The Uluburun Shipwreck

by

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Abstract

The Uluburun Shipwreck was discovered in 1982 by sponge divers off the coast of Kaş, Turkey and was subsequently excavated from 1984-1994 by George Bass and Cemal Pulak. The researchers determine that what they had found was a Late Bronze Age shipwreck, similar to the Cape Gelidonya Ship Wreck excavated in the 1960s. The ship provided the best preserved assemblage of artifacts allowing the researchers to better trace Mediterranean trade during the Late Bronze Age. Since its discovery, controversy has stewed amongst researchers regarding the origin and nationality of the ship. This paper attempts to address this argument by using excavation reports and written sources to ascertain the origin of the ship. This is done by examining the construction of the ship and shipboard materials that would not have been used in trading with merchants. The construction materials, as well as the items that would not have been traded, place a probable origin of the ship along the Syrio-Palestine Coast, between the border of Israel and Lebanon to Syria, and area occupied by Phoenicians. Using radiocarbon dating and dendrochronology, researchers have placed the date of the ship’s construction between 1379-1345 BCE and the date of its final voyage between 1343-1274 BCE which would place it around the Amarna Period which could indicate it was a royal shipment. This paper also uses personal items to determine the nationalities of those on board in an effort to establish a probable origin. Those items deemed necessary for merchants appear to be Canaanite in origin, indicating the crew was also from the Syrio-Palestine region. This paper also addresses a probable route of the ship’s voyage prior to its loss by using the larger assemblage of material culture and natural resources found in situ with the shipwreck. This last part is included for the purposes of addressing the impact of the discovery on our knowledge of global trade during the Late Bronze Age just prior to the Dark Ages. In examining the global trade relationships and the interdependency of trade on the Bronze Age peoples, we may be able to understand what could have led to the collapse of the Late Bronze Age system.
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Introduction

Its origin, debatable; its cargo, priceless; its impact, revolutionary. It was a just like any day in the summer of 1982 when Mehmet Çakir, a sponge diver from Turkey, came across what he could only describe as “a metal biscuit with ears” off the coast of Kaş, Turkey\(^2\). This simple discovery sparked a fury of underwater archaeologists scrambling to reach this site for the “metal biscuit with ears” was so much more than he thought. What Çakir had found was an ox-hide ingot, typical of the Late Bronze age copper trade. His discovery suggested that what he had actually found was a Late Bronze Age shipwreck carrying a cargo of copper ingots, something the researchers had spent years looking for, since the

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\(^1\) Image from Google Earth, created by author.
discovery and subsequent excavation of the Cape Gelidonya shipwreck in 1960. The researchers hoped that this wreck would provide further insight into the Late Bronze Age copper trade\(^3\).

The shipwreck, which would become known as the Uluburun Shipwreck, far exceeded all expectations. This paper will address the origin of this archaeological gold mine using the ship’s construction materials and the personal items excavated by the researchers from the Institute of Nautical Archaeology. It will also examine the artifacts recovered in an effort to establish the route taken by the ship in order to trace Late Bronze Age trade networks. The overall purpose of this paper will be to discern a probable origin and nationality of the Uluburun and to examine the global trade relationships of the major naval powers during the late Bronze Age, before the collapse of international trade at the start of, what archaeologists refer to as, the Dark Ages in which very few elements of material culture have been recovered.

**The Site and Excavation:**

The shipwreck is located approximately 60 meters from the east face of Uluburun and 350 meters from the end of the cape. It is under roughly 42-61 meters of water about 14.5 kilometers from the town of Kaş, Turkey. The ship appears to have sunk in an east-west orientation 15 degrees to starboard. The majority of the artifacts were found scattered throughout 250 square meters of the ocean seabed. The researchers discovered over 15000 artifacts which included several tons of raw materials and several manufactured materials\(^4\). The excavation was begun by George F. Bass of the Institute of Nautical Archaeology in the summer of 1984 and was completed by Cemal Pulak in 1994\(^5\).

\(^3\) Bass, *"A Bronze Age Shipwreck at Uluburun (Kaş): 1984 Campaign"*, 269.
\(^4\) Pulak, *"The Uluburun Shipwreck and Late Bronze Age Trade"*, 288.
\(^5\) Manning, Pulak, Talamo, Ramsey, & Dee, *"Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule"*, 163.
Origin

The origin of the ship has not really been discussed at great length, due to most of the focus being on the dating and the artifacts found aboard the ship which mapped international Bronze Age relations. Although the origin of the ship itself has not really been addressed, there is an intense debate about the nationality of the ship. To make an important distinction for the purposes of this paper, the origin is the location that the ship was built whereas the nationality is the flag under which it sailed, the owner. Because of the wealth of artifacts found aboard the ship and the fact that most of the artifacts were from all over the Mediterranean world, tracing its nationality has been difficult. After considering evidence gathered from various textual sources, I would argue that the ship originated from the Syrio-Palestinian Coast. Further, I believe that it is possible that the ship was employed by Mycenae, or the cargo belonged to or was being sent to the Myceneans by way of the royal gifts mentioned in the Amarna letters.6

For the purposes of this paper, some terms will be used interchangeably when describing certain locations due to the nature of the literary sources. The Syrio-Palestinian Coast may be used interchangeably with the Canaanite Coast and the Levant. Mycenae will refer to the Greek interests of this particular time period. Phoenicians, Kenaani, and Canaanites will also be used interchangeably due to the fact they represent the same peoples. Phoenician was the Greek word for the people along the Syrio-Palestine Coast. These people identified themselves as Kenaani which later transformed into Canaanite.7

6 Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 163.
7 Tubb, Canaanites, 141-2.
8 Renan, History of the People of Israel, 1888.
Remarkably, sections of the hull were found among the wreckage of the ship, a rarity among ancient shipwrecks because the wood would have decomposed or have been carried away by sea creatures. It is believed that the copper oxide formed from the reaction of water and the copper ingots.

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9 Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 293.
10 Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 291.
may have discouraged sea creatures from consuming the remainder of the hull. Analyses performed on the hull fragments show that the ship was 15 meters long with a beam\textsuperscript{11} of 5 meters with a carrying capacity of 20 tons. Also found were remnants of a bulwark and the keel of the ship; it is built approximately 10 centimeters higher than the interior surfaces of the garboard stakes. Such a practice was not common in the early Mediterranean vessels from Greece and Mycenae which were flat, further evidencing a Near Eastern origin of the ship\textsuperscript{12}.

Unfortunately, there was not enough of the ship’s hull to ascertain what kind of frame it may have taken\textsuperscript{13}. What we have of the hull indicates that the ship was built via the shell-first method in which, as the name suggests, the shell of the ship was constructed first then the planks were fastened together and locked\textsuperscript{14}, as opposed to the skeleton-first method popular in later Roman times in which the frame was built first. This particular type of ship evolved out of necessity due to the growth of the various city-states in the Mediterranean region and the increase in maritime trade. These shell-first ships were sturdier and could withstand attacks from hostile peoples in the region. They were also able to build them larger so as to accommodate larger cargos\textsuperscript{15}, similar to the royal shipments mentioned in the Amarna Letters\textsuperscript{16}. Had the ship been of Phoenician origin, as I suspect, one would have expected to see a rounded hull, which is indeed what most reconstructions of the Uluburun Shipwreck have (see Figure 2 and 3)\textsuperscript{17}.

\textsuperscript{11} Width of the boat at the widest part.
\textsuperscript{12} Pulak, "The Late Bronze Age Ship At Uluburun: Aspects of Hull Construction", 212-5.
\textsuperscript{13} Wachsmann, Seagoing Ships & Seamanship in the Bronze Age Levant, 216.
\textsuperscript{14} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 302.
\textsuperscript{16} Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 163.
\textsuperscript{17} Rawlinson, History of Phoenicia, 271.
Underneath a large portion of the hull, the excavators also found the remains of what was later identified as a bulwark. A bulwark is a fence constructed around the deck of a ship, usually extending all around the weather deck. It functioned as both an element of defense against aggressive parties, as well as a measure of protection against natural enemies such as waves. Though not fully elaborated on by any source, I would suspect that the bulwark functioned as a seawall in that when conditions on the seas become difficult, as they do occasionally during storms, the waves would break along the bulwark. The bulwark would then absorb the impact lessening the blow, similar to the way some surfers use surfboards as they paddle out towards the break line. The wave breaks around them, preventing them from getting hit full force.

The remains of the bulwark consisted of five stakes, evenly spaced (roughly), and approximately 1.7 meters long. They were rounded and sharpened to a point purposely as seen by the strike marks on the wood from a sharp, blunt implement. Lying perpendicular, across the wooden stakes, were withies. A withe is a tough, supple twig used for lashing things together during the Late Bronze Age.
This was typical of the bulwarks seen in Egyptian Tomb paintings depicting Syrian merchant vessels (see Figure 4). This type of bulwark is one of the descriptors of Phoenician merchant vessels, which is further indicative of a Phoenician origin²³.

Perhaps the most interesting aspect of the hull that was recovered is its keel. Unlike Cemul Pulak, I found the presence of this keel most interesting when considered in the context of the history of shipbuilding. Many scholars place the origin of the keel during the Age of the Vikings, whose mastery of the keel allowed them to travel to such far off places as the Americas and the Artic regions²⁴. Its presence on the Uluburun ship gives cause to re-examine that original theory. It also lends support to my theory regarding the origin of the Uluburun itself because one of the defining characteristics of Phoenician vessels is the presence of this rudimentary keel. The Phoenicians were among the only groups during the Late Bronze Age who utilized this keel, the Myceneans and Egyptians preferring a flat bottom²⁵. While the Vikings may have been the first to build the “true keel” used for navigational purposes, the technology first emerged with the Phoenicians during the Late Bronze Age and would later evolve into the modern keel.

The keel of a ship is typically a beam, in this case, a wooden one, that extends lengthwise at the bottom of the boat and is used as a base to fasten the structural planks to. It typically projects down into the water and its modern use is mainly navigational, providing stability and maneuverability to the ship²⁶. In the case of the Uluburun ship, however, the keel is more wide than it was high extending upwards into the hull, indicating that its function was mostly structural²⁷. For example, the keel was used as “spine” which provided an anchor for the “ribs” or planking, which was then connected via

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²³ Rawlinson, History of Phoenicia, 272.
²⁵ Pulak, “The Late Bronze Age Ship At Uluburun: Aspects of Hull Construction”, 212-5.
²⁶ Merriam Webster Dictionary
²⁷ Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 302.
“muscle” or mortise and tenons\textsuperscript{29}. Due to the structure of this particular keel, it would have offered little, if any resistance in the water, leaving navigation to the mercy of the winds. This most likely would have led to the sailors favoring certain times, conditions, and routes before setting out, and which I will later explain, could have been a possible cause for the wreck.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure5.png}
\caption{An example a fresco of a Syrian trading vessel from the Tomb of Kenamun\textsuperscript{29}}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure6.png}
\caption{Reconstruction of the Uluburun Ship\textsuperscript{30}}
\end{figure}

The ship’s planking was assembled in a mortise-and-tenon method similar to that of Grecian and Roman ships 1000 years later, such as the Kyrenia Ship excavated from 1968-1969\textsuperscript{31}. The mortise and tendon method is a construction method used in early shipbuilding in which a mortise, or a cavity, is cut into wood and a tenon, or a peg, is then inserted into the wood thereby fastening two planks together.

\textsuperscript{28} Analogy provided by author.
\textsuperscript{29} Wachsmann, Seagoing Ships & Seamanship in the Bronze Age Levant, 42.
\textsuperscript{30} Welter-Schultes,\textit{“Bronze Age Shipwrecks From Turkey: First Direct Evidence For Oversea Carriage of Land Snails In Antiquity”}, 82.
\textsuperscript{31} Pulak, \textit{“The Uluburun Shipwreck and Late Bronze Age Trade”}, 300.
This method also appears to have been used by the Egyptians as evidenced by the observations of Herodotus, however, it appears that the Egyptian mortise and tenon method did not utilize the locking mechanisms that the Phoenicians did\textsuperscript{32}. The function of the mortise and tenon joints, like the keel, appears to be strictly functional. The mortise and tendon fastenings provided the ships with a more rigid frame and contributed to the structural integrity of the vessel itself. This would allow for the transportation of heavier loads directly on the hull itself\textsuperscript{33}. This would be necessary to transport the heavy loads indicative of a royal shipment referred to in the Amarna Letters\textsuperscript{34}.

Also, archaeologists in Egypt have found a series of tomb paintings depicting similarly styled ships, such as one from the Tomb of Kenamun (Figure 4), that were identified through inscriptions as those of Syrian merchants from the coast of the Levant\textsuperscript{35}. The tomb paintings and the observations Herodotus made while in Egypt, as well as the fact that the same method was seen in Greece 1000 years after the ship sank, circa 4\textsuperscript{th} century BC, nearly a century after Herodotus, suggest that the method may have diffused westward which would place its origin somewhere along the Levant\textsuperscript{36}. In fact, the Romans called the mortise and tenon method of wood working \textit{Coagmenta punicana}, or “the Phoenician joint,” which could further affirm a Syrio-Palestine origin of this construction method\textsuperscript{37}. Because the Uluburun ship is the oldest, preserved Late Bronze Age shipwreck discovered in the Mediterranean, the Levant origin of the construction method would also provide support of a similar origin for the actual ship.

\textsuperscript{33} Pulak, "The Late Bronze Age Ship At Uluburun: Aspects of Hull Construction", 219.
\textsuperscript{34} Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 163.
\textsuperscript{35} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 300.
\textsuperscript{36} Pulak, "The Late Bronze Age Ship At Uluburun: Aspects of Hull Construction", 212-5.
**Construction Materials**

Analyses show the ship was constructed of *cedrus libani*, or Cedar of Lebanon, mostly found in Turkey and along the Syrio-Palestinian Coast near the Mount Lebanon Range. This wood was preferred for shipbuilding in the Late Bronze Age because there is minimal shrinkage and seasoning. It is also easily worked and would not dull the Bronze Age tools used for maintenance. Further, cedar is more resistant to decay in salt water which would be critical along the high seas. The presence of the *cedrus libani* points to a Syrio-Palestinian Coast origin for the ship. There is the possibility that because this particular cedar was so prized, it was imported from the Syrio-Palestinian coast and the ship was assembled elsewhere.

In addition to the Cedar of Lebanon, analysis of the mortise and tenon joints indicate that they were made of *Quercus coccifera*, or Kermes Oak, typically found in the Western Mediterranean and Northern Africa. *Quercus coccifera* is very closely related to *Quercus calliprinos*, otherwise known as Palestine Oak which is probably a subspecies of *Quercus coccifera*. The Kermes’ range is vast, extending from Portugal into Turkey, which could indicate multiple conceivable locations for the construction of the ship. However, modern botanical surveys of the region have indicated its presence in the lower elevations of the western slopes of the Mount Lebanon range. *Cedrus libani* is also found on the western slopes of this range, though, in higher elevations (1300-2000 meters). Due to modern encroachment and thousands of years of deforestation due to timbering, the ranges of both types of trees have been vastly depleted in the region. It is not inconceivable that these forested areas once overlapped and were used in constructing ships from the Syrio-Palestine region.

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38 Season is a term used in shipbuilding meaning wood drying. In this case, it means that Cedar was easily dried without morphing the underlying architecture of the boat.
41 USAID/Lebanon. “Conservation Of Forests and Biological Diversity in Lebanon”, 11-2
Above, I was prepared to concede that it was possible that the *cedrus libani* needed for shipbuilding could have been imported to the ship’s port of origin which is still possible, but when taken with the anchors recovered from the wreck, this scenario becomes improbable. While excavating the Uluburun wreck, archaeologists retrieved 22 large anchors made of costal sandstone or beach rock as well as two smaller ones made of limestone. Mineral analysis of the coastal sand stone places the origin of these anchors near Tell Abu Hawam. These anchors are also consistent with several other examples of anchors found on beaches at sites along the Carmel Coast and the Levant such as the assemblage found at Newe-Yam, just north of Abu-Hawam as well as ones found in the harbor at Dor. Many of the Uluburun anchors bear a striking resemblance to shifonim found in modern day Israel around the Sea of Galilee. These particular anchors and the ones found at Uluburun are generally trapezoidal in shape with large holes borne into the narrow edge of each where the anchor cable would have been tied. They are considered to be of Canaanite origin and are strictly native to the Eastern Mediterranean. Taken as a group, according to Wachsmann, the assemblage found at Uluburun most closely resembles those from Kition, Byblos, and Ugarit (for a geographical perspective, see Figure 7).

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42 Map created by author via Google Earth.
43 Pulak, *The Uluburun Shipwreck and Late Bronze Age Trade*, 306-7.
44 Pulak, *The Uluburun Shipwreck and Late Bronze Age Trade*, 299.
Figure 8: Anchors Excavated From the Uluburun

Figure 9: Anchor Excavated at Tell Abu Hawam

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46 Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 306.
47 Wachsmann, Seagoing Ships & Seamanship in the Bronze Age Levant, 270.

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Other anchors in the Western Mediterranean are similar, though each locale has subtle differences. In Egypt, anchors were not typically used on ships, however, pictographical evidence found in 5th Century BCE tombs in Saqqara, as well as an anchor found in the mastaba of Kehotep indicate when they were are apsidal in shape and are tall and narrow, whereas the Uluburun anchors are more square and trapezoidal. Very few anchors have been recovered in Turkey and around the Aegean. This has led some to speculate that the peoples of Anatolia and Mycenae did not use anchors as frequently as those in Egypt and the East. The anchors that have been excavated in these regions greatly differ from those found at Uluburun: instead of having a single hole, they have three.

When taken in context with the *cedrus libani* hull and the *quercus coccifera* mortise and tenon joints, these anchors suggest that the port of origin for the Uluburun ship was almost certainly along the Syrio-Palestinian coastline. While it is likely that the Cedar of Lebanon could have been imported and the ship built elsewhere, it is equally unlikely that the anchors would have been imported from anywhere. They are extremely heavy, the larger ones weighing roughly 110 to 200 kilograms each. All together, these anchors would have added up to roughly four tons. At this weight, it would have been very

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48 Wachsmann, Seagoing Ships & Seamanship in the Bronze Age Levant, 263.
50 Wachsmann, Seagoing Ships & Seamanship in the Bronze Age Levant, 274-80.
impractical to import these particular items which would mean they most likely came from where the ship was built or from somewhere nearby. In fact, due to the variety and stylistic features present on those anchors that have been recovered, there is very little evidence that anchors were ever imported. Their designs were simple, sometimes they were not carved, but merely large rocks with a hole drilled into them\textsuperscript{51}.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figures/Phoenicia.png}
\caption{Phoenicia\textsuperscript{52}}
\end{figure}

The similarities in some of the anchor shapes of the Uluburun and Tell Abu Hawam, Dor, and Newe Yam, as well as shapes consistent with Byblos, Kition, and Ugarit, would place the origin somewhere between Tell Abu Hawam and Ugarit. When mapping these cities and noting the possible location of the forests from which the wood was derived, it is not unreasonable to suggest that the

\textsuperscript{51} Wachsmann, Seagoing Ships & Seamanship in the Bronze Age Levant, 283.
\textsuperscript{52} Rawlinson, History of Phoenicia, Title Page.
Uluburun was constructed and set sail from the Syrio-Palestine Coast, somewhere between the border of modern day Israel and Lebanon and along the Lebanese Coast, which interestingly enough happens to include the region around Tyre, one of the most powerful Phoenician cities and a possible port of origin for the ship. Since the Phoenicians occupied 300 miles of coastline, ranging from the area directly opposite Cyprus and southward towards Jaffa and Jabneh, which encompasses most of these cities, it is likely that the ship was of Phoenician origin. It is interesting to note that while the Phoenicians had 300 miles of coastline, they did not travel far inland, encroaching maybe 15-30 miles from the coast. This would confirm later statements made by Herodotus claiming that the Phoenician’s chief interests lay in mercantilism as opposed to conquest.

The Crew

In addition to the structural evidence of a Syrio-Palestinian origin, we also have items from the people who would have sailed aboard the ship. A ship this size would have required no less than four crew members to sail. It would have required a navigator, as well as three others to rig the sails for steering the ship. The galley wares are perhaps the most useful in identifying the origins of the crew. These included lamps, jugs, and bowls that would have been used for shipboard activities such as simple sustenance as well as perishable materials whose residues have identified them as foods many of which were staples of a Mediterranean diet.

Several of the 150 Canaanite jars found contain residues of organic materials, such as spices and foods needed to sustain a ship of this size. These were undecorated indicating a purpose of daily use rather than trade. Also found aboard were numerous undecorated pilgrim flasks of Canaanite origins containing residues of fig seeds. The multitude of fig seeds found throughout the wreck which indicates

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53 Rawlinson, History of Phoenicia, 3.
54 Greeks and the East Class Lecture, January 22, 2013.
55 Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 299-301, 320-1.
that figs were common aboard for either export or shipboard use. The presence of these seeds on these pilgrim flasks indicate that they may have been eaten were integral to their diets staples\textsuperscript{56}. The origin of the fig, or \textit{ficus carica}, is still an unsettled issue, however, scientist have traced early cultivations of the fruit to the Jordan Valley, in the West Bank, which also happens to be near Tell Abu Hawam, Dor, and Newe Yam. Evidence suggests that cultivation was occurring during Neolithic times about 12000 BCE and was widespread in the region during the dates the ship would have sailed\textsuperscript{57}.

In addition to vessels containing what may have been food items for the crew, lamps with char marks were also among the artifacts recovered. These char marks on the wick would indicate that they were well used, probably by members of the crew. These lamps are consistent with those found just north of the Carmel Coast in a separate site near Tell Abu Hawam\textsuperscript{58}. It stands to reason the crew would have been from the same region as the ship. Therefore, these items, taken with the anchors found in the general vicinity of Tell Abu Hawam, strengthen the supposition that the ship was from the particular region near the modern Israel-Lebanon border. In addition to the lamps, archaeologists also found four sets of merchant weights. These were crafted in the Near Eastern tradition suggesting the presence of at least, three, probably four merchants aboard the ship. Weapons found that likely belonged to the crew are in the Syrio-Canaanite tradition including a single ornate sword that likely belonged to someone with status, perhaps the chief merchant aboard\textsuperscript{59}. Both the lamps and the merchant weights were not items typical of trade in the region, therefore they most certainly belonged to the crew.

\textsuperscript{56} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 299-301, 320-1.
\textsuperscript{57} Kislev, "Early Domesticated Fig in the Jordan Valley", 1372.
\textsuperscript{58} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 299-301, 320-1.
\textsuperscript{59} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 288-9.
An andesite scepter mace found in the wreck suggests that there was also an individual of Northern Greek decent, perhaps a Scythian, who may have been an elite soldier or mercenary hired to guard the shipment. The curvature of the base of the scepter is very similar to scepters found at Drajna, Romania and Bulgaria indicating that the origin of the scepter may be somewhere in the Balkans (see figures 10 and 11). Due to the symbolic nature of the scepter and the lack of other items of Balkan origin aboard indicates that this item was a personal possession. Since there is scant evidence of a major Balkan presence in the Eastern Mediterranean trade, this would indicate the individual comes from a region that would interact with many of the Northern Balkan tribes, such as Northern Greece or Macedonia because of their proximity to them.

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61 Institute of Nautical Archaeology. “Tools & Weapons.”
Due to the wealth of the raw materials recovered, such as the glass ingots and the copper ingots, this was most likely a royal shipment commissioned by one of the kings of the region which during the time the ship sailed may have been Assur-uballit of Assyria, Burna-Burias of Babylonia, Smenkhare, Tutankamun, or Aya of Egypt, and Suppiluliumas, because only a king could afford so much. With the ship’s probable origin in the Levant, it most likely was commissioned by Egypt. The Phoenician cities, while relatively independent, were more interested in trading rather than who was king. Nevertheless, they were still vassals of Egypt as seen in the Amarna Letters in exchanges between Abi-Milk, king of Tyre, and others in the Canaanite region, and the Pharaoh. In these letters, Abu-Milk addresses the Pharaoh as his “king, my lord, my god, my Sun,” and gives him the traditional sevenfold blessing reserved for kings, not seen in exchanges between the pharaohs and the other kings such as Burna-Burias who addresses the pharaoh as his brother. The raw materials contained on the Uluburun Ship were probably on their way to be fashioned into the royal shipments mentioned in the Amarna Letters, such as ebony and ivory wares mentioned as a dowry. We know from the Amarna Letters that merchants had been killed in the service of the king. This would warrant a need for a mercenary whose presence may dissuade pirates and other unscrupulous characters.

Also present are several items that suggest the presence of two Myceneans on board. The lack of Mycenaen merchant weights and the multitude of Mycenaen fine wares are indicative that these men were not merchants. Due to the nature of the particular items found, these men were probably of the

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65 Though Akhenaten would have been alive partly during the estimated dates (see Absolute Dating), the presence of the single Nefertiti Scarab would indicate a loss of popularity which did occur after his death when Amarna was abandoned and the cult of Egypt was shifted back to Amun-Ra. (Reeves, The Complete Tutankhamun, 24.)
71 Moran, The Amarna Letters, 16.
72 Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 288-9.
73 Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 300-1.
elite class, and may have been emissaries, such as those mentioned in the Amarna letters who would represent the king and relay messages back and forth\textsuperscript{74}. The orientation of the ship, the materials found, and the presence of these individuals has lead some researchers to the conclusion that the ship was headed for either Crete or Mainland Greece which would coincide with the idea that the Mycenaans were establishing trade relationships after their conquest of Minoan territories\textsuperscript{75}. These men were likely returning to or accompanying the shipment to their native land\textsuperscript{76}.

![Short Sword Found in the Uluburun Shipwreck](image1)

**Figure 14: Short Sword Found in the Uluburun Shipwreck**\textsuperscript{77}

![Late Aegean Bronze Age Short Sword from Mycenae](image2)

**Figure 15: Late Aegean Bronze Age Short Sword from Mycenae**\textsuperscript{78}

We know there were at least two Mycenaean individuals because of the presence of duplicate personal items found. Two ornate swords of Mycenaean origins were located in the wreck. These swords are consistent with several others found in Mycenae and appear to be similar in shape as the swords found in Mycenean shaft graves a century earlier (see Figures 13 and 14). They are short with

\textsuperscript{74} Moran, *The Amarna Letters*, 63.
\textsuperscript{75} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 300.
\textsuperscript{76} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 303-4.
\textsuperscript{77} Pulak, "The Bronze Age Shipwreck at Ulu Burun, Turkey: 1985 Campaign", 20.
\textsuperscript{78} Sandars, "Later Aegean Bronze Swords", 158.
ribbing in a vertical direction down the shaft of the sword. The ones found at Uluburun are noticeably different in that they are more elaborate and have a larger hilt then the earlier ones. The ornate style of these swords would indicate that they were representative of status symbols because swords in battle were limited to the most elite individuals on the battlefield, spears being the common weapon. In addition to these Mycenaean swords, several Mycenaean relief beads were recovered. Mycenaean relief beads were not routinely exported and are almost exclusively found in tombs of the elite in the Mycenaean world, indicating these were most likely brought aboard with the Mycenaeans who were most likely elite.

All of this would support the theory that these individuals may have been envoys in service of the Mycenaean king. The presence of these two individuals coincides with the apparent shift in trade from the Cretans to the Mycenaeans seen towards the end of the 14th century BCE as well as an increase in the power of the Mycenaean fleet. Prior to the 14th century BCE, there is very little textual evidence of direct trade between Mycenae and the Levant Coast. Many have speculated that the wares found actually came from Cyprus, with whom the Mycenaeans had a lucrative trade relationship. They would trade with the Cypriots who would then trade with the rest of the western Mediterranean. However, towards the end of the 14th century, some scholars have suggested that the Aegeans may have been attempting to establish direct trade relationships with both Egypt and the Levant. These two individuals may have been sent to Egypt or the Levant and may have negotiated with the crew to passage back to the Aegean to report back.

History

80 Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 300-1.
81 Zukerman, “On Aegean Involvement in Trade with the Near East During the Late Bronze Age”, 890-1.
Absolute Dating

Using segments of the ship’s hull and keel as well as several perishable materials, such as wicker, organic materials found in jars, as well as rope, researchers sought to use both dendrochronology and carbon dating to attain exact dates of both the construction of the ship and its final voyage. In ascertaining a date, researchers would be better able to reconcile the ship within the written records of the Late Bronze Age. This would then allow them to lend credence to the hypothesis that the ship sailed during the Amarna Period and may have been carrying one of the royal shipments mentioned in the Amarna Letters. Reconciling the ship with the archaeological record could also assist researchers with determining where within the written records the ship sailed so as to see the socio-political factors that it would have been synonymous with.

Dendrochronology was developed in the 20th century by an astronomer named A.E Douglas. It is a method of dating using tree rings to determine the exact time that the tree expired and comparing the pattern of the actual rings against trees of a known expiry time. Different periods of drought and massive rainfall would impact the size of the rings. During a drought, trees are undernourished and do not grow as much, therefore their growth rings during that season are noticeably thinner, whereas in periods of overabundance, they will grow more and their rings will be fatter. Tracing the exact date of the ship is accomplished by studying trees in the region using individual rings (trees in the same regions are exposed to the same extremes and will have identical rings for the same season) and layering the rings on top of one another so to speak. From this we can trace trees all the way to the Late Bronze Age. Nowadays, dendrochronology is not as accurate due to widespread use of artificial watering. Trees that

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82 Manning, Pulak, Talamo, Ramsey, & Dee, “Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule”, 163.
are artificially watered are not exposed to extremes and are continuously fed, therefore their rings are very fat all of the time\textsuperscript{83}.

In an effort to confirm the dendrochronological dates of the Uluburun ship, gleaned from the analysis, the researchers also utilized radiocarbon dating. Radiocarbon dating was invented by Willard Libby shortly after World War II. Basically, there is carbon in everything organic in the natural world. In addition to this carbon (C-12) that is present in every living (and dead) thing, there is an unstable, radioactive isotope known as Carbon-14, or C-14. This isotope is absorbed by all living things until their death via cellular respiration and/or photosynthesis. After something has died, there is no longer a mechanism for which the C-14 can enter their being and, as with most radioactive materials, it begins to decay. Since C-14 has a known half-life, analysts can use the amount remaining to establish a highly accurate time of death of what is being dated. Just like with dendrochronology, environmental factors can impact the amount of C-14 that is absorbed. Because of this, comparing radiocarbon dating to other methods of absolute dating, such as dendrochronology, is necessary to ascertain and exact time of death\textsuperscript{84}.

Dendrochronological analysis, using the tree-rings from the keel, place the construction of the ship somewhere between 1379-1345 BCE with 95% certainty\textsuperscript{85}. Though the construction of the ship is placed somewhere before the Amarna Period or at its beginning, its construction date as given by the analysis should not be confused with date of its final voyage. The dendrochronological data was discerned via tree rings which indicate the date that the tree was cut down to build the ship, which may have taken months, if not years. In addition, the Uluburun Ship could have made multiple trips around the Mediterranean before its loss. High resolution dendro-dating using the shorter lived items aboard the

\textsuperscript{83} Medieval Archaeology Class Lecture, January 22, 2013.
\textsuperscript{84} Medieval Archaeology Class Lecture, January 22, 2013.
\textsuperscript{85} Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 173-181.
ship, such as the wicker fence (which may have needed to be replaced after subsequent voyages do to wear and tear), indicate that the last voyage partaken by the ship occurred between 1343-1274 BCE with 95% certainty.

Further, carbon dating of sections of the hull and keel as well as the perishable materials confirms the dendrochronological estimate. This date would confirm the date of the Amarna period as well as reconcile the Assyrian and Babylonian chronologies⁸⁶. Both the date of construction and the dates of its final voyage would also suggest that the ship sailed during and perhaps immediately following the Amarna period⁸⁷, between 1353-1328BC. Further, the presence of a single Egyptian scarab inscribed with the name Nefertiti⁸⁸ which was found amongst the wreckage and is believed to have belonged to the crew⁸⁹. This would indicate that the date of the Uluburun’s final voyage was certainly during or immediately following the Amarna period because the Nefertiti scarab would not have existed before. Due to the lack of other artifacts depicting Nefertiti and her husband, Akhenaten, it is not unreasonable to assume that the ship’s final voyage took place several years after Akhenaten’s death, perhaps during the reign of King Tutankhamen or subsequent rule of Ay⁹⁰.

⁸⁶ Manning, Pulak, Talamo, Ramsey, & Dee, “Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule”, 173-181.
⁸⁷ The reign of Ahkenaten of the 18th Dynasty of New Kingdom Egypt and subsequently Smenkhare (perhaps Nefertiti), Tutankhamun, and Ay from 1358-1328BC.
⁸⁸ The main wife of Akhenaten whose reign marks the beginning of the Amarna period at 1353BC.
⁸⁹ Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 302.
The Final Voyage

In addition to the construction materials, the ship’s orientation from east to west, and the materials of those who would have been aboard, we can also attempt to discern the ship’s origin by tracing the ship’s route. The best way to determine the route the ship took on its final voyage is by looking at the items excavated from the wreck and back tracing them. Because the majority of the items were raw materials and appear to have had a common origin that has been confirmed, it is not unreasonable to assume that once the ship had made its last voyage, it returned to its home port for the winter season. It is however, important to note that based on the absolute dating chronologies at the 95% interval, at the closest point between the time the ship was built and the ship departed on its final voyage, 1345BCE and 1343BCE respectably, there is at the very least a two year and a most likely longer

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91 Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 298.
span where the ship would have been sailing elsewhere around the Mediterranean. This means that several of the items found may have been left over from previous trips around the Mediterranean such as the Nefertiti scarab mentioned above. However, this can only explain a minute amount of the items found.

**The Wreck**

![Figure 17: The slope of the seabed near where the ship went down, indicating a northwest trajectory](image)

The ship went down approximately 14.5 kilometers off the coast of Kaş, Turkey. When the Institute of Nautical Archaeology began to survey the wreck, they notice that the ship had gone down in an east-west configuration and the position of the hull indicates it was traveling northwest. Shipwrecks found in the same general area, such as the Cape Gelidonya wreck, indicate that ships following the same trajectory may have hugged the rocks going in this direction. It appears that the ship, while hugging the shore, may have been blasted by an unexpected southern gale and thrown against the rocks. The particular construction of the ship’s keel, as addressed above, may have made it more difficult to make course corrections in such an unlikely event ultimately causing the ship to hit the rocks.

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92 Manning, Pulak, Talamo, Ramsey, & Dee, “Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule”, 173-181.

93 Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 292.

94 Pulak, “The Uluburun Shipwreck and Late Bronze Age Trade”, 299.

rocks. While archaeologists recovered a good portion of the hull and keel, not enough was left to
determine the cause of the accident and due to the condition of the hull after 3000 years on the ocean
floor.

The fact that the ship was travelling northwest and that northwest winds are more heavily
favored in the summer as well as the probability the ship would not have set off in unfavorable
conditions is further evidence of a Syrio-Palestine origin. Based on their location, it is reasonable to
assume that the seasoned crew, who would most likely accompany a ship of that importance, would
have been familiar with the conditions on the high seas. They would not have departed during a time
where they would tempt a southern gale that would most certainly smash them against the rocks at
Uluburun or anywhere along the southern Anatolian coast for that matter. Furthermore, they would
have used the natural wind patterns in order to propel the ship so as to arrive at their destination faster
or on time. Because southern gales are very unlikely during the summer, this is when they would have
likely embarked. This, in combination with the fact that northwestern winds and eddies are more
common during the summer and the configuration of the ship’s keel would have made it necessary to
travel during favorable wind conditions would point to a port of origin bearing southeast of the ship’s
final position along the Syrio-Palestine coast.

**Back-Tracing the Route**

Lead isotope analysis has proven the copper ingots found on the ship were native to Cyprus
which is just southeast of the ship’s final position, lending credence to my previous supposition. The
excavators recovered 10 tons of ox-hide copper ingots. Traversing the entire Mediterranean with so
much copper would have been impractical. The sheer weight alone would have placed the ship, with a

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96 Pulak, "The Late Bronze Age Ship At Uluburun: Aspects of Hull Construction", 219.
97 Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 163.
carrying capacity of 20 tons\textsuperscript{98}, at risk of being over-laden. The copper ingots in addition to the anchors recovered in the shipwreck would have weighed roughly 14 tons, or 28000 pounds. Therefore it seems logical to presume that the copper ingots were loaded in with a destination in mind, perhaps to a king because only a king would receive such a shipment. Because of the volume of copper ingots recovered, it is also practical to assume that the copper, native to Cyprus, was loaded on at a one of their ports which is located some 425 kilometers from where the ship sank\textsuperscript{99}. This would indicate that just before the ship went down, it most likely stopped in Cyprus.

In addition to the copper ingots, approximately 1 ton of tin was also recovered from the wreck\textsuperscript{100}. Due to a complex chemical reaction caused by the seawater interacting and oxidizing the tin, the remaining tin ingots were highly corroded and may have weighed more at one point\textsuperscript{101}. Since tin is not native to Cyprus, it must have been loaded on elsewhere. Though very little is known regarding the source of Late Bronze Age tin, archaeologists have found evidence of small scale deposits in and around modern day Turkey and the Middle East. Because tin is an essential element of bronze, it is likely the tin was imported to the Levantine Coast from Turkey and Northern Mesopotamia, a fact which is confirmed by ancient Assyrian documents\textsuperscript{102}. The tin deposits in Turkey were found in the Targus Mountains, part of which comes close to Minet el-Beida and Ugarit which were major trading emporiums during the Late Bronze Age and could have been likely stops for the ship\textsuperscript{103}.

\textsuperscript{98} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 290.
\textsuperscript{99} Karageorghis, Early Cyprus: Crossroads of the Mediterranean, 30-3.
\textsuperscript{100} Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 163.
\textsuperscript{101} Hauptmann, Andreas, "On the Structure and Composition of Copper and Tin Ingots Excavated from the Shipwreck of Uluburun", 15-7.
\textsuperscript{102} Maddin, "Tin in the Ancient Near East: Old Questions and New Finds", 11.
\textsuperscript{103} Yener, “Kestel: An Early Bronze Age Source of Tin Ore in the Taurus Mountains, Turkey”, 201.
In addition to the ingots, archaeologists found over 150 Canaanite jars\(^\text{104}\). Similar jars created in the same style were found in a large storeroom at Minet el-Beida with similar contents\(^\text{105}\). Several of the jars contained organic residues of foods such as figs, olives, pomegranates, wheat and barley\(^\text{106}\). Most of which would have been consumed by the crew of the ship with the exception of the pomegranates, a luxury item that was mostly exported\(^\text{107}\). Minet el-Beida is located about 125 kilometers from Cyprus along the Syrio-Palestinian coast in northern Syria. It is the port city of Ugarit which held great prominence within Late Bronze Age Trade. The presence of these storerooms indicate the possibility that there were several ports along the Levant coast where goods would have been stored for transshipment which is one of the problems others have had about discerning an exact port of origin for the Uluburun wreck\(^\text{108}\). However, these storerooms could be uniquely Syrio-Palestinian which would further support that the port of origin was somewhere along this coast.

At least two-thirds of the jars contained over half a ton of terebinth resin. This particular terebinth resin is native to the region surrounding the Dead Sea which is located in the Levant. In the other jars, they found remnants of spices which could have been used for shipboard meal preparation that are uniquely from the East\(^\text{109}\). Because of how much resin was found in these jars (1000lb), it is probable that it was not carried overland very far. The resin supports a narrow window for a port of origin for the ship. The proximity of the Dead Sea to the Carmel Coast could support an origin in this general area. Also, in Abu-Hawam, archaeologists have found storerooms containing both Cypriot and Canaanite jars stacked in an identical fashion as those found in the wreck\(^\text{110}\). Also found just north Abu-Harem, are several anchors constructed of identical sandstone and beach rock as the unique set of

\(^{104}\) Manning, Pulak, Talamo, Ramsey, & Dee, "Absolute Age of the Uluburun Shipwreck: A Key to Late Bronze Age Time Capsule", 163.

\(^{105}\) Pulak, "The Uluburun Shipwreck: An Overview", 216.

\(^{106}\) Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 295.

\(^{107}\) Ward, "Pomegranates in Eastern Mediterranean Context During the Late Bronze Age", 529-31.


\(^{110}\) Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 299.
anchors found aboard the ship which would further support a port of origin at or just to the north of Abu-Hawam\textsuperscript{111}.

**Impact**

The importance of the Uluburun Shipwreck is not in the wealth of materials it provides, but the implications those materials have on Late Bronze Age trade. By examining the cargo of the Uluburun Ship, archaeologists and historians can get a better understanding of the economic forces that were present and set the stage for the development of the world’s first organized trading emporium. It is this understanding which can be used to trace the development of the great civilizations present in the Mediterranean during the Late Bronze Age and how their interactions with one another led to an era that would be envied for years to come. Nearly every civilization that would come after would try their best to reclaim the glory that was the Late Bronze Age, or the Age of Heroes as the Greeks call it. They would achieve limited successes as the majority of the time was spent fighting and conquering one another. It would be many years until the world would achieve stability again.

After the breakdown of these Late Bronze Age interactions and the trading relationships fostered by them, the Mediterranean would then be plunged in to a period of upheaval and uncertainty lasting well over half of a millennium, known as the Dark Ages. It is during this time that material culture all but vanishes from the archaeological record. There are practically no written records of what occurred during this time or what caused the downfall to begin with. What we do know of the Dark Ages is that almost all trading between the Mediterranean cultures: Greece, Egypt, Anatolia, and Mesopotamia, ceased and would not resurrect, and never to the extent, until the Classical period. By

\textsuperscript{111} Pulak, "The Uluburun Shipwreck and Late Bronze Age Trade", 306-7.
using the materials found in the shipwreck to trace the economic interdependency present within these cultures, archaeologists may then be able to discern a reason for this total collapse of the Bronze Age system.

Perhaps the greatest impact the Uluburun will have will not be to the past, but to the future. By understanding the economic models of the past, we may become better equipped to understand the current world economy and the mechanisms that led to its evolution. If macroeconomics taught me anything, it was that the basic principle of an economy is supply and demand. One group may have the supply of natural resources needed by another while the other may have different resources leading to favorable commercial exchanges between the two. In the ship for example, Cyprus had the copper but did not have the tin needed to smelt Bronze. They had to trade for it. By understanding what factors led to the collapse of the Late Bronze Age economy, perhaps we can learn from this and may find a solution to our own world economic crisis.

**Conclusions**

Based on the construction materials of the ship, the absolute dating chronology gathered, the people aboard, and the probable route of the ship calculated by using the materials found, I believe there is sufficient evidence to support that the Uluburun ship originated along the Syrio-Palestinian coastline. Further, I also think that the ship is more specifically from the region near the border of modern day Israel and Lebanon. Because of its probable origin and several of the materials gathered, it was most likely owned and operated by the Phoenicians. Based on the absolute dating chronology, which places the last voyage during the Amarna Period, the Phoenician cities, while independent for the most part, were vassals of the Egyptian empire. Their focus on trade may have prevented them from establishing a state of their own at the time the ship sailed. There is also evidence based on the materials gathered and the presence of the two Mycenaean individuals, the Uluburun ship may have
wrecked around the time of the shift from a Cypriot monopoly on trade to a Mycenaean. This could possibly indicate that the ship was on its way to Mycenae, perhaps as a gift of the Egyptian pharaoh in recognition of Mycenae’s new role as a significant power during the Late Bronze Age.

There is no doubt that this particular shipwreck will leave lasting echoes on the archaeological record. Despite its discovery being nearly thirty years ago, new research is being conducted even today. Someday, the Uluburun Ship may provide archaeologist answers to some of the questions regarding the Late Bronze Age network and could perhaps lead to answers regarding the Dark Ages. Eventually, we may discover what happened and prevent it from happening again. It is my belief that this shipwreck will continue to inspire those with an interest in our history as I know it has done for me.

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