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Author(s): Steve Vinson

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The Earliest Representations of Brailed Sails

STEVE VINSON

Introduction¹

One of the most important innovations in ancient nautical technology was the invention of brails, specialized lines that Mediterranean sailors employed to shape and furl the square sails of their ships, used from some point in the Late Bronze Age until the close of antiquity.

The 20th Dynasty relief at Medinet Habu of the sea battle between an Egyptian fleet and the so-called “Sea Peoples” (fig. 1) has usually been treated as the first appearance of brails in the iconographic record.² However, new study of

less well-known material shows that Egyptians were acquainted with the technology no later than the Amarna period, though it seems doubtful that they themselves had invented it.

Brails (κάλοι in Greek, e.g., *Od.* 5, 260³) are best known from the art and literature of classical antiquity.⁴ Sails so equipped seem to have been much easier to work than earlier rigs. Probably no less important, however, was the capability they gave ships to sail closer to the wind—that is, closer to the direction from

¹ I wish to thank my Egyptology professors at The Johns Hopkins University, Profs. Betsy M. Bryan and Hans Goedicke, who were most generous with their time in discussing the problems raised by the objects presented. Prof. Bryan first suggested an early 19th Dynasty date for the Turin papyri, and pointed out to me the Herihor and Tutankhamun processions. Prof. Goedicke gave me much useful advice, reading and suggesting a range of dates for the hieratic on Turin 2033. (In fairness, Prof. Goedicke disagrees with the date proposed here, preferring a Graeco-Roman attribution.) My grateful acknowledgement also to Mr. Stéphane Cattai, for permission to publish PC 103; to Michael and Susan Katzev for the photo of Kyrenia II; to Prof. Dieter Wildung for permission to publish (E.) Berlin 24025; to Prof. J. Richard Steffy of Texas A&M University (retired), who made several telling suggestions; and to Prof. Frederick van Doorninck, Prof. George F. Bass, Cemal Pulak and Shelly Wachsmann, also of Texas A&M, who read and commented on the manuscript. It will be seen where I disagree with Dr. Wachsmann on some issues, but that does not reflect on my appreciation for the help extended or my respect for his well-considered views. Thanks especially to Cemal Pulak and Dr. Bass for permitting me to discuss aspects of the Ulu Burun shipwreck. And my sincere appreciation to my wife, Dr. Asma Afsaruddin, who assisted in the preparation of the manuscript and was generous with patience, encouragement and love.

² L. Casson, *Ships and Seamanship of the Ancient World* (Princeton, 1971), 37. T. Dothan, *The Philistines and Their Material Culture* (Westford, Mass., 1982), 7. S. Wachsmann (*infra* nn. 86 and 87) adduces a number of possible ex-

amples on Helladic and Cypriot sherds or in other media. These are for the most part not as explicit in their treatment of the rigging as the Egyptian material, nor as precisely datable. See also N. B. Millet, *infra* n. 12.

³ Readers consulting English versions of the *Odyssey* for this passage will probably not find the word “brail,” since most translators have been imprecise in their rendering. For example, R. Lattimore renders ὑπέρας τε κάλους τε πόδας as “straps and halyards and braces”; R. Fitzgerald gives “halyards, braces”; T. E. Lawrence (writing as T. E. Shaw) has “stays and sheets and halyards”; Rouse renders “stays and halyards and sheets.” Only G. S. Kirk comes close with “braces, reefs and sheets.” Lionel Casson, however, has shown convincingly (*Ships and Seamanship*, 259 with notes 1, 2 and 3) that the reading ought to be “braces and brails and sheets.” I can claim no special insight as to whether this portion of the *Odyssey* is based on authentic Mycenaean tradition, but would remind the reader that the other constructional details of Odysseus’ ship are documented archaeologically in the Late Bronze Age, e.g., its keel (*Od.* 5, 130; G. F. Bass, *AJA* 90 [1986], 275; Casson, *Ships and Seamanship*, 46, n. 19); pegged mortise-and-tenon joints (*Od.* 5, 245, 247; Bass, *ibid.*, 275; Casson, *Ships and Seamanship*, 218); and even its dunnage (*Od.* 5, 257; Bass, *Cape Gelidonya: A Bronze Age Shipwreck* [Transactions of the American Philological Society, New Series, Vol. 67, Part 8, Philadelphia, 1967], 49; Casson, *Ships and Seamanship*, 219). In any event, *Od.* 5, 260 would still be the oldest literary reference to brails yet recognized, even if the poet of the *Odyssey* was describing Geometric ships of his own experience rather than the Late Helladic vessels of Odysseus.

⁴ See Casson, *Ships and Seamanship*, figs. 79, 82, 89, 90, 91, 97; 259 n. 3, 234 n. 42.

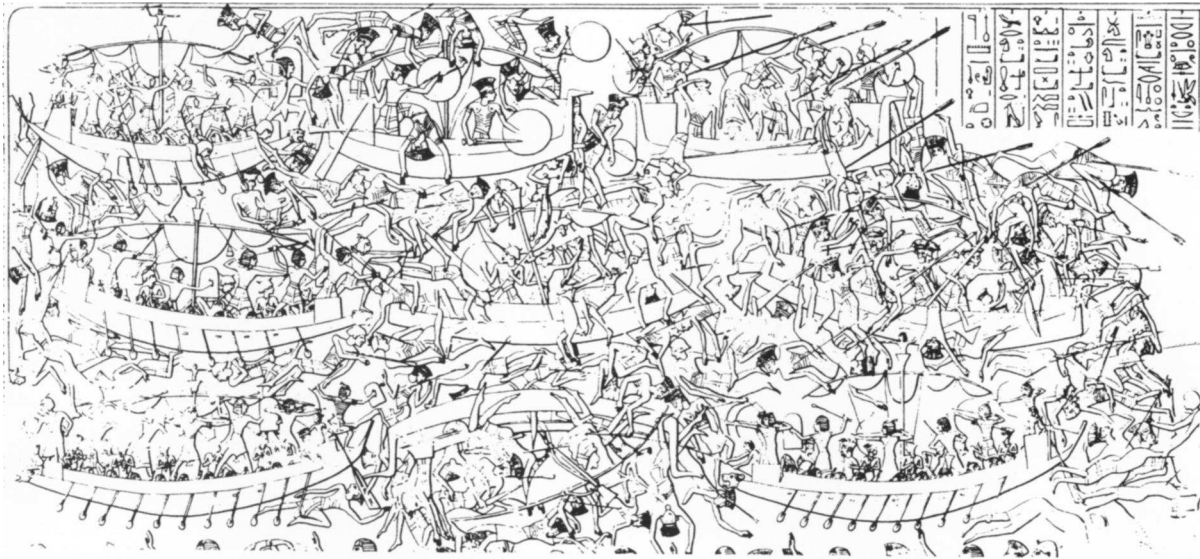


Fig. 1. The sea battle between the fleet of Ramses III and the Sea Peoples. From Plate 46 of H. H. Nelson, *Medinet Habu I: Earlier Historical Records of Ramses III*, *University of Chicago Oriental Institute Publications VIII* (Chicago, 1930). (Reproduced courtesy of the Oriental Institute of the University of Chicago.)

which the wind was blowing—than ships which used the traditional Bronze Age rig. Brailed sails disappear from the iconographic record in the early Middle Ages, when they seem to have been superseded by triangular or quadrilateral lateen-type rigs.⁵

To borrow an image first used by Lionel Casson,⁶ brails worked essentially like venetian blind cords. Each brail was secured to the bottom, or foot, of the sail, then run up to the yard through metal rings—fairleads—sewn into the sail itself. The lines were looped over the yard and led down to deck level, where they could be controlled by crewmen. Sailors could furl the sail from the deck by simply pulling all brails as far as possible, a simpler operation than that required with the traditional Eastern Mediterranean and Nilotic rig (see below). By adjusting the brails, the sail could be shaped in an infinite number of ways—a distinct improvement over the traditional rig, whose boom or lower yard kept the sail square at all times. This will be examined in detail below.

⁵ F. Van Doorninck, "Byzantium, Mistress of the Sea: 330–641," in G. Bass, ed., *A History of Seafaring Based on Underwater Archaeology* (London, 1972), 135.

⁶ *Ships and Seamanship*, 70.

The best Late Bronze Age representation of ships with brailed sails is indeed the Medinet Habu sea-battle relief. The relief represents both the Egyptian and the Sea Peoples' ships with their sails furled. The sail of each vessel is shown hanging in bunches from its yardarm, with the brails indicated as lines proceeding to deck level from each point at which the sail is most tightly held.

This paper discusses five other representations, from the late 18th or early 19th dynasties, that definitely or possibly show watercraft with brailed sails. Each has been previously published, but never (with the exception of [E.] Berlin 24025) with a view toward explaining its peculiar, non-traditional rendering of rigging. The most provocative (fig. 2a, b) is a relief from Hermopolis (originally from Amarna) that shows a riverine boat with its sail brailed into a fore-and-aft configuration for tacking. To my knowledge, it is unique in pre-classical nautical art. A second relief (fig. 4a, b) shows a seagoing ship with rigging that parallels the Medinet Habu ships' almost exactly. It is from an unprovenanced block, probably from Saqqara, currently in Berlin, ([E.] Berlin 24025). It is datable on stylistic grounds to the late 18th Dynasty. Two others are on illuminated papyrus frag-

ments now in the Turin Museum (fig. 5, right, Turin 2032 and fig. 5, left, Turin 2033). The rigging of these riverine boats closely parallels that of the ships of the Medinet Habu relief with one important divergence: the addition of booms, typical of pharaonic Egyptian and Bronze Age Eastern Mediterranean rigging but of no obvious use with a brailed sail. These are almost certainly Ramesside, probably early. Finally, a painting from Theban Tomb 50 (fig. 8),⁷ is securely datable, to the reign of Horemheb. Unfortunately, this riverine boat is the most problematic of the group.

PC 103 (fig. 2a–b)

This is a small, crudely carved block with no archaeological context, but almost certainly from Amarna, by way of Hermopolis,⁸ and thus quite securely dated. It is one of several blocks published by Roeder which were in private hands, and is currently in the Stéphane Cattai collection in Switzerland. If genuine, this block has fascinating implications for the history of nautical technology in general and Egyptian nautical technology in particular.⁹

The block shows a boat with three crewmembers. One sailor crouches and controls the steering oar. A second sits inside a tepee-like deck-house. A third (female, as Stéphane Cattai has pointed out to me) holds a bouquet of flowers and seems to be handling the sail, which is shown in a unique manner. The sail is loosefooted, meaning that, unlike watercraft with the traditional Egyptian rig, it has no boom attached to the bottom of the sail. The yard is tilted forward, and there is enough of the sail left to show that its foot was shaped into a crescent. The trim indicated precisely parallels that shown in a photograph of *Kyrenia II*



Fig. 2a. PC 103. (Photo courtesy of Stéphane Cattai.)

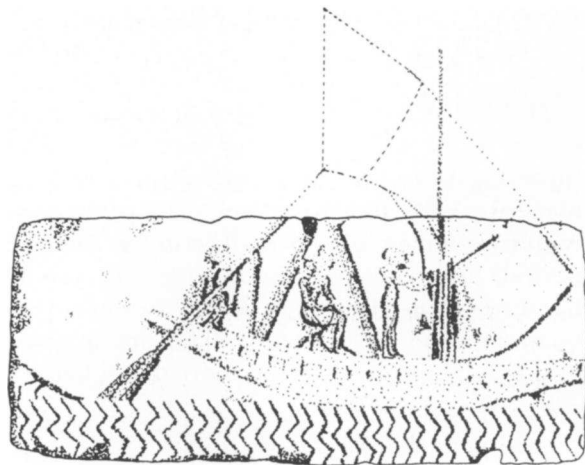


Fig. 2b. PC 103. (Drawing by Harold Dinkel, reproduced courtesy of Shire Publications Ltd.)

(fig. 3), a replica of a fourth-century B.C. Greek *holkas* constructed by the Hellenic Institute for the Preservation of Nautical Tradition in cooperation with the Institute of Nautical Archaeology.¹⁰ The port-side sheet seems to be attached to or near the steering oar stanchion; and a line proceeding at roughly a 50-degree angle from the middle of the mast would appear to indicate a brail.¹¹

⁷ *PM*² I.1, Scene 9–10.

⁸ G. Roeder, *Amarna-Reliefs aus Hermopolis*, Ausgrabungen der Deutschen Hermopolis-Expedition in Hermopolis 1929–1939 (Hildesheim, 1969), Vorwort.

⁹ I have no reason to question the block's authenticity, but it seems prudent to retain at least some skepticism of any such object that has neither a certain provenience nor any parallel. The same reservation may frankly be expressed for the other representations presented here, with the exception of the boat in TT 50.

¹⁰ See M. Katzev, "The Voyage of *Kyrenia II*," *INA Newsletter* 16.1 (1989), 4–10.

¹¹ It is interesting to note that, if this line is a brail, it is on the windward side of the sail, not the forward side as was the usual case in classical antiquity. This is precisely as described in the fifth century B.C. by Herodotus, who noted that Egyptians mounted their brails "inside" the sail, while other mariners mounted their brails "outside;" cf. Herodotus 2, 36; Casson, *Ships and Seamanship*, 234 n. 42. If this line is correctly interpreted here, it could indicate that the



Fig. 3. *Kyrenia II*. (Photo courtesy of Susan Katzev.)

This is precisely the configuration one would expect if the sail were being used, not with a following wind, but as an airfoil in a tacking maneuver. PC 103 would seem to prove that such a rig was in use on the Nile in the Amarna period, and was appreciated, not only for its handiness, but also for its ability to improve a boat's upwind performance. The implications of this will be considered in more detail below.

(E.) *Berlin 24025* (fig. 4a–b)

This carved block, apparently from a New Kingdom tomb in the Memphite necropolis at Saqqara, was first published in Jean Capart's 1931 *Documents pour servir à l'étude de l'art égyptien II*, pl. 67. Capart proposed a late 18th-Dynasty date for the piece, based on the dress of the stevedores and crewmen and on the shape of the amphoras being unloaded. This dating has been adopted in all subsequent discussions of the piece, and is accepted here.¹²

Egyptian practice known to Herodotus was of great antiquity, conceivably preserving the original configuration.

¹² A. Schulman, *JARCE III* (1964), 56 n. 38 and *JARCE VII* (1968), 27–35; G. Martin, *Corpus of Reliefs of the New Kingdom from the Memphite Necropolis and Lower Egypt I* (London, 1987), 17. On the other hand, the Berlin museum's label for the piece gives a date of c. 1200. The rigging of [E.] Berlin 24025 was discussed by the author in "E. Berlin 24025: A Ship of the Sea Peoples?," a paper read before the conference of the American Research Center in Egypt in Philadelphia, 1989; and see now a note by N. B. Millet, "The First Appearance of the Loose-Footed Squaresail Rig in the Mediterranean," *The Journal of the Society for the Study of Egyptian*



Fig. 4a. [E.] *Berlin 24025*. (Photo by the author.)

There are actually parts of two ships visible in the relief: the right side of the crow's nest, the right end of the yard and the backstay of a second vessel are visible at left. However, all these details simply repeat features in the more fully-visible ship, and so will not be further described.

The main scene shows five men in the process of landing and unloading a ship with a

Antiquities, Vol. XVII, No. 3 (dated 1987, but appearing in 1991): 89–91. Capart noted the similarity of the crow's nest in the relief to those in the Medinet Habu scene, but did not otherwise comment on the rigging. It should be noted that strictly speaking, referring to the block as "E. Berlin 24025" is no longer accurate; I am retaining the designation (E.) Berlin for clarity's sake, as it resides in what was formerly the East Berlin Museum and is designated as such in most previous publications of the piece. I am informed by Prof. Wildung that while the designation of the museum is now simply "Berlin Museum," the accession number of the piece in question has not been changed.



Fig. 4b. [E.] Berlin 24025. (Drawing by Harold Dinkel, reproduced courtesy of Shire Publications Ltd.)

rather unusual sail. The scene of the action appears to be somewhere on the Nile, judging from the nilotic fish and vegetation shown in the upper register—perhaps we are at the *Prw-Nfr* dockyard in Memphis. At upper left, we see a man crawling along the yard arm, helping to bunch up the sail or secure it in place.¹³ His left leg is visible, but it should not be concluded from this sculptor's mistake that the scalloped lines are simply ropes—the painted papyrus fragments to be described next put the matter beyond doubt. At right, a sailor crawls up a double backstay, which perhaps also serves as a halyard for the yardarm. On deck, three men unload cargo. The first and third men are un-

¹³ As we said above, it was possible for crewmen to furl a brailed sail from the deck. However, classical reliefs show that when in port, men were sent aloft to secure the sail in place. A nice parallel to [E.] Berlin 24025 is the scene of a Roman merchantman in port (Casson, *Ships and Seamanship*, fig. 151), which has two men on the yard arm tying off the sail, and men climbing up the fore- and backstays, all in the same position as the men in our relief.

loading what appear to be unusually squat Canaanite amphoras. The center man seems to be carrying a basket. At lower right, under the left arm of the amphora carrier, appear to be the mouths of two pithoi. Carved in the scene are various objects: an apparent basket, a pilgrim flask (?), the mouth and shoulder of a jar (?), a scimitar (?), and some odd hatch-marks. The basket and "pilgrim flask" are paralleled at Medinet Habu, where the ship on the far left of the middle row has a container of some kind suspended on the rigging. The other objects may be extraneous.¹⁴

The parallel between the rigging of this ship and that of the Medinet Habu vessels is remarkably close. The crow's nest is the same, as is the bunching of the sails and the lines that come down from between the bunches. As in the Medinet Habu relief, the central bunch is much larger than those at either side.

It is probably significant that the ship has a crow's nest, only unequivocally seen in Egyptian art on foreign, sea-going ships, e.g., the (sea-going) ships of the Medinet Habu relief, the Syrian (sea-going) ships of Ken-Amun's tomb (fig. 10 below),¹⁵ and in a similar tableau from the 19th or 20th Dynasty tomb of Iniwia¹⁶ (but see below, note 45, and the description of Turin

¹⁴ I thank Cemal Pulak and Shelly Wachsmann of Texas A&M University for pointing out to me the container in the rigging of the Medinet Habu vessel. As to the other objects, it is difficult to assess whether they were carved before or after the main composition. Only the lip of the "jar" crosses an element of the main scene; it is cut deeper than the ropes which it intersects, making it seem to me that it was part of a deeply cut scene that had been mostly smoothed away before the present composition was cut. While previous descriptions of this scene have indeed identified this object as the mouth and shoulder of a jar, an intriguing suggestion was made to me by fellow-student John Wells: he sees this as an upside down headrest, and he may well be right. If so, that proves that the block was recut at some point, and this object is not to be interpreted as ship's equipment. Further confirmation that the scene was recut, or at least modified during its lifetime, lies in the fact that the basket-carrier has two right arms—one held high, the other across his chest.

¹⁵ N. Davies, *Scenes from some Theban Tombs*, Private Tombs at Thebes IV (Oxford, 1963), pl. XV.

¹⁶ S. Wachsmann, *Aegeans in Theban Tombs*, *Orientalia Lovaniensea Analecta* 20 (Leuven, 1987), 9–10; B. Landström, *Ships of the Pharaohs: 4,000 Years of Egyptian Shipbuilding* (New York, 1970), 138, fig. 403.

2032 and 2033). These crow's nests of the ships of Ken-Amun and Iniwia are different from those of the Medinet Habu ships and the present relief, however, in that they are hung from the masthead, not sitting on top of it. Thus, the position of the crow's nests suggests that the ships at Medinet Habu and in (E.) Berlin 24025 belong to a tradition different from Ken-Amun's and Iniwia's ships of Syro-Palestinian origin.

Most of the elements of this scene seem to confirm Capart's suggested late-18th Dynasty date, and none would require a date much later than Ramses II. A rough *terminus post quem* might be the early years of Tutankhamun.¹⁷ A *terminus ante quem* might be the early 19th Dynasty, when scenes of this type seem to have become considerably less common in Memphis than in the 18th Dynasty; this seems borne out by Porter-Moss's descriptions of the individual dated tombs of the Saqqara necropolis, and by the fact that none of the 19th Dynasty blocks presented by Martin¹⁸ have comparable subject matter—they deal almost universally with religious or funerary themes. Few New Kingdom tombs at Saqqara post-date the reign of Ramses II.¹⁹

More specifically, the elongated head of the sailor climbing the backstay seems to show considerable Amarna-period influence—compare the head of the food carrier in block UC 017 at the Petrie Museum.²⁰ The attitude of the amphora carriers is strongly paralleled by a scene from the South Amarna tomb of Parennefer²¹ and by a line of amphora carriers from the 19th Dynasty tomb (TT 178) of Neferronpet.²² Their curved backs and protruding chests stand in strong contrast to the stiff amphora carriers from the earlier tomb of Rekh-Mi-Re.²³

¹⁷ J. van Dijk, "The Development of the Memphite Necropolis in the Post-Amarna Period," in A. P. Zivie, ed., *Memphis et ses nécropoles au nouvel empire. Nouvelles données, nouvelles questions*, Actes du colloque international CNRS, Paris, 9 au 11 octobre, 1986 (Paris, 1988), 40.

¹⁸ *Supra*, n. 12.

¹⁹ *LdA* IV, 432.

²⁰ J. Samson, *Amarna: City of Akhenaten and Nefertiti. Key Pieces from the Petrie Collection* (London, 1972), 57, fig. 30.

²¹ *PM* IV, 221, scene 9–10; *Denkmäler* III, Bl. 108.

²² A. I. Hote, *Les Chefs-d'œuvre de la peinture égyptienne* (Paris, 1954), pl. 109.

²³ TT 100; Davies, *The Tomb of Rekh-Mi-Re at Thebes* (New York, 1943), pl. L.

The general treatment of the faces of the stevedores in [E.] Berlin 24025 is very closely paralleled by the mourners in Memphite block I.1.a. 6008 in the Pushkin Museum in Moscow.²⁴ This block is unprovenienced but again, most probably of late 18th Dynasty date. Finally, the line of fish and vegetation above the ship compares nicely to the fish from a Hermopolis block in the Schimmel²⁵ collection as well to block AE.I.N.38 in Carlsberg.²⁶ This last is a Memphite block with no exact provenience, but which was dated by Mogensen to the late 18th Dynasty or early 19th Dynasty on stylistic grounds.

As noted above, the amphoras in the scene seem unusually squat. Canaanite amphoras are most often shown in Egyptian art with a narrower proportion, although one or two squat amphoras are to be seen in the Ramesside tableau of amphora-carriers in the tomb of Neferonpet (*supra* n. 22). The crudity of the relief in [E.] Berlin 24025 makes specific comparisons difficult, but perhaps there is a parallel to be drawn with the few squat amphoras that are known archaeologically. These seem datable to the period contemporaneous with the late 18th Dynasty.

One such amphora is KW 588 from the Ulu Burun shipwreck near Kaş, Turkey, recovered in 1985 by the Institute of Nautical Archaeology team led by George F. Bass and Cemal M. Pulak.²⁷ KW 588 is distinctive among the large number of amphoras that have been recovered from the Ulu Burun wreck in that it is almost as wide as it is tall: it has a preserved height of 49.5 cm (about 4 cm is missing from its neck and rim) and has a diameter of 39.5 cm. The Ulu Burun wreck has yet to be definitively dated, but so far the most diagnostic pieces recovered are a Mycenaean kylix (KW 57), dated by Bass to the LH III A:2 period, or late in the

²⁴ S. Hodjash and O. Berlev, *The Egyptian Reliefs and Stelae in the Pushkin Museum of Fine Arts, Moscow* (Leningrad, 1982), 122.

²⁵ J. D. Cooney, *Amarna Reliefs from Hermopolis in American Collections* (Brooklyn, 1964), 65 and pl. 41.

²⁶ M. Mogensen, *La Glyptothèque Ny Carlsberg, La Collection Égyptienne* (Copenhagen, 1930), 95 and pl. CIII.

²⁷ C. Pulak, *A Late Bronze Age Shipwreck at Ulu Burun: Preliminary Analysis (1984–1985 Excavation Campaigns)* (Unpublished MA thesis, College Station, Texas, 1987), 39–41.

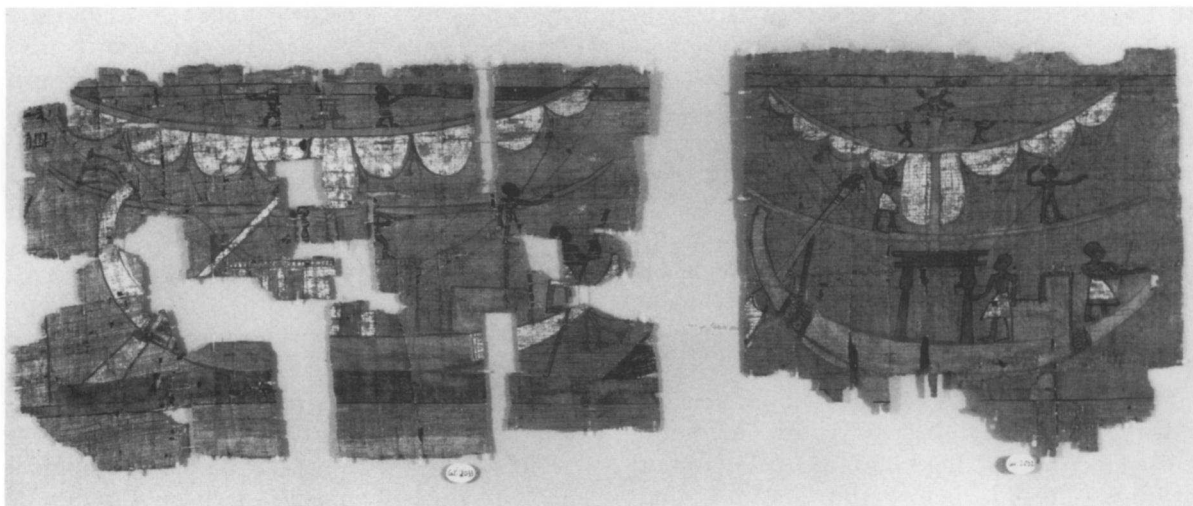


Fig. 5. Turin Papyri 2032 (right) and 2033 (left). (Photo courtesy of Prof. A. M. Donadoni Roveri.)

14th century B.C., and a golden scarab of Nefer-titi (KW 772), obviously made in the Amarna period but most likely arriving onboard the ship sometime later.²⁸

A similar amphora, said to be the best parallel to KW 580, is amphora 282 from Akko grave C 1, found with a kylix belonging likewise to the LH III A:1 or early LH III A:2 period.²⁹ If the Artist of [E.] Berlin 24025 had such squat amphoras in mind, it would appear from these datable parallels that this scene belongs to the immediate post-Amarna period.

Turin 2032 (fig. 5 right) and 2033 (fig. 5 left)

These are pieces of painted papyrus, currently separate but apparently originally part of a single roll. While they have only recently been published,³⁰ their existence was noted by Lionel

Casson,³¹ who first pointed out that they show brailed sails. The Turin Museum only dates these pieces generally to the New Kingdom, but for reasons to be given presently, I think they can be ascribed to the Ramesside period, probably earlier than later. The papyri show two riverine boats traveling from left to right without power, which is to say the boats' sails are furled but there are no rowers indicated. 2033 seems to be leaving a dock or quay; the end of a building lintel is just visible at left. 2033 also includes the blade of a steering oar for a third vessel; this blade seems to be too large and to enter the water at the wrong angle for it to join 2032's steering oar. There is no cargo indicated.

The boats' rigging and overall shapes are quite similar, but there are differences of detail. To take the similarities first: Each ship has its sail drawn up in bunches against the upper yard, and in each case, there are lines coming down to the deck from between the bunches, gathered together at midships. The bunches are shown in the same conventionalized manner we saw in [E.] Berlin 24025 and in the Medinet Habu ships, with the central bunch much larger than the others. Unlike [E.] Berlin 24025 and the Medinet Habu vessels, their yards curve upward, a feature seen frequently in 19th Dynasty boat

²⁸ G. Bass, C. Pulak, D. Collon and J. Weinstein, "The Bronze Age Shipwreck at Ulu Burun: 1986 Campaign," *AJA* 93 (1989), 17–29.

²⁹ S. Ben-Arieh and G. Edelstein, "Akko—Tombs Near the Persian Garden," *Atiqot (English Series)* XII (1977), 16 and pl. XII.2.

³⁰ A. M. Donadoni Roveri, *Museo Egizio di Torino, Civiltà degli Egizi, La Vita quotidiana* (Turin, 1987), 195, fig. 270. According to personal communication from Roveri, the painted papyri were originally part of the Drovetti collection, and probably come from the Theban area.

³¹ *Ships and Seamanship* (*supra* n. 2), 37 n. 19.

art. And, of course, unlike [E.] Berlin 24025 and the Medinet Habu boats, each has an (apparently) useless and erroneously-drawn boom.

Each boat has six crewmen; in both cases, two crewmen walk balanced along each upper yard, each with his back to the masthead (cf. the man crawling along the yard in [E.] Berlin 24025). A pilot stands in the bow of each boat, facing forward; in each case, he is standing in front of his step-shaped box. Each vessel has a single steering oar mounted at one of its quarters, and the loom of each oar is surmounted by the head of a ram of Amun. The boats have similar profiles, with high, curved sterns and gently upcurving bows. The only parallel I have been able to find for such a profile before the Graeco-Roman period is the determinative for *br*-boat in the Medinet Habu inscription.³²

The differences between the two boats seem comparatively minor. In the case of Turin 2033, the sail is in front of the mast from our point of view; in the case of 2032, it is behind the mast. 2033's sail is gathered into nine bunches (four on either side of the large central bunch), which are larger than 2032's; 2032's sail has one less bunch on the right side of the picture (three) than it does on the left (four). 2033's steering oar is at the starboard quarter; 2032's is mounted on the port side. 2033 has more elaborate deck structures, though these are unfortunately obscured by damage to the papyrus; two crewmembers are standing on top of the deck structures, their backs to each other. 2032 has a simple shrine-shaped deckhouse with papyrus-bud columns and a pronounced *mr*-shaped architrave. The shrine appears to be open yet somehow hides the mast which must pass through it. Two crewmen stand on the lower yard, each facing forward; yet another stands on deck, facing the shrine with his back to the pilot.

2033 has more painted decoration, with its bow and stern painted entirely white; 2032 has only painted bands at the bow and stern. 2032 has a (*p3*?) bird perched at its masthead, and a slight widening that could be a crow's nest

(though without a crewmember standing inside it is difficult to be sure); 2033 has what is perhaps a differently-shaped "crow's nest" atop what reminds one of the masthead rings of the more traditional rig (see below). 2033 has tassels at bow and stern, and its lower yard is tied to its mast by means of some kind of lashing; 2032 lacks tassels and its lower yard is not visibly tied to the mast.

Finally, 2033 has two words written in hieratic at its upper lefthand corner: perhaps *ḥ33* above and certainly *ip.t* below. Professor Goedicke suggests that the handwriting could be Rameside or later.

The style of painting and the iconographical elements present appear to bear out the proposition that the papyri are Rameside and suggest a date earlier rather than later in the period. Perhaps the closest overall parallel to the two Turin boats is from the tomb of Amenemheb (fig. 6).³³ This is a boat of traditional rig, but it has upcurving yards in the manner of the Turin vessels, men perched on the lower yards, and masthead rings of the same kind as Turin 2033. Moreover, its mast passes through a single deck shrine in the same manner as 2032.

A figured ostrakon from Deir el-Medineh³⁴ similarly shows a boat with an upcurving sail, mounted on a mast which passes through a central deck structure. The deckhouse seems to be split-level, and its upper level has the *mr*-shaped architrave of the shrine of 2032. Finally, a boat with a similar deck structure is to be seen in TT 19.³⁵ This boat lacks a sail, but does have a similar stepped pilot's box and painted bands at bow and stern in the manner of 2032.

Overall, shrines such as the one on Turin 2032 seem quite comfortably dated to the late 18th and early 19th Dynasty. The tomb facade depicted in the tomb of Ipuwy³⁶ embodies a similar

³³ TT 278, 19th Dynasty; Lhote (*supra* n. 22), fig. XVIII.

³⁴ Ostrakon 3022 in V. D'Abbadie, *Catalogue des Ostraca Figurées de Deir el-Médineh*, Documents de fouilles publiés par les membres de l'Institut Français d'Archéologie Orientale du Caire II, 4e Fasc. (Cairo, 1959).

³⁵ C. K. Wilkinson, *Egyptian Wall Paintings* (New York, 1983), 139; Ramses I-early Ramses II.

³⁶ TT 217, Ramses II; N. De G. Davies, *Two Ramesside Tombs at Thebes* (New York, 1927), pl. XXVIII.

³² See H. H. Nelson, *Medinet Habu I: Earlier Historical Records of Ramses III*, University of Chicago Oriental Institute Publications VIII (Chicago, 1930), pl. 46.



Fig. 6. Abydos boats from the tomb of Amenemheb (TT 278). (Photo courtesy of The Metropolitan Museum of Art. [30.4.125].)

idea, as do other early 19th Dynasty tomb facades illustrated by Badawi,³⁷ compare also the shrine in a counterpoise of Tutankhamun.³⁸

The early 19th Dynasty also seems to have brought a shift in the position of many boat pilots. At least in the Theban material, the favored position for pilots during most of the 18th Dynasty seems to have been within the stepped box provided for them; only in the very late 18th and 19th Dynasties have I been able to find examples of pilots standing in front of the box, e.g., in TT 49 of Neferhotep,³⁹ TT 31 of Khonsw;⁴⁰ TT 277 of Amenemhet;⁴¹ TT 339 of Huy and Pachedou.⁴² Likewise, the bird at the masthead of 2032 is a feature with good parallels in the late 18th Dynasty⁴³ and in the

Ramesside period⁴⁴ as well as in the 21st Dynasty (fig. 7).⁴⁵

Taken together, the preponderance of the evidence favors an early 19th Dynasty date for these two papyri. However, they are unique

mosis IV or early Amenhotep III) is from TT 78, where a bird with folded wings is to be seen perched on a masthead block of indeterminate function. See Annelies and Artur Brack, *Das Grab des Haremheb: Theben Nr. 78*, Archäologisches Veröffentlichungen 35, Deutsches Archäologisches Institut Abteilung Kairo (1980, Mainz am Rhein), pl. 89.

⁴⁴ Figured ostrakon 2668 from Deir el-Medineh; D'Abbadie, *Catalogue des Ostraca Figurées de Deir el-Médineh*, Documents de fouilles publiés par les membres de l'Institut Français d'Archéologie Orientale du Caire II, 2e fasc. (Cairo, 1937).

⁴⁵ Epigraphic Survey, *The Temple of Khonsu—Volume 1. Scenes of King Herihor in the Court*, The University of Chicago Oriental Institute Publications Volume 100 (Chicago, 1979), pls. 19–23. The boats in the Herihor procession admittedly parallel the Turin paintings quite closely in a number of respects, especially the birds at the mastheads and the slight flare of the “crow’s nest.” However, this scene harkens back strongly to 18th and 19th Dynasty prototypes, especially a fragmentary scene of Tutankhamun—see W. R. Johnson, “A la recherche des décors perdus,” *Dossiers Histoire et Archéologie* 101 (1986), 51. The upcurving yardarms are strongly paralleled in the 19th Dynasty. Despite these similarities, Herihor’s boats lack the step-shaped pilot’s box common in the 19th Dynasty, and included in the Turin papyri. This means we need not necessarily push these papyri into the Third Intermediate Period. Other interesting parallels are Ptolemaic boat procession scenes from Edfu (pointed out to me by Professor Goedicke), which show a number of boats, many of which have birds (in this case, vulture-winged falcons) at their mastheads, small deck shrines, and, possibly, brailed sails, e.g., E. Chassinat, *Le Temple d’Edfu* T. 10,

³⁷ A. Badawi, *Le dessin architectural chez les anciens Égyptiens* (Cairo, 1948), 226, figs. 285–88.

³⁸ C. Aldred, *Jewels of the Pharaohs* (London, 1978), pl. 71.

³⁹ Ay; J. Vandier, *Manuel d’archéologie égyptienne V: Bas-reliefs et peintures. Scènes de la vie quotidienne* (Paris, 1969), 950, fig. 357.

⁴⁰ Ramses II; Vandier, *Manuel V*, 976, fig. 372 and 977, fig. 373.

⁴¹ 19th Dynasty; *Manuel V*, 952, fig. 360.

⁴² Ramses II; *Manuel V*, 944, fig. 354. An exception to this general rule is to be noted in the tomb of Paheri at El Kab (Thutmose III); see in J. J. Tylor, *Wall Drawings and Monuments of El Kab, the Tomb of Paheri* (London, 1895), pl. V.

⁴³ TT 40 of Huy, reign of Tutankhamun—see A. H. Gardiner and N. Davies, *The Tomb of Huy. Viceroy of Nubia in the Reign of Tutankhamun (No. 40)* (London, 1926), pl. XII. Note that a similar bird appears, not at the masthead but in flight, in the tableau of Ken-Amun, two reigns previous to this one—see below fig. 10. An even earlier example (Thut-

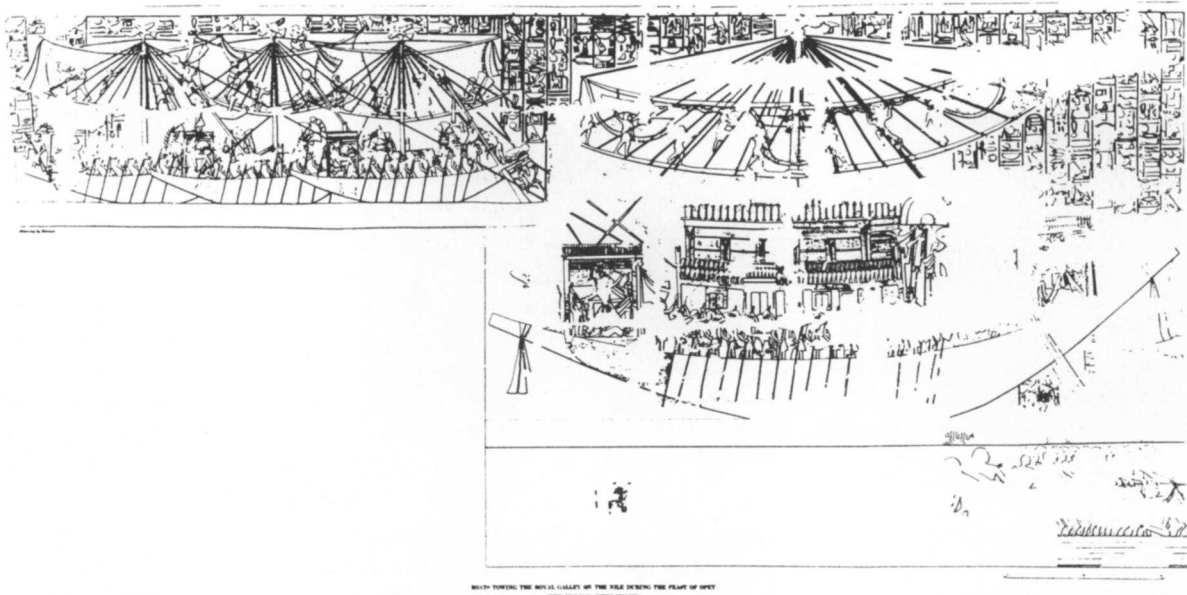


Fig. 7. Boats from the Opet feast of Herihor. From Plate 20 of *The Epigraphic Survey, The Temple of Khonsu—Volume 1. Scenes of King Herihor in the Court, The University of Chicago Oriental Institute Publications Volume 100* (Chicago, 1979). (Reproduced courtesy of the Oriental Institute of the University of Chicago.)

pieces without sure provenience and so without further good parallels, any suggested date is admittedly provisional.

TT 50 (fig. 8)

Theban Tomb 50 of Neferhotep, in Sheikh Abd el-Gournah, was published by G. Bénédite in 1893,⁴⁶ and republished in 1985 by Hari.⁴⁷ The tomb's inscriptions date it to the reign of Horemheb.⁴⁸ Of interest in this tomb is a single boat traveling from right to left in a vignette

showing the voyage to Abydos.⁴⁹ The furlled sail is hanging in three large bunches from the upper yard, which is still aloft. While this arrangement does not follow the typical conventions of Egyptian boat art, neither does it precisely follow

fasc. 2, *Memoires publiés par les membres de la mission archéologique française au Caire T. 27* (Cairo, 1960), pls. CXXXVI, CXXXII. While some of the compositional elements are the same, stylistically there is little comparison; however, the boats of the Turin papyri must have originally been shown as engaged in some such procession as those at Karnak and Edfu.

⁴⁶ G. Bénédite, *Le tombeau de Neferhotep*, *Mémoires publiés par les membres de la Mission archéologique française au Caire T. 5* (Cairo, 1893).

⁴⁷ R. Hari, *La tombe thébaine du père divin Neferhotep (TT50)* (Geneva, 1985).

⁴⁸ *Supra* n. 46, 496.

⁴⁹ Hari (*supra* n. 47), pl. XXX. The inscription accompanying the vignette is problematic. It specifies that the boat in our fig. 8 is one of several heading north and includes the phrase *šbw.t htp.w=sn*, or apparently, "to furl their sails"; see *Wb IV*, 439, 1; D. Jones, *A Glossary of Ancient Egyptian Nautical Titles and Terms* (London, 1988), 226. However, the verb *šbw* has only been quoted twice in nautical contexts and is of unclear meaning. S. Sauneron points out in "Le rhume d'Anynakhte (Pap. Deir el-Médineh 36)," *Kêmi XX* (1970), 13, that in Pap. Deir el-Medineh 36, the verb appears to have exactly the opposite meaning, "to deploy" a sail. Sauneron argues that, despite the TT 50 text's specification that the boats in question are heading north, *šbw* ought to be translated as "deploy" even here. Indeed, PC 103 shows that the sail could have been deployed to head north if the boatmen were using their brailed sail to tack, as do modern Nile boatmen with their lateen-rigged feluccas. Yet, the boat in the vignette seems to have its sail entirely furlled, not partially so as in PC 103.

In passing, it probably ought to be noted that in Pap. Deir el-Medineh 36, *šbw* is spelled with syllabic orthography, while in TT 50 it is spelled with uniconsonantal signs.

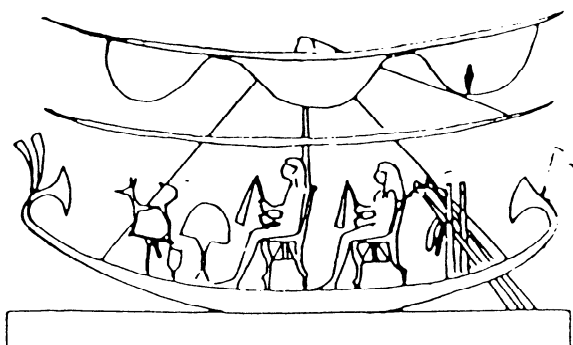


Fig. 8. Abydos boat from TT 50 of Neferhotep. After G. Bénédite, *Le tombeau de Neferhotep, Mémoires publiés par les membres de la Mission archéologique française au Caire* T. 5 (Cairo, 1893): pl. III.

the alternative convention adopted by the artists of the Turin paintings, the Berlin block, and the Medinet Habu relief. It has far fewer bunches of sail (cf. PC 103, which, according to our reconstruction, would have only three bunches of sail if furled), the bunches are all the same size, and there are no ropes coming down from between the bunches to indicate brails. (In fact, it resembles the royal barge of Herihor except that its upper yard is entirely hoisted and there are no men working to furl the sail by hand.) Like the Turin paintings, the boat has a boom. In the other vignettes of the inscription, the boom is shown attached to the deployed sail in the usual manner.

Perhaps this indicates that one scribe or the other was unfamiliar with the word and used it incorrectly. However, a plausible solution to the problem could lie in considering the root meaning of *šbw*, which perhaps derives from *šbi*. This latter verb originally meant “to mix two things together.” Beginning in the late 18th Dynasty, however, examples can be quoted in which the word means “to change or substitute” (*Wb* IV, 436, 9 and 12), a meaning which the verb has regularly in Demotic and Coptic. It would seem quite possible, then, that *šbw* meant to change the setting of the sail, or, in idiomatic English, “to trim” it. For a similar turn of phrase, cf. Pindar, *Pythian* IV, 291–92: ἐν δὲ χρόνῳ μεταβολαὶ λήξαντος ὄρου ἰστίων, “In time, the winds having died down, the sails change,” i.e., come back into proper trim. See in B. K. Braswell, *A Commentary on the Fourth Pythian Ode of Pindar*, *Texte und Kommentare*, Eine altertumswissenschaftliche Reihe Bd. 14 (Berlin, 1988), 391.

While the line drawing reproduced by Bénédite and Hari show the boom supported by a single rope running diagonally from the masthead, a squeeze taken of the tomb in the early 19th century by I. E. Hoskins shows a full complement of lifts hanging from the masthead.⁵⁰ It is also worth noting that the boat’s yard and boom curve slightly upward, much less markedly than in 19th Dynasty boats such as we have seen above, but in contrast to the downward-curving spars typical of the earlier 18th Dynasty.

It must be admitted that, because the artist of this scene did not use the conventions adopted by the artists of [E.] Berlin 24025, the Turin papyri, and the Medinet Habu relief, it is not absolutely certain that he meant to portray a boat which uses brails to furl its sail. Nevertheless, the boat of TT 50 has shown an arrangement that is more like that of the other vessels described here than it is like the traditional Egyptian rig, and so it would seem that the artist was attempting to render the same phenomenon.

From an art-historical perspective, it is interesting to note that the earliest of these representations, PC 103, is the freest and most realistic in its portrayal of the sail. The sculptor has captured one of the true configurations of such a rig, anticipating Greek and Roman artists by one thousand years. The painting from TT 50 is clumsy at best; but soon thereafter (if not simultaneously) the convention for portraying ships with brailed sails was established, to the point that there is hardly any difference between the schematized rigging of [E.] Berlin 24025 and the Medinet Habu relief of perhaps 200 years later.

Finally, PC 103 shows that when 18th and 19th Dynasty Nile boatmen did use brailed sails, they dispensed with booms. Thus, it seems unlikely that the artists of the Turin papyri and of Theban Tomb 50 were faithfully recording actual riverine boats with both brailed sails *and* booms. Rather, they were probably mistakenly combining two different artistic conventions, perhaps under the influence of scenes like those of Tutankhamun and Herihor.

⁵⁰ See Hari (*supra* n. 47), pl. LXXII, with note 14 on p. 3.

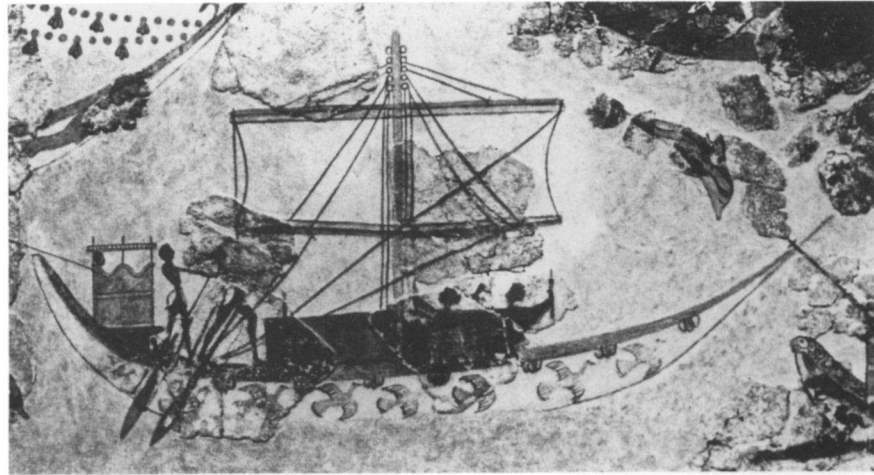


Fig. 9. Sailboat from the Thera Fresco. From S. Marinatos, *Thera VI* (Athens, 1974), Color Plate 9. (Used by permission of Hē en Athēnais Archaïologikē Hetaireia.)

The Technological Context

From the 6th Dynasty to the New Kingdom, the rigging of Egyptian ships seems to have been functionally based on the same model: a square sail hung from a yard arm and secured at its foot with a heavy boom. The boom was supported by numerous lifts, which ran to the middle of the mast during the Old and Middle Kingdoms but which were generally attached at the masthead by the New Kingdom. Herodotus reports (2,96) that some Egyptian boats in his day had papyrus sails, but iconographic evidence as early as the Fifth Dynasty (e.g., the richly decorated sail of Sahure's royal barge) suggests that linen was preferred (if not universally available) throughout pharaonic history.

By the time contemporaneous with the early 18th Dynasty (and probably much earlier), Minoans, Greeks, and Levantines all rigged their (sea-going) ships essentially after the Egyptian model.⁵¹ The best examples are from the famous fresco from the Cycladic island of Thera. The single ship under sail (fig. 9)⁵² in the fresco has both a yard and a boom; the boom is held aloft by four lifts, passed through rings at the masthead. The other ships in the scene

have their sails furled; in each case, the upper yard has been lowered along Egyptian lines.

The Syrian ships (fig. 10) from the tomb of Ken-Amun (mayor of Thebes in the reign of Amenhotep III) show a similar arrangement, with the upper yard lowered to furl the sail.⁵³ Other similar ships are seen in Minoan seal im-

⁵¹ This paper refers to such rigging as "Egyptian" only because Egyptian art includes the earliest and most numerous examples of boats rigged in this way. Where such techniques were actually invented is an open question.

⁵² S. Marinatos, *Thera VI* (Athens, 1974), Color Plate 9.

⁵³ There is room for discussion on the question of whether the boom of these ships remained stationary, or was hoisted when the sails were furled. In the large ships at left, whose sails are deployed, the boom is above the top of the bow and stern posts. In the smaller ships, at upper right, also with sails deployed, the boom is *below* the top of the posts. In the smaller ship with its sail furled at lower right, the upper yard has definitely been lowered. However, because of the contradiction between the booms' positions in the other ships, it is hard to know whether the boom has also been raised. Davies and Faulkner thought so; see their "A Syrian Trading Venture to Egypt," *JEA* 33 (1947), 42. While their argument is not to be entirely dismissed, my view is that the boom was stationary, for three reasons. First, the difference in sail placement (i.e., either entirely above the bow and stern posts as in the large ship or between them as in the smaller ships) is dictated by the proportion of the space the artist had to fill. Given the cramped space at upper right, the artist could not have shown the sail fully deployed unless he had lowered it so that the boom was nearer to deck level. However, leaving the boom in its proper position and having the upper yard lowered to it, even in this cramped space, does not create too jarring an impression. Secondly, if the boom had been raised in the smaller ship at lower right, its lifts should be hanging slack, not taut as shown here. Third, as Shelly Wachsmann of Texas A&M University reminds me, the boom of the large ship at left is lashed to the mast and so could not have been maneuvered up and down.

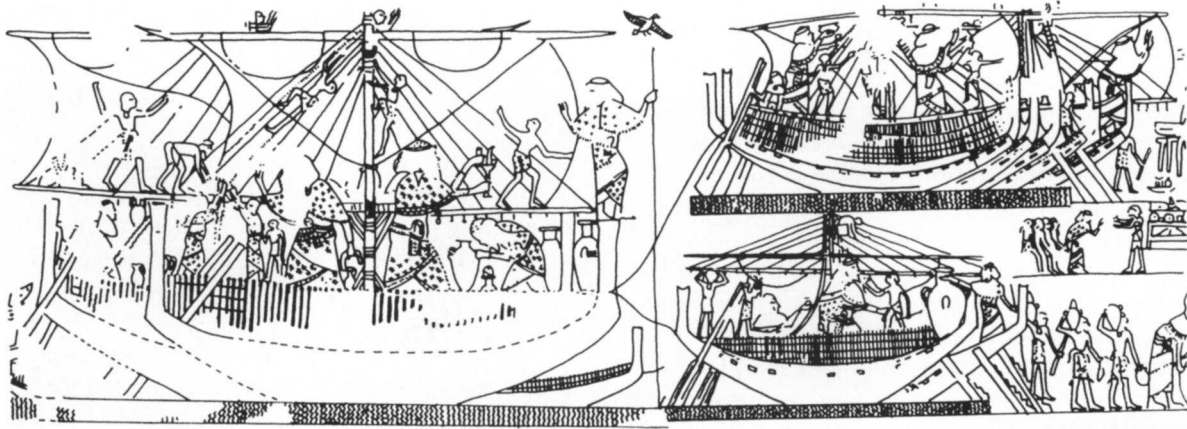


Fig. 10. Syrian ships in port from the tomb of Ken-Amun (TT 162). (Drawing by Harold Dinkel after Plate XV of N. Davies, *Scenes from some Theban Tombs, Private Tombs at Thebes IV* [Oxford, 1963], reproduced courtesy of Shire Publications Ltd.)

pressions from the Middle Minoan⁵⁴ to Late Minoan periods;⁵⁵ in each case, the upper yard has been lowered. Finally, two fresco fragments from the "Palace of Nestor" at Pylos shows what appears to be the rigging of a similar ship.⁵⁶ The rings at the masthead are clearly visible, as are the lifts for the boom and the boom itself. These fragments were not found *in situ* within the palace but seem rather to have been discarded sometime early in the Late Helladic period.⁵⁷

Ships with traditional Egyptian rigs were at their best with a following wind, such as is typical on the Nile with its prevailing northerly breeze. The boom would have held the sail flat, providing maximum surface area for the wind to blow directly against. The rig must have been clumsy to work, requiring the maneuvering of large, heavy spars to furl or unfurl the sail. The boat procession of Herihor from Karnak and the similar, fragmentary scene of Tutankhamun

(see above, fig. 7 and n. 45) show how sails were probably furled on large vessels. The upper yard was lowered partially, to a level which was convenient for men standing on the boom. Those men would detach the foot of the sail from the boom, then bunch up and furl the sail by hand. Then the upper yard would be lowered the rest of the way, even with the boom itself.

A brailed sail was fundamentally different. With a loose foot and yard held more or less permanently aloft, maneuvering the sail was easier. Moreover, the sail could be shaped at will, which ought to have rendered the vessel quite effective upwind. Empirical tests with replicas of classical ships rigged with brails show that an angle as small as 50 degrees off the wind can be achieved.⁵⁸ Viking ship replicas, whose square sails are not equipped with brails, have proved less effective, with angles of at best about 60 degrees off the wind reported under controlled conditions.⁵⁹

⁵⁴ D. Gray, "Seewesen," *Archaeologia Homerica I. Kapitel G* (1974), 1–139, Abbildung 8.b.

⁵⁵ J. H. Betts, "Ships on Minoan Seals" in D. J. Blackman, ed., *Marine Archaeology. Proceedings of the Twenty-third Symposium of the Colston Research Society* (Hamden, Conn., 1973), fig. 5.

⁵⁶ M. L. Lang, *The Palace of Nestor at Pylos in Western Messinia II, the Frescoes* (Princeton, 1969), pl. 113.

⁵⁷ L. Morgan, *The Miniature Wall Paintings of Thera: A Study in Aegean Culture and Iconography* (Cambridge, U.K., 1988), 122.

⁵⁸ Katzev (*supra* n. 10), 8.

⁵⁹ It was reported in the *Christian Science Monitor* 76 (Sept. 20, 1984), 31 and 34, that the knarr *Saga Siglar* had sailed as close to the wind as 50 degrees. However, in his 1986 comments, Vinner said that *Saga Siglar's* best performance was 60 degrees into the wind; see "Recording the Trial Run" in O. Crumlin-Pedersen and M. Vinner, eds., *Sailing into the Past: Proceedings of the International Seminar on Replicas of Ancient and Medieval Vessels, Roskilde 1984* (Roskilde, Denmark, 1986), 224–25.

Egyptian-rigged ships were probably considerably less efficient upwind, for at least three reasons. First, the extremely broad shape of New Kingdom sails was not suitable for providing the efficient lift-to-drag ratio needed for upwind sailing. Secondly, those sails, held rigid with booms, could not be easily shaped or shortened in any way to control the aerodynamic pressures of tacking. Finally, the hull shape of Nilotic boats, characterized by a keelless bottom and ends held out of the water, likely made them much more vulnerable to leeway (the tendency for the whole vessel to be blown away from its upwind course) than ships built in the Aegean tradition.

This last point may be of significance in understanding the origin of Graeco-Roman shipbuilding and sailing techniques. As Cemal Pulak of Texas A&M University has suggested (personal communication), brails may well have evolved to simplify sail-handling, and in particular to make it possible to shorten sail quickly in case of heavy weather. But it no doubt became obvious that they made it easier to sail close-hauled. However, for a ship to sail properly off the wind, the aerodynamic forces developed on the sail must be balanced by hydrodynamic forces developed on the hull. Thus, improvements in rig efficiency could not have been employed to full advantage if they had not been accompanied by improvements in hull performance.⁶⁰ For this reason, it may be no coincidence that our first archaeological evidence for the existence of the keel (the Ulu Burun shipwreck near Kaş, Turkey)⁶¹ comes at about the time we have our first iconographic evidence for brails. Might the keel—along with the wine-glass section typical of Graeco-Roman hulls—have resulted from attempts to improve the hydrodynamic characteristics of hulls, and only incidentally have come to provide longitudinal stiffening?⁶²

⁶⁰ See extended and very understandable discussions in C. A. Marchaj, *Aero-Hydrodynamics of Sailing* (New York, 1979), passim, but esp. parts 1A, 1C and p. 488.

⁶¹ G. F. Bass, *AJA* 90 (1986), 275.

⁶² This is solely the author's view, and it ought to be made clear that it is purely hypothetical. As of this writing, the keel and other hull remains of the Ulu Burun wreck remain *in situ* on the wreck site, and the dimensions of the keel and the shape of the hull are complete unknowns.

The Historical Context

Were brailed sails an Egyptian innovation, or borrowed from abroad? If borrowed, from whom?

Of all the representations of brailed sails examined so far, only the Medinet Habu relief offers any direct evidence: it shows ships with brailed sails directly associated with the confederation of "Sea Peoples" that was attempting to invade Egypt.

The Medinet Habu record is unusually comprehensive in that its relief and text not only show ships with brailed sails in action, but give the names of the Egyptian ship types, give the ethnic identities of the enemy forces, and show the marines fighting on either side. The Egyptian ships are described as *mnš*-, *br*-, and ^h*h*²-ships. Of these, *mnš*-ships are first attested in the latter third of the 18th Dynasty, when they appear in the compound phrase *hry-mnš(.w)* (*mnš*-ship captain, lit. "one who is over a *mnš*-ship or *mnš*-ships"), seen in a number of 18th-Dynasty ostraca (temp. Amenhotep III) from Thebes⁶³ and el-Amarna.⁶⁴ The ostraca usually describe some commodity brought by a *hry-mnš(.w)*, quite often incense. *Mnš*-ships are seen as sea-going trading vessels in the Kadesh battle inscriptions of Ramses II.⁶⁵ In the 19th Dynasty, an identically spelled word is attested in the meaning "cartouche,"⁶⁶ prompting Goedicke to suggest that *mnš* refers to a ship's status rather than to its type—specifically, the status of being under charter to the pharaoh.⁶⁷

According to the *Wörterbuch*, the ship name, *br*, appears for the first time in the earlier 19th Dynasty, written in the syllabic orthography usually associated with the Egyptian transcrip-

⁶³ W. C. Hayes, "Inscriptions from the Palace of Amenhotep III," *JNES* 10 (1951), 94 with n. 151; Ramesside parallels in Y. Koenig, *Catalogue des étiquettes de jarres hiératiques de Deir el-Médineh*, DFIFAO XXI, fasc. 1 (Cairo, 1974), pls. 23–26.

⁶⁴ H. Frankfort and J. D. Pendlebury, *The City of Akhenaten Part II* (London, 1933), 106–7 and pl. LVIII.

⁶⁵ *KRII*, 38. The phrase is *mnš m wšd-wr*. *Mnš* ships are also seen as sea-going ships in Pap. Turin B, vso., 1, 7 (late 19th Dynasty), in Pap. Lansing, 4, 10 through 5, 1 (late 20th Dynasty) and in Pap. Anastasi IV, 3, 10 (Seti I)—see *infra* n. 71.

⁶⁶ *Wb* II, 89; Gardiner, *EG*³, 74. For further discussion of *mnš*-ships, see L. Basch, "Le navire mnš et autres notes de voyage en Égypte," *Mariner's Mirror* 64 (1978), 99–123.

⁶⁷ *The Report of Wenamun* (Baltimore, 1975), 25.

tion of foreign words.⁶⁸ It has been suggested that *br* can be associated with the *br*-boats of Ugaritic texts and may refer to some sort of Aegean boat type;⁶⁹ conversely, it may have a Semitic etymology.⁷⁰ It is the normal word for “ship” in the *Tale of Wenamun*, though Wenamun has *br* ships under the command of *hry-mnš(.w)*, and in at least one passage, (1,58–2,2), *mnš* and *br* seem to be used as synonyms.⁷¹ Both are seen as sea-going ships under the control of Canaanites or Tjeker settled on the Levantine coast—never under the control of any Egyptian. While the name ^ḥš (or fighting) ship is Egyptian and could designate Egyptian elements in Ramses III’s fleet, the use of the words *br* and *mnš* at Medinet Habu implies that at

⁶⁸ *Wb* I, 465, 8–9. But see below, note 70.

⁶⁹ A. Alt, “Ägyptisch-Ugaritisches,” *Archiv für Orientforschung* 15 (1945–51), 70–71.

⁷⁰ W. Helck, *Die Beziehungen Ägyptens zu Vorderasien im 3. und 2. Jahrtausend v. Chr.*,² Ägyptologische Abhandlungen Band 5 (Wiesbaden, 1971), 511; questioned by A. Cody in “The Phoenician Ecstacy in Wenamun,” *JEA* 65 (1979), 101 n. 13, but perhaps not unlikely if the name *bšw*, used in line 13 of the Second Kamose Stela to describe sea-going cargo vessels at the Hyksos capital of Avaris, is actually a mistake for *br*—see L. Habachi, *The Second Stela of Kamose and his Struggle Against the Hyksos Ruler and His Capital*, Abhandlungen des Deutschen Archäologischen Instituts Kairo; Ägyptologische Reihe, Bd. 8 (Glückstadt, 1972), 37, and compare Lesko, *Late Egyptian Dictionary* I, 157. The ship-name *bšw* is first attested in the Middle Kingdom, perhaps as early as the reign of Sesostris I; see W. K. Simpson, *Accounts of the Dockyard Workshop at This in the Reign of Sesostris I, Papyrus Reisner II, Transcription and Commentary* (Boston, 1965), Fr. 3, Vs. 6 and p. 38; according to Simpson, however, the reading of the word is doubtful and it may be part of a proper name. Later in the Middle Kingdom (Reign of Sesostris III or Amenemhet III), the word appears in the daybook of a minor official—see F. L. Griffith, *The Petrie Papyri, Hieratic Papyri from Kahun and Gurob (Principally from the Middle Kingdom)*, (London, 1898), p. 56 and pl. XXII, line 15 (= Griffith’s catalog no. III, 1, A, line 15). The word also appears in Pap. Westcar (V, 2), where it describes the royal barge of Snofru. In all these cases the *bšw*-boat is certainly to be seen as a Nilotic craft. Thus, *br* would seem a likely emendation for the Kamose text, and if accepted, the connection between the *br*-ships at Avaris and Syria-Palestine might be seen as strengthening the idea of a Semitic source for this ship type; on the other hand, we now know that Aegeans were also active in the Delta during the Second Intermediate Period.

⁷¹ Perhaps also in Pap. Anastasi IV, where a *bšy* (read *br?* with Lesko, *supra* n. 70) *nš* (*bšy/br*-ship of ^ḥš-wood) in 3,6 is probably to be equated with a *mnš iw hr Hšrw* (a *mnš*-ship come from Syria-Palestine) in 3,10.

least some of Ramses III’s fleet was made up of foreign, sea-going ships.

The Medinet Habu text further describes the ethnic identity of the invading ships’ crews: Philistines, Tjeker, Shekelesh, Danuna and Weshesh.⁷² Further, it is interesting to note that with only two exceptions, the “Egyptian” marines at Medinet Habu all actually wear mixed costumes: their headgear and weapons are typical of the Egyptian troops in the reliefs of land fighting, but their kilts are typical of the invaders and the Egyptians’ mercenary Sherden allies. Thus, it cannot be excluded that Ramses III was relying on mercenaries for his naval defense as well, and that in fact the ships on both sides were crewed by “Sea Peoples.”⁷³

Like the nomenclature of the Egyptian ships, the phenomenon of “Sea Peoples” has its origin in the late 18th/early 19th Dynasties. As is well known, Egypt’s sea-faring contact with Syria-Palestine and the Minoan world was of long standing. However, Egypt’s contact with and knowledge of the inner Aegean increased considerably in the years just prior to the Amarna

⁷² *KRI V*, 40; translated by J. A. Wilson in J. B. Pritchard, ed., *Ancient Near Eastern Texts Relating to the Old Testament* (Princeton, 1950), 262–63.

⁷³ See the similar conclusion in G. A. Wainwright, “Some Sea Peoples,” *JEA* 47 (1961), 23 n. 6; an opposite point of view is in *LdÄ V*, 818 and 822 n. 58. The text, unfortunately, does not give a clear idea as to the ethnicity of the battle fleet’s crew. The phrase used to describe Ramses’ crews is *stp nb n tš-mry*, or “every picked (man) of Egypt” (*KRI V*, 40, 10). The synonymous phrase *stp nb [n km.t]*, however, is earlier used to describe the combined native and mercenary force being armed to meet the Sea Peoples (*KRI V*, 29, 7–8). While Sherden are not actually shown drawing weapons (see Pl. 29 of *The Epigraphic Survey, Earlier Historical Records of Ramses III, Medinet Habu Vol. I*, University of Chicago Oriental Institute Publications Volume VIII [Chicago, 1930]), they are mentioned by name as among those receiving weapons from the royal arsenals (*KRI V*, 28, 15) and so would almost certainly be meant to be included in the report on the readiness of the army in *KRI V*, 29, 7–8: *pš mš^c twt iw=w m kš.w n tš m stp nb [n km.t] r ḏr=s*, “The army is equipped, consisting of bulls of (the) land, of every picked (man) [of] all [Egypt].” (The word *km.t* falls in a lacuna, but is sensibly restored by Kitchen, evidently on the basis that (a) a name of Egypt is required by the context and (b) the name must be feminine to agree with *r ḏr=s*.) If I am correct in postulating a dominating role on the part of Sherden or other mercenaries in Ramses III’s navy, it is perhaps not surprising that it is not explicitly mentioned: compare the reluctance to admit Egyptian reliance on foreign sea power evinced in *Wenamun*, I, 57–58.

period. Specific Egyptian knowledge of Greece, the Aegean, and western Anatolia is documented by the geographical lists from the mortuary temple of Amenhotep III.⁷⁴ Egypt—and, indeed, the entire Eastern Mediterranean littoral—seems to have suffered an upsurge in piracy at this same time, connected in many instances with ethnic names of the type associated with “Sea Peoples.” The earliest mentions occur in the reigns of Amenhotep III and Akhenaten, when the first mention is made of the Sherden (e.g., in Amarna letters 81, 122, and 123), Luka (EA 38), and Danuna (EA 151). EA 38 describes the early depredations of the Luka, now more generally agreed to be the Lykians of classical antiquity.⁷⁵ The Sherden had apparently been involved in piratical attacks on Egypt in the early years of Ramses II, disrupting trade with other Aegean islands, and resulting in Sherden being impressed into Ramses’ military service.⁷⁶ Luka, Sherden and Akawasha (Achaians?) were supposed to have been active in Libyan desert bases during the reign of Merneptah.⁷⁷ To recapitulate: the iconographic and lexicographic elements so closely linked at Medinet Habu, i.e., ships with brailed sails, the ship names *br* and *mnš*, and piratical ethnic groups known as Sea Peoples, all appear in the Egyptian record at roughly the same time: the late 18th/early 19th Dynasty. Is this a coincidence?

As to the problem of “Sea Peoples” in Libya during the reign of Merneptah, it is worth recalling that foreign traders seem to have been on Bates’ Island (Marsa Matruh) off Egypt’s northwest coast in the late 18th Dynasty or early 19th dynasties.⁷⁸ These traders brought with them both Cypriot ceramics and Canaanite am-

phoras⁷⁹ (cf. [E.] Berlin 24025). Now, despite historical references to Sea People activity in the Libyan desert, White is only prudent to point out that “at this stage . . . the evidence will not support a direct association between the island’s (that is, Marsa Matruh’s) foreign occupants and the Sea Peoples of the thirteenth century.”⁸⁰ But it bears repeating that this archaeological evidence for sea-farers is in exactly the place that historical considerations would lead us to look for Sea Peoples; and that, again, the appearance of these archaeologically-documented sea-farers coincides with the appearance of brailed sails in the iconographic record.

Who the “Sea Peoples” were is of course a difficult question in its own right. Most of the names in Egyptian texts are obscure,⁸¹ and little consensus has been achieved on the identifications that have been proposed. But it is certain that the Philistines, at least, brought an Aegean material culture with them to the Levant.⁸² If the equation Luka = Lykians is close to secure and that of Akawasha = Ἀχαιοί (= the Ahhiyawa of Hittite sources) is at least plausible,⁸³ then the standard identification of the “Sea People” generally with Aegean and western Anatolian elements is probably not far off the mark.⁸⁴

⁷⁹ L. Hulin, “Marsa Matruh 1987, Preliminary Ceramic Report,” *JARCE* XXVI (1989), 120, 124.

⁸⁰ *Supra* n. 78, 83.

⁸¹ The sources are Merneptah’s Great Karnak Inscription, *KRI* IV, 2–12, relevant portions translated in Breasted, *Ancient Records* III, §§574, 579, 588, 589; The Cairo Column, *KRI* IV, 23, translated in *Ancient Records* III, §595; The Athribis Stela, *KRI* IV, 19–23, relevant portions translated in *Ancient Records* III, §§600–601; Ramses III’s First Libyan War, *KRI* IV, 20–27, relevant portions translated in *Ancient Records* IV, §44; Ramses III’s Great Inscription of Year 8, The Sea People campaign, *KRI* V, 37 ff., relevant portions translated in *Ancient Records* IV, §64; Papyrus Harris, transcribed in W. Erichsen, *Papyrus Harris I, Hieroglyphische Transkription*, Bibliotheca Aegyptiaca V (Brussels, 1933), relevant portions translated in *Ancient Records* IV, §§402, 403.

⁸² See Dothan (*supra* n. 2), 96.

⁸³ A. B. Lloyd, *Herodotus Book II Introduction* (Leiden, 1975), 6–8; although this is far from universally agreed and the most recent treatment of the problem, Donald Redford’s *Egypt, Canaan and Israel in Ancient Times* (Princeton, 1992), 246 denies that the Akawasha of the Egyptian records are to be equated with the Ἀχαιοί.

⁸⁴ For a rather different view of the Sea People problem, see A. Nibbi, *The Sea Peoples and Egypt* (Park Ridge, New Jersey, 1975).

⁷⁴ E. Edel, *Die Ortsnamenlisten aus dem Totentempel Amenophis III* (Bonn, 1966), lists B_N, C_N, and esp. E_N. Cf. also Amarna letters 38, 81, 122, 123 and 151 mentioned above.

⁷⁵ T. R. Bryce, *The Lycians in Literary and Epigraphic Sources* (Copenhagen, 1986), 3–10.

⁷⁶ See the Sherden stela from Tanis, in W. M. F. Petrie, *Tanis Part II* (London, 1888), 25–26 and pl. II; and J. Yoyotte, “Les Stèles de Ramsès II à Tanis,” *Kémi* 10 (1949), 60–64 and pl. VI. Cf. the false tale of Odysseus in *Od.* 14, 192–286.

⁷⁷ Breasted, *Ancient Records* III, §§241, 243.

⁷⁸ D. White, “1985 Excavations on Bates’ Island, Marsa Matruh,” *JARCE* XXIII (1986), 81.

The argument, then, for attributing the technology of brailed sails to the northeast Mediterranean is based principally on this apparently contemporaneous appearance of new sea-faring peoples associated with that area, a new sailing technology strongly associated with those people in later historical records, and new words for ships that would appear to be related to the new technology. (This can be said with more confidence of the term *mnš* than the term *br*, which as we have said, may have a Semitic etymology and may even have been introduced in the Hyksos period.) The grounds for excluding the Levant or the Minoan world as the home of the new technology are primarily iconographic: the tomb of Ken-Amun seems to show that the old-style rig was still very much in vogue in Syria-Palestine right up to the reign of Amenhotep III; and Minoan evidence from the Thera fresco through the Late Minoan IIIb seal discussed above (*supra* n. 55) shows that Minoan sea-farers may have used the old rig as late as the reign of Ramses II. Moreover, while the dockyard annals of Thutmose III show that shipwrights with Semitic names were building ships for the Egyptians in the mid-18th Dynasty,⁸⁵ these people seem to have left no traces of any innovations they may have brought with them in either Egyptian ship iconography or nomenclature. Certainly the names *br* and *mnš* do not appear in the dockyard records.

But if Egypt itself was not the home of the brailed sail, what should we make of the Amarna-period relief PC 103? This, the earliest known representation of a brailed sail, clearly shows a native Egyptian riverine boat using its rig to sail off the wind.

Two interpretations are possible. Either the relief is a good representation of real life, and shows that at least some Nile boatmen were experimenting with foreign rigs, or else the artist has incorrectly placed a sea-going rig on a river boat. I would prefer to suppose that the artist was being accurate, and allow that some river boat operators did indeed try to use the new rig. It is not unlikely that, if sea-going ships with

brailed sails did come up the Nile, Egyptian boatmen may have copied the new technology. (Perhaps [E.] Berlin 24025—almost certainly a sea-going merchant ship—is a record of one such visit.) If the rigs were simply put on traditional flat-bottomed hulls, they may not have worked all that well. Conversely, the use of new rigs may show that new hull construction ideas were also penetrating the Nile valley if, as we suggested above, rig and hull evolution proceeded in tandem.

However, any such experiments were probably sporadic, at least at first. The weight of the iconographic evidence indicates that throughout the New Kingdom, most Nile boatmen preferred to use the traditional rigs and hulls. Egyptian boatmen had less need for vessels that worked efficiently upwind, since they could use the south-to-north current of the Nile to help them against the prevailing north wind. This does not mean that the ability to tack is superfluous on the Nile: modern felucca operators tack northward rather than row; such an arrangement permits a crew of one or two to operate a relatively large boat. Labor was rarely in short supply in ancient Egypt, however; and it seems likely that the advantages in improved upwind performance must have been greatest at sea.

When brails became generally adopted in the Eastern Mediterranean is an open question. There are not many depictions of Eastern Mediterranean sailing craft from the period between the mid-18th Dynasty and the beginning of the Iron Age; one such could be the Minoan seal dated by Betts to LM IIIb, or the late 18th or early 19th dynasties (*supra* n. 55). If it is so late, and is not deliberately archaizing, it implies that traditional rigs continued in use alongside the new rigs in the Mediterranean for some time. Rigging on the Late Helladic (or Cypriot) IIIb or IIIc representations (mostly sherds) enumerated by Wachsmann rarely can be easily identified either as the traditional Egyptian rig or as the new brailed rig.⁸⁶ The only one that can convincingly be argued to carry a brailed rig, a graffito from Enkomi, Cyprus, is to be dated only generally to the Late

⁸⁵ W. Helck (*supra* n. 70), 356; T. Säve-Söderbergh, *The Navy of the Eighteenth Dynasty* (Uppsala Universitets Årsskrift 1946: 6), 53–54. Säve-Söderbergh minimizes the significance of these few Semitic names on sensible grounds.

⁸⁶ S. Wachsmann, "The Ships of the Sea Peoples," *IJNA* 10.3 (1981), 187–220; his figs. 14, 15, 17, 18, 22, 28.

Cypriot III period.⁸⁷ A graffito from Kition, Cyprus, could show a ship with one or two brails. However, this is apparently to be dated no earlier than the 11th century B.C.⁸⁸

The Ulu Burun ship seems to show considerable advances in hull construction;⁸⁹ might it have also adopted brails for its rigging? Homeric tradition puts brails on Odysseus' ship, but Homer's description (see above, n. 3) can apply equally well to both the ships of his own day and to the end of the Late Bronze Age, so it is difficult to read too much into it. The technique was standard in the Mediterranean by the Geometric/Phoenician period.⁹⁰

⁸⁷ Wachsmann (*supra* n. 86), 207 and his fig. 22.

⁸⁸ L. Basch and M. Artzy, "Ship Graffiti at Kition," appendix II of V. Karageorghis and M. Demas, eds., *Excavations at Kition V: The Pre-Phoenician Levels* (Nicosia, Cyprus, 1985), 323 and figs. 1A, 1B.

⁸⁹ It should be conceded that this statement can really only be made with any certainty in comparison with Egyptian riverboat construction, no sea-going ship before the Ulu Burun wreck having been excavated. Moreover, our best evidence for Egyptian hull construction techniques is the 4th Dynasty Cheops funerary boat, more than a thousand years earlier than the time we are dealing with. [For a full description, see P. Lipke, *The Royal Ship of Cheops*, BAR International Series 225 (Greenwich, UK, 1984)]. New Kingdom boat models and paintings (of both river-going and ocean-going craft) certainly *look* as though they are based on vessels substantially like the keelless, sewn Cheops boat, but we are at the mercy of the Egyptian artist and his conventions and cannot be sure. The Thera ships and the ships of the Minoan seals discussed above also *look* as though they may be quite similar to Egyptian river boats, but any definitive assertion must await archaeological discovery of an actual hull. There is, on the other hand, literary evidence that Greek and Roman authors believed sewn boats to have been common in the heroic past; see Casson (*supra* n. 2), 9–10.

⁹⁰ See Casson (*supra* n. 2), figs. 78 and 79. Unfortunately, warships represented on Geometric vases tend to be shown unrigged, perhaps because the mast and rigging were removed for battle.

It has not been the purpose of this paper to follow the historical consequences of the development of brails. But as a point of departure for research in this direction, it is interesting to note Liverani's observation of a fundamental realignment in sea-trade patterns in the Iron Age. Liverani dates this realignment to around 1200 B.C. and connects it to technological developments:

As for sailing techniques, I personally am not aware of precise innovative elements introduced around 1200 B.C. which could be said to characterize Iron Age I shipping in contrast to Late Bronze Age navigation. However, I am strongly inclined to postulate some such innovation, since we get the impression of a sudden widening of the sea routes and of a technical and operative freedom which distinguishes sailing of, so to speak, an "Homeric" type, from the cautious coast-hugging of the Late Bronze Age.⁹¹

The observations made here would seem to bear out Liverani, with the reservation that the innovation was probably a century or two earlier, and only slowly diffused from its original milieu to the established Egyptian and Canaanite civilizations of the southeast Mediterranean.

The Johns Hopkins University

⁹¹ "The Collapse of the Near Eastern Regional System at the End of the Bronze Age: The Case of Syria," in M. Rowlands et al., eds., *Centre and Periphery in the Ancient World* (Cambridge, U.K., 1987), 70.