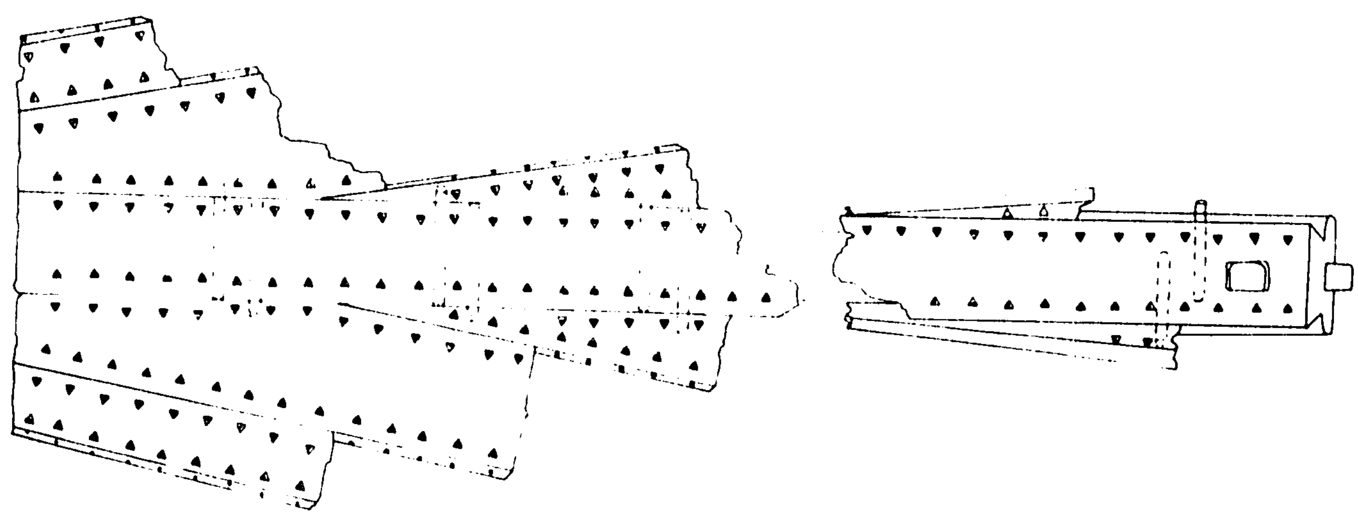

Fig. 3.18. Remains of the Giglio wreck. (After M. Bound, "Relitto arcaico di Giglio Campese, Parta Seconda - Il recupero," *Archeologia Viva* 13 [1986] 50)

seventh and most of the sixth centuries B.C. One may attempt to support such an opinion by quoting Ephorus, who writes that Greeks refused to sail in Sicilian waters prior to the founding of Naxos (ca. 735 B.C.) because of Etruscan piracy.[87] This statement is, nevertheless, contradicted by the archaeological evidence. The Greeks established the prosperous trading colony of Pithekoussai on the island of Ischia at approximately 775 B.C. It seems unlikely that such an isolated Greek settlement that depended on trade as a basis of its economy could have prospered without the relatively safe passage of Greek ships through Sicilian waters.

The myth that sailing the Tyrrhenian Sea was dangerous has undoubtably been influenced by the tendency among a number of ancient writers to label the Etruscans as pirates. The earliest such description is in the *Homeric Hymn to Dionysus* (VII.6–14). In this work, Dionysus is kidnaped by pirates, but disagreement exists as to its date,[88] the location of the kidnapping (either in Aegean or Etruscan waters),[89] and whether these pirates were in fact Etruscan or non-Hellenic peoples of Thrace, Lemnos, or Athens.[90] The theme of Etruscan piracy does not become common until the fourth century B.C.[91] In the works of earlier authors such as Hesiod, Herodotus, Pindar, and Thucydides, the mention of Etruscan piracy is conspicuously absent.

This discrepancy may be explained by the Greek defeat of the Etruscan navy at the Battle of Cumae (524 B.C.). This crushing defeat may have led to a disintegration of the Etruscan navy and coastal economy, which resulted in an increase in piracy.[92] In fact, we lack any evidence that suggests the Tyrrhenian Sea was any less accessible nor more dangerous to Greek merchantmen than was the Aegean Sea before the end of the sixth century B.C. In contrast, the evidence of early Greek commerce in this area is plentiful. For example, we have the legend of Demaratus, a Corinthian aristocrat who made a number of trading voyages between Greece and Etruria. He immigrated with various craftsmen to

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[87] Strabo 6.2.2.

[88] M. Grant, *The Etruscans* (New York 1980) 47 [8th cen.]; A. Athanasakis, *The Homeric Hymns* (Baltimore 1976) 97 [no later than 6th cen.]; M.L. West, *Hesiod Theogeny* (Oxford 1966) 435 [no earlier than 5th cen.].

[89] See respectively, H.G. Evelyn-White, *Hesiod, The Homeric Hymns and Homerica* (Loeb ed. 1977) 429 n. 1; H.A. Ormerod, *Piracy in the Ancient World* (Chicago 1967) 152.

[90] Evelyn-White (supra n. 89) 429, n. 1.

[91] By authors including Ephorus, Isocrates, and Philochrus. For a more complete study of Etruscan seafaring see, E. Shuey, *Etruscan Maritime Activity in the Western Mediterranean ca. 800–400 B.C.* (Ph.D. dissertation, University of California 1982) 7–55, 61–71.

[92] See also, Strabo 5.2.2.

Tarquinia because of a political crises in Corinth (ca. 657 B.C.).[93] In addition, excavations at Gravisca, the port of Tarquinia, have revealed a rich Greek quarter including temples. Archaeological evidence from the site suggests that trade between Greece and Etruria continued to grow into the sixth century B.C.[94] Greek trading colonies were also established at Caere and Vulci,[95] and the Phocaean Greeks established the colony of Massilia (Marseille) in southern France primarily as a port of trade at about 600 B.C. This port continued to received a variety of imports from Greece during the sixth century B.C.[96]

The most likely and profitable route to connect Greece and Marseille would be via the Tyrrhenian Sea. In fact, even today the recommended route connecting Marseille with the Aegean is via the Straits of Messina.[97] Thus, instead of the Tyrrhenian Sea being closed to Greek shipping, the evidence indicates that Greek merchants had an important trade center in the Etruscan city of Gravisca less than 75 kilometers from where the Giglio ship sank. The evidence therefore suggests that Greek ships commonly made trading voyages along the Etruscan coast during the seventh and sixth centuries B.C.

The cargo recovered from the Giglio wreck consists of Samian, Ionian, Laconian, Corinthian, and Etruscan fine wares. Amphorae include, Samian, East Greek, Punic, and Etruscan types, and possibly Laconian and Corinthian types. The cargo also contains lead, copper, and iron from Etruria, and anchor stocks from the Island of Giglio.[98] Bound argues that Greek wares could have been transhipped to Etruscan ports and are not reliable indicators of the ship's route or home port. He continues by stating that most of the cargo consists of Etruscan amphorae, stone anchor stocks, and metal ingots, and, as such, these items are more indicative of the ship's origin, which is probably Etruscan.[99] Although this is a possible interpretation and Greek wares may have been transhipped, we must not ignore evidence that consists of exploits by early Greek seafarers, indicating Greeks commonly participated in long-distance trading at this time. As previously mentioned, Demaratus undertook many voyages between Corinth and

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[93] J. Boardman, *The Greeks Overseas* (London 1980) 202; Pliny, *N.H.* 35.152; Livy I.34; Dionys. Hal. 3.46.

[94] Boardman (supra n. 93) 206.

[95] J.M. Turfa, "International Contacts: Commerce, Trade, and Foreign Affairs," in L Bonfante, ed., *Etruscan Life and Afterlife* (Detroit 1986) 70.

[96] Boardman (supra n. 93) 162, 217.

[97] Defense Mapping Agency, *Sailing Directions (Planning Guide) for the Mediterranean* (Washington D.C. 1991) 175.

[98] M. Bound "The Giglio Wreck," *ENAΛIA*, Supplement 1 (Athens 1991) 14–25.

[99] Bound (supra n. 83) 51.

Tarquinia. We also know of Colaeus, a Samian trader who, while sailing to Egypt, was blown off course and found himself at Tartessus in Spain and returned to Samos with one of the richest cargoes in the island's history.[100] Sostratos, a successful Aeginetan trader who is mentioned by Herodotus,[101] may have dedicated an inscribed anchor stock to Apollo at Gravisca. In addition, he has been associated with many Athenian vases exported to Etruria by graffiti and *dipinti*.[102] Finally, according to Herodotus, the Phocaeans had a reputation for making long sea voyages,[103] one of which culminated in the foundation of Marseille. We should therefore examine the cargo in its entirety to see if it reflects the route this vessel traveled.

If the Giglio wreck was a Samian trader, the Samian, Ionian, Laconian, Corinthian, and Etruscan wares recovered from it represent the ports of call that a ship would make on a long voyage to Gravisca. Furthermore, if a trader began a voyage with a cargo of Samian products, we would expect this original cargo to diminish the farther a vessel traveled from its port of origin. Under these conditions, it is understandable that a large part of the cargo from the Giglio wreck consists of fine wares, amphorae, and metals from Etruria. John Boardman maintains that merchants's marks found on many of the Athenian and Corinthian vases from Etruria are Ionian, and he suggests that ships carrying these items would have been Ionian.[104]

Finally, the anchor stocks recovered from the wreck site may not have been cargo but were needed to replace anchors lost on the long voyage from the East. Ironically, it is also possible that the practice of giving anchor stocks as offerings to the gods for a safe voyage may have contributed to a shortage of anchors onboard. As previously mentioned, one such anchor stock inscribed with the name of Sostratos was given as an offering at a Greek temple in Gravisca. If this ship was sailing from Gravisca and en route to Marseille, then the island of Giglio would have been a likely place to acquire extra anchor stocks in anticipation of the voyage ahead. The cargo is therefore consistent with what we would expect to find in the hold of a vessel trading along an east-west route from Samos to Etruria and possibly on to Marseille.

George F. Bass maintains that shipboard items are more characteristic of a ship's home port than the

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[100] Herodotus 4.152.

[101] Herodotus 4.152.

[102] Boardman (supra n. 93) 206.

[103] Herodotus 1.163.

[104] Boardman (supra n. 93) 200.

cargo it carries.[105] Unfortunately, few such items survive from this wreck, but those that do include three lamps and calipers, all of which are Greek.[106] In addition, a Laconian tankard, an "Ionian" bowl, and arrowheads of Near Eastern style may have been shipboard items.[107] All of these, like the cargo, suggest an East Greek home port, possibly on Samos.

Finally, Bound argues that the most convincing indicator of this ship's nationality is the method of construction.[108] Little of the hull survives; it consists of some planking and an approximately 3 meter section from the stern end of a rabbeted keel. The planks are edge-joined using horizontal wooden dowels. Triangular notches are cut along both inboard edges of the planking and from each notch a diagonal hole is drilled down to the center of the seam. Each hole joins with another hole in the adjacent plank. A cord is then passed through these holes and secured with small pegs (fig. 3.18). Finally, the interior surface of the hull planking is coated with pitch.[109] Bound's belief that this type of construction is Etruscan is based on Pomey's analyses of the Bon Porté I wreck.

The Bon Porté I wreck was found off the southern coast of France near St. Tropez. The cargo consists of Etruscan, "Graeco-Massiliot," and Chian amphorae and a "Rhodian" oinochoe.[110] The excavator was unable to determine whether this wreck was Greek or Etruscan based on this cargo.[111] The types of pottery recovered from this wreck, however, would be consistent with a cargo resulting from a trading voyage beginning in Rhodes.

The fragmented hull remains extended over an area of nearly 4 meters. They include a section of keel, four frames, a mast step, and fragments of planking. Neither bow nor stern sections were preserved. The planks, only a little more than 2 centimeters thick on average, were edge-joined and secured in the same manner as the planking of the Giglio wreck (fig. 3.17 and 3.18). The keel is small, lacks its extremities, and is not rabbeted. In contrast, the few frames that survive were quite large and were spaced as much as

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[105] Bass (supra n. 76) 165.

[106] See respectively, Bound (supra n. 97) 21; M Bound "A Wreck of Likely Etruscan Origin off the Mediterranean Island of Giglio," in S.R. Rao, ed., *Recent Advances in Marine Archaeology: Proceedings of the Second Indian Conference on Marine Archaeology of Indian Ocean Countries-January, 1990* (Goa 1991) 43.

[107] Parker (supra n. 83) 192.

[108] Bound (supra n. 83) 51.

[109] Bound (supra n. 83) 51, 53; Bound (supra n. 98) 31.

[110] J.P. Joncheray, "L'èpave grecque, ou ètrusque, de Bon Porté," *Cahiers d'archèologie subaqutique* 5 (1976) 5–22, Parker (supra n. 82) 74–75.

[111] Joncheray (supra n. 110) 5–6.

a meter apart. The futtocks were attached to floor timbers by means of diagonal or horizontal-Z scarfs that were secured by small treenails (fig. 3.19).[112]

It appears that the frames were held in place by lacings and pegs. The holes for the framing cords are located closer to the center of the plank than the seam holes; they lack triangular notches; and they have been drilled through to the exterior face of the planking (fig. 3.17).[113] The upper face of the frames are wide and rounded and the lateral faces taper resulting in the smallest dimension at the base (fig. 3.19). Pomey's original belief that this type of construction is Etruscan appears to be based primarily on the tradition of laced-ship construction in the Adriatic region during the Classical to Medieval periods. The discovery of two vessels in the old harbor of Marseille have changed his opinion.

Recently, two Greek vessels that appear to have been abandoned at the end of the sixth century B.C. were discovered in what was the ancient harbor at Marseille, France. One vessel, Wreck 9, is believed to have been a local fishing vessel that was constructed in the same fashion as the Giglio and Bon Porté I wrecks. One notable exception was that only the horizontal-Z scarf was used to fit futtocks to floor timbers. Near Wreck 9 was Wreck 7, a contemporary vessel constructed primarily with pegged mortise-and-tenon joinery, but some sections were fastened with cords.

Pomey describes Wreck 7 as a transitional type of ship that utilizes both cords and pegged mortise-and-tenon joinery to fasten hull planking. Most of the hull planking is fastened with mortise-and-tenon joints, but the tenons are small (3 cm wide), and the joints are widely spaced (20 cm). The extremities of this ship reveal the same triangularly-notched lacing holes seen on the previously mentioned vessels. The frames are the same type as those recovered from Wreck 9, except these frames are secured with double-clenched nails instead of by lacing.[114] Pomey's claim that the shipwrights who built Wreck 7 had yet to master the intricacies of mortise-and-tenon joinery is supported by the use of lacings to repair the hull planking instead of mortise-and-tenon joints as seen on the Kyrenia shipwreck (ca. 300 B.C.).[115] Pomey now believes that the Bon Porté I wreck is Massilian—not Etruscan.[116] As previously mentioned, this port was established by the Phocaean Greeks about 100 years before these vessels were abandoned. This is

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[112] Joncheray (supra n. 110) 23–34; Steffy (supra n. 8) 39–40.

[113] These measurements are based on the figures from Joncheray (supra n. 110) 24, 25, 27, 29.

[114] P.G. Bahn, "Ancient Ships in Marseille," *Archaeology* 47 (1994) 15; P. Pomey, "Les épaves grecques et romaines de la place Jules-Verne à Marseille," *Académie des inscriptions & belles-lettres* Avril-Juin (1995) 470–479.

[115] Steffy (supra n. 8) 56.

[116] P. Pomey, "Bon Porté Wreck," in J.P. Delgado, ed., *The British Museum Encyclopaedia of Underwater and Maritime Archaeology* (London 1997) 69.

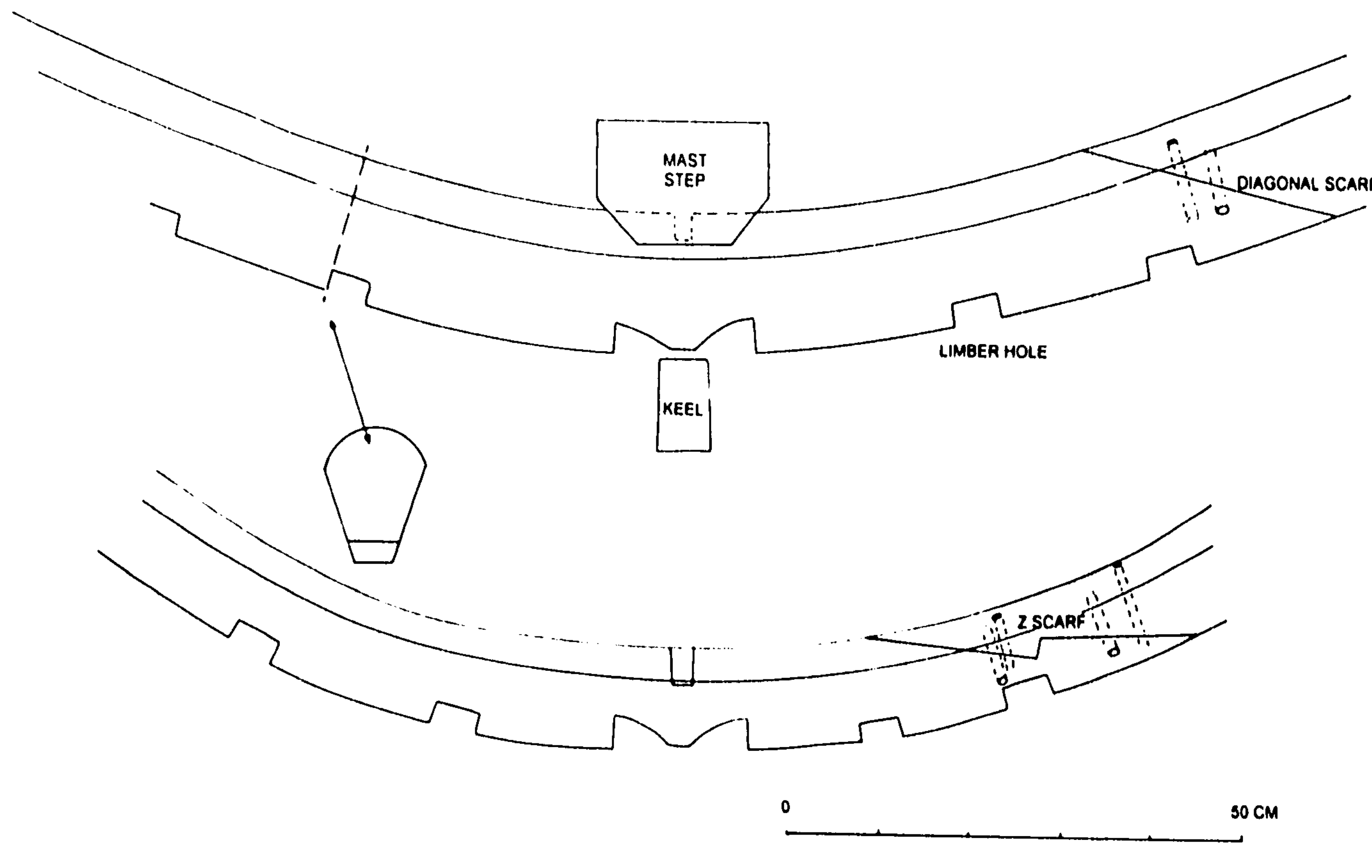

Fig. 3.19. Bon Portè framing. (After J.P. Joncheray, "L'èpave grecque, ou ètrusque, de Bon Porté," *Cahiers d'archèologie subaquatique* 5 [1976] 27)

about the same time that the Giglio ship was sailing in Tyrrhenian waters and fifty years before the Bon Porté I vessel went down. If Greek shipwrights at Massilia had yet to master the use of mortise-and-tenon joinery by 500 B.C., this would suggest that the Phocaeans were building laced ships when they founded the harbor (ca. 600 B.C.). The discovery of a wreck off Gela, Sicily dating to about 500 B.C. also supports a late tradition of laced construction by the Greeks.

The remains of the cargo from the Gela ship include Attic, Corinthian, Ionian, and Punic amphorae; and Rhodian jugs, Black Figure *kylikes*, Red Figure *askoi* and *oinochoe*, and Ionian cups. Nothing of Etruscan origin was recovered from this wreck nor does much evidence of trade between Gela and Etruria exist at this time. The composition of the cargo, like that of the Giglio ship, suggests a ship performing cabotage beginning at an Ionian port in the Aegean.

The wreck is approximately 17 meters in length and 7 meters wide, with hull planking joined in the same manner as in the Giglio, Bon Porté I, and Wreck 9 vessels (fig. 3.20). This wreck appears to have the same widely spaced system of framing as the Bon Porté I and Marseille wrecks, and is pitched internally like the Giglio and Marseille wrecks. A longitudinal stringer, which consists of a mast step and three other pieces, is set on 16 of 17 frames and has a large number of mortises in its upper face; 15 or 16 of these mortises seem to be stanchion holes to support deck beams or possibly a raised longitudinal girder as on the Cheops vessel. The frames appear to have a center-to-center spacing of 70 centimeters and, as in Wreck 7 at Marseille, are fastened to the planking with nails, a unique feature for a laced ship.[117] All evidence published at this time suggests that this is a Greek ship. It should be noted, however, that this type of hull construction should not be seen as diagnostic of only Greek ship construction. Considering that Greek artisans immigrated to Etruria in the seventh and sixth centuries B.C., it is possible that shipwrights also immigrated. Ship construction, as so many other aspects of Greek culture, may have been adopted by the Etruscan people resulting in Greek and Etruscan ships with many similar characteristics. It should also be noted that as the Greeks influenced the Etruscans so to did the Etruscans influence the Romans. Yet, the Romans called the mortise-and-tenon joint a *Punicana coagmentá* after their Punic enemies suggesting they learned to make this joint from them, not the Etruscans or Greeks. This is curious especially since most maritime terms used by the Romans are derived from Greek.[118] If the Greeks were using this type of joinery in the seventh and sixth centuries B.C., then it is likely they would

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[117] A. Freschi, "Note tecniche sul relitto greco arcaico di Gela," *Atti: IV rassegna di archeologia subacquea IV premio Franco Papò* (Messina 1990) 201–210, see figure on page 202; R. Panvini, "L'attività delle soprintendenze di Agrigento e Caltanissetta nel campo dell'archeologia subacquea," *Atti: IV rassegna di archeologia subacquea IV premio Franco Papò* (Messina 1990) 197–200; Parker (supra n. 82) 189.

[118] A.W. Sleeswyk, "Phoenician Joints, *coagmenta punicana*," *IJNA* 9 (1980) 243–44; L. Basch, "Carthage and Rome: Tenons and Mortises," *MM* 67 (1981) 245–50.

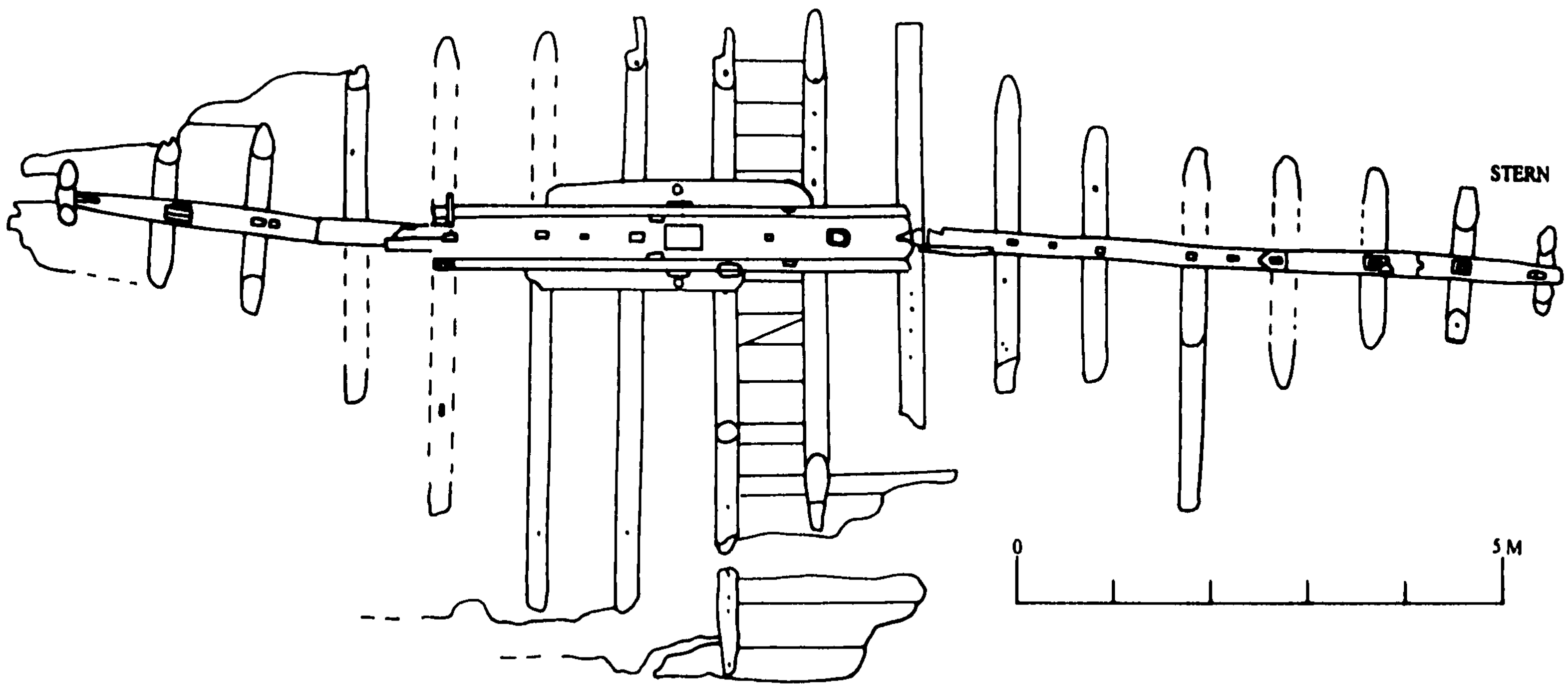

Fig. 3.20. Gela wreck. (After A. Freschi, "Note tecniche sul relitto greco arcaico di Gela," *Atti: IV rassegna di archeologia subacquea IV premio Franco Papò* [Messina 1990] 202)

have introduced it to both Etruria and Rome. Vestiges of this laced tradition continue to survive for over 100 years in Greek ship construction.

The Ma'agan Michael wreck was discovered off the coast from Kibbutz Ma'agan Michael, Israel and is tentatively dated to about 400 B.C. 11.25 meters of the hull was preserved, and the vessel may have originally been 13.4 meters long (fig. 3.21). Many similarities are shared by the Ma'agan Michael ship and the previously mentioned vessels. Like that of Wreck 7 at Marseille, the hull planking is edge-joined in the classical tradition by pegged mortise-and-tenon joints, but the tenons are wider (3.8 to 5.1 cm wide), and the spacing of the mortise-and-tenon joints (12 cm) is closer. Both dimensions are similar to those on later ships, such as the Kyrenia ship.[119]

Unlike previous vessels the Ma'agan Michael ship has a wine-glass-shaped hull, a shape also characteristic of later ships. At the extremities of this ship are lacing holes, which are triangularly notched just as on the Giglio, Bon Portè I, Gela, and Marseille wrecks. By the time the Kyrenia ship is built, they seem to disappear from Greek shipbuilding.

The mast steps on the Bon Porté I and Ma'agan Michael wrecks are similar in shape, the manner in which they are attached to the frames, and the pattern of mortises on their upper faces (figs. 3.21 and 3.22). Considering the similarities between the two mast steps, it is possible that the mortise on the stern end of the Bon Porté I mast step may have been used as a base for a stanchion as are two mortises on the Ma'agan Michael mast step. The mast step on the Gela wreck appears similar to the previous examples, especially in regard to the pattern of mortises on its upper face (fig. 3.20). The mast step on the Gela wreck is flanked by two timbers as is the one on the Ma'agan Michael wreck. Both vessels also have a longitudinal stringer that is notched to fit on the frames and acts as a stanchion holder, possibly to support deck beams (figs. 3.20 and 3.21). This longitudinal stringer cannot be classified as a keelson because it does not extend the length of the vessel, it is not one complete timber, it is not attached to the keel, and it is too small to give the ship the structural support we associate with a keelson. The frames of the Ma'agan Michael wreck are similar to those of the Marseille vessels in that floor timbers are scarfed to futtocks with a horizontal-Z scarf and secured with small wooden fasteners (fig. 3.23). The shape of the frames is also reminiscent of earlier vessels; the upper faces are still rounded but flatter and both lateral faces taper toward the base. Moreover, only a few limber holes are cut into these frames, unlike the framing on the previously mentioned wrecks. The frames are widely separated with a room and space of 75 cm, which is similar to the spacing on the Gela and Wreck 7 vessels, and they are attached to the hull planking with double clenched nails like the frames of Wreck 7 and the Gela wreck. The frames are also unique in that the center of each floor timber is carved to be set into the space formed by the wine-glass shape of the

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[119] E. Linder, "Ma'agan Micha'el Shipwreck, Excavating an Ancient Merchantman," *Biblical Archaeology Review* 18.6 (1992) 34.

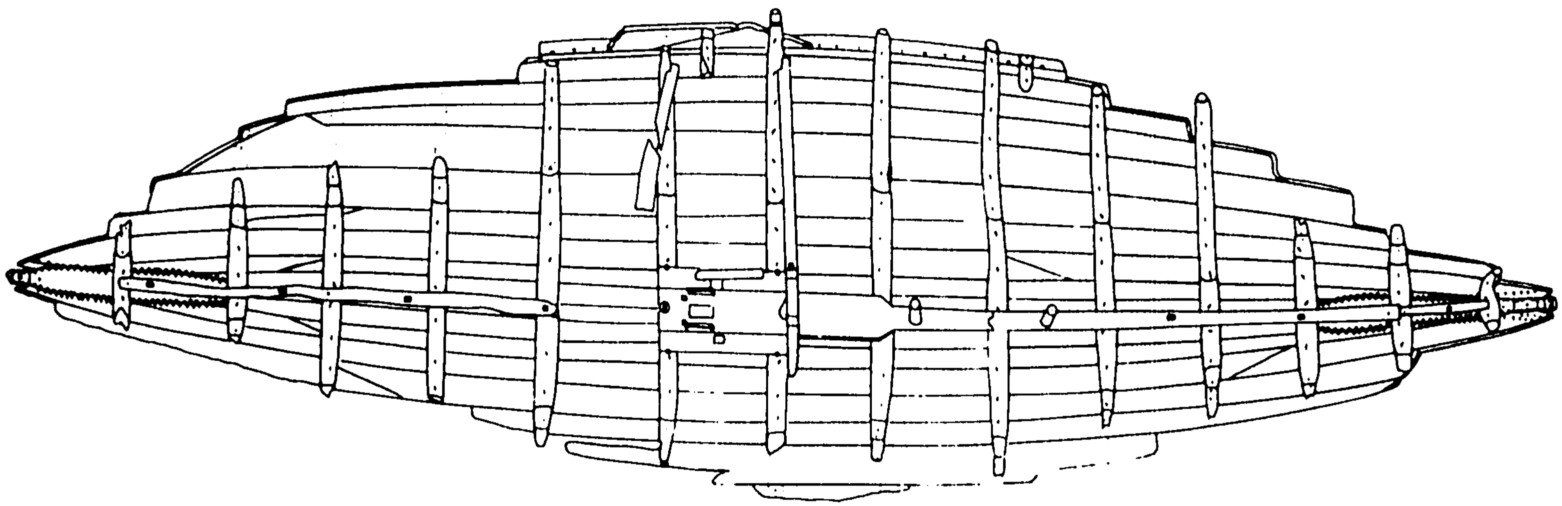

Fig. 3.21. Ma'agan Michael wreck. (After J. Rosloff, "A One-Armed Anchor of *c.* 400 B.C.E. from the Ma'agan Michael Vessel, Israel. A Preliminary Report," *IJNA* 20 [1991] fig. 1)

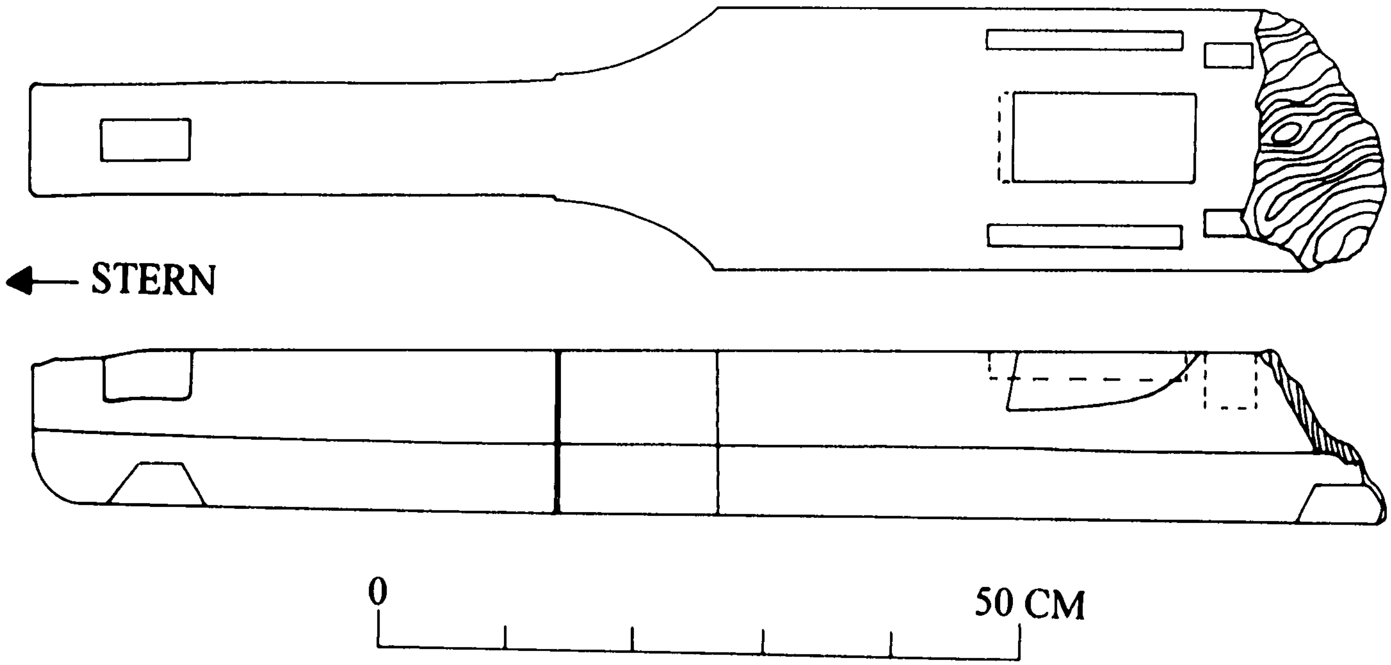

Fig. 3.22. Bon Portè mast step. (After J.P. Joncheray, "L'èpave grecque, ou ètrusque, de Bon Porté," *Cahiers d'archèologie subaquatique* 5 [1976] 32)

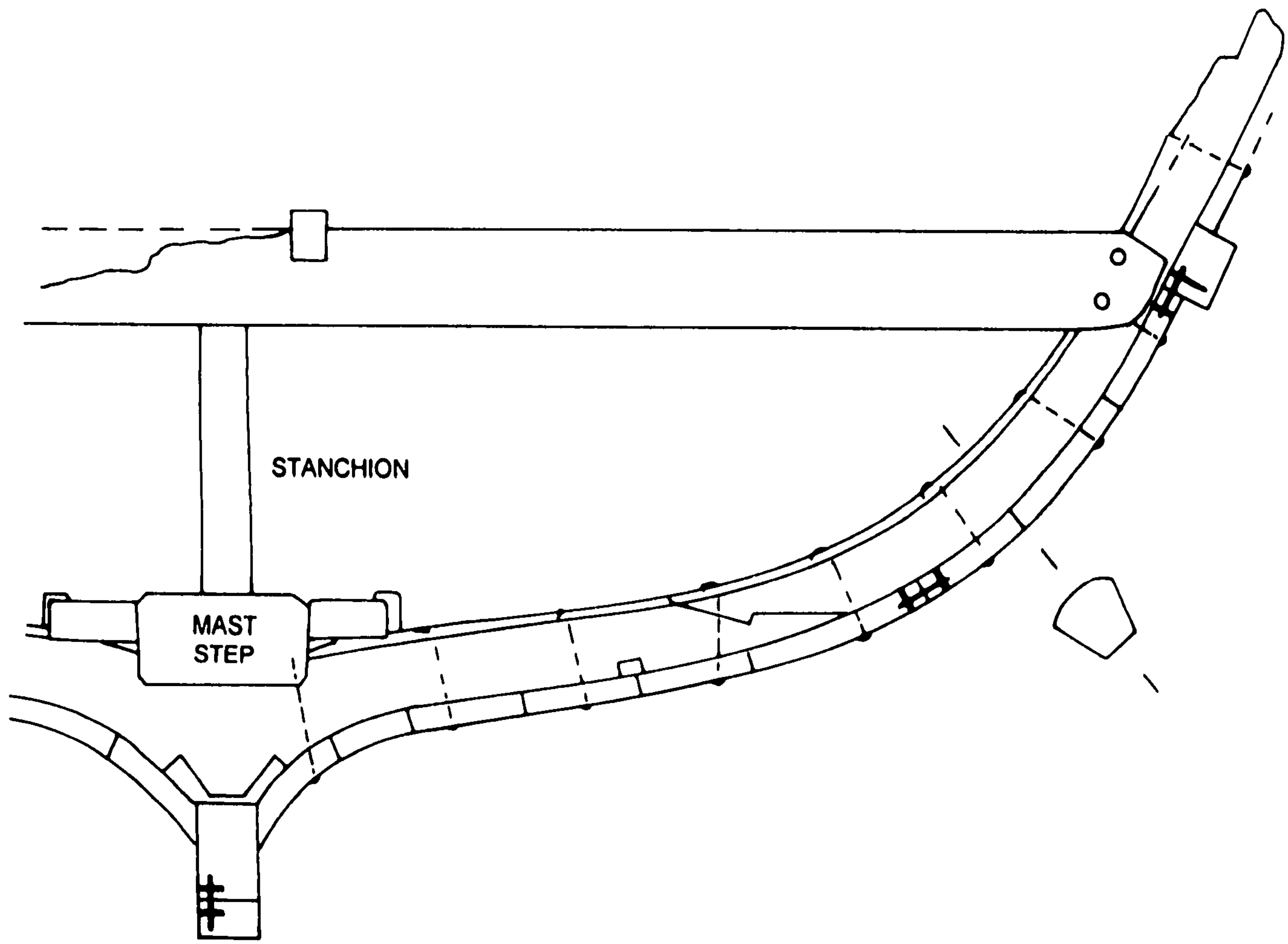

Fig. 3.23. Midship section of Ma'agan Michael wreck. (After J.R. Steffy, *Wooden Ship Building and the Interpretation of Shipwrecks* [College Station, Texas 1994] 3-21b)

hull, and it is this shape that is the most innovative aspect of this ship. By the time the Kyrenia ship was built, this characteristic shape appears to be more pronounced. Furthermore, on ships earlier than the Kyrenia ship, it appears that only the extremities of the keel are rabbeted whereas the keel of the Kyrenia ship has a rabbet running its full length. This extension of the rabbet may have been a result of the continued lengthening of the stem of the wine-glass shape that resulted in a sharper angle between the garboard strakes and keel. A comparison of these early ships reveals a clear pattern of evolution connecting the earlier laced ships to the later Ma'agan Michael wreck.

We must then ask what other evidence points to the origin of the Ma'agan Michael wreck. Seventy pottery items were recovered from the wreck site consisting of Cypriot, Palestinian, and Greek wares. Although a study of the pottery has not been completed at this time, it appears that the pottery indicates a Greek or Cypriot origin.[120] The ballast has been petrographically and geochemically examined and most of it consists of blue schist, which was originally believed to have come from somewhere on the Tyrrhenian coast. It is now believed that the Greek islands, Crete, or possibly Cyprus is a more likely location for this schist.[121]

The pine and oak used to build this ship is rather common throughout the eastern Mediterranean, but an acorn that survived from the ship's stores is of a variety that grows only in southwest Turkey and the Aegean Islands.[122] Furthermore, the material used as lacings in the bow and stern of this vessel have been tentatively identified as *Ruscus hypoglossum* a monocotylean plant of the Liliaceae Family,[123] which does not grow any father south than Turkey. These lacings are important because the Ma'agan Michael ship was a new ship when it sank. This interpretation is based on considerable evidence, such as a lack of rot in the bilges and dunnage; a lack of wear or scarring on the bottom of the keel (or any external timbers); a lack of wood-borers, moss, or any other marine growth adhering to the vessel; and patches of bark still adhering to some of the internal timbers.[124] Therefore, since plants suitable for making lacings grow throughout the Levant, the plants used to make these lacings were probably harvested near the construction site of this ship. The above evidence suggests that the Ma'agan Michael wreck was probably a Greek vessel from Rhodes or a nearby Aegean port on a maiden voyage off the coast of Palestine. The

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[120] Linder (supra n. 119) 32, 35.

[121] Linder (supra n. 119) 29.

[122] Yaakov Kahanov, "Conflicting evidence for defining the origin of the Ma'agan Michael shipwreck," in H. Tzalas, ed., *Tropis* IV (Athens 1996) 245.

[123] Private communcation from William Charlton. Mr. Charlton is publishing a study of the ropes and knots recovered from this wreck.

[124] Jay Rosloff, "The Ma'agan Michael Shipwreck Excavation–1989 Season," *C.M.S. News: University of Haifa Center for Maritime Studies* 17 (1990) 4.

documentary evidence indicates that seafaring Greeks in this region were common at this time.[125]

We must then ask why the transition from ships built with lacings to those with pegged mortise-and-tenon joinery occurred so late in Greek history. Syro-Canaanite shipwrights appear to have been building ships with pegged mortise-and-tenon joinery at least as early as 1300 B.C. The cargo and personal items found among the remains of the Uluburun wreck indicate that at least two Mycenaean passengers of high rank were on board. Considering that a port in Greece was a probable destination, it is not surprising that high ranking Mycenaeans official would be onboard to accompany such a rich cargo.[126] Mycenaean passengers on Syro-Canaanite ships may therefore have been rather common. For a people who built ships with lacings instead of pegged mortise-and-tenon joinery, the fact that Mycenaean passengers would be able to see pegs in the hull but not any cords running between them must have caught their attention. It also seems likely that at some time on their lengthy voyage they would probably have enquired as to the missing cords. In addition, Mycenaeans did have knowledge of at least one type of pegged mortise-and-tenon joint. A table from Grave V of Circle A (16th century B.C.) at Mycenae had legs that were carved at the upper extremity in the shape of a tenon and then pegged to a table top (fig. 3.24).[127] The evidence suggests that the Mycenaeans knew of this type of ship construction and had the tools and ability to build ships in this tradition. They also had the social structure necessary to support craftsmen to build such complex vessels.[128] Yet, if they knew of such ships, why did the Greeks wait so long to adopt this technique of ship construction? It is possible that they did so during the Mycenaean period, but with the collapse of their society at the end of the Bronze Age, they were no longer able to support the specialized craftsmen necessary to build such vessels.[129] On the other hand, it is possible that they felt this technique did not offer any advantages, and the laced ships they built were adequate for their needs.

As previously mentioned, laced ships can be built to be watertight and can carry heavy loads depending on the amount of time invested in construction. It would be easier for shipwrights to invest more time in the construction of a laced ship than to adopt a completely different tradition of ship construction. For example, the notching of lacing holes and the drilling of lacing holes that meet at the seam instead of continuing through to the exterior face of the planking on ships dating to the sixth century B.C. indicate

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[125] A. Yardeni, "Maritime Trade and Royal Accountancy in an Erased Customs Account from 475 B.C.E. on the Ahiqar Scroll from Elephantine," *BASOR* 293 (1994) 67–78.

[126] Pulak (supra n. 25) 253, 256–57.

[127] P. Muhly, "Furniture from the Shaft Graves: The Occurrence of Wood in Aegean Burials of the Bronze Age," *BSA* 91 (1996) 198–200.

[128] Mark (supra n. 12) 444–45.

[129] Mark (supra n. 12) 445.

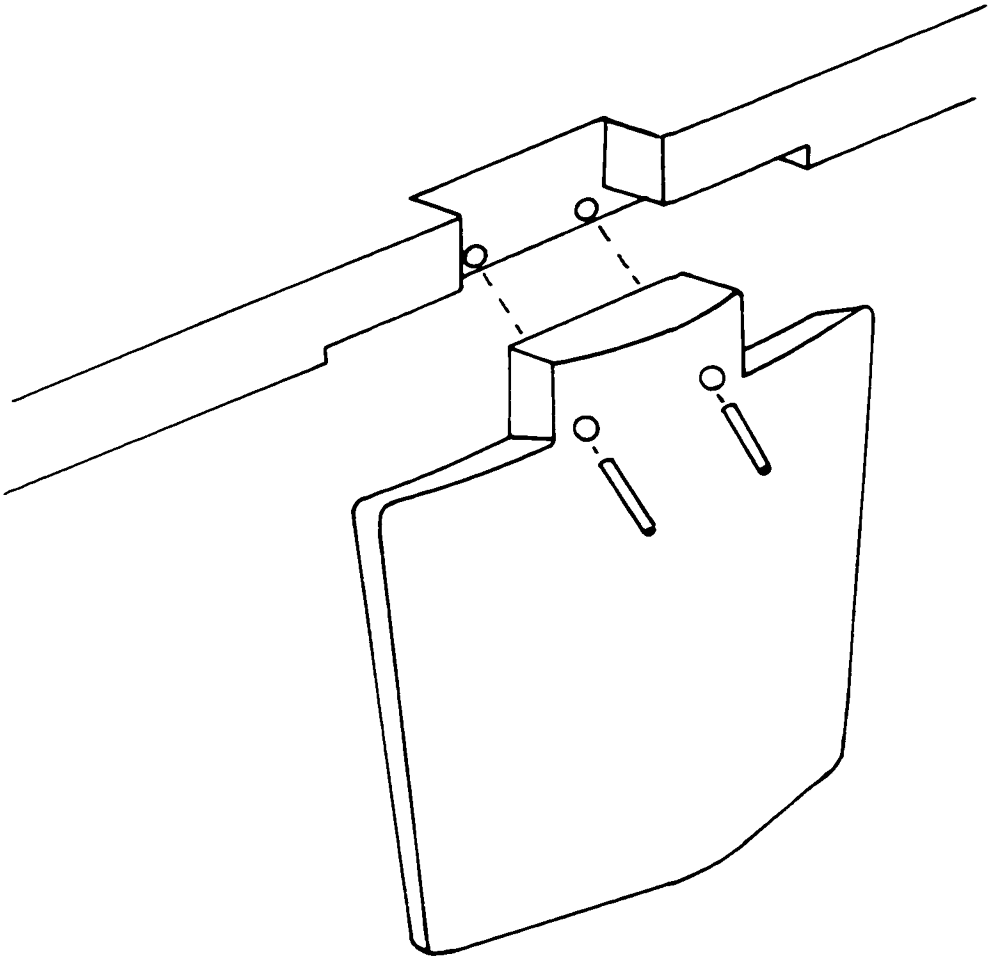

Fig. 3.24. Mycenaean table with pegged mortise-and-tenon joinery. (After P. Muhly, "Furniture from the Shaft Graves: The Occurrence of Wood in Aegean Burials of the Bronze Age," *BSA* 91 [1996] fig. 3)

that shipwrights were investing considerable time in building these ships.

This care suggests that these vessels, like an Arab *boom*, may have been watertight vessels that could carry considerable tonnage. As previously mentioned, we lack evidence to suggest that ships built with pegged mortise-and-tenon joinery could carry more tonnage than a laced ship.

It can be argued that these laced ships may have needed new wadding, lacing, and pegs every year. This is possible, but, again, we lack evidence to substantiate this practice. As previously mentioned, the length of time between replacement of lacing depends much on the quality of lacing material and the amount of time in maintaining lacing during a voyage. Instead of oiling their lacings, the Greeks coated their hulls with pitch, as they did with the later pegged mortise-and-tenon hulls. So, there was little difference in this aspect of maintenance between the two types of ship construction. Yet, even if the lacing had to be changed every year, the fact that the Greeks sailed in the Aegean, at most, from March 10th to November 10th means that there were four months to refit a ship.[130] Refitting would therefore be done at a time when a ship is normally idle, and would not cost its owner.

The labor to refit a ship may not have cost an owner either. Alan Villiers points out that an Arab shipowner did not directly pay his crewmen. Arab sailors did receive a small percentage of the profits made from each voyage, but food eaten during a voyage was deducted from their share. In addition, they could make more money by personal trading at foreign ports. The only cost to the owner was the small space onboard that he gave each sailor to store his trade goods in a small chest. Crewmen could also make additional money from goods they acquired during a voyage and sold at home.[131] Villiers continues by pointing out that a crewman's responsibilities were not limited to the beginning and ending of a voyage. Crewmen fitted out a ship before a voyage, which included sewing the sails and rigging the ship. At the end of each voyage, they beached the ship, removed all gear, and oiled down the hull. The cost of meals eaten by the crewmen during both periods were also deducted from their share of the profits.[132] The vessels described by Villiers were built with nails, not lacings. So, he is unable to comment on this aspect of refitting. But Hornell points out that on a *mtepe* it was the captain and crew who performed these chores; they could change the wadding and lacing on a *mtepe* in two weeks.[133] It is therefore likely that the refitting of a vessel was considered part of an obligation of each crewman. Under this system, a shipowner incurred few expenses other than acquiring the necessary lacing and wadding materials. It therefore seems unlikely that owners and shipwrights would have been motivated to abandon one tradition

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[130] Casson (supra n. 13) 270.

[131] A. Villiers, *Sons of Sinbad* (New York 1969) 43–44, 252, 325.

[132] Villiers (supra n. 131) 326–27, 398.

[133] Hornell (supra n. 3) 62.

of ship construction for a new tradition only because the lacing must be changed every year. If lacing is as durable as that on a *boom* and several seasons can pass before it must be changed, then the cost is minimal. Refitting a ship may not have imposed any real cost to an owner in either time or resources.

Much has also been made of the tradition-bound nature of sailors and shipwrights. This may have been a possible reason for resisting changes in shipbuilding traditions, for shipwrights are probably similar to other craftsmen in this respect. In 1960, George Foster studied the people of the village of Tzintzuntzan, Mexico, a community made up of farmers, shopkeepers, and fishermen. Sixty percent of the population of approximately 1800 people were either full- or part-time potters. Foster noticed that the potters were by nature conservative. He took a census of the village population to see which individuals were first to adopt new innovations. These innovations included items like the presence of a latrine, raised plank bed, type of lighting, and source of water. An individual's economic situation did not appear to be a mitigating circumstance in adopting these innovations. Among farmers, fishermen, shopkeepers, and day laborers, the potters were the least likely to adopt new innovations in their homes.[134]

Foster believes this conservatism is a result of the pottery-making process. It is a difficult process at best. A slight variation in the use of raw materials, glazes, paints, or firing temperatures can lead to the loss of one or even several months' work. Therefore, economic security depends on duplicating as closely as possible the use of materials and techniques that a potter knows from experience are least likely to result in failure. If a potter has the basic skills and uses traditional methods, it is possible to predict the outcome of each firing. Furthermore, potters consider themselves artisans not artists. Little effort is expended to surpass common standards. Pottery making is viewed as a job just like housecleaning that must be completed as quickly as possible. In contrast, farmers are at the mercy of the weather and insects, while fishermen must also contend with weather and the mysterious nature of fish. Since luck is more of a way of life and innovations are less likely to result in an economic disaster, innovations are more quickly accepted by these groups.[135]

Shipwrights are more like potters than farmers. Luck has little influence on the building of a ship. A shipwright's conservatism is a result of the shipbuilding process, and it is a difficult process at best. A slight variation in planking width or thickness, or the use of inferior materials, can lead to the loss of one or even several months work. As previously mentioned, these early ships were built with few tools and with few aids other than the eye of a shipwright. An inferior piece of timber, a poorly set plank, or an area of weakness in the hull may lead to the loss of a cargo, a ship, and possibly a ship's crew. Even in a well-built vessel such as the Kyrenia ship, we still see evidence of rather obvious errors on the part of one of

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[134] G.F. Foster, "The Sociology of Pottery: Questions and Hypotheses Arising from Contemporary Mexican Work," in F.R. Matson, ed., *Ceramics and Man* (Chicago 1965) 43–48.

[135] Foster (supra n. 134) 49–50.

two shipwrights.[136] Economic security and peace of mind therefore depends on duplicating as closely as possible the use of materials and techniques that a shipwright knows from experience are least likely to result in failure. If a shipwright has the basic skills and uses traditional methods, it is possible to predict the outcome of each vessel being built. Furthermore, since shipwrights consider themselves craftsmen and not artists, little effort will be expended to surpass common standards.

Another factor contributing to the conservatism of potters is the amount of time necessary in mastering new techniques, like the use of a potter's wheel. Time spent learning is time that pots are not being made and money is lost. Under these circumstances, Foster argues that only when requirements change and traditional techniques can no longer produce a product that sells, only then will a potter accept innovations. In many cases, master potters refuse to accept innovations. Instead, it is new potters who will adapt to market changes.[137]

Shipwrights, like potters, must also invest a considerable amount of time mastering new techniques, such as using different types of joinery. Time spent learning is time that a ship is not being built. Time is also lost to correct mistakes; such mistakes are more likely when a shipwright does not yet know the nuances of a new technique. Under these circumstances, only when requirements change and traditional techniques are no longer produce a ship that meets the needs of a shipowner, only then will a shipwright accept innovations.

We must understand that ancient artisans spent their lives mastering their crafts. To propose that a shipwright would just abandon one tradition of ship construction to learn a completely different tradition is unrealistic. To make such a drastic change would require that a shipwright has a very strong incentive to do so because he must not only learn new techniques of construction, but must also adopt a new philosophy of ship construction.

At first glance, pegged lacings and pegged mortise-and-tenon joinery construction appear very similar, but the similarities are superficial. A shipwright that built vessels like the Bon Porté I and Giglio ships would design his ships to be flexible. He used thin planking and widely spaced framing that was lightly fastened to the hull. To suddenly start building ships with pegged mortise-and-tenon joinery requires more of a shipwright than merely learning how to fashion a new type of joint. He is expected to understand the intricacies of a more rigid hull that requires thicker planking, and wales. He must also understand how to correctly space the joinery for optimum strength and then fasten the framing with dowels and nails to strengthen the hull. He must know how a rigid hull will react when the cargo shifts or how it will handle in rough seas. All the intricacies that a shipwright has mastered over the years to build

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[136] J.R. Steffy, "The Kyrenia Ship: An Interim Report on its Hull Construction," *AJA* 89 (1985) 92–93; 94.

[137] Foster (supra n. 134) 51.

a laced ship must be replaced by an intricate understanding of the compromises necessary to build a working ship with pegged mortise-and-tenon joinery.

Of course, the type of society a shipwright works in can influence how quickly he adopts new techniques. A shipwright in ancient Greece who has his own shipyard will be more likely to follow the above pattern of a local artisan described by Foster. In contrast, a shipwright in Egypt who is employed by the Pharaoh is less likely to be influenced by these. Pharaonic Egypt was a rich, highly centralized, and stratified kingdom with a large population. This society supported specialized artisans. If the Pharaoh requires a ship that meets specific needs his shipwrights are, in effect, supported to solve problems, not just to build one or two ships a year. Materials and time spent building a vessel that fail to meet the required specifications can be more easily absorbed by the state than by an individual. These artisans are more likely to adopt new techniques more quickly than a shipwright who builds a vessel for a private individual. Many of the economic pressures on Greek shipwrights of the Geometric and Archaic periods are therefore absent on Egyptian shipwrights under the Pharaoh.

We must still ask what influences could result in the Greeks replacing laced fastenings with pegged mortise-and-tenon joinery? One possible clue is that a captain of a *mtepe* would refuse to haul a cargo of coconuts in his ship. According to F. B. Pearce, his enquiries produced only vague explanations that a cargo of coconuts tends to force open the laced seams of a ship. Pearce rejects this interpretation and instead argues that some "deep-seated superstition" is the actual cause of this aversion to hauling coconuts.[138] Robert Adams disagrees with Pearce and believes that this aversion to hauling coconuts is a reflection of the inherent flexibility of a *mtepe's* hull.[139]

Mitepe had few frames, which were lightly laced and pegged to the hull. In addition, the thinner the planking the more flexible the hull. These vessels are so flexible that when out of water poles are lashed to the thwarts on the exterior of the hull to keep the vessel upright. If such a vessel were to heel over the lacings can be strained, which will weaken the hull.[140] Adams, like Bell, points out that the hull of a ship is analogous to an inverted arch. The force of water pressing on a hull is the same as gravity exerted downward on an arch. The weight of the hull above the waterline is not buoyant (force of gravity) and opposes the force of the water (buoyant force). When two forces are acting on a hull, the hull is compressed. This compression is absorbed primarily by the lacings and the wadding along the seams of a hull as the planks work. It is for this reason that frames must be lightly attached to a hull because

[138] F.B. Pearce, *Zanzibar: The Island Metropolis of Eastern Africa* (New York 1967) 30.

[139] Adams (supra n. 3) 77.

[140] Hornell (supra n. 3) 62; Adams (supra n. 3) 42, 75.

otherwise they interfere with the transfer of force among the planking.[141] Framing is primarily to maintain plank alignment and provide a platform to distribute the weight of a cargo.[142] Coconuts disrupt this force because they have a density equal to or greater than the seawater that presses against the hull of a ship. Usually, this is not a problem, but since coconuts are small enough to rest directly on planking and planking seams, a full cargo of coconuts produces a force equal to or greater than the force of the seawater pressing on the hull. Under these circumstances, only the lacings are holding the planking together.[143] Any sudden stress on such a loaded hull could result in it coming apart rather quickly.

But what do coconuts have to do with laced ships in the Mediterranean? An amphora containing wine or oil is similar to a coconut. A clay amphora and the wine or oil it carries has a density greater than the seawater that supports the hull of a laced ship. Furthermore, ships like the Bon Porté I wreck were built with thin planking (2 cm.) and had widely spaced frames (1 m.). This is not to say that laced ships cannot carry amphorae, but it is unlikely these ships could safely carry a full cargo of such containers filled with wine or other liquids. Filled amphorae are larger and denser than coconuts, and since frames of laced ships are so widely spaced, the weight of these containers, like coconuts, sit directly on planking and planking seams. In addition, amphorae have small bases. Therefore, their weight is concentrated in a much smaller area. Finally, the shape an amphora allows it to be stacked in several layers in a cargo hold of a ship (fig. 3.25). A captain can therefore store more cargo in a smaller space than with mixed cargoes of pottery, metals, and finished goods found in ships like the Giglio ship. Yet, stacking amphorae presents a major problem. Much of the weight of these stacked amphorae is pressing on the hull through the small bases of the lowest level of amphorae. This concentrates considerable pressure into a very small area.

It is the end of the Archaic period through the Classical period that appears to be the transitional period from ships built with lacings to those with pegged mortise-and-tenon joinery. This period also seems to coincide with an increase in the shipping of bulk cargoes in amphorae.

Ships like the Giglio ship could not compete with a ship like the Ma'agan Michael ship in this type of trade, even though shipwrights may have tried. One such indication is that shipwrights used copper nails to fasten the framing to the hull planking of the Gela ship. By doing so, the hull would be stiffer and was better able to carry cargoes of amphorae. Yet, by being stiffer, a hull loses its main advantage, its flexibility. In addition, the lacing and wadding on these hulls will be much more difficult to change because the frames are nailed in place.

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[141] Adams (supra n. 3) 75; R. Adams, "Designed Flexibility in a Sewn Boat of the Western Indian Ocean," in S. McGrail and E. Kentley, eds., *Sewn Plank Boats*, BAR International Series 276. (Oxford 1985) 293. See also, Bell (supra n. 56) 101.

[142] Adams (supra n. 3) 42; Adams (supra n. 141) 292.

[143] Adams (supra n. 3) 75, 77.

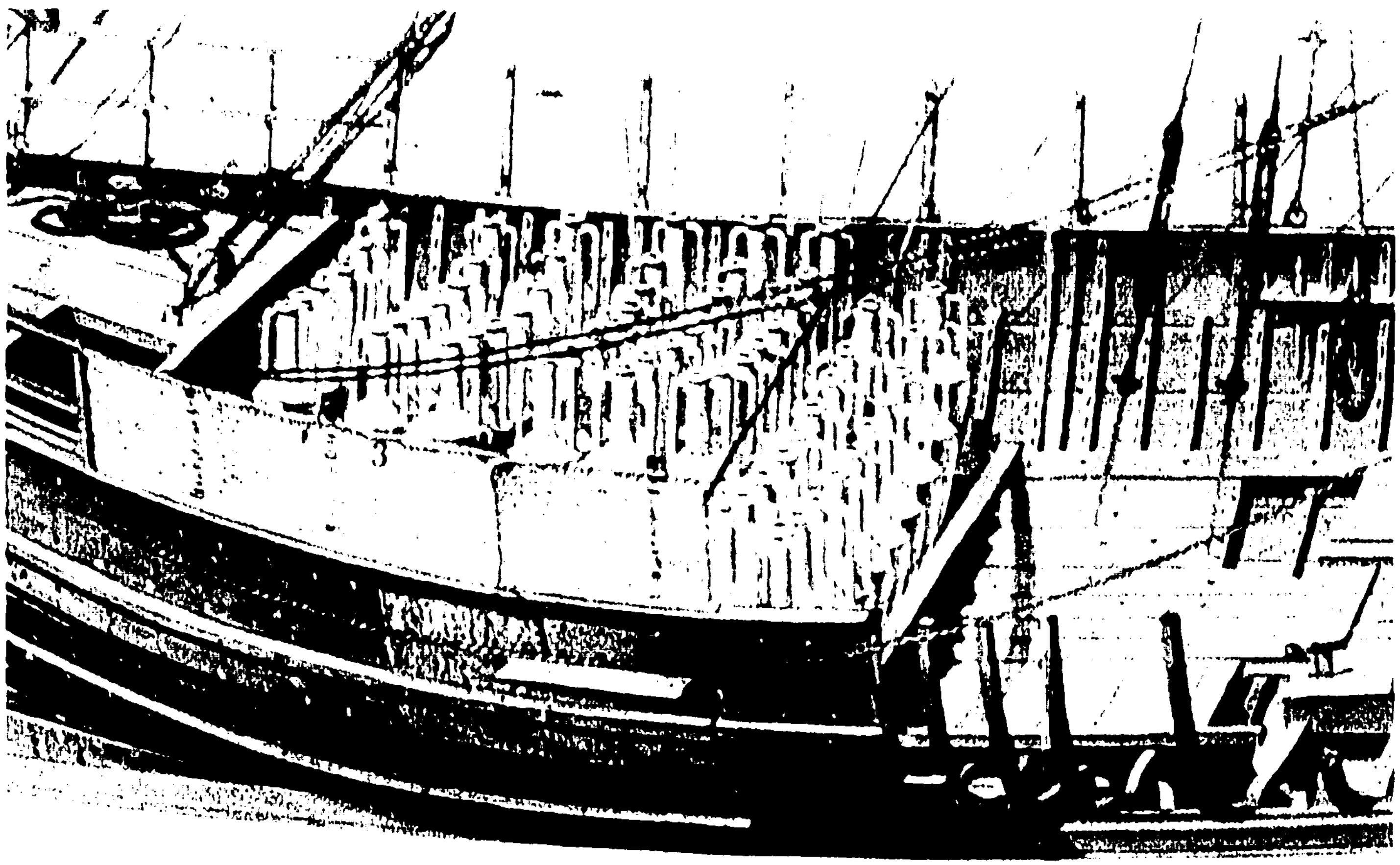

Fig. 3.25. Cargo of amphorae. (Detail after S. Katzev and M. Katzev, "Last Harbor for the Oldest Ship," *National Geographic* 146 [1974] 622–23)

The Ma'agan Michael ship has widely spaced framing identical to that on the Gela ship, but even with a stiffer and stronger hull provided by the pegged mortise-and-tenon joinery, this does not appear to be sufficient. By the time of the Kyrenia ship a hundred years later, the frame spacing has decreased from 75 centimeters to 25 centimeters (fig. 3.3). This change in spacing may be a direct result of the extra framing required to carry a full cargo of amphorae. The substitution of framing like that in laced ships with closely spaced floor timbers and futtocks alternating with half frames was a simpler and stronger system of framing that took advantage of a wider variety of timber shapes.

In addition to the framing, ceiling planking covered the framing and relieved the pressure amphorae put on the hull (fig. 3.4). Another important feature is the wine-glass shape of the hull. Even on the Kyrenia ship, the keel had little backbone strength. The weakness of this timber is illustrated by the fact that this keel had actually been damaged and was repaired by cutting out the damaged section and nailing in a new piece of timber. Therefore, the V-shaped trough of planks that was reinforced with pegged mortise-and-tenon joints and braced by heavy, closely spaced chocks produced the backbone strength for this ship. This structure continued in use until it was replaced by a heavy keelson that was bolted to the keel.[144] The keel, even at this late date, acted as a keystone that connected two sides of an arch. In essence, this is the same theory of construction used to build the Cheops vessel. This arch, however, acquires greater rigidity by its wine-glass shape, closely spaced frames, and attachment by mortise-and-tenon joints.[145] These improvements in hull construction result in a stronger hull, allowing a ship's captain to take greater advantage of an amphora's shape and stacking more layers of amphorae in the hold of his ship. If these structural changes were made to a laced ship it would only make it stiffer and make the lacing that much more difficult to change. Therefore, the only way to adapt a laced ship to carry as many amphorae as a mortise-and-tenon joined ship would be to build a much larger ship, but this results in longer building times, more raw materials, and a larger crew. A laced ship is not well adapted to carry this type of cargo.

Laced ships probably continued in use for a long time, but there is little doubt that they were rarer and only carried smaller mixed cargoes. The demise of the laced ship can probably be directly linked to the increased need to ship large numbers of amphorae by sea. Such a demand changed the requirements of a laced ship and traditional techniques were no longer able to produce a ship that shipowners demanded. By understanding how and why ships were built before and after Homer's time, we are better able to understand ships and seafaring during his time. This understanding will help us decipher Homer's building passage in the next chapter.

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[144] Steffy (supra n. 136) 100.

[145] J. R. Steffy, "The Ram and Bow Timbers: A Structural Interpretation," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* (College Station, Texas 1991) 36.

CHAPTER IV*

ODYSSEUS BUILDS A SEAGOING VESSEL

Homer has interspersed various names, hints, and descriptions of ship timbers throughout the *Iliad* and the *Odyssey*. Unfortunately, we must deduce the function of most timbers with little more than the etymology of a word to guide us. Homer does come to our aid by describing how Odysseus builds a seagoing vessel in Book Five of the Odyssey. This relatively detailed account allows us to place some terms in a more comprehensible context. Some nautical aspects in the text are, nevertheless, still obscure. One of the longest nautical debates was over the type of craft Odysseus is building.

E. Warre proposes that Odysseus builds a raft instead of a ship. In this view, Odysseus's raft is large and complex but not very seaworthy. It consists of a stern deck built high above a broad platform. In the center of this platform, Odysseus builds a framework of timbers to support a mast, sail, and rigging. Finally, he places brush around the perimeter of the platform to ward off the sea.[1]

Thomas Seymour supports Warre's interpretation.[2] He argues that this vessel cannot have been a ship in the ordinary sense of the word. He points out that it is not called a ship or νηῦς but a σχεδίη. Odysseus builds it in only four days, which is too short a period to build a ship, and he shrinks from sailing across the sea in it.[3] Furthermore, Homer describes the destruction of the σχεδίη by stating "the waves scattered it as the wind scatters a heap of chaff."[4] Seymour believes these passages more consistently describe a raft than a ship.

In contrast, Brewster argues that σχεδίη denotes a boat. He claims the care Odysseus takes in shaping, smoothing, and fitting all timbers are superfluous for building only a raft, but necessary for a boat. In addition, he points out that Odysseus uses an adze to finish the surfaces of a plank or timber, not shape logs. Odysseus trims and squares his logs with his axe, which is all that is required to build a raft.[5] Lionel Casson agrees with Brewster. Furthermore, he points out that a raft does not have framing or a stern deck

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[1] E. Warre, "On the Raft of Odysseus," *JHS* 5 (1884) 209–19.

[2] T. Seymour, *Life in the Homeric Age* (New York 1914) 319–21.

[3] *Od.* 5.174.

[4] *Od.* 5.368.

[5] F. Brewster, "The Raft of Odysseus," *HSCP* 37 (1926) 49–53.

as a ship does.[6] In addition, Casson answers Seymour's first objection by pointing out that a σχεδίη does not denote a raft or a ship but an "improvised" boat.[7] Seymour is correct that the four days Odysseus takes to build this vessel is too little, and the platform of a raft can be assembled more quickly than the hull of a vessel. Yet Seymour fails to consider a few other aspects of shipbuilding.

It is far more difficult to build a solid framework for a mast and a raised deck on a flat raft than to do so within the curved hull of a ship, especially considering the types of wood Odysseus uses to build it. Odysseus could build a bipod or tripod mast relatively easily, but we do not have any archaeological or ethnographic evidence to suggest that the Greeks built masts in this way. Furthermore, Odysseus needs to build a larger and heavier raft to sail in seas a smaller vessel can weather. The time Odysseus would save in preparing and joining the timbers for the platform of a raft is therefore lost in the extra time required to build a larger raft with a secure mast and raised deck.

The argument that it takes Odysseus only four days to build his vessel is another aspect commonly cited to support the raft theory, but it has little merit. Another literary figure, Utnapishtim, plans and has a vessel built large enough to carry him, his family, their kin, all his possessions, the children of craftsman, and a sample of all living creatures in only two days. Noah completes a similar feat in seven days.[8] Considering these literary traditions, we should not make too much of Odysseus building a small, seagoing vessel in only four days.

Odysseus's fear of sailing in a σχεδίη may be due to the "improvised" nature of the vessel, but this seems unlikely. Homer gives the impression that Odysseus is an adept warrior, speaker, sailor, hunter, storyteller, and carpenter.[9] Odysseus is also the favorite of Athena, the goddess who guides the hands of craftsmen.[10] Just because Odysseus builds his vessel quickly and with no preparation does not mean that it is a poorly built craft. In contrast, Odysseus knows he has incurred the wrath of Poseidon after blinding his son Polyphemus, and Odysseus has already suffered much on the open seas because of it. His return voyage would, therefore, be dangerous and difficult even in a large and fully-manned ship, let alone by himself in a small vessel. His fears may be the result of his precarious situation with Poseidon more than in the type of vessel he must sail. Another, and simpler possibility, is that Odysseus is afraid to sail alone in dangerous

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[6] L. Casson, "Odysseus' Boat (*Od.*, V, 244-257)," *AJP* 85 (1964) 61; L. Casson, *Ships and Seamanship in the Ancient World* (Baltimore 1995) 217.

[7] Casson (supra n. 6) 217.

[8] See respectively, J. Gardner and J. Maier, *Gilgamesh* (New York 1984) Tablet 11.56, 11.76; Genesis 6: 14–16.

[9] *Il.* 10.240–531 [warrior]; *Il.* 220–24 [speaker]; *Od.* 5.269–80 [sailor]; *Od.* 17.514–21 [story teller]; *Od.* 10.158–73 [hunter] *Od.* 5.234–57, 23.190–200 [carpenter].

[10] *Il.* 15.411–12.

and uncharted waters in such a small vessel.

Homer's description of the destruction of the σχεδίη may be consistent with some types of seagoing vessels. As mentioned in the previous chapter, laced ships are not designed to weather heavy seas. If cords securing the hull planking started breaking under the conditions described by Homer, the waves may indeed scatter pieces of the hull much like wind scatters a heap of chaff.

Finally, we lack any ethnographic or archaeological evidence suggesting that Greeks built rafts of such timbers. In contrast, we have many depictions and models of ships and boats dating from the Late Bronze Age through Archaic times. All of the evidence suggests that Odysseus is building a small seagoing ship and not a raft.

Odyssey 5.234-57 is important because it is a relatively detailed description of Odysseus building this vessel. The translation of the relevant lines of the *Odyssey* passage is as follows:

> She gave him a great double axe of bronze, fitted to the palms, sharpened on both sides. Furthermore, in it was a very beautiful, well fitted, olive handle, and she gave him a well-polished adze, she then led the way to the end of the island where tall trees grew, alder and poplar and fir that reached to the heavens, long dry, well-seasoned, so they would float buoyantly for him....he felled the timber. And he completed the task quickly. And he felled twenty in all, and then he roughly shaped them with the bronze axe, and he skillfully adzed and made them straight to his line. Meanwhile Calypso, the beautiful goddess, brought along drills. He bored all the pieces and fit them to one another, and then by dowels and fastenings did he hammer it [join it ?] together. As wide as a skilled carpenter marks off the circumference for the bottom of a broad merchant ship, so wide of beam did Odysseus build his vessel. And setting up the deck, joining it to the closely spaced frames...And finished it with long pieces. He fenced it continuously with osiers to protect against the waves of the sea and then filled it with brush.[11]

Odysseus begins by felling alder (κλήθρη), poplar (αἴγειρός), and fir (ἐλάτη) trees.[12] According to Russell Meiggs, Homer should be allowed some poetic license when he mentions three or more trees per line because as the number of trees increases their relevance decreases. He cites the passage describing Calypso's home, which is surrounded by alder and poplar and cypress, as opposed to the alder and poplar and fir Odysseus cuts down to build his vessel. Meiggs believes that these two passages should be seen as literary devices instead of information on landscaping and shipbuilding. He supports his argument by pointing out that these trees are not found together in nature. Alders and poplars grow near streams in

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[11] *Od.* 5.234–41, 5.243–53, 5.256–57. The lines pertaining to the mast and sails will be covered in a later chapter.

[12] *Od.* 5.239.

mountain valleys and at medium elevations. In contrast, fir needs less water and grows at higher elevations. Meiggs proposes that Homer is substituting fir for cypress only because fir is the best timber for ship construction; the other two species should be ignored. This interpretation is corroborated by the absence of alder and poplar from ancient texts on shipbuilding. Yet, Meiggs also observes that Homer has an intimate understanding of the habits and uses of different trees.[13]

Homer's eye for detail is aparant in the passage describing the Achaians gathering wood for Patroclus's funeral pyre. The Achaians travel to Mount Ida with mules and woven ropes to bind and haul timber. They drive their mules in a sinuous pattern to the shoulder of the mountain where they cut oak trees.[14] Oak is a species that grows on Mount Ida and is a strong burner, well suited for cremations. If the Achaians had traveled any higher on the mountain, they would probably have been at an elevation where conifers grow, trees that are not so suitable for a funeral pyre.[15] Homer also states that the shafts of spears are always made of ash (μελίη).[16] Ash is a tough, elastic, and relatively light wood that is well suited for this purpose. The spear is so closely associated with this particular wood that it is commonly called an ash.[17]

Homer's keen sense of detail is also revealed in this building passage. The axe handle is olive (ἐλάα). Olive is a wood that wears well, is very hard, and was used for tool handles.[18] Homer seems to have an innate feeling for such aspects of life. Even if Meiggs is correct and this line is a literary device, Homer may have constructed it to accurately reflect life as he did with other lines of his poetry. It has been proposed that when Homer describes the area around Calypso's home, he envisages alder and poplar in a valley and cypress on a hillside above. Meiggs rejects this interpretation because such subtleties are beyond Homer's ability.[19] This is an apt observation if Homer is constructing his song orally, but we expect to see such subtleties in a written text, which it may be. Furthermore, if such subtleties were beyond Homer and his oral song, he would substitute fir for cypress to describe the trees around Calypso's home because it preserves the economy of the poem, and Odysseus would still have access to the fir necessary to build his boat.

It is, therefore, possible that alder, poplar, and fir were used to build seagoing vessels. A survey of all

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[13] R. Meiggs, *Trees and Timber in the Ancient Mediterranean World* (Oxford 1982) 108–09.

[14] *Il.* 23.110–26.

[15] Meiggs (supra n. 13) 108–09.

[16] *Il.* 2.543, 16.143; *Od.* 14.282, 22.259.

[17] Meiggs (supra n. 13) 110; H. Stone, *The Timbers of of Commerce and Their Identification* (London 1904) 160; F.H. Titmuss, *Commercial Timbers of the World* (London 1965) 31.

[18] Theophrastus, *Hist. Pl.* 5.7.8; Meiggs (supra n. 13) 111.

[19] Meiggs (supra n. 13) 109.

three types of wood supports this observation.

Homer appropriately describes fir as reaching "to the heavens" because it can have straight sections of over 30 meters in length. A fir tree, under the right conditions, grows few lower branches, producing long lengths of wood with few knots.[20] Fir is also light, strong, easy to split and work, resistant to decay, and durable in water.[21] These characteristics made it a favorite of shipwrights for the building of merchant ships.[22] In contrast, alder and poplar are deciduous trees.

Alder is a fine-grained hardwood that is durable underwater. It is dense and elastic, it seasons without difficulty, and is easily split and worked.[23] In addition, carpenters did use alder for ship planking. Alder, pine, and fir were used for the hull planking on the St. Gervais 2 wreck.[24]

Poplar is also a fine grained hardwood that is easy to work, but it is only moderately durable. Poplar is commonly used in carpentry and statue carving.[25] Poplar has a definite advantage over fir; it is a hard wood. Fir is ideal for planking but a poor wood for fasteners because, after a ship is launched the planking absorbs water and swells. If the fasteners were to swell at the same time, the planks would distort or even split. The possibility of damaging the planking is reduced if fasteners are made of a hard wood that swells little.[26] A ship that sank to the North of the Roman harbor of Caesarea had poplar tenons.[27] In addition, Homer uses poplar in a simile to describe Asius falling to the ground after being struck by a spear. "He fell like an oak (δρῦς) or white poplar (ἀχερωΐς),[28] or stately pine (πίτυς), which the carpenters fell in the mountains with sharpened axes for a ship's timber."[29] Oak and pine were common shipbuilding timbers

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[20] Meiggs (supra n. 13) 241.

[21] Theophrastus, *Hist. Pl.* 5.7.1; Stone (supra n. 17) 273; Meiggs (supra n. 13) 119.

[22] Theophrastus, *Hist. Pl.* 5.7.1.

[23] Stone (supra n. 17) 217–18, Titmuss (supra n. 17) 22.

[24] M. Fitzgerald, "The Ship," in J.P. Oleson, ed., *The Harbours of Caesarea Maritima*, BAR International Series 594. (Oxford 1994) 172.

[25] Stone (supra n. 17) 237.

[26] J.R. Steffy *Wooden Ship Building and the Interpretation of Shipwrecks* (College Station, Texas 1994) 46.

[27] Fitzgerald (supra n. 24) 163, 176.

[28] R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman, Oklahoma 1988) 65, s.v. ἀχερωΐς. See also, Cunliffe 10, s.v. αἴγειρός.

[29] *Il.* 13.389–91.

for ancient ships.[30]

Ancient shipwrights used various woods to build ships besides fir, oak, and pine, like walnut, carob, elm, linden, dogwood, olive, ash, pistachio, cedar, cypress, larch, spruce, and even alder and poplar,[31] most of which were not mentioned by ancient writers. Unfortunately, most of what survives on ancient wrecks are the keel, lower planking, framing, and sometimes the mast step and stringers. We know little of the various species of wood used for crossbeams, decking, bulkheads, and ornamentation because these structures rarely survive in shipwrecks and are rarely mentioned in ancient texts. The fact that Homer mentions only woods that are good for woodworking suggests that he mentions poplar and alder because they are an acceptable timber for many of these structures. Finally, the use of three different types of wood may also have been an indication of Odysseus's versatility. Not only can he build a seagoing vessel in four days,[32] but he can build it out of whatever timber is available.

Homer describes the trees as αὖα πάλαι περίκηλα[33] (long dry, well-seasoned). This phrase suggests that the trees had dried out over a long time before Odysseus cut them down. Ancient woodcutters commonly seasoned their wood before cutting. They would girdle a tree allowing the sap to drain.[34] Regardless of whether these trees were seasoned by man, nature, or the gods, we know that Odysseus used seasoned wood to build his vessel.

Seasoned wood is light, hard, and durable,[35] and it has advantages and disadvantages. Seasoned wood is more difficult to split and work, especially when using an axe or adze. Yet, tools remain sharper when working a hard wood, reducing the time spent sharpening tools. Furthermore, carpenters can bore seasoned wood more easily because the wood dust is dry and is easy to bring up.[36] It is true that Theophrastus advocates the use of wood with some moisture. He does so because such wood can be bent more easily. Once a ship has been completed, however, the wood must dry out so joints can set.[37] In the *Argonautica*, trees are felled and then laid along the beach to be hardened in seawater before construction

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[30] Steffy (supra n. 26) 41, 43; Fitzgerald (supra n. 24) 170–75.

[31] Fitzgerald (supra n. 24) 172, 176.

[32] *Od.* 5.262.

[33] *Od.* 5.240; LSJ 1376, s.v. περίκηλος.

[34] Vitruvius, *De Arch.* 2.9.3.

[35] C. Desmond, *Wooden Ship-Building* (New York 1984) 12.

[36] Theophrastus, *Hist. Pl.* 5.6.3.

[37] Theophrastus, *Hist. Pl.* 5.7.4.

starts.[38] It is therefore not a matter of whether seasoning of the timbers took place but when it took place. Finally, Homer points out another advantage of seasoned wood; these trees were well seasoned so they would float "buoyantly" (ἐλαφρῶς) for Odysseus.[39]

After felling the trees, Odysseus roughly shapes the planking and timbers with his axe and obtains the final form and thickness with an adze. A line (στάθμη), probably of chalk, guides Odysseus in shaping his timbers. Ancient carpenters and shipwrights coated a string with chalk, pulled it tight over the surface to be marked, and then plucked the string. The string then struck the surface leaving a straight chalk line.[40] This simple tool is commonly alluded to in both epics. Homer uses it in the form of a simile to demonstrate a person's skill while performing a difficult project.[41]

After Odysseus has split, carved, and adzed his planking and timbers, he bores holes for fastenings. One of the more visual similes in the *Odyssey* describes a large type of drill for boring ship timbers: "They snatched the olive stake, sharp at the end, and leaned on it into his eye, while I, throwing my weight on it from above, twirled it around, like a man who bores a ship's timber with a drill, which his men below keep continually spinning with a thong they grasp by either end. So we took the fiery-pointed stake and spun it around in his eye."[42]

This passage describes a large bow drill. A bow drill consists of a chuck that holds a bit, a spindle, a loosely rotating handle at the top, and a bow. The bow is made of wood and strung with a loose leather thong that is wrapped once around the spindle. The carpenter presses down on the handle of the drill with one hand and then pushes and pulls the bow with the other.[43] The main difference between a small bow drill and the larger drill alluded to by Homer, other than size, is that a carpenter would substitute a piece of leather for a bow on the larger drill and replace the handle with a transverse piece of wood. The transverse piece of wood is shaped to fit the chest of a carpenter. A carpenter would rest his chest on this piece while guiding and pressing down with as much of his weight as possible on the drill.

A bow drill relies on reciprocal motion. This type of motion is inefficient and best suited to drilling through rather thin pieces of wood or thick wood with small holes. In contrast, an auger is more efficient for drilling holes greater than 2 or 3 centimeters in diameter. It consists of a long bit with a transverse handle. Carpenters can more easily bore larger holes in thicker pieces of wood because the bit turns

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[38] Apollonius Rhodius 1.1003–5.

[39] *Od.* 5.240.

[40] Cunliffe (supra n. 28) 363, s.v. στάθμη; LSJ 1632, s.v. στάθμη.

[41] *Il.* 15.410; *Od.* 17.341, 21.44, 21.121, 23.197.

[42] *Od.* 9.382–88.

[43] A.W. Bealer, *Old Ways of Working Wood* (New York 1980) 124.

continuously in one direction.[44] Most scholars interpret τέρετρα as auger, a possible interpretation. A wooden handle of an auger was discovered in Egypt and dates to the seventh century B.C., but it is the earliest known example of this type of drill.[45] Augers are probably more ancient than the evidence indicates because we are unable to differentiate either type of drill by the bits. Furthermore, since most auger handles are made of wood and are rather small, they are not likely to survive in the archaeological record. Augers are not seen in the iconographic record but may have been used despite this absence. Augers were used by carpenters during Roman times, but only bow drills are represented in art.[46] On the other hand, pegs and dowels used to build ships during the Bronze Age through the Archaic period are no more than 2 centimeters in diameter. A carpenter therefore could bore the necessary holes with a bow drill. All that we know for certain is that Calypso gives Odysseus more than one borer, but whether the difference is only in the size of the bit or type of drill that is needed for different tasks cannot be discerned with the available information.

After boring the timbers, Odysseus fits the planking together and hammers them in place with pegs [γόμφος] and fastenings [ἁρμονίῃ]. Few lines in the *Iliad* and the *Odyssey* have taxed the imagination of scholars more than this line. Scholars have imagined Odysseus building his boat with such diverse fastenings as lashings, treenails and dowels, nails and clamps, and even bolts and rivets.[47] Casson reinterpreted this passage by using information discovered by nautical archaeology of Greek and Roman shipwrecks. He proposes that Homeric ships were built with pegged mortise-and-tenon joinery (fig. 3.2).[48] Ships in the Classical Greek and Roman periods were built by joining the edges of hull planking with mortise-and-tenon joints. Once a tenon was fitted into a mortise, a hole was drilled through the joint and a wooden peg was hammered in, which permanently locked the joint in place (fig. 3.2). The protruding ends of the pegs were then cut off with an adze to make them flush with the planking. At separate stages of this construction, frames were inserted to reinforce the shell of planks. Holes were drilled through frames and planks, and then treenails were hammered into place.[49]

In order for Odysseus to build a boat in this manner, with the aforementioned tools and materials, he

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[44] Bealer (supra n. 43) 125.

[45] W.M.F. Petrie, *Tools and Weapons Illustrated by the Egyptian Collection in University College London* (Warminster, England 1974) 39, pl.43.28.

[46] W.L. Goodman, *The History of Woodworking Tools* (London 1964) 165.

[47] See translations of this passage by, respectively, R. Lattimore (New York 1991) 94; S.H. Butcher (New York 1905) 60; W.C. Bryant (Boston 1899) 110; and S. Butler (New York 1944) 63.

[48] Casson (supra n. 6) 61–64. See also, J.R. Steffy, "The Kyrenia Ship: An Interim Report on its Hull Construction," *AJA* 89 (1985) 87–93.

[49] See the previous chapter for more details.

must follow a specific sequence of tasks: shape the planks with an axe and an adze; drill holes in the edges of the planks to facilitate cutting the mortises; cut the mortises out with a chisel; fit the plank to the vessel; bore the peg holes through the mortise-and-tenon joints and hammer in the pegs; install the frames after the planking was assembled; and finally, bore and treenail the frames to the hull. However, if the frames are laced into place as on the Mazaron wreck, the lacing holes could be drilled when the peg holes are drilled.

There are problems with this interpretation, however. If Odysseus was building a vessel with pegged mortise-and-tenon joinery, we would expect Homer to have referred to a stage of chiseling before the planks were fitted and to subsequent drilling, since all required drilling for pegged mortise-and-tenon construction occurs after the plank is fitted. Casson attempts to circumvent this inconsistency by proposing that Odysseus was drilling into the edges of the planks to start the mortises. A carpenter can make a mortise by first drilling two holes to define the edges and then cutting out the wood between both holes with a chisel. Nevertheless, drilling the edge of a plank before cutting the mortises is not required, and archaeological evidence suggests that it was more of a personal preference than a standard practice. Of all Classical Greek and Roman shipwrecks that have been studied, only the fourth-century B.C. Kyrenia ship provides information on the cutting of mortises. None of the mortises that were studied from the hull planking were drilled before they were cut, but mortises found on some of the starboard-ceiling planking had been drilled before cutting as Casson describes. The ceiling planking in this vessel was salvaged from three older ships and had originally been used as hull planking. Therefore, the hull planking of only one vessel out of four appears to have had the mortises drilled before being cut.[50] The Uluburun wreck is the earliest known vessel with pegged mortise-and-tenon joints; the mortises on this vessel were not drilled before being chiseled.[51] Although what Casson suggests is possible, it appears that this practice is rarer than originally thought.

An interpretation that conforms more closely to the evidence is that Odysseus's boat was laced together (fig. 3.1).[52] The use of such vessels during the Heroic Age is commonly described in both Greek and Roman literature. In the *Supplices*, for example, Aeschylus describes the suppliant maidens sailing from Egypt to the shores of Argos in such a ship.[53] In Pacuvius's Latin version of the *Odyssey*, the *Niptra*,

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[50] Steffy (supra n. 26) 90.

[51] Personal communication with Edward Rogers. Edward Rogers has helped record the Uluburun planking.

[52] Laced construction is most commonly referred to as sewn construction. This term appears to have been adopted with little understanding of this type of construction. When holes are drilled first and then a cord is laced through them, the term lacing is a more appropriate description.

[53] Aeschylus, *Supp.* 134-35: λινορραφής τε δόμος ἄλα στέγων δορὸς. See also, *Supp.* 11.439–41.

Odysseus builds a laced boat to escape from Calypso's island.[54] The Roman encyclopedists, Varro and Pliny, believe that the Greeks sailed to Troy in laced ships on the basis of the following passage in the *Iliad*: "the planks of our ships have rotted away and the cords are parted."[55] Casson argues that these passages are not really relevant because the authors used laced ships as a device to evoke a feeling of the distant past as does the mention of the "ark" today.[56] This is a poor parallel. All we know of the ark is that it was a wooden ship with three decks, a door, and a window that was covered inside and out with pitch.[57] It was a large vessel with few specific features. What everyone remembers of the ark is that it was large enough to hold two of each animal. It is this general concept that evokes images of the past not any specific details of the ship itself. This is supported by an earlier Babylonian version of the flood in which the ark is a six-decked reed vessel with water-plugs and is coated with bitumen.[58] The details have changed but the general concept of a large vessel that can carry all the animals of the earth still survives. In contrast, Homer is supposed to evoke feelings of the past by mentioning a laced fastener. This seems unlikely. In addition, Casson fails to explain why Homer consistently evokes feelings of the past throughout both epics except in this one passage in which Odysseus builds a vessel with the more modern technique of pegged mortise-and-tenon joinery.

It is more likely that Homer was describing how shipwrights built vessels in his day. To understand how a ship was built by being told only one detail of its joinery suggests such vessels were a common sight when a literary work was written because this is the type of information that is quickly forgotten once one detail of ship construction is replaced by another. Laced vessels must, therefore, have been relatively common in Greece when Aeschylus wrote the *Supplices* in the fifth century B.C. In addition, Herodutus wrote an abbreviated description of Egyptians building a laced river boat, also in the fifth century B.C. His audience must have been well acquainted with laced construction to understand this passage. Today, even with the aid of archaeology, iconography, and textual information, scholars continue to disagree on some

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[54] Pacuvius, *Niptra* 277-78: *Nec ulla subscus cohibet compagem alvei, sed suta lino et sparteis serilibus.*

[55] Pliny, *HN* 24.40.65: *et cum fierent sutiles naves, lino tamen, non sparto umquam sutas*; *Il.* 2.135: καὶ δὴ δοῦρα σέσηπε νεῶν καὶ σπάρτα λέλυνται. See Aulus Gellius, *NA* 27.3.4: *Liburni...plerasque naves loris suebant, Graeci magis cannabo et stuppa ceterisque sativis rebus.*

[56] L. Casson, "New Light on Ancient Rigging and Boatbuilding," *American Neptune* 24 (1964) 91.

[57] Genesis 6: 14–16.

[58] Gardner and Maier (supra n. 8) Tablet 11.20–24, 56–65.

of the finer points of this passage as they do with this shipbuilding passage by Homer.[59] But by the time Apollonius Rhodius wrote the *Argonautica* in the third century B.C., laced vessels are no longer being built or are so rare in the Greek world that a mention of one would result in confusion instead of conjuring visions of the past. Jason and the Argonauts appear to build their ship with pegged mortise-and-tenon joinery instead of cords, even though they lived before the time of Odysseus.[60]

The assembly of a laced vessel corresponds much more closely to the construction sequence followed by Odysseus. The sixth-century B.C. Giglio and Bon-Porte I ships are the earliest examples discovered of seagoing laced vessels, but, even by this time, a few features are too sophisticated for the rudimentary craft described by Homer.[61] To build a simple laced boat, an axe and an adze are required to shape the planks, then a large borer to drill the dowel holes in the edges of the planks. A borer with a smaller diameter is used for the pegs that secure the cords.[62] The planks are then fitted to one another and laced, and finally the pegs are driven into place or the cords are tied in place. The frames of this ship were neither treenailed nor nailed to the planking,[63] but were probably laced and then pegged in place. Since dowels were not pegged and it was not necessary for the lacing holes to line up, all the holes in a plank could have been bored at the same time, before the plank was fitted, exactly as related by Homer. In contrast, the assembly of a pegged mortise-and-tenon joined vessel would have required the boring of the holes at two or three different times, depending on whether the frames are treenailed or laced. Finally, Odysseus could have built a rudimentary laced boat with the few tools mentioned in the passage; not so, however, in the case of a pegged mortise-and-tenoned craft.

Arthur Wallace describes the construction of a laced vessel called a *prahu kulis*, which was built by the people of Kei Island, Indonesia. A *prahu kulis* was a seagoing vessel that could carry from 20 to 30 tons of cargo and was praised for its seaworthiness. Yet, a carpenter needed only an axe, an adze, and a drill to

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[59] G. Wilkinson, *The Manner and Customs of Ancient Egyptians* (New York 1878) 208; A.B. Lloyd, "Herodotus 2.96.1–2," *CQ* 29 (1979) 45–48; C.W. Haldane and C.W. Shelmerdine, "Herodotus 2.96.1–2 Again," *CQ 40* (1990) 535–39; L. Casson, "Skippers on the Nile in Ancient Times," *American Neptune* 54 (1994) 7; Casson (supra n. 6) 14, n. 15; S. Vinson, "ΠΑΚΤΟΥΝ and ΠΑΚΤΩΣΙΣ as Ship-Construction Terminology in Herodotus, Pollux and Documentary Papuri," *ZPE* 113 (1996) 197–204.

[60] Apollonius Rhodius 1.1005, 2.80–82, 2.614, and 2.1112.

[61] These characteristics include triangular notched peg holes that do not extend all the way through to the outside of the hull but come out through the edge of each plank and the rather complex floor timbers. See the previous chapter for more information.

[62] J.P. Joncheray "L'èpave grecque, ou ètrusque, de Bon Porté," *Cahiers d'archèologie subaquatique* 5 (1976) 28.

[63] Joncheray (supra n. 62) 26-27.

build one.[64]

In a previous article, I pointed out that there were difficulties with my interpretation. The first was that a laced vessel requires caulking, which Homer fails to mention.[65] Upon further study, I realized that I was technically incorrect because laced vessels cannot be caulked in the strict sense of the word. When a shipwright caulks seams, he drives either plant material, fibrous material, animal hair, or some combination into the planking seams with a caulking chisel.[66] If a shipwright attempted to caulk the seams of a laced vessel in this manner, the force necessary to drive in the caulking material would stretch or break the cords holding the planks together.

In most laced ships, shipwrights lay rolls of organic or fibrous material, which is called wadding, along the inner planking seams and then tie the wadding in place by small cords before lacing begins.[67] In the Cheops vessel, wooden battens are placed on top of seams instead of wadding.[68] We even have accounts of laced vessels that do not use either wadding or battens. The hull planking of the previously mentioned *prahu kulis* was fitted so tightly that caulking was apparently not necessary.[69] In addition, John of Monte Corvino sailed on a laced ship in the fourteenth century A.D. that lacked wadding or battens.[70] Although wadding and battens are commonly used in the building of laced vessels, the necessity of such material appears to be dependent on a number of factors including the quality of workmanship and materials, the thickness of the planking, and the amount of time invested in building such a craft. It is therefore possible that building a vessel without wadding or battens reflects the skill of Odysseus as a shipwright.

The second problem I raise is that Homer fails to describe Odysseus lacing the planks together, but this does not appear to be significant because he does not describe the insertion of any fasteners into place. It is true that Homer describes the pegs and fasteners as being either hammered into place or joined, but he fails to mention Odysseus placing them into their respective holes before securing them. The omission of such details should not be surprising as Homer's intention was to entertain, not to give a detailed seminar

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64 A.R. Wallace, *The Malay Archipelago* (New York 1869) 425–26.

65 S. Mark, "*Odyssey* 5.234–53 and Homeric Ship Construction: A Reappraisal," *AJA* 95 (1991) 444.

66 Steffy (supra n. 26) 268.

67 Z. Brusić and M. Domjan, "Liburnian Boats - Their Construction and Form," in S. McGrail and E. Kentley eds., *Sewn Plank Boats*, BAR International Series 276 (Oxford 1985) 76, fig 6.5; T. Severin, "Constructing the Omani Boom Sohar," in S. McGrail and E. Kentley eds., *Sewn Plank Boats*, BAR International Series 276 (Oxford 1985) 283–85.

68 Steffy (supra n. 26) 25–26.

69 Wallace (supra n. 64) 425–26.

70 H. Yule, *Cathay and the Way Thither* (Millwood, New York 1967) 66–67.

on ship construction. Thus, if a necessary tool is omitted, such as a chisel, or if the series of steps to build a vessel seems to lack the necessary steps for a specific technique, the reason for such exceptions may be that Homer was more concerned with the construction of his poetry than he was with the minutiae of Odysseus's shipbuilding. For example, pitch was commonly used to coat the hull planking of ships built with either lacings or pegged mortise-and-tenon joinery,[71] but Homer omits this aspect of the building sequence. In addition, Homer fails to mention the props or δρύοχοι used to support a ship under construction.[72] The type of vessel that Odysseus builds can, therefore, be better understood by looking at both the shipbuilding passage and the etymology of the words being used by Homer.

Casson interprets γόμφοι as the transfixing pegs that fix the mortise-and-tenon joints in place. I proposed that γόμφοι denotes both the transfixing pegs that secure either cords or mortise-and-tenon joints and also the dowels or tenons that edge-join planking. Yet, in ancient texts that describe ship and boat construction, γόμφοι is used to denote only wooden fasteners that join the edges of planking.[73] We, therefore, can only be sure that γόμφοι denotes wooden fasteners for edge-joining planks.

The standard translation of ἁρμονίαι is "joints" or "fasteners," although the type of joint is not known. Casson translates ἁρμονίαι as "mortise-and-tenon joints."[74] Yet, Heraclitus uses it to denote the strings on bows and lyres.[75] Casson disagrees with this interpretation. He argues that I omitted the significant words "of the universe" from my original translation of this passage, and the text should read: "the harmony of the universe produced by opposite tensions, like that of a bow and lyre."[76]

While I agree that a sense of cosmic unity is implied in this poetic fragment, I omitted the words "of the universe" from the translation of this passage because they do not appear in the Greek text. According to Charles Kahn, no paleographic evidence exists for a correction of this passage. Such a correction is based only on an error in transcription of ὁμολογέειν for ὁμολογέει in the manuscripts of Hippolytus. This "correction" to συμφέρεται allows the passage to conform with a free paraphrase in Plato's *Symposium* 187A. In fact, this "correction" is nothing more than an inexact quotation in an after-dinner speech. Thus, an accurate translation of Heraclitus 51 D-K is "[it is] an attunement (or fitting together) turning back [on

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[71] M. Bound, "The Giglio Wreck," *ENAΛIA*, Supplement 1 (Athens 1991) 31; Steffy (supra n. 26) 52.

[72] *Od.* 19.574.

[73] Herodotus 2.96; Strabo 16.1.11; Apollonius Rhodius 1.1005, 2.1112.

[74] Casson (supra n. 6) 217-19. 218.

[75] 51 D-K: οὐ ξυνιᾶσιν ὅκως διαφερόμενον ἑωυτῷι ὁμολογέει· παλίντροπος ἁρμονίη ὅκωσπερ τόξου καὶ λύρης; Mark (supra n. 65) 444.

[76] L. Casson "Odysseus' Boat (5.234–53)," *IJNA* 21 (1992) 74.

itself], like that of a bow and the lyre."[77] The beauty of this passage comes from the various meanings of ἁρμονία and the interplay of these meanings in comparison to a bow and a lyre.

According to Kahn, one comparison of παλίντροπος ἁρμονίη [an attunement turning back] with a lyre is the stringing or tuning the strings of an instrument; in relation to a bow, a comparison is "the fitting of the string to the bow-arms and the fitting of an arrow to the string." He maintains that the usage of ἁρμονία in this passage is nothing more than a simplified fusion of two or three archaic meanings and that one archaic meaning of ἁρμονία is the stringing or tuning the strings of a lyre or the fitting of a string to a bow.[78]

I also proposed that in the Hippocratic corpus ἁρμονίαι denotes sutural ligaments.[79] Ἁρμονία is most commonly used to describe a means of joining or fastening, even in Casson's translation of *Od.* 5.248, and the suture joints are fibrous connective tissue located between the bony parts of the skull.[80] In this passage. Hippocrates uses ἁρμονία to describe a condition in which the contiguous edges of the bones of the skull have pulled apart; the suture joints would be most easily seen in just such circumstances. Casson disagrees, he translates ἁρμονίαι as "the seams or joints where two contiguous members meet, in this case the seams between the bones in the skull."[81] Based upon his definition, ἁρμονίαι is best described as fibrous joints because they are the joints located between the contiguous edges of the bony parts of the skull.[82]

Casson's translation is also unlikely because Hippocrates and other ancient Greek writers use ῥαφίς and ἁρμονία to denote the sutures of the skull.[83] Ῥαφίς is a form of the verb ῥάπτω, and ῥάπτω is commonly used to denote sewing and stitching.[84] This suggests that both ἁρμονία and ῥαφίς could have been used to mean a fibrous joint instead of a seam, because both were used to denote fasteners of thread, string, or cord. It is also possible that both words were used to denote the sutures of the skull for the simple reason that these sutures look as if they are stitched together.

Finally, if ἁρμονία is a synonym for ῥαφίς, this supports the contention that ἁρμονίαι can be used to

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77 C.H. Kahn, *The Art and Thought of Heraclitus* (New York 1979) 195–198.

78 Kahn (supra n. 77) 195–98.

79 *Off* 25: τὰ δὲ καὶ τῶν διαστασίων τῶν κατὰ τὰς ἁρμονίας ἐν τοῖσι [τῶν] κατὰ τὴν κεφαλὴν ὀστέων ἐρεισμάτων χάριν·; Mark (supra n. 64) 444.

80 W.R. Hensyl, *Stedman's Medical Dictionary*, 25th Edition (Baltimore 1990) 1513; J. Hanken and B.K. Hall, *The Skull*, Volume I (Chicago 1993) 177.

81 Casson (supra n. 76) 74.

82 Hensyl (supra n. 80) 1513; Hanken and Hall (supra n. 80) 177.

83 See, Herodotus 9.83; Hippocrates, *VC* I; Plato, *Ti.* 76a.

84 *Od.* 22.186; Plato, *Plt.* 280c; Dio Cassius 43.11; LSJ 1565, s.v. ῥάπτω, 1566, s.v. ῥαφεύς.

denote cords that join planking together. In both the *Supplices* and the *Periplus Maris Erythraei*, laced vessels are respectively called ῥαφαὶ ὀστέων and πλοιάρια ῥαπτὰ.[85] The terms ῥαφίς, ῥαφαὶ, and ῥαπτὰ are all derived from the verb ῥάπτω.[86] Therefore, if ἁρμονία is associated with ῥάπτω in one sense, it may be associated in both. After reviewing all available information, it seems that ἁρμονίαι were, in fact, the cords that held together planks, not mortise-and-tenon joints.

Casson goes on to state that if ἁρμονίαι does mean cords it "is totally at variance with the verb the term goes with, 'hammered'[ἄρασσεν]...".[87] I disagree, because, after the cords have been laced and the pegs inserted into the laced holes, the cords are secured by hammering the pegs into place. Therefore, both pegs and cords are literally hammered into place—just as Homer describes.

It should also be noted that some doubt exists as to the correct translation of ἄρασσεν. Casson maintains that ἄρασσεν is from ἀράσσω and means "to hammer," yet it is also possible that ἄρασσεν is a form of ἀραρίσκω and means "to join together." This translation is based on the possibility that ἄρηρεν was an alternative ancient reading for ἄρασσεν.[88] Thus, the translation will be "and then by dowels and lacings did he join it together." This translation clearly describes one aspect of constructing a laced boat. Yet, Liddell, Scott, and Jones deny that ἄρηρεν is an alternative reading for ἄρασσεν, because ἄρηρεν is thought to be only an intransitive verb.[89] However, even if Liddell, Scott, and Jones are correct and ἄρηρεν is an intransitive verb, it does not automatically discount the possibility that ἄρασσεν is a form of ἀραρίσκω. Albert Bates Lord says it is not uncommon for oral poets to suspend such grammatical niceties during an oral performance.[90] The use of ἄρηρεν as a transitive verb may therefore be a vestige of the original oral performance.

The problem of deciding the correct translation arises from the fact that this form of the verb appears only in this passage of the *Odyssey*, and, as a result, there is disagreement concerning the etymology of this verb. A drawback to Casson's interpretation is that the verb ἀράσσω, in the context of the *Iliad* and the *Odyssey*,[91] means to break or smash, hardly the meaning you wish to convey to your audience. The verb

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[85] L. Casson, *The Periplus Maris Erythraei* (Princeton 1989) 59.

[86] LSJ 1565, s.v. ῥάπτω, 1566, s.v. ῥαφεύς.

[87] Casson (supra n. 76) 74.

[88] Apollonius Sophista, *Lexicon Homericum* s.v.v. ἁρμονιάων, ἄρηρεν.

[89] LSJ 234, s.v. ἀραρίσκω.

[90] A.B. Lord, *The Singer of Tales* (Cambridge 1960) 32.

[91] Cunliffe (supra n. 28) 52, s.v. ἀράσσω; LSJ 234, s.v. ἀράσσω.

ἀραρίσκω, however, is used to describe the joining of the deck beams to the frames of Odysseus' boat.[92] Moreover, the placement of a form of ἀραρίσκω directly after ἁρμονίη would mean that the verb and indirect object are two cognate words; this type of punning is common in Homer.

Other supporting evidence that Homeric boats were laced does exist. As previously mentioned, Casson maintains, classicists have misinterpreted σχεδίη as "raft," when, in fact, it means a boat.[93] But Homer also uses the phrase σχεδίη πολυδέσμου (*Od.* 5.33), which means "on a boat fastened with many bonds." Whenever δεσμός appears in Homer, it means cables, not wooden joints.[94] In the *Odyssey*, for example, δεσμός is used to describe, variously, a mooring cable, a cord used to tie up a box, a cable to secure a lock, and the cords used to tie Odysseus to the mast.[95] Although δεσμός is sometimes made of metal, it is only in association with the gods, not man.

Another passage in the *Odyssey* may suggest that ships were laced together: "He said that he had seen Odysseus among the Cretans at the house of Idomeneus, mending [ακειόμενον] his ships which storms had shattered."[96] The verb ἀκέομαι ("to heal," "to cure," or "to repair") is used frequently in reference to tailors, cobblers, and even to a spider mending its web.[97] Therefore, the various passages describing ship fastenings in both epics indicate that Homeric heroes were sailing in laced ships. The archaeological evidence also supports this interpretation. As mentioned in the previous chapter, the evidence suggest Greeks were building laced ships well into the sixth century B.C. If these vessels were still common so late, it would explain why a description of such a vessel appears in the play by Aechylus. A. B. Lloyd points out in his study of the Egyptian boatbuilding passage by Herodotus that the manner in which the passage is written is best understood as a contrast of Greek and Egyptian techniques of laced-ship construction. He dismisses his own theory because of a lack of evidence for Greeks building laced vessels so late.[98] The archaeological evidence now seems to support his original interpretation. If we therefore look at all available evidence, it appears rather obvious that ἁρμονίαι should be interpreted as cords used to bind the hull planking together.

After the hull planking has been joined together, Homer states that "as wide as a skilled carpenter marks

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[92] *Od.* 5.253.

[93] Casson (supra n. 6) 217.

[94] Cunliffe (supra n. 28) 88, s.v. δεσμός; LSJ 380, s.v. δεσμός.

[95] *Od.* 13.100, 8.444, 21.241, 12.200.

[96] *Od.* 14.382-83; trans. A.T. Murray, *Homer, The Odyssey* (Cambridge 1984) 65; cited in J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* (Cambridge 1968) 50.

[97] LSJ 49, s.v. ἀκέομαι.

[98] Lloyd (supra n. 59) 47.

off the circumference for the bottom of a broad merchant ship, so wide of beam did Odysseus build his boat." This passage suggests that Odysseus has built himself a beamy vessel. He appears to be more concerned with stability and safety than speed.

Another important aspect of this passage is the comparison of Odysseus to a skilled carpenter. In actuality, no specific name for a shipwright appears in either the *Iliad* or the *Odyssey*. Τέκτων is the word commonly translated as shipwright, but it is used to describe any type of carpenter.[99] Homer fails to differentiate between woodworking crafts in Homeric society, suggesting an absence of specialization. Nevertheless, Homeric society revered its master carpenters. The importance of a carpenter's position is emphasized in that only carpenters, healers, seers, and singers are ever invited from a foreign land.[100] Furthermore, carpenters were not confined to the lower classes. Odysseus, who is beloved by Athena, not only builds a seagoing vessel by himself, but, on the Island of Ithaca, he alone crafted his own bed and built the bedroom around it.[101] Phereklos, who could make anything because he was a favorite of Athena, was both a shipwright and a warrior; he built the ships that Paris used to bring Helen to Troy. Even Paris helps to build his own house. Curiously, he is the only person mentioned in the *Iliad* who is both hated by Athena and requires the assistance of other craftsmen to build his house and ships.[102] Homer may be using this comparison as a device to make a statement about Paris's lack of character. It also emphasizes the importance of Athena to the craft because carpenters were guided by her hand.[103]

Another tool mentioned in this passage is a τορνόομαι, which is used by carpenters to find the curvature of large ships. This device appears to be little more than a string used to strike off circles.[104] It is also used to mark the circumference for the burial mound of Patrocolus.[105] The use of a τορνόομαι suggests that some ships were not built by sight alone because of the size of the vessel or because a level of precision was required beyond the ability of a carpenter. Odysseus does not appear to use this tool to build his vessel. It is therefore possible he was building this vessel solely by eye or Homer may have omitted this device to enhance the abilities of Odysseus. On the other hand, building a ship without the aid of any such device has been reported. A passage from *Field: The Country Gentlemen's Newspaper* describes this

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[99] Cunliffe (supra n. 28) 376, s.v. τέκτων.

[100] *Od.* 17.384–85.

[101] *Od.* 23.190–200.

[102] See respectively, *Il.* 5.59–63, 6.314–15.

[103] *Il.* 15.411–12.

[104] Cunliffe (supra n. 28) 387, s.v. τορνόομαι.

[105] *Il.* 23.255.

practice in the construction of a *mtepe*. The reporter writes: "When it is considered that no measurements are taken, that the building of the whole structure is directed solely by the chief fundi's eye, and the tools used are crude and few in number, it is remarkable how beautiful and symmetrical are the lines and how true they remain to the type."[106] *Mitepe* were approximately 18 meters long. The use of such a tool may therefore suggest that the Greeks were building merchant vessels in excess of 18 meters at this time, and the construction of such a vessel required the use of a τορνόομαι.

After the hull planking has been completed, Odysseus sets up the deck (ἴκρια) and joins it to the closely spaced frames (σταμίνεσσιν). There is little doubt that ἴκρια denotes decking,[107] and that the deck is attached to the σταμίνες. Unfortunately, σταμίνες is a rarely used nautical term. It is a form of ἵστημι and denotes some object that stands up or is vertical.[108] Considering the etymology of the word and the construction sequence in the passage, there can be little doubt that it denotes framing.[109] The difficulty lies in trying to understand how individual planks can be attached to the framing, which are perpendicular to the planks, not parallel. We would expect the decking to be fastened to crossbeams not framing. Some scholars translate ἴκρια as crossbeams for this reason.[110] This translation actually makes more practical sense, but we lack etymological evidence to support such an interpretation. It is also possible that ἴκρια denotes an assembled deck. Homer may be describing both the planking and crossbeams to which they must be attached to make a platform. This would explain why Homer consistently uses the plural form of ἴκρια to denote one deck. In this way, the decking could be directly joined to the frames.

Once the frames and the decks are in place, Odysseus finishes his vessel with "long pieces" (ἐπηγκενίδες).[111] These pieces are commonly translated as the planksheer or gunwale of a ship.[112] A planksheer is the uppermost level of planking that extends the full length of a ship. Of course, this is only conjecture and does not fit with the construction sequence. Homer does seem to omit steps, but he also appears to keep the remaining steps in their proper order. If ἐπηγκενίδες does denote a planksheer, they should be in place before the decking is added to the ship. When building ancient ships a specific sequence will be followed. First, all of the planking must be in place before the last of the framing is

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[106] Sept. 24, 1925: 524.

[107] Cunliffe (supra n. 28) 199, s.v. ἴκρια; forward deck *Od.* 12.229 and stern deck *Il.* 15.729.

[108] Cunliffe (supra n. 28) 364, s.v. σταμῖνες; LSJ 841, s.v. ἵστημι.

[109] Nonnus, *Dion.* 40.446, 452; LSJ 1633, s.v. σταμίν; Casson (supra n. 6) 218.

[110] Murray (supra n. 96) 189.

[111] LSJ 620, s.v. ἐπηγκενίδες.

[112] Seymour (supra n. 2) 321, n. 3; Casson (supra n. 6) 218, n. 5, s.v. gunwales, 384. Gunwale is a poor term to use to describe any part of an ancient ship.

added to the hull. Second, all planks must be joined and fastened before the framing is added to the vessel since the framing must be in place before the stern deck can be attached to it. Finally, there is no particular reason to use longer pieces for a planksheer than for any other strake. The most important aspect of assembling planking is to make sure scarfs of each strake are staggered. If planking scarfs are located one above the other, then a plane of weakness is created. To translate ἐπηγκενίδες as a sheer strake does not appear to be a viable interpretation.

John Morrison proposes that ἐπηγκενίδες may refer to longitudinal planks on the interior of the vessel. If we think of this passage in terms of the construction of a laced vessel, it is possible that the "long pieces" are long internal stringers that are tied to the upper faces of frames.[113] Morrison also argues that since ἐπηγκενίδες is derived from ἀγκών, which has the meaning of an elbow, it may mean a longitudinal plank that was used by a helmsman as an elbow rest.[114] This interpretation seems unlikely because Morrison ignores the full meaning of ἀγκών. It denotes an elbow only because an elbow is something that is bent.[115] It also denotes two headlands that form a bay and a rib that supports the horn of a kithara.[116] It is possible that ἐπηγκενίδες also denotes frames. As mentioned in the previous chapter, early ships appear to have had only a few widely spaced frames. The most likely sequence of construction is to complete the hull planking and then add the stern frames which Homer describes as "closely spaced" or θαμειαί.[117] Of course, θαμειαί is a relative term. The framing would probably be more closely spaced to support the extra weight of a deck in contrast to the wider spacing of framing between the bow and stern decks. These closely spaced frames in the stern were probably cut from a single piece of naturally curving wood. After the deck was attached to these frames, longer frames were added to the remainder of the ship. To get the necessary length, these frames probably consisted of a floor timber with futtocks of naturally curving wood (fig 3.19).

After the hull is completed, Odysseus collects osiers and makes a fence to protect against the sea. What appears to be a similar structure was recovered from the Uluburun shipwreck. Withies appear to have been woven together and then attached to well-rounded stanchions about 1.7 meters long.[118] A depiction of

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[113] R. Adams, *Construction and Qualitative Analysis of a Sewn Boat of the Western Indian Ocean* (M.A. thesis, Texas A&M University 1985) 50.

[114] Morrison and Williams (supra n. 96) 48.

[115] LSJ 10, s.v. ἀγκών.

[116] See respectively, Strabo 12.8.19; Semus 1; Hesychius; LSJ 10, s.v. ἀγκών.

[117] Cunliffe (supra n. 28) 186, s.v. θαμέες; LSJ 783, s.v. θαμ-έες.

[118] C. Pulak, "The Shipwreck at Uluburun, Turkey: 1992 Excavation Campaign," *INA Quarterly* 19.4 (1992) 11.

similar wickerwork fences appear on Canaanite ships from the tomb of Kenamun in Egypt (fig. 3.13). Finally, Odysseus fills the bottom of his ship with brush.[119] Casson proposes that this brush was to keep Odysseus's feet dry from water that collects in the bilge.[120] George Bass proposes that the brush was used as dunnage, which was laid down to protect hull planking from cargo stored on it. Archaeological evidence supports this interpretation. Of course, both interpretations are probably correct. This brush may also have a third purpose. As mentioned in the previous chapter, it was a rather common practice to coat the interior and exterior of ships with pitch. Pitch can harden when it is relatively cold, but, when the weather turns hot, pitch can become very tacky. Dunnage may allow a sailor to walk around the hold without walking on tacky pitch. This would allow pitch to remain on the planking where it is needed instead of on a crewmen's feet. Protecting the pitch with dunnage would increase the time before a hull must be coated again.

Although Homer reveals much to us about ancient ships in this passage, it appears that there are omissions. These omissions may be due to poetic license, but we must be cautious when interpreting Homer. Some of the "omissions" may be little more than our continued ignorance of Homeric vessels. Homer's description may be relatively accurate. For example, the following is a complete description of the building of a *prahu kulis*.

> "Their small canoes are beautifully formed, broad and low in the centre, but rising at each end, where they terminate in high-pointed beaks... They are not hollowed out of a tree, but are regularly built of planks running from end to end, and so accurately fitted that it is often difficult to find a place where a knife-blade can be inserted between the joints. The larger ones are from 20 to 30 tons burden, and are finished ready for sea without a nail or particle of iron being used, and with no other tools than axe, adze, and auger. These vessels are handsome to look at, a good sailer, and admirable sea-boats, and will make long voyages with perfect safety, traversing the whole Archipelago from New Guinea to Singapore in seas which, as every one who has sailed much in them can testify, are not so smooth and tempest-free as word-painting travelers love to represent them. The forests of Ké produce magnificent timber, tall, straight, and durable, of various qualities, some of which are said to be superior to the best Indian teak. To make each pair of planks used in the construction of the larger boats an entire tree is consumed. It is felled, often, miles away from the shore, cut across to the proper length, and then hewn longitudinally into two equal portions. Each of these forms a plank by cutting with the axe to a uniform thickness of three or four inches, leaving at first a solid block

[119] *Od.* 5.234–41, 5.243–53, 5.256–57. The lines pertaining to mast and sails will be covered in a later chapter.

[120] Casson (supra n. 6) 219.

at each end to prevent splitting. Along the centre of each plank a series of projection pieces are left, standing up three or four inches, about the same width, and a foot long: these are of great importance in the construction of the vessel. When a sufficient number of planks have been made, they are laboriously dragged through the forest by three or four men each to the beach, where the boat is to be built. A foundation-piece, broad in the middle and rising considerably at each end, is first laid on blocks and properly shored up. The edges of this are worked true and smooth with the adze, and a plank, properly curved and tapering at each end, is held firmly up against it, while a line is struck along it which allows it to be cut so as to fit exactly. A series of auger-holes, about as large as one's finger, are then bored along the opposite edges, and pins of very hard wood are fitted to these, so that the two planks are held firmly, and can be driven into the closest contact; and difficult as this seems to do without and other aid than rude practical skill in forming each edge to the true corresponding curves, and in boring the holes so as exactly to match both in position and direction, yet so well is it done that the best European shipwright can not produce sounder or closer-fitting joints. The boat is built up in this way fitting plank to plank till the proper height and width are obtained. We have now a skin held together entirely by the hard-wood pins connecting the edges of the planks, very strong and elastic, but having nothing but the adhesion of the pins to prevent the planks gaping. In the smaller boats seats, in the larger ones cross-beams, are now fixed. They are sprung into slight notches cut to receive them, and are further secured to the projecting pieces of the plank below by a strong lashing of rattan. Ribs are now formed of single pieces of tough wood chosen and trimmed so as exactly to fit on to the projections from each plank, being slightly notched to receive them, and securely bound to them by rattans passed through a hole in each projecting piece close to the surface of the plank. The ends are closed against the vertical prow and stern posts, and further secured with pegs and rattans, and then the boat is complete; and then fitted with rudders, masts, and thatched covering, is ready to do battle with the waves."[121]

The construction sequence of this vessel is similar to that described by Homer in that both require few tools, few steps to build, and the result is a seaworthy vessel. Homer may therefore be describing the building of a lashed-lugged vessel like a *prahu kulis*. Such vessels have been discovered not only in Indonesia but as far north as England.[122] At the very least, we must be cognizant of the possibility that Homer's description may be more accurate than originally thought. The difficulty in interpreting

[121] Wallace (supra n. 64) 424–26.

[122] K. Parfitt, "The Dover Boat," *Current Archaeology* 133 (1993) 4–8.

building techniques in this passage underscores the difficulty of interpreting various aspects of ship construction with little or no clear textual context. It is for this reason that we are forced to rely on the various names, hints, and descriptions of other aspects of ancient ships that are interspersed throughout the *Iliad* and *Odyssey*. We will look at these in the next chapter.

CHAPTER V

HOMERIC SHIPS

Homer uses many epithets to describe ships. Unfortunately, most are too general to reveal much about them. Ships are commonly described as "swift" (θοός),[1] and "hollow" (κόϊλος and γλαφυρός[2]). "Swift" tell us little because it is a relative term, while a similar yet more poetic epithet is "chariots of the sea" or ἁλὸς ἵπποι.[3] In comparison to other forms of Homeric transport, ships were not only the fastest form of travel but could also carry the heaviest cargoes.[4] Yet, even by classical standards, Homeric ships may have been quite slow. The epithet "hollow" only indicates that there is space inside a ship. It is also used to denote caves, streams, bays, and the Trojan horse.[5]

Ships are also referred to as κορωνίς or "curved."[6] Κορωνίς is normally taken to refer to the upward curve of a ship at the bow and stern.[7] Seymour believes that it denotes a curved tip or end, and seems to refer to the curved ends of a ship.[8] In addition, J. S. Morrison suggests that it refers to the upward curve of the stern that is portrayed on Mycenaean and Geometric paintings (fig. 5.1). If κορωνίς is connected with κορώνη, "a sea-bird," it may also allude to the beak-like bow on Geometric ships.[9] This second interpretation seems unlikely since Homer appears to use the word στεῖρα to denote the beak-like bow or, more properly the cutwater or forefoot of a ship.

Shelley Wachsmann maintains that the similarity between κορωνίς "having curved extremities" with κορώνη, "a sea-bird" may be a play on words. He believes that κορωνίς should be translated as "having curved extremities that are bird-shaped."[10] Wachsmann claims that the horn-like ornaments at the bow and

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[1] R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman, Oklahoma 1988) 190, s.v. θοός; *Od.* 9.86.

[2] See respectively, *Il.* 1.26, 2.454.

[3] *Od.* 4.708.

[4] J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* (Cambridge 1968) 45.

[5] Cunliffe (supra n. 1) 79, 231, s.v.v. γλαφυρός, κοῖλος.

[6] *Il.* 18.338; *Od.* 19.182.

[7] Cunliffe (supra n. 1) 234, s.v. κορωνίς; LSJ 983, s.v. κορωνίς.

[8] T. Seymour, *Life in the Homeric Age* (New York 1914) 307.

[9] Morrison and Williams (supra n. 4) 45.

[10] S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* (College Station, Texas 1998) 186.

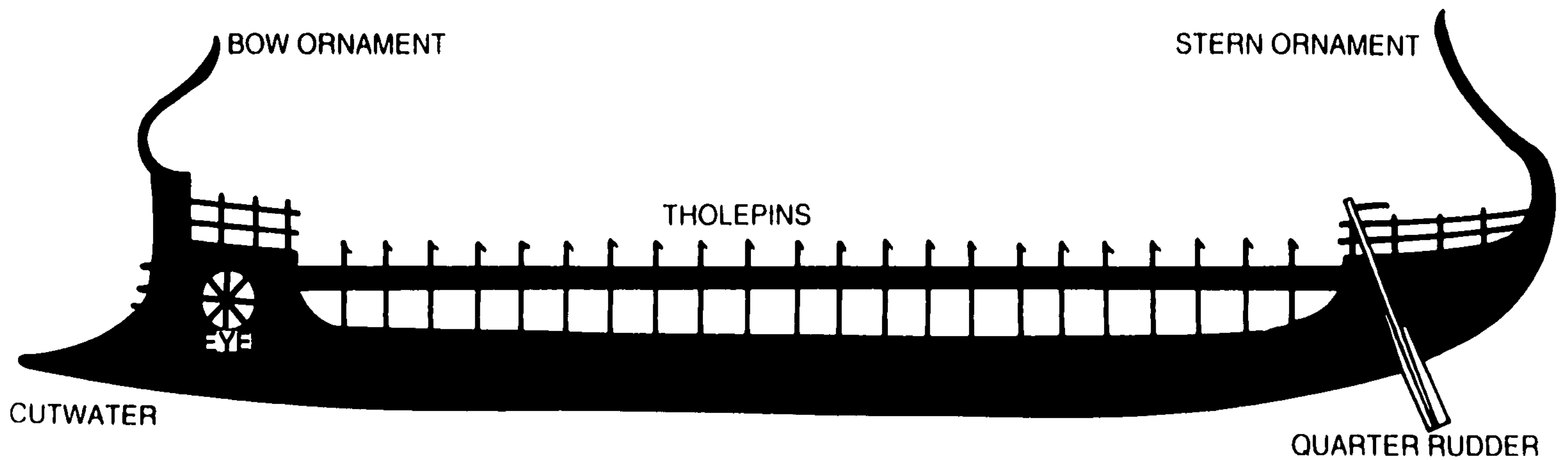

Fig. 5.1. Geometric ship.

stern of Geometric ships are stylized or abstract bird's heads; κορωνίς therefore describes these abstract ornaments.[11] John Lenz disagrees with this interpretation. He states that κορώνη has two possible meanings either as a curved extremity or as a seabird or crow, and Homer exploits both meanings. Yet, these two meanings have different etymological roots. He points out that a crow's beak has little curvature, and the Indo-European word for "crow" reflects an onomatopoeic root *kor*. This is similar to the English "crowbar" that retains the sense of "bent" but has no connection to a crow. The adjective κορωνίς therefore derives a meaning of curved from κορώνη. Objects called κορώνη are curved extremities that cap or crown another object.[12] Homer uses κορωνίς to describe a door handle and a gold tip on a bow.[13] The epithet may therefore denote curved elements that cap or crown the stem and stern of a ship, such as a horn. Lenz concedes that Homer does enjoy word play, and it is possible that he uses κορωνίς to evoke a sense of a seabird.[14] Regardless of Homer's poetic wordplay, the etymology of κορωνίς suggests that Homer may be using this word as a general description of the curved ornaments at the bow and stern of Mycenaean and Geometric ships,[15] but we cannot be certain.

Like κορωνίς, ἐΐσας (ἐΐσαι) is a general description of a ship, which means "equal"[16] or "balanced."[17] Morrison suggests that it means "bilaterally symetrical,"[18] but he fails to cite any parallels to support his interpretation. According to R. J. Cunliffe, it means that a ship is well balanced or trim while sailing. His interpretation is supported by Homer's use of the same epithet to describe a "well-balanced shield," meaning a shield responding freely to each movement of the arm.[19] A "well-balanced" ship or one that responds quickly would be a prized feature.

More ambiguously, ships are called ἀμφιέλισσα,[20] which Liddell, Scott, and Jones point out always refers to ships. They translate it as either "curved at both ends," "curved on both sides," or "wheeling

[11] Wachsmann (supra n. 10) 176–97.

[12] J. Lenz, "Homer's νηυσὶ κορωνίσιν," in S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* (College Station, Texas 1998) 199–200.

[13] See respectively, *Od.* 1.441; *Il.* 4.111; Lenz (supra n. 12) 199.

[14] Lenz (supra n. 12) 200.

[15] Morrison and Williams (supra n. 4) pls. 1–7.

[16] LSJ 839, s.v. ἴσος; *Od.* 4.349.

[17] Cunliffe (supra n. 1) 202, s.v. ἴσος; Seymour (supra n. 8) 307, n. 3; *Od.* 4.349.

[18] Morrison and Williams (supra n. 4) 45.

[19] Cunliffe (supra n. 1) 202, s.v. ἴσος.

[20] *Il.* 2.165; *Od.* 6.264.

either way," depending on whether the word is active or passive.[21] Cunliffe translates ἀμφιέλισσα as "wheeling both ways" denoting a ship that is easy to handle.[22] The prefix, ἀμφί, means "both sides,"[23] and the verb ἕλισσω means "turn" or "twist."[24] Homer uses ἑλίσσω to denote the twisting of a snake and the turn of a chariot.[25] Morrison proposes that the ships were "twisted round at each end," possibly meaning both ends are curved or spiral-shaped.[26] R. T. Williams proposes that ἀμφιέλισσα means literally "revolving on both sides." He argues that the "eye" on Geometric ships is almost always painted as a wheel with a varying number of spokes (fig. 5.1). He believes that the motion of a Geometric ship made the spoked-eye produce an illusion of revolving.[27]

I believe Williams is referring to either the "waterfall" or "windmill" effects. The first is produced by looking steadily for several seconds at a moving object, like a waterfall, and then quickly looking at a stationary object. The stationary object will then appear to move in the opposite direction. This is impossible in relation to a Geometric ship because neither sea or ship are stationary objects. The "windmill" effect is the result of looking at a revolving object, such as the vanes of a windmill or the spokes of a wheel, and the direction of rotation reverses.[28] This is also impossible as described by Williams because the spoked eye must revolve independently of the ship. In addition, we lack parallels or etymological evidence to support such an interpretation.

In contrast, Lattimore translates ἀμφιέλισσα as "oarswept,"[29] possibly to describe the "turning" or "twisting" action of a ship's oars. It is an interesting and poetic interpretation, but no evidence exists to support it. Homer does little to help clarify the meaning of ἀμφιέλισσα. The context of ἀμφιέλισσα is always too general to understand its meaning. Yet, considering that Homer does use ἑλίσσω to describe the turning of a chariot, the most likely interpretation is that it denotes a ship's ability to turn quickly. It may therefore be a synonym of ἐΐσας.

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[21] LSJ 91, s.v. ἀμφιέλισσα.

[22] Cunliffe (supra n. 1) 28, s.v. ἀμφιέλισσα.

[23] Cunliffe (supra n. 1) 27, s.v. ἀμφί; LSJ 89, s.v. ἀμφί.

[24] Cunliffe (supra n. 1) 124, s.v. ἑλίσσω; LSJ 534, s.v. ἑλίσσω.

[25] See respectively, *Il.* 22.95, 23.320.

[26] Morrison and Williams (supra n. 4) 45.

[27] Morrison and Williams (supra n. 4) 37–38.

[28] R.L. Gregory, *Eye and Brain: The Psychology of Seeing* (Princeton 1990) 114, 188.

[29] R. Lattimore, *The Odyssey of Homer* (New York 1991) 109; *Od.* 6.264

The epithet "black" or "dark" is common in both the *Iliad* and the *Odyssey*.[30] Ships were probably blackened or darkened (μέλαιναι) with pitch.[31] Pitch is a dark and viscous substance that was spread over the inner and outer surfaces of ancient ships to waterproof and to protect against some forms of marine life.[32] Pitch is extracted almost exclusively from the resins of conifer trees, and in Mediterranean regions it is collected primarily from pines.[33]

Once a ship had been coated with pitch, the bow or "cheeks" of a ship were painted a bright color. Homer calls them μιλτοπάρῃος or "red-cheeked."[34] He also uses φοινικοπάρῃος, which may mean either "red-cheeked" or "purple-cheeked." The two words are interchangeable.[35] The practice of painting a bow may be traced back as early as Mycenaean times as the prefixes of both words appear in some Linear B tablets. Mi-to is part of the compound *mi-to-we-sa* (Kn 269), "painted with red," and *po-ni-ki-ja* (Kn 266, 267, 268, 270 and 274) or *po-ni-ke-a* (Kn X1017), "painted" or "dyed crimson."[36] Both are used as synonyms to describe the colors of chariots and, like the Homeric epithets, are interchangeable.

Homer also describes ships as κυανόπρῳος. Κυανόπρῳος is most commonly translated as "blue prowed" or "dark prowed."[37] Yet, Cunliffe proposes that it means to have a "prow ornamented with designs in κύανος."[38] Generally, the word κύανος is thought to denote either an enamel applied to a metal or a glass that is cobalt or dark-blue in color.[39] In both epics, it appears to refer mainly to a dark-blue enamel, especially since Achaeans usually use it to decorate armor.

Agamemnon's breastplate has ten bands of κύανος, as well as twelve of gold and twenty of tin. Six serpents of κύανος, three on each side of his breastplate, appear to crawl toward Agamemnon's neck. His

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[30] Cunliffe (supra n. 1) 260–61, s.v. μέλας; LSJ 1095, s.v. μέλας.

[31] *Il.* 2.524; Seymour (supra n. 8) 307.

[32] J.R. Steffy, *Wooden Ship Building and the Interpretation of Shipwrecks* (College Station, Texas 1994) 277.

[33] R. Meiggs, *Trees and Timber in the Ancient Mediterranean World* (Oxford 1982) 468–69.

[34] *Il.* 2.637; *Od.* 9.125; Cunliffe (supra n. 1) 270, s.v. μιλτοπάρῃος; LSJ 1134, s.v. μιλτοπάρῃος; Morrison and Williams (supra n. 4) 45–46.

[35] *Od.* 11.124; Cunliffe (supra n. 1) 410, s.v.v. φοινικοπάρῃος, φοῖνιξ; LSJ 1948, s.v.v. φοινῖκοπάρῃος, φοῖνιξ; Morrison and Williams (supra n. 4) 45–46.

[36] M. Ventris and J. Chadwick, *Documents in Mycenaean Greek* (Cambridge 1956) 366.

[37] *Od.* 9.482; Seymour (supra n. 8) 307; LSJ 1004, s.v. κυανόπρῳος.

[38] Cunliffe (supra n. 1) 240, s.v. κυανόπρῳος.

[39] Cunliffe (supra n. 1) 240, s.v. κύανος; LSJ 1004, s.v. κύανος.

shield is decorated with ten circles of bronze, twenty of tin, and a circle of κύανος is in the center with the head of a Gorgon mounted on it.[40] Considering this context, κύανος must be a dark-blue enamel. It is unlikely that a glass or lapis lazuli inlay would survive the repeated impact from swords, spears, and arrows.

Κύανος also modifies θριγκός, which is a feature in the palace of Alcinous.[41] A θριγκός is thought to be an interior frieze running along the uppermost course of a wall.[42] Friezes made with a cobalt-blue pigment have been recovered from the Minoan palace of Knossos and the Mycenaean palace at Tiryns.[43] This archaeological evidence is supported by textual evidence. Κύανος appears in the form *ku-wa-no* in Linear B tablets from Pylos.[44] *Ku-wa-no* is an inlay that, like gold and ivory, is used to decorate a stone table, a wooden chair, and a footstool.[45] In addition, κύανος is a prefix in κυανόπεζα, which describes the feet of a table with either a blue enamel or a cobalt-blue glass inlay.[46] Michael Ventris and John Chadwick point out that ancient Egyptians decorated their furniture with a similar glass inlay.[47] This technique, therefore, has a long tradition. In classical times, κύανος denotes lapis lazuli or a synthetic imitation.[48] Yet, in the context of the Alcinous's palace, the frieze may be an enamel decoration applied to a metal, instead of glass, because all other features of Alcinous's palace, like Agamemnon's armor, are made of metal: the walls are bronze; the doors are gold; and the door posts are made of silver.[49]

The evidence is consistent with Cunliffe's interpretation of κυανόπρῳος as some type of ornament or design made of κύανος inlaid on the bow of a ship. Eye motifs appear on the bows of both Mycenaean[50]

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[40] *Il.* 11.24–36.

[41] *Od.* 7.87.

[42] Cunliffe (supra n. 1) 191, s.v. θριγκός; LSJ 806, s.v. θριγκίον.

[43] See respectively, A. Evans, *The Palace of Minos at Knossos* I (New York 1964) 533–34; W. Dörpfeld, "The Buildings of Tiryns," in H. Schliemann, ed., *Tiryns: The Prehistoric Palace of the Kings of Tiryns* (New York 1967) 284–92.

[44] Ventris and Chadwick (supra n. 36) 339 [Py 239], 344 [Py 244].

[45] Ventris and Chadwick (supra n. 36) 339 [Py 239], 344 [Py 244].

[46] *Il.* 11.629.

[47] Ventris and Chadwick (supra n. 36) 340.

[48] Theophrastus, *Lap.* 31, 37, 39, 40, 55.

[49] *Od.* 7.86–89.

[50] S. Marinatos, "La marine créto-mycénienne," *BCH* 57 (1933) pl. 15.26.

and Geometric ships (fig. 5.1), and κυανῶπις or "dark-eyed" is an epithet of Amphitrite, a sea god.[51] Furthermore, Aeschylus uses κυανῶπις in the same way as Homer uses κυανόπρῳρος to describe ships.[52] It is therefore possible that κυανόπρῳρος denotes a dark-blue eye of inlaid glass or enamel on the bow of a ship. Considering the rarity of glass at this time and that such an eye must be relatively large to be visible and must be very durable, an enamel inlay is probably the most likely interpretation.

Homer also describes ships as ὀρθοκραιράων. According to Seymour, ὀρθοκραιράων may denote the ends of a yard and is analogous to the *cornua antemnarum* mentioned in the *Aeneid* by Vergil.[53] Liddell, Scott, and Jones disagree; they propose that the two extremities of a ship curve up to resemble horns.[54] Morrison proposes that it might describe a horn-like ornament.[55]

Homer uses ὀρθοκραιράων to describe only oxen and ships in the *Iliad* and the *Odyssey*. When describing oxen, it denotes "straight" or "upright horns."[56] Seymour's interpretation of it as a yard is flawed. Homer uses ὀρθοκραιράων only two times in relation to ships.[57] In both passages, the ships are beached and the context of the lines are "in front of the ὀρθοκραιράων ships."[58] In each situation, the mast and yard would be down and stowed away. It seems, therefore, unlikely that ὀρθοκραιράων describes the ends of a yard. Furthermore, when looking at a ship from the bow, the horns would be the most prominent feature. In this context, ὀρθοκραιράων appears to describe the horn-like ornaments at the bow of Geometric ships (fig. 5.1). We lack any evidence to suggest that this term applies to a stern ornament.

Homer appears to use the word στεῖρα to denote the beak-like bow or, more properly the cutwater or forefoot of a ship (fig. 5.1).[59] According to Cunliffe, it may also denote the stem of a ship,[60] but considering the context of στεῖρα in the Homeric passages, a meaning of cutwater fits best. Homer writes

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[51] *Od.* 12.60; Cunliffe (supra n. 1) 240, s.v. κυανῶπις.

[52] *Supp.* 743; *Pers.* 559.

[53] Seymour (supra n. 8) 307; *Aen.* 3.549.

[54] LSJ 1249, s.v. ὀρθόκραιρος.

[55] Morrison and Williams (supra n. 4) 45; Cunliffe (supra n. 1) 298, s.v. ὀρθόκραιρος.

[56] *Il.* 8.231, 18.573; *Od.* 12.348; LSJ 1249, s.v. ὀρθόκραιρος.

[57] *Il.* 18.3, 19.344; G.L. Prendergast, *A Complete Concordance to the Iliad of Homer* (New York 1983) 298.

[58] *Il.* 18.3, 19.344: προπάροιθε νεῶν ὀρθοκραιράων.

[59] *Il.* 1.482; *Od.* 2.428.

[60] Cunliffe (supra n. 1) 364, s.v. στεῖρα; LSJ 1637, s.v. στεῖρα.

that once a ship is underway the waves rise and sing strongly at the στεῖρα.[61] Considering the size of cutwaters on Geometric paintings, Homer is probably describing a cutwater because most of the wave action will be produced at this part of a ship. It is, however, possible that the στεῖρα may be an extension of the keel. Both Theophrastus and Nonnus use a form of στεῖρα to denote the keel of a ship.[62] In contrast, we lack any evidence to suggest that στεῖρα was ever used to denote a stem.

Not only does the στεῖρα act as an instrument so waves can sing as a ship sails, but it was probably a substantial timber protecting the joint at the stem and keel from wave action and beaching. In addition, it was used as a boarding ramp (fig. 5.2) and even as a head to defecate from (fig. 5.3), suggesting it is a substantial structure. As previously mentioned, θοός means "swift," but it can also mean pointed or sharp. Homer uses θοός to describe islands as being pointed,[63] and he may therefore be making a play on words. Θοός denotes primarily the swiftness of a ship, and, as a secondary meaning, it refers to the pointed forefoot, which contributes to the swiftness of a ship.

At the stern is a carved ornament or ἄφλαστον (fig. 5.1).[64] In the battle by the ships, the Achaeans fight from stern platforms. Hector grasps the stern of Protesilaus's ship and holds "the ἄφλαστον in his hand."[65] Morrison argues that this stern ornament is thought to be the forward curving horn visible on all Geometric paintings of ships's sterns. He infers that the ἄφλαστον of a beached ship stood a little over two meters above the beach.[66] Unfortunately, Morrison fails to inform us how he arrives at this height.

Cunliffe maintains that ἄφλαστον[67] and κόρυμβον[68] are synonymous.[69] Yet, this disputed interpretation is based only on a passage by Hesychius.[70] In contrast, Liddell, Scott, and Jones translate κόρυμβον as the

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[61] *Il.* 1.482–83; *Od.* 2.428–29: ἀμφὶ δὲ κῦμα στείρῃ πορφύρεον μεγάλ᾽ ἴαχε νηός ἰούσης.

[62] See respectively, Theophrastus, *Hist. Pl.* 5.7.3; Nonnus, *Dio.* 40.451. See also, J.S. Morrison, "Parmenides and Er," *JHS* 75 (1955) 65; Morrison and Williams (supra n. 4) 50–51.

[63] *Od.* 15.300; LSJ 802, s.v. θοός.

[64] *Il.* 15.717; Seymour (supra n. 8) 307.

[65] *Il.* 15.716–17; Morrsion and Williams (supra n. 4) 47, 57, n.2.

[66] Morrsion and Williams (supra n. 4) 47, 57, n.3.

[67] *Il.* 15.717.

[68] *Il.* 9.241.

[69] Cunliffe (supra n. 1) 64, s.v. ἄφλαστον; 234, s.v. κόρυμβον.

[70] LSJ 982, s.v. κόρυμβος.

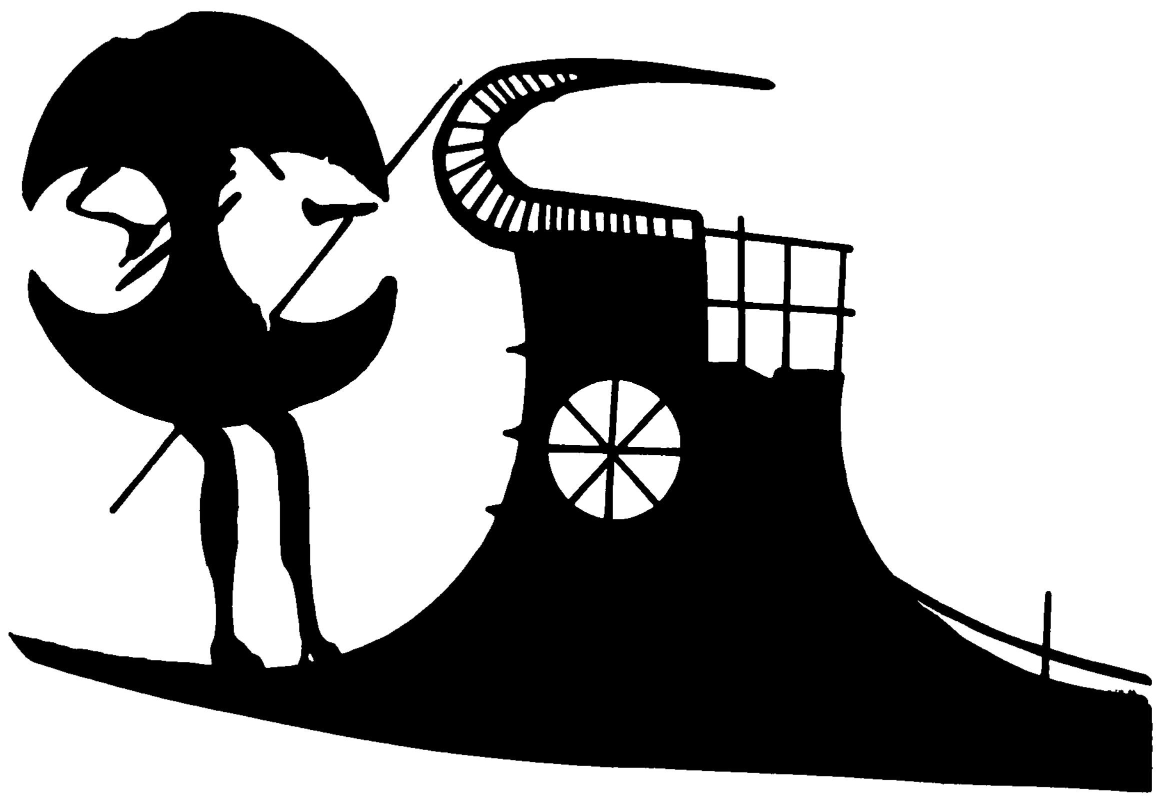

Fig. 5.2. Warrior standing on the cutwater of a Geometric ship. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 1e)

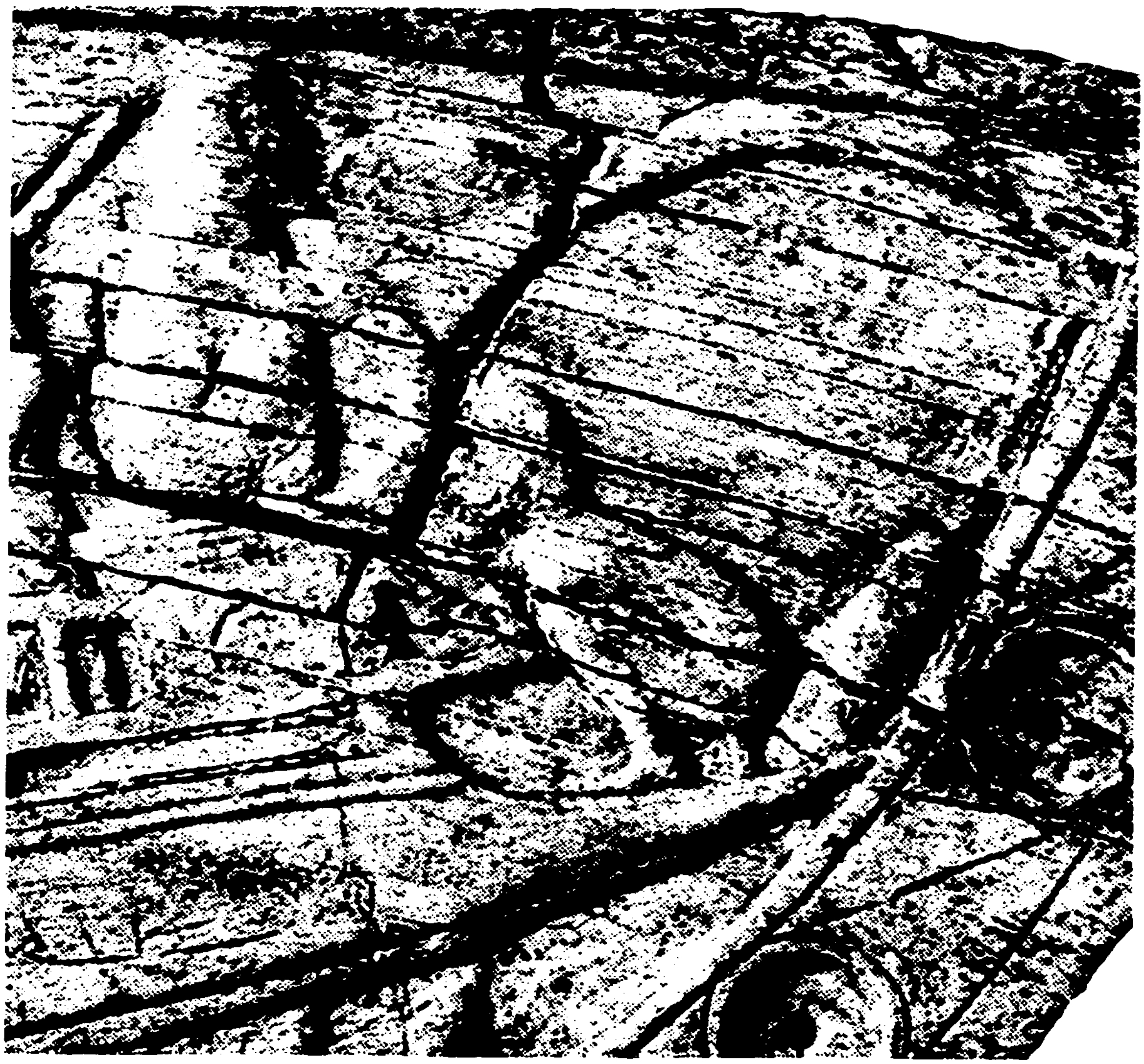

Fig. 5.3. Man defecating on a cutwater.

"uppermost point," of a stern, and ἄφλαστον as a "curved poop of a ship with its ornaments."[71] This interpretation has merit because forward-curving horns appear to be found only on Geometric ships,[72] but fifth-century ships do have high curving sterns (fig. 5.4). The meaning of ἄφλαστον may have evolved over the years to denote these stern structures. In addition, Hector wants to cut the κόρυμβα from the sterns of Achaean ships,[73] suggesting they are the curving stern ornaments, and, as such, it appears that Cunliffe may be correct that κόρυμβον is a synonym for ἄφλαστον. An ἄφλαστον appears to be a curved ornament at the stern of an Homeric ship. If this is correct, then Homer may have used ὀρθοκραιράων to denote the bow horns, ἄφλαστον and κόρυμβον the high curving stern ornament, and κορωνίς as a general description of both bow and stern horns or of the general curvature of Achaean ships (fig. 5.1).

The ἴκρια is a raised platform or small deck located at the stern and bow of Homeric ships (figs. 5.1 and 5.5).[74] Unlike some previous terms, there appears to be unanimous agreement for this interpretation of ἴκρια.[75] This is due to the various contexts in which Homer uses ἴκρια. Homer describes Aias quickly crossing from ἴκρια to ἴκρια with great strides to fight the Trojans.[76] We know they are fighting at the stern because the Achaean ships were pulled from the sea stern first. Furthermore, Hector grabs the stern ornament or ἄφλαστον of an Achaean ship while fighting. During Odysseus's shipwreck, the mast falls on the head of the helmsman, and he plunges from the ἴκρια like a diver. The helmsman's seat must therefore be located on the stern ἴκρια.[77] Odysseus also sleeps on the stern ἴκρια during his passage onboard a Phaeacian ship.[78] Athena sits next to Telemachus on the stern ἴκρια when they leave Ithaca, as does Theoclymenus on the return voyage.[79] In fact, Homer mentions the stern ἴκρια quite often, and mentions the bow ἴκρια only once. Odysseus arms himself and then stands on the bow ἴκρια to look for Scylla.[80]

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[71] LSJ 291, s.v. ἄφλαστον; 982, s.v. κόρυμβος.

[72] Morrison and Williams (supra n. 4) 47.

[73] *Il.* 15.685–86.

[74] See respectively, *Il.* 15.729; *Od.* 12.229.

[75] Cunliffe (supra n. 1) 199, s.v. ἴκρια; LSJ 827, s.v. ἴκρια; Seymour (supra n. 8) 309; Morrison and Williams (supra n. 4) 47–48.

[76] *Il.* 15.685–86.

[77] *Od.* 12.413–14; Morrsion and Williams (supra n. 4) 47.

[78] *Od.* 13.74–75; Morrsion and Williams (supra n. 4) 48.

[79] See respectively, *Od.* 2.416–18, 15.285–86. Morrsion and Williams (supra n. 4) 48.

[80] *Od.* 12.229–30; Morrsion and Williams (supra n. 4) 48.

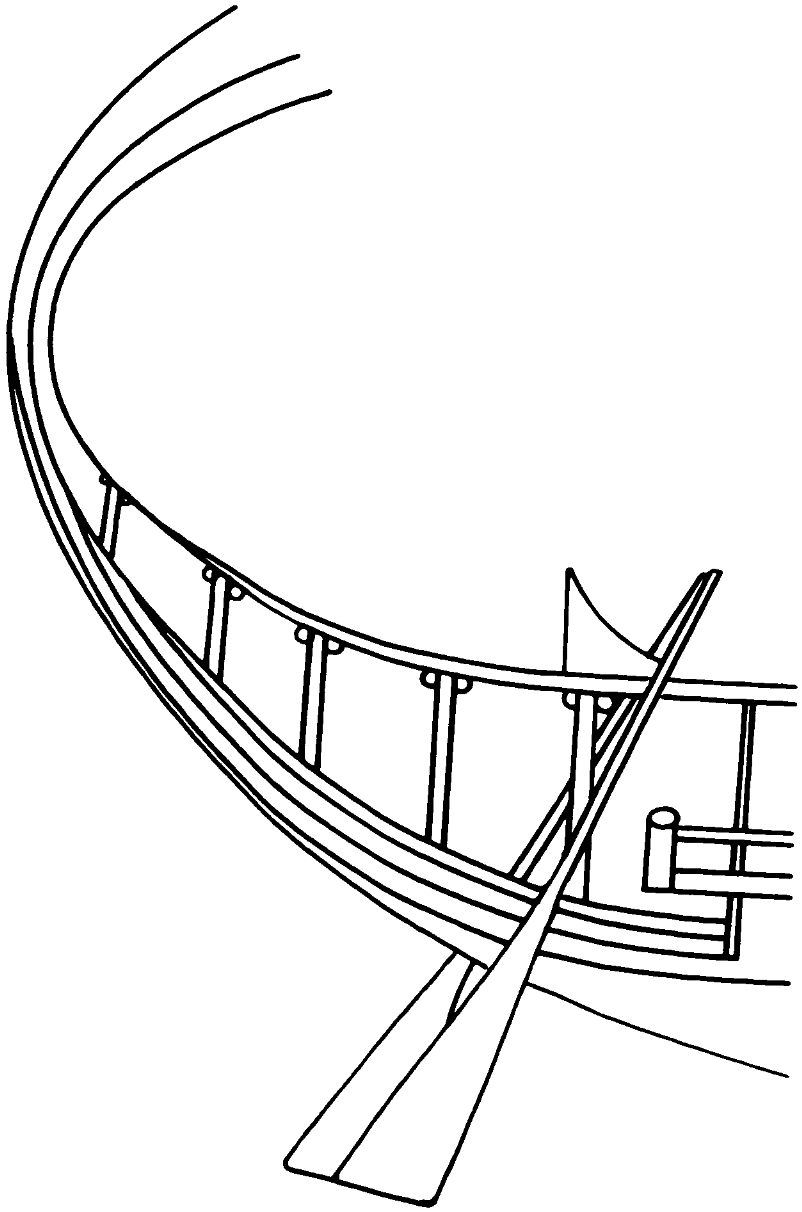

Fig. 5.4. Stern of a Classical warship. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 31)

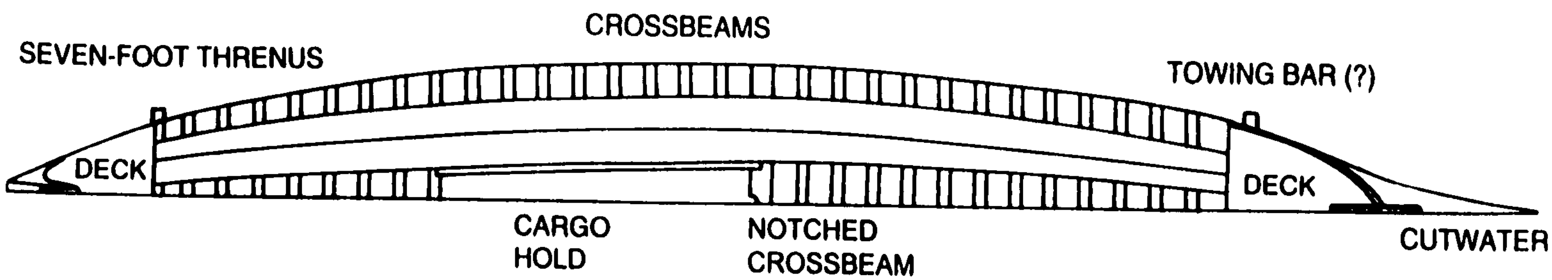

Fig. 5.5. Plan view of a Geometric ship.

Both bow and stern ἴκρια were also storage areas for spears (figs. 5.6 and 5.7).[81] Morrison points out that there must be some type of storage area under these decks, but during the escape from the island of the Lotus Eaters, Odysseus binds his men under the crossbeams instead of putting them below the ἴκρια.[82] This action suggests that he had no room under the bow or stern decks for them.[83] Homer's audience probably knew that these storage areas below both ἴκρια were for extra tackle, cords, sails, tools, and numerous items carried onboard a ship that should remain as dry as possible. They would realize it was much easier to tie the men to the timbers, than to clean out the storage areas and secure them there. All we know of the size of a stern ἴκρια is it was, at least, long enough to accommodate one sleeping man and wide enough to comfortably seat two men or one man and a goddess.

Some type of decking connects the bow and stern ἴκρια. Homer does not name this gangway directly, but he alludes to it when he writes that Odysseus could move along the ship while encouraging his men.[84] Little consensus exists as to the type of decking that Homer speaks of. Seymour is not sure whether the gangway was between the oarsmen, or beside the planksheer. He argues that it might have been between the rowers from the bow to the mast, but towards the stern, the lowered mast seems to have required this space.[85] Dorothea Gray points out that raised gangways on representations give ships an incredibly top-heavy look. She assumes that the artist is raising the deck higher than normal so it can be seen over the heads of the rowers. This is possible, but it is difficult to support because Geometric artists commonly ignore conventions with the relative scale of different objects.[86] For example, people, especially warriors , usually appear to be depicted at a larger scale than ships, making it difficult to prove Gray's point.

Some scholars claim that these ships had an overall deck and base this interpretation on Geometric paintings. Morrison counters that when a Geometric artist draws what appears to be a deck he is really drawing the far planksheer above the near planksheer by a kind of "primitive" perspective. He cites parallels for this type of perspective in other Geometric paintings, especially the wheels of chariots.[87] Of

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[81] *Od.* 15.282–83, 15.551–52; Morrsion and Williams (supra n. 4) 48, 57, n.7–11.

[82] *Od.* 9.99.

[83] Seymour (supra n. 8) 310.

[84] *Od.* 12.206.

[85] Seymour (supra n. 8) 310.

[86] D. Gray, *Seewesen* (Göttingen 1974) 62.

[87] Morrison and Williams (supra n. 4) 51, 59, n.33; *Od.* 12.410–11.

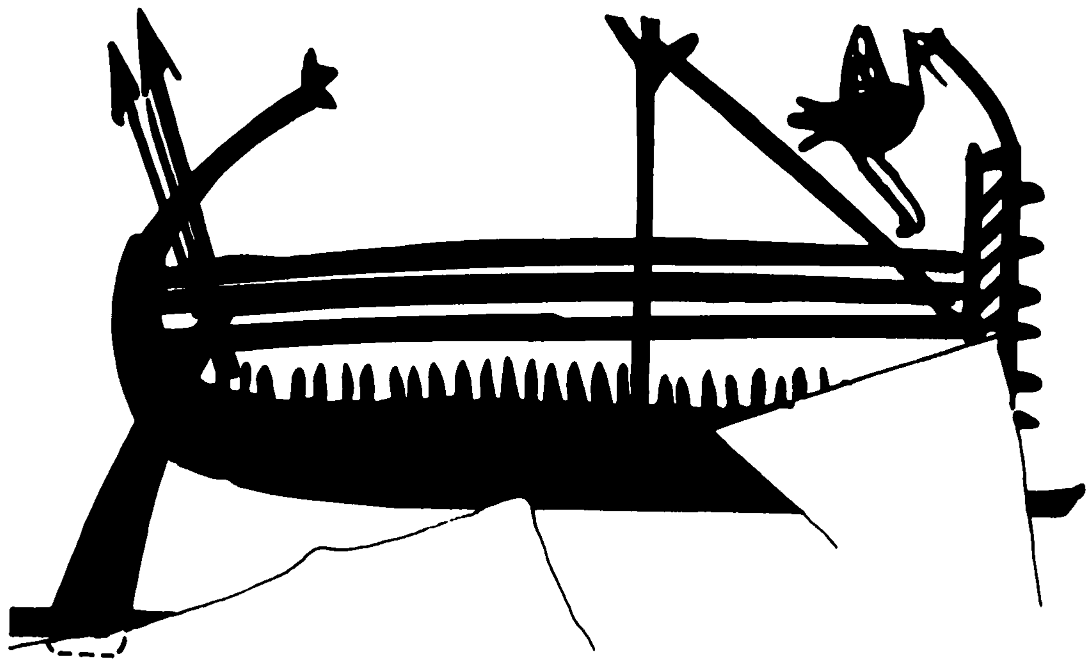

Fig. 5.6. Spears stored at the stern of a Geometric ship. (After P.G. Calligas, "Early Euboean Ship Building," in H. Tzalas, ed., *Tropis* II [Athens 1990] fig. 1)

Fig. 5.7. Spears stored at the bow of a Geometric ship. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 6a)

course, this interpretation of "primitive" perspective has been challenged.[88] Moreover, he maintains that Homeric ships did not have an overall deck because a complete deck is never mentioned, and during Odysseus's shipwreck when the mast falls, all the tackle falls into the bottom of the ship.[89] Morrison supports his interpretation by citing Thucydides who states that the ships of Themistocles lacked complete decks throughout their length.[90] Morrison then points out that the earliest evidence for such a deck is dated to 467 B.C., and he emphasizes that Homer does not mention one.[91] It should also be noted that Thucydides uses the words "πάσης καταστρώματα" when describing the ships of Themistocles, which suggests he is referring to a deck that completely covers the length and breadth of a ship. It is therefore still probable that a narrow deck connected the bow and stern ἴκρια.

Most of these interpretations are dependent on the perceived length-to-breadth ratio of an Homeric vessel. If Odysseus is sailing a rather beamy vessel, it is possible that side decks located between the rowers and the mast could connect the bow and stern decks and still leave room for a rather substantial cargo hold (fig. 5.5).

Below the decking are ζυγά. Homer describes a ship in the *Iliad* as πολύζυγος, with many ζύγα, and twice in the Odyssey as εὔζυγος, with good ζύγα.[92] After visiting the land of the Lotus Eaters, Odysseus binds his struggling crewmen under them, and in the Phaeacian ship Odysseus's gifts are stowed in the same place.[93] Alcinous inspects this cargo to make sure it is properly stowed so it will not hinder the oarsmen. According to Seymour, this suggests that there was nowhere else to put it. Morrison concurs with Seymour's interpretation.[94] This interpretation is corroborated by a passage in which Odysseus fails to tell his men of Scylla because they would hide themselves within (ἐντός).[95] Seymour believes, Odysseus feared they would crawl underneath the benches.[96] On the other hand, he notes some inconsistencies. The

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[88] M. Wedde, "Rethinking Greek Geometric Art: Consequences for the Ship Representations," in H. Tzalas, ed., *Tropis* IV (Athens 1996) 573–96.

[89] Morrison and Williams (supra n. 4) 51, 59, n.33; *Od.* 12.410–11.

[90] Thucydides 1.14.

[91] Morrison and Williams (supra n. 4) 51, 59, n.33, 161–62.

[92] *Il.* 2.293; *Od.* 13.116, 17.288.

[93] *Od.* 9.98–99, 13.20–22.

[94] *Od.* 13.21; Seymour (supra n. 8) 310; Morrison and Williams (supra n. 4) 51.

[95] *Od.* 12.225.

[96] Seymour (supra n. 8) 310.

Phoenician slave who kidnaped Eumaeus falls from the deck into the bilge water,[97] which indicates a large open space. In addition, such a space was needed for the hecatomb which Odysseus took to Chrysa, but not for the sheep that he took to Hades.[98] Regardless of these inconsistencies, Seymour maintains that the ζύγα serve as seats and as beams that run the width of a ship.[99] He is supported by Herodotus, who writes that ζύγα are the crossbeams joining the sides of a vessel, and Sophocles associates ζύγα with rowing.[100] Ζύγον is also used by Homer to denote a yoke for oxen and a crossbar that joins the horns of a lyre.[101] There is little doubt that a ζύγον was some type of crossbeam that reinforced the hull of a ship. These crossbeams appear to be the primary internal timbers that join the two sides. Homer also describes a ship with a hundred crossbeams or νηῦς ἑκατόζυγος.[102] This may be an hyperbole, but maybe not. Laced ships such as *mitepe* have two levels of beams. The lower beams are heavy crossbeams that join the two sides together. Upper beams, if strongly attached to the hull, also increase a hull's strength, and they also serve as rower's benches.[103] Ζύγα may therefore denote both upper and lower crossbeams of a ship. If so, then a ship with a hundred crossbeams is possible. Regardless, ζύγον appears to denote a structural timber that runs the width of a vessel.

Ships were also ἐΰσσελμος, "well-benched" or "well-decked."[104] The word ἐΰσσελμος is frequently used as an epithet for ships in the *Iliad* and the *Odyssey*. It implies that Homeric ships had well-built σέλμα, but this latter word does not appear in either epic. Morrison claims that σέλμα probably denotes a bow or stern platform and is a synonym for ἴκρια. He cites a phrase in the *Hymn to Dionysus* in which σέλμα might denote a bow platform.[105] He continues by arguing that later occurrences of this word appear to refer to bow and stern platforms.[106] His interpretation is possible but not convincing. The context of σέλμα in the phrase from the *Hymn to Dionysus* may refer to decking in the bow and stern, but the context

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[97] *Od.* 15.479: ἄντλῳ δ' ἐνδούπησε.

[98] *Il.* 1.309; *Od.* 11.4.

[99] Seymour (supra n. 8) 310.

[100] Herodotus 2.96; Sophocles, *Ajax* 249–50.

[101] *Il.* 5.730; *Il.* 9.187; Cunliffe (supra n. 1) 176, s.v. ζυγόν. See also, LSJ 757, s.v. ζυγόν.

[102] *Il.* 20.247.

[103] R. Adams, *Construction and Qualitative Analysis of a Sewn Boat of the Western Indian Ocean* (M.A. thesis, Texas A&M University 1985) 50.

[104] *Il.* 2.170, *Od.* 2.390; LSJ 732, s.v. εὔσελμος.

[105] 7.47–48.

[106] Morrison and Williams (supra n. 4) 48, 196–97.

is vague, and it is impossible to be certain that this is the correct interpretation. Even if σέλμα does refer to decking, we cannot be certain that it is located only in the bow or stern. Furthermore, all of the passages cited by Morrison may be describing a bench on the stern platform and not the platform itself.[107] All the passages cited by Morrison are too ambiguous to be certain of a specific translation. In contrast, both Cunliffe and Seymour maintain that ἐύσσελμος means well-benched referring to rowing benches.[108] This interpretation is possible since σέλμα can mean a seat or throne.[109] The difficulty with any interpretation is the versatility of this word. Σέλμα can denote decking, seats, any general timber work, and has even been used to denote a complete ship.[110] In my opinion, it is doubtful that the bow and stern decks, which make up such a small part of a ship, would be emphasized so often. In contrast, the upper-most timbers that would be visible for most of ship's length and consist of timbers for rowing benches are a more representative description of an Homeric ship. A possible interpretation for ἐύσσελμοι is a "well-timbered" ship. Homer may be using ἐύσσελμοι to denote both upper and lower crossbeams, possibly to emphasize their role as primary internal timbers for the hull of a ship. Since the evidence suggests that widely-spaced frames were common in early ships, hull strength was more dependent on the crossbeams and hull planking. The importance of crossbeams as internal timbers is seen as late as the time of Thucydides. The Corcyraeans strengthen their old ships with crossbeams or "ζεύξαντές" to make them seaworthy.[111] In contrast, Thucydides fails to mention framing or any other internal timbers. Finally, ἐύσσελμοι may be a synonym for ζύγα in which case both would denote crossbeams.

Another structural beam may exist that runs the width of a ship. As Aias fights from the stern of an Achaean ship, Trojan missiles force him to step back to the "seven-foot threnus" (θρῆνυς ἑπταπόδης). When he does so, he steps off the ἴκρια of the ship.[112] According to Morrison, a θρῆνυς is probably a stout beam that projects on each side of a hull below and forward of the helmsman's seat. This beam can be seen on paintings of later ships.[113] It is to this beam that Ajax would have stepped when he was driven from the stern ἴκρια. In addition, it would have been in the right position to serve as a footrest for a

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[107] Aechylus, *Ag*. 182–83, 1440–43; Sophocles, *Ant*. 715–17.

[108] Cunliffe (supra n. 1) 169, s.v. ἐΰσσελμος. See also, Seymour (supra n. 4) 307.

[109] LSJ 1590, s.v. σέλμα.

[110] LSJ 1590, s.v. σέλμα.

[111] Thucydides 1.29.3.

[112] *Il*. 15.728–29.

[113] Morrsion and Williams (supra n. 4) 48–49, 58, n.13.

helmsman. Morrison supports this interpretation by citing Homer who uses θρῆνυς to denote a footrest.[114] Morrison also proposes that the θρῆνυς may have been the fulcrum for a quarter rudder and also possibly the seat of the helmsman inside the hull.[115] He does have some reservations about this last interpretation. He feels that it is unlikely that a "seven-foot" (ἑπταπόδης) beam would have been located at a point where the stern tapers so rapidly. If the θρῆνυς was a seat for the helmsman it must have been forward of the ἴκρια and not part of it at all.[116] Yet, we know that when the mast falls on the head of Odysseus's helmsman, he plunges from the ἴκρια,[117] suggesting his seat was located on the stern ἴκρια and cannot be the θρῆνυς.

Cunliffe proposes that the θρῆνυς was a deck connecting the bow and stern that was raised by 7 feet or 2.1 meters.[118] Nothing in the context of the Homeric passages or from later texts suggests that θρῆνυς denotes such a structure. Furthermore, such a high deck must be in the center of a vessel to maintain a good center of balance, but this location would interfere with the raising and lowering of the mast. In fact, there is no evidence to support this interpretation.

Since the θρῆνυς is most commonly used to denote a foot stool, it appears that it was a beam about 7 feet wide (or 2.13 meters) that a helmsman rests his feet on while steering (fig 5.5).[119] It is unlikely that it acts as a fulcrum for a steering oar as Morrison suggests, because the fulcrum would be too far forward to be effective. A θρῆνυς would also strengthen the hull and could possibly be used to tie off lines to the mast or mooring cables.

Oars (ἐρετμά)[120] were carved from pine or fir.[121] The blade is πηδόν, and the handle is κώπη.[122] Homer uses κώπη to denote the hilt of a sword, the handle of a key, and at times the oar itself.[123] Although πηδόν

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[114] *Il.* 14.240; Morrsion and Williams (supra n. 4) 49, 58, n.14.

[115] Morrison and Williams (supra n. 4) 49. See also, Seymour (supra n. 8) 311; LSJ 806, s.v. θρῆνυς.

[116] Morrison and Williams (supra n. 4) 49.

[117] *Od.* 12.413–14.

[118] Cunliffe (supra n. 1) 191, s.v. θρῆνυς; 153, s.v. ἑπταπόδης [seven foot].

[119] *Il.* 14.240, 18.390; *Od.* 1.131, 4.136, 10.315, 10.367, 17.409, 17.462, 17.504, 19.57.

[120] Cunliffe (supra n. 1) 156 s.v. ἐρετμόν; LSJ 686, s.v. ἐρετμόν.

[121] See respectively, *Il.* 7.5; *Od.* 12.172. See also, Seymour (supra n. 8) 310.

[122] See respectively, *Od.* 7.328, 9.489.

[123] *Il.* 1.219 [hilt], *Od.* 21.7 [handle], *Od.* 9.489, 12.214 [oar]; Seymour (supra. n. 8) 310, n. 1; Cunliffe (supra n. 1) 242, s.v. κώπη; LSJ 1019, s.v. κώπη.

denotes the blade of an oar, it can also refer to a complete oar.[124] Oars are also "well-polished" or "fashioned with skill" (ἐυξέστης) and have sharp or thin edges on the blade (προήκεα).[125]

According to Seymour, oar blades were wider than in modern times. He cites the directions of Teiresias, who tells Odysseus that in order to appease the wrath of Poseidon, he must carry his oar on his shoulder and journey inland until he meets men who are ignorant of the sea, who do not eat salt with their food, and who think his oar is a winnowing shovel. Seymour believes people living inland confuse an oar for a winnowing shovel because both are similar in shape and size.[126] This is not necessarily so. Instead, Homer may be trying to illustrate how far from the sea Odysseus must travel. Homer is describing a people who live so far from the sea that any long handled object with a blade would be mistaken for a winnowing shovel, regardless of how odd an oar may appear to them. In this way, Homer emphasizes to his audience that Odysseus must complete a very long journey to appease Poseidon.

Rowers usually sat facing the stern. When escaping from Polyphemus, Odysseus is at the stern and communicates with his men by nodding, suggesting they could see him.[127] Furthermore, every man on board, except the commander, and perhaps a steersman, was expected to ply an oar in a calm. The oar was such a personal possession that Odysseus's comrade Elpenor wanted his oar placed on his grave.[128]

A leather thong or strap (τροπός) was placed around each oar and then fastened to a tholepin (κληΐς),[129] because it is not possible to row without securing an oar to a tholepin. In addition, when oars were dropped, they were not lost overboard.[130] Homer also uses the word κληΐς to denote a key, or a collarbone suggesting that it is a hook-shaped object.[131] Hook-shaped pins are clearly visible on depictions of Geometric ships (fig. 5.1).

Oars are sometimes set in place before departure.[132] On one occasion, so they will be ready to sail after

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[124] *Od.* 7.328, 13.78; Cunliffe (supra n. 1) 329, s.v. πηδόν; LSJ 1400, s.v. πηδόν.

[125] See respectively, *Il.* 7.5; *Od.* 12.205; Cunliffe (supra n. 1) 168, s.v. ἐΰξεστος; LSJ 1400, s.v. ἐΰξεστος; Cunliffe (supra n. 1) 343, s.v. προήκης; LSJ 1400, s.v. προήκης; *Od.* 12.205.

[126] Seymour (supra n. 8) 310–11; *Od.* 11.128.

[127] *Od.* 9.490.

[128] *Od.* 11.77; Seymour (supra n. 8) 307–08.

[129] *Od.* 8.37, 8.53, 4.782, 12.203–04; Cunliffe (supra n. 1) 391, s.v. τροπός; LSJ 1827, s.v. τροπός; Cunliffe (supra n. 1) 229, s.v. κληΐς; LSJ 957, s.v. κλείς.

[130] *Od.* 12.203–04.

[131] Cunliffe (supra n. 1) 229, s.v. κληΐς; LSJ 957, s.v. κλείς.

[132] *Od.* 4.782, 8.53.

dinner, a crew make fast their oars to the tholes and then go ashore.[133] Oars may even have been put in place hours before departure.[134] In later times, this was an early preparation for battle.[135]

The πηδάλιον denotes a quarter rudder (fig. 5.1).[136] During ancient times, quarter rudders were mounted on one or both stern quarters. These rudders have the appearance of large oars and are commonly, but incorrectly, called steering oars.

Morrison points out that Odysseus equips his improvised boat with only a single πηδάλιον, and the use of only one might suggest the improvised nature of his craft. It may also be an indication of the small size of a vessel. Yet, elsewhere in the *Odyssey*, the use of a single quarter rudder appears to be the normal practice. Two may have been fitted but were not mentioned because only one was usually used at a time.[137] Homer's use of only one quarter rudder is logical. Using only one quarter rudder reduces drag on a vessel and also reduces wear and damage to rudder blades without compromising handling.[138] Another reason for using only one at a time is to reduce water absorption and keep them as light as possible. The advantage to using both rudders is that it greatly increases a ship's ability to quickly maneuver in small areas, making this technique most effective in harbors and narrow passages.[139] Two quarter rudders would also be used when close hauled or when sailing as close to the wind as possible. This maneuver with only one quarter rudder results in an increased drift to leeward and an increase in stress on the remaining quarter rudder.[140]

Quarter rudders are removed when a ship is beached and Hesiod hangs his above the hearth at the end of a sailing season.[141] Of course, he was probably sailing a rather small vessel, like Odysseys, as suggested by both his having only one rudder to hang and his being able to hang it over his hearth.

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[133] *Od.* 8.53; Morrison and Williams (supra n. 4), 52.

[134] *Od.* 8.53, 4.782.

[135] Seymour (supra n. 8) 311. See also, Aechylus, *Pers.* 376.

[136] Cunliffe (supra n. 1) 329, s.v. πηδάλιον; LSJ 1400, s.v. πηδάλιον.

[137] *Od.* 5.255, 7.328, 13.78.

[138] L. Mott, *The Development of the Rudder: A Technological Tale* (College Station, Texas 1997) 48, 50–52.

[139] Mott (supra n. 138) 48, 50–52.

[140] G.A. Cariolou, "Kyrenia II: The Return from Cyprus to Greece of the Replica of a Hellenic Merchant Ship," in S. Swiny, R.L. Hohlfelder, and H.W. Swiny, eds., *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity* (Atlanta 1997) 95.

[141] See respectively, *Od.* 3.281, 5.255; *Op.* 629.

The use of the plural οἰήια has been thought to denote a tiller of a quarter rudder.[142] A parallel word, οἴηκες, which in later times does describe a tiller, is used in the *Iliad* to denote the guides on a yoke or for reins.[143] Morrison agrees that οἰήια denotes a tiller.[144] In contrast, Cunliffe and Liddell, Scott, and Jones interpret it as a quarter oar.[145]

Morrison concedes that his interpretations of οἰήια and πηδάλιον do not fit with the passage in the *Odyssey* that describes Polyphemus throwing boulders at Odysseus's departing ship. Twice boulders thrown by Polyphemus miss the ship and both land in the sea near the οἰήϊον,[146] suggesting that each stone lands near the rudder blade. This action indicates that οἰήια is not a tiller but the blade itself. Morrison argues that in this case οἰήια refers to the quarter rudder as a whole instead of just the tiller. Homer does have a tendency to use more than one meaning for a word. Κώπη denotes an oar handle and πηδόν an oar blade, but both also denote an oar. In addition, a spear is sometimes called merely an ash after the ash shaft.[147] Οἰήια and πηδάλιον may therefore denote all or part of a quarter rudder depending on the context.[148]

Homeric ships had a single mast or ἱστός of fir (fig. 5.8).[149] In Geometric paintings, the mast was depicted equal in height to the bow and stern ornaments. Morrison points out that it looks as if mast and sail were reduced to fit the available space on a pot. Gray makes a similar observation in regard to the number of oars on Geometric ships.[150]

Morrison does attempt to estimate the length of the mast for Odysseus's ship. After leaving the island of Helios, lightning strikes the ship, and the mast falls, hitting the helmsman on the head.[151] A ship with twenty-five oarsmen per side could not have been less than twenty six meters in length. This is based on the assumption that each rower requires about one meter of rowing space plus about three meters for bow

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[142] Seymour (supra n. 8) 311, n. 2; *Od.* 12.218.

[143] *Il.* 19.43, 24.269.

[144] Morrison and Williams (supra n. 4) 52, 59, n. 41.

[145] Cunliffe (supra n. 1) 286, s.v. οἰήϊον; LSJ 1201, s.v. οἰήϊον. See also, *Il.* 19.43; *Od.* 9.483, 12.218.

[146] *Od.* 9.483, 9.540.

[147] Cunliffe (supra n. 1) 261, s.v. μελίη.

[148] Morrison and Williams (supra n. 4) 53, 60, ns. 42, 43.

[149] *Od.* 2.424, 15.289; Cunliffe (supra n. 1) 204, s.v. ἱστός [also, a loom, a web, and a general term for weaving]; LSJ 842, s.v. ἱστός [anything upright].

[150] Gray (supra n. 86) 58.

[151] *Od.* 7.409–13.

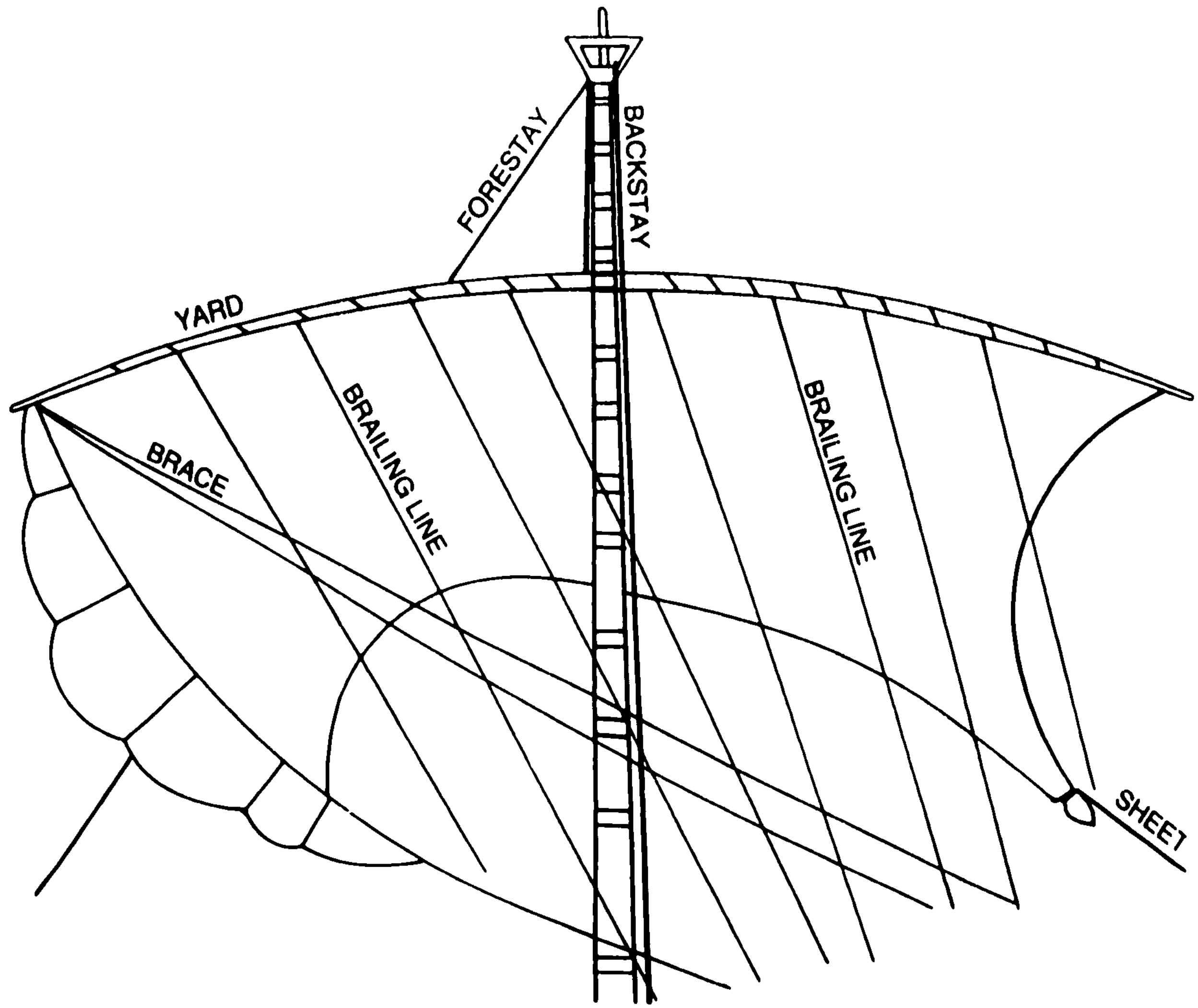

Fig. 5.8. Brailed sail.

and stern platforms. If the mast was stepped at the midpoint between bow and stern as the word μεσόδμη suggests,[152] then the mast was approximately thirteen meters high depending on where the helmsman was seated. Morrison then points out that on the François vase, the mast is shown resting in a mast crutch with the top short of the helmsman.[153] Before a ship was pulled ashore, the mast was lowered toward the stern and placed in a mast crutch or ἱστοδόκη.[154] Morrison feels that Homer's story is a fabrication because this painting shows that the mast was too short to strike the helmsman. He feels that a height of approximately eleven meters is more realistic.[155] Morrison fails to take into account that a mast can be easily pulled forward once it has been lowered. A mast long enough to strike a helmsman when it falls would probably be a hindrance to anyone on the stern deck if it was not shifted forward after being placed in the crutch. It is also possible that Homer's description and the illustration on the François vase portray two different types of ships with different mast lengths. A height of at least thirteen meters appears to be reasonable for Odysseus's mast.

The only evidence for the length of a mast of a merchant vessel comes from the passage describing the olive tree used to put out the eye of Polyphemus. Polyphemus had an olive tree cut to serve as a staff, and it is compared in length and thickness to the mast of a large twenty-oared merchant ship. Unfortunately, we have no idea how tall Polyphemus was nor do we know how long a staff he needed.[156]

When raising a mast, it may have been leaned into a deep notch in a large crossbeam at amidships called a μεσόδμη.[157] In addition, Seymour points out that Homer uses the expression "within the hollow cross timber." He feels this implies that the mast was dropped through a hole in the center of the main crossbeam on Telemachus's ship. Seymour believes this is entirely practicable for a mast on a twenty-oared ship, which should be about six meters long. Although such an arrangement would be difficult in a large ship, when a six-meter mast was freed from the weight of sail and yard, it could be easily lifted. Furthermore, lifting the mast from the μεσόδμη seems to be implied in Homer's use of ἀείραντες,[158] but he admits his interpretation is inconsistent with lowering the mast simply by loosening the forestays

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152 The prefix μεσ- can have a meaning of "middle." See, Cunliffe (supra n. 1) 264, s.v.v. μεσήεις, μέσος, μέσατος, μέσσαυλος.

153 Cunliffe (supra n. 1) 204, s.v. ἱστοδόκη; LSJ 842, s.v. ἱστοδόκη; Morrison and Williams (supra n. 4) 53, 60, n. 44.

154 ἱστοδόκη, *Il.* 1.434; *Od.* 2.422–27.

155 Morrison and Williams (supra n. 4) 54, 60, n. 45.

156 *Od.* 9.322; Seymour (supra n. 8) 311–12.

157 *Od.* 2.424, 15.289; Seymour (supra n. 8) 312. See also, Morrison and Williams (supra n. 4), 52.

158 *Od.* 2.425; Cunliffe (supra n. 1) 7, s.v. ἀείρω [to raise or carry].

(πρότονοι), which are two lines running from the top of the mast to the bow (fig. 5.8).[159]

Seymour's interpretation has two flaws. Κοῖλος or hollow is not limited to meaning a circular hole. It can also mean a cut or depression.[160] Therefore, a μεσόδμη with a semicircular cut to take a mast does not violate the meaning of κοῖλος. In addition, since ἀείραντες has a general meaning of "raising",[161] it does not necessarily imply that the mast was picked up and dropped into a μεσόδμη as Seymour claims. Raising a mast by pulling on the forestays is consistent with the meaning of ἀείραντες. Consequently, Seymour's interpretation of μεσόδμη as a large notched crossbeam at amidships is consistent with the evidence.

Seymour continues by claiming that the mast of Odysseus's improvised vessel was broken because he either did not lower the mast or because the storm approached too quickly for him to lower his sail.[162] He points out that it must have been securely stepped because it was broken in the middle, not torn from its fastenings. In contrast, when a storm breaks both forestays on Odysseus's ship, the mast falls backward and kills the steersman.[163]

It is possible that different types of vessels had different arrangements for securing a mast. Smaller ships, like the one in which Telemachus sails to Pylos, may have had a more secure mast, which was dropped into a hole cut through a large beam as Seymour suggests. This is supported by the fact that μεσόδμη is only mentioned in relation to twenty-oared ships. In addition, a similar structure on Odysseus's makeshift vessel would explain why the mast broke off instead of falling backwards. Nevertheless, this arrangement seems unlikely because, even for stops ashore of only a few hours, the mast of Telemachus's ship is still lowered when entering a harbor.[164] It also seems unlikely that a mast on a smaller ship would require a heavier structure to support it than on a larger ship. A more likely scenario is that, regardless of the size of a vessel, Homeric seamen always raise and secure a mast in the same manner.

Other interpretations of μεσόδμη have been proposed. Liddell, Scott, and Jones translate it as either a tie-beam or a box amidship in which a mast was stepped.[165] Cunliffe translates μεσόδμη as a box-like

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[159] *Il.* 1.434, *Od.* 2.425, 12.409, 15.290; Cunliffe (supra n. 1) 348, s.v. πρότονοι; LSJ 1537, πρότονοι.

[160] Cunliffe (supra n. 1) 231, s.v. κοῖλος.

[161] Cunliffe (supra n. 1) 7, s.v. ἀείρω; LSJ 27, s.v. ἀείρω.

[162] *Od.* 5.316; Seymour (supra n. 8) 312, n. 2.

[163] *Od.* 12.409; Seymour (supra n. 8) 312.

[164] *Od.* 15.496.

[165] 1106, s.v. μεσόδμη. Μεσόδμη also refers to a shelf built between the floor of the gallery and the roof.

structure in which the mast was set, which is probably synonymous with ἱστοπέδη.[166] Morrison interprets μεσόδμη to mean a notched thwart. He maintains that the μεσόδμη should not be identified with the ἱστοπέδη but may be part of it.[167] Morrison claims that when Odysseus sails by the Sirens, he is standing in the ἱστοπέδη and is tied to the mast, which has been lowered. Odysseus's body must therefore have taken its place in the ἱστοπέδη and μεσόδμη.[168] Morrison concludes that the ἱστοπέδη appears to have been a raised footing for the mast, just as the ἱστοδόκη was the crutch which receives a mast.[169] Lionel Casson concurs and cites a line from Alcaeus describing how bilge water surrounds the ἱστοπέδη, suggesting it must be deep in the hull.[170] In contrast, Cunliffe proposes that the ἱστοπέδη is a mast step, while Liddell, Scott, and Jones claim it is either "a piece of wood set in the keel to which the mast was bound or a hole in the keel to step a mast."[171] We can discount Liddell, Scott, and Jones's translation because the weight of a mast, sail, and rigging directly on a keel, especially one with a hole cut in it, would result in a dangerously weak structure. Yet, Liddell, Scott, and Jones are supported by the passage "...and broke off the mast at the τρόπις..."[172] Τρόπις is commonly translated as a keel.[173] If this is correct, and the mast broke off at the keel, then it would have to be stepped in a hole in the upper face of this timber. A second passage from the *Odyssey* describes Odysseus pacing the length of his ship until waves break or free the "sides" ("τοίχους") from the "keel" ("τρόπιος").[174] The difficulty with accepting these interpretations is that a keel will not completely separate from a ship when it is sinking, but the context of this sentence does appear to indicate this. Furthermore, in later classical texts τρόπις does denote a keel,[175] but this may not be so in Homeric times. It is possible that τρόπις denotes a mast step. A τρόπις, as

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[166] (supra n. 1) 264, s.v. μεσόδμη; *Od.* 2.424, 15.289. In a house it appears to refer to a beam, rafter or column; *Od.* 19.37, 20.354.

[167] Morrison and Williams (supra n. 4) 52.

[168] Morrison and Williams (supra n. 4), 52, 59, ns.34–35.

[169] Morrison and Williams (supra n. 4), 52, 59, n.34.

[170] L. Casson, ***Ships and Seamanship in the Ancient World*** (Baltimore 1995) 47, n. 33. See also, Alcaeus 18.6 or D. Page, *Lyrica Graeca Selecta* (Oxford 1968) 148.6.

[171] See respectively, Cunliffe (supra n. 1) 204, s.v. ἱστοπέδη; LSJ 842, s.v. ἱστοπέδα. See also, *Od.* 12.51, 162, 179; Alcaeus 18.6.

[172] *Od.* 12.422.

[173] Cunliffe (supra n. 1) 391, s.v. τρόπις; LSJ 1826–27, s.v. τρόπις; Morrison and Williams (supra n. 4) 50–51; Casson (supra n. 170) 221.

[174] *Od.* 12.420–22: ...διά νηὸς ἐφοίτων, ὄφρ' ἀπὸ τοίχους λῦσε κλύδων τρόπιος...

[175] Aristophanes, ***Thesm.*** 52; Polybius 1.38.5.

described by Homer, does fulfill the function of a mast step, and, after losing mast, sail, and rigging, a mast step may come free as a ship breaks up, just as Homer describes.

Τοῖχος is a general term that denotes some type of wall.[176] In *Iliad* 15.382, Homer describes waves coming over the τοῖχος, but whether τοῖχος denotes hull planking, bulwarks, or side screens is impossible to discern. It is therefore possible that the mast step was secured on both sides by some type of structure, and it is this structure that is torn from the sides of the mast step instead of the ship's hull being torn from the keel. As previously mentioned, even if a ship was built with a large keel, a seagoing hull could not sustain the stress of having a mast stepped in this timber. Even early-dynastic river boats in Egypt were equipped with mast steps (fig. 5.9). What makes the translation of these words so difficult is a paucity of examples for each in ancient texts.

As previously mentioned, the possibility of a μεσόδμη being a large crossbeam at amidships with a deep notch to take the mast is consistent with the evidence. Discerning the meaning of ἱστοπέδη is more problematic. We are hindered, again, because ἱστοπέδη rarely appears outside of the Homeric texts, and even he uses it in limited contexts. The closest parallel to ἱστοπέδη is ἱστοπόδες, which are long loom beams to which a web is attached.[177] The best description of a ἱστοπέδη comes from *Odyssey* 12.178–79. Odysseus describes how he is tied "hand and foot and upright within the ἱστοπέδη, and from here [the ἱστοπέδη] bound by ropes."[178]

The word ἱστοπέδη appears to be made up of ἱστός, which has the meaning of an upright pole, beam, or mast.[179] Πέδη has two possible roots, either πούς or πεδάω. Cunliffe, Morrison, and Liddell, Scott, and Jones all believe πέδη is derived from πούς and refers to the "foot" of a mast. Another possibility is that πέδη is derived from πεδάω.[180] Πεδάω means to bind, and πέδη denotes fetters or shackles.[181] In one Homeric passage, Odysseus appears to bind a door shut with a cable from a ship.[182] Since ἱστοδόκη describes a forked pole (δοκή) that supports a mast (ἱστός),[183] then so too may a ἱστοπέδη describe a rope

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[176] Cunliffe (supra n. 1) 387, s.v. τοῖχος.

[177] LSJ 842, s.v. ἱστοπόδες.

[178] *Od.* 12.178–79: οἱ δ᾽ ἐν νηί μ᾽ ἔδησαν ὁμοῦ χεῖράς τε πόδας τε ὀρθὸν ἐν ἱστοπέδῃ,ἐκ δ᾽ αὐτοῦ πείρατ᾽ ἀνῆπτον.

[179] LSJ 842, s.v. ἱστός.

[180] Apollonius Sophista, *Lexicon Homericum* s.v. πεδάω.

[181] LSJ 1351, s.v. πεδάω; LSJ 1352, s.v. πέδη.

[182] *Od.* 21.391.

[183] LSJ 441, s.v. δοκάνη; LSJ 842, s.v. ἱστός.

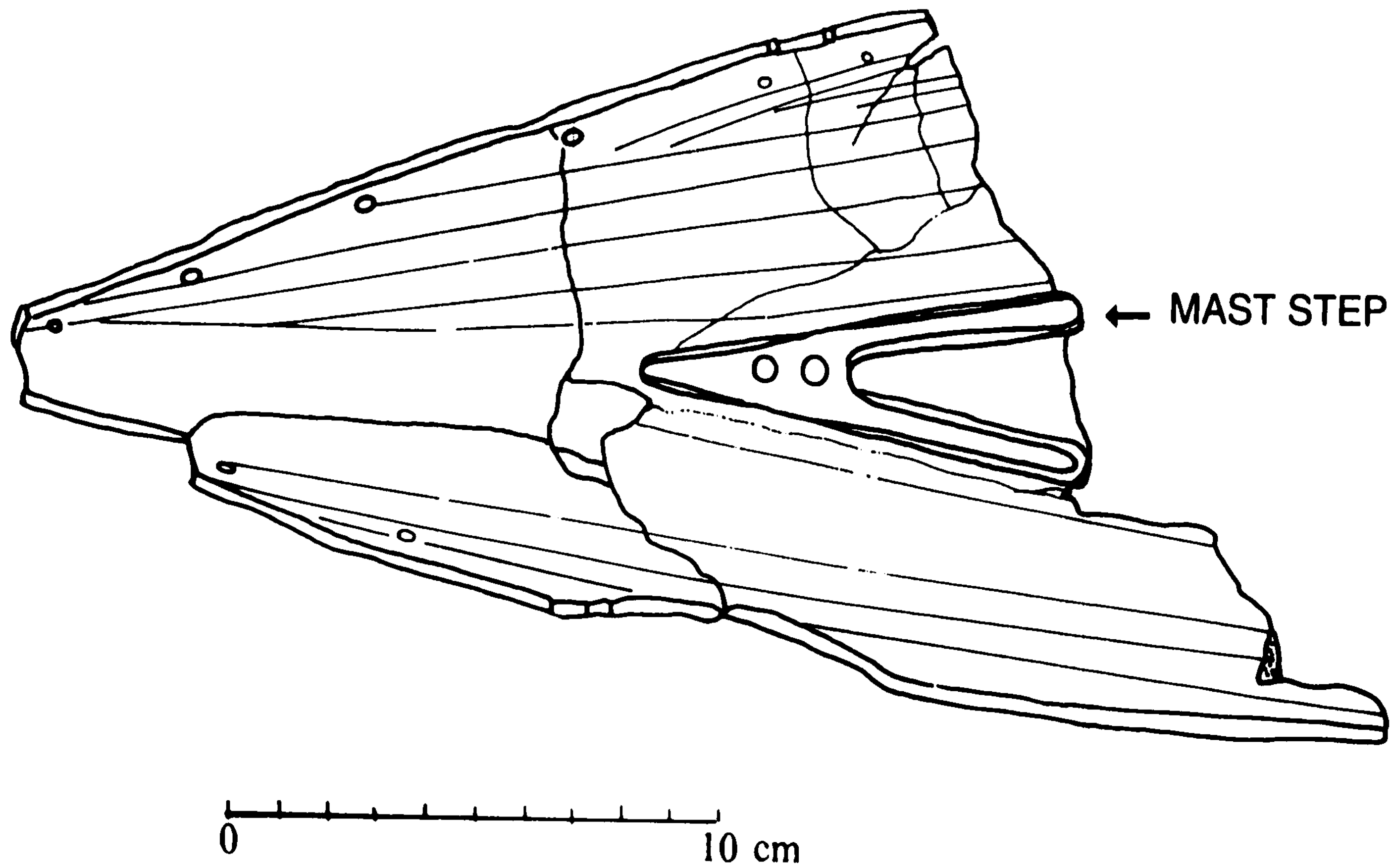

Fig. 5.9. Model of an early-dynastic river boat. (After W. Kaiser, St. Seidlmayer, and M. Ziermann, "Stadt und Tempel von Elephantine," *Mitteilungen des deutschen archäologischen instituts, Abteilung Kairo* 44 [1988] 176)

or fetter (πέδη) that secures a mast (ἱστός). To hear the Sirens, Odysseus is first bound hand and foot and then placed in a fetter or binding that was attached to a post, and once he was in, it was bound.

Laced vessels are commonly equipped with similar devices. An Egyptian model has a mast step with two holes in the upper face. A post is stepped in the forward hole, and it would also fit into a semicircular cut on the forward side of a crossbeam placed at deck level (figs. 5.9 and 5.10). The mast was stepped in the after hole in the mast step, and it would fit into a semicircular cut in the after side of the same crossbeam. The mast was then secured by tying it to the post above the crossbeam, and two forestays were then secured at the bow.[184] Such an arrangement would explain why the mast falls back or breaks at deck level. A ἱστοπέδη may not have been strong enough to secure a mast without the forestays. On Odysseus's ship when the forestays break so to would the ἱστοπέδη, and the mast falls backwards. If the mast breaks before the lines do, we would expect the mast to break above the ἱστοπέδη or more toward the center of a mast. Onboard Odysseus's σχεδίη, when the storm hits and the lines hold, the mast does break where we would expect.[185]

The line from Alcaeus describing how bilge water surrounds the ἱστοπέδη, seems to contradict this interpretation. Yet, as previously mentioned, it is relatively common to see words describing more than one aspect of an object. Κώπη denotes an oar handle and πηδόν an oar blade, but both also denote an oar. In addition, οἰήια and πηδάλιον appear to denote all or part of a quarter rudder depending on the context. Therefore, ἱστοπέδη may refer to both bindings and the forward post they are attached to. It is therefore possible that a τρόπις is a mast step, a μεσόδμη a notched crossbeam, and a ἱστοπέδη a binding that helps secure the mast.

Attached to the mast is a yard (ἐπίκριον), which was drawn up the mast by a backstay (ἐπίτονος) of oxhide.[186] This backstay must have passed through a ring or some structure attached to the masthead or through a hole in the mast itself that served as a pulley. The backstay was tied off aft of the mast, but Homer does not tell us where (fig. 5.8).[187]

The backstay not only held up the sail but also braced the mast. According to Seymour, the backstay endured heavy stress and friction from hauling up the yard and sail without a block. To compensate, seafarers plaited this rope out of oxhide instead of relying on fibrous ropes. Seymour points out that Homer only mentions that the backstay is made of oxhide, and, therefore, other ropes were not of leather.

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[184] W. Kaiser, St. Seidlmayer, and M. Ziermann, "Stadt und Tempel von Elephantine," *Mitteilungen des deutschen archäologischen instituts, Abteilung Kairo* 44 (1988) 174–177; S. Mark, "The Earliest Mast Step," *INA Quarterly* 25.2 (1998) 24–25.

[185] *Od.* 5.316–17.

[186] Cunliffe (supra n. 1) 151, s.v. ἐπίτονος; LSJ 667, s.v. ἐπίτονος.

[187] Seymour (supra n. 8) 312.

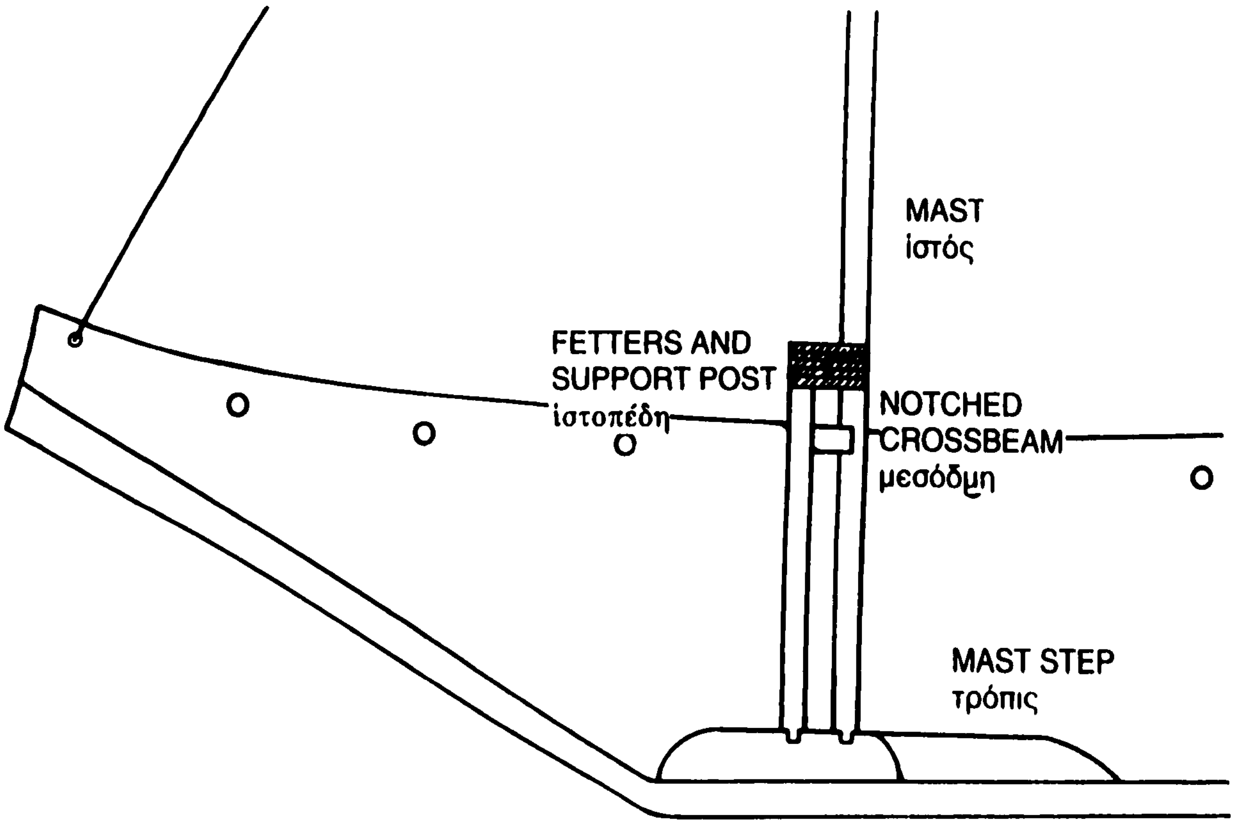

Fig. 5.10. Cross section and reconstruction of an early-dynastic river boat. (After W. Kaiser, St. Seidlmayer, and M. Ziermann, "Stadt und Tempel von Elephantine," *Mitteilungen des deutschen archäologischen instituts, Abteilung Kairo* 44 [1988] 176)

He supports his view by citing Agamemnon who tells the Achaeans that the planks of their ships have rotted, and the cords of σπάρτα have worked loose or broken.[188] Seymour believes σπάρτα may denote rigging in this context.

Σπάρτον appears to be a generic word denoting ropes and cables,[189] but Homer uses this word only in this one sentence. As mentioned in the previous chapter, the cords of σπάρτα are thought to be cords holding the planking together and not the running and standing rigging of a ship. The mast, sail, and rigging are always taken down when a ship enters port, and, as such, the sail and rigging would be stowed in a dry place, probably under the decking. The rigging would be the last to rot and the easiest items to maintain and replace. In contrast, most of the cords binding the hull planking would be exposed to the elements and very difficult to replace, especially during a siege. In addition, Seymour concedes that σπάρτα is used in conjunction with δοῦρα (planking), and he feels that the two are closely related, which they are when binding hull planks together. Finally, although Seymour is correct that Homer only mentions leather backstays, it does not preclude the possibility that other lines were also made from leather. Considering that a helmsman's life and the survival of a ship are both dependent on only a few lines to secure the mast, it is possible that all rigging lines were made from leather. Leather rigging would be stronger, and, since it is taken down and stored, it would be easy to maintain against the elements. In Egypt, ropes were commonly made from animal hides.[190]

The ὑπέραι appear to denote braces or lines that are fastened to either end of a yard and run to the deck (fig. 5.8). These lines are used to adjust the yard in relation to the wind.[191] Cunliffe is less sure; he only states that they are for trimming a sail, but he does not elaborate.[192]

Πόδες appear to correspond to the sheets, which are called the feet of a sail.[193] Sheets were fastened to the lower corners of a sail and could be secured to either side of a ship aft of the mast. A sheet is held by Odysseus throughout his voyage from the island of Aeolus to Ithaca while the other sheet is presumably

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[188] Seymour (supra n. 8) 313, n. 1; *Il.* 2.135.

[189] Cunliffe (supra n. 1) 362, s.v. σπάρτα; LSJ 1624, s.v. σπάρτον.

[190] N. de G. Davies, *The Tomb of Rekh-mi-Rēat Thebes* (New York 1973) 50; R. Faulkner, *The Ancient Egyptian Coffin Texts* I & II (Warminster, England 1977) 49 [Spell 404]; W. Charlton, *Rope and the Art of Knot-Tying in the Seafaring of the Ancient Eastern Mediterranean* (M.A. thesis, Texas A&M University 1996) 3.

[191] LSJ 1858, s.v. ὑπέρα; *Od.* 5.260; Seymour (supra n. 8) 313.

[192] Cunliffe (supra n. 1) 395, s.v. ὑπέραι.

[193] *Od.* 5.260, 10.32; Cunliffe (supra n. 1) 341, s.v. πούς; LSJ 1457, s.v. πούς.

made fast,[194] suggesting it was needed to adjust the sail.

Other lines mentioned by Homer are κάλοι, ὅπλον, and δεσμός. Cunliffe believes κάλοι denotes the tackle for raising the sails, or possible halyards.[195] Liddell, Scott, and Jones see it as a general term for lines, ropes, and cables.[196] A line from Herodotus though clearly describes κάλοι as brailing lines.[197] Brailing lines are attached to the lower edge of a sail and are laced through evenly spaced brailing rings, which are sewn to the forward face of a sail. These lines then run over the yard and back to the helmsman. A helmsman can control the area of a sail by pulling or releasing these lines (fig. 5.8).[198]
Seymour was the first person to suggest that Homeric ships had some type of brailed sail, but his insight was based on the context of στεῖλαι in *Odyssey* 3.11.[199]

The ὅπλον is a strong rope or cable made of papyrus.[200] Seymour proposes that in *Od.* 2.390, it may also refer to mast, sail, and oars, as well as lines.[201] Finally, δεσμός denotes a ship's mooring cable.[202]

Homer generally uses the word for a sail or ἱστία in the plural,[203] but he means only one sail.[204] The plural refers to strips of cloth (φάρεα), possibly of linen, from which it was made because no ancient loom would have been large enough to make a sail all in one piece.[205] Odysseus sews together his sail from strips of linen provided by Calypso.[206] Using plural forms to describe a singular object in this manner is common in Homer.[207]

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[194] *Od.* 10.32; Morrison and Williams (supra n. 4) 56.

[195] (supra n. 1) 210, s.v. κάλοι; *Od.* 2.246, 5.210.

[196] LSJ 871, s.v. κάλως.

[197] Herodotus 2.36; Morrison and Williams (supra n. 4) 56.

[198] Morrison and Williams (supra n. 4) 56.

[199] Seymour (supra n. 8) 314, n. 1.

[200] *Od.* 14.346, 21.390.

[201] Seymour (supra n. 8) 313, n. 1.

[202] *Od.* 13.100; Cunliffe (supra n. 1) 88, s.v. δεσμός.

[203] *Od.* 5.259.

[204] Cunliffe (supra n. 1) 204, s.v. ἱστίον; *Il.* 1.433.

[205] Morrison and Williams (supra n. 4) 54.

[206] *Od.* 5.258; Seymour (supra n. 8) 314; Morrison and Williams (supra n. 4) 55.

[207] See, ὄχεα, *Il.* 5.794 [a singe chariot]; δώματα, *Il.* 6.313 [a house].

A sort of ladder or landing plank or ἐφόλκαιον may be referred to once.[208] Yet, Morrison points out that the ladders and gangplanks depicted on paintings of later ships are not mentioned by Homer. He claims that Homeric ships were not high enough in the stern to need a ladder. He bases this on the observation that Hector could grasp the stern ornament. Furthermore, the projecting θρῆνυς at the stern and a similar timber at the bow would provide a step into the ship, which was all that was necessary.[209] This may be true for merely boarding a vessel, but a gangplank would be necessary for efficiently loading and unloading heavy cargo or booty. When Odysseus and his men escape from Polyphemus, each man is carried from the cave under a sheep. After escaping, Odysseus and his men return to their ship and quickly load the herd of sheep onboard.[210] To load sheep large enough to carry a man would require some type of ramp leading up to the ship, especially since Polyphemus is in pursuit. A gangplank would be a practical and easily stowed piece of gear to have onboard. Finally, we appear to have one example of a Geometric ship painting depicting warriors boarding by walking up a gangplank at the stern (fig. 5.11).

Morrison continues by citing a story Odysseus tells of his escape from the crew of a Thesprotian ship. As the crew ate their meal on the beach, Odysseus, who was left tied up onboard, manages to free himself, and then he climbs down to the ἐφόλκαιον, lowers his body into the water, and swims off.[211] Morrison proposes that the ἐφόλκαιον was a corresponding beam to the "seven-foot" θρῆνυς, but it was in the bow instead of the stern; and it, like the θρῆνυς, would afford a step for anyone going over the side. Such projecting beams are visible in later depictions and in the bow of a clay model.[212]

Morrison concedes that Odysseus does not say that the ἐφόλκαιον was in the bow, but if the stern was beached, as is usually the case with Homeric ships, the bow was the only part of the ship from which he could have made his escape by swimming. Furthermore, the bow would also be the furthest from his captors on the beach. A projecting beam on each side of the bow would have been useful for the attachment of a towing rope or mooring cables. Morrison believes it is from towing that this beam got the name ἐφόλκαιον or towing bar (fig. 5.5).[213] Morrison makes an interesting and strong argument for this interpretation, but another interpretation is possible. An ἐφόλκαιον may be a small dingy commonly towed

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[208] *Od.* 14.350; Cunliffe (supra n. 1) 172, s.v. ἐφόλκαιον; LSJ 746, s.v. ἐφόλκαιον.

[209] Morrison and Williams (supra n. 4) 54.

[210] *Od.* 9.425–444, 462–70.

[211] *Od.* 14.350–52.

[212] Morrison and Williams (supra n. 4) 49, 58, n.15.

[213] Morrison and Williams (supra n. 4) 49, 58, n.15.

Fig. 5.11. Geometric ship with gangplank. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 7b)

by larger ships.[214] From my own personal experience, a dingy is not needed when mooring a vessel stern first close to shore, it is common for the lowest ranking person, which was usually myself, to untie the dinghy and pull it to the bow while the ship is mooring. The dingy remains tied at the bow until the ship prepares to leave harbor. Homer may be describing a similar arrangement. Odysseus may have climbed down to the dingy and then lowered himself into the water. Trying to row a dingy would quickly alert the crew to his escape.

Homer mentions at least three different types of ships, those with twenty oars, fifty oars, and broad merchant ships with twenty rowers. Unfortunately, we know little about the size of such ships. Homeric ships are commonly thought of as little more than small, open vessels. This perception can be traced back to a statement by Thucydides.[215] Yet, considering that at least two centuries separate Thucydides from Homer and no known histories survived to guide Thucydides, it seems unlikely that he had any reliable information on the types of ships sailed during Homer's time. A closer look at the Homeric texts suggest that ships may have been larger and more diverse than commonly thought.

Homer most commonly describes ships with a crew of about fifty. Achilles and Protesilaus each had fifty oarsmen onboard, and the Phaeacian ship had fifty-two men.[216] This suggests that a full crew consists of fifty oarsmen, a helmsman, and a captain. Of course there are always exceptions, Odysseus's ship had forty-six men, after six were killed by the Ciconians, and six had been devoured by Polyphemus, for an original crew of fifty eight.[217] As previously mentioned, these ships must have been at least twenty-six meters in length based on the space needed per rower plus the fore and aft decks. They may also have been much broader than previously thought because Homer describes them as capacious or μεγακήτης.[218] Seymour also proposes that since Homer uses the word cheek or παρήϊον to describe the bow, it implies a full bow.[219] Furthermore, each Boeotian ship carried 120 men to Troy.[220] Thucydides believes these ships had 120 rowers.[221] It is also possible that all large warships are the same size, and the 120 men mentioned

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[214] Strabo 2.3.4; LSJ 746, s.v. ἐφόλκιον.

[215] 1.10.4.

[216] See respectively, *Il.* 16.170, 2.719; *Od.* 8.48.

[217] See respectively, *Od.* 10.208 [forty six], 9.60 [six die], and 9.289, 9.311, 9.344 [two die at each meal].

[218] Cunliffe (supra n. 1) 257, s.v. μεγακήτης; LSJ 1086, s.v. μεγακήτης; Morrison and Williams (supra n. 4), 45; *Il.* 8.222, 15.160 [also used to describe the mighty depth of the sea *Od.* 3.158].

[219] Seymour (supra n. 8) 307.

[220] *Il.* 2.510.

[221] Thucydides 1.10.4.

are an indication of how many men each ship can carry, including crew and passengers. Homer never mentions a ship with more than fifty rowers, and this should not surprise us. Penteconters appear to have been the standard type of warship used before the Classical period and derives its name from the fifty oarsmen onboard. These ships made up the Phocaean fleet in the battle of Alalia (535 B.C.). According to Herodotus, the Phocaeans with sixty ships met a combined force of 120 Tyrrhenian and Carthaginian ships. The Phocaeans won the battle, but they lost forty of their ships. After the battle, the Phocaeans returned to their settlement and took onboard all their women and children and all the possessions that the ships could hold and then left Corsica.[222] The fact that the remaining ships could carry not only their families, but the families of those lost that day plus many of their possessions suggest these were rather large and beamy ships.

The second type of ship mentioned by Homer has twenty rowers. Twenty-oared ships were useful for shorter voyages, such as the returning of Chryseis to her father, Telemachus's trip to Pylos, and the suitors's ambush.[223] Unfortunately, we cannot be sure that these are all the same type of ship. Odysseus may have taken only twenty crewmen on a fifty-oared ship because the voyage was a short and easy sail. If this is a smaller ship, then it must have been a rather beamy one to carry a hecatomb or ἑκατόμβη.[224] An ἑκατόμβη is a sacrifice of a hundred oxen. Of course, it is possible that an ἑκατόμβη is a smaller gift with the value of a hundred oxen.[225]

Finally, a beamy merchant ship or φορτίς has twenty oarsmen.[226] Seymour proposes that these ships were about twelve meters long. He bases this calculation on the space needed per oarsman as used for a fifty-oared ship.[227] These calculations are based on the assumption that space is at a premium. Such may be the case for warships, but may not be so for merchant vessels. For example, a *mtepe* commonly carried a twenty-man crew. Two of the crew always appear to be bailing, leaving eighteen rowers, and *mitepe* are usually described as about eighteen meters in length.[228] Oars on merchant ships are used primarily as sweeps to maneuver while entering or leaving a harbor and lack the closely spaced crossbeams that allow a rower to sit while pulling on an oar. In addition, merchant ships must carry enough water and food to feed

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[222] Herodotus 1.166. See also 1.164.

[223] See respectively, *Il.* 1.309; *Od.* 1.28, 4.669.

[224] *Il.* 1.309.

[225] Cunliffe (supra n. 1) 118, s.v. ἑκατόμβη.

[226] *Od.* 9.322–23.

[227] Seymour (supra n. 8) 308.

[228] J. Hornell, "The Sea-Going *Mtepe* and *Dáu* of the Lamu Archipelago," *MM* 27 (1941) 62.

a crew. Therefore, the larger the crew, the less space that can be used for cargo. It would seem that a twelve-meter ship is rather small for a twenty-man crew. A φορτίς was probably more like a *mtepe* in that it must have been about or in excess of eighteen meters to efficiently carry and maintain such a large crew. This underscores an important point; lengths of ships described in this chapter should be seen as minimum lengths.

Unfortunately, like ship size, Homer tells us little of the cargoes carried by each type of ship. We do know that ships carried parched grain or meal in leather bags,[229] and water and wine in jars or leather bottles.[230] The largest cargoes mentioned are the hecatomb and the gifts given to Odysseus by the Phaeacians. An open space aft of the mast, probably for loading cargo, must have been a common feature on Phoenician and Homeric ships. The Phoenician slave falls from the deck into the bilge water, and the rigging falls into the bilge when the mast kills the helmsman on Odysseus's ship, indicating a large open space.[231] Seymour believes these open spaces contradict Homer's descriptions of ships with closely spaced crossbeams. If they exist, then why must Alcinous inspects Odysseus's cargo to make sure it is properly stowed so it will not be in the way of the oarsmen. Seymour suggests that there was nowhere else to put it.[232] This interpretation is corroborated by a passage in which Odysseus fails to tell his men of Scylla because they would hide themselves within (ἐντός).[233] Seymour believes that Odysseus feared they would crawl underneath the benches.[234] These inconsistencies can be reconciled.

It is possible that Odysseus's ship had closely spaced crossbeams on two levels. The upper level was used as rowing benches. Aft of the mast, a cargo hold could be built by having the crossbeams tie into a frame that defines the hold (fig. 5.5). Alcinous's inspection of the cargo may also be a literary device. Phaeacian ships may have had deep cargo holds, but Odysseus receives so much wealth, more than his share of the booty from Troy, that it fills the hold and must even be stored under the rowing benches. In addition, Odysseus's rowers could have dropped quickly below the crossbeams and hidden under the gangplank. Unfortunately, this is all speculation, and we have few descriptions of merchant ships from even later times.

Homer is one of our best sources of information on the various parts of ancient ships. In addition, nautical archaeology has helped to clarify our understanding of ancient ships but, as this chapter indicates

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[229] *Od.* 2.354, 5.266.

[230] *Od.* 5.266, 2.349, 9.165; Seymour (supra n. 8) 307.

[231] See respectively, *Od.* 15.479, 7.411.

[232] Seymour (supra n. 8) 310; *Od.* 13.21.

[233] *Od.* 12.225.

[234] Seymour (supra n. 8) 310.

most of our information still consists of little more than names and hints many of which can have more than one possible interpretation. We must therefore still qualify and use each term cautiously. Our understanding of Homeric seafaring is also ambiguous, and the next chapter will clarify the competence of Homer's heroes as seafarers.

CHAPTER VI

SEAFARING

The Greeks of the Homeric Age were not hardy and adventurous seafarers, according to Thomas Seymour. He supports his opinion by pointing out that Achilles's shield portrays many aspects of life, including ploughing, reaping, cattle herding, scenes of war, disputes argued before judges, marriage processions, and a choral dance—but nothing of seafaring.[1]

Seymour is correct that Achilles's shield depicts important aspects of Homeric life, but not all aspects. When Achilles accepts his new armor, he is forced to make a choice. Either he can don the armor, kill Hector, and then die shortly thereafter, acquiring great glory as a result, or leave Troy and live a long and uneventful life. What Hephaestus is portraying on this shield is the life that Achilles is giving up to revenge the death of Patroclus. These scenes are events that a Homeric noble would consider as important facets of his life. Seafaring is omitted because Homeric Greeks saw it as little more than a conveyance. Homer never attempts to glamorize any aspect of seafaring. Ships are merely objects that are never named, and seafaring is seen as an arduous and dangerous way of life. Furthermore, if we are to accept Seymour's interpretation of the importance of these scenes, we must also accept the view that Homeric Greeks had little interest in, or knowledge of, horses and chariots since Hephaestus omits these also. Yet, Achilles's immortal horses were given to him by his father and appear to be an important facet of his life.[2] We must, therefore, conclude that Seymour overstates the importance of Achilles's shield as an absolute indicator of what is an important part of a noble's life.

Seymour continues by arguing that the landlubberly nature of Achaeans is evident during their return from Troy. When Menelaus, Nestor, and Diomedes reach Lesbos, they discuss whether to sail directly across the Aegean Sea to Euboea, a voyage of about 177 kilometers (110 miles), or to sail the long route, which is south along the coast of Asia Minor, west to Crete, and then north to the Peloponnese. Nestor and Diomedes sail directly from Lesbos to Euboea in a day, arriving after nightfall,[3] but they attempt this voyage only after receiving a favorable omen from the gods. Menelaus returns to Agamemnon, and they decide to take the longer course via Crete.[4] Seymour feels that experienced seafarers would have struck

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[1] T. Seymour, *Life in the Homeric Age* (New York 1914) 305; *Il.* 18.483–607.

[2] *Il.* 16.866–67, 20.400–20.

[3] *Od.* 3.165–78.

[4] *Od.* 4.514.

out on the shorter course without deliberation.[5] The first flaw with his interpretation is that the Achaeans's apprehension over which route to take can be a result of a number of factors and may not necessarily be an indication of inexperience. Dorothea Gray, for example, points out that Homeric Greeks sailed their ships along the coast from harbor to harbor not because they were afraid to sail in open seas, but because there was no refuge from a sudden storm. In addition, we should consider that the Achaean ships were not very seaworthy after ten years at Troy and may have been heavily laden with booty, men, and weapons.[6] Under these conditions, the direct route from Lesbos to Eubeoa would have been even more dangerous to sail.[7]

Another important consideration is the time of year. Homer fails to tell us when Troy finally fell. If it was anytime between the 10th of November to the 10th of March, it would be a season when weather conditions in the Aegean were the most unpredictable and dangerous.[8] Menelaus, Nestor, and Diomedes should be concerned about their course at this time of year. It can also be argued that a knowledge of alternative routes and a willingness to deliberate over them are signs of experienced seafarers—not of ignorant ones.

Homer may also be using these passages as nothing more than a literary device. As mentioned in Chapter II, Homer enjoys using irony in both epics. He sets the scene with Nestor and Diomedes taking the direct and more dangerous route home and arriving at their destinations unscathed. The ironic part is that all those who choose the longer and safer route experience some type of misfortune.

Seymour cites other evidence that Achaeans were landlubbers. Odysseus is thought cruel by his crew because, even though they are "overcome by weariness and sleep," he still asks them to continue rowing by the island of Helios.[9] Although his companions understand the dangers of doing so, they still want to go ashore to fix their dinner; Odysseus finally relents.[10] Seymour maintains that it was necessary to land because Homeric ships were not built for long voyages. They were in essence only open boats without a hold or a cabin and without berths or hammocks. It was therefore necessary to go ashore to cook or sleep. In addition, he claims that Achaeans would not sail at night except in special circumstances. In Seymour's words, the men would be "very wretched" if they had to sail for any longer than a day or two in one of

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[5] Seymour (supra n. 1) 305.

[6] *Il.* 2.135; *Od.* 10.40.

[7] D. Gray, *Seewesen* (Göttingen 1974) 1.

[8] L. Casson, *Ships and Seamanship in the Ancient World* (Baltimore 1995) 270–72.

[9] *Od.* 12.274.

[10] Seymour (supra n. 1) 306.

these ships.[11]

Although Seymour's argument is well reasoned, the epics appear to contradict him. Odysseus and his crew sail for nine days from the island of Aeolus to Ithaca without a break and without any indication of hardship. Other long voyages by Odysseus include a nine-day voyage to the land of the Lotus Eaters, a four-day voyage from Crete to Egypt, and seventeen days from Calypso's island to the land of the Phaeacians.[12] Voyages of this length may have been uncomfortable and even unpleasant, but should not have posed any great burden on him or his crew.

In some cases, such as the nine-day voyage from Cape Malea to the land of the Lotus Eaters, Odysseus's ship is at the mercy of winds. Yet, in other situations, long voyages appear to be made solely at the discretion of Odysseus. The nine-day voyage from the island of Aeolus to Ithaca is one such example. It appears that as long as the bag of winds given to him by Aeolus is tied, Odysseus will have a fair West Wind to take him home. He decides on a continuous voyage because he wishes to arrive home as soon as possible, not because he is forced to do so.[13] Furthermore, Odysseus's four-day voyage from Crete to Egypt appears to be under ideal conditions. When Odysseus is weaving his tales to the swineherd Eumaeus, he tells him that a favorable and fair North Wind carried his ships easily to Egypt. Neither ship nor person was harmed, there was no sickness, and on the fifth day they arrived safely in Egypt.[14] If Achaeans were truly adverse to making long, nonstop voyages, they could work their way to Egypt by hugging the coast.

Gray proposes that Achaeans only took to the open sea because of a lack of friendly harbors.[15] Yet, Greeks had been trading in Cyprus and along the Phoenician coast for about a hundred years before Homer's time.[16] So, it is difficult to find any merit in this argument. It can also be argued that since Odysseus is spinning a tale, we should discount what he says, but the most convincing tales are those that use truth as a background, and Homer was a master storyteller.

Odysseus probably sails south from Crete because the prevailing winds and currents would take him quickly to Egypt. Furthermore, Odysseus sails from Crete to Egypt in four days, which is identical to the

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[11] Seymour (supra n. 1) 306.

[12] See respectively, *Od.* 10.28, 9.82, 14.257, 5.278.

[13] *Od.* 10.20–34.

[14] *Od.* 14.252–57.

[15] Gray (supra n. 7) 3.

[16] J. Boardman, *The Greeks Overseas* (London 1980) 39, 43.

sailing time reported by Strabo during the Classical period.[17] This suggests that by Homer's time this four-day voyage was commonly sailed by the Greeks. Therefore, Seymour's argument that Homeric Greeks sailed in open boats that were unfit for continuous days at sea lacks merit.

In regard to the Achaeans' reservations for sailing at night, this argument does not really appear to have much merit either. All but one of the above voyages appear to have been continuous without any recorded complaints. The only mention of an aversion to sailing at night is when Odysseus and his men are off the island of Helios. Eurylochus, one of Odysseus's crew, expresses a fear of deadly storm winds from the south or west that arise during the night.[18] In addition, it is only in this passage that a crew of an Achaean ship has been rowing for a long period of time. They begin rowing when the wind drops near the Siren's island and continue until their ship reaches the island of Helios.[19] In every other passage, ships are only rowed when entering and leaving a harbor or to react to dangerous conditions. Homer may, therefore, be using this passage to set up another ironic situation. If we accept the possibility that Homeric ships were built to be sailed and were rowed only under the previously mentioned conditions, then the crew may fear that they will be destroyed by night winds because they are too tired to handle the ship if winds do blow up. The irony is that once Odysseus and his crew go ashore, the very winds that the crew fears at sea trap them ashore and, in effect, seal their fate. In addition, Telemachus's voyage to and from Pylos are night voyages,[20] and the suitors are apparently willing to attack Telemachus at any hour without reservation.[21] Odysseus's ability to navigate by the stars also suggests considerable sailing experience at night.

Homeric seafarers are already using constellations to guide them on long voyages. Odysseus sails during the night after leaving Calypso's island.[22] The constellation then already known both as Bear and as Wain, is not "bathing in Oceanus," which means it never sinks below the horizon. Odysseus sails from Calypso's island for seventeen days, keeping this constellation on his left hand.[23]

In addition to being too small for sleeping and eating on board, Homeric ships, according to Seymour, were built to be rowed instead of sailed. He maintains that oars were used almost constantly during a voyage, and he is supported by the prominence of oarsmen in both epics. Oars, not sails, are the "wings of

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[17] Strabo 10.4.5.

[18] *Od.* 12.287–89.

[19] *Od.* 12.166–262.

[20] *Od.* 2.434, 15.296.

[21] *Od.* 16.365–68.

[22] *Od.* 5.270.

[23] *Od.* 5.273.

a ship."[24] Seymour believes that sailors were prepared to use sails if a fair wind blew, but every man on board, except the commander, and perhaps a steersman, was expected to ply an oar in a calm, and the oar was so personal a possession that Odysseus's comrade Elpenor asked that his oar be planted as a monument on his grave.[25]

Although oarsmen are prominent figures, descriptions of rowing are nearly always qualified in relation to sailing. When Hector and Paris return to the field of battle, they rejuvenate the Trojan warriors like a fair wind to weary oarsmen.[26] On their second voyage from the isle of Aeolus, Odysseus's oarsmen are tired from rowing, because no breeze aids them.[27] Finally, Menelaus is detained by a calm on the island of Pharos off the coast of Egypt.[28] Seymour believes the distance from their home port made rowing out of the question.[29] But why not return to Egypt, which is only a day's sail away? If these ships were indeed built to be rowed, then Menelaus could easily row back to Egypt. Instead, he faces the prospect of starvation after spending twenty days on the island Pharos.[30]

The evidence suggests that Homeric ships were built to be sailed, not rowed. Both Odysseus and Menelaus say it is the winds, not oarsmen, that drive their ships across the seas.[31] In the *Iliad* and the *Odyssey*, ships are only rowed when entering or leaving port,[32] or, as previously mentioned, during a calm at sea. The evidence suggests that sailors were reluctant to put to sea without any wind, which would be excellent rowing conditions. A harbor is located near the cave inhabited by Polyphemus. In this harbor, sailors come to wait for the right winds to blow before continuing their voyage,[33] suggesting that rowing is only a secondary form of propulsion for Achaean ships.

If we look dispassionately at the passages that describe seafaring in both epics, the evidence suggests that Achaeans were experienced seafarers instead of landlubbers. Odysseus takes his first voyage as a young

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[24] *Od.* 11.125: πτερὰ νηυσί; Seymour (supra n. 1) 309. See also Euripedes, *Iph. Taur.* 1346.

[25] Seymour (supra n. 1) 307–08; *Od.* 11.77.

[26] *Il.* 7.4–7.

[27] *Od.* 10.78.

[28] *Od.* 4.360.

[29] Seymour (supra n. 1) 309.

[30] *Od.* 4.360.

[31] See respectively, *Od.* 14.252–57, 4.362.

[32] Seymour (supra n. 1) 309, n. 4.

[33] *Od.* 9.136–39.

man to visit his grandfather.[34] His son Telemachus also takes his first voyage just as he is coming to manhood. Even Hesiod, who seems to have an aversion to ships, took a voyage.[35]

Ships appear to be a common feature of Homeric life. "Ferrymen" bring Odysseus's cattle and travelers from the mainland to Ithaca.[36] Similarly, the bodies of the suitors, who were from other lands, were given to "seamen," or ἁλιεῦσι, to return them to their homes.[37] Athena borrows a boat from Noëmon who four days later needs it to bring some young mules from Elis, where he is pasturing them.[38] Finally, when Homer describes the Cyclopes, he points out their lack of ships and contrasts them with men, who often cross the sea to visit one another.[39]

One of the strongest arguments that Achaeans are adverse to taking long voyages comes from the mouth of Odysseus, himself. Odysseus says that an Homeric nobleman ideally never wants to be away from home for more than a month. On the other hand, we need to realize that life is seldom ideal. When he makes this statement, Odysseus has already spent nearly ten years from home. Furthermore, we should not take Odysseus's view of the perfect life and suppose that it applies to all men of his station. When Odysseus tells his tales to Eumaeus, he says he is from Crete and after the war felt a need to go to sea again.

The passages in the *Iliad* and the *Odyssey* that describe seafaring indicate that Achaeans, such as Odysseus, felt comfortable sailing long distances day or night. We must now ask why sailing was such an important part of a noble's life, a question that may be answered in the next two chapters.

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[34] *Od.* 19.409–10.

[35] *Op.* 648.

[36] *Od.* 20.187: πορθμῆες.

[37] R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman, Oklahoma 1988) 20, s.v. ἁλιεύς; *Od.* 24.419.

[38] *Od.* 4.634; Seymour (supra n. 1) 318.

[39] *Od.* 9.129.

CHAPTER VII

TRADE AND ECONOMICS

The οἰκός or household is the essence of the economy described by Homer, and, in the *Iliad* and the *Odyssey*, the household is an agricultural estate. This type of economy may have developed after the fall of the Palace economies of the Bronze Age. The importance of the household continues at least as late as the fourth century B.C. when Xenophon wrote his *Oeconomicus* and Aristotle his *Oeconomica*. Xenophon and Aristotle believe that agriculture is the only activity befitting a gentleman because it is the only self-sufficient activity.[1] Odysseus's household does appear to be self-sufficient. He raises pigs, cattle, sheep, fruits, and grains. Wool and possibly flax are also produced, which were woven into textiles. Local stands of trees would provide the timber necessary for most construction needs. Any surplus produced by a household is placed in storage, which is usually a locked room in the main house. The prestige and honor of an Homeric hero is based in part on his ability to bequeath a thriving household to his children. When Odysseus supplicates himself to the Phaeacians, he wishes not only that the gods will bestow prosperity in their own lives, but will also allow them to bequeath their wealth and the rights the people have given them to their children.[2]

We should keep in mind that not all agricultural labor is considered honorable work. The lowest position in Homeric society is to be a day-laborer working for an ἄκληρος or a man without any land of his own.[3] Furthermore, Odysseus reacts angrily when he is offered a job hedging and ditching. He wishes he could compete in reaping or plowing, so that he could outwork everyone, or a war, so that he could outfight everyone.[4] Some types of agricultural labor are a proper test of manhood and therefore transcend social classes.[5]

Although self-sufficiency was an ideal, it was not always attainable. Metals, slaves, and luxury goods could seldom be acquired from within a household. The only way to acquire such goods was either

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[1] See respectively, *Oec.* 7.17; *Oec.* 2.1.1–6.

[2] *Od.* 7.148–50.

[3] *Od.* 11.489-90.

[4] *Od.* 18.356-386.

[5] J.M. Redfield, "The Economic Man," in C.A. Rubino and C.W. Shelmerdine, eds., *Approaches to Homer* (Austin 1983) 232.

through war, raiding, or bartering.[6]

The most famous example of warfare is the ten-year siege of Troy. Odysseus does acquire wealth after the fall of Troy, but this cannot be seen as all pure gain. The booty that Odysseus acquires must recompense him for the ten years he is unable to work his estate or raise a family. Ironically, few of the Achaeans appear to benefit from this long siege. Odysseus's comrades from Ithaca are returning home with nothing to show for ten years of warfare.[7] Therefore, beyond the fame and glory Odysseus gains, it is difficult to calculate how his household and his community gains by such a protracted war.

Homeric warriors acquire livestock, slaves, and other goods by raiding,[8] but by Homer's day raiding may have diminished in importance. All mention of raiding in both epics appears to be restricted to enemies and distant foreign lands.[9] The most famous description of raiding in the epics is described by Nestor. In his youth he leads a successful raid against the Eleans a longtime foe who has done considerable damage to Nestor's people.[10] Similarly, when Odysseus raids a Circonian city on his return to Ithaca, he is attacking a Trojan ally.

Odysseus, who is posing as a Cretan, tells Eumaeus that it is through labor and care of the household that children are raised. Yet, he continues by stating that he prospered as a raider. Nevertheless, nearly every raid Homer describes in the *Odyssey* ends in disaster, suggesting that success in such a career may have been rare.[11]

Thucydides asserts that piracy was no disgrace in Homer's time,[12] but it does not appear to garner any glory either. Odysseus describes such a lifestyle as gloomy and terrible. When successful, a raider seems to gain only fear and respect, but no glory, even among his own people.[13] Eumaeus describes raiders "as hostile and heartless men who land on a foreign shore, and Zeus gives them plunder...[but] even in their

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[6] J. Hasebroek, *Trade and Politics in Ancient Greece* (Chicago 1978) 70; F. Meijer, and O. van Nijf, *Trade, Transport and Society in the Ancient World* (New York 1992) 21.

[7] *Od.* 10.41–42.

[8] *Od.* 1.398, 11.401, 23.357,

[9] H. Knorringa, *Emporos: Data on Trade and Trader in Greek Literature from Homer to Aristotle* (Chicago 1987) 25; see for example, *Il.* 11.67–89.

[10] *Il.* 11.671–88.

[11] *Od.* 14.223–34.

[12] 1.5.4.

[13] *Od.* 14.226, 14.234.

hearts there is great fear."[14] In the eyes of Homer, piracy and raiding appear to be acceptable when done out of necessity, as seen in the *Iliad*, but it is not a lifestyle that one aspires to or is held in high esteem.

Barter was probably the most common means of acquiring goods not produced by a household. Aristotle defines barter (μεταβλητική) as the exchange of goods that are meant for use, such as wine for corn, and only in quantities necessary to meet ones needs. Unlike barter, he disapproves of trade (καπηλική), which has the object of acquiring gold and riches. In addition, he disapproves of those who try to find the largest profit from trade goods.[15]

Homer does describe a few incidents of barter in the epics. When Athena pretends to be Mentes, king of the Taphians, she tells Telemachus that she is sailing to Temesa to exchange iron for copper.[16] Homer describes a poor woman weighing wool with scales "to get scanty wages for her children."[17] Finally, the Achaeans at Troy exchange copper, iron, hides, cattle, and slaves for wine from Lemnos. In contrast, Agamemnon and Menelaus are given a thousand measures of wine.[18] We must wonder if this is some form of kickback or duty for the right to trade wine with the troops. This passage may be a clue as to why Odysseus's comrades come home without any booty. They may have been forced to trade everything to acquire wine and other necessities. If some troops had to barter for necessities at Troy, the practice of stripping the dead of armor may have been done for more than honor. In some situations stripping a body is a matter of honor as when Hector strips the body of Patroclus. On the other hand, warriors may have stripped the dead of their armor so they could barter for necessities.

Unfortunately, Homer does not describe all classes of Greek society, usually only the Greek nobility. What little Homer tells us of the rest of society is almost exclusively in short similes.[19] Undoubtably, trade thrived in other classes. A farmer or peasant may have taken his surplus stock and sailed with it to some other district where he could dispose of it when not needed on the farm.[20] Hesiod tells merchants and farmers not only when to ship a cargo but how to do so. If it is necessary to ship a cargo, ship a large cargo in a large ship. This strategy will win larger profits, but only if the ship does not sink.[21]

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[14] *Od.* 14.85–88.

[15] *Pol.* 1256b28–1258b49.

[16] *Od.* 1.184.

[17] *Il.* 12.433–35.

[18] *Il.* 7.470–75.

[19] Knorringa (supra n. 9) 2.

[20] Hasebroek (supra n. 6) 13.

[21] *Op.* 618–45.

Like Aristotle, Homer takes a dim view of trading for profit. Odysseus is insulted when Euryalus, a Phaeacian youth, describes him as a sea trader obsessed with his profits. Odysseus's reaction to this insult suggests that a stigma is attached to those who do trade for profit.[22]

Homer does not even use a word to specifically denote traders. Later Greek authors use ἔμπορος to denote a trader, but Homer uses it to denote a "passenger on another's ship."[23] Instead, Euryalus calls Odysseus a πρηκτήρ, which has a general meaning of a "doer."[24] Hesiod, however, does use a form of ἔμπορος to denote trading, suggesting Homer's omission may have been due to poetic or metrical constraints.

We see a disdain for traders and merchants throughout classical literature. Plato, in the *Laws*, says that merchants are objects of universal contempt, and that they are examples of people without culture who attract and foster the worst qualities of society.[25]

Although such a stigma exits for nobles participating in sea trade, examples are found in the literature. Odysseus goes trading with a Phoenician, but he does so only out of necessity.[26] Hesiod's father becomes a trader, but he does so to escape debt and hunger.[27] Andocides had been an admiral of the Athenian navy, but he was forced to become a merchant and shipowner after being driven into exile. He then supplied the Athenian fleet at Samos with wood, grains, and metal.[28] It, therefore, appears acceptable for nobles to trade if they were poor. In addition, it appears acceptable for nobles like Solon to defray expenses by trading while on foreign trips.[29] In the *Odyssey* and other classical works we do see a tendency to undervalue trade at the expense of agriculture but to trade more than is admitted.[30]

In what way trade takes place is best demonstrated by the tale of Eumaeus. He relates that he is a native of the island of Syria, which abounds in cattle, sheep, wine, and wheat. One day the Phoenicians come carrying a large amount of knick-knacks (ἀθύρματα) in their black ship. During their stay, they secretly agree to help a Phoenician slave girl return home with them to Phoenicia. This slave girl is the property of

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[22] *Od.* 8.159–64; Meijer and van Nijf (supra n. 6) 24; Knorringa (supra n. 9) 7.

[23] R.J. Cunliffe, *A Lexicon of the Homeric Dialect.* (Norman, Oklahoma 1988) 127, s.v. ἔμπορος.

[24] Cunliffe (supra n. 23) 342, s.v. πρηκτήρ; *Il.* 9.443.

[25] *Leg.* 4.704b5-705b8.

[26] Hasebroek (supra n. 6) 18; *Od.* 14.296.

[27] *Op.* 634, 647.

[28] Lysias 6.19, 6.47; Andocides 2.11.

[29] Aristotle *Resp.* 2.6; Plato *Leg.* 951a–951c.

[30] Redfield (supra n. 5) 234–35.

Eumaeus's father, the ruler of the country. The slave urges them to make haste with their bartering and send for her as soon as their ship is loaded with a new cargo (βιότοιο). The Phoenicians stay for a whole year acquiring a large cargo and send word to the Phoenician slave by going to the house of Eumaeus's father with a necklace of gold and amber. While Eumaeus's mother and the other maid-servants are distracted while haggling, the trader signals the slave girl. As soon as he returns to his ship, the slave takes Eumaeus, steals a few gold objects, and runs under cover of darkness to the harbor where the Phoenician ship is waiting. The ship puts to sea and sails to Ithaca, where Eumaeus is sold to Laertes.[31]

Goods appear to be traded only in the harbor near each ship or a merchant visits homes with his goods. Homer does not specifically mention a fixed market place. Instead, the word agora (ἀγορή) denotes a "gathering place," but nowhere a "market".[32] Yet, nothing precludes the possibility that an Homeric agora was used as a market place. Homer may have omitted mentioning a market simply because it was not a necessary setting for his story. Even if the agora was used as a marketplace, a harbor would still be a natural place to trade for bulk items that are difficult to move from a ship to each town's market.

Although the Phoenicians are asked to make haste by the slave girl, they spend a year trading before acquiring a new cargo.[33] In contrast, Herodotus tells us that Phoenicians at Argos sold nearly everything in five or six days.[34] Of course, many factors may influence the time spent trading at any one location. For example, the Syrians may have provided a slow but steady trade, and the Phoenicians were content to spend a year in port. In contrast, the Phoenicians described by Herodotus may have been performing cabotage on a trading voyage that lasted for several months to a year. Both groups of Phoenicians may have actually spent the same time away from home; they just pursued different trading strategies. Unfortunately, Homer, as with most things, tells us too little of the trading habits of Phoenician seafarers to be certain.

This story also reinforces a perception that Phoenicians are sly and cunning traders who were mistrusted by other Homeric peoples.[35] Homer cultivates this impression by his word play. He describes Phoenicians as both "of many skills" or πολυδαίδαλος and "of many tricks" or πολυπαίπαλος.[36] In addition,

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[31] *Od.* 15.403–83.

[32] Knorringa (supra n. 9) 11.

[33] *Od.* 15.455.

[34] 1.1.

[35] R. Carpenter, "Phoenicians in the West," *AJA* 62 (1958) 35–36.

[36] Carpenter (supra n. 36) 35–36; see respectively, *Il.* 23.743, *Od.* 15.419.

Odysseus describes his Phoenician companion as a conniving rogue.[37] James Redfield characterizes Phoenicians as being "like gypsies, selling gee-gaws and stealing babies."[38] On the other hand, such characterizations are probably overstated. There does not appear to be any stigma attached to slavery in Homeric times. The slave girl who kidnaped Eumaeus and the Trojan women taken after the fall of Troy would probably have similar opinions of Taphians and Achaeans. Furthermore, if all Phoenicians were thought of as cunning rogues, it is unlikely that Eumaeus's mother would have allowed them in her house. In other passages, Phoenicians are described as skilled craftsmen[39] and as honest seafarers. When Odysseus meets Athena, who is disguised as a young sheepherder, he tells her that he paid Phoenicians to transport him and his treasure to Pylos or Elis. Unfortunately, due to adverse winds, they dropped him in Ithaca. After he fell asleep they unloaded his treasure and left him.[40] If Phoenicians were indeed all cunning rogues, they could have easily stolen his treasure and sold him into slavery. It can be argued that since this is another one of Odysseus's lies, we should ignore it. Yet, a good liar, which Odysseus obviously is, knows that the best lie is one interwoven with the truth. If all Phoenicians were the rogues portrayed in other Homeric stories, not even a sheepherder would believe Odysseus's story. A more balanced view of seafarers, regardless if they were Phoenicians, Taphians, or Achaeans, is that most were probably honest, but all people should be wary of any foreign seafarers. After all, strangers are commonly asked whether they are on some business or are pirates who bring evil.[41]

Phoenicians make attractive rogues because they are foreigners, and they appear to trade for pure profit. Yet, some times it is difficult to justify some transactions carried out by Achaean nobles as pure barter. As previously mentioned, Aristotle defines bartering as the trade for necessities. At first glance, gift exchange appears to fall outside the barter system. When Telemachus visits Menelaus, Menelaus offers him three horses and a chariot as a gift.[42] Such gifts are a common aspect of Homeric society, and they appear, for the most part, to be exchanges and not presents.[43] In Homeric society it is usually only the host who offers a gift.[44] If a gift cannot be used, it can be refused. Telemachus refuses the horses and chariot because the

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[37] *Od.* 14.288–89.

[38] Redfield (supra n. 5) 233.

[39] *Il.* 23.743.

[40] *Od.* 13.273–286.

[41] *Od.* 3.71–74.

[42] *Od.* 4.590.

[43] Knorringa (supra n. 9) 4.

[44] Knorringa (supra n. 9) 4. For the one exception see, *Il.* 6.216–20.

rocky island of Ithaca lacks the wide meadows to pasture and drive the horses.[45] Accepting a gift obliges a guest to offer a gift of similar value if his host should ever visit his home.[46] If a noble is unable to visit his gift friend before he dies, then he forfeits any right to a gift.[47] The gift-exchange custom, however, may transcend generations. Hereditary exchanges are commonly a basis for gift exchanges in later generations.[48]

Exchanging gifts is not usually seen as a source of wealth since gifts of equal value are expected for gifts received. It is a form of social interaction. It is a way for a noble family to acquire friends and allies, and thus, it strengthens a household. Yet, not all gifts are of this type. As previously mentioned, some appear to take the form of duties. Agamemnon and Menelaus receive a 1,000 measures of wine from the Lemnians, and Thoas receives a silver bowl from the Phoenicians.[49] Furthermore, some gift exchanges are not equal. Glaucus is thought to have lost his mind when he exchanges his golden armor for Tydeus's bronze armor.[50] It would seem that Tydeus violates the principle of gift exchange by accepting a gift of much higher value than the one he gives. He, in effect, makes a profit on this trade. His actions are similar to those of Odysseus.

Odysseus appears to do a basic cost-benefit analysis of everything. He always seems to be weighing his present expenditures against hoped-for profits.[51] He tells his men it is miserable to spend even one month from home, but it is disgraceful to stay away from home for long periods and come home empty.[52] He also tells Alcinous that no matter how eager he is to go home, he would stay another year to go home rich.[53] Odysseus exploits the gift-exchange custom by taking gifts from the Phaeacians that he will never have to reciprocate. Furthermore, he makes it clear that it is the value of the gift and not the thought that counts.[54] His gifts are so numerous that Poseidon complains Odysseus is getting more in gifts than he could have

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[45] *Od.* 4.600–07.

[46] Knorringa (supra n. 9) 4.

[47] *Od.* 24.265–85.

[48] *Il.* 6.211–31.

[49] See respectively, *Il.* 7.470–75; 23.741–45.

[50] *Il.* 6.230–36.

[51] Redfield (supra n. 5) 228.

[52] *Il.* 2.295-98.

[53] *Od.* 11.355–61.

[54] Redfield (supra n. 5) 234.

won from the fall of Troy.[55] Odysseus goes so far as to count his gifts as if they are merchandise to confirm the Phaeacian crewmen did not steal anything.[56] Ironically, he is acting like the careful and grasping merchant that Euryalus accuses him of being.[57] In a matter of speaking, Odysseus does earn the gifts given to him by the Phaeacians. The number and quality of these gifts are a direct result of the glory that Odysseus attained at Troy. A noble of little distinction would probably have gotten considerably less. Regardless of the apparent similarities between a merchant and Odysseus, in Odysseus's mind no similarities exist. Traders and merchants are seen as acquiring extortionate profits for themselves only. In contrast, everything Odysseus or any noble should do is to acquire wealth for his household and his descendants. When he spins the tale of all the wealth being held for himself by the Thesprotians, he says it would feed his children for the next ten generations.[58] He is mainly concerned with the longevity and security of his household. It is therefore the household that defines an Achaean noble.

These passages cited from both epics clearly show how ships and seafaring contribute to the wealth of a household. Ships were conveyances that allow a noble to acquire necessary goods and to extend his social network. Chariots and wagons were far less efficient when we consider the heavy burdens even a small ship could carry. This is especially so when no evidence exists for a well-developed road system in Homeric Greece. The ship is therefore an important feature of the economic prosperity of Homeric heroes. Homer is less clear in his description of war at sea, which will be reviewed in the following chapter.

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[55] *Od.* 13.135–38.

[56] *Od.* 13.215–19; Knorringa (supra n. 9) 4–5.

[57] *Od.* 8.159–64.

[58] *Od.* 14.325.

CHAPTER VIII

WARFARE AT SEA

Homer writes at length of both war and ships in the *Iliad* and the *Odyssey*, but he fails to describe any naval engagements. He does give a few hints that suggest fighting at sea may have been relatively common. When Telemachus sails to Pylos, he is accompanied by twenty of the best men from Ithaca, all of whom appear to be well armed.[1] After hearing of Telemachus's departure, Penelope's suitors, led by Antinous, plot to kill him on his return voyage. Antinous sails with twenty men to the straits between Ithaca and Samos to set an ambush.[2] We now have all the necessary elements for a battle at sea. Athena, however, spoils everything by helping Telemachus avoid the ambush.[3] Through it all, the suitors appear comfortable with the idea of fighting Telemachus and his well-armed companions at sea.

In addition, Homer describes a long pike (μακροῖσι ξυστοῖσι) used for sea fighting(ναύμαχα).[4] The head of a pike is made of bronze, and the handle consists of several pieces closely joined (κολλήεντα) with bands or rings (βλήτροισι).[5] This weapon is much longer than a conventional spear, which is 11 ells long, or about 5 meters, as opposed to the 22 ells for a naval pike.[6] Lionel Casson does not believe ten meters is the standard length for a naval pike because Homer only mentions its length when it is wielded by Aias, and Aias is noted for his great strength.[7] The flaw with his interpretation is that Hector and lesser characters like Tydeus and Aineias are also known for their great strength.[8] Furthermore, Homer best illustrates Aias's strength not by the length of his pike but by his ability to jump from deck to deck of several ships while brandishing such a weapon.[9] After all, it is the length of a pike that makes it effective

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[1] See respectively, *Od.* 4.652, 4.666, and *Od.* 2.402, 16.326.

[2] *Od.* 4.671–73.

[3] *Od.* 15.28–35.

[4] *Il.* 15.388–89.

[5] See respectively, *Il.* 15.678; R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman, Oklahoma 1988) 232, s.v. κολλητός; LSJ 972, s.v. κολλ-ητός; Cunliffe 71, s.v. βλῆτρον; LSJ 318, s.v. βλητ-ός.

[6] See respectively, *Il.* 6.319 and *Il.* 15.678. A cubit is equal to about 45.7 cm or 1.5 feet. See also, T. Seymour *Life in the Homeric Age* (New York 1914) 665.

[7] L. Casson, *Ships and Seamanship in the Ancient World* (Baltimore 1995) 48, n. 48.

[8] See respectively, *Il.* 12.445, 5.302, 20.285.

[9] *Il.* 15.674–88.

in ship-to-ship combat. On the other hand, Homer is characterizing warriors from an Heroic Age, men who can perform feats beyond the abilities of normal men. When heroes like Hector and Aias fight with weapons 5 and 10 meters long, Homer may indeed be using these lengths as a literary device to enhance their prowess as Casson suggests. Similar literary devices include the tripod that Achilles gives as a first prize in the games after Patrocolus's funeral, which holds "22 measures" (δυωκαιεικοσίμετρος), and Odysseus's ability to build a seagoing vessel in only four days.[10] According to Casson, naval pikes are portrayed on paintings of Geometric ships (figs. 8.1). The iconographic evidence does indicate that some type of spear is stored at the bow or stern of a ship, but it is possible that more than one type of weapon was used during naval engagements. Naval pikes, being longer, were only for hand-to-hand combat as used by Aias, while shorter spears may have been used for both hand-to-hand combat and for throwing.[11] In addition, naval pikes were probably too long to be stored upright in the manner portrayed. The length of these weapons may have forced crewmen to lay them on deck or in the hold,[12] and Homer fails to give any indication that pikes are stored at the bow or stern decks. In contrast, the storage of spears does appear to be associated with the stern deck in two passages and possibly once with the bow deck.[13] This question is made more difficult in that we do not know whether a Homeric pike was only a long and heavy spear or if it had a cutting edge like a halberd. Homer fails to describe the head of this weapon in detail.

Thomas Seymour argues that naval pikes were not intended for engagements between ships, instead, warriors used them to fight their way ashore when they were met by opposing forces. He supports his argument by pointing out that Protesilaus, the first Achaean to die at Troy, was killed as he jumped from his ship.[14] But Homer fails to mention a naval pike being used in this engagement. In contrast, the adjective ναύμαχα does seem to imply that naval pikes were made for fighting at sea.[15]

Curiously, Homer fails to mention a ram in either the *Iliad* or the *Odyssey*. A ram is a strong wooden protrusion, sheathed in metal, that is an integral part of the bow of an ancient warship and is used as a

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[10] See respectively, *Il.* 23.264; *Od.* 5.262.

[11] *Il.* 15.730–31 [Aias]; Herodotus 8.90; R.T. Williams, "Ships in Greek Vase-Painting," *Greece and Rome* 54 (1949) 131. See also, D. Gray, *Seewesen* (Göttingen 1974) 126.

[12] *Il.* 15.388; Cunliffe (supra n. 5) 221, s.v. κεῖμαι; LSJ 934, s.v. κεῖμαι.

[13] *Od.* 15.282–83, 15.551–52 [stern deck]; 12.228–30 [bow deck]. See also J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* (1968 Cambridge) 48, 57, n.7–11.

[14] Seymour (supra n. 6) 673–74.

[15] Cunliffe (supra n. 5) 275, s.v. ναύμαχος; LSJ 1162, s.v. ναυμαχ-έω.

Fig. 8.1. Spears stored at the bow of a Geometric ship. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 6a)

weapon to strike another ship.[16] Homer may have composed as early as the first half of the eighth century B.C.,[17] but he never alludes to this weapon. Yet, according to Casson, it was a prominent feature on ships of his day. Casson proposes that Homer omits any mention of a ram because "the poet seems to have been careful not to commit an anachronism."[18] This view is supported by the belief that the ram was not only a prominent weapon during Homer's time but appears considerably earlier.[19] The main flaw in this view is the lack of evidence for a ram—even as late as Homer's day. Therefore, if Homer fails to mention a ram it must be because he thought a ram was anachronistic or because it did not yet exist. We can decide only after reviewing the earliest evidence for this weapon. Unfortunately, we lack archaeological examples of early rams to guide us. Instead, we have only models, iconography, and written sources to rely on. Fortunately, a ram dating to the second century B.C. has survived.[20] It is necessary to understand what a ram is and how it was built to understand how it evolved. We must therefore study this weapon first.

The Athlit ram consists of a bronze cast, weighing 465 kilograms, and sixteen timber fragments (figs. 8.2, 8.3). The maximum length is 2.26 meters and maximum height 95 centimeters. All but the forward most 30 centimeters of it is hollow, and the walls of the hollow section are approximately 1 centimeter thick. The bow timbers were housed in this aft section of the ram. The forward 30 centimeters consist of four fins of solid metal, and the center fin is 6.8 centimeters thick. The face of the ram head is flat and measures approximately 41 by 43 centimeters. This bronze cast was attached to the bow timbers by nails and bolts. Fragments of timbers survive from the keel, two bottom planks, two wales, a ramming timber, a stem, six side planks, a chock, a nosing piece, and a false stem. The ramming timber was at least 2 meters long and 39 by 37.7 centimeters in cross section and was supported by the two wales.[21] The ship bearing this ram must have been heavy to withstand the shock of ramming. Such a vessel must also have been light enough to be maneuverable and achieve momentum, yet heavy enough to drive the ram home.

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[16] J.R. Steffy, *Wooden Ship Building and the Interpretation of Shipwrecks* (College Station, Texas 1994) 277.

[17] B. Powell, *Homer and the Origin of the Greek Alphabet* (New York 1991) 219.

[18] Casson (supra n. 7) 43, n. 1.

[19] Casson (supra n. 7) 49; Morrison and Williams (supra n. 13) 7.

[20] W.M. Murray, "The Provenience and Date: The Evidence of the Symbols," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* (College Station, Texas 1991) 66.

[21] J.R. Steffy, "The Ram and Bow Timbers: A Structural Interpretation," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* (College Station, Texas 1991) 11–13, 17, 23 [ram and timbers]; S. Eisenberg, "Metallurgical Analysis of the Ram," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* (College Station, Texas 1991) 40 [weight of ram].

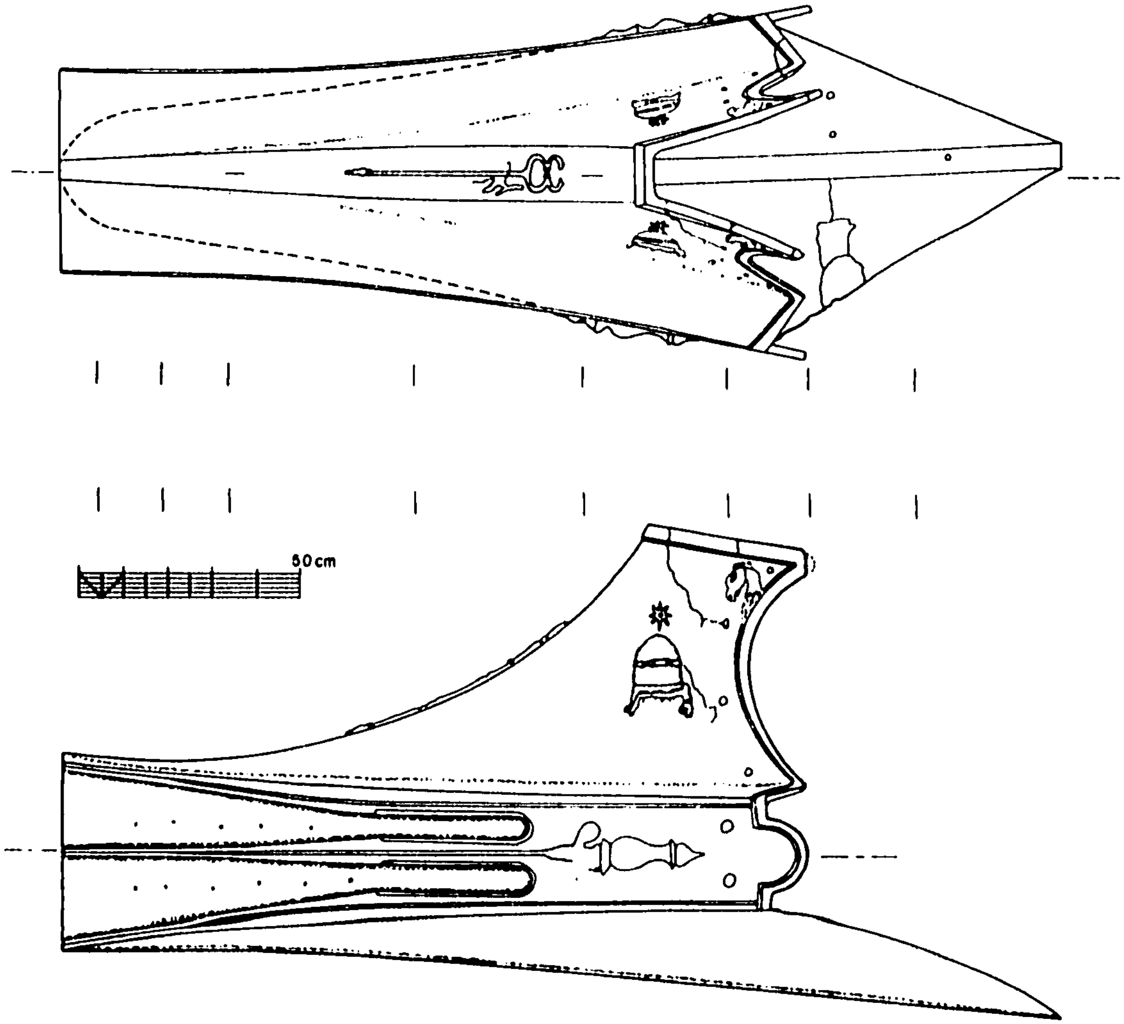

Fig. 8.2. Bronze Athlit ram. (From J.R. Steffy, "The Ram and Bow Timbers: A Structural Interpretation," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* [College Station, Texas 1991] fig. 2-9)

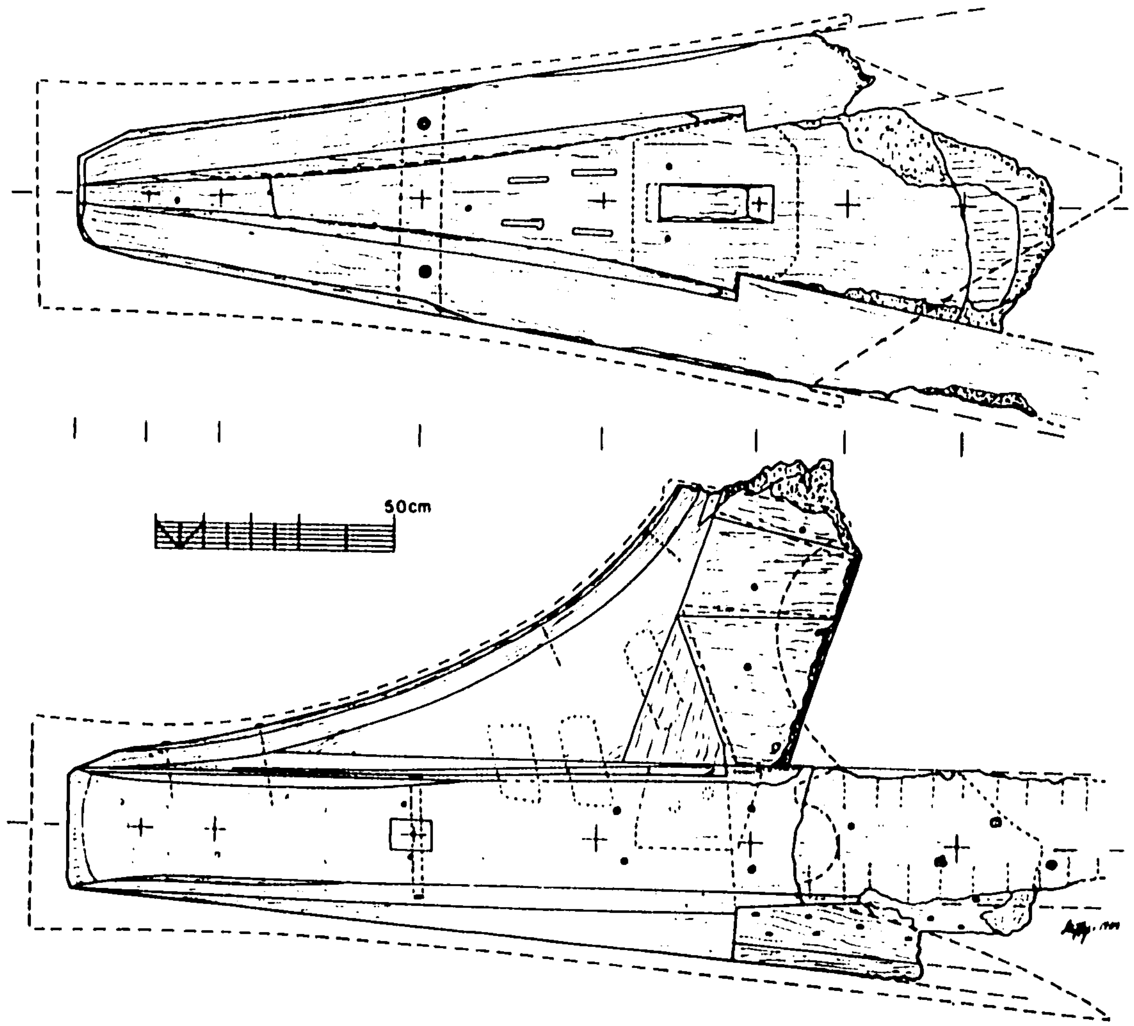

Fig. 8.3. Timbers of the Athlit ram. (From J.R. Steffy, "The Ram and Bow Timbers: A Structural Interpretation," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* [College Station, Texas 1991] fig. 2-15)

Warships were also frequently hauled out of the water, so they needed to be light enough for this practice. Such a vessel probably weighed at least a ton per meter of length, and it is likely this weight was actually greater. This weight is the result of a very strong hull and heavy bottom timbers.[22]

Much of the force on impact was transferred from the hull through the wales to the bronze ram, but the wales were interlocked with the bottom hull timbers. Ramming power comes from the momentum of such a heavy hull. This power is directed and concentrated into the small surface of the ramming face, which is an area less than one-half of a square meter. The rapid deceleration of the hull on impact must have required more bracing for the topside timbers than seen in the timbers that survive.

In a forward direction this ramming structure was strong, but from the side it was vulnerable and could be bent or broken.[23] The vessel this ram was attached to was probably a "five" or maybe a "four."[24]

A small clay model discovered at Mochlos, Crete, is the earliest vessel thought to have a ram. This model dates to between 3100 and 2600 B.C. (fig. 8.4).[25] It clearly has some type of a waterline projection at both extremities. Lionel Cohen states that four basic criteria define a ram. A ram is always placed at the waterline; it projects a substantial distance from the bow of a ship to protect the bow; the bow is of massive construction to withstand the impact of ramming; and the ornament on the prow is bent towards the stern to keep it from being damaged during impact.[26] Cohen argues convincingly that the pointed extremities on the Mochlos model are too short to protect the bow from impact, and the upper section of the bow curves out over the pointed extremity. These upper sections would be damaged if this vessel attempted to ram an enemy. Furthermore, this vessel is too small to hold an adequate number of rowers to drive a ram into another vessel.[27]

Lucian Basch declares that such pointed extremities ensure a good hold on the water and are commonly found on small craft in the Pacific and Central Africa.[28] According to E. B. Worthington, these extensions act as breakwaters that protect the extremities of a vessel from the pounding of rough waves. They also

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[22] Steffy (supra n. 21) 33.

[23] Steffy (supra n. 21), 33, 37–38.

[24] W.M. Murray, "Classification of the Athlit Ship: A Preliminary Report," in L. Casson and J.R. Steffy, eds., *The Athlit Ram* (College Station, Texas 1991) 74.

[25] J.S. Soles, "Molchos: A New Look at Old Excavations: The University Museum's Work on Crete," *Expedition* 20 (1978) 6.

[26] L. Cohen, "Evidence for the Ram in the Minoan Period," *AJA* 42 (1938) 487.

[27] Cohen (supra n. 26) 487, 489.

[28] L. Basch, "Bow and Stern Appendages in the Ancient Mediterranean," *MM* 69 (1983) 396.

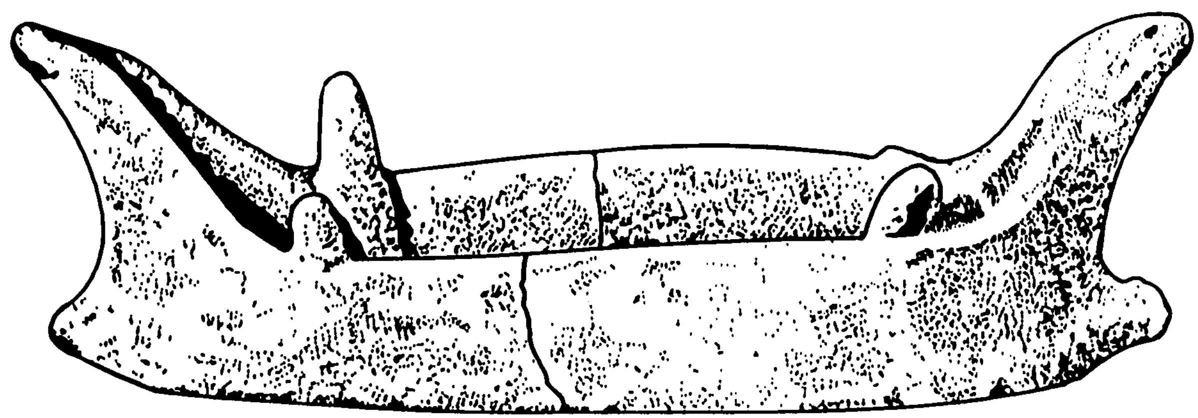

Fig. 8.4. Clay model from Molchos. (After A. Göttlicher, *Materialien für ein Korpus der Schiffsmodelle im Altertum* [Mainz am Rhein 1978] fig. 313)

increase the seaworthiness of small vessels by increasing the length of the boat. This extra length allows paddlers to occupy all the thwarts and at the same time it keeps the load located well aft.[29] Pointed extremities are also characteristic of many types of craft, such as skin boats, dugouts, and even planked boats.[30] Casson claims most of these projections are traditional features without function. He believes they were perpetuated because shipwrights are as conservative as seamen,[31] but he fails to explain why they would stop being functional. In contrast, the fact that shipwrights from northern Europe to the Pacific have built vessels with similar projections suggests that these extensions had practical applications. Basch's and Worthington's explanations for such structures are more practical than Casson's classification of these projections as merely ornamental structures.

Cycladic "frying pan" boats are the second group of vessels thought to have rams; they date to the third millennium B.C. (fig. 8.5). These boats are etched on flat terra-cotta vessels that appear to be roughly shaped like a frying pan. These boats are unique in that one end has a high post surmounted by an emblem, and the other end has a short extension jutting from the hull.[32] A few scholars, such as August Köster and G. S. Kirk, believe the low end is the bow and the extension is a ram.[33] Cohen argues against this interpretation. He points out that on a later vessel the fish emblem is on the bow, and if the high end is the stern, then the emblem is facing in the wrong direction. Finally, a model from this period is broad and rounded at the lower extremity and narrow and highest at the opposite end (fig. 8.6). Cohen argues that, since ancient vessels are built with fine bows and wide sterns, the high end is the bow and the low end the stern. Since the low end is therefore the stern, the projection from the hull cannot be a ram.[34]

Even if Cohen is wrong, which I doubt, and the low end is the bow, this projection cannot be a ram. The height of the projection in relation to the waterline varies considerably on these vessels and, as such, does not appear to be related to its function. The pointed end is not only out of the water on most of these vessels but is usually above the sheer line of the boat (fig. 8.5). If paddlers attempted to use the low end

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[29] E.B.W. Wortington, "Primitive Craft of the Central African Lakes," *MM* 19 (1933) 161.

[30] See, J. Hornell *Water Transport: Origins and Early Evolution* (Newton Abbot, England 1970) 170–171 [skin boats], 190 [dugouts], 202 and 210 [planked boats].

[31] Casson (supra n. 7) 35. See also, Hornell (supra n. 30) 210.

[32] G.F. Bass, "The Earliest Seafarers in the Mediterranean and the Near East," in G.F. Bass, ed. *A History of Seafaring* (New York 1972) 16–17; Casson (supra n. 7) 30–31; S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* (College Station, Texas 1998) 70–73.

[33] A. Köster, *Das antike seewesen* (Berlin 1923) 58; G.S. Kirk, "Ships on Geometric Vases," *BSA* 44 (1949) 125–27. See also, Cohen (supra n. 26) 489, n. 5.

[34] Cohen (supra n. 26) 488–489. See also, Bass (supra n. 32) 17; Casson (supra n. 7) 41–42; Wachsmann (supra n. 32) 73.

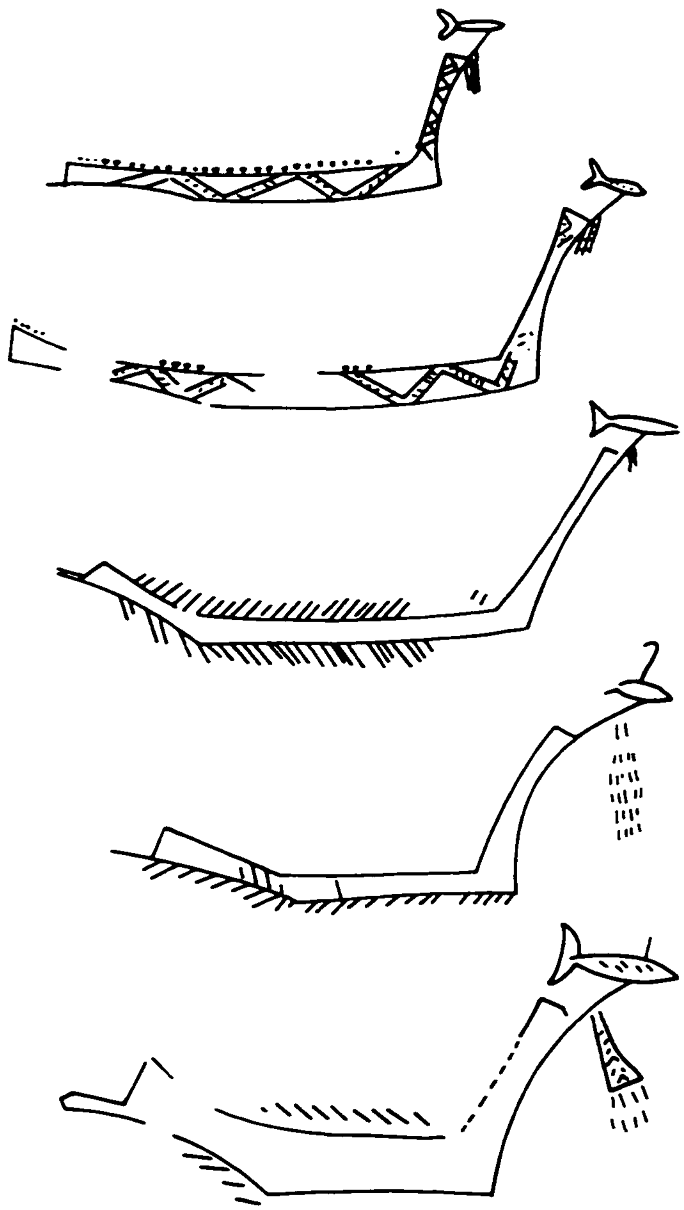

Fig. 8.5. "Frying pan" boats. (After L. Casson, *Ships and Seamanship in the Ancient World* [Baltimore 1995] fig. 22)

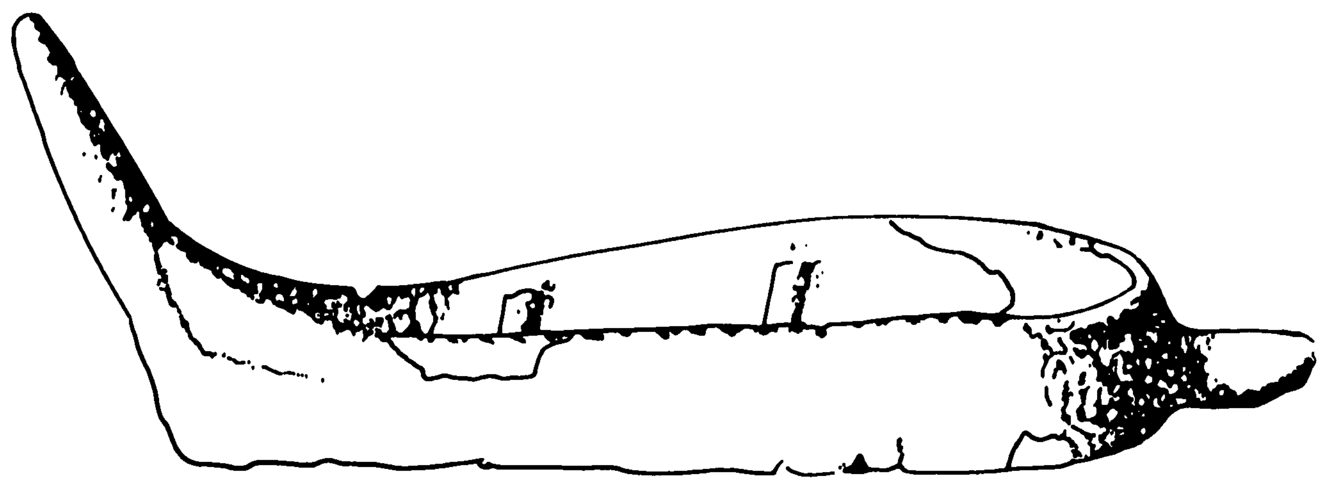

Fig. 8.6. Model of "frying pan" boat. (After L. Casson, *Ships and Seamanship in the Ancient World* [Baltimore 1995] fig. 23)

for ramming, it would be too high to be effective.

Two fragments of pottery dating to approximately 1600 B.C. from Iolkos, Thessaly have been interpreted to depict a ship fitted with a ram (fig. 8.7).[35] Casson points out that the restoration by Demetrios Theochares has been accepted uncritically. This restoration is based on a few fragments of what Theochares believes is a prow but which may not even be part of a boat at all.[36] G. F. Bass points out that the remains of this decoration is similar to a fish motif painted on a contemporary vase in the Archaeological Museum at Nauplion.[37] Even if a seagoing vessel is depicted, we do not have any indication of its size. What we may be seeing is nothing more than a small ceremonial or fishing boat with a cutwater. To accept this protrusion as a ram clearly overstates the evidence.

A unique interpretation of a ship fitted with a ram concerns the Thera wall paintings. These paintings were discovered in the "West House" at Akrotiri and date roughly to the late seventeenth century B.C. A waterborne procession was painted on the southern wall of this building. Some of the ships in this procession have a projecting structure strapped to the stem (fig. 8.8).[38] Avner Raban proposes that this projecting timber is a ram. The fact that this "ram" is attached to the stern poses no problem for him. Raban believes these vessels are double ended; the prow and stern can perform either function.[39] His argument fails on a number of points. First, these vessels do not appear to be double ended. The bow appears to be finer and more elongated than the stern, and the hull appears to be rather spoon-shaped.[40] Vessels with such a shape would be slower and more difficult to steer from the bow than the stern. This is important because handling and speed are two important characteristics of ramming maneuvers.

Second, this ram is too high to be effective. Raban disagrees and argues that these vessels are of such shallow draft that a higher ram is required.[41] Yet, Raban contradicts himself by stating that the Thera

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[35] D. Theochares "Tolkos, Whence Sailed the Argonauts," *Archaeology* 11 (1958) 13–18; W. Taylour, *The Mycenaeans* (London 1983) 152–153; Morrison and Williams (supra n. 13) 7 and pl. 1a.

[36] Casson (supra n. 7) 42, note 4.

[37] Bass (supra n. 32) 20. See also, Wachsmann (supra n. 32) 80.

[38] L. Morgan, *The Miniature Wall Paintings of Thera* (New York 1988) 121–165; Wachsmann (supra n. 32) 86–99.

[39] A. Raban, "The Thera Ships: Another Interpretation," *AJA* 88 (1984) 16–18.

[40] L. Casson, "Bronze Age Ships: The Evidence of the Thera Wall Painting," *IJNA* 4 (1975) 4; Basch (supra n. 28) 401; Raban (supra n. 39) 16.

[41] Raban (supra n. 39) 17–18.

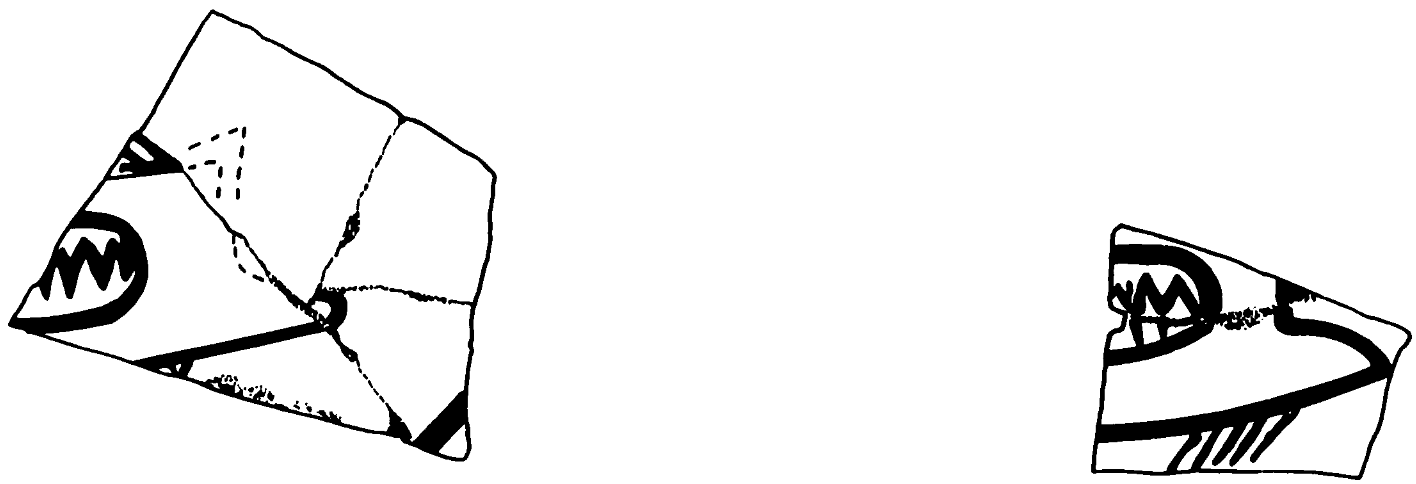

Fig. 8.7. Iolkos painting. (After D. Theochares, "Iolkos, Whence Sailed the Argonauts," *Archaeology* 11 [1958] 15)

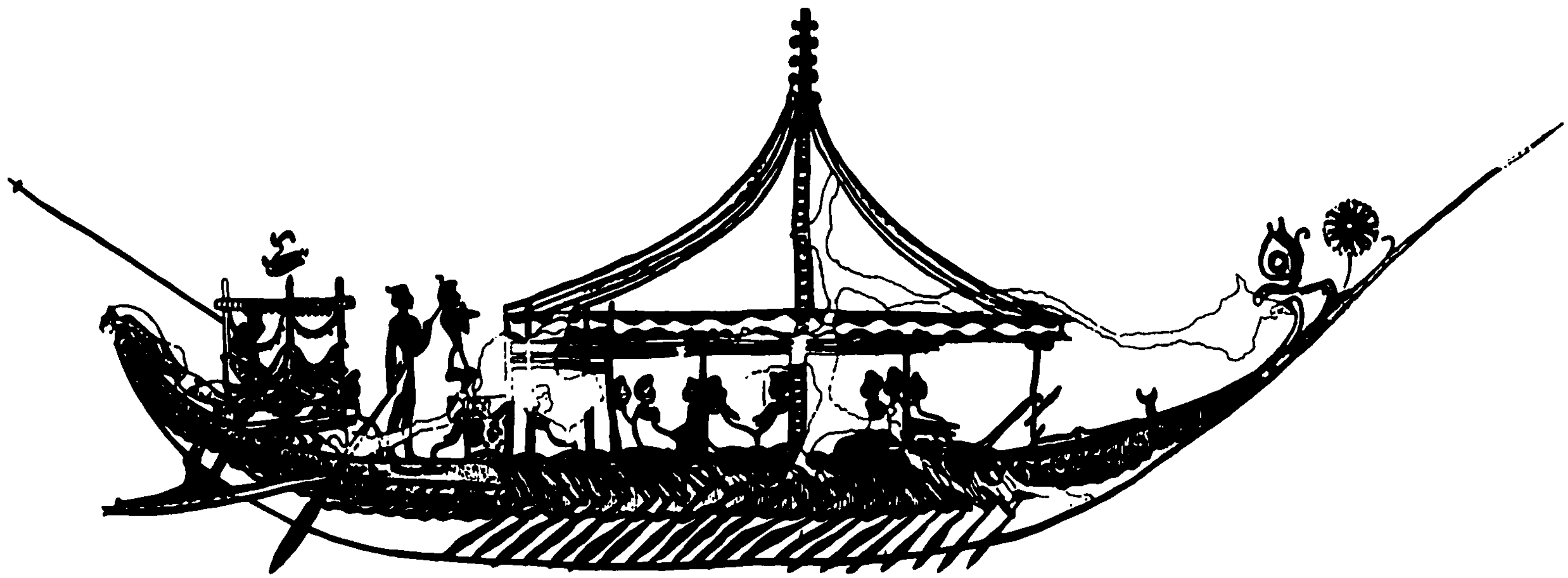

Fig. 8.8. Thera vessel. (After S. Marinatos, *Excavations at Thera* VI [Athens 1974] color pl. 9)

ships "were quite large and heavy, with considerable draught."[42] Third, this projection does not extend far enough from the hull. If any attempt was made to ram using this device, the result would be considerable damage to the curving hull above it.

Finally, the few straps that hold this device in place are not strong enough to withstand the impact of a ramming attempt. This projection would be sheared off with little damage to the opposing ship. Raban disagrees, supporting his argument by pointing out that the Marsala ship had a detachable ram. These straps should therefore be strong enough to support a ram.[43] The fatal flaw with his argument is that the Marsala ship did not have a ram.

The Marsala ship is thought to have sunk off the western tip of Sicily in the third century B.C.[44] There are at least two obvious reasons why this ship was a merchant galley instead of a warship. The most obvious reason is that this vessel was sheathed with lead;[45] only merchant ships are known to have had such sheathing in ancient times.[46] Ancient warships were constantly dragged out of the water to dry out the hull and reduce weight, which makes a ship faster and more maneuverable.[47] Considering that lead sheathing is so soft and thin (ca. 2 mm), dragging a ship out of the water would quickly destroy any lead sheathing on a hull. In addition, the type of "ram" at the bow makes it unlikely that this vessel was a warship. A "ram" was not found attached to this vessel but on a ship of similar construction 70 meters away.[48] The "ram" consists of two pieces of pine nailed on each side of the keel (fig. 8.9). A third piece of wood was placed between the two pieces of pine and fitted into a mortise near the base of the stem (fig. 8.9). This center piece was secured with nails driven through both of the outer pieces. This assemblage was covered in fabric, smeared with resin, and finally sheathed with sheets of bronze that were tacked into place.

Frost proposes that these three curved pieces were reinforced with timbers that ran from the stem to the two pieces of pine (fig. 8.10).[49] Yet, she fails to cite any evidence for reinforcing timbers. She proposes

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[42] Raban (supra n. 39) 17.

[43] Raban (supra n. 39) 18, n. 30.

[44] H. Frost, *Lilybaeum* (Rome 1981) 13, 275.

[45] Frost (supra n. 44) 262.

[46] L. Casson, "Greek and Roman Shipbuilding: New Findings," *American Neptune* 45 (1985) 17.

[47] Steffy (supra n. 21), 33.

[48] Frost (supra n. 44) 264–67.

[49] Frost (supra n. 44) 128, 267–70.

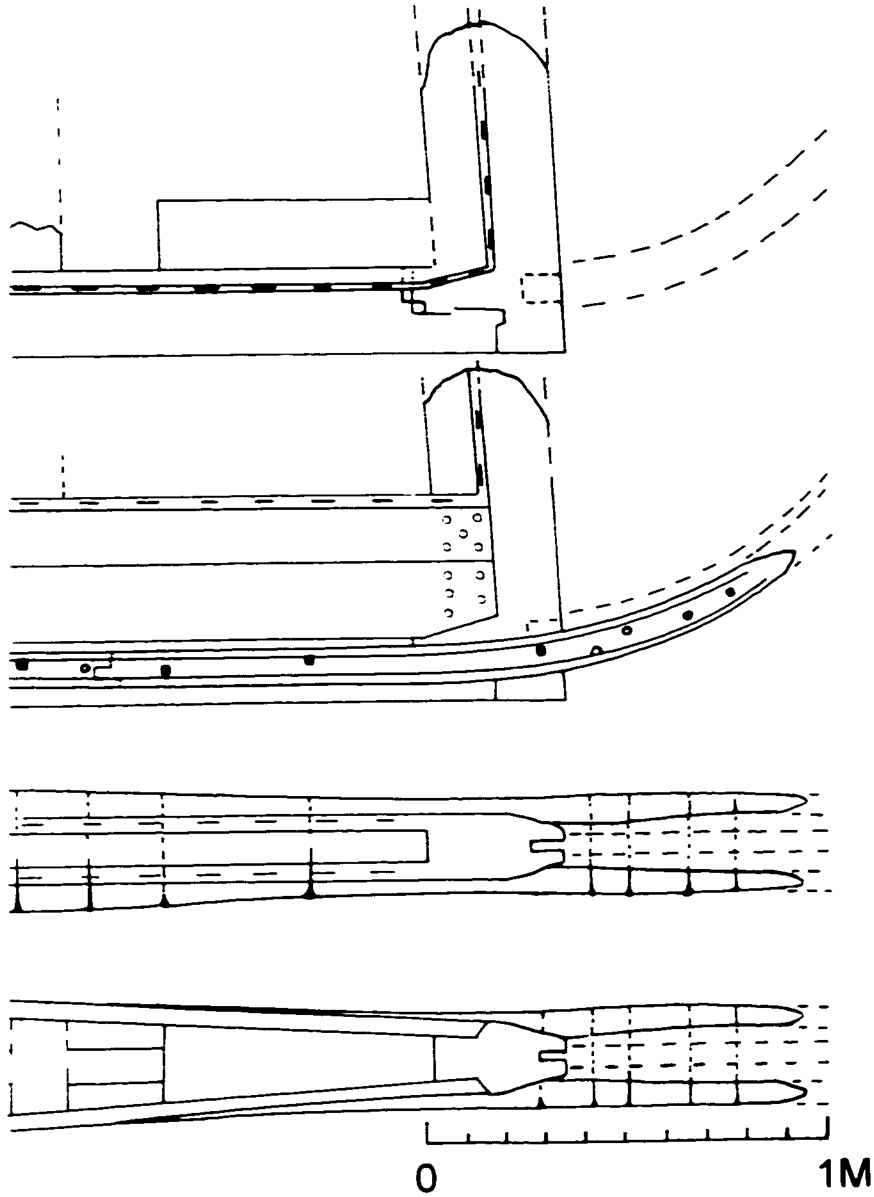

Fig. 8.9. Marsala "ram." (After H. Frost, "The Ram from Marsala," *IJNA* 4 [1975] fig. 35)

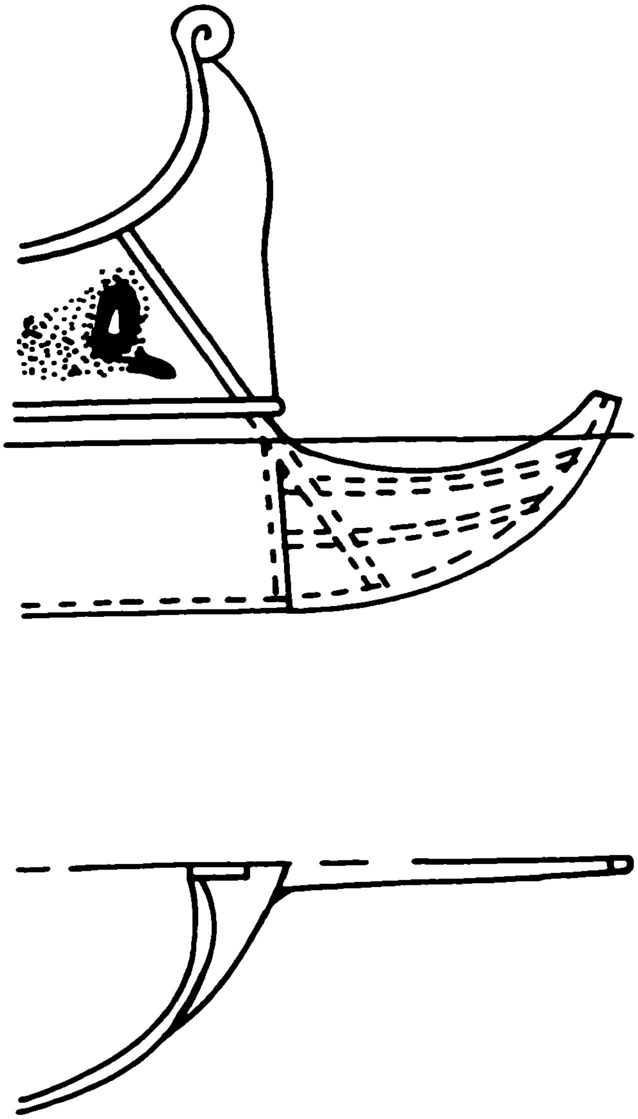

Fig. 8.10. Proposed reconstruction of the Marsala "ram." (After H. Frost, *Lilybaeum* [Rome 1981] 272)

that this "ram" was designed to penetrate the hull of an enemy ship and then break off on impact.[50] Yet, Frost fails to provide any data to show that such a light structure is strong enough to penetrate hull planking. A ram that is designed to pierce an enemy's hull must be able to withstand great shear stress to be effective. It must absorb the forward momentum of its victim on impact. This transverse force can be considerable if an enemy ship is traveling at a high rate of speed, which is understandable considering that it is attempting to escape a death blow from an attacking ship. As a pointed ram penetrates the planking it must be strong enough to either absorb this forward momentum, which means the wounded vessel must stop almost immediately, or the ram must be strong enough for the tip to cut sideways through the planking until the enemy ship comes to rest. The only other option is for the ram to be sheared off. For a 50-ton ship, this force can be upwards of 40 tons.[51] As previously mentioned, a ram is most vulnerable from such a shear stress. Like a spear it can be most easily broken from the side.[52]

The Athlit ram deals with this structural problem by having a flat ramming face that allows the attacking ship to strike a vessel and then the victims forward momentum will push the attacking ship away, most of the time. If the attacking ship does get stuck, the results could be disastrous. Such a situation is best illustrated by Polybius. In 201 B.C., Philip V of Macedonia was at war with Attalus of Pergamum, and their two fleets met off the island of Chios. One "five" commanded by Autolycus attacked an enemy ship and left his ram in it. The ship that had been struck sank with all hands, as did Autolycus's ship because the ram and much of the bow was sheared from the hull on impact.[53] Autolycus's ship may have been very similar to the Athlit vessel. Both vessels may have been "fives" and both sailed the seas at about the same time.

The Marsala "ram" must therefore be strong enough to absorb the forward momentum of an enemy ship until successfully piercing an enemy's hull. But if such a heavy structure like the Athlit ram can be broken off so easily from the side, how is such a light structure as that on the Marsala ship going to be able to resist the similar forces long enough to penetrate a hull before it detaches? This structure is clearly unable to do so.

Finally, as J. Richard Steffy points out, the force of an impact is produced from the weight and velocity of a hull. The weight and velocity are channeled and concentrated in the ram. The resulting shock of a collision must then be returned and diffused throughout the hull. This force is transferred via the ram to

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[50] Frost (supra n. 44) 269; L. Basch, "When is a Ram not a Ram?" *MM* 69 (1983) 137.

[51] J.S. Morrison and J.F. Coates, *The Athenian Trireme* (New York 1986) 222.

[52] Steffy (supra n. 21): 38.

[53] Polybius, *The Histories* 16.5.2.

the wales and into the hull because the wales are integrated with the bottom of the hull.[54] This shock is in large part due to the almost instantaneous deceleration of the attacking ship. In other words, the ram of the attacking ship must absorb and distribute throughout the hull the force of its own forward momentum. In contrast, a ram that detaches will not absorb any of its own forward momentum. According to the published drawings of the Marsala "ram," it extends 1.4 meters forward of the stem (fig. 8.9). If a ship with such a projection is traveling at 4 knots (2m/sec), by the time the point of the ram reaches the bottom planking of an opposing ship, the stem is less than a meter and a half from the hull of its victim or less than one and a half seconds from impact. A heavy vessel with such forward momentum could not stop quickly enough to avoid a collision; the stem must then absorb the shock of this collision.

Considering that the stem of the Marsala ship is only secured by thin hull planking, a Jupiter scarf joining stem to keel, and possibly a small chock at this juncture, the bow would be crushed on impact with any other ship. This vessel is obviously not structurally strong enough to support a ram of any type. It is more likely that the Marsala ship is some type of a merchant galley as Casson proposes.

Such a lightly built projection whether on the Marsala ship or a Thera ship cannot be a ram. It is obvious, therefore, that the various points Raban proposes to support his theory of a Thera ram have no basis, and the projection depicted at the stern of some Thera vessels cannot be a ram.

Over four hundred years after the Thera fresco was painted, a naval battle took place between the Hittites and Alašiya (ca. 1180 B.C.). This battle was commemorated on a tablet by the Hittites which states "I mobilized and I, Shuppiluliuma II, the Great King immediately [crossed/reached] the sea. The ships of Alašiya met me in the sea three times for battle, and I smote them; and I seized the ships and set fire to them in the sea."[55]

In sea battles where ramming is the primary tactic, ships are usually rammed and sunk. The fact that the Hittites seized ships and then set them on fire suggests that boarding tactics, instead of ramming, were still being used.

The Medinet Habu relief is the earliest known depiction of a naval battle (ca. 1190 B.C.).[56] This mural portrays Egyptian vessels that are easily recognizable by a figure-head of a lion with a human head in its mouth. They are fighting the Sea Peoples, whose vessels are decorated with bird heads at each extremity (fig. 8.11). According to Eric Marx, this representation is important because it depicts the introduction of

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[54] Steffy (supra n. 21), 38.

[55] H.G. Güterbock, "The Hittite Conquest of Cyprus Reconsidered," *JNES* 26 (1967) 78.

[56] The Gebel el Arak knife, which dates to about 3200 B.C., is carved with a relief depicting ships and warfare. The vessels are a central theme of the relief, but no fighting is depicted between them. Combat may, therefore, have taken place after troops were landed.

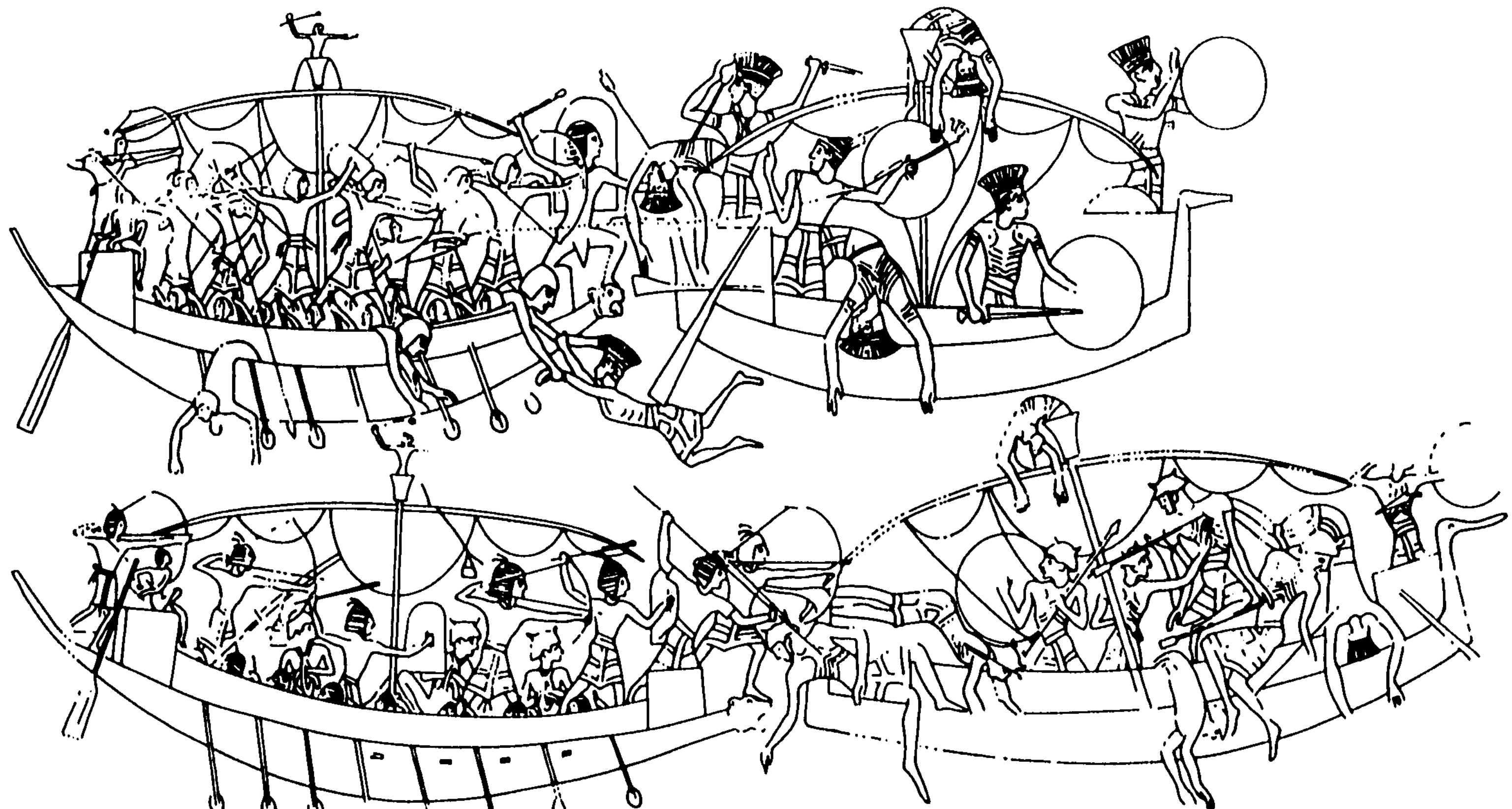

Fig. 8.11. Section of the Medinet Habu Relief. (After H. Nelson, *Earlier Historical Records of Ramses III* [Chicago 1930] pl. 39)

the ram, which was used with "deadly effect" at this battle.[57]

Marx bases his interpretation on the fact that Egyptian ships were built with a number of small components, comparatively short planks, and no keel or frames to form and maintain the shape of a hull. Hull planks were edge joined with mortise-and-tenon joints and secured with lashings. The strength of such hulls is similar in theory to an arch except that instead of a weight above to hold it in place there is the pressure of the water below. Marx believes that this arch consists of a continuous curve from bow to stern that is broadest and deepest in the middle and then tapers off at each end. A longitudinal timber that joins the bow and stern of the hull is the base of this arch and binds the structure into a firm unit.[58] He continues by proposing that in such a vessel all the stresses will run along the surface of the hull, and it will be a great deal stronger longitudinally than transversely. Such a hull would withstand considerable force on impact at the ends but would be much more likely to come apart if hit amidships. The "ram" consists of a horizontal timber with a carved lion head at the end. Curiously, Marx admits that this ram is too high for maximum damage.[59] It is far above the water-line and in general would not pierce the hull of a ship, but would smash through the side-screens protecting the rowers. According to Marx, if the hull of the ramming ship was in the right position, it would ride up on the deck of the enemy and smash his hull. More often, such an impact would push the nearer side under water and either crush or capsize an enemy.[60]

C. E. Gibson responds by pointing out that Egyptian ships fail to meet all four criteria necessary for a ram as proposed by Cohen. Paradoxically, he also proposes that ramming tactics were used by the Egyptians in this battle. He argues that the lion's head acted as a boarding ram.[61]

There are three main flaws in Marx's theory. First, if the Egyptians could propel their ships up on enemy vessels and then capsize them, the ram has no real function. The weight of a ship will easily break through side-screens without the aid of a ram. Second, it appears unlikely that, even with their curved bows, the Egyptian ships could attain speeds high enough to propel themselves up on an enemy ship. Even if it could be done, a vessel with a rounded hull in such a position would be just as likely to capsize as cause the enemy to do so. Finally, the most glaring error is that Marx's theory, as does Gibson's, ignores the written and iconographic evidence. The inscription that accompanies this relief states that "As

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[57] E. Marx, "The First Recorded Sea Battle," *MM* 32 (1946) 242.

[58] Marx (supra n. 57) 244.

[59] Marx (supra n. 57) 245.

[60] Marx (supra n. 57) 249.

[61] C.E. Gibson "The Origin of the Ram," *MM* 32 (1947) 165–168.

for those [Sea Peoples] who came together on the sea the full flame was in front of them at the river mouth, while a stockade of lances surrounded them on the shore. They were grappled, capsized, and laid out dead ashore."[62]

The relief illustrates the inscription. The ships of the Sea Peoples are shown without oars and with sails furled. In contrast, the Egyptian ships portray men at the oars, and they have surrounded their enemy (fig. 8.11). The Egyptians appear to be using primarily arrows from both land and sea to decimate their foes; they also use lances and maces for hand-to-hand fighting. Finally, grappling hooks are thrown to ensnare and capsize an opposing vessel. A naval engagement was therefore still a version of a land fight. Ships were positioned so warriors could fight it out with swords, maces, lances, or bows and arrows.[63]

One of the more unusual interpretations for the introduction of the ram concerns this relief. Yigael Yadin argues that the duck bills on the Sea Peoples' vessels serve as battering instruments.[64] Yet, these bills are too short and too high to hit any part of an opposing ship.

Representations of ships with waterline projections are rather common before 1000 B.C. Cohen argues convincingly that most waterline projections earlier than 1000 B.C. are too small to be effective rams.[65] But two different representations of ships from this period are thought to have bow projections large enough to be rams. The first is a painting on a stirrup-jar from Asine (1200-1000 B.C.)(fig. 8.12). Kirk claims that the long thick line projecting from the hull is a ram.[66] Bass proposes that it is a quarter rudder.[67] R. T. Williams is unsure; he points out that the shape of the projection is more like a quarter rudder than a ram but is unlikely to be a quarter rudder because it appears to be an extension of the keel. After considering all the details, he believes this projection is most consistent with a ram. In addition, he states that the checkered rectangle is a sail and the line at the lower left is a mast.[68] Kirk also believes the checkered rectangle is a sail, and the thick line at the lower left corner of the sail is either a support for the deck or is the mast.

Shelley Wachsmann maintains that the projection is a quarter rudder. He points out that quarter rudders

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[62] N.K. Sanders, *The Sea Peoples* (London 1985) 120.

[63] Casson (supra n. 7) 38; Wachsmann (supra n. 32) 317–19.

[64] Y. Yadin, *The Art of Warfare in Biblical Lands in the Light of Archaeological Discovery* (London 1963) 341; T. Dothan, *The Philistines and their Material Culture* (New Haven 1982) 11.

[65] Cohen (supra n. 26) 489–93.

[66] Kirk (supra n. 33) 1949: 117–18

[67] Bass (supra n. 32) 22.

[68] Morrison and Williams (supra n. 13) 10, BA 3.

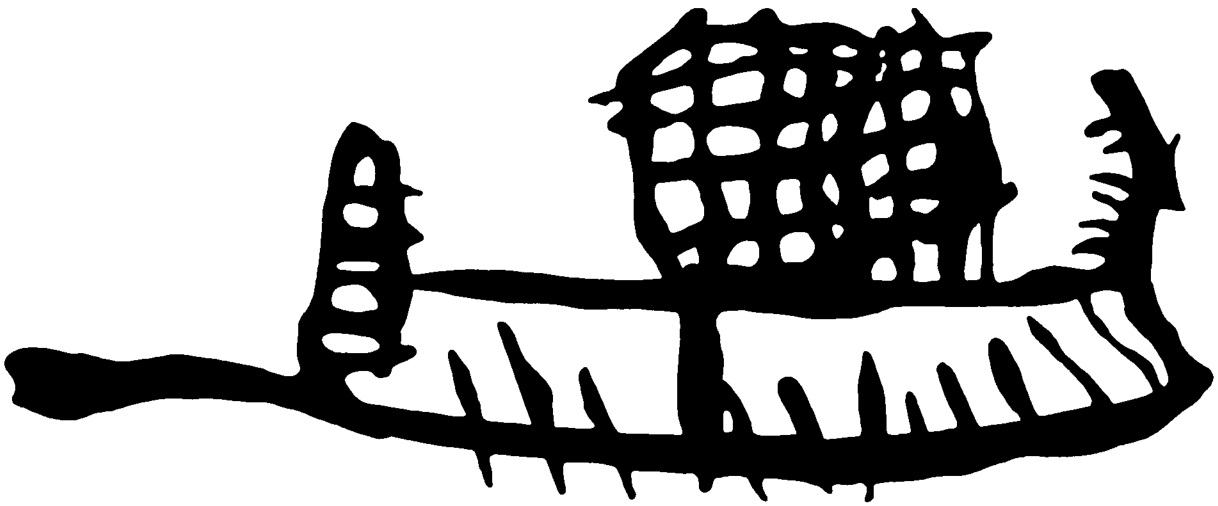

Fig. 8.12. Ship painting on a vase from Asine. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 1c)

are depicted in a horizontal position on other paintings, and the placement of the mast and sail appears to represent a billowing sail.[69] Wachsmann's interpretation of a billowing sail does have a close parallel with a ship painting on a contemporary pyxis from Tragana Pylos (fig. 8.13). Little doubt, therefore, exists that the bow is to the right and the stern to the left. This means the projection cannot be a ram. But William's observation has some merit in that a quarter rudder, even one that is hung out, should not be located this low on the hull. Another possibility is that the artist was attempting to illustrate a ship under sail. To illustrate the speed of the ship, the artist added the thick black line to represent a following wake. Regardless of whether this is a quarter rudder or the wake of a ship, it is not a ram.

The second depiction of a vessel with a large ram-like projection comes from Kition in Cyprus. Nineteen ship graffiti were discovered on the southern wall of Temple 1. These graffiti are roughly contemporary with the previous two depictions (ca. 1200-1100 B.C.). According to Lucien Basch and Michel Artzy, one graffito, #13, represents a ship with a crude ram (fig. 8.14). Yet, they concede that there are no parallels for this type of ram at this time.[70] Graffito #13 is also badly weathered making multiple interpretations possible.[71] Furthermore, we have no way of judging the size of this vessel. It may be either a small fishing vessel or a large warship. If this is a large ship, the authors still fail to explain why this projection is a ram and not a cutwater. It is also possible that the high end is the stern, and the projection is a quarter rudder. There are too many variables to confidently state that this is a ram.

According to Casson, the ram probably made its debut during the transition from the Bronze to the Iron Age, sometime after 1000 B.C. He believes that its introduction had a revolutionary impact because a warship was no longer merely a particularly fast transport to ferry troops or bring marines into fighting proximity with those on enemy ships. Instead, it was "a man-driven torpedo armed with a pointed cutwater for puncturing an enemy hull."[72]

The closest depictions after this date are on a Cretan krater found at Fortetsa. It is decorated with two ships and dates from about 950 to 900 B.C. (fig. 8.15). Kirk, Basch, and Casson all believe the protrusions on the left end of each vessel are the blades of quarter rudders.[73] In contrast, Williams argues that the ends with the protrusions are drawn squarer and thicker than the opposite end. He proposes that

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[69] Wachsmann (supra n. 32) 140.

[70] L. Basch and M. Artzy, "Ship Graffiti at Kition," in V. Karageorghis and M. Demas, eds. *Excavations at Kition* V (Cyprus 1985) 325–27.

[71] Wachsmann (supra n. 32) 147.

[72] Casson (supra n. 7) 49.

[73] Kirk (supra n. 33) 118–19; Basch *Le musée imaginaire de la marine antique* (Athens 1987) 159; Casson (supra n. 7) 67.

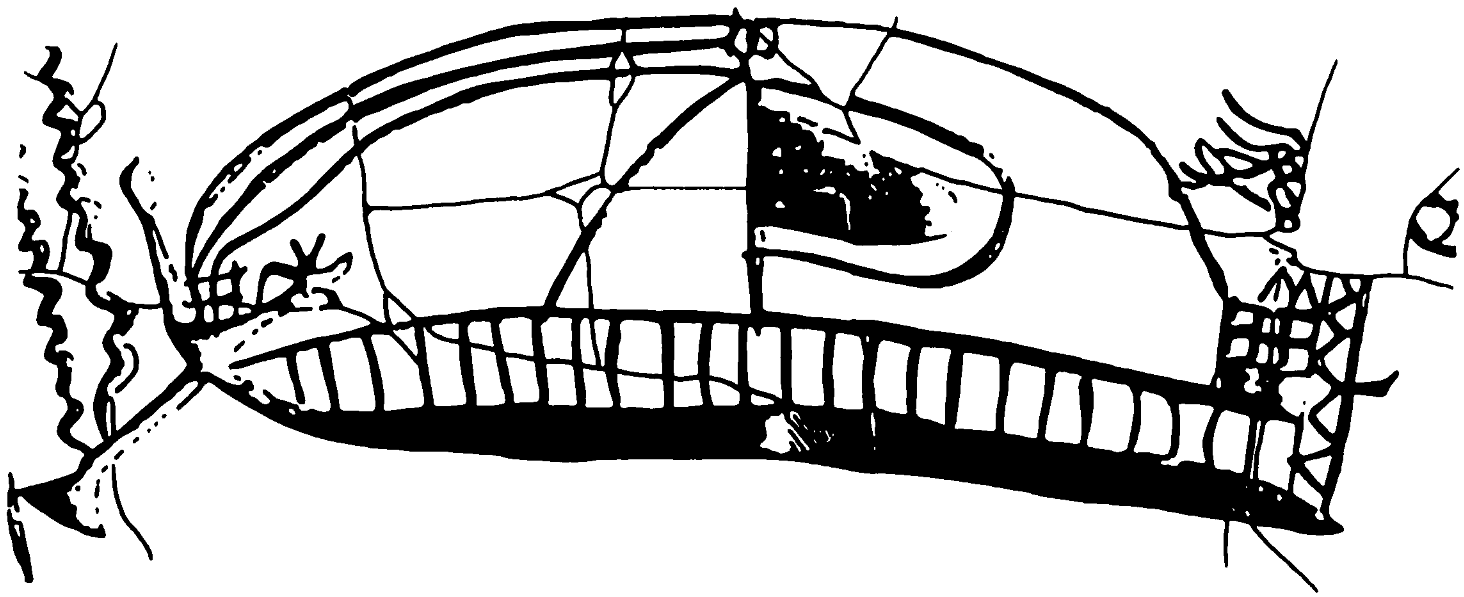

Fig. 8.13. Ship painting on a pyxis from Tragana, Pylos. (After G. Korrés, "Representation of a Late Mycenaean Ship on the Pyxis from Tragana, Pylos," *Tropis* I [1989] 200)

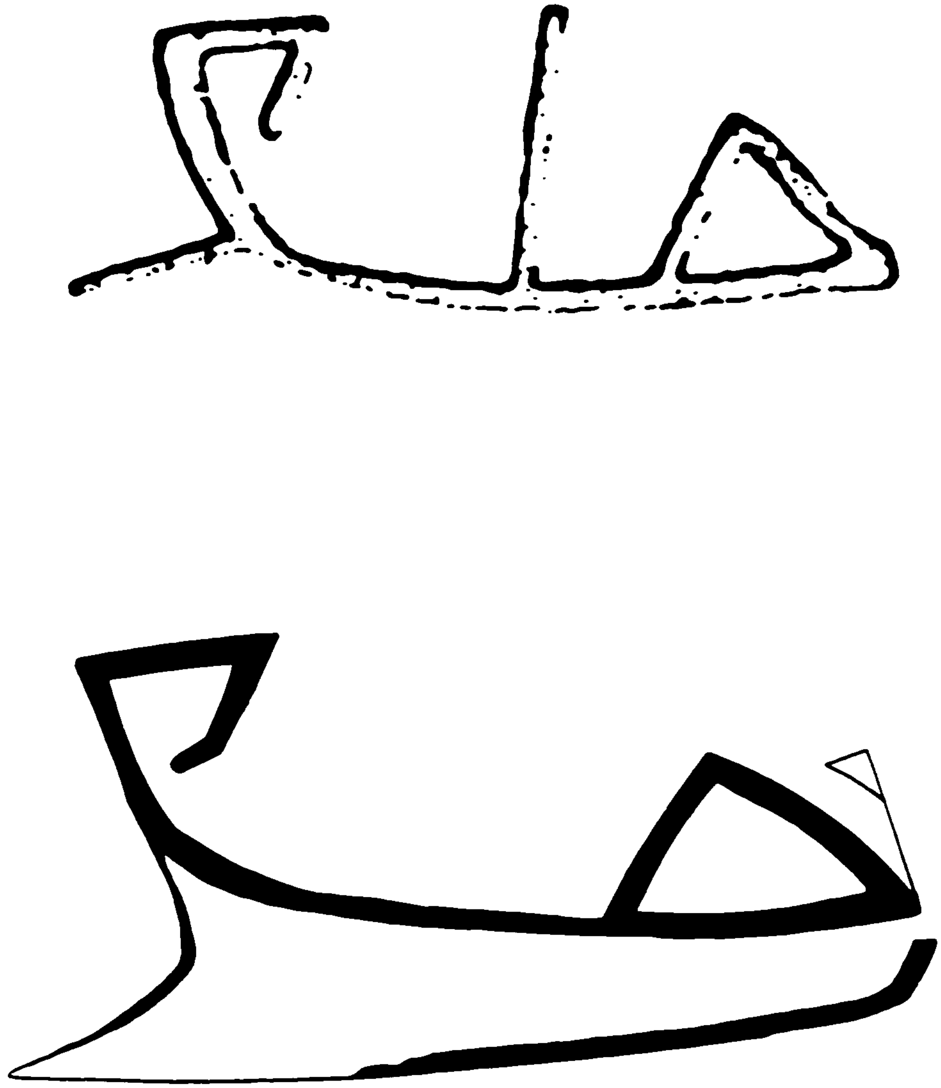

Fig. 8.14. Graffito #13 from Temple 1 at Kition [above] and its proposed reconstruction. (After Basch, L. and M. Artzy, "Ship Graffiti at Kition," *Excavations at Kition* V: *The Pre-Phoenician Levels, Areas I and II*, Part 1 [Nicosia 1985] figs. 8b, 8c)

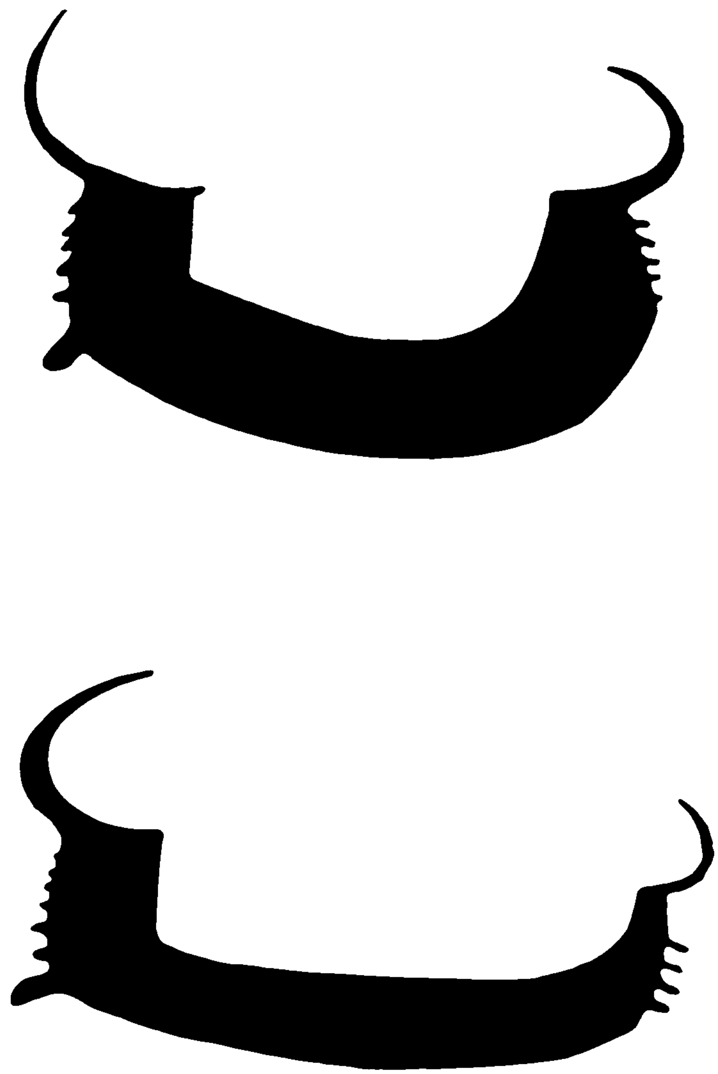

Fig. 8.15. Ship paintings on a krater from Fortetsa, Crete. (After F.H. van Doorninck, "Protogeometric Longships and the Introduction of the Ram," *IJNA* 11 [1982] fig. 6a)

these square, thick sections are high solid side screens that are characteristic of bows instead of sterns. He also argues that there is a parallel for a downward pointing ram on the Aristonothos krater (fig. 8.16).[74] There are a number of flaws in his argument. Even Williams concedes that both ends are so similar that it is difficult to distinguish the bow from the stern. In addition, he concedes that the shape and angle of each protrusion is similar to that of a blade of a quarter rudder.[75] His parallel with the "ram" painted on the Aristonothos krater is not a close one because the "ram" on this vessel is too high above the waterline to be effective.[76] Even if Williams is correct and the Aristonothos ship has a ram, it is still much higher on the hull and must have had a different function than the protrusions on the Fortetsa vessels. Finally, his main objection to this protrusion being a quarter rudder is the lack of a loom. He maintains that Geometric painters always show rudder blades with looms.[77] Williams's position is weak because he is arguing that these lines cannot be quarter rudders because of a lack of parallels, but, at the same time, he is arguing that these lines are rams for which we also lack parallels during this period. Furthermore, we do have at least one parallel for a similar protrusion at the stern of a Geometric ship. The quarter rudder in figure 8.17 lacks a loom. It cannot be a gangplank because the sail is unfurled indicating the ship is sailing and not at anchor. Finally, Gray looks at the Fortetsa silhouettes and claims that the hull shapes are indicative of ships that depend on sails and are not warships.[78]

Frederick van Doorninck supports William's interpretation by pointing out some similarities between these silhouette paintings and a terra-cotta model from Oropos, Attica (fig. 8.18) Yet, there is little resemblance between the shape and angle of each protrusion. Even if van Doorninck is correct, he refers to the protrusions on each Fortetsa vessel as a forefoot, not a ram.[79] Considering the shape and inclination of this protrusion and that the closest parallels are at the sterns of Geometric ships, these protrusions must be quarter rudders. Yet, even if the end with the protrusion is the bow, the inclination and small size indicates a forefoot or cutwater, but no evidence exists to suggest it is a ram.

Casson continues by arguing that the development of this new weapon during the Geometric period resulted in far-reaching changes in ship design and construction. Ships with rams were built more

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[74] Morrison and Williams (supra n. 13) 12.

[75] Morrison and Williams (supra n. 13) 12.

[76] Casson (supra n. 7) 67.

[77] Morrison and Williams (supra n. 13) 12.

[78] Gray (supra n. 11) 57.

[79] F.H. van Doorninck, "Protogeometric Longships and the Introduction of the Ram," *IJNA* 11 (1982) 282.

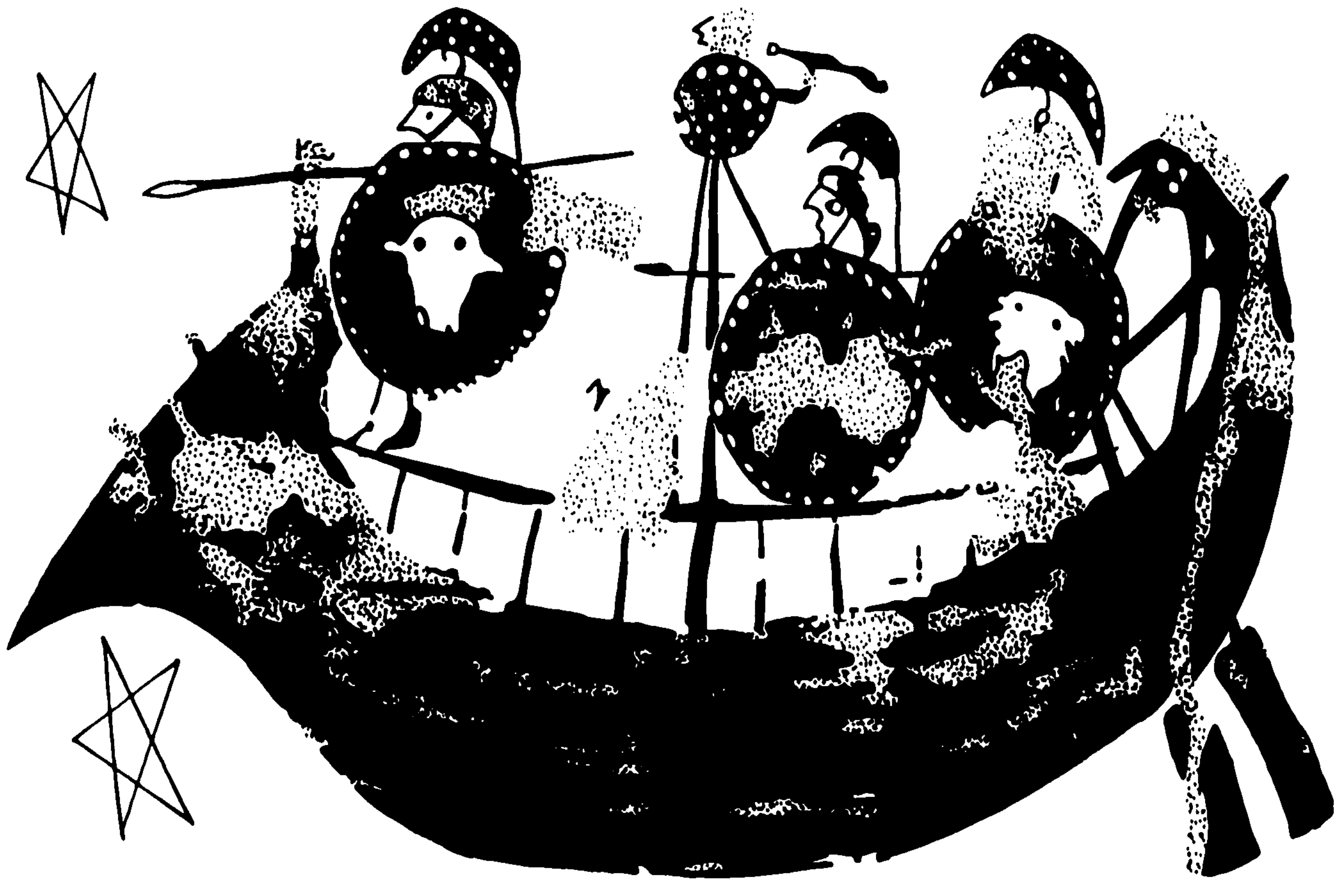

Fig. 8.16. Ship painting on the Aristonothos krater. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 9b)

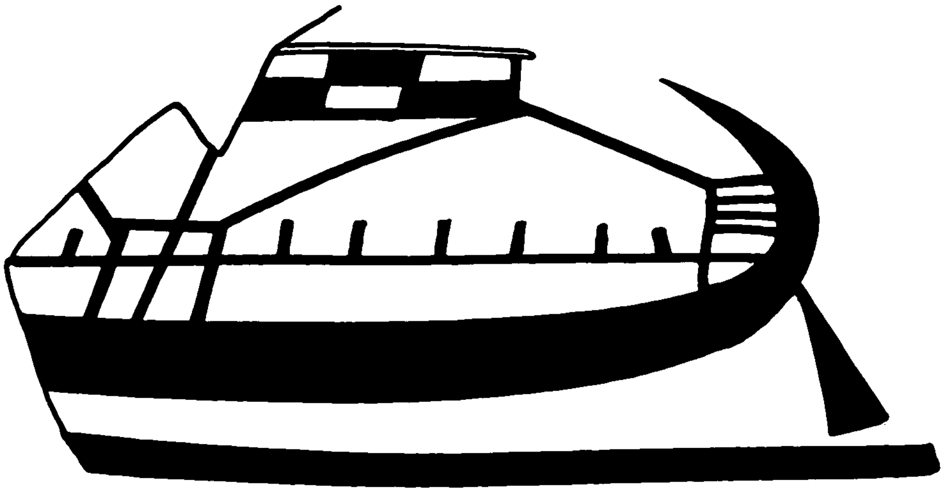

Fig. 8.17. Geometric ship with quarter rudder. (After D. Gray, *Seewesen* [Göttingen 1974] abb. 19)

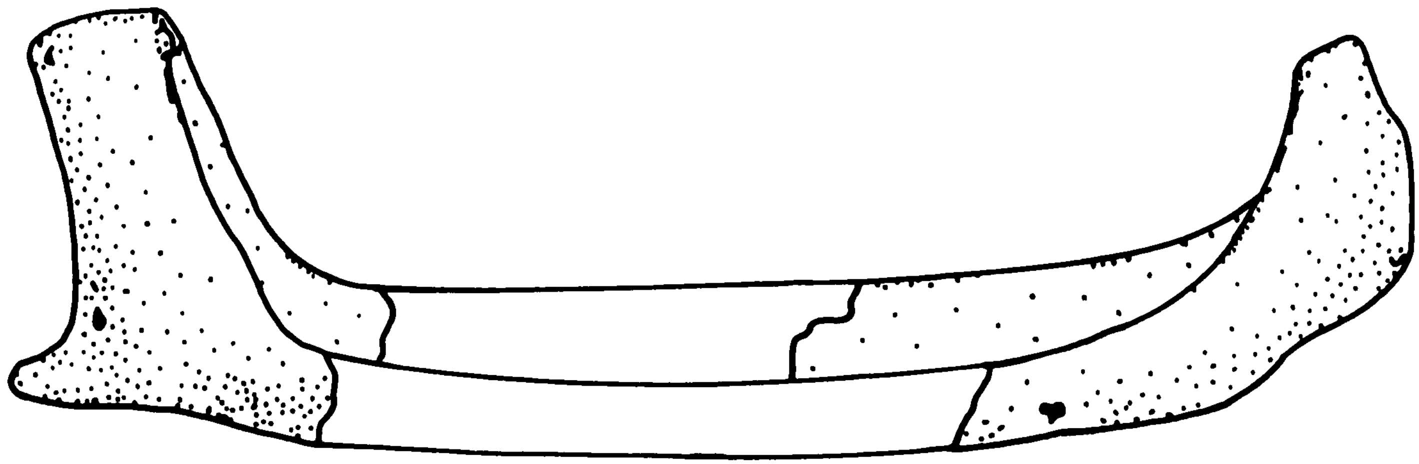

Fig. 8.18. Terra-cotta model from Oropos, Attica. (After F.H. van Doorninck, "Protogeometric Longships and the Introduction of the Ram," *IJNA* 11 [1982] fig. 6b)

powerfully and with heavier materials to withstand the shock of ramming; the bow area had to be as massive as possible to absorb this impact. He believes the changes are visible even in the simple profile drawings on Geometric pottery (ca. 850-700 B.C.), which are painted in silhouette.[80] The Bronze Age artist renders the bow area of ships without rams as open or with a latticed design. In contrast, the Geometric artist renders it as a solid, heavy mass.[81]

Casson is supported by van Doorninck, who proposes that the earliest representation of a ship bearing a ram is etched on the catchplate of a bronze fibula from the Kerameikos cemetery in Athens (fig. 8.19). This fibula is firmly dated to about 850 B.C. based on the pottery recovered with it.[82] Van Doorninck claims that the use of the ram must precede the making of this fibula, and the ram was probably introduced at about 900 B.C. He does concede that the shape of the forefoot alone is not in itself evidence that it is a ram, and he also concedes that there is an absence of supporting evidence for the ram and ramming techniques during the Geometric period. Scenes of ships and fighting are common on Geometric pottery, but the Geometric artist painted mainly warfare scenes with beached ships.[83] Of all scenes depicting ships and combat that survive from this period, only three fragments may depict naval warfare.[84] The two smallest fragments are so small that it is difficult, if not impossible, to discern what is painted on them. The third fragment portrays the forefoot of one vessel painted very close to the stern of another vessel with two bodies beneath both ships (fig. 8.20). A hand and arm of an individual is painted above the forefoot. The hand touches the bow of the ship as if to steady the warrior. Originally, there must have been an individual standing on the forefoot. We do have a close parallel for this depiction. On the forefoot of a Geometric ship stands a warrior carrying a large shield; in one hand he grasps a spear and in the other possibly the strap to the shield (fig. 8.21). It is possible that the forefoot was used as a boarding ramp, and this individual is either attempting to board an enemy ship or is attacking from his beached ship. There is no evidence of any ship attempting to ram another ship on any known Geometric pottery.

Van Doorninck concedes that his interpretation is based solely on the observation that such a structure

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[80] There is some disagreement of the dating of this pottery. See, van Doorninck (supra n. 79) 283.

[81] Casson (supra n. 7) 49–50.

[82] van Doorninck (supra n. 79) 283–85.

[83] Casson (supra n. 7) 50.

[84] Morrison and Williams (supra n. 13) 19–20; G. Ahlberg, *Fighting on Land and Sea in Greek Geometric Art* (Stockholm 1971) 25–27, 58.

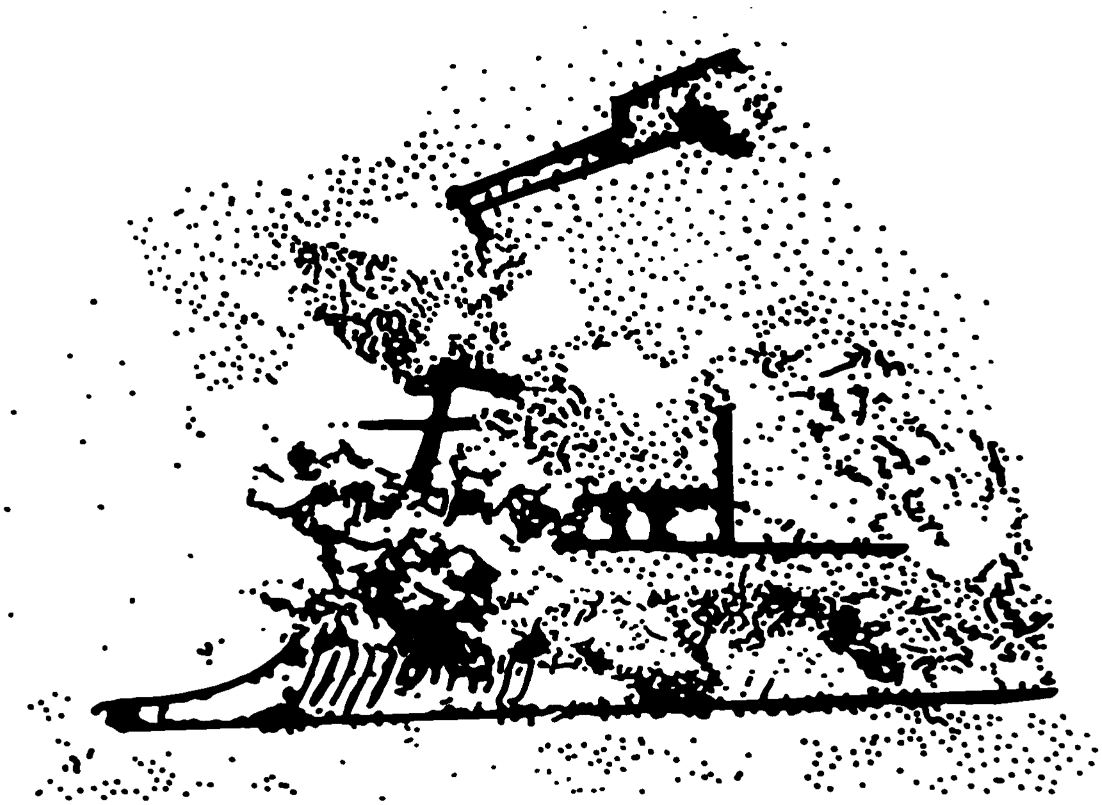

Fig. 8.19. Ship engraved on a catchplate of a fibula from Kerameikos, Athens. (After F.H. van Doorninck, "Protogeometric Longships and the Introduction of the Ram," *IJNA* 11 [1982] fig. 7)

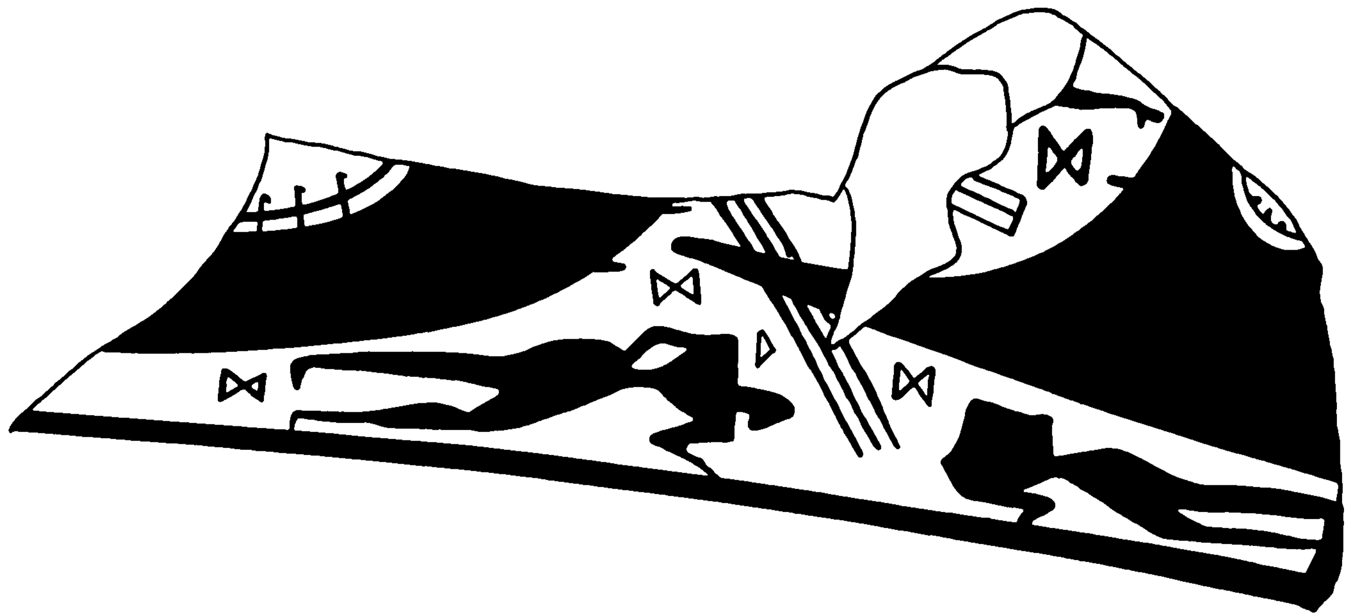

Fig. 8.20. Proposed ramming scene. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 2b)

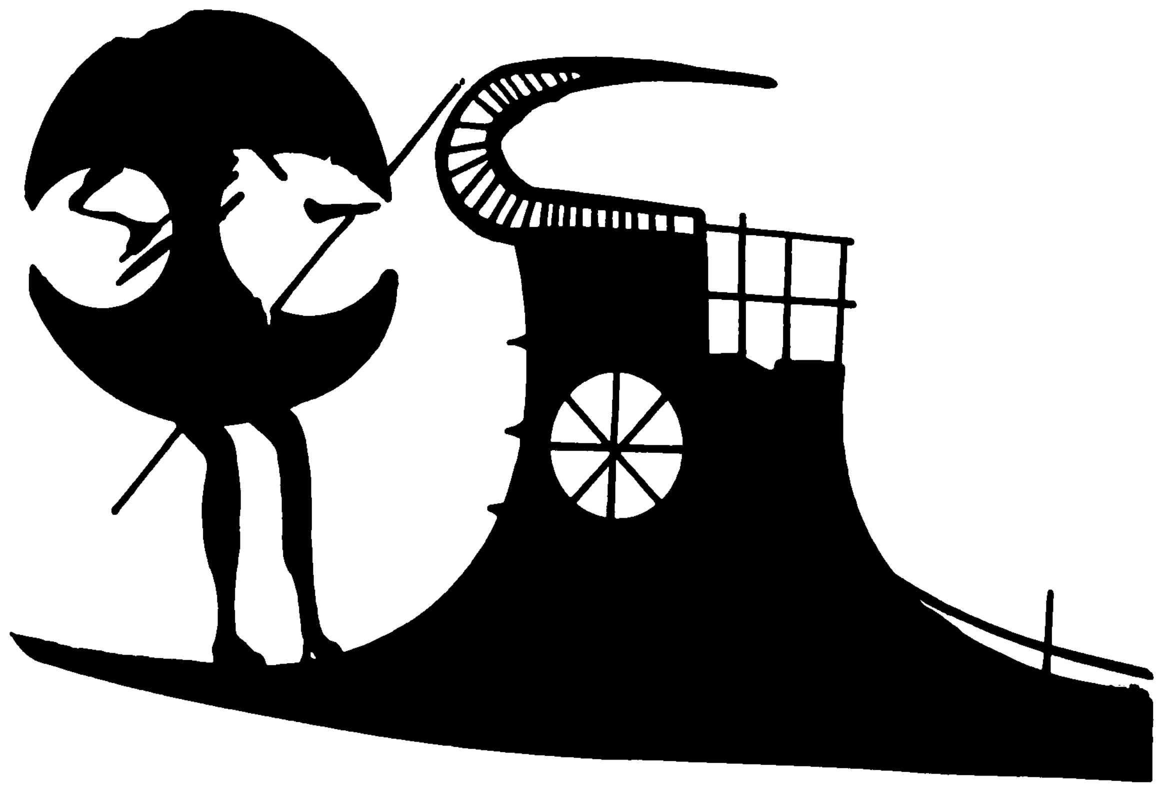

Fig. 8.21. Warrior standing on a cutwater. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 1e)

on a warship with a large crew of rowers must be a ram.[85] This line of reasoning is flawed. The French built ram-like structures on the armored cruiser *Dupuy de Lôme*, the battleship *Masséna*, and the armored cruiser *d'Entrecasteaux* at the end of the nineteenth century, but these structures were not rams.[86]

Casson and van Doorninck both fail to provide any evidence that indicates these structures are rams. At most, their evidence suggests that larger and heavier ships were being built during the Geometric period than during the Bronze Age. Heavier ships would be in need of larger and longer cutwaters to both protect the bow and to help increase the speed of a vessel. On the other hand, it is impossible to look at a small etching on a fibula or a silhouette painting and deduce that bow timbers are structurally sound enough to withstand the shock of ramming.

Casson actually weakens his own argument by stating that even small open galleys or aphracts are also fitted out with rams. These are ships with lighter hulls and less massive bows, which were built to carry dispatches and transport troops (fig. 8.22).[87] Casson thus disregards the criteria he uses to differentiate Bronze Age ships without rams from Geometric ships with rams. In fact, the evidence suggests only that ships are larger and heavier in the Geometric period than in the Bronze Age, and as the ship increases in size so does the length of the forefoot. To argue anything else clearly overstates the evidence.

Another difficulty with the view that the ram existed during the Geometric period is that Homer fails to mention this weapon. Proponents of the ram theory argue that Homer did not mention the ram because he wished to avoid the inclusion of an anachronistic weapon in his epics.[88] Yet, as pointed out in Chapter II, we lack credible evidence to suggest that oral-traditional poets were ever concerned with anachronisms in their songs. In contrast, the evidence suggests that epic singers commonly included anachronisms in their songs, as long as they did not effect the story.[89] Since Homer does not describe a naval engagement in either epic, there is no reason why the mention of a bronze ram should do so. In addition, it has been pointed out that there appears to be a limit to man's long term memory. Objects described in this type of poetry are only stable for about a hundred years.[90] Therefore, if Casson is correct and Homer lived in the eighth or seventh century B.C. and is describing people who lived four to five hundred years before him,[91]

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[85] van Doorninck (supra n. 79) 284.

[86] Basch (supra n. 50) 395.

[87] Casson (supra n. 7) 50

[88] van Doorninck (supra n. 79) 284; Casson (supra n. 7) 43.

[89] See Chapter II.

[90] See Chapter II.

[91] Casson (supra n. 7) 43.

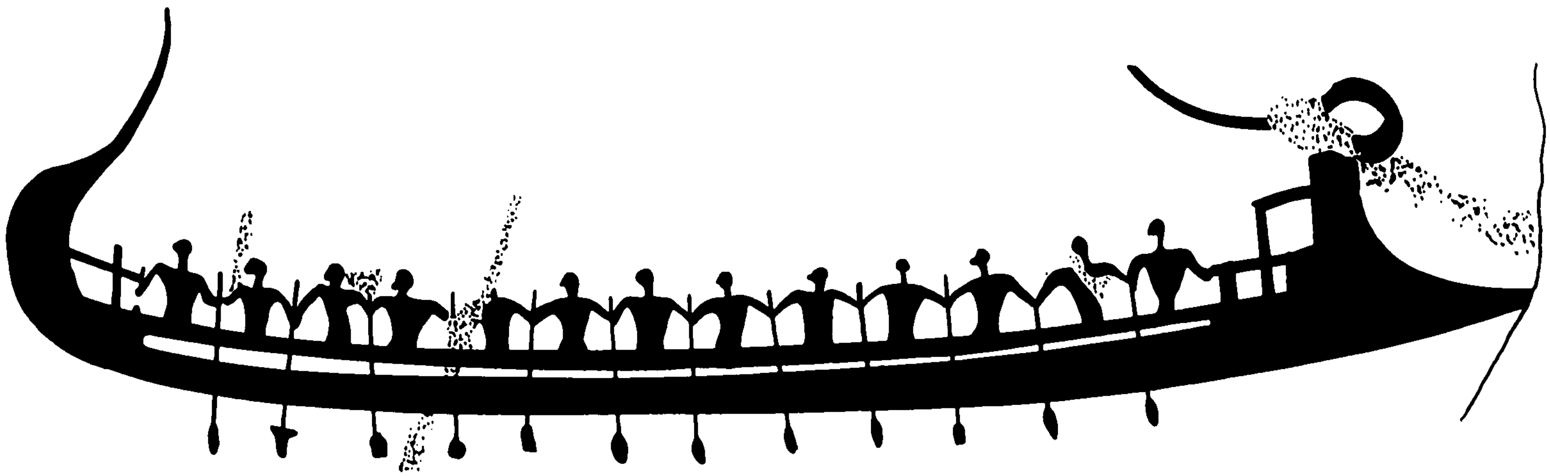

Fig. 8.22. Geometric aphract. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 4d)

how would Homer know that the ram, a weapon that is supposed to have been introduced over a hundred years before his time, is an anachronism? Furthermore, a ram that is sheathed in bronze would appear to be less of an anachronism than an iron axe, since bronze is associated with the Heroic Age. A large bronze weapon would be an ideal representation of this Heroic period much like the bronze-covered walls in the palace of Alcinous.[92] In addition, Williams points out that the high, curving horns on the extremities of Geometric ships that Homer describes are also anachronisms.[93] If Homer is willing to add horns to his ships, why not bronze rams?

According to van Doorninck, rams portrayed on Geometric pottery must have been sheathed in bronze because they are too long and slender to have been effective without a metal covering. He believes that bronze sheathing was used to prolong the life of a ram, and as he points out sheathing can be seen on the Til Barsib painting and Kuyundijk relief (figs. 8.23, 8.24). He says that bronze sheathing could be applied to large objects by nailing it to a wooden core.[94] Yet, if bronze sheathing was so thin that it could be nailed to a wooden core, then it could not give the slender point of a ram much protection as it struck another ship. In contrast, thin bronze sheathing would be strong enough to give a slender cutwater protection from floating debris and from teredo worms, like the cutwater on the Marsala ship. Although we have no evidence of bronze sheathing on Geometric warships, figures 8.23 and 8.24, dated to 700 B.C. do suggest sheathing.

It can also be argued that this sheathing was cast sheathing, but bronze casting at this time was still in its early stages. Hollow casting for large scale bronzes was not developed until the middle of the sixth century B.C.[95] Bronze sheathing must therefore be hammered, and hammered sheathing is much more brittle than cast bronze.[96] Hammered sheathing would not add much to the effectiveness of a ram, but it would be one more thing that had to be repaired after an attack.

These are not the only difficulties with assigning ships fitted with rams to Homer's time. According to Casson, ramming was a delicate maneuver. The captain had to gauge the proper speed for an attack because a ship going too fast would either become stuck in its victim or risk severe damage upon impact. On the other hand, a ship traveling too slow would either miss its target or fail to damage the enemy ship. Another factor is the condition of the crew. Even a well trained and conditioned crew would only get one

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[92] *Od.* 7.86.

[93] Morrison and Williams (supra n. 13) 38.

[94] van Doorninck (supra n. 79) 284–85.

[95] C. Rolley, *Greek Bronzes* (London 1986) 41.

[96] Rolley (supra n. 95) 27.

Fig. 8.23. Til Barsib painting before cleaning. (After F. Thureau-Dangin and M. Dunand, *Til Barsib*, Text [Paris 1936] frontispiece)

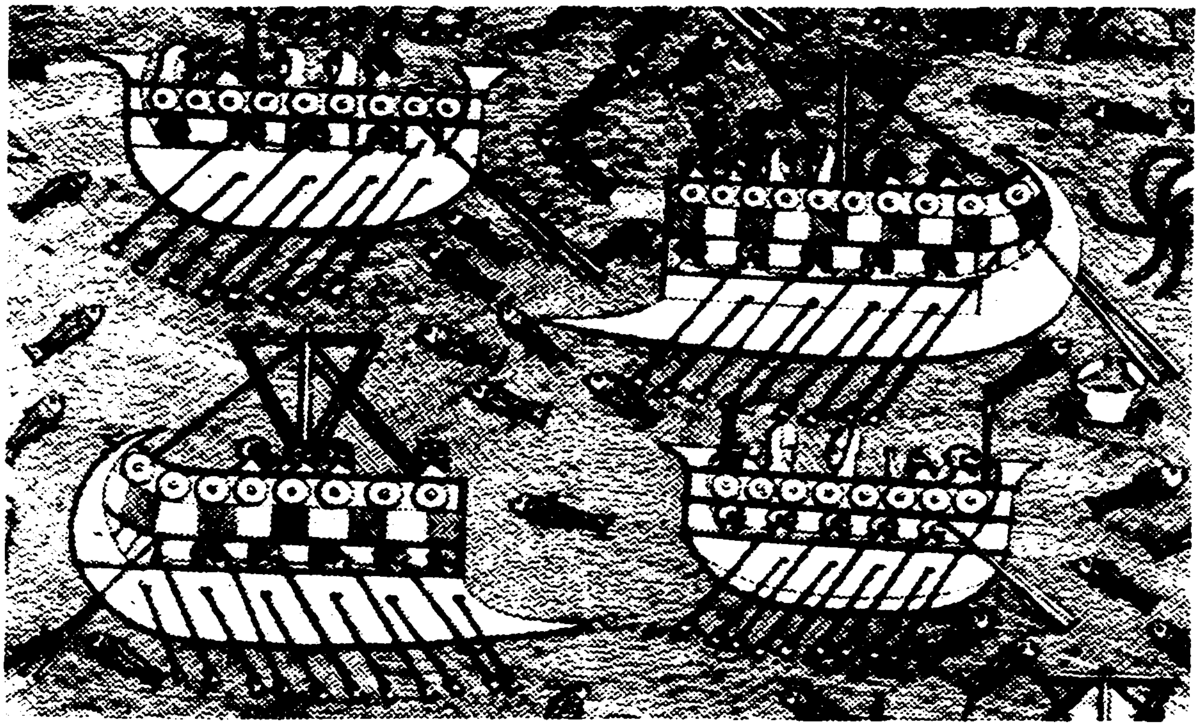

Fig. 8.24. Detail from the Kuyundijk relief. (After A. Layard, *The Monuments of Niniveh: from Drawings Made on the Spot* [London 1849] pl. 71)

or two chances to sink a ship. After the second try the attacking crew would be too exhausted to try again.[97] A crew's ability and willingness to quickly execute orders was essential for the success of such maneuvers. To acquire the necessary skills for these types of maneuvers, a crew must be well trained and well disciplined, but these characteristics are absent in the military structure of Homer's heroes. Odysseus seldom seems to have much control over his crew. His style of leadership seems more like decision making by committee instead of that of a military commander issuing orders.[98] Odysseus has so little trust in his crew that he alone guides his ship night and day for ten days. He then falls asleep at his post, and while he is sleeping, the voyage is inadvertently sabotaged by his own crew when they open the bag of winds.[99] Odysseus also orders his men to row through the night to avoid the island of Helios. His men complain so bitterly that he relents, and they go ashore after promising not to kill any of Helios's sacred sheep. This decision leads to the loss of his ship and death of his crew. After defeating the Cicones, Odysseus wants to escape as quickly as possible, but his men refuse to leave and, as a result, suffer a defeat when the Cicones counterattack. We see a similar situation, when Odysseus, who is posing as a Cretan, describes his landing in Egypt.[100] This is hardly the environment in which ramming tactics would flourish. Not only do we fail to see any mention of a ram in Homer's epics, but we also fail to see the necessary technological and social structure required to build and properly use such a weapon.

Not only is there a lack of evidence for the ram in the Aegean during Homer's time, but we lack such evidence anywhere in the eastern Mediterranean. Two Assyrian reliefs are often cited as evidence for Phoenician ships being fitted with a ram. The relief most commonly cited depicts Phoenicians evacuating the city of Tyre (701 B.C.). It was recovered from the palace of Kuyunjik, which was built by the Assyrian king Sennacherib (704-681 B.C.). Casson claims that the bowl-shaped vessels are merchant galleys and those with long conical "rams" are warships (fig. 8.24). Most scholars seem to agree with this interpretation.[101] He continues by pointing out that a merchant galley was heavier, roomier, and wider than a warship. Merchant galleys also had sturdier masts to carry more sail and these masts were probably

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[97] L. Casson, "Sailing," in C. Roebuck, ed. *The Muses at Work* (Cambridge 1969) 182.

[98] *Od.* 12.271–303.

[99] *Od.* 10.30–50.

[100] *Od.* 12.268–305, 352–420; F. Meijer and O. van Nijf, *Trade, Transport and Society in the Ancient World* (New York 1992) 23.

[101] L. Basch, "Phoenician Oared Ships," *MM* 55 (1969) 144–47; Williams (supra n. 11) 127; K. DeVries and M.L. Katzev, "Greek, Etruscan and Phoenician Ships and Shipping," in G.F. Bass, ed. *A History of Seafaring* (New York 1972) 48; H.T. Wallinga, "The Ancestry of the Trireme 1200–525 B.C.," in R. Gardiner, ed. *The Age of the Galley* (Annapolis 1995) 44.

not retractable.[102]

There are however a few difficulties. A ship utilizing a ram as a primary weapon must be fast and maneuverable to be effective. Such a ship relies on speed and maneuverability to put it in a position to use the ram. Based upon this observation, warships should be smaller and sleeker than merchant ships. Yet, when we compare the two types of ships portrayed in figure 8.24, it is obvious that the "beaked men-of-war" are longer and higher than the "bowl-shaped merchant galleys," the exact opposite of what we would expect. Furthermore, all of the beaked ships have masts in place, suggesting that the masts are not retractable. In contrast, the "bowl-shaped merchant galleys" lack masts, suggesting retractable masts. Yet, we would expect the exact opposite. This incongruity and the large "ram" on the ship with a mast has lead Gray to propose that each type of ship is a warship.[103] Basch has also modified his views and sees the round merchant ships as ships that are both warships and merchant ships.[104]

These beaked ships may represent either large merchantman or, if these ships are primarily fighting platforms, large warships. This is more consistent with the subject of the relief, the evacuation of Tyre. Ships able to carry the largest number of passengers would be the ones employed to transport people. If it is a merchantmen, the larger the vessel the more cargo that can be carried. If it is a warship, the larger the vessel the more warriors that can be transported; the extra height may give archers an advantage over vessels with a lower superstructure like the "bowl-shaped merchant galleys." In either situation, a ship with increased capacity and height with little increase in length must be beamier. A beamier ship will be slower. Extra speed can be acquired with a finer bow. Such a bow could be constructed by attaching the stem to the keel at a 90° angle, which allows the hull planking to come into the stem at a much sharper angle. Another way to increase the speed of a beamier vessel would be to add a long conical cutwater. Such a cutwater will give a more hydrodynamic shape to the bow. In addition, the longer the cutwater the greater the length to beam ratio of a ship. The greater the length to beam ratio of a ship the faster it will sail. The only parallel for such a structure on the bow of a ship is a cutwater on a large Roman merchantman that is depicted in a second century A.D. mosaic discovered at Thermetra in Tunisia (fig. 8.25). There is little doubt that the size of this cutwater has been exaggerated, but the shape might not be. Although this ship is Roman, this depiction was found in northern Africa, homeland of the Carthaginians, and may reflect a Phoenician tradition that had survived through the centuries.

The main drawback to having such a long cutwater is that it increases the turning radius and, consequently, the turning time of a ship. For a merchant ship this does not pose much of a problem since

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[102] Casson (supra n. 7) 65–66.

[103] Gray (supra n. 11) 69.

[104] Basch (supra n. 73) 315.

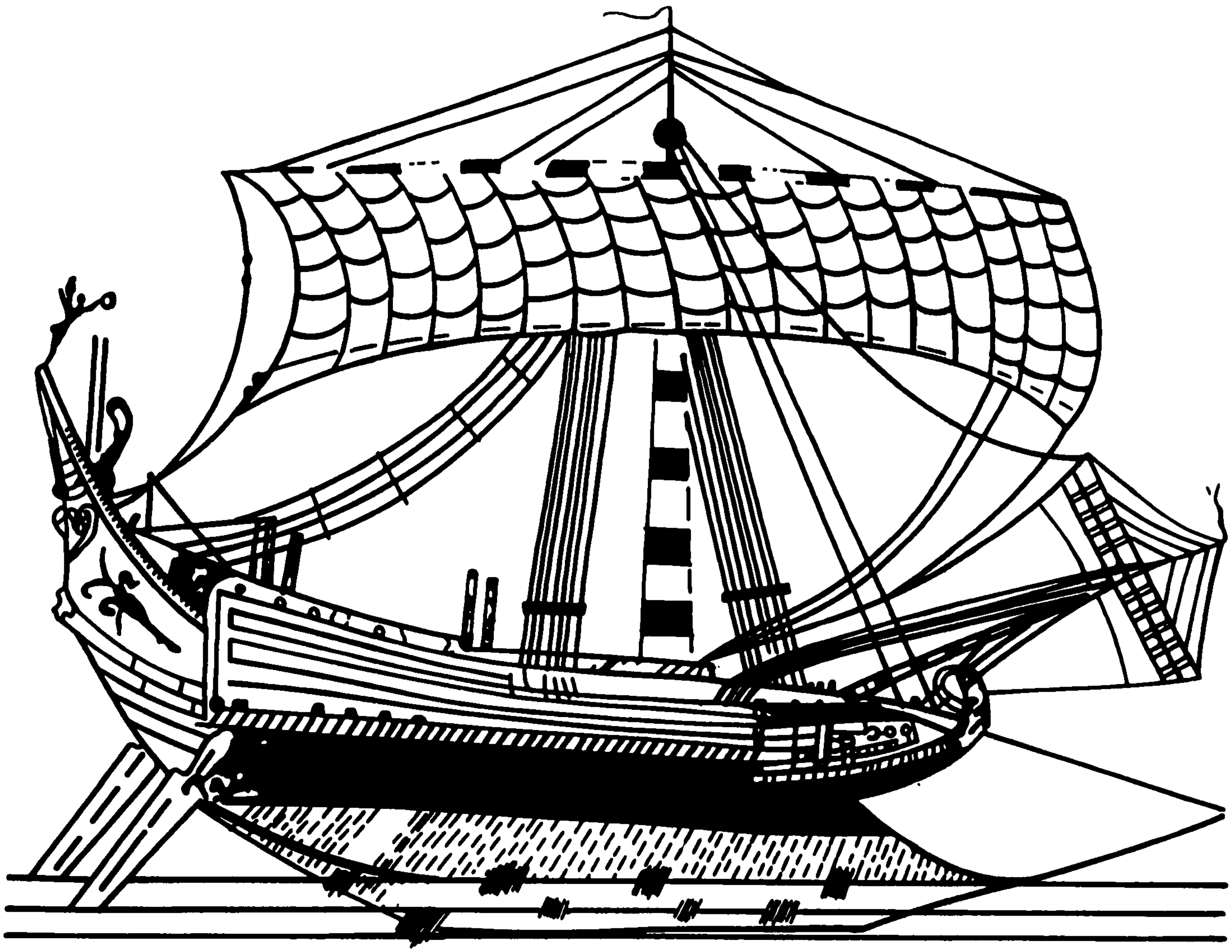

Fig. 8.25. Roman ship with cutwater. (After L. Foucher, "Un voilier antique," *Antiquités africaines* 1 [1967] 90)

such ships are seldom required to take evasive maneuvers. In contrast, a warship with such a long ram that is surprised from either side will be at a disadvantage because it can only turn very slowly.

Casson argues that a Phoenician version of a warship was also built with a single bank of oars. He cites as an example a relief from Karatepe in Cilicia that dates between 725 and 680 B.C (fig. 8.26).[105] Yet, this vessel has a standing mast; it appears to be too small to be a warship with a ram; and the point of this "ram" appears to be located above deck level. The front edge of this carving is badly broken, and the point of the "ram" is missing. If we put a point on this ram, then the point would so high that it would do little or no damage to an enemy ship. A more likely interpretation is that this is a vessel with a large cutwater.

Another commonly cited Phoenician(?) galley fitted with a "ram" appears in a fragmentary Assyrian wall-painting from Til Barsib that dates to the reign of Tiglatpileser III (745-727 B.C.) (fig. 8.23). Casson is uncertain whether it is a combat craft or just a naval auxiliary vessel. He argues that although the forefoot juts out in a long, needle-like extension, it may be only a structural projection and not a ram, since "rams" on Phoenician warships are distinctively cone-shaped (fig. 8.24).[106] Unfortunately, Casson fails to explain how to differentiate between the two. This vessel fulfills all four criteria proposed by Cohen, and is very similar in appearance to the Geometric vessels he believes have rams.

Sadly, much of this painting is badly damaged. The earliest photograph appears to have been taken before it was cleaned (fig. 8.23). Some detail is therefore obscured by dirt. A second photograph was taken after it was cleaned, but in some areas much of the paint had flaked off by this time (fig. 8.27). We can glean a considerable amount of information from this painting by making a drawing based on both photographs (fig. 8.28). A study of this painting clearly shows that this is indeed a warship. This ship is similar to the silhouette paintings on Geometric pottery. It has a high bow platform and a pointed forefoot. The forefoot is a gold color suggesting that it is metal. Unfortunately, on both photographs of this painting the point of this forefoot has chipped off. Basch depicts this forefoot as a three-pronged ram (fig. 8.29). Heads of three fasteners are depicted near the base of the forefoot. In addition, three corresponding fasteners are on the hull of the ship. Each pair of fasteners is joined by a pair of straight lines suggesting that this metal sheathing was held in place by three straps each of which was secured by two fasteners. Aft of the forefoot, four nearly complete oars can be seen extending from circular oar ports.

The scene depicts a number of warriors participating in hand-to-hand combat. A warrior standing in the bow is the central figure. He is grasping what appears to be a sword with his right hand, but part of the

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[105] Casson (supra n. 7) 57–58, n. 80.

[106] Casson (supra n. 7) 57, n. 80.

Fig. 8.26. Karatepe relief (After L. Casson, *Ships and Seamanship in the Ancient World* [Baltimore 1995] fig. 79)

Fig. 8.27. Til Barsib painting after cleaning. (After P. Amiet, *Art of the Ancient Near East* [New York 1980] fig. 105)

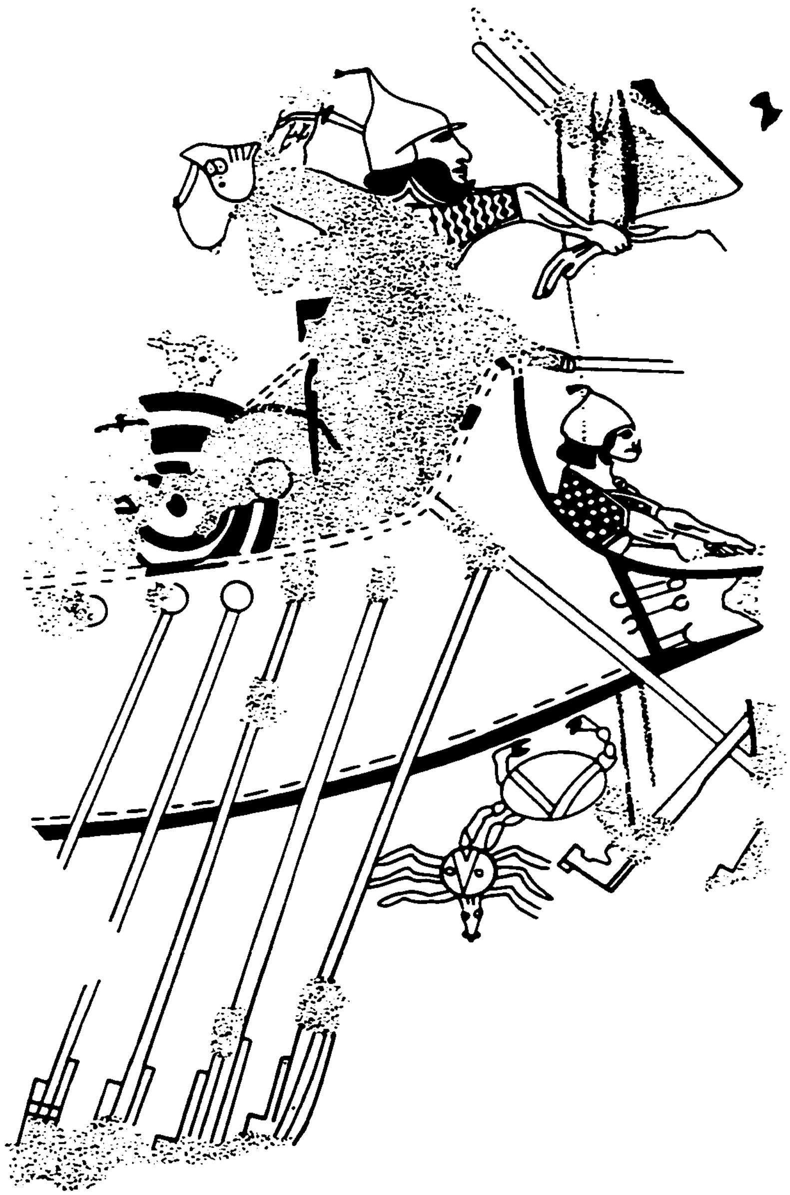

Fig. 8.28. Til Barsib painting. (After F. Thureau-Dangin and M. Dunand, *Til Barsib*, Text. [Paris 1936] frontispiece; P. Amiet, *Art of the Ancient Near East* [New York 1980] fig. 105)

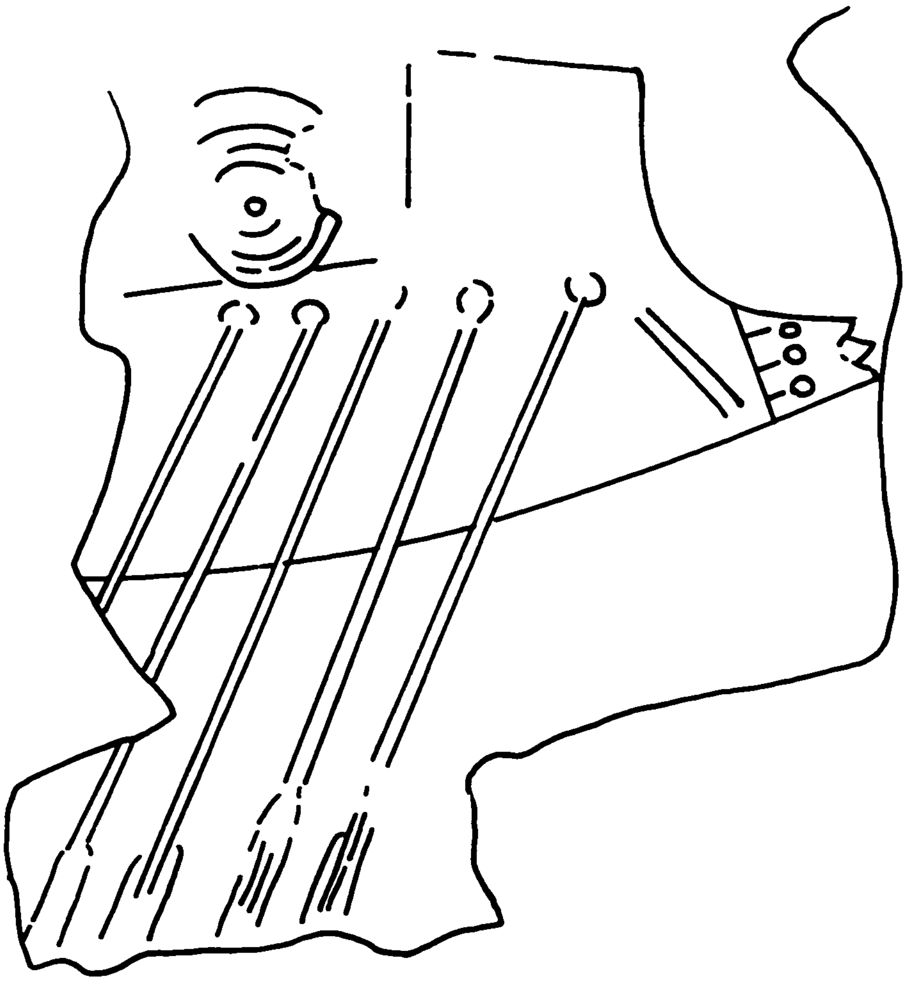

Fig. 8.29. Lucien Basch's interpretation of the Til Barsib cutwater. (After L. Basch, *Le musée imaginaire de la marine antique* [Athens 1987] fig. 649)

sword is obscured by his helmet. In addition, He is wearing what appears to be a decorated wrist guard on his right forearm. He is also wearing a high, pointed helmet and appears to be wearing some type of neck guard. This neck guard may be metal since it is the same color as the sheathing on the forefoot and as the helmet. This warrior grasps the wrist of a foe with his left hand, a foe who has also been struck by an arrow. Unbeknownst to the attacking warrior, above and to the right of his head may be the blade of an oncoming lance.

The area directly below the warrior is badly damaged. Originally, it appears that another warrior filled this space. We can still see two fingers of his left hand grasping the shaft of some type of weapon. In his right hand he appears to hold some type of cup with two circular eyes and a small circular mouth. To the left of the cup appears to be a banner or flag suspended from a line.

To the left of this second warrior is a large shield; the lower edge of the shield disappears behind the hull. Above the shield may be the outline of a third warrior's head and, to the right, is an outline of the shaft of his weapon. What little remains of his helmet is different from the pointed helmet worn by the first warrior. This third warrior appears to be carrying a shield and weapon towards the bow. On top of the forefoot is another warrior pulling on a pole or spear. This warrior may be bracing himself with his foot as he pulls on the pole or a second warrior is preparing to step onto the forefoot. Warriors standing on a forefoot is a common motif on Geometric ship paintings (fig. 8.21), suggesting that the cutwater was used as a boarding ramp in ship-to-ship combat.[107]

Although, this depiction is commonly cited as a ship with a ram, it is obvious that the main theme is hand-to-hand combat. Each vessel seems to have a few modifications for this purpose. The oars have a piece of wood attached to the blade at a 90° angle. This structure cannot have any advantage for propelling the vessel, but these oars may be designed to hook an enemy's oar or to hook over the planksheer of an opposing ship in order to pull it in close for boarding. Near the bow, where the forward-most oarport should be, two oars appear to come from one oarport. A closer examination suggests that the forward-most oar extends beyond the oarport up to the cap rail. This pole may have had a hook at its end or be a modified oar that a warrior is using to snag the oars of the opposing ship to disrupt its ability to maneuver. The shaft of this implement crosses a shaft with a large hook at its extremity. This "blade" is too narrow to be an effective oar. It must be to ensnare oars or to ward off a hook being brandished by an enemy.

The forefoot cannot be a ram. The straps would probably be too weak to secure a ram during impact from any direction other than head on. The fact that straps are being used to secure the metal sheath instead of its being bolted directly to the wooden core suggests that the metal is relatively thin and probably would not be able to protect the wooden core from the impact of a collision. All of the

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[107] At least four such motifs exist.

weaponry being depicted is also consistent with previous descriptions of naval battles. Ships are still platforms for archers and warriors instead of ships that utilize a ram. This scene is consistent with the scenes portrayed on Geometric pottery and Homer's epics.

It should also be noted that there are many structural drawbacks to having a pointed ram. As previously mentioned, such a structure would have to absorb considerable shear forces to be able to pierce the hull of a ship. The shear stresses to which a ram is most vulnerable to bending or breaking would, at the least, severely damage a ram with such a fine point, probably rendering it useless after only one attack. At the worst, it would tear away the ram and most of the bow, especially a ram that is held in place by only straps or lashings.

Another drawback to using a pointed ram is that if the attacking ship was able to pierce the hull of an enemy ship, it probably would become stuck. The attacking ship would have all their rowers at their benches trying to break free. The ship that is holed and sinking is full of a large number of very scared, heavily-armed men who need a new ship; this usually does not bode well for the crew of the ship that is stuck. Herodotus relates such a situation at the battle of Salamis (480 B.C.). A Samothracian ship rammed and sank an Attic ship. While the Attic ship was sinking, a ship from Aegina rammed the Samothracian ship, but the ship from Aegina did not pull away quickly enough. The Samothracian javelin throwers then cleared the Aeginian decks, boarded it, and seized it. If this situation is possible with ships using rams with flat faces, then a vessel with a pointed ram would always be at a definite disadvantage. Furthermore, an attacking ship is also in danger of sinking if the ram becomes stuck. The only thing connecting two heavy, floating bodies is a small bronze-shod timber. In other words, as one ship rides up on a wave the other is dropping into a trough. All of this stress is concentrated on the ram unless the ships are fighting on a completely flat sea, which is a rare situation. If the stuck ship cannot free itself quickly, then the ram or even the bow will be torn away. Furthermore, the bow of a ship with a pointed ram will have to be stronger and heavier than one without a ram. This is because after a ram pierces a ship, the bow must undergo a shearing stress first, and it then receives a blow directly back. A ram that delivers a blow but does not pierce hull planking, receives only the blow directly back. Holing an enemy ship weakens the attacker because of the prying action that takes place while the two ships are attached. This prying action is really a fore and aft flexing of the stem post. Therefore the stem must be heavily reinforced. As a result, such a ship would be slower and less maneuverable because of the extra weight. There is simply no advantage to having a pointed ram on an ancient ship.

Lucien Basch has proposed that Geometric ships may have been laced and not built with pegged mortise-and-tenon joinery. He believes that since a laced hull is weaker, a more fragile ram would be effective.[108] Laced hulls are more flexible, but the disadvantages of a pointed ram as described above are

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[108] L. Basch, "Another Punic Wreck in Sicily: Its Ram," *IJNA* 4 (1975) 203.

the result of the forward momentum of two heavy bodies that produce extreme shearing stress when colliding, regardless of the type of ship. A pointed ram will have the same disadvantages on a laced ship as it will on a ship built with pegged mortise-and-tenon joinery. Such a ram would still be required to absorb considerable shear stress, and the cutwaters on Geometric ships appear too slender to do so.

By 600 B.C., the pointed cutwater, for the most part, was replaced by a blunt one that assumes the shape of an animal's head (fig. 8.30). This change in shape may result from the accumulation of experience in naval battles. Incidental contact between ships, especially while maneuvering for boarding, could easily damage a fine point. The change from a pointed end to a blunt end would have had little hydrodynamic impact on the speed and handling of a ship, but it would reduce the number of repairs to such a fine point. In my opinion, this type of cutwater was the true forerunner of the ram and was introduced sometime during the sixth century B.C.

The literature supports the possibility of a late introduction of the ram. The earliest known use of the Greek word for ram (ἔμβολος) does not appear until the middle of the sixth century B.C.[109] The earliest known record of a naval battle in which ramming is mentioned is the battle of Alalia in 535 B.C. According to Herodotus, the Phocaeans with 60 ships met a combined force of 120 Tyrrhenian and Carthaginian ships. The Phocaeans won the battle, but they lost 40 of their ships, and all of the remaining ships were useless because their rams were "twisted off." After the battle, the Phocaeans returned to their settlement and took on board all their women and children and all the possessions that the ships could hold and then left Corsica.[110]

Both passages suggest that the ram was introduced but not yet perfected as late as 535 B.C. Furthermore, if the Phocaeans could take all the women and children and all of their possessions on the remaining 20 ships, these must have been large and heavy ships that could be used for both war and commerce. If blunt-faced rams were so badly damaged in this battle, what would have happened if the rams were still pointed?

The next battle in which rams were purported to be used was the battle of Lade in 494 B.C. It is assumed that ramming took place because of a tactic mentioned by Herodotus that is usually associated with it. A number of tactics were used in engagements between fleets in which the ram was the primary weapon to maximize its effect. Διέκπλους, which means "break-through," is the earliest mentioned ramming tactic.[111] A διέκπλους was a passage through the enemy's line for the purpose of breaking off oars or gaining an advantage in the exchange of missiles. The captain would then quickly turn his ship

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[109] Hipponax, fragment 45.

[110] Herodotus 1.166. See also, 1.164.

[111] Casson (supra n. 7) 280.

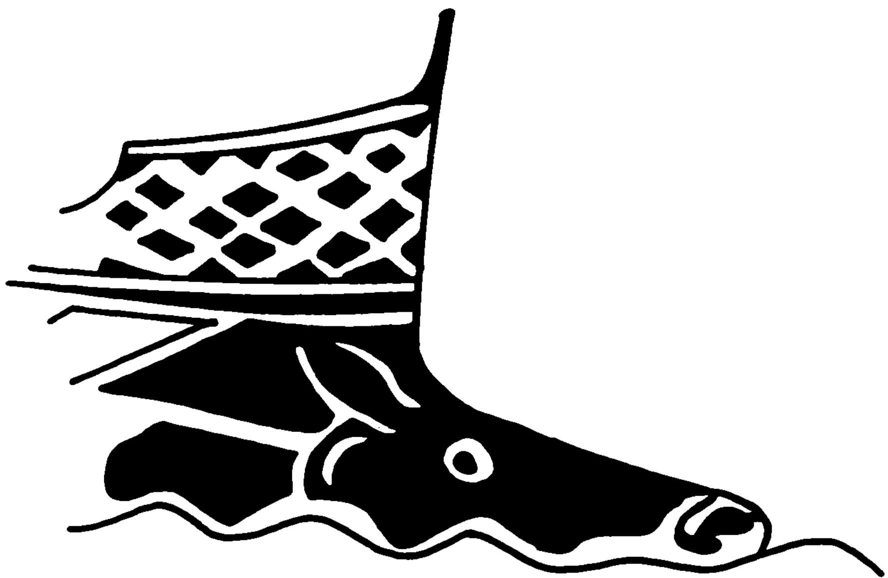

Fig. 8.30. Prow in the shape of a boar's head. (After L. Basch, *Le musée imaginaire de la marine antique*. [Athens 1987] fig. 440b)

back (ἀναστροφή) and ram the opposing ship in the stern.[112] Herodotus is the first to mention a διέκπλους maneuver shortly before the battle of Lade in 494 B.C. The Ionian Greeks had revolted from their Persian masters, and, in response, the Persians were sending a fleet to put down the uprising. The Ionian Greeks were outnumbered and had little experience of such warfare; so they asked a Phocaean named Dionysius to train them. According to the passage, everyday Dionysius would "put out to sea with his ships in a column, and having used the rowers to pierce (διέκπλους) each other's line of ships, and armed the fighting men on board, he would for the rest of the day keep the fleet at anchor; all day he made the Ionians work."[113] This description does not describe a ramming tactic, there is no mention of an ἀναστροφή after the διέκπλους as we would expect. Instead, it appears that Dionysius is using the διέκπλους to position the ships for hand-to-hand combat because the long day of work does not begin until after the maneuver has been completed; the men are armed; and the ships are at anchor. Therefore, no evidence exists to support that ramming was used in this battle.

The Battle of Salamis (480 B.C.) is probably the most famous naval battle in which ramming tactics were used. Most scholars believe that such tactics were second nature to the combatants at such a late date and the smaller Greek fleet won because they tricked the Persians into fighting in the Bay, which restricted their movement and nullified their numerical superiority. Yet, prior to this battle, the Persian forces may have lacked experience in such tactics, and the ram may have been only a secondary weapon to them. This situation is illustrated at the Battle of Artemesion, which took place a few days earlier, the Athenians were in the open sea and hopelessly outnumbered, yet they decisively defeated their Persian foes. It is possible that, especially in light of the literary evidence presented above, the ram was still a new and untried weapon. The innovative use of it and the development of tactics to maximize its use may have been the main factor in the defeat of the Persians.

This theory finds support in the works of Thucydides. According to Thucydides, in 433 B.C., the Corinthians sailed to Corcyra and attacked the Corcyrians. Instead of relying on ramming tactics, both sides depended on many heavy-armed men, archers, and javelin throwers stationed on deck, and they fought in an old fashion way.[114] The Corinthians were the first of the Greeks to build triremes, and they participated at the Battle of Salamis, yet, almost fifty years later, they continue to fight in the old manner, suggesting that, even at this late date, the ram had not yet been accepted as the naval weapon of choice by all city-states.

It is possible to reconstruct a second interpretation of the evolution of the ram that better fits the

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[112] W.L. Rodgers, *Greek and Roman Naval Warfare* (Annapolis, Maryland 1983) 10.

[113] Herodotus 6.12; translated by A.D. Godley.

[114] Thucydides, 1.49.

evidence. Some Mycenaean ships lack a forefoot, and those that do are small ones. This suggests that the Mycenaeans were the first Greeks to build ships with stems at approximately a 90° angle to the keel, possibly to create a finer bow. Since such a joint is inherently weak, the keel may have been extended and a small knee attached at the juncture of the keel and stem on the forward side. Even this small protrusion may have increased the handling and speed of the vessel and resulted in a continuous lengthening of the forefoot. As the forefoot was lengthened and reinforced over time, the speed of vessels increased. Speed can be increased by two possible effects. The forefoot can cancel out bow waves, which benefits the efficiency of the forward rowers[115] or the changing length to breadth ratio of a vessel increased the speed and handling of a vessel. A vessel with a length to breadth ratio of 3:1 will be a beamy and slow vessel in relation to a ship with a length to breadth ratio of 7:1. A forefoot will increase the ratio while adding little weight and surface area to a vessel. As the forefoot increased in size and strength, it was used for other purposes such as to defecate (fig. 5.3) and as a boarding ramp (fig. 8.21). Metal spikes or blades may then have been added to the bows of ships to make boarding more difficult (fig. 8.31). The increased use of a forefoot as a boarding ramp during naval engagements probably led to frequent damage of the point when ships collided. To reduce repairs to the forefoot and shock to the hull, the end of the forefoot was squared off and reinforced at the beginning of the sixth century B.C. By the middle of the sixth century B.C., the introduction of hollow casting led to a stronger forefoot. This coincides with the first mention of a ram in the literature. As previously mentioned, the first record of ramming was slightly later at 535 B.C., when the Phocaeans were outnumbered two to one by a combined force of Etruscans and Carthaginians. The Phocaeans won the battle but lost forty of their sixty ships. The surviving twenty ships had their rams twisted off. The fact that all Phocaean ships were destroyed or damaged suggests that their bows were not yet strong enough to withstand the shock of ramming. It is also possible that the process of hollow casting was not yet perfected, and the damage to the rams was due to poor casting. Herodotus also mentions that the Samians had ships with boar-shaped bows like those painted on sixth-century pottery. But Herodotus does not call this type of boar-shaped protrusion a ram, but just a prow (πρῷρα), suggesting that these boar-shaped bows were not designed for ramming.[116]

In 480 B.C. the Greeks fought with success against a larger number ships from Xerxes's fleet in two engagements at Artemisium. Shortly thereafter, a small Greek fleet defeated a much larger Persian fleet at Salamis.[117] These victories may have been due to the unexpected use of the ram as a primary weapon.

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[115] C. Mudie, "Designing Replica Boats, the Boats of St. Brendan, Sinbad, and Jason," in O. Crumlin-Pedersen and M. Vinner, eds., *Sailing into the Past* (Roskilde 1986) 53.

[116] Herodotus 3.59.

[117] See respectively, Herodotus 8.10–11, 8.15–17, 8.84–92.

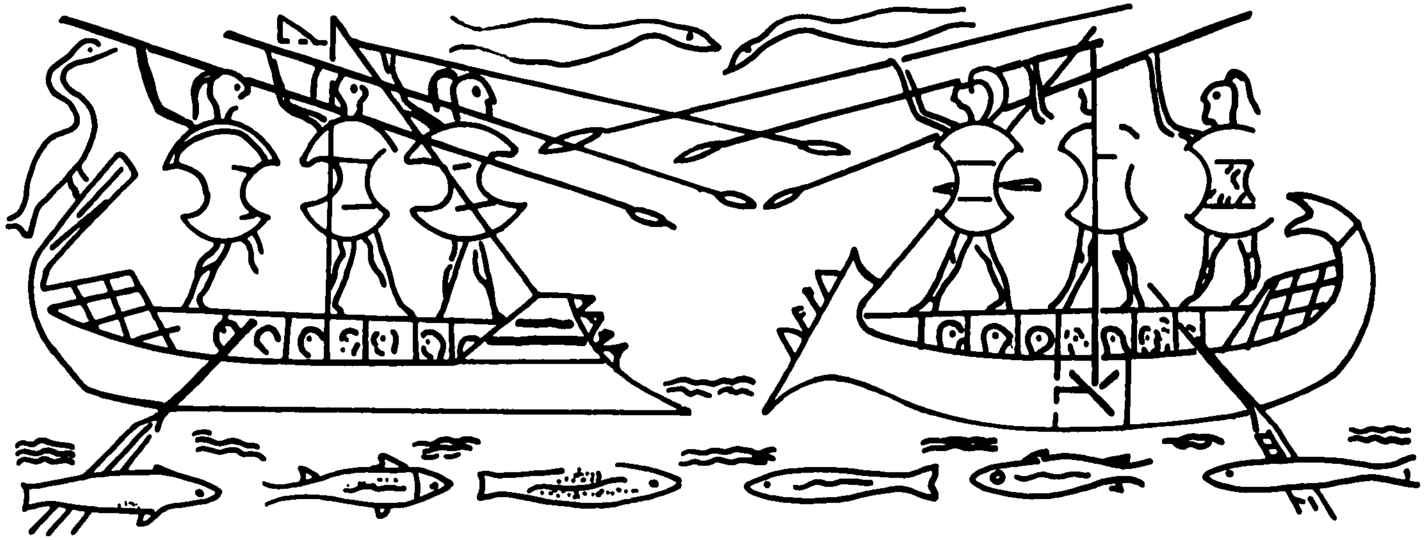

Fig. 8.31. Two ships fitted out with spikes. (After J. Hagy, "800 Years of Etruscan Ships," *IJNA* 15 [1986] fig. 19)

Improved bronze casting, ship construction, and the fact that in all these battles the forces using ramming tactics were heavily outnumbered suggests that the ram may have been adopted out of a desperate necessity. The genius of the Greeks in defeating the Persians at sea may have been because they recognized that all the necessary factors had finally come together to make the ram a viable weapon. But even nearly fifty years later, the Corinthians and Corcyrians continued to fight relying on archers, javelin throwers, and in the end maneuvering their ships for hand-to-hand combat. Thucydides describes this type of warfare as old fashioned, and it was the ramming tactics of the Athenians that won the day. It is unlikely that the Corinthians and Corcyrians fought in this manner out of nostalgia for the past. Instead, the ram was used as a primary weapon by only a few people, especially the Athenians. Such a lag in time is understandable for a period of fifty years, but not for four or five hundred years.

If we look at the evidence dispassionately, it appears obvious that the ram was much slower to develop than originally thought. This development was influenced by technology, social organization, and military situations that required drastic action. The evidence for an early ram is based solely on interpretations of ship paintings. Most of these paintings are little more than vague sketches.

Artistic license is a potential problem in ship depictions. For example, according to Casson, the Aristonothos vase depicts a Greek warship preparing to fight a merchant ship (fig. 8.32).[118] In contrast, on a catchplate of a fibula, we see what is obviously the same scene. But the tubby merchant ship has been transformed into a low and sleek warship (fig. 8.31).

Finally, most of the evidence to support such an early introduction of the ram is based more on the preconceived notions that any pointed object on the bow of a ship must be a ram. Having such preconceived ideas is dangerous even with detailed paintings. For example, figure 8.33 is commonly cited as a pirate ship taking a merchant vessel.[119] The only evidence to suggest that we are seeing a pirate ship preparing to take a merchant ship is that the painter places a warship opposite a merchant ship. In contrast, we would expect a pirate ship to attack using its oars—not sails. Furthermore, the warship has both banks of oars out of the water on both depictions. To rely solely on sails removes much of the speed and maneuverability of a warship. The ships speed and maneuverability are further compromised by the dingy it is pulling (fig. 8.33). I have never heard of a pirate ship with a dingy in tow because it has little need for such a boat. We would expect a pirate ship to come along side, secure a merchant ship with grappling hooks, and then board it. This type of scenario allows a pirate ship to use its superior number of well-armed crewmen to quickly overwhelm the few crewmen on a merchant ship. Instead, this "pirate" ship leaves most of its men onboard to tend to the sails and apparently a few men take the dingy, which is

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[118] Casson (supra n. 7) fig. 80.

[119] Casson (supra n. 7) fig. 81.

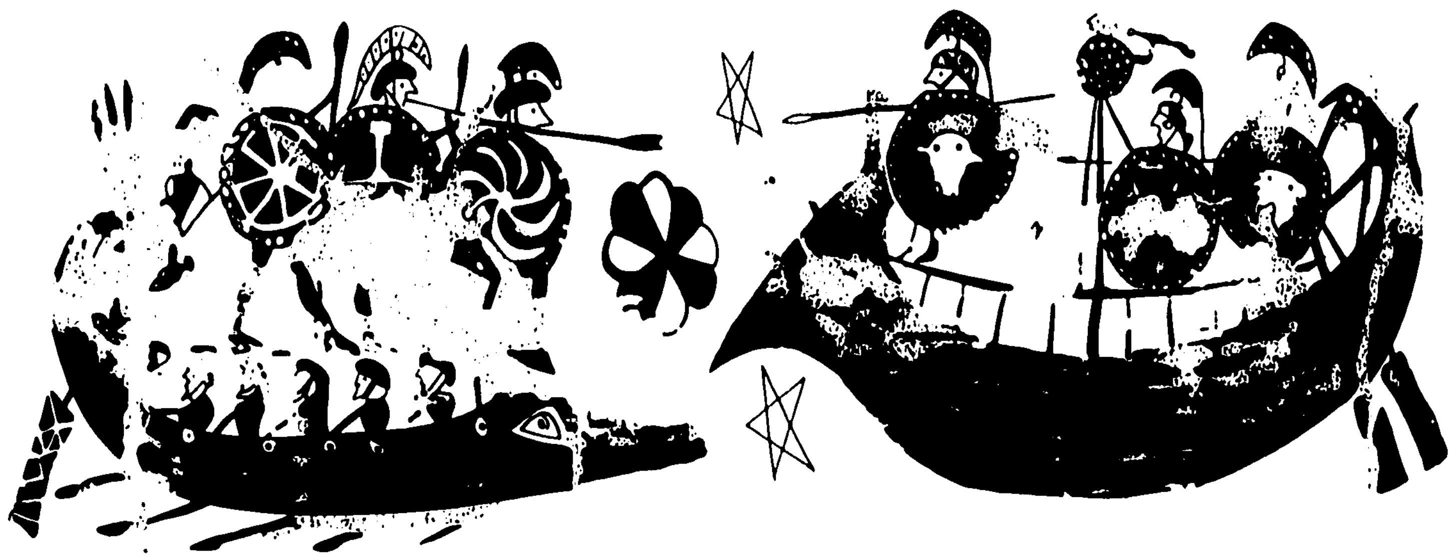

Fig. 8.32. Two ships painted on the Aristonothos vase. (After J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* [Cambridge 1968] pl. 9)

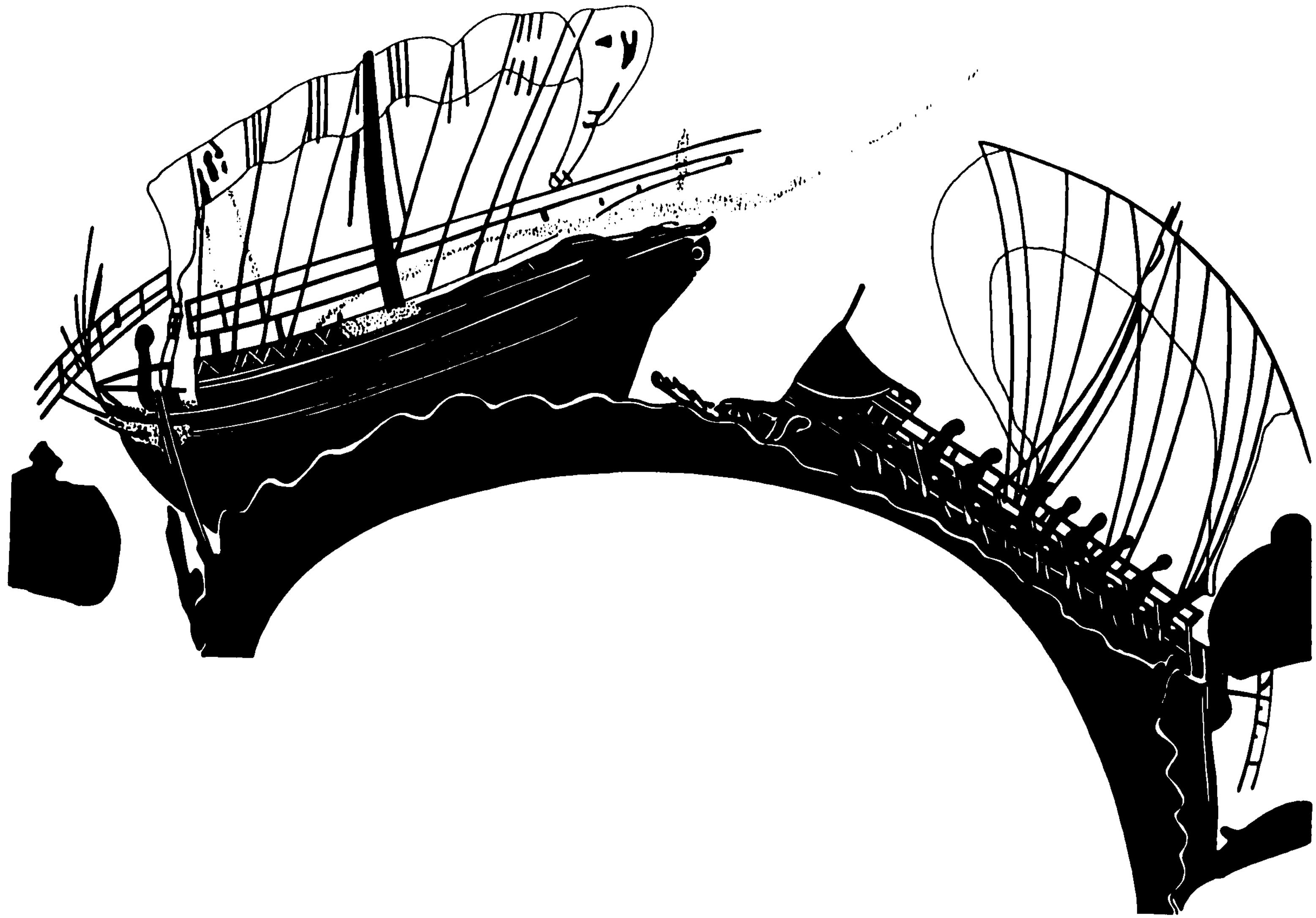

Fig. 8.33. Proposed painting of piracy on the high seas. (After L. Casson, "Hemiolia and Triemiolia," *BSA* 78 [1958] pl. 5a; L. Casson, *Illustrated History of Ships & Boats* [New York 1964] fig. 53)

absent on the second depiction (fig. 8.34), to the merchant ship. If we look at all the elements, it seems more likely that, instead of attacking pirates, a more mundane interpretations exist that will explain the depiction better. For example, ships commonly had to pay duties upon entering a foreign harbor. This depiction may portray an official vessel carrying a customs official. It is also possible this warship is checking a vessel for contraband or possibly delivering a passenger. But we do not have any evidence to suggest piracy. We should therefore be cautious of any theory that relies so heavily on the interpretation of iconography as its foundation.

The reason Homer did not describe the ram in either epic is because such a weapon did not exist during his time. Warfare at sea had probably changed little from the Bronze Age to Homer's time. Ships were platforms that allowed land battles to be fought at sea. Now that we have explored the possible uses of Homeric ships, we must see if Homer gives any clues as to how far his heroes would venture from home.

Fig. 8.34. Pirates preparing to board ? (After L. Casson, "Hemiolia and Triemiolia," *BSA* 78 [1958] pl. 5b; K. DeVries and M.L. Katzev, "Greek, Etruscan and Phoenician Ships and Shipping," in G.F. Bass, ed., *A History of Seafaring* [New York 1972] pl. 10)

CHAPTER IX

GEOGRAPHY

Homeric scholars have written literally hundreds of books and articles on various aspects of the *Iliad* and the *Odyssey*, giving an impression that every imaginable aspect of both epics has been exhaustively studied. Homeric geography has drawn much of this attention. We can best understand the different interpretations of it by dividing Homeric geography into three different sections: Odysseus's adventures from Troy to Ithaca, foreign travels of Homeric characters, and Aegean geography.

Most studies of Homeric geography concentrate on Odysseus's return voyage from Troy to Ithaca, which usually begins once Odysseus is blown off course near Cape Malea. We can roughly divide these works into two opposing views. The first is that Homer was ignorant of the lands west of Ithaca, and no connection exists between the peoples and places he describes and actual fact. The second is that Homer was knowledgeable of this region either from his own personal experience, from accounts heard from seafarers, or a combination of both, and, all locales he describes can therefore be equated with specific places. Scholars who hold this second view believe it is possible to recreate Odysseus's voyage by using sailing distances and landscapes provided in both epics.

One of the most detailed studies of Odysseus's voyage is by Victor Bérard. He proposes that the *Odyssey* contains accurate geographic descriptions and sailing instructions that Homer acquired from Phoenician seafarers. Yet, he also believes that some distances are conventions.[1] Bérard identifies the island of Djerba in Tunisia with the land of the Lotus eaters; Polyphemous lives at Cumae; and Aeolus resides on Stromboli, which is the easternmost of the Lipari islands. The Laestrygonians reside on Sardinia at Porto Pozzo; Circe lives on Mt. Circeo, a small island off the west coast of Italy; and Hades is located at Avernus in the Bay of Naples. After leaving Circe's island for a second time, Odysseus encounters Scylla and Charybdis in the Straits of Messina and meets Calypso on the island of Perejil, which is on the African side of the Straits of Gibraltar. Finally, Corfu is the home of the Phacacians.[2]

Louis Moulinier supports Bérard's interpretations with a few exceptions. Aeolus is moved from Stromboli to Alicudi, which is the westernmost of the Lipari Islands.[3] Moulinier also moves Circe's home

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[1] V. Bérard, *Les Phéniciens et l'Odyssée* I (Paris 1902) 49–55.

[2] See respectively, V. Bérard, *Les Phéniciens et l'Odyssée* II (Paris 1903) 95–113, 114–79, 183–208, 209–57, 264–310, 311–29, 349–64; Bérard (supra n. 1) 260–83, 481–87.

[3] L. Moulinier, *Quelques hypotheses relative a la géographie d'Homère dans l'Odyssée* (Aix-en-Provence 1958) 61–63.

from Mt. Circeo to the island of Aiaia off the western coast of Italy and the Phacacians to Cyrene.[4] Finally, the house of Hades is placed in a mythological land to the far west.[5] In contrast, Ernle Bradford moves the Cyclops to Trapani on Sicily, Aeolus to Ustica, the Laestrygonians to Corsica, Calypso to Malta, and Hades to the Straits of Gibraltar (9.1).[6]

A few dissenting scholars believe Homer bases Odysseus's adventures on locations taken from a more limited geographic area. Samuel Butler proposes that Trapani, on the northwest coast of Sicily, is the background for both Scheria and Ithaca. He believes that Homer sets Odysseus's adventures almost exclusively on the island of Sicily, because Nausicaa, the Phaeacian princess, wrote the *Odyssey*, and Sicily is the only place she knew.[7]

In contrast, A. Rousseau-Liessens proposes that Odysseus sails only along the coasts of Albania and Yugoslavia,[8] except for the Lotus Eaters who reside somewhere on the Gulf of Taranto.[9]

L.G. Pocock agrees with Butler that Homer was an inhabitant of Trapani, and Trapani is the setting for both Scheria and Ithaca. Furthermore, Odysseus's other adventures take place on islands around Sicily and Gibraltar. Pocock, like Butler, believes that the stories that make up the *Odyssey* are suggested by real places, but he differs from most in that he believes one location can be the background for more than one adventure. Homer is able to do this by emphasizing different aspects of a place in each story.[10] In addition, Pocock believes the *Odyssey* is an allegory, describing real places and events.

In his opinion, Odysseus represents a Greek hero living in Phoenician-controlled territory. He feuds with his neighbors, Polyphemus and the Laestrygonians, and then the Phoenicians, who represent Poseidon. They exile him to Ustica where he enters the Phoenician navy; this is his year with Circe. Odysseus is then sent on a mission to Gibraltar, which is Hades, and then east where he again falls into trouble at Thrinacia. He is exiled for seven years to Perejil at Gibraltar, which represents his stay with Calypso. After returning home, he feuds again. This feud symbolizes his encounter with the suitors,

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[4] See respectively, Moulinier (supra n. 3) 77–83, 109–18.

[5] Moulinier (supra n. 3) 85–93.

[6] See respectively, E. Bradford, *Ulysses Found* (New York 1964) 43–62, 67, 78, 179–95, 104–15.

[7] S. Butler, *The Authoress of the Odyssey* (Chicago 1967) 158–207.

[8] A. Rousseau-Liessens, *Géographie de l'Odyssée: la Phéacie*, Volume 1 (Bruxelles 1961) 13–102; A. Rousseau-Liessens, *Géographie de l'Odyssée: les récits*, Volume 2, Part 1 (Bruxelles 1962) 9–134.

[9] Rousseau-Liessens, Volume 2, Part 1 (supra n. 8) 32–33.

[10] L.G. Pocock, *Reality and Allegory in the Odyssey* (Amsterdam 1959) 20.

resulting in his being forced to live out his days with the Phoenician rulers.[11]

In contrast to those who favor a limited geographic range, others believe Odysseus sails out into the Atlantic. Gilbert Pillot proposes that Odysseus sails from Troy to Madeira and then to Iceland, and he returns via Ireland and Scotland.[12] Henriette Mertz has Odysseus sailing west. Odysseus first visits the Lotus Eaters who are in northern Africa, but Circe lives on the island of Madeira in the Atlantic. The Sirens live on Hispaniola and Cuba; the Clashing Rocks are on the Windward Passage between Cuba and Haiti; Charybdis and Scylla are in Nova Scotia; Calypso's island, Ogygia, is the island of Santa Maria, one of the Azores; and Scheria is North America.[13]

Of those that believe Odysseus sails only in a mythological world, the most convincing is Thomas Seymour. According to Seymour, the *Iliad* and the *Odyssey* speak clearly for themselves. On his return from Troy, Odysseus is blown off course at Cape Malea, and his ships are driven for nine days by Boreas to the land of the Lotus Eaters. Unfortunately, this land is not otherwise identified, but it is thought to be in or near Africa. Odysseus and his men then sail for an unspecified time in an unspecified direction until coming to the country of the Cyclopes. After leaving, they sail for an unspecified time, in an unspecified direction, to the floating island of Aeolus. Aeolus, who is master of the winds, gives them a favorable West Wind to convey them to Ithaca, but when Odysseus's comrades open the bag containing other winds just as they arrive off the coast of Ithaca, they are driven back to the island of Aeolus. From Aeolus's island, Odysseus heads in an unspecified direction for six days and on the seventh day comes to the land of the Laestrygonians. After losing all but one ship, Odysseus sails on for an unspecified time in an unspecified direction, until he comes to the island of Circe. From her island, he sails in one day, in an unspecified direction, to the realm of Hades after which he returns to Circe's island. The next day, Circe gives Odysseus a favorable breeze blowing in an unspecified direction that takes him by the island of the Sirens, between Scylla and Charybdis, and to the island of Helios. After his comrades kill some of the kine belonging to Helios, they are killed, the ship is lost, and Odysseus, floating on wreckage from his ship, is carried back to Charybdis by a South Wind. After surviving this ordeal, he is carried on his raft in an unspecified direction for nine days, and on the tenth night reaches Calypso's island. On leaving Calypso's island, Odysseus sails for eighteen days due East. He maintains this heading by keeping the Great Bear on his left. He survives another wreck and floats on wreckage for two days and nights while a strong North Wind blows. He then swims ashore to Scheria. Upon leaving Scheria, in an unspecified direction, Odysseus is carried back to Ithaca in a single night, but Phaeacian ships are known to be "swift

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[11] Pocock (supra n. 10) 13–32, 47–133.

[12] G. Pillot, *The Secret Code of the Odyssey* (New York 1972) 44–114.

[13] H. Mertz, *The Wine Dark Sea* (Chicago 1964) 17–165.

as a thought" (ὡς εἰ νόημα),[14] and Homer does not suggest that a Greek vessel could travel from Scheria to Ithaca in only one night.[15]

Seymour cogently argues that this sketch of Odysseus's travels indicates that it is impossible to try to identify most of the sites in the *Odyssey* based only on the sailing directions provided by Homer. In addition, the geographic epithets given to places visited by Odysseus are not very specific. Homer does not assign an epithet to the land of the Lotus Eaters. The island on which Odysseus beaches his ships near the land of the Cyclopes is low and well wooded; it has good soil and a good harbor; it has a spring; and it lies not very far from the mainland. The floating island of Aeolus consists of a bronze wall and sheer rock. The island of the Laestrygonians has a harbor surrounded by steep rocks with a narrow entrance between projecting headlands.[16] These epithets, like the sailing directions, are so general that they can be applied to many of the islands and lands of the Mediterranean.

Pocock concedes that the times and directions of Odysseus's travels are at best indefinite and, in most stories, neither is given. The time taken on a voyage cannot therefore be a reliable guide to the distance of a voyage.[17] Nevertheless, Pocock maintains the stories that make up the *Odyssey* are suggested by real places. He believes the vividness of Homer's descriptions are proof they are based on reality and on Homer's personal knowledge of them.[18] What Pocock says is probably true, but if only one location can be the scenery for more than one story and since the topography and geology of many Mediterranean islands are similar, Homer could easily create all locations described in Odysseus's travels without leaving the Aegean.

Scholars who believe that Homer is describing specific sites in the western Mediterranean undermine their own position because many of them are able to argue, rather convincingly, for different locations for each landfall made by Odysseus. The only definite statements that can be made in regard to Odysseus's voyage are that the land of the Lotus Eaters is south of Cape Malea, and other places described by Homer might be almost anywhere west of Ithaca.[19] This suggests that Homer's descriptions are too vague to prove any accurate knowledge of the western Mediterranean.

Of course, if Homer's descriptions are so vague, why is he so convincing? Denys Page suggests it is his

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[14] *Od.* 7.36, 7.321–26.

[15] T. Seymour, *Life in the Homeric Age* (New York 1914) 58–60.

[16] Seymour (supra n. 15) 60–61.

[17] Pocock (supra n. 10) 22–23.

[18] Pocock (supra n. 10) 12, 20.

[19] Seymour (supra n. 15) 57–58.

skill as a storyteller. Homer begins Odysseus's travels not at Cape Malea, where he is blown off course to the Land of the Lotus Eaters, but in Thrace. Odysseus's first adventure is his raid against the Cicones. This raid creates an "illusion of reality" that sets the tone for the following adventures. This illusion is strengthened by placing what the Greeks thought were "historical characters" from the *Iliad* in a mythological setting. Finally, Homer is careful to make his characters and events as lifelike as possible. He suppresses or modifies the magical elements in his stories to produce a tale that seems almost credible to a reader or listener.[20]

One way to better evaluate Homer's abilities as a geographer is to see how accurately he describes foreign places that we know existed and have accurate information on. It is obvious that Homer knew of Egypt, which is described as a wealthy land producing many medicinal herbs and in which every man is a physician.[21] The king lives in the rich and powerful city of Thebes.[22] Even an old Ithacan is called Aegyptius,[23] suggesting either he or a member of his family traveled there. Homer tries to give the impression that he had an intimate knowledge of this country, but, at the same time, Homer also states that the island of Pharos is a day's sail from Egypt.[24] Yet, Pharos Island is less than two kilometers from shore. A few rationalizations have been proposed to explain this discrepancy. One is that Homer knew the Delta of the Nile was alluvial. He therefore sets Pharos far from shore to suggest how the coast had changed since the time of Menelaus.[25] The second is that Homer is referring to the time it takes to travel from Pharos to the Canopic mouth of the Nile where Naucratis was later established.[26] Homer also describes Egyptian Thebes as a city with a hundred gates, but no evidence exists to support him.[27] It has been suggested that the gates refer to the great pylons of Egyptian temples.[28] Regardless of whether these are accurate interpretations, we are still forced to rationalize Homer's descriptions of Egypt to make them

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[20] D. Page, *Folktales in Homer's Odyssey* (Cambridge 1973) 4–5.

[21] *Od.* 4.127, 4.229.

[22] *Il.* 9.382; *Od.* 4.126–27.

[23] *Od.* 2.15.

[24] *Od.* 4.354–57.

[25] Seymour (supra n. 15) 55, n. 1.

[26] W.B. Stanford, *The Odyssey of Homer* I (New York 1959) 278. See also, D. Gray *Seewesen* (Göttingen 1974) 106–07.

[27] *Od.* 9.383–84.

[28] Seymour (supra n. 15) 55, n. 2.

consistent with what we know of it.

To the west of Egypt is Libya. Homer tells us nothing other than that sheep have a very short gestation period, being able bear offspring three times a year, and that seafarers sail close to Crete when traveling from Phoenicia to Libya.[29]

Of the Aethiopians, Homer tell us little other than they are split into two groups, one to the farthest east and the other to the farthest west.[30] They often entertain the gods with feasts. Twelve-day visits by the gods seem to be common,[31] suggesting a great distance between Mt. Olympus and Aethiopia. The only other mention of Aethiopia is that Menelaus visits it. The ancients assume that Aethiopia was located somewhere in the Red Sea, and they propose three different routes Menelaus could have taken to reach it: either through the Straits of Gibraltar, over the Isthmus of Suez, or via a canal connecting the Nile to the Red Sea.[32]

Homer also gives the impression that he has an intimate knowledge of Sidon and Phoenicia,[33] but he does not describe either location. Homer fails to mention either Tyre or Byblos, but a cable is called βύβλινον after Byblos,[34] suggesting that this city may have been a middleman for papyrus.[35] Homer does mention Cyprus, but gives little detail. Dmetor is a king in Cyprus,[36] and Aphrodite has a sanctuary at Paphos.[37]

To the west, Homer mentions both Italy and Sicily. Mentes, a Taphian king, goes to Temese (Τεμέσην) to exchange his iron for copper.[38] Strabo proposes that Temese is Temesa in Bruttium on the west coast of Italy, but a less popular, although possible site, is Tamasos in Cyprus, which was also known for its rich

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[29] *Od.* 4.85, 14.295–301.

[30] *Od.* 1.24.

[31] *Il.* 1.423; *Od.* 1.22.

[32] Strabo 1.2.31.

[33] *Il.* 6.291; *Od.* 4.617, 14.288–300.

[34] *Od.* 21.391.

[35] A. Köster, *Das Antike Seewesen* (Berlin 1923) 78.

[36] *Od.* 17.443.

[37] *Od.* 8.362–63.

[38] *Od.* 1.184.

copper sources.[39]

In regard to Sicily, Homer only mentions that the old woman who cares for Laertes is from Sicily, and the Sicels are noted slave traders,[40] but he fails to mention trips to the island of Sicily. Homer appears to have a wide knowledge of a number of countries from Sicily in the West to Phoenicia in the East, but he also appears to have little or no detailed knowledge of these same areas. In contrast, Homer does seem to have a more detailed knowledge of the Aegean region.

Homer does mention more detailed features in this region.[41] He describes not only Mt. Olympus, but its relationship to Mt. Ossa and Mt. Pelion. Otus and Ephialtes, who were sons of Poseidon, wanted to stack Ossa on Olympus and Pelion upon Ossa, so they could climb to the heavens.[42] Seymour argues that Homer must have seen the shapes of these mountains to know which of the three should form the base and which the apex.[43] In addition, Homer knows the names of many countries and specific places, but his reputation of having exact geographic knowledge is based only on three or four epithets in the Catalogue of Ships.[44] These epithets describe Aulis as "rocky," Thisbe is teeming with "doves," and Haliartus as "grassy".[45] Of course, these epithets are somewhat suspect in that many other sites in the Aegean are also grassy, rocky, and have doves. This suspicion is heightened when we consider that Homer uses only a few characteristic epithets to describe most sites. Mycenae is "broad-streeted" and "rich-in-gold,"[46] but Homer fails to describe the walls of the citadel or the Lion Gate, which have never fallen nor been concealed. Athens is seldom mentioned and is described only by epithets of "sacred," "broad-streeted," and "a well-built town."[47] Many prominent places are not even mentioned, such as Smyrna, Ephesus, and Sardis, while Rhodes and Miletus are only mentioned once.[48] More importantly, Homer appears to make a

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[39] E.D. Phillips, "Odysseus in Italy," *JHS* 73 (1953) 54. See also, Stanford (supra n. 26) 223–24.

[40] *Od.* 20.383.

[41] See for example, J. Scott, *The Unity of Homer* (Berkeley 1921) 4–7; Gray (supra n. 26) 1.

[42] *Od.* 11.307–316.

[43] Seymour (supra n. 15) 55.

[44] *Il.* 493-760.

[45] *Il.* 2.496, 2.502, 2.503; Seymour (supra n. 15) 64–65.

[46] *Il.* 4.52, 7.180.

[47] Seymour (supra n. 15) 64.

[48] Seymour (supra n. 15) 56.

number of geographic errors. Pylos, the home of Nestor, has been associated with the site of Epano Englianos in Messenia since its discovery by Carl Blegen,[49] but this association does raise some problems. Athena gives Telemachus a West Wind to carry him from Ithaca to Pylos in a single night.[50] Yet, a voyage from Ithaca to the Bay of Navarino (Pylos) cannot be completed in a single night, and Telemachus needs a Northwest by North Wind to take him there, not a West Wind.[51] More importantly, Telemachus and Nestor's son Pisistratus travel in a chariot from Pylos to Pherae, and then, on to Sparta.[52] Homer fails to mention a mountain range en route to Sparta, but such a journey would take Telemachus over Mt. Taygetus. According to Seymour, this route is better suited to bandits and goats, and he argues that a chariot drawn briskly by horses has never traveled along this route. Seymour is able to rationalize these discrepancies by proposing that Homer either knew nothing of this route, or Nestor's Pylos was not in this region.[53]

John Scott makes a similar observation in regard to the West Wind, Zephyrus. Zephyrus is considered by ancient Greek and Latin writers as a gentle and benevolent wind, but Homer describes it as rough and difficult. Scott rationalizes this by proposing that Homer was from Smyrna, which is one of the few places where Zephrus is a rough wind.[54] Other proposed geographic irregularities include the description and location of Ithaca, the landing of Agamemnon on his return from Troy,[55] and the location of the plain of Marathon.[56]

Finally, we see some disagreement as to which region Homer best describes. Seymour claims that Homer has little knowledge of Asia Minor, outside the Troad, or any other country with the exception of Greece. What knowledge he does have of countries outside Greece is confined to the coast.[57] In contrast, Scott argues that Homer's most detailed knowledge is of the area around Smyrna on the coast of Asia

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[49] W. Taylour, *The Mycenaeans* (London 1983) 11.

[50] *Od.* 2.421, 2.434.

[51] Seymour (supra n. 15) 53, 68.

[52] *Od.* 3.481–4.1.

[53] Seymour (supra n. 15) 68

[54] Scott (supra n. 39) 4–5.

[55] Seymour (supra n. 15) 68–76 [Ithaca], 66 [Agamemnon].

[56] Scott (supra n. 41) 52.

[57] Seymour (supra n. 15) 53, 56.

Minor.[58] Dorothea Gray agrees with Scott in that both epics best describe the eastern Aegean. She believes that both poems reflect an exact knowledge of the weather conditions in the Aegean, particularly in the eastern Aegean. In the Odyssey, a more general knowledge of the Levant is suggested and only a vague knowledge of the western seas. Homer's accurate description of the steady Southeast Wind in the straits of Messina is one of the details suggesting Homer acquired some of his material while living in Sicily.[59]

We see a similar pattern of disagreement in regard to Homer's knowledge of the Aegean as we previously saw in regard to his knowledge of the western Mediterranean. We should not be surprised by this. After all, Homer is a poet, and poets are seldom considered as accurate sources of geographic knowledge. Furthermore, as Seymour points out, the limits of geographical knowledge during Homer's time were narrow, and it is doubtful that Homer could ignore matters that were familiar to his audience. He had nothing to gain by appearing ignorant of what others knew. We must look at Homer as a man of his times, rather than an archaeologist or geographer.[60] As such, a background of Homeric times will elucidate this problem.

Sea charts are unknown until 499 B.C. and still appear to be an oddity during the time of Aristophanes (444–388 B.C.).[61] Even Herodotus states that the pass at Thermopylae runs north and south,[62] but it actually runs east and west. This error was accepted until 1825.[63] If such errors were commonly accepted for such famous land features, it should not be surprising that errors were even more common in regard to seafaring. This is especially so since the evidence suggests that Homeric Greeks had only relatively recently been sailing out of the Aegean.

After the "Dark Ages," Al Mina is believed to be one of the most important and earliest Greek trading post in the eastern Mediterranean. The earliest evidence for a Greek presence dates to around 800 B.C., and a similar presence is seen on Cyprus at about the same time.[64] To the West, the site of Pithekoussai was established at about 775 B.C. and Naxos at 735 B.C. If we accept the general belief that Homer lived

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[58] Scott (supra n. 41) 4–8.

[59] Gray (supra n. 26) 12, 137.

[60] Seymour (supra n. 15) 53.

[61] See respectively, Herodotus 5.49; Aristophanes *Nub*. 206.

[62] Herodotus 7.176.

[63] Gray (supra n. 26) 1.

[64] J. Boardman, *The Greeks Overseas* (London 1980) 39, 43.

sometime from the later half of the eighth century B.C. to the beginning of the seventh century B.C., then he lived during this period of Greek exploration and expansion into Italian waters. Furthermore, Homer would have lived about 50 years before Demaratus made his voyages to Erutria (c.a. 657 B.C.),[65] about 60 years before Colaeus discovered Tartessus in Spain,[66] and about 100 years before the Phocaeans founded Massilia in southern France (c.a. 600 B.C.).[67] He lived at a time when little was known about Italy. Hesiod, who is believed to have lived a generation later, still believed that Etruria was a kingdom of islands.[68] The region west of Sicily was probably for the most part an unknown region. In addition, when we consider that Homer lived during a period when all information was circulated by word of mouth, it is understandable that his descriptions are so vague.

The fact that Homer lived at a time when Greeks were first colonizing Italy may explain why Charybdis and Scylla, Polyphemus, and Circe have all been associated with this region.[69] Such a seafaring story would have been quite popular during a period of exploration, especially since so little was know of these new lands. They are always described as lands of plenty with good harbors, but the people who inhabit these lands and the western seas that must be crossed are dangerous. Both elements would have held the attention of Homeric audiences, much like *Gulliver's Travels* fascinated eighteenth century readers.[70] We must also take into consideration that if Homer was forced to acquire his background information from seafarers, such seafarers may have refused his requests. Traders that had a virtual monopoly in some regions may have been reluctant to share their knowledge in fear of inviting competition. Some seafarers may have even spread false information or exaggerated the dangers of sailing in western waters. Charybdis and Scylla and the Sirens may have been invented to discourage others from sailing into unknown, yet lucrative areas.

Homer was indeed a man of his times. He appears to have a general knowledge of the Aegean, is aware of the eastern Mediterranean region, and knows little of the region north or west of Sicily. In fact, he knows as much as a man could who lived during a period of exploration when maps and books did not exist. Finally, much of his knowledge may have been omitted from both epics because it was not relevant to his story or because of metrical constraints. We do know that by his time Achaeans, Taphians, and

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[65] Boardman (supra n. 64) 202; Pliny, *N.H.* 35.152; Livy 1.34; Dionysius Halicarnassensis 3.46.

[66] Boardman (supra n. 64) 213; Herodotus 4.152.

[67] Boardman (supra n. 64) 162, 217.

[68] *Theogony* 1015.

[69] Seymour (supra n. 15) 58–60.

[70] R. Quintana, *Swift: An Introduction* (New York 1955) 23.

Phoenicians were sailing throughout the eastern Mediterranean and opening up the West. The thought of Odysseus on a long voyage to Egypt at such an early time captures our imagination. Just as important, but more mundane, are the harbors that provide Odysseus with a safe haven, which we will look at in the next chapter.

CHAPTER X

HARBORS

Homeric harbors are always natural features. The best harbors are those surrounded by high cliffs on both sides with two jutting promontories running toward a narrow mouth, protecting a ship from waves and winds.[1] Achaean sailors look for harbors with good εὔορμος; εὔορμος refers to good holding ground, moorings, or shelter.[2] An island near the cave inhabited by Polyphemus has such a harbor. Neither anchors nor stern cables are required to moor here. A ship is run ashore and sailors can wait for the right winds to blow before continuing their voyage.[3] The harbor of Phorcys at Ithaca is similar in that it has two projecting headlands at its mouth that protect ships from large waves and heavy winds so well that moorings are not needed.[4]

When entering less protected harbors, sailors take down, gather, and stow the sail, lower the mast and place it in a crutch, row to a mooring, throw out the anchors, and then make fast the stern cables to the shore. This sequence is followed even for the shortest stays.[5] Of course, exceptions always exist. When a ship enters a harbor at night, the mast and sail are taken down after beaching.[6]

When preparing to leave a harbor, the crew will load the running gear, stow provisions and any other possessions or booty (such as sheep or women), set the mast and sail, put the oars in place, castoff the stern cables, go back on board, and then row the ship out. Homeric ships also carry a long pole (κοντός) on board to aid in pushing away from shore or for maneuvering in shallow water.[7] The mast and sail can be raised either before boarding or after rowing out. The sail is unfurled after leaving the harbor, and, once it fills with wind, the lines are made fast.[8]

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[1] *Od.* 10.87–90.

[2] R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman 1988) 168, εὔορμος; *Od.* 4.358, 9.136; *Il.* 21.23.

[3] *Od.* 9.136–39.

[4] *Od.* 13.96–101.

[5] *Il.* 1.432–36, *Od.* 3.10–12, 15.495–98 [short stay for lunch].

[6] *Od.* 9.142–49.

[7] *Od.* 9.487.

[8] *Od.* 2.389–90, 2.414–33, 3.153–54, 3.577–78, 4.780–86, 11.2–5, 11.7–9.

Homer does describes more than one way to moor a vessel. The fastest way is to row a ship, bow first, directly on to the beach. When the Phaeacians return Odysseus to Ithaca, their vessel is moving so fast that it is halfway out of the water when it stops.[9] Such a rapid type of landing may have been adopted for raiding. To land bow first allows raiders to come in, disembark, and attack as quickly as possible. Homeric ships, however, are most commonly moored stern first. According to Thomas Seymour, the habit of mooring stern first was a natural precaution of early ages, making ready for a speedy departure if this should prove necessary.[10] This practice is mentioned as late as the thirteenth century A.D. Francesco da Barberino (A.D. 1264–1348) wrote in his *Documenti d'amore* that a galley should enter a harbor stern first so it could flee quickly if attacked.[11] Further precautions may also be take in extreme situations. When Odysseus and his ships arrive at the island of the Lastrygonians, all ships, except Odysseus's, tie up close together inside the harbor. In contrast, Odysseus stays outside the harbor and makes fast his ship to a cliff with a cable. He has apparently grown more cautious after his encounter with Polyphemus. When the Lastrygonians attack, all ships inside the harbor are lost, but Odysseus cuts his cable and escapes.[12] On the other hand, we must be careful not to overstate the importance of mooring stern first as only a precaution from attack. This appears to be the most common way to moor regardless of the situation. Another factor that may have influenced mooring stern first was the shape of the hull. Ships with high-curving sterns may have been easier to moor stern first close to shore than mooring by the bow.

If a stay was to be brief, sailors moored their ship with stern ropes (πρυμνήσια, πεῖσμα, δεσμός) to trees or rocks on shore. The Egyptians at Punt also tie their mooring cables to trees, but they moor from the bow possibly suggesting there is no danger from the inhabitants of Punt. Furthermore, the bow was probably grounded since there is no evidence that anchors were used at Punt (fig. 10.1).

Seymour infers the length of a mooring cable in a rather macabre fashion. Odysseus hangs twelve unfaithful maids with such a cable. One end is tied either to a gateway or column of the palace and the other end to a building in the courtyard.[13] Odysseus then fashions nooses for each woman's head. Seymour calculates that a rope sixty feet long would have sufficed and would also have been suitable for a stern cable.[14] Unfortunately, Seymour fails to elaborate on how he tested his hypothesis and arrived at an

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[9] *Od.* 13.114–16.

[10] T. Seymour *Life in the Homeric Age* (New York 1914) 314.

[11] F. da Barberino, *Documenti d'amore* (Rome 1640) 275.

[12] *Od.* 10.87, 10.95–96, 10.127.

[13] *Od.* 22.465.

[14] Seymour (supra n. 10) 315.

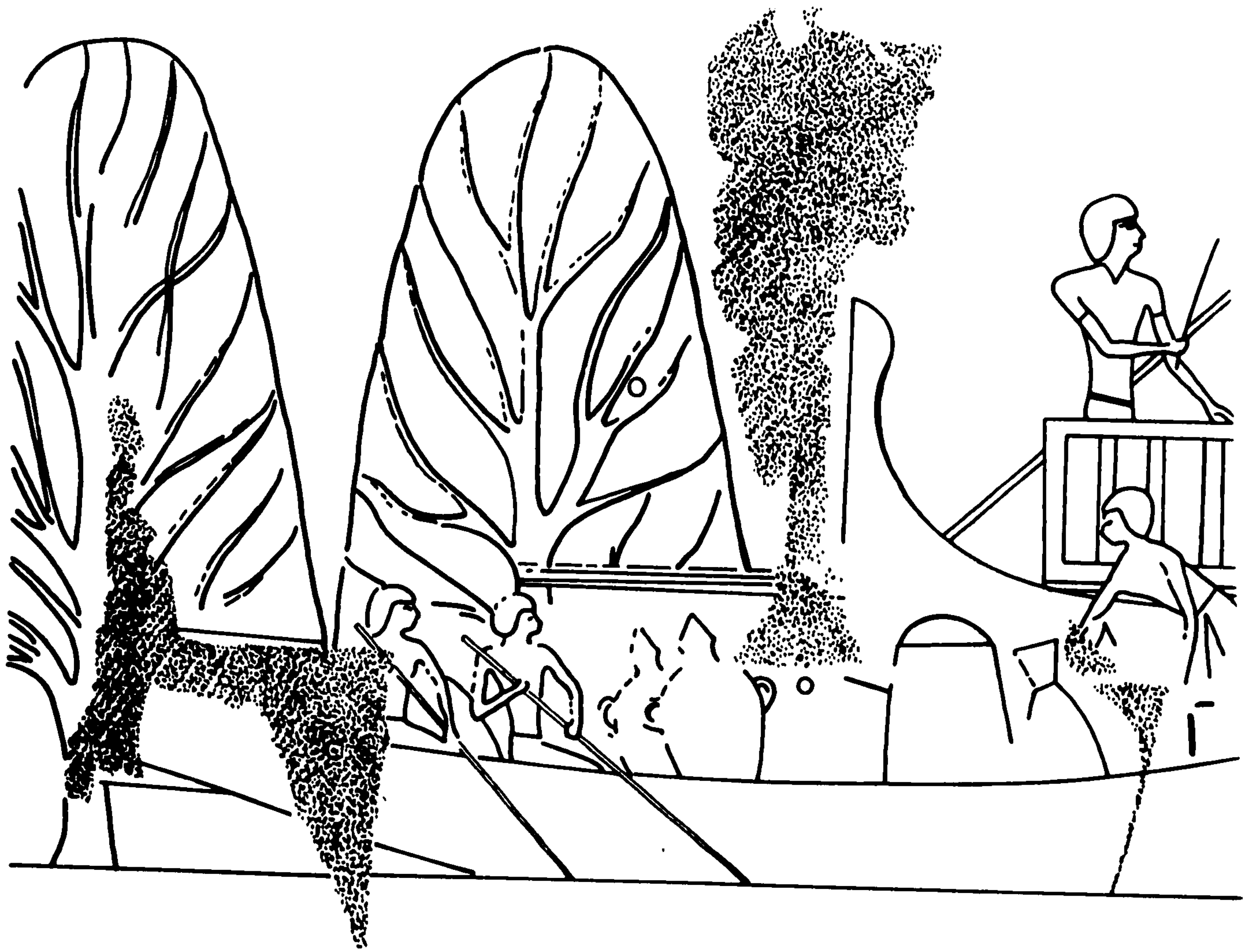

Fig. 10.1. Cable mooring for one of Queen Hatshepsut's ships. (After É. Naville, *The Temple of Deir el Bahari: End of Northern Half and Southern Half of the Middle Platform*, No. 16, Part 3 [London 1898] pl. 72)

accurate length.

When a ship is moored by the stern cables at least two men are nearby,[15] and, although a guest may sleep onboard, crewmen sleep beside the stern cables.[16] These precautions were probably not only to guard a ship but also to allow the crew more time to react to emergencies, such as when a strong wind blows up that requires repositioning or adding cables. For example, when the weather turns bad during the third watch on the island of Helios, the ship is dragged into a cave.[17]

If wind was blowing in from the sea, then anchor stones (εὐναί) were cast from the bow.[18] Scholars consistently translate εὐναί as anchor stones. They believe they were little more than stones pierced with a hole for the cable (fig. 10.2).[19] But Homer never says anchors are made of stone. In contrast, he does describe the Phaeacians mooring their ships to a τρητός λίθος, which is literally a "pierced stone" that is permanently fixed in the harbor.[20] Seymour proposes that Homeric Greeks must have been using simple anchor stones only because we lack evidence that anchors with flukes had yet been invented.[21]

In support of this argument, Lionel Casson points out that εὐναί can literally mean "beds." He claims that flat stones used for anchors look like beds on the sea floor.[22] Nevertheless, a translation of "beds" for εὐναί is only one possible translation. Homer also uses εὐνή to denote sexual intercourse, a place of ambush, a place to keep swine, and a place for rest or sleep in general, such as a lair.[23] Εὐνή is commonly associated with the act of lying down. We cannot, therefore, safely assume that εὐναί denotes a flat stone anchor because even an anchor with a stock, shank, and arm lies down when the tooth of the arm digs into the seabed.

Stone anchors have been found in the Aegean, but such anchors are very rare compared to the number of

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[15] *Od.* 3.424.

[16] *Od.* 3.353, 3.365, 12.32.

[17] *Od.* 12.317.

[18] Seymour (supra n. 10) 314; see *Il.* 1.436.

[19] Seymour (supra n. 10) 314; J.S. Morrison and R.T. Williams, *Greek Oared Ships 900-322 B.C.* (Cambridge 1968) 56; L. Casson, *Ships and Seamanship in the Ancient World* (Baltimore 1995) 48, n. 45.

[20] *Od.* 13.77.

[21] Seymour (supra n. 10) 314.

[22] Casson (supra n. 19) 48, n. 45.

[23] See respectively, *Il* 3.445, *Od.* 4.438, 14.14, 5.482; Cunliffe (supra n. 2) 167–68, εὐνή.

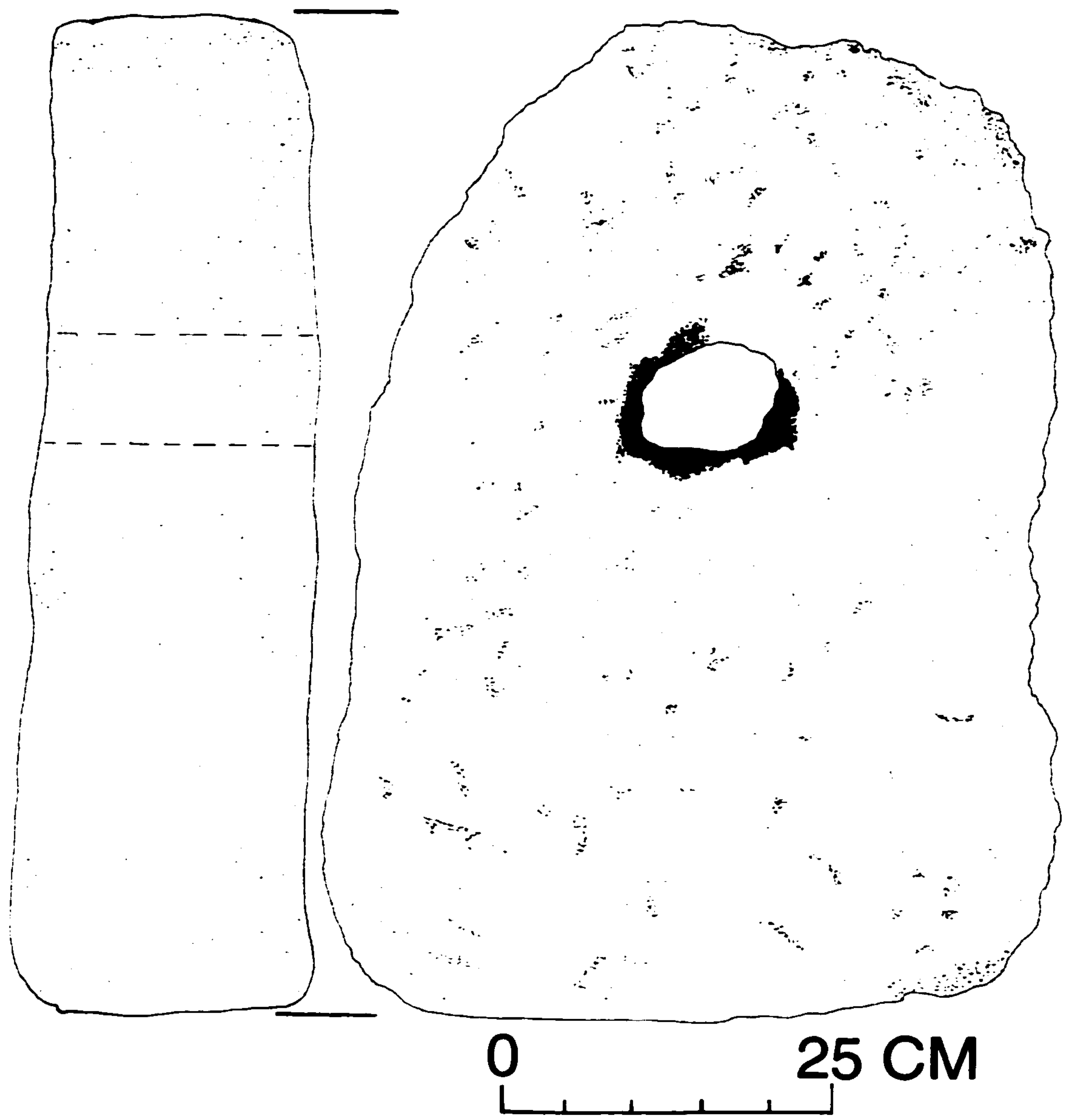

Fig. 10.2. Scale sketch of a stone anchor KW 1040 from the Uluburun wreck. (After field drawings and photographs)

similar anchors found in the Levant.[24] In contrast, stone anchor stocks were recovered from the sixth-century Giglio wreck,[25] and a wooden anchor was recovered from the Ma'agan Michael wreck that dates to about 500 B.C. The head, shank, crown, and arm were carved from a single piece of naturally curving timber. The stock was also of wood and was attached to the shank with a wooden cotter pin, but the wooden arms were filled with lead (fig. 10.3).[26] Evidence for similar anchors has been discovered in France, Sicily, and Italy.[27] Wooden anchors with stone stocks were developed by the seventh or sixth centuries B.C., at the latest.[28] The Bon Porté vessel may also have carried anchors with lead-filled stocks. If not, little doubt exists that such anchors were used by the end of the fifth century B.C.[29] Therefore, evidence for a well-developed composite anchor exists between 100 to 300 years after Homer's time. When we consider the rarity of stone anchors in this region, it is possible that Homeric Greeks were using anchors like that from the Ma'agan Michael wreck instead of flat anchors stones.

Homer also uses the plural form of εὐνή raising the possibility that Homeric sailors are dropping one anchor from both the port and the starboard side of the bow. The crew would pick a location for the first anchor while the ship stands against the current or wind. This anchor is the riding anchor. Once dropped, the crewmen let out cable as the ship is carried by wind or current until it is at the location for the second or lee anchor. After dropping the lee anchor, the crewmen lay cable for the lee anchor and pull in on the riding cable until the vessel is midway between both anchors.[30] This process may also have been facilitated with the use of oarsmen to position a ship.

Homer may also be describing one cable with a large anchor at the end and a number of small anchor stones spaced at intervals along an auxiliary line attached to the main cable. Small, evenly spaced anchor stones, called catenary stones or weights, on one cable would act as links in a chain, which absorb the

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[24] S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* (College Station, Texas 1998) 255–93.

[25] M. Bound, "The Giglio Wreck," *ENAAIA*, Supplement 1 (Athens 1991) 14–25.

[26] J.P. Rosloff, "A One-Armed Anchor of *c.* 400 B.C.E. from the Ma'agan Michael Vessel, Israel. A Preliminary Report," *IJNA* 20 (1991) 223–24.

[27] Rosloff (supra n. 26) 225.

[28] Rosloff (supra n. 26) 226.

[29] C.J. Eiseman and B.S. Ridgeway, *The Porticello Shipwreck: A Mediterranean Merchant Vessel of 415–385 B.C.* (College Station, Texas 1987) 23, n. 21; Rosloff (supra n. 26) 226.

[30] A.M. Knight, *Modern Seamanship*, Eleventh Edition (New York 1945) 232.

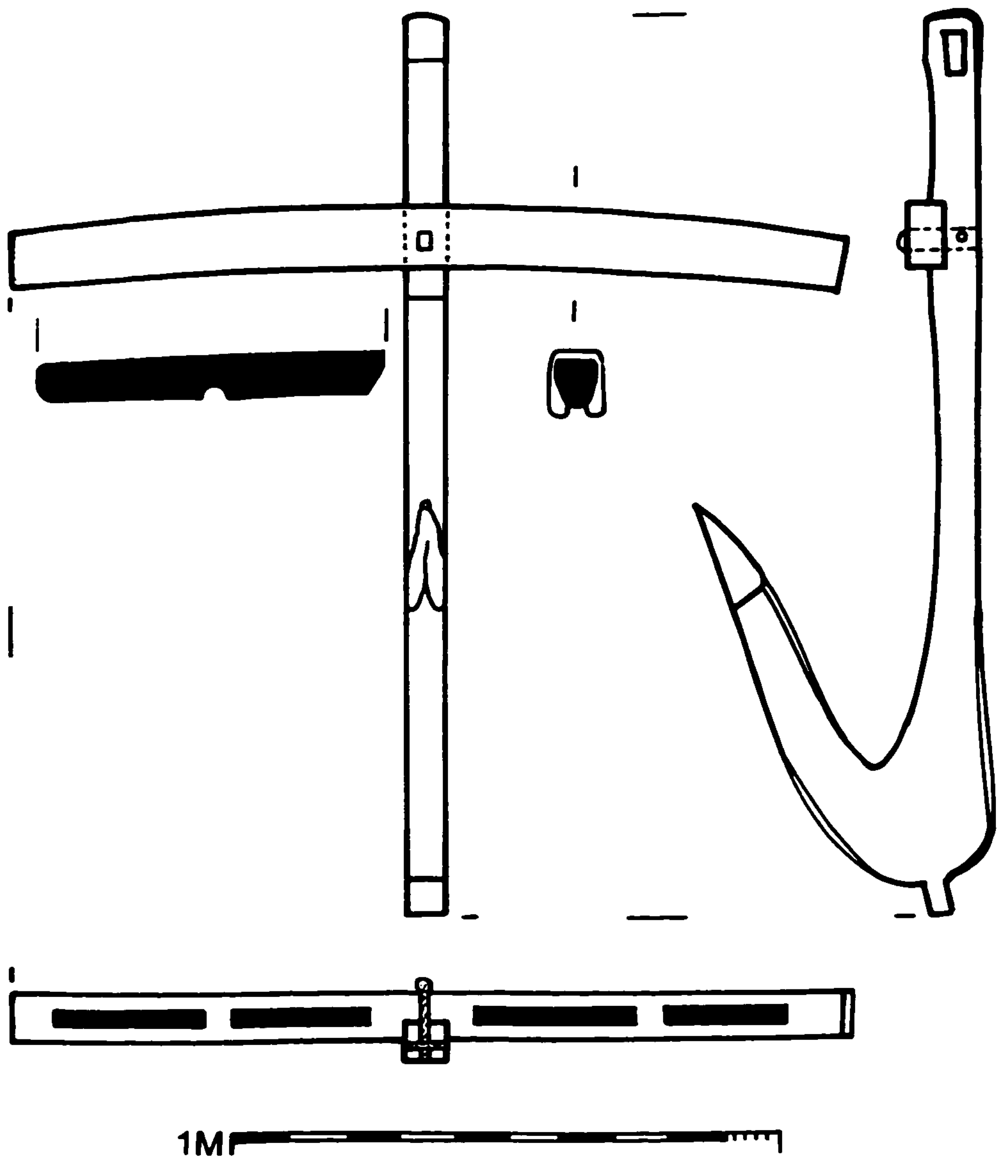

Fig. 10.3. Ma'agan Michael anchor. (After J. Rosloff, "A One-Armed Anchor of *c.* 400 B.C.E. from the Ma'agan Michael Vessel, Israel. A Preliminary Report," *IJNA* 20 [1991] fig. 2)

shocks of waves and reduce the possibility that an anchor will drag in high seas (fig. 10.4).[31] A third possibility is that Homeric sailors tied cantenary anchors to all their anchor cables, and depending on the severity of the conditions used either one or two anchors from the bow. Unfortunately, this is all speculation. Only future discoveries will be able to clarify this arrangement.

Seymour distinguishes between a brief stay and stays of only a night or two. Stays of a night or two are longer and require that the stern be pulled ashore.[32] According to Seymour, this was because Homeric ships were not watertight, and must therefore be removed from the sea.[33] This explanation seems unlikely since it will leave a ship with a waterlogged bow and a dry stern. Homer does not give any indication of how much of the stern is usually pulled on shore, if any. It is possible that if winds are mild when mooring, then lightly grounding the stern and running stern cables ashore are enough to secure a ship. It may therefore be the weather conditions and not the length of time that dictate the manner in which a vessel is moored. Mooring in this fashion may also have allowed for easier unloading and loading of cargo.

For long stays a ship is dragged completely out of the water. Menelaus was forced to stay on Pharos Island for twenty days. Although Pharos has a good anchorage, Menelaus pulls his ship from the water.[34] When Odysseus decides to spend an extended time on Circe's island, his ship is dragged ashore and all gear is stored in caves.[35] At Troy, when stays of years are contemplated, special arrangements are taken. First a channel (οὐροί)[36] is dug or cut from the shore to the storage area. This channel probably facilitates dragging a ship up the beach. Some Achaean ships were probably a considerable distance from the sea because the large number of ships necessitated arranging them in two lines. When Agamemnon gives the order to abandon Troy, he tells his commanders to pull down the first line of ships and moor them in deep water so the remainder of the ships can be pulled down during the night.[37]

Once a ship is pulled into place on land, long props are placed against the side of a ship to keep it upright. These poles (ἕματος) are not mentioned after Homer's time. A possible parallel, however, is

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[31] H. Wallace, "Ancient Anchors: Taking Stock," *Triton* 8 (1964) 14–17; Wachsmann (supra n. 24) 286–87.

[32] *Od.* 9.546, 11.20.

[33] Seymour (supra n. 10) 315

[34] *Od.* 4.360, 4.428, 4.573, 4.358.

[35] *Od.* 10.402–05, 10.423–25.

[36] *Il.* 2.153.

[37] *Il.* 14.77.

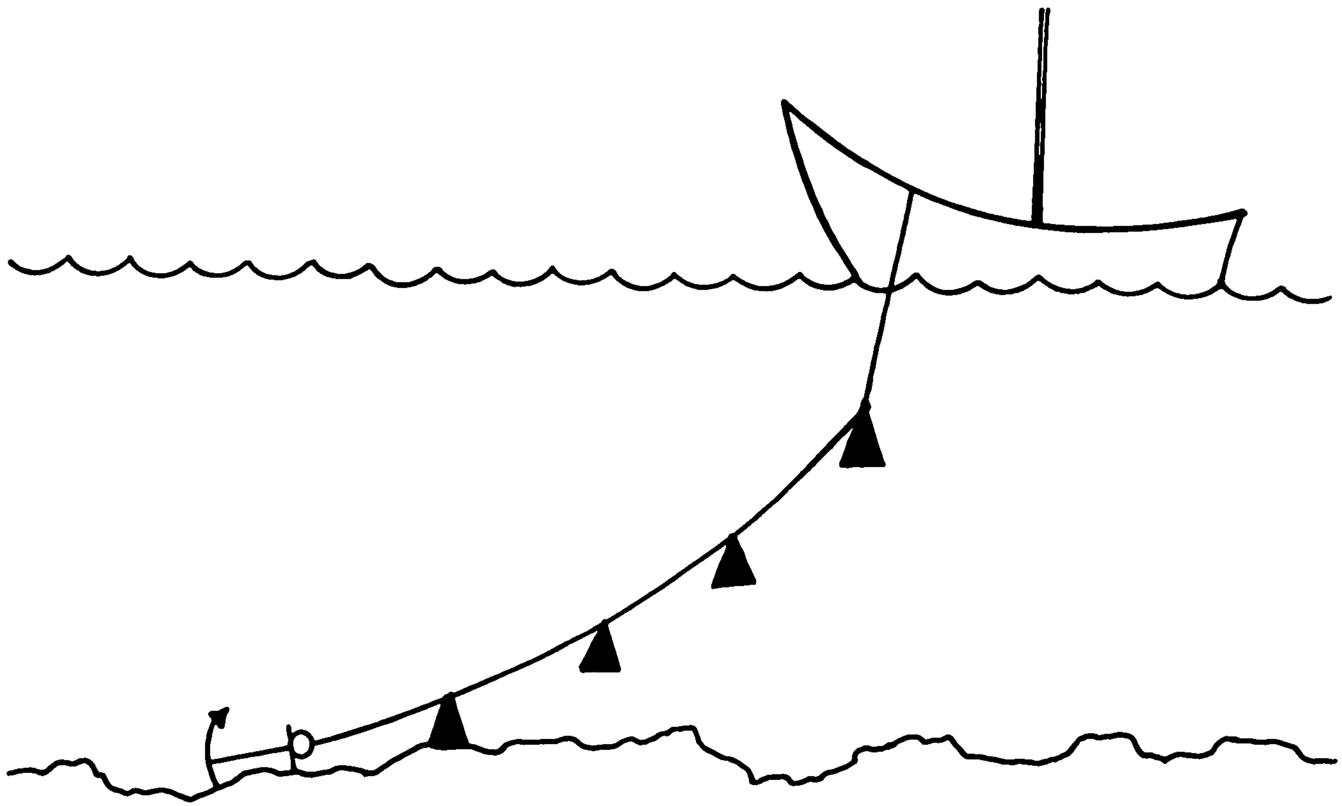

Fig. 10.4. Subsidiary anchors attached to an anchor cable. (After S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* [College Station, Texas 1998] fig. 12.50)

seen with the beaching of a *mtepe*. When a *mtepe* is brought ashore, long poles are placed underneath each through beam. This is necessary because if a laced ship is allowed to heal over on its side, the lacings can be strained.[38]

After the props are in place stones are packed underneath and around the sides of a ship probably to keep the planking from resting and rotting on the ground.[39] A similar practice is mentioned by Hesiod.[40] Hesiod also recommends that when a vessel has been pulled out of the water for the winter, the drain plug should be removed so that water may not gather in the bottom, but Homer fails to mention this.[41] The earliest mention of drain plugs dates back to Babylonian times when Utnapishtim builds an ark.[42]

When the Achaeans needed to use a ship at Troy, they first had to clear out the trench in which the ship was dragged.[43] Homer does not mention rollers to help move ships, but Apollonius of Rhodes does mention them (φάλαγγες).[44] When Odysseus launches his improvised vessel by himself, however, he does use levers.[45]

The Phaeacian harbor has some similarities to other Homeric harbors. It is a natural harbor that is well protected with a small opening, and it borders the city on two sides. It is different than all other landing places described in both epics because, instead of just mooring ships on the beach, each ship has a slip and is moored to a pierced stone. When a ship is ready to leave the harbor all that is required of the crew is to let go the mooring cable from the pierced stone.[46] Unfortunately, I have been unable to find any examples in the Aegean before the Classical period.

Although a good harbor is considered a safe haven for seafarers, it may also be an excellent location for an ambush. The suitors set an ambush by anchoring in a narrow strait between Ithaca and Samos Islands. After dinner, they go aboard and sail to the island of Asteris. It is an island with a double anchorage

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[38] J. Hornell, "The Sea-Going *Mtepe* and *Dáu* of the Lamu Archipelago," *MM* 27 (1941) 62.

[39] *Il.* 14.410, 1.486, 2.154; Seymour (supra n. 10) 315.

[40] *Op* 624.

[41] Seymour (supra n. 10) 316.

[42] J. Gardner and J. Maier, *Gilgamesh* (New York 1984) Tablet 11.20–24, 56–65.

[43] *Il.* 14.31–36.

[44] *Argonautica* 1.388; Seymour (supra n. 10) 315.

[45] *Od.* 5.261; Cunliffe (supra n. 2) 274, s.v. μοχλός.

[46] *Od.* 6.261–65; 10.96, 13.77.

where ships can be hidden while waiting for victims.[47]

Finally, Seymour points out that any Homeric passages that may suggest the use of a beacons to warn sailors of dangerous coasts and describe only to campfires of shepherds on the mountains.[48]

Harbors are where all voyages begin and where all sailors hope they will safely end. This voyage, however, has one more stop to make.

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[47] *Od.* 4.671, 4.842, 4.847.

[48] *Od.* 10.30, *Il.* 19.375.

CHAPTER XI

CONCLUSION

Homer reveals much of ships and seafaring in the *Iliad* and the *Odyssey*. Unfortunately, trying to look at his world through these works is like trying to navigate in an intermittent fog. Important aspects of Homeric seafaring are obscured, but we do have moments of clarity. Archaeology has dispersed some of the fog and allowed us to see Homer's world more clearly in the last few decades, but there is still much we cannot see. This is why this work should be seen as only one stop on a long voyage.

When beginning this voyage, the goal was to write an all encompassing work that would explain even the smallest detail of Homeric seafaring, but Homer can quickly humble one trying to understand his world. The most that I can hope for is that archaeological discoveries will continue to clarify Homer's works and substantiate my interpretations. The least is that this study will provide a starting point for someone else in the next thirty or forty years undertaking a similar voyage, a voyage that is rewarding regardless of its destination.

REFERENCES

*See APPENDIX A for standard abbreviations of publications.

Adams, R. 1985. *Construction and Qualitative Analysis of a Sewn Boat of the Western Indian Ocean.* M.A. thesis, Texas A&M University.

____. 1985. Designed Flexibility in a Sewn Boat of the Western Indian Ocean. In *Sewn Plank Boats.* Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276. Pp. 279–302. Oxford: British Archaeological Reports.

Ahlberg, G. 1971. *Fighting on Land and Sea in Greek Geometric Art.* Stockholm: Svenska institutet i Athen.

Albright, W.F. 1950. Some Oriental Glosses on the Homeric Problem. *AJA* 54: 162–76.

Amiet, P. 1980. *Art of the Ancient Near East.* New York: Harry N. Abrams, Inc.

Anderson, J.K. 1988. Wars and Military Science: Greece. In *Civilization of the Ancient Mediterranean: Greece and Rome* I. Edited by M. Grant and R. Kitzinger. Pp. 679–701. New York: Charles Scribner's Sons.

____. 1995. The Geometric Catalogue of Ships. In *The Ages of Homer: A Tribute to Emily Townsend Vermeule.* Edited by J.B. Carter and S.P. Morris. Pp. 181–91. Austin: University of Texas Press.

Arias, P.E. and M. Hirmer. 1962. *A History of 1000 Years of Greek Vase Painting.* New York: Harry N. Abrams, Inc., Publishers.

Athanasakis, A.N. 1976. *The Homeric Hymns.* Baltimore: Johns Hopkins University Press.

Azipurua, C. and J. Méndez. 1996. Extracción y tratamientos del barco Fenicio (barco 1) de La Playa de La Isla (Puerto de Mazarrón, Mazarrón)." *Cuadernos de arqueología marítima* 4 (Cartagena 1996) 217–25.

Bahn, P.G. 1994. Ancient Ships in Marseille. *Archaeology* 47: 15.

Barberino, F. da 1640. *Documenti d'amore.* Rome: Nella stamperia di Vitale Mascardi.

Basch, L. 1969. Phoenician Oared Ships. *MM* 55: 139–62, Pls. 6–9.

____. 1975. Another Punic Wreck in Sicily: Its Ram. *IJNA* 4: 201–28.

____. 1981. Carthage and Rome: Tenons and Mortises. *MM* 67: 245–50.

____. 1983. Bow and Stern Appendages in the Ancient Mediterranean. *MM* 69: 395–412.

____. 1983. When Is a Ram Not a Ram? *MM* 69: 129–42.

____. 1987. *Le musée imaginaire de la marine antique.* Athens: Institut hellénique pour la préservation de la tradition nautique.

Basch, L. and M. Artzy. 1985. Ship Graffiti at Kition. In *Excavations at Kition* V: *The Pre-Phoenician Levels, Areas I and II*, Part 1. Edited by V. Karageorghis and M. Demas. Pp. 322–37. Nicosea, Cyprus: Department of Antiquities, Cyprus.

Bass, G.F. 1967. Cape Gelidonya: A Bronze Age Shipwreck. *Transactions of the American Philosophical Society* Volume 57, Part 8. Philadelphia: The American Philosophical Society.

____. 1972. The Earliest Seafarers in the Mediterranean and the Near East. In *A History of Seafaring.* Edited by G.F. Bass. Pp. 11–36. New York: Walker and Company.

____. 1989. The Construction of a Seagoing Vessel of the Late Bronze Age. In *Tropis* I. Edited by H. Tzalas. Pp. 25–35. Athens: Hellenic Institute for the Preservation of Nautical Tradition.

____. 1997. Beneath the Wine Dark Sea: Nautical Archaeology and the Phoenicians of the *Odyssey*. In *Greeks and Barbarians: Essays on the Interactions between Greeks and Non-Greeks in Antiquity and the Consequences for Eurocentrism*. Edited by J.E. Coleman and C.A. Walz. Pp. 71–101. Bethesda, Maryland: CDI Press.

Bealer, A.W. 1980. *Old Ways of Working Wood.* New York: Barre Publishing Company, Inc.

Bell, C.D.J. 1933. Ancient Egyptian Ship Design; Based on a Critical Analysis of the XIIth Dynasty Barge. *Ancient Egypt and the East* December, Parts III and IV: 101–10.

Bérard, V. 1902. *Les Phéniciens et l'Odyssée* I. Paris: Librairie Armand Colin.

Bérard, V. 1903. *Les Phéniciens et l'Odyssée* II. Paris: Librairie Armand Colin.

Blue, L.K. 1997. Cyprus and Cilicia: The Typology and Palaeogeography of Second Millennium Harbors. In *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity.*

Proceedings of the Second International Symposium "Cities on the Sea" Nicosia, Cyprus. October 18–22, 1994. Edited by S. Swiny, R.L. Hohlfelder, and H.W. Swiny. Pp. 31–43. Atlanta: Scholars Press.

Boardman, J. 1980. *The Greeks Overseas*. London: Thames and Hudson.

Borchardt, L. 1981. *Das Grabdenkmal Des Königs Sa³hu-re^c*. Band II: *Die Wandbilder*. Text. Osnabrück: Otto Zeller Verlag.

Bound, M. 1985. Early Observations on the Construction of the Pre-Classical Wreck at Campese Bay, Island of Giglio: Clues to the Vessel's Nationality. In *Sewn Plank Boats*. Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276. Pp. 49–65. Oxford: British Archaeological Reports.

____. 1986. Relitto arcaico di Giglio Campese, Parta Seconda - Il recupero. *Archeologia Viva* 13: 49–63.

____. 1991. The Giglio Wreck. *ENAΛIA*. Supplement 1. Athens: Hellenic Institute of Marine Archaeology.

____. 1991. A Wreck of Likely Etruscan Origin off the Mediterranean Island of Giglio. In *Recent Advances in Marine Archaeology: Proceedings of the Second Indian Conference on Marine Archaeology of Indian Ocean Countries-January, 1990*. Edited by S.R. Rao. Pp. 43–44, 204. Goa, India: Society for Marine Archaeology and National Institute of Oceanography.

Bowen, Jr., R. 1949. Arab Dhows of Eastern Arabia. *American Neptune* 20: 87–132.

Bradford, E. 1964. *Ulysses Found*. New York: Harcourt, Brace & World Inc.

Breasted, H. 1906. *Ancient Records of Egypt: Historical Documents* IV. Chicago: University of Chicago Press.

Brewster, F. 1926. The Raft of Odysseus. *HSCP* 37: 49–53.

Bruce, J. 1805. *Travels to Discover the Source of the Nile*. Volume II. London: Archibald Constable and Co.

Brusić, Z. and M. Domjan. 1985. Liburnian Boats - Their Construction and Form. In *Sewn Plank Boats*. Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276.

Pp. 67–85. Oxford: British Archaeological Reports.

Bryant. W.C. 1899. *The Odyssey of Homer*. Boston: Houghton Mifflin and Company.

Butcher. S.H. 1905. *The Odyssey of Homer*. New York: MacMillan Company.

Butler. S. 1944. *The Odyssey of Homer*. New York: W.J. Black.

____. 1967. *The Authoress of the Odyssey*. Chicago: University of Chicago Press.

Buxton. D. 1970. *The Abyssinians*. New York: Praeger Publishers.

Calligas. P.G. 1990. Early Euboean Ship Building. In *Tropis* II. Edited by H. Tzalas. Pp. 77–83. Athens: Hellenic Institute for the Preservation of Nautical Tradition.

Cariolou. G.A. 1997. Kyrenia II: The Return from Cyprus to Greece of the Replica of a Hellenic Merchant Ship. In *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity*. Proceedings of the Second International Symposium "Cities on the Sea" Nicosia. Cyprus. October 18–22. 1994. Edited by S. Swiny. R.L. Hohlfelder. and H.W. Swiny. Pp. 83–97. Atlanta: Scholars Press.

Carpenter. R. 1958. Phoenicians in the West. *AJA* 62: 35–53.

Carter. J.B. and S.P. Morris. eds. *The Ages of Homer: A Tribute to Emily Townsend Vermeule*. Austin: University of Texas Press.

Casson. L. 1958. Hemiolia and Triemiolia. *BSA* 78: 14–18. pls. 5–6.

____. 1964. *Illustrated History of Ships & Boats* New York: Doubleday & Company. Inc.

____. 1964. Odysseus' Boat (*Od*.. V. 244-257). *AJP* 85: 61–64.

____. 1964. New Light on Ancient Rigging and Boatbuilding. *American Neptune* 24: 81–94.

____. 1969. Sailing. In *The Muses at Work*. Edited by C. Roebuck. Pp. 172–200. Cambridge: MIT Press.

____. 1975. Bronze Age Ships: The Evidence of the Thera Wall Painting. *IJNA* 4: 3–10.

____. 1985. Greek and Roman Shipbuilding: New Findings. *American Neptune* 45: 10–19.

____. 1989. *The Periplus Maris Erythraei*. Princeton: Princeton University Press.

____. 1991. *The Ancient Mariners*. Second Edition. Princeton: Princeton University Press.

____. 1992. Odysseus' Boat (5.234–53). *IJNA* 21: 73–74.

_____. 1994. Skippers on the Nile in Ancient Times. *American Neptune* 54: 5–10.

_____. 1995. *Ships and Seamanship in the Ancient World*. Baltimore: Johns Hopkins University Press.

Catling, H. 1995. Heroes Returned? Subminoan Burials from Crete. In *The Ages of Homer: A Tribute to Emily Townsend Vermeule*. Edited by J.B. Carter and S.P. Morris. Pp. 123–36. Austin: University of Texas Press.

Chadwick, J. 1987. *Linear B and Related Scripts*. Berkeley: University of California Press.

Charlton, W. 1996. *Rope and the Art of Knot-Tying in the Seafaring of the Ancient Eastern Mediterranean*. M.A. thesis, Texas A&M University.

Coates, J.F. 1985. Some Structural Models for Sewn Boats. In *Sewn Plank Boats*. Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276. Pp. 9–18. Oxford: British Archaeological Reports.

Cohen, L. 1938. Evidence for the Ram in the Minoan Period. *AJA* 42: 486–94.

Cunliffe, R.J. 1988. *A Lexicon of the Homeric Dialect*. Norman: University of Oklahoma Press.

Davies, N. de G. 1973. *The Tomb of Rekh-mi-Rē at Thebes*. New York: Arno Press.

Davies, N. de G. and R. Faulkner. 1947. A Syrian Trading Venture to Egypt. *JEA* 33: 40–46, pl. 8.

Defense Mapping Agency. 1991. *Sailing Directions (Planning Guide) for the Mediterranean*. Publication 130, fifth edition. Washington D.C.: United States Government Defense Mapping Agency.

Desmond, C. 1984. *Wooden Ship-Building*. New York: Vestal Press.

DeVries, K. and M.L. Katzev. 1972. Greek, Etruscan and Phoenician Ships and Shipping. In *A History of Seafaring*. Edited by G.F. Bass. Pp. 37–64. New York: Walker and Company.

Dörpfeld, W. 1967. The Buildings of Tiryns. In *Tiryns: The Prehistoric Palace of the Kings of Tiryns*. Edited by H. Schliemann. Pp. 177–308. New York: Benjamin Blom, Inc.

Dothan, T. 1982. *The Philistines and their Material Culture*. New Haven: Yale University Press

Edwards, M.W. 1987. *Homer, Poet of the Iliad*. Baltimore: The Johns Hopkins University Press.

Eiseman, C.J. and B.S. Ridgeway. 1987. *The Porticello Shipwreck: A Mediterranean Merchant Vessel of 415–385 B.C.* College Station: Texas A&M University Press.

Eisenberg, S. 1991 Metallurgical Analysis of the Ram. In *The Athlit Ram*. Edited by L. Casson and J.R. Steffy. Pp. 40–50. College Station: Texas A&M University Press.

Else, G.E. 1967. Homer and the Homeric Problem. In *Lectures in Memory of Louise Taft Semple*. Edited by D.W. Bradeen, C.G. Boulter, A. Cameron, J.L. Caskey, P. Topping, C.R. Trahman, and J.M. Vail. Pp. 315–65. Princeton: Princeton University Press for the University of Cincinnati.

Emery, W.B. 1961. *Archaic Egypt*. Baltimore: Penguin Books.

Evans, A. 1964. *The Palace of Minos at Knossos* I: *The Neolithic and Early and Middle Minoan Ages*. New York: Biblo and Tannen.

Evelyn-White, H.G. 1974. *Hesiod. The Homeric Hymns and Homerica*. Cambridge: Harvard University Press.

Faulkner, R. 1940. Egyptian Seagoing Ships. *JEA* 26: 3–9.

____. 1977. *The Ancient Egyptian Coffin Texts*, I & II. Warminster, England: Aris & Phillips Ltd.

Field: The Country Gentlemen's Newspaper. Sept. 24, 1925: 524.

Finley, M.I. 1978. *The World of Odysseus*. New York: The Viking Press.

Finnegan, R. 1977. *Oral Poetry*. Cambridge: Cambridge University Press.

Fitzgerald, M. 1994. The Ship. In *The Harbours of Caesarea Maritima* Edited by J.P. Oleson. British Archaeological Reports, International Series 594. Pp. 163–273. Oxford: British Archaeological Reports.

____. 1996. Laboratory Research and Analysis. *INA Quarterly* 23.1: 7–9.

Foster, G.F. 1965. The Sociology of Pottery: Questions and Hypotheses Arising from Contemporary Mexican Work. In *Ceramics and Man*. Edited by F.R. Matson. Pp. 43–48. Chicago: Aldine Publishing Company.

Foucher, L. 1967. Un voilier antique. *Antiquités Africaines* 1: 83–98.

Freschi, A. 1990. Note tecniche sul relitto greco arcaico di Gela. *Atti: IV rassegna di archeologia subacquea IV premio Franco Papò*. Messina: Azienda Autonoma di Soggiorno e Turismo Giardini Naxos.

Frost, H. 1975. The Ram from Marsala. *IJNA* 4: 219–28.

____. 1981. *Lilybaeum*. Rome: Accademia Nazionale dei Lincei.

Gardner, J. and J. Maier. 1984. *Gilgamesh*. New York: Vintage Books.

Gibson, C.E. 1947. The Origin of the Ram. *MM* 32: 164–69.

Gilbert, E. 1998. The *Mtepe*: Regional Trade and the Late Survival of Sewn Ships in East African Waters. *IJNA* 27: 43–50.

Giovannini, A. 1969. *Étude historique sur les origines du Catalogue des Vaisseaux*. Bern: A. Francke S.A.

Goodman, W.L. 1964. *The History of Woodworking Tools*. London: Bell & Hyman.

Göttlicher, A. 1978. *Materialien für ein Korpus der Schiffsmodelle im Alterum*. Mainz am Rhein: Verlag Philipp von Zabern.

Grant, M. 1980. *The Etruscans*. New York: Scribner.

Gray, D. 1974. *Seewesen*. Göttingen: Vandenhoeck & Ruprecht.

Gregory, R.L. 1990. *Eye and Brain: The Psychology of Seeing*. Princeton: Princeton University Press.

Güterbock, H.G. 1967. The Hittite Conquest of Cyprus Reconsidered. *JNES* 26: 73–81.

Habicht, C. 1985. *Pausanius' Guide to Ancient Greece*. Los Angeles: University of California Press.

Hadidaki, E. 1997. The Classical Shipwreck at Alonnesos. In *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity*. Proceedings of the Second International Symposium "Cities on the Sea" Nicosia, Cyprus, October 18–22, 1994. Edited by S. Swiny, R.L. Hohlfelder, and H.W. Swiny. Pp. 125–34. Atlanta: Scholars Press.

Hagy, J. 1986. 800 Years of Etruscan Ships. *IJNA* 15: 221–50.

Haldane, C. 1992. The Lisht Timbers: A Report on Their Significance. In *The Pyramid Complex of Senwosret I: The South Cemeteries at Lisht*. Publication of the Metropolitan Museum of Art Egyptian Expedition, Volume 25. Edited by D. Arnold. Pp. 102–12, pls. 115–33. New York: Metropolitan Museum of Art.

____. 1993. *Ancient Egyptian Hull Construction*. Ph.D. dissertation, Texas A&M University.

Haldane, C.W. and C.W. Shelmerdine. 1990. Herodotus 2.96.1–2 Again. *CQ* 40: 535–39.

Hanken, J. and B.K. Hall. 1993. *The Skull*, Volume I. Chicago: University of Chicago Press

Hasebroek, J. 1978. *Trade and Politics in Ancient Greece*. Chicago: Ares Publishers Inc.

Hassan, S. 1954. The Causeway of Wnis at Sakkara. *ZÄS* 80: 136–39, tafs. 12–13.

Hensyl, W.R. 1990. *Stedman's Medical Dictionary*, 25th Edition. Baltimore: Williams & Wilkins.

Hocker, F. and T.G. Palima. 1990–91. Late Bronze Age Aegean Ships and the Pylos Tablets Vn 46 and Vn 879. *Minos* 25–26: 297–317.

Hood, S. 1995. The Bronze Age Context of Homer. In *The Ages of Homer: A Tribute to Emily Townsend Vermeule*. Edited by J.B. Carter and S.P. Morris. Pp. 25–32. Austin: University of Texas Press.

Hope Simpson, R. and J.F. Lazenby. 1970. *The Catalogue of the Ships in Homer's Iliad*. Oxford: Clarendon Press.

Hornell, J. 1941. The Sea-Going *Mtepe* and *Dáu* of the Lamu Archipelago. *MM* 27: 54–68.

____. 1970. *Water Transport: Origins and Early Evolution*. Newton Abbot, England: David & Charles.

Hourani, G.F. 1995. *Arab Seafaring*. Princeton: Princeton University Press.

Janko, R. 1982. *Homer, Hesiod, and the Hymns*. Cambridge: Cambridge University Press.

Joncheray, J.P. 1976. L'èpave grecque, ou ètrusque, de Bon Porté. *Cahiers d'archèologie subaquatique* 5: 5–36.

Kahanov, Y. 1996. Conflicting evidence for defining the origin of the Ma'agan Michael shipwreck. In *Tropis* IV. Edited by H. Tzalas. Pp. 245–48. Athens: Hellenic Institute for the Preservation of Nautical Tradition.

Kahn, C.H. 1979. *The Art and Thought of Heraclitus*. New York: Cambridge University Press.

Kaiser, W., St. Seidlmayer, and M. Ziermann. 1988. Stadt und Tempel von Elephantine. *Mitteilungen des deutschen archäologischen instituts, Abteilung Kairo* 44: 174–77.

Katzev, S. and M. Katzev. 1974. Last Harbor for the Oldest Ship. *National Geographic* 146: 618–25.

Kirk, G.S. 1949. Ships on Geometric Vases. *BSA* 44: 93-153, pls. 38–40.

____. 1962. *The Songs of Homer*. Cambridge: Cambridge University Press.

____. 1975. The Homeric Poems as History. In *The Cambridge Ancient History*, Third Edition, Volume II.

II, Part 2. Edited by I.E.S. Edwards, C.J. Gadd, N.G.L. Hammond, and E. Sollberger. Pp. 820–50. Cambridge: Cambridge University Press.

Knight, A.M. 1945. *Modern Seamanship*, Eleventh Edition. New York: D. van Nostrand Company, Inc.

Knorringa, H. 1987. *Emporos: Data on Trade and Trader in Greek Literature from Homer to Aristotle.* Chicago: Ares Publishers, Inc.

Korrés, G. 1989. Representation of a Late Mycenaean Ship on the Pyxis from Tragana, Pylos. *Tropis* I. Edited by H. Tzalas. Pp.177–202. Athens: Hellenic Institute for the Preservation of Nautical Tradition.

Köster, A. 1923. *Das Antike Seewesen*. Berlin: Schoetz & Parrhysius.

Kullman, W. 1993. Festgehaltene Kenntnisse im Schiffskatalog und im Troerkatalog der *Ilias*. In *Vermittlung und Tradierung von Wissen in der griechischen Kultur*. ScriptOralia 61. Edited by W. Kullman and J. Althoff. Pp. 129–47. Tübingen: Gunter Narr.

Landström, B. 1970. *Ships of the Pharaohs*. Garden City, New York: Doubleday & Company, Inc.

Lattimore, R. 1961. *The Iliad of Homer*. Chicago: Phoenix Books, The University of Chicago Press.

____. 1991. *The Odyssey of Homer*. New York: Harper Perennial.

Layard, A.H. 1849. *The Monuments of Nineveh: From Drawings Made on the Spot*. London: J. Murray.

Lenz, J. 1998. Homer's νηυσὶ κορωνίσιν. In *Seagoing Ships & Seamanship in the Bronze Age Levant.* Pp. 199–200. College Station: Texas A&M University Press.

Linder, E. 1992. Ma'agan Micha'el Shipwreck, Excavating an Ancient Merchantman. *Biblical Archaeology Review* 18.6: 26–35.

Lipke, P. 1984. *The Royal Ship of Cheops*. British Archaeological Reports, International Series 225. Oxford: British Archaeological Reports.

____. 1985. Retrospective on the Royal Ship of Cheops. In *Sewn Plank Boats*. Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276. Pp. 19–34. Oxford: British Archaeological Reports.

Lippold, G. 1909. Griechische Schilde. In *Münchener archäologische Studien dem Andenken A.*

Furtwänglers gewidmet. Editor not listed. Pp. 399–504. Munich: C.H. Beck.

Lloyd, A.B. 1979. Herodotus 2.96.1–2. *CQ* 29: 45–48.

Lord, A.B. 1948. Homer, Parry, and Huso. *AJA* 52: 34–44.

____. 1953. Homer's Originality: Oral Dictated Texts. *Transactions of the American Philological Association* 84: 124-34.

____. 1959. The Poetics of Oral Creation. In *Comparative Literature: Proceedings of the Second Congress of the International Comparative Literature Association*. Edited by W.P. Friederich. Pp. 1-6. Chapel Hill: University of North Carolina Press.

____. 1960. *The Singer of Tales*. Harvard Studies in Comparative Literature, 24. Cambridge: Harvard University Press.

____. 1967. The Influence of a Fixed Text. In *To Honor Roman Jakobson: Essays on the Occasion of His Seventieth Birthday (11 October 1966)*, Volume 2. Janua Linguarum, Series Maior. Pp. 1199–1206. The Hague: Mouton.

____. 1970. Tradition and the Oral Poet: Homer, Huso, and Avdo Medjedović. In *Atti del Convegno Internazionale sul Tema: La Poesia epica e la sua formazione*. Edited by E. Cerulli. Pp. 13–30. Rome: Accademia Nazionale dei Lincei.

____. 1971. Homer, the Trojan War, and History. *Journal of the Folklore Institute* 8: 85–92.

____. 1972. History and Tradition in Balkan Oral Epic and Ballad. *Western Folklore* 31: 53-60.

____. 1987. Characteristics of Orality. *Oral Tradition: A Festschrift for Walter J. Ong, S.J.*, A Special Edition 2: 54–72.

Lorimer, H.L. 1950. *Homer and the Monuments*. London: MacMillan & Co. Ltd.

Lucas, A. 1962. *Ancient Egyptian Materials and Industries*. London: Edward Arnold LTD.

Luce, J.V. 1975. *Homer and the Heroic Age*. New York: Harper & Row Publishers.

Lydekker, C.J.W. 1919. The *Mtepe* Dhau of the Bajun Islands. *Man* 19: 88–92.

Marinatos, S. 1933. La marine créto-mycénienne. *BCH* 57: 170–235, pls. 13–16.

____. 1974. *Excavations at Thera* VI. Athens: Zeno Booksellers & Publishers.

Mark, S. 1991. *Odyssey* 5.234–53 and Homeric Ship Construction: A Reappraisal. *AJA* 95: 441–45.

____. 1996. *Odyssey* 5.234–53 and Homeric Ship Construction: A Clarification. *IJNA* 25: 46–48.

____. 1998. The Earliest Mast Step. *INA Quarterly* 25.2: 24–25.

Marx, E. 1946. The First Recorded Sea Battle. *MM* 32: 242–51.

Mededović, A. 1974. *The Wedding of Smailagić Meho*. Serbo-Croatian Heroic Songs Collected by Milman Parry. Volume III. Translated by A.B. Lord. Cambridge: Harvard University Press.

Meiggs, R. 1982. *Trees and Timber in the Ancient Mediterranean World*. Oxford: Clarendon Press.

Meijer, F. and O. van Nijf. 1992. *Trade, Transport and Society in the Ancient World*. New York: Routledge.

Mertz, H. 1964. *The Wine Dark Sea*. Chicago: H. Mertz.

Morgan, L. 1988. *The Miniature Wall Paintings of Thera*. New York: Cambridge University Press.

Morris, I. 1986. The Use and Abuse of Homer. *ClAnt* 5: 81–138

Morrison, J.S. 1955. Parmenides and Er. *JHS* 75: 59–68.

Morrison, J.S. and J.F. Coates. 1986. *The Athenian Trireme*. New York: Cambridge University Press.

Morrison, J.S., and R.T. Williams. 1968. *Greek Oared Ships 900-322 B.C.* Cambridge: Cambridge University Press.

Mott, L. 1997. *The Development of the Rudder: A Technological Tale*. College Station: Texas A&M University Press.

Moulinier, L. 1958. *Quelques hypotheses relative a la géographie d'Homère dans l'Odyssée*. Centre d'études et de recherches helléniques de la Faculté des Lettres et Sciences humaines d'Aix-en-Provence (2). Nouvelle Série, N° 23. Aix-en-Provence: Publication des annales de la Faculté des Lettres et Sciences humaines d'Aix-en-Provence

Mudie, C. 1986. Designing Replica Boats, the Boats of St. Brendan, Sinbad, and Jason. In *Sailing into the Past*. The International Ship Replica Seminar, Roskilde 1986. Edited by O. Crumlin-Pedersen and M. Vinner. Pp. 38–59. Roskilde: The Viking Ship Museum.

Muhly, J.D. 1970. Homer and the Phoenicians. *Berytus* 19: 19–64.

Muhly, P. 1996. Furniture from the Shaft Graves: The Occurrence of Wood in Aegean Burials of the Bronze Age. *BSA* 91: 197–211.

Murray, A.T. 1984. *Homer, The Odyssey*. Cambridge: Harvard University Press.

Murray, W.M. 1991. Classification of the Athlit Ship: A Preliminary Report. In *The Athlit Ram*. Edited by L. Casson and J.R. Steffy. Pp. 72–75. College Station: Texas A&M University Press.

____. 1991. The Provenience and Date: The Evidence of the Symbols. In *The Athlit Ram*. Edited by L. Casson and J.R. Steffy. Pp. 51–66. College Station: Texas A&M University Press.

Nagy, G. 1979. *The Best of the Achaeans*. Baltimore: Johns Hopkins University Press.

____. 1980. An Evolutionary Model for the Text Fixation of Homeric Epos. In *Oral Traditional Literature: A Festschrift for Albert Bates Lord*. Edited by J.M. Foley. Pp. 390–93. Columbus, Ohio: Slavica Publishers, Inc.

____. 1990. *Pindar's Homer*. Baltimore: Johns Hopkins University Press.

____. 1996. *Homeric Questions*. Austin: University of Texas Press.

Naville, Ė. 1898. *The Temple of Deir el Bahari: End of Northern Half and Southern Half of the Middle Platform*, No. 16, Part 3. London: Offices of the Egypt Exploration Fund.

Negueruela, I., J. Pinedo, M. Gómez, A. Miñano, I. Arellano, and J.S. Barba. 1995. Seventh-Century BC Phoenician Vessel discovered at Playa de la Isla, Mazarron, Spain. *IJNA* 24: 189–97.

Nelson, H. 1930. *Earlier Historical Records of Ramses III*. Chicago: University of Chicago Press.

____. 1943. The Naval Battle Pictured at Medinet Habu. *Journal of Near Eastern Studies* 2: 40–55.

Nibbi, A. 1979. Some Remarks on the Assumption of Ancient Egyptian Sea-Going. *MM* 65: 201–08.

Nilsson, M.P. 1968. *Homer and Mycenae*. New York: Cooper Square Publishers, Inc.

Nour, M., M. Osman, Z. Iskander, and A. Moustafa, 1960. *The Cheops Boats*. Cairo: General Organization for Government Printing Offices.

Ong, W.J. 1982. *Orality and Literacy: The Technologizing of the Word*. London: Methuen.

Ormerod, H.A. 1967. *Piracy in the Ancient World*. Chicago: Argonaut.

Page, D. 1963. *History and the Homeric Iliad*. Los Angeles: University of California Press.

____. 1968. *Lyrica Graeca Selecta*. Oxford: Oxford University Press.

____. 1973. *Folktales in Homer's Odyssey*. Cambridge: Harvard University Press.

Panvini, R. 1990. L'attività delle soprintendenze di Agrigento e Caltanissetta nel campo dell'archeologia subacquea. *Atti: IV rassegna di archeologia subacquea IV premio Franco Papò*. Messina: Azienda Autonoma di Soggiorno e Turismo Giardini Naxos.

Parfitt, K. 1993. The Dover Boat. *Current Archaeology* 133: 4–8.

Parker, A.J. 1992. *Ancient Shipwrecks of the Mediterranean & the Roman Provinces*. British Archaeological Reports, International Series 580. Oxford: Tempus Reparatum.

Parker, G. 1995. *The Cambridge Illustrated History of Warfare: The Triumph of the West*. Cambridge: Cambridge University Press.

Parry, A. 1989. Have We Homer's *Iliad*. *The Language of Achilles and Other Papers*. New York: Oxford University Press.

Parry, M. 1928. *L'épithète traditionnelle dans Homère: Essai sur un problème de style homérique*. Paris: Société d'éditions "Les belles lettres."

Pearce, F.B. 1967. *Zanzibar: The Island Metropolis of Eastern Africa*. New York: Barnes & Noble, Inc.

Petrie, W.M.F. 1974. *Tools and Weapons Illustrated by the Egyptian Collection in University College London*. Warminster, England: Aris and Phillips, Ltd.

Phillips, E.D. 1953. Odysseus in Italy. *JHS* 73: 53–67.

Pillot, G. 1972. *The Secret Code of the Odyssey*. New York: Aberlard-Schuman.

Pocock, L.G. 1959. *Reality and Allegory in the Odyssey*. Amsterdam: Adolf M. Hakkert.

Podlecki, A.J. 1970. *The Persians* by Aeschylus. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Pomey, P. 1981. L'épave de Bon-Porté et les bateaus cosus. *MM* 67: 225–44.

____. 1985. Mediterranean Sewn Boats in Antiquity. In *Sewn Plank Boats*. Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276. Pp. 35–47. Oxford: British Archaeological Reports.

____. 1995. Les épaves grecques et romaines de la place Jules-Verne à Marseille. *Académy des* *inscriptions & belles-lettres* Avril-Juin: 470–79.

_____. 1997. Bon Porté Wreck. In *The British Museum Encyclopaedia of Underwater and Maritime Archaeology*. Edited by J.P. Delgado. P. 69. London: British Museum Press.

Poncet, C.J. 1949. A Voyage to Aethiopia in the Year[s] 1698, 1699, and 1700. In *The Red Sea and Adjacent Countries at the Close of the Seventeenth Century*. Hakluyt Society. Second Series. Number 100. Edited by J. Pitts. Pp. 93–165. London: Hakluyt Society.

Pope, M. 1985. A Nonce-Word in the *Iliad*. *CQ* 35: 1–8.

Powell, B. 1991. *Homer and the Origin of the Greek Alphabet*. New York: Cambridge University Press.

Prendergast, G.L. 1983. *A Complete Concordance to the Iliad of Homer*. New York: G. Olms Verlag.

Pritchard, J.B., ed. 1969. *Ancient Near Eastern Texts Relating to the Old Testament*. Third Edition. Princeton: Princeton University Press.

Pulak, C. 1988. The Bronze Age Shipwreck at Ulu Burun, Turkey: 1985 Campaign. *AJA* 92: 1–37.

_____. 1992. The Shipwreck at Uluburun, Turkey: 1992 Excavation Campaign. *INA Quarterly* 19.4: 4–11.

_____. 1993. The Shipwreck at Uluburun: 1993 Excavation Campaign. *INA Quarterly* 20.4: 7

_____. 1994. 1994 Excavation at Uluburun: The Final Campaign. *INA Quarterly* 21.4: 8–16.

_____. 1997. The Uluburun Shipwreck. In *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity*. Proceedings of the Second International Symposium "Cities on the Sea" Nicosia, Cyprus, October 18–22, 1994. Edited by S. Swiny, R.L. Hohlfelder, and H.W. Swiny. Pp. 233–62. Atlanta: Scholars Press.

Quintana, R. 1955. *Swift: An Introduction*. New York: Oxford University Press.

Raban, A. 1984. The Thera Ships: Another Interpretation. *AJA* 88: 11–19, pls. 5–6.

Redfield, J.M. 1983. The Economic Man. In *Approaches to Homer*. Edited by C.A. Rubino and C.W. Shelmerdine. Pp. 218–47. Austin: University of Texas Press.

Rodgers, W.L. 1983. *Greek and Roman Naval Warfare*. Annapolis, Maryland: Naval Institute Press.

Rolley, C. 1986. *Greek Bronzes*. London: Sotheby's Publications/Chesterman Publications.

Rosloff, J. 1990. The Ma'agan Michael Shipwreck Excavation–1989 Season. *C.M.S. News: University of Haifa Center for Maritime Studies* 17: 3–4.

____. 1991. A One-Armed Anchor of *c.* 400 B.C.E. from the Ma'agan Michael Vessel, Israel. A Preliminary Report *IJNA* 20: 223–26.

Rousseau-Liessens, A. 1961. *Géographie de l'Odyssée: la Phéacie*, Volume 1. Brussels: Editions Brepols.

____. 1962. *Géographie de l'Odyssée: les récits*, Volume 2, Part 1. Brussels: Editions Brepols.

Sanders, N.K. 1985. *The Sea Peoples*. London: Thames & Hudson, Ltd.

Säve-Södderberg, T. 1946. *The Navy of the Eighteenth Egyptian Dynasty*. Uppsala: A.B. Lundequistska Bokhandeln.

____. 1957. *Four Eighteenth Dynasty Tombs*. Oxford: The Griffith Institute at the University Press.

Scott, J. 1921. *The Unity of Homer*. Sather Classical Lectures I. Berkeley: The University of California Press.

____. 1931. *Homer*. New York: Longmans, Green and Co.

Severin, T. 1985. Constructing the Omani Boom Sohar. In *Sewn Plank Boats*. Edited by S. McGrail and E. Kentley. British Archaeological Reports, International Series 276. Pp. 279–302. Oxford: British Archaeological Reports.

Seymour, T. 1914. *Life in the Homeric Age*. New York: MacMillan Company.

Shive, D. 1987. *Naming Achilles*. New York: Oxford University Press.

Shuey, E. 1982. *Etruscan Maritime Activity in the Western Mediterranean ca. 800–400 B.C.* Ph.D. dissertation, University of California, Santa Barbara.

Sleeswyk, A.W. 1980. Phoenician Joints, *coagmenta punicana*. *IJNA* 9: 243–44.

Smith, J.D. 1990. Worlds Apart: Orality, Literacy, and the Rajasthani Folk-*Mahābhārata*. *Oral Tradition* 5: 3–19.

Snodgrass, A.M. 1967. *Arms and Armour of the Greeks*. Ithaca, New York: Cornell University Press.

Soles, J.S. 1978. Molchos: A New Look at Old Excavations: The University Museum's Work on Crete.

Expedition 20: 4–15.

Sølver, C.V. 1961. Egyptian Sea-Going Ships, about 2600 B.C. *MM* 47: 24–30.

Stanford, W.B. 1959. *The Odyssey of Homer* I. New York: St Martins Press.

Steffy, J.R. 1985. The Kyrenia Ship: An Interim Report on Its Hull Construction. *AJA* 89: 71–101.

____. 1991. The Ram and Bow Timbers: A Structural Interpretation. In *The Athlit Ram*. Edited by L. Casson and J.R. Steffy. Pp. 6-39. College Station: Texas A&M University Press.

____. 1994. *Wooden Ship Building and the Interpretation of Shipwrecks*. College Station: Texas A&M University Press.

Stone, H. 1904. *The Timbers of of Commerce and Their Identification*. London: William Rider & Son. Limited.

Taylour, W. 1983. *The Mycenaeans*. London: Thames & Hudson, Ltd.

Theochares. D. 1958. Tolkos, Whence Sailed the Argonauts. *Archaeology* 11: 13–18.

Thomas, B. 1936. *Arabia Felix: Across the Empty Quarter of Arabia*. London: Jonathan Cape.

Thomas, R. 1992. *Literacy and Orality in Ancient Greece*. Cambridge: Cambridge University Press.

Thureau-Dangin, F. and M. Dunand, 1936. *Til Barsib*, Text. Paris: Paul Geuthner.

Titmuss, F.H. 1965. *Commercial Timbers of the World*. London: Technical Press LTD.

Trigger, B.G. 1992. *A History of Archaeological Thought*. Cambridge: Cambridge University Press.

Turfa, J.M. 1986. International Contacts: Commerce, Trade, and Foreign Affairs. In *Etruscan Life and Afterlife*. Edited by L Bonfante. Pp. 66–91. Detroit: Wayne State University.

Tzahou-Alexandri, O. and E. Spathari, Editors. 1987. *A Voyage into Time and Legend Aboard the Kyrenia Ship*. Athens: Ministry of Culture.

Van Doorninck, F.H. 1972. Byzantium Mistress of the Sea. In *History of Seafaring*. Edited G.F. Bass. Pp. 134–58. New York: Walker and Company.

____. 1982. Protogeometric Longships and the Introduction of the Ram. *IJNA* 11: 277–86.

Vansina, J. 1985. *Oral Tradition as History*. Madison: The University of Wisconsin Press.

Ventris, M. and J. Chadwick, 1956. *Documents in Mycenaean Greek*. Cambridge: Cambridge University

Press.

Villiers, A. 1969. *Sons of Sinbad*. New York: Charles Scribner's Sons.

Vinson, S. 1996. ΠΑΚΤΟΥΝ and ΠΑΚΤΩΣΙΣ as Ship-Construction Terminology in Herodotus, Pollux and Documentary Papuri. *ZPE* 113: 197–204.

____. 1997. Dimensions and Proportions of Pharaonic Ships in Literary, Monumental and Archaeological Material. *AFP* 43: 69–73.

Wace, A.J.B. and F.H. Stubbings. 1962. *A Companion to Homer*. New York: Macmillan & Co. Ltd.

Wachsmann, S. 1998. *Seagoing Ships & Seamanship in the Bronze Age Levant*. College Station: Texas A&M University Press.

Wade-Gery, H.T. 1952. *The Poet of the "Iliad."* Cambridge: Cambridge University Press.

Wallace, A.R. 1869. *The Malay Archipelago*. New York: Harper & Brothers, Publishers.

Wallace, H. 1964. Ancient Anchors: Taking Stock. *Triton* 8: 14–17.

Wallinga, H.T. 1995. The Ancestry of the Trireme 1200–525 B.C. In *The Age of the Galley*. Edited by R. Gardiner. Pp. 36–48. Annapolis: Naval Institute Press.

Warre, E. 1884. On the Raft of Odysseus. *JHS* 5: 209–19.

Wedde, M. 1996. Rethinking Greek Geometric Art: Consequences for the Ship Representations. In *Tropis* IV. Edited by H. Tzalas. Pp. 573–96. Athens: Hellenic Institute for the Preservation of Nautical Tradition.

West, M.L. 1966. *Hesiod Theogeny*. New York: Oxford University Press.

Wilkinson, G. 1878. *The Manner and Customs of Ancient Egyptians*. New York: Dodd Mead & Company.

Williams, R.T. 1949. Ships in Greek Vase-Painting. *Greece and Rome* 54: 126–37, Pls. 85–88.

Wortington, E.B.W. 1933. Primitive Craft of the Central African Lakes. *MM* 19: 146–63.

Yadin, Y. 1963. *The Art of Warfare in Biblical Lands in the Light of Archaeological Discovery*. London: Weidenfeld and Nicolson.

Yardeni, A. 1994 Maritime Trade and Royal Accountancy in an Erased Customs Account from 475

B.C.E. on the Ahiqar Scroll from Elephantine. *BASOR* 293: 67–78.

Yule, H. 1875. *The Book of Ser Marco Polo, the Venetian*. Book I. London: John Murray.

_____. 1967. *Cathay and the Way Thither*. Millwood, New York: Kraus Reprint.

APPENDIX A

STANDARD ABBREVIATIONS OF PUBLICATIONS

AJA: American Journal of Archaeology

AJP: American Journal of Philology

BCH: Bulletin de correspondance hellénique

BSA: Annual of the British School of Athens

BASOR: Bulletin of the American Schools of Oriental Research

ClAnt: Classical Antiquity

CQ: Classical Quarterly

HSCP: Harvard Studies in Classical Philology

IJNA: International Journal of Nautical Archaeology

JEA: Journal of Egyptian Archaeology

JHS: Journal of Hellenic Studies

JNES: Journal of Near Eastern Studies

MM: Mariner's Mirror

ZPE: Zeitschrift für Papyrologie und Epigraphik

ZÄS: Zeitschrift für ägyptische Sprache und Altertumskunde

APPENDIX B

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4 Nightingale Close
Royal Victoria Country Park
Netley Abbey, Hants SO31 5GB
Phone/fax: 01703 454 331

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001 409 847 9260

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Institute of Nautical Archaeology
P O Drawer HG
College Station
Texas 77841-5137

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Anthropology Building
Texas A&M University
Campus MS 4352

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Samuel EuGene Mark

ADDRESS

Anthropology Department, Texas A&M University, College Station, Texas 77843-4352

EDUCATION

2000 Ph.D. in Anthropology, Texas A&M University

1993 M.A. in Anthropology, Texas A&M University

1984 Arabic Language Certificate, Defense Language Institute, U.S. Army

1980 B.A. in History, Ball State University

1980 B.S. in Anthropology and Geology, Ball State University

HONORS

1997 Mr. and Mrs. Ray H. Siegfried II Fellow

PUBLICATIONS

BOOKS

1997 *From Egypt to Mesopotamia: A Study of Predynastic Trade Routes*. College Station, Texas: Texas A&M University Press.

PEER REVIEW ARTICLES

1991 *Odyssey* 5.234-53 and Homeric Ship Construction: A Reappraisal. *American Journal of Archaeology* 95: 441-445.

ARTICLES

1996 *Odyssey* (5.234-53) and Homeric Ship Construction: A Clarification. *International Journal of Nautical Archaeology* 25: 46-48.

1997 Straits of Messina Wreck. Iskandil Burnu Shipwreck. *British Museum Encyclopaedia of Underwater and Maritime Archaeology*. London: British Museum Press.

1998 The Earliest Mast Step. *INA Quarterly*. 25.2: 24–25.

REVIEWS

1991 Dilwyn Jones, Model Boats from the Tomb of Tut'ankhamun. *Discussions in Egyptology* 21: 91–94.

1998 L.E. Babits and H. van Tilburg, Maritime Archaeology: A Reader of Substantive and Theoretical Contributions. *Near Eastern Archaeology* 61: 260.

1999 Raphael Patai, The Children of Noah: Jewish Seafaring in Ancient Times. *Isis* 90: 356–57.