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Toward a Comparative Analysis of Etruscan and Levantine Maritime Technology

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TOWARD A COMPARATIVE ANALYSIS OF ETRUSCAN AND LEVANTINE MARITIME TECHNOLOGY

By

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Abstract

Previous treatments of the relationship between the Phoenician and Etruscan civilizations are mostly devoid of analysis of their respective port design and ship construction. This thesis aims at a comparative study of Phoenician and Etruscan maritime technologies, individually examining harbor features and naval typologies.

The relative lack of evidence is the main problem concerning both fields of study. Uncertain dating, moreover, represents a serious obstacle to a constructive analysis of port technology both in central Italy and the Levant. The difficulty in determining the dates of Mediterranean harbor sites is due primarily to the fact that Romans tended to reoccupy most of the sites analyzed in this thesis, so that it is difficult to determine whether port facilities were built by Romans or indigenous populations.

So far, little data suggesting a possible cultural influence regarding port facilities has been found. The most interesting piece of evidence on the matter consists of the presence in the Etruscan site of Graviscae of an artificial enclosed harbor which resembles those of a number of Punic colonies. The breakwater of the Tyrrenian port of Populonia seem to function similarly to those of the Levantine port at Sidon, both allowing a certain amount of waves to flow within the ports.

There are fewer problems concerning the study of naval typologies, with most of the evidence coming from iconography. While there is not enough evidence allowing a comparative analysis of cargo ships, some hypotheses may be formulated about war galleys. With regard to the latter, the presence of a complete fighting deck both in Etruscan and Levantine galleys may be the result of direct cultural influence. Vessels that share features characteristic of cargo ships as well as war galleys appear both in Phoenician and Tyrrenian imagery. The Etruscan version of such vessels, however, is substantially different from its Levantine counterpart.
Introduction

During the early Iron Age, the Mediterranean world experienced a period of great dynamism. The archaeological record shows a considerable amount of imported goods throughout the Levant, North Africa, and Southern Europe. Considering that non-perishable items are likely to represent just a minor percentage of the actual movement of goods across the Mediterranean, one may assume that the level of trade was even higher. The same period is characterized by the founding of several Greek and Levantine colonies, implying massive population movements and a high degree of contact among the peoples of the interested regions.

The Early Iron Age, in other words, could be described as an era pulsating with movements, trade, and strong interaction among different populations. In such a context, the relationship between Phoenicians and Etruscans deserves some special attention. Both archaeological and historical sources demonstrate that those two peoples had an extremely close relationship.

A large amount of luxury goods of Levantine origin, such as ostrich eggs, silver bowls and ivory objects, has been found in the tombs of many Etruscan sites, as in the cases of Populonia, Tarquinia, Vulci, Vetulonia, and the well known “princely tombs” of Praenestae and Caere, all dating to the 7th and 6th centuries BC (Turfa 1986:67; Markoe 2000:149). Tyrrhenian bucchero pottery, on the other hand, is found in Phoenician colonies in the Italian archipelago, Spain, and North Africa (Turfa 1986:69; Shuey 1989:247) and many scholars have agreed that commodities like metal, grain, and wood were likely to be exported from Etruria to the Levant (Turfa 1986:68, plate 1).

The interaction between Levantines and Tyrrhenians, however, went well beyond mere commercial exchange. The introduction of luxurious exotica from the East had an enormous impact on the modus vivendi of the Etruscan ruling class: not only did the local elite enhance its status thanks to the possession of prestigious oriental objects, but
also certain aristocratic customs such as banquets are often considered to have been introduced by Eastern traders (Turfa 1986:67).

According to historical sources, Etruscan city-states often allied with their Carthaginian neighbors against the Greek colonists, as in the case of the battle of Alalia (540 BC ca, see Ridgway 1990:274). Inscriptions as well provide evidence for a substantial interaction among the two populations, as in the case of the two golden plaques at Pyrgi, two of which were in Phoenician language, and of the Etruscan inscription of the Punic colony of Seliunte (Shuey 1989:274).

The findings at the sanctuary complex in the Italian port-town of Pyrgi also provide much information concerning the cultural, social, and political interaction between Etruscans and Levantines.

Although the architecture of the temples is of a standard Italic design, several terra-cotta antefixes have been interpreted as representing Middle Eastern deities (Ridgway 1990:524). According to a golden tablet inscribed in Etruscan, the sanctuary was dedicated to "Uni-Astarte", implying that a Semitic goddess (Astarte) had been assimilated to an Italic equivalent (Etruscan Uni, Latin Juno). Another golden tablet is inscribed in Phoenician and in fact represents the first Phoenicio-Punic text ever found in Italy (Ridgway 1990:519).

The examples quoted above demonstrate the existence of close ties and constant interaction between Tyrrhenians and Phoenicians during the early Iron Age. It is interesting to notice, however, that in a period in which the Phoenicians founded colonies throughout the Mediterranean region (plate 2), including the Italian archipelago, no Levantine settlements have been found in Etruria itself. This seems particularly surprising if we take into consideration that Phoenicians tended to found settlements in regions rich in metals -- the best known case being Tartessos in the Iberian peninsula -- and that Etruria is extremely rich in iron and other minerals (plate 3).
The iron mines of the Tyrrhenian coast must indeed have been extremely appealing to Levantine traders, always in search of metallic resources, and it reasonable that metal was indeed the primary motivation for trading with Etruria. Furthermore, there are several Phoenician colonies in the islands of Sardinia and Sicily, in the Tyrrhenian sea, not far away from the coasts of Tuscany and Latium.

Despite the lack of actual Levantine settlements in Etruria, the impact of oriental influence is well documented. Moreover, a certain Semitic presence in Etruscan port towns not only explains the Phoenician inscription of Pyrgi, but also fits well into a model of intensive trade between the two populations. This paper discusses the development of maritime technology in Etruria and in Phoenicio-Punic sites and analyzes separately port design and ship construction. The goal is to identify patterns and analogies that may indicate cultural influence.

**Levantine and Punic Harbors**

The Phoenicians passed into history as the seafaring people par excellence, and it is no surprise that some scholars have suggested that it was they who introduced the construction of artificial harbors in the Mediterranean region (Bass 1972:93, Rothaus 1995:295).

Dating, however, constitutes a major problem in the study of Phoenician and Punic port sites, most of which have been reoccupied and modified in later times, and it is not always possible to distinguish Phoenician features from those of later colonizers.

The lack of extensive excavations in most of the major sites on the coast of Syria-Palestine constitutes another obstacle to reconstructing a complete picture of Levantine
harbor typology. Nevertheless, there are certain elements that recur in both Phoenician and Punic sites (plate 4 and table 1).

Settlements often were founded on a small isle close to the mainland, as in the case of Tyre, Motya, Gadir, and Arwad, for the strip of sea between the coast and the isle offered an ideal protection from waves and currents. The construction of "twin ports" (Aubet 1986:53), i.e. two-harbor constructions -- usually one inner and one more exposed -- roughly in the same site, constitutes another common Phoenician practice. Double harbors are still visible nowadays in Tyre, Sidon, Arwad, Tharros, Nora, and Carthage.

_Cothons_, artificial inner harbors dug from the shore line and connected to the open sea by a narrow channel, are probably to be considered a Phoenician invention. Since _cothons_ have been found only in Carthage and some of its colonies (Motya and Madhia), it has been suggested that they constitute a Punic innovation (Bass1972:93 Rothaus 1985:295).

Tyre and Sidon are the two main Phoenician sites in the Levant. Tyre now appears as a promontory, although it was built on a small island off the coast of Lebanon (plate 5). Indeed, Alexander the Great built a mole that connected the isle to the mainland and, throughout the centuries, sediments were deposited around such an artificial structure, creating a promontory that may seem natural. The site consists of an artificial southern harbor, presumably carved out of rock, and a natural northern one, that exploited the configuration of a reef (Aubet 1986:152).

Sidon had two ports as well. It is interesting to notice how in this case both the inner and the outer port exploited the same massive artificial reef (plate 7). In the outer port there is a considerable gap between the reef and the jetty: in this way currents could flow and prevent the harbor from being silted up by debris. It is difficult, however, to determine whether such a strategy was common in Phoenician sites, for scholars still
disagree widely on the dating of Sidon's port (Honor Frost, as quoted by Muckleroy 1978:77 dates it to the Persian period, while Gianfrotta'80:316 dates it to the Roman age).

Arwad, a smaller site situated in northern Israel, reproduces some of the patterns described above. It is situated on an island close to the coast and has two ports. Moreover, remains of a massive artificial reef similar to the one found at Sidon are still visible today.

Motya was a Punic colony located on a small island off the southern coast of Sicily (plate 7). Since it was destroyed in 397 BC and there is no evidence that suggests a major resettlement, dating does not constitute a problem. The artificial port of Motya consists of a rectangular *cothon* that is connected to the open sea by a paved channel. The small dimensions of the artificial enclosure and the narrowness of the channel—which measures less than 17 feet in width—suggest that only small vessels could be hosted (Muckleroy 1978: 83).

Gadir is one of the westernmost Phoenician colonies, located on the Atlantic coast of southern Iberia. It constitutes a case similar to Tyre, for it was founded on an island -- or a group of islands -- which eventually developed into a promontory (plate 8). Unfortunately, the radical change in the geography of the site has made impossible any study of the harbor structure that must have been built on this colony.

Carthage, situated in modern Tunisia, was initially a Phoenician colony in the west. When the Levant lost its independence to the Persian Empire (6th century BC), Carthage became the major Phoenician city. It was destroyed by the Romans in 146 BC and reconstructed in the Augustan age (Lancel 1995:430).

The port of Carthage (plate 9) consists of an outer harbor and two *cothons*, one of which served trading vessels and the other of which hosted warships (Appian, *Lybica*96). The outer harbor is now half-submerged and consists of a series of jetties that form an irregular trapezium. These jetties probably served as breakwaters to create a small harbor.
basin, but may as well represent the remains of a platform used to load and unload ships (Lancel 1995:180).

The military harbor appears now as a semicircular lagoon with a diameter of about 360 yards and is connected to the sea by a small channel. At the center of the lagoon, there is a small circular island that was excavated by a team of British archaeologists in the 1970s. It seems likely that a watchtower stood in the middle of the island (Lancel 1995:177).

Several structures, probably dating to the end of the second century BC, were found on this islet, and a series of quays have been discovered around its perimeter (Lancel 1995:176). There are docks, whose function was that of berthing ships, arranged all around the perimeter of the cothon and around the islet. It has been estimated that these docks were able to house between 170 and 180 ships (Lancel 1995:178).

The shape of the merchant harbor is similar to a rectangle, measuring more or less 330 by 350 yards. The edges of the rectangle are smoothed away, so that the cothon can be described as an irregular hexagon. Its present shape, however, is likely to be the result of a reworking dating to the second century AD and one may presume that the harbor was originally square (Lancel 1995:178).

Today the rectangular lagoon has no direct access to the sea, and a channel connects it with the semicircular cothon. In antiquity, however, it must have been connected to the outer harbor by a channel that has since silted up (Lancel 1995:179).

Distinguishing Punic from Roman features constitutes a problem that has not been resolved. George Bass compared the harbors of Carthage to those of Lechaion, the western port of Corinth (Bass 1972:96). Indeed, the harbor of Lechaion also includes an outer harbor consisting of breakwaters and an inner cothon (plate 10). The fact that the Greek city was destroyed in the same year as Carthage and rebuilt in the Julio-Claudian age may suggest at first that both Carthage’s and Corinth’s cothons are indeed Roman structures.
Although Lechaion’s inner harbor is likely to have been significantly reconstructed in the Claudian period (Rothaus 1995:300), there are good reasons to believe that the *cothons* of the North African city may predate to the Roman reconstruction. The Latin author Appian, quoting the historian Polybius, who was an eyewitness of the first Punic war, writes that when the general Scipio seized Carthage in 146 he blocked two *cothons* (Appian, *Lybica* 96). American archaeologists digging the western part of the merchant harbor dated the lower layer of its quays to the second half of the third century BC (Lancel 1995:178).

Pottery shards found during the excavation of a ramp of the circular *cothon* have been dated to the very end of the second century BC (Lancel 1995:177). Since Carthage was destroyed in the middle of the century, one may be led to deduce that those shards, unless they are associated to a later rebuilding, prove that the ramp was built after the Punic War.

We must take into account, however, that the Roman colony on the Carthaginian soil was built only at the end of the first century BC and that Carthage, after its destruction, remained inhabited until then. The building of a ramp at the end of the first century seems therefore extremely unlikely, and common sense suggests a more careful dating of the pottery found in context.

A definitive dating has not been established either for Lechaion or for the *cothons* at Carthage. There are some elements, both from literary sources and the archaeological record, that suggest that at least part of the Carthaginian *cothons* may be antecedent to the Roman colonization.

Moreover, even if Lechaion is proven to be a Roman harbor, this does not demonstrate that Carthage’s *cothons* are Roman as well. That of the *cothon*, indeed, represents a typically Phoenician structure (Bass 1972: 93; Roethaus 1995:295), while Lechaion represents the only inner constructed artificial harbor in Greece. In other words,
we may not exclude the possibility that the Romans, if it was them who built Lechaion, deliberately copied the model of the harbors of Carthage.

Etruscan harbors

The study of Etruscan harbors faces the same problems encountered by archaeologists in the Levant: changes in the site geography and sea level, poor conditions of port facilities and, above all, lack of dating evidence, which makes it difficult to determine whether a port can actually be considered Etruscan.

To all this one must add that the number of known Etruscan harbors is far less than that of Phoenician harbors. Etruria is much smaller than the Levant, and the Tyrrenhians did not have any large empire. Due to the limited number of sites and difficulty in gathering evidence, it is impossible to recognize any recurring pattern that may summarize the prototype of the Etruscan harbor. In the following paragraphs, I will describe individually the three best known Tyrrenhian ports.

Pyrgi, a small settlement in southern Etruria, has already been mentioned for the sanctuary dedicated to Uni-Astarte; together with Punicum, it functioned as a port for the nearby city of Caere (modern Cerveteri). Although the Etruscans were actively engaged in maritime commerce, it is interesting to note that most of their major cities were not located on the sea, but rather were connected to one or more coastal towns that served as ports.

The remains of two distinct ports, both underwater, can still be seen in Pyrgi: one is close to the sanctuary area and consists of relatively thin jetties built on natural shoals, the other is composed by larger and more uniform jetties (plate 11). It has been argued that the former may have been Etruscan and the latter Roman (Oleson 1977:299).

There are good reasons to believe that the larger port is Roman: hydraulic cement, for instance, has been used for the construction of a fish tank (Oleson 1977:303-304).
There is no trace of evidence, however, that the smaller harbor was built in Etruscan
times. Pyrgi was destroyed by Dionysius of Syracuse in 384 BC; a few years later the
Latins took over the whole region, and the remains of a Roman castrum have been
discovered. The Etruscan and the Roman settlements, however, do not overlap.

The Etruscan harbor is likely to have been close to the Etruscan site and probably
was located on the little bay in front of the sanctuary where the jetties have been found.
Nevertheless, this does not prove that such jetties are contemporary with the temples:
since there has been a considerable rise in the sea level, the shoals may have been tall
enough in Etruscan times to provide adequate shelter without need for any artificial

Graviscae was the port town of Tarquinia. As in the case of Pyrgi, Graviscae is
likely to have both and Etruscan and a Roman harbors. Since the geographical setting
has changed drastically, the actual location of the ports has not yet been found. Some
scholars believe they have identified the remains of a cothon in a basin that is now buried
(Frau 1985:97; see plate 12). The fact that the bay was fortified by massive defensive
walls and the presence of a large external mole may be connected to Greek influence
(Frau 1985:96).

Populonia is the only Etruscan city located directly on the coast. The harbor was
built in a wide bay in front of the isle of Elba that could offer little shelter without the
help of artificial structure (plate 13). The breakwater that is visible nowadays is actually
medieval, but underwater excavations have shown that the modern jetty lies on top of an
ancient one (McCann 1977:282).

The ancient breakwaters were built from local sandstone right on top of the
bedrock. It is hard to understand the actual function of the jetties, due to a considerable
rise in the sea level (most of the ancient necropolis is now submerged). It has been
suggested that they were designed in such a way to allow a certain amount of current to
flow within the port, in order to prevent it from being silted up (Shuey 1983:233).
According to another interpretation, the jetties were not meant to be breakwaters, but rather a protection for the shoreline (McCann 1977:285).

Since we know that Populonia was a commercially active city that imported iron ore from Elba, and wooden logs dated to the middle of the ninth century were found in the proximity of the harbor, together with pottery dating earlier than 500 BC, (McCann 1977:286), it is reasonable to assume that this port facility was built during the Etruscan period.

**Patterns in Etruscan and Levantine harbor design**

There are many factors that make the study of both Levantine and Etruscan harbors extremely difficult. The geographical settings throughout the Mediterranean have been changed greatly since the Iron Age and underwater constructions have been silted by debris, while former land sites have been submerged. Some sites, as in the case of Gadir, have changed so much that they hardly resemble the geography of two thousand years ago; as a result it has been impossible to locate the ancient harbor.

Dating represent another major obstacle to understanding of the evolution of port technologies in the Mediterranean. Many Etruscan and Levantine maritime sites were reoccupied by the Romans. It is often difficult, if not impossible, to distinguish between early features and later ones built by Latin colonizers, as in the cases of Carthage, Sidon, and Pyrgi. Due to lack of evidence, a model for a prototype of the Etruscan harbor has still not been formulated. Only a few patterns are recognizable in Phoenician and Punic port facilities (table 1).

The data analyzed in the sections above does not suggest any major similarity between Tyrhenian and Levantine harbor design. The Phoenicians were masters in the construction of massive artificial ports, while the harbors found in Etruria consisted of simple bays protected by man-made breakwaters.
Whereas the Levantines built their cities directly on the coast or on small islands, most major Etruscan sites were located in the interior and were connected to minor coast towns that served as their ports.

So far there are only two Tyrrhenian sites where there is some indication of Levantine influence in the harbor design. The port structure of Graviscae included a *cothon*, which is a Punic invention, although it was utilized by the Romans as well, as in the case of Corinth.

The breakwater at Populonia seems to have functioned according to a principle similar to the one found at Sidon: the jetties did not break the waves completely, but rather allowed the flow of a certain amount of current to enter the harbor to avoid silt ing.

Although we know of the close relations among Phoenicians, Carthaginians, and Etruscans and would expect some degree of interaction in the development of harbor technology, the two analogies described above are not enough to argue for the application of a Levantine model in the Tyrrhenian coast, and further studies ought to be carried out in order to shed light on the actual degree of similarity of such harbors.

**Phoenician ships**

Despite the considerable intensity of Phoenician maritime activity, our information about Levantine ships is scarce when compared to their Graeco-Roman counterparts. Most of the data concerning the early Iron Age comes from detailed reliefs from Assyrian palaces describing the conquest of Phoenicia. Information regarding later ships consists of representations on Levantine coins and historical sources from the Classical world.

The earliest representation of Phoenician ships on Assyrian reliefs dates to the reign of Sennacherib (705-681 BC). A bronze plaque from the gates of the palace of Balawat depicts the conquest of mainland Phoenicia on the lower register and Levantine
tribute barriers from a fortified islet loading two cargo boats on the upper register (plate 14). These boats, which are perfectly symmetric, were known in antiquity as "hippoi", i.e. "horses", due to the equine heads on their bow and stern (Basch 1987:306; Casson 1971:66).

The human figures on the relief are obviously too large to be considered realistically proportioned to the boats. Nevertheless, the hippoi represented on the gate were likely to be of small dimensions and were destined to short routes, for they are oared only by one man and have no sail.

Most scholars agree that the small fortified island depicted on the upper register is Tyre (Markoe 2000:41, Frankfort 1954:165). Therefore, one may presume that the hippoi served to transport the cargo from the island to Tyre's territory on the coast, which was only half a mile away. Most of the journey to Assyria would have been on land or by river.

The bas-reliefs from the palace of Khorsabad, dating to the third quarter of the eight century, represent a depict kind of hippoi (plate 15). Such cargo boats have an equine head only on their prow, but maintain a somewhat symmetrical shape, with significantly high both prow and stern. These later hippoi must have been significantly larger than those depicted on the Balawat gate, for they were fit to carry timber. The artist depicted a boat simply dragging the timber over the water level, for instance ship #4, and another carrying trunks aboard, as in the case of ship #2.

In this case as well, the itinerary depicted by the scene is the one from the island of Tyre to the nearby coast. Two of the hippoi (#8 and #5) have a mast, which means they might have been capable of rather long voyages. A hippos with a mast is also found on an almost contemporary relief from the palace of Nimrod, dating to the mid-seventh century (plate 16). There is no doubt that the sail on the hippoi was a square rig, which was the only type of sail used in the Mediterranean until the Hellenistic period (Casson 1971:68).
The reliefs from the walls of the palace of Sennacherib at Nineveh are perhaps the most interesting depiction of Levantine ships from the Assyrian world and deserve particular attention (plate 17). The scene depicted refers to the evacuation of king Luli from Tyre, which was conquered by the Assyrian army in 701 BC (Morrison 1996:179).

The observer may easily distinguish between two kinds of vessels: one round without a mast, and a flatter one endowed with a mast and an offensive ram. The latter represents the prototype of the fighting vessel at the end of the eight century. It would have been oared during battle and it utilized the sail during while cruising. Its raison d’être lay in the ram, whose purpose was to puncture the enemy’s ship with a rapid strike.

The relief clearly shows that these war vessels had two rows of oars in order to maximize their overall speed and offensive power in battle. The Greeks referred to them as "biremes" or "dieres", which could be translated as "two-fitted". Such a name, however, did not refer to the number of oars level, but rather to the number of files of rowers on each side of the vessel (Morrison 1996:177). This theory would explain how in the Hellenistic period up to "forty-fitted" warships could be built (Casson 1956:61). In the cases of triremes and biremes, the number of oars level and of files of rowers simply happens to coincide.

On the reliefs, the two rows of oars seem to be completely superimposed. We know, however, that in later times multiple-level warships had their oars level only partially superimposed (Casson 1996:65). Therefore, it has been pointed out that the oars level of the biremes of Nineveh were also likely to be only partially superimposed and that the artist simply depicted the scene too naively: this would also explain the hatched panels that otherwise would not have any plausible function (Basch 1987:313, plate 18 a. and b.).

Basch argued that this arrangement was uniquely innovative for the end of the eighth century, for only much later did Greek biremes begin to have oars level that are only partially superimposed (Basch 1987:317). The depiction of a warship on a late
geometric vase, indeed, shows clearly that the rowers were separated by a considerable interval (plate 18 c.). What may have been unique to Phoenician biremes, with regard to their Hellenic counterparts, was the presence of a deck for transporting passengers or soldiers.

The interpretation of the round vessels is more problematic. The round hull and the double rows of oars are two elements that are hardly reconcilable. A round hull is characteristic of merchantmen, for it allows more space for goods to be transported. The system of multiple rows of oars is characteristic of warships, which need to achieve a considerable speed during battle in order to strike the enemy with the ram, and is unnecessary in merchantmen, which rely on wind power.

The round vessels on the reliefs from Nineveh cannot be biremes, for they do not have a ram and would therefore prove to be useless in a sea battle. Yet they are not merchantmen either, for they have two rows of oars and no sail.

It has been argued that these ships are "fleet auxiliaries" designed to keep up with the speed of oared ships, whose function was presumably carrying soldiers and supplies (Morrison 1996:180). If some kind of military auxiliary ever existed, however, it is hard to believe that they had no mast. Indeed, warships relied on wind power for most of their cruise, and auxiliaries must have keep up with them.

Another theory is that the Nineveh round vessels may be a form of "militarized merchantman," in which the second row of oars was added in order to increase speed (Basch 1987:315). The added weight of the rowers would have destabilized the ship and, to counterbalance this, the mast would need to be removed.

The latter theory is more convincing, although one must be careful about what the term "militarized" means in this context. Since the round vessels do not have a ram, there is no way that they could have fought a sea battle. Nevertheless, they may have been used to transport soldiers to fight on land.
If one considers carefully the specific context of the scene depicted on the reliefs of Nineveh, however, the possibility that the Phoenician soldiers were headed toward some kind of fight, whether on land or on sea, seems extremely unlikely. The reliefs describe the evacuation of a city, not a battle scene.

We have no information concerning a powerful Assyrian military fleet and it is not impossible that they had none, for the land of Assyria did not lie on the sea. Tyre’s inhabitants who were fleeing their seized homeland must not have feared that their enemies may have attacked them on the water. What they were concerned about was fleeing from Tyre as soon as possible and reaching Cyprus. In order to do so, King Luli needed the fastest vessels, which are biremes. It seems reasonable to deduce that since biremes were not sufficient to transport all the refugees, the people of Tyre turned some of their slow merchantmen into faster oared ships.

By the end of the eight century, the two-level oar system is likely to have been widespread among the Levantine sea powers, and Morrison has argued that they may have even developed a three-level oar system (Morrison 1996:181). The earliest representation of triremes in the Levant, however, date to the end of the fifth century (Basch 1987:321), and there is no substantial evidence that leads us to believe that triremes were built before that date.

Coins from Sidon, dating back to the end of the fifth century, carry the image of a slender warship with a large ram (plate 19 a.). Although none of the fifth-century coins includes the oars in the depiction, later ones dating to the early fourth century show that this type of galleys had three rows of oars (plate 19 c.). The shields on top of the galleys indicate that they were decked and were capable of transporting soldiers.

Some coins depict the galley with a mast, while others do not. The lack of representation of a mast, however, does not necessarily imply that Phoenician triremes had no sail. Indeed, the earliest coins do not show oars either (plate 19 b.), and it is impossible to conceive of a galley with no sail and no oars!
When depicted, a mast takes up most of the space on the coin, and it is plausible
that artists chose not to include such an element as a matter of convenience. The idea that
some warships may not have had a sail is not to be excluded either. Such galleys may
have only fought battles close to mainland Phoenicia.

In the fourth century, Byblos and Arados also begin to mint coins depicting
triremes. The representations on the coins of Arados are rather crude and seem to mimic
those of Sidon (plate 20). The galleys lack both a mast and oars and do not provide much
data.

The coins from Byblos, however, are both aesthetically pleasing and detailed
(plate 21). A mast is not visible in any of these coins. The soldiers on top of the decks are
very large and disproportional, and one must not exclude the hypothesis that such
triremes indeed had a mast, which would happen to be covered by the enormous figures
of the soldiers.

The most interesting feature of the Byblos coins is that they represent a ram very
different from that of Sidon's triremes. While the latter is of a simple triangular shape, the
ram depicted on the Byblos coins has three sharp branches. It has been suggested that
such a shape might have been borrowed from the Greek world (Basch 1987:322).

The trireme model found in Erment, Egypt, provides a more detailed source of
information about the structure of Phoenician warships (plate 22). Here the observer may
clearly distinguish the superimposition of the three oar levels and the presence of a deck.

As in the case of the earlier biremes, the superimposition of the oars must have
been only partial. Based on the inclination of the oars, Basch has suggested an
arrangement opposite to that of Greek galleys (Basch 1987:331 plate 23). According to
this theory, Phoenician triremes had the uppermost level of oarsmen (thranites) toward
the center of the ship and the lowermost level (thalamites) toward the sides.

The Greek trireme, by contrast, had the thranites placed toward the exterior. Since
it was only partially decked, the thranites could see the oars and could have helped to
maintain the timing (Morrison and Coates 1989:101). The model of Levantine warship proposed by Basch (plate 23) includes a total decking. If the thranites were at the center of the galley, there was no way they could see the oars regardless of the decking.

The model for Phoenician oar arrangement described above implies that the oars must have been of different lengths at each level (Basch 1987:330). This, however, seems unlikely, for it would have been almost impossible to keep proper timing with oars of different length.

A perfect timing between the three levels of rowers was indispensable to avoid a continuous clashing between the oars. Experimental archaeology demonstrates that even a trireme with all oars of the same length requires a well-trained crew to keep proper timing (Morrison and Coates 1989:98).

The hypothesis that Levantine warships were entirely decked is not to be excluded. An episode described by the Greek historian Herodotus (Historiae III:118) has been interpreted to support such a theory (Basch 1987:331). The historian describes a Phoenician ship "with a crowd of Persians who were traveling home with the king and packed on the deck." Although the episode is set in a time of war, Herodotus does not refer explicitly to a trireme, and the Levantine ship may have been a merchantman.

Concerning the oar system, however, in the lack of any substantial evidence, common sense suggests that the oar arrangement of Phoenician triremes was likely to resemble that of their Hellenic counterparts. In particular, the thesis that Phoenician thranites were placed toward the center of the ship seems quite improbable.

**Etruscan ships**

In comparison to the vast pictorial repertoire of Levantine vessels, we have few representation of Etruscan ships. Most of the information comes from painted pottery, engraved stelai, and painted tombs. Occasional references from Classical authors provide additional data.
A very peculiar kind of vessel is depicted on an Etruscan oinochoe dating to the seventh century (plate 24). The ship has a large square sail and the round shape of a merchantman, but a large ram is attached to the prow. A roughly contemporary graffito on a vase from Veii shows a merchant ship with a sharp appendix as well (plate 25). However, the position of this appendix, that is rather low and clearly underwater, suggests that it may be a buoyancy device rather than a ram (Basch 1987:407).

In the sixth century, it is not uncommon to find depictions of round ships endowed with appendixes that are clearly offensive rams. An incised amphora from Vulci (plate 26), for instance, shows a round ship with a ram well high on the prow. The artist, who depicted the sail but not the oars, may have done so intentionally to emphasize the commercial function of the vessel. Although merchantmen obviously needed to have oars to get in and out of ports, manpower played a much smaller role in cargo ships than in war vessels.

A painting on a vase from Cerveteri dating roughly to the same period depicts another ship with a ram (plate 27). The shape of the vessel is round and almost completely symmetrical, with a very raised prow and stern, so that it resembles that of the cargo ships from the palace at Nineveh (plate 17). Although the depiction is rather crude, the round shape of the ship and the absence of oars suggest that it is probably a merchantman.

In conclusion, the vessel painted on the vase from Cerveteri shares certain characteristics with that depicted on the amphora described above (plate 26) and the oinochoe (plate 24). In all three artifacts, the vessels are depicted without oars. All three vessels are endowed with an offensive ram, but have a round, symmetrical shape that seems more suitable for a cargo vessel. Indeed, it has been suggested that these three are all examples of regular merchant ships to which a ram has been added (Basch 1987:407). This theory, which is extremely plausible, leaves open the question of whether such
vessels were utilized in battle, or those armed merchantmen had an offensive ram for other purposes.

There are three different functions that these ships may have performed. First, they may have been common merchantmen that were turned into warships in case of conflict. This seems unlikely, however, for such round ships would have been hard to maneuver in battle, and the Etruscans had more efficient warships designed specifically for battle.

Second, they may have been pirate ships. They would have needed the spur to attack their prey, but needed a roomy hull to store and transport the loot. During the Iron Age, such activity was rather widespread across the Mediterranean Sea: the word "Tyrrenian" in Greek was often equated with "pirate" (Basch 1987:406).

Third, they may have been regular merchant ships that needed an offensive weapon to defend themselves from pirates and other kinds of threats. This last hypothesis seems the most likely, for nothing in the context of their representation suggests that such ships were pirate vessels.

The possibility of common merchantmen engaging in occasional piracy, however, should be taken into account. In conclusion, the presence of a ram suggests that the vessels in question were "armed merchantmen" (Casson 1971:67) who may have needed such a weapon for both offensive and defensive purposes.

Only one representation of a purely commercial ship, devoid of an offensive spur, has survived until today (Basch 1987:410). However, it is so detailed and well preserved that it provides an enormous wealth of information. The wall painting from the "Tomba della Nave" (literally, "tomb of the ship") in Tarquinia dates to the first half of the fifth century and represent a large merchantman with two masts (plate 28).

The ship, which is much more realistically portrayed than any of those on painted vases, is extremely round and roomy in space. Unlike the earlier militarized cargo vessels of plates 25, 26 and 27, the prow and the stern are not particularly raised. The ship is
completely decked. There are no oars and the presence of two square sails, almost of the same size, suggests that the ship must have been of considerable dimensions. It has been suggested that this large type of cargo ship may have been the precursor of the enormous grain ship that was common in the Roman Empire (Turfa 2001:283).

The representation of military vessels is not lacking in Etruscan iconography. A crater from Cerveteri, dating to the end of the seventh century, carries the depiction of a rowed galley that was without doubt a warship (plate 29). A sharp ram is attached to the prow, which has the shape of an equine head. Although the stern and the prow are still high, the galley is more slender and flat than the merchantmen described and therefore could have been more easily maneuvered in battle. There is only one level of rowers, who are under the deck. The decking of the ship is evident also because a number of soldiers are standing upon it.

A mast is visible, although the sail is not in use, while the ship is oared. This suggests that the galley is depicted during a fight. Vessels cannot be oared and sailed at the same time, and warships that had a mast were likely to utilize wind power during journeys and manpower in battles.

The roughly contemporary Aristonothos crater comes from Cerveteri as well and carries the depiction of a ship with a disproportionately large ram (plate 30). The artist did not depict the oars, but it is clear that the ship was oared. Although the ship has a mast, it was not making use of the sail. Men armed with spears and shields are standing on the deck.

Casson argued that that the vessel on the Aristonothos crater is an armed merchantman (Casson 1971:67 and fig.80). Indeed, the hull of the ship is definitely rounder than that of the galley on plate 29, but is not symmetrical like that of the merchantmen described above (plates 24-27). The prow, in other words, is low and designed to carry a ram. In the cases of the armed merchantmen, the offensive ram looks like an extraneous element added to an otherwise inoffensive vessel. In the ship of the
Aristonothos crater, however, the ram looks like an integral part of the ship, cast in the shape of the prow. Therefore, the hypothesis that such a ship was a war vessel should not be excluded.

A later kind of warship is depicted hydria dating to between the end of the sixth and the beginning of the fifth century (plate 31). In this case as well, the galley looks agile and slender. There is only one level of rowers, and soldiers are standing on the deck. As opposed to its early counterpart, such as the galley depicted on the Cerveteri crater (plate 29), this warship is more flat and does not have a mast. The prow is low and not shaped as a horse head, while it carries the representation of an oculus, the "eye" often painted on Greek triremes.

We have no representation of Etruscan warships with more than one row of oar levels. This seems rather surprising, given that multiple-level galleys were widespread both in Greece and in the Levant by the end of the eighth century (plates 17 and 18).

The Greek historian Thucydides (VI, 103) reports that the Etruscans sent "three ships of fifty oars" to support the Athenians in the expedition of Sicily, which lasted from 415 to 413 BC. The term "ship of fifty oars" ("pentekontoros" in Greek) is rather generic: as opposed to "bireme" or "trireme," referring to the number of oars rather than that of oar files. There were indeed two distinct types of fifty-oared ships, the one-level pentekontoros, and the two-level pentekontoros (Morrison and Coates 1989:98).

Since Thucydides does not provide any information concerning the number of oarsmen rows, the absence of multiple-level galleys in the Etruscan iconographic repertoire suggests that the warships sent to Sicily were probably one-level galleys.

Regardless of the number of oarsmen rows, the very fact that the Tyrhenians were fighting with pentekontoroi in the last quarter of the fifth century, when triremes were dominating the military scene in the eastern Mediterranean, testifies that the people of Etruria were well behind their Greek and Levantine neighbors in warship construction.
Levantine and Tyrrhenian ship typologies

The Phoenician vessels discussed above can be classified into three categories based on their function (table 3). On one hand there are cargo ships, characterized by a round shape of the hull. The hippoi of the Balawat gates (plate 14) represent a small and early version of cargo ship. From the small kind of cargo vessel evolved a larger kind of hippoi, endowed with a mast, which are capable of more storage and longer journeys, such as those depicted on the reliefs of Khorsabad (plate 15).

On the other hand, there are vessels whose primary function is offensive. Warships are characterized by the presence of a ram and tend to be more slender than their commercial counterparts. Military vessels tended as well to have multiple levels of oars, in order to increase their speed and power in battle. The reliefs from Nineveh demonstrate that Tyre's fleet already had biremes at the end of the eighth century (Plate 17). Representations of triremes first appear on Sidon's coins from the late fifth century (plate 19). Triremes tend to be more slender than biremes, and tend to be decked.

The round vessels of the Nineveh relief constitute a particular case (plate 17). These "militarized merchantmen" cannot be categorized either as cargo ships or as war galleys. Their round hull suggests that these ships were originally designed for the transport of goods and that the second level of oars must have been added in exceptional circumstances. The lack of a ram, however, indicates that these vessels could not have carried out an offensive role in sea battles. Although scholars have formulated different hypothesis on the matter, the question concerning the actual function of the "militarized merchantmen" remains open.

The same categories apply as well to the Etruscan vessels discussed in this thesis (table 3). The wall painting from the Tomba della Nave (plate 28) offers a detailed example of a large cargo ship. It is interesting to notice how, already in the fifth century, Tyrrhenians had such huge merchantmen with two masts. Earlier examples of vessels
whose only function is transport are extremely rare in the Etruscan iconographic repertoire. The vessel on the seventh-century graffito from Veii (Plate 25) may be categorized as a cargo ship despite the presence of a spur, for it seems that such a protuberance was a buoyancy device rather than a ram.

Similarly to the Phoenicians, the Etruscans had military vessels whose main function was to fight sea battles. War galleys tended to be slender, and their raison d’etre lay in the ram (plate 29 and 31). There is no iconographic evidence that suggests the existence of Tyrrenian galleys with multiple oar levels. Although Thucydides makes a reference to Etruscan pentekontoroi, the historian does not provide any information concerning the oar system of such warships.

The representation of "militarized merchantmen" is rather common in Etruscan iconography. For instance, the vessel depicted in the amphora from Vulci (plate 26) has both the round hull that characterizes cargo ships and the offensive ram typical of war galleys. Similar vessels are depicted on a vase from Cerveteri (plate 27) and on an Etrusco-Corinthian oinochoe (plate 24).

The relative lack of evidence makes a comparative study of Levantine and Tyrrenian ship typologies quite difficult. In particular, we have only a few detailed representations of Etruscan and Phoenician cargo vessels, consisting mainly of the Tomba della Nave and the reliefs from Nimrod and Khorsabad (plates 15-16 and 28).

One may argue that information about Levantine cargo vessels can be drawn from the round vessels of the Nineveh relief, for their hull is that of a merchantman. The main problem, however, is that the representations discussed above are far from overlapping in time: the Tomba della Nave dates to the end of the fifth century, whereas the reliefs from Nineveh and Nimrod date to the eight century and that of Khorsabad to the ninth. Such a significant gap in time makes a comparative study of Phoenician and Etruscan cargo ships virtually impossible. The next paragraphs, therefore, will focus on war galleys and the case of "militarized merchantmen."
The presence of a full deck on war galleys constitutes an interesting common point between Tyrrhenian and Levantine ship construction (plates 22, 23 and 29-31). This similarity is particularly relevant because the idea of a fighting deck that completely covered the rowers was unknown to the contemporary Greek world (Basch 1987:410). Indeed, the presence of a fighting deck in Etruscan war galleys may be the result of a cultural influence from the Levant.

A severe technological gap divides war galleys in Etruria and the Levant. The reliefs from the Nineveh palace (plate 17) demonstrate that multiple oar levels appear in the Phoenician iconography as early as the end of the eight century. In the Etruscan iconography, however, there is no evidence of galleys with more than one level of oars.

As mentioned before, the Greek historian Thucydides mentions Etruscan pentekontoroi that fought in Sicily alongside the Athenians (VI, 103). Although there is no means to determine whether those galleys had one or two oar levels, the backwardness of the Tyrrhenian fleet is obvious. Even if we assume that the pentekontoroi mentioned by Thucydides had two oar levels, they would still represent an obsolete kind of warship at the end of the fifth century, when Greeks and Phoenicians fought with triremes.

Such an enormous gap in war technology appears rather surprising if one considers that the Tyrrhenians developed an advanced technology of cargo ships and had been in close contact with both Levantines and Greeks. Indeed, the Etruscans already had very sophisticated merchantmen as early as the fifth century, such as that painted on the Tomba della Nave, endowed with two masts.

Moreover, the Etruscans often fought with or against their Phoenician and Greek neighbors, as in the case of the expedition of Sicily and the battle of Alalia. Since the Tomba della Nave testifies that Etruscans had advanced skills in ship construction, it seems strange they did not try to catch up with their neighbors.

The presence of "militarized merchantmen" seems at first to constitute a common point between the Levantine and the Tyrrhenian ship typologies. Most apparent is the
similarity between Phoenician and Etruscan vessels that share traits of both cargo ships and war galleys.

The ships from the Nineveh palace reliefs could not have had a directly offensive function, for they did not have a ram. As has already been argued, the absence of a mast suggests that the round ships were originally large, sailed merchantmen and that the mast had to be taken down due to the additional weight of the second row of oars. The "militarization" of the cargo vessels in this case consisted of the addition of another oar level.

The Etruscan version of "militarized merchantman" instead consists of a cargo ship with a roomy hull to which an offensive ram was added. Unlike their Phoenician counterparts, the kind of vessels depicted on the amphora from Vulci could have played an offensive role.

The exact function of ships that share both transport and offensive traits is not clear either in the case of Phoenician or of Etruscan iconography. The round vessels from Nineveh may have been some sort of "fleet auxiliaries" (Morrison 1996:180), or transport means for emergency evacuation that required additional speed. The Etruscan roomy ships with a ram may have been pirate vessels, merchantmen turned into warships in case of conflict as well as common cargo ships that needed a ram for defensive purposes.

Although the exact role of Etruscan and Phoenician "militarized merchantmen" has not yet been determined, it is clear that they must have had very different functions. Indeed, the Tyrrenian vessels could take an active role in sea battles, while their Levantine counterparts could not. The very concept of "militarization," moreover, assumes a different meaning in the context of Etruscan and Phoenician studies. In the former case, it indicates the addition of a ram; in the latter, the addition of a second oar level.
Conclusion

Several factors constitute an obstacle to a comparative analysis of port design and ship construction in Etruria and the Levant. The main problems concerning the study of port design consist of severe changes in the geography (such as in the cases of Gadir and Graviscae) and dating (such as in Sidon and Pyrgi). Difficulties in dating are mostly due to the Roman reoccupation of the sites.

Despite the lack of information, the data discussed in this thesis bring to light two interesting features that are shared by certain Levantine and Tyrrenhian ports. The breakwaters from Populonia, which allow a certain amount of waves inside the port, work with the same principle as those from Sidon. Before drawing any conclusions, however, one must take into account that there are major doubts concerning the date of Sidon's port, which may be Roman.

The presence in Graviscae of a *cothon* suggests Punic influence in Etruscan port design. The artificially enclosed harbor is an element characteristic of the Pheenician colonies in the West, and it seems likely that the Tyrrenhians may have imported it directly from their Punic neighbors.

More data is available for the study of ship construction. This thesis has focused mainly on the iconographic repertoire. The most interesting result from comparing their respective imageries is the realization that both Etruscan and Phoenician war galleys tended to be fully decked. This common point assumes particular significance if one takes into account that the idea of a deck that completely covered the hull was alien to contemporary Greek warships. In other words, the fact that a full deck was not a common trait of Mediterranean galleys, but rather a peculiar element of Levantine and Tyrrenhian warships, suggests that it may be the result of direct cultural influence. Before reaching any conclusions, however, a more detailed study must be carried out.
The existence of a "militarized merchantman" in both Etruscan and Levantine iconography no doubt represents a very intriguing point for those interested in the maritime technologies of both cultures. Even a primary analysis, however, demonstrates that Phoenician "militarized merchantmen" shared few, if any, traits with their Tyrrhenian counterparts and fulfilled very different roles.

The archaeological discourse around the political, commercial, and cultural relationship between Etruria and Phoenicia has suffered from the absence of any extensive comparative analysis of the maritime technologies of the two civilizations. The little data provided in this thesis are not sufficient to draw any definitive conclusions about eventual symmetries between Tyrrhenian and Levantine technologies.

The close commercial and political ties that characterized the relationship of the two civilizations, however, suggests that a future study may bring to light new evidence for more features in common between Phoenician and Etruscan nautical science and port construction. Once more data is gathered, an accurate study of port design and ship construction may substantially contribute to a better understanding of the influence of Levantine culture on the Tyrrhenians and, to a lesser extent, vice versa.
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Plate 1: Exports of Etruscan buccherò pottery

Bucchero distribution in Etruria, the Mediterranean and beyond. (After von Hase, 1989: 329)
Plate 2: Phoenician colonies in the Mediterranean
(After Auber'86:134, fig. 22)

Plate 3: Mineral resources in Etruria
Plate 4

Phoenician, Punic and Etruscan harbors
mentioned in this thesis

Table 1

<table>
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<th>Site</th>
<th>Ethnic context</th>
<th>Geography</th>
<th>Features of interest</th>
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<td>island (?)</td>
<td></td>
</tr>
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<td>Phoenician/Punic</td>
<td>promontory</td>
<td>twin ports</td>
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<td>twin ports</td>
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<td>Punic (unlikely Roman)</td>
<td>bay</td>
<td>cothon, twin ports</td>
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<tr>
<td>Mahdia</td>
<td>Punic</td>
<td>promontory</td>
<td>cothon</td>
</tr>
<tr>
<td>Motya</td>
<td>Punic</td>
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a) Aerial view (Auber'86:26, fig. 5)

b) Tyre's twin ports (Auber'86:28, fig. 4)
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a) Aerial view (Aubet'86:227, fig. 47)

b) Possible reconstruction of the ancient site (Aubet'86:229, fig. 48)
Plate 9: Carthage

a) Aerial view of the modern site (Aube'86:154, fig. 25)

b) Detail: outer harbor (Lanct'95: 179, fig. 99)

Carthage's outer harbour: 1 commercial harbour; 2 access channel; 3 half-submerged platform of Falbe's quadrilateral. The arrow indicates the probable access to the interior harbour basins (after J. Baradez, 1959).
c) Plan Carthage's ports

(Lancel'95:181, fig. 100)

Carthage's ports in the first half of the second century BC:
1 the tophet; 2 the military harbour; 3 the commercial harbour;
4 'Falbe's quadrilateral', platform; 5 access passage; 6 'Mur Pistor';
7 wall separating the two harbour basins; 8 second-century sea defence
wall; 9 southern city wall; 10 access channel to the lake of Tunis;
11 extremity of the littoral band (taenia) (S. Lancel).
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Plate 12: Graviscae
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1. The port's double defence walls.
2. Probable port tower.
3. Southern side of the port defensive walls.
5. Probable "cothon".
6-7. Channels of the "cothons"?
8. The mole of Greek typology and the remains of the circular tower.
9. Remains of the Roman city walls (period of the Emperor Tiberius?)
10. The detached mole.
11. Excavations of the Graeco — Etruscan built up area.
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13. Ancient Route Tarquinia-Graviscae...
15. The port area which is presumed to have been already buried in the Roman period.
16. The port area which is presumed to have been buried in Medieval period.
17. The port area existed as a marsh towards mid 19th century.
18. The "cothons" in the Roman period.
19. Remains of a marsh still existed during the mid 19th century.
20. Area filled with detritus.
21. Exit of the ancient channel.
22. Present coastline.
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(Map by J. Warren, published on Journal of Field Archaeology vol. 4, 1977, page 280)

Map of the gulf of Populonia with grid. Shaded zones indicate areas which both Italian and American teams have searched underwater. C 1, C 2, C 3: caisson trenches; U 14: area of worked wooden logs and spar. Small numerals: 1, remains of ancient smelting furnace in beach cliff; 3, line of underwater Necropolis Shore Trench; 3, line of wall of breccia rock underwater; 4, area of cinder and tufa blocks; 5, remains of early pre-Elvasan necropolis; 6, remains of modern boat; 7, remains of second modern boat; 8, Elvasan necropolis. Plan: J. Warren.
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a. Detail of a bireme
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b. "Realistic" reconstruction of a bireme
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c. Fragment of a Geometric vase from Athens, 8th century B.C.
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a. Drawing of war galley from a late 5th century coin.
(Basch'87:321, fig. 677). Notice the presence of a rig and the lack of oars.

b. Late 4th century coin
(Casson'95:62, fig. 52). Notice the lack of mast and the three-level oars system.

c. Drawing of a war galley from an early 4th century coin
(Basch'87:321, fig.676). Notice the lack of oars and mast.

Phoenician trireme pictured on a coin from Sidon, dating from 380-374 BC. The artist has clearly indicated the three levels of oars.
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a. photography of the model, now at the National Museum of Copenhagen
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b. Drawing of the model
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a. Oars disposition of a Phoenician trireme according to L. Basch
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<td>oars/sail</td>
<td>round/symmetric</td>
<td>cargo</td>
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<tr>
<td>Khorsabad relief</td>
<td>late 8th</td>
<td>oars/sail</td>
<td>round/symmetric</td>
<td>cargo</td>
<td>hippoi</td>
</tr>
<tr>
<td>Nineveh relief 1</td>
<td>700 ca.</td>
<td>oars/sail</td>
<td>asymmetric</td>
<td>military</td>
<td>ram (deck), 2 levels</td>
</tr>
<tr>
<td>Nineveh relief 2</td>
<td>700 ca.</td>
<td>oars</td>
<td>round/symmetric</td>
<td>cargo/military</td>
<td>2 levels</td>
</tr>
<tr>
<td>Sidon coin</td>
<td>end 5th</td>
<td>sail (oars)</td>
<td>slender</td>
<td>military</td>
<td>ram (3 levels) (deck?)</td>
</tr>
<tr>
<td>Sidon coin</td>
<td>400 ca.</td>
<td>(oars)</td>
<td>slender</td>
<td>military</td>
<td>ram, (3 levels) (deck?)</td>
</tr>
<tr>
<td>Sidon coin</td>
<td>early 4th</td>
<td>oars</td>
<td>slender</td>
<td>military</td>
<td>ram, 3 levels (deck?)</td>
</tr>
<tr>
<td>Arados coin</td>
<td>4th</td>
<td>(oars)</td>
<td>slender</td>
<td>military</td>
<td>ram (3 levels)</td>
</tr>
<tr>
<td>Byblos coin</td>
<td>mid 4th</td>
<td>oars (sail?)</td>
<td>slender</td>
<td>military</td>
<td>&quot;Greek&quot; ram, 3 levels</td>
</tr>
<tr>
<td>Erment model</td>
<td>4th</td>
<td>oars</td>
<td>slender</td>
<td>military</td>
<td>ram, deck</td>
</tr>
</tbody>
</table>

Table 3: Iconography of Etruscan ships

<table>
<thead>
<tr>
<th>Artifact/feature</th>
<th>Date</th>
<th>Propulsion</th>
<th>Hull shape</th>
<th>Function</th>
<th>Features of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etrusco-corinthian Oinochoe</td>
<td>725-625</td>
<td>oars/sail</td>
<td>round</td>
<td>cargo/offensive</td>
<td>ram</td>
</tr>
<tr>
<td>Graffito fro Veii</td>
<td>early 7th</td>
<td>oars/sail</td>
<td>round</td>
<td>cargo</td>
<td></td>
</tr>
<tr>
<td>Aristhonotos crater</td>
<td>7th</td>
<td>(oars)/sail</td>
<td>somewhat round</td>
<td>cargo/military?</td>
<td>ram, deck</td>
</tr>
<tr>
<td>Crater from Cerveteri</td>
<td>late 7th</td>
<td>oars/sail</td>
<td>slender</td>
<td>military</td>
<td>ram, deck</td>
</tr>
<tr>
<td>Vase from Cerveteri</td>
<td>early 6th</td>
<td>?</td>
<td>round</td>
<td>cargo/offensive</td>
<td>ram</td>
</tr>
<tr>
<td>Amphora from Vulci</td>
<td>early 6th</td>
<td>(oars)/sail</td>
<td>round</td>
<td>cargo/offensive</td>
<td>ram</td>
</tr>
<tr>
<td>Tomba della Nave</td>
<td>early 5th</td>
<td>sail</td>
<td>round</td>
<td>cargo</td>
<td>deck, 2 masts</td>
</tr>
<tr>
<td>Hydria (British Museum)</td>
<td>475-325</td>
<td>oars</td>
<td>slender</td>
<td>military</td>
<td>ram, deck</td>
</tr>
</tbody>
</table>

Note: Features are put in parentheses when not explicitly visible. Question marks indicate doubt.