

31 JAN 2023

Hors-Série XVIII



BAAL

Bulletin
d'Archéologie et
d'Architecture
Libanaises

Tyre, Sidon, and Byblos
Three Global Harbours of the
Ancient World

Proceedings of the International Symposium
Bristol, 25–29 October
Beirut 2017

MINISTÈRE DE LA CULTURE
DIRECTION GÉNÉRALE DES ANTIQUITÉS



Ancient Harbours at the Central Levantine Coast

IBRAHIM NOUREDDINE

Eastern Mediterranean coasts are rich in maritime activities since the dawn of time. Their shipwrecks, ports, anchorages, and submerged rock-cut coastal installations have established its maritime heritage and mark a large portion of human history. In Lebanon, Byblos and Tyre both attracted many travelers who started their explorations since the nineteenth century to find ‘Bronze Age harbours’. However, were harbours built at the Bronze Age? if not, what was the alternative? is it possible that they only relied on natural coastal formations? or did they modify beaches to serve their seafaring purposes? Despite the doubt regarding the existence of maritime installation at the Bronze Age, it is evident that various forms of ports existed at the time to transport freights on sizeable vessels that correspond to the Bronze Age, and were big enough to handle the bulky cargoes of this period. This paper aims to discuss the harbour development in the Central Levantine between the Bronze and Iron Ages. It is based on historical references, archaeological excavations, surveys, and material cultural elements.

Keywords: Tyre, Sea Peoples, Phoenician harbour, Iron Age.

Historical Background

Major changes in the Eastern Mediterranean occurred during the twelfth century BC with the decline of the two great-centralised states who were the sole powers, the Hittites and the Egyptians. After the unrest that marked the twelfth century BC, the Hittites pulled to the north, and Egypt diminished and lost control over Canaan, but was not totally out of the scene (Finkelstein and Piasezky 2009: 373–386). The retreat of the Hittites to the north, and the withdrawal of Egypt to the south along with severe climate changes, paved the way for newcomers to infiltrate the region and perhaps help in transforming

the order for a long era. In a quest to find harbours of the Bronze Age, it is advisable to first pinpoint more recent ones, or perhaps the methods used to dock and maintain ships and cargoes. Honor Frost strongly suggested that the Bronze Age harbour at Byblos could be in the southern bay of Skhineh and the outer Egyptian anchorage area could be located on a reef around 2 km off the south-west shore of Byblos (Frost 2006: 101), called Martine’s reef by local fishermen. At Tyre, in the northern part of the peninsula, there is a mole built with headers and ashlar that could be as early as the Iron Age II. Whereas, the existence of the so-called Egyptian harbour on the southern side of Tyre, is controversial so far.



There was heavy cargo trading between Byblos and Egypt as early as the third millennium BC. This fact is confirmed by texts mainly from ancient Egypt. On the Central Levant, references indicate the importance of the sea commerce since the Bronze Age. The pioneer surveys conducted by scholars such as Jules de Bertou 1843, John Kenrick 1855, Ernest Renan 1874, Antoine Poidebard 1930s, and Honor Frost 1960s, have not revealed enough information to merit proceeding to an excavation of underwater structure. However, these studies have established the basis to progress with this kind of research.

During the Late Bronze Age, the Central Levantine people were not yet known as Phoenicians and perhaps the crisis that characterised this era paved the way for the Phoenician cities to gain commercial authority over the region. The unrest of the 1200 BC led to the power vacuum of the two major centralised powers both the Hittites and the Egyptians, set the stage for the Phoenicians to rise. Late Bronze Age Medinet Habu murals at Luxor west show soldiers from the Levant fighting along with the Sea Peoples against Egypt (fig. 1 and 2). Perhaps this was the age when Levantine sailors realised that the time is changing for Egypt and they had a chance to be independent. However, in the Early Iron Age, the Phoenician cities were somehow released from Egyptian and Hittite domination, and despite the unrest and alteration of power during the twelfth century BC, they did not seem to be affected (tab. 1).

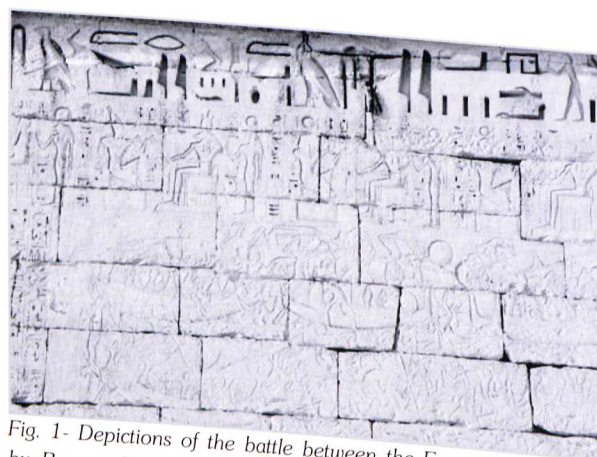


Fig. 1- Depictions of the battle between the Egyptian army led by Ramses III and the Sea Peoples (Medinet Habu. Photo by Ahmed Amin - Egyptian Museum 2013).



Fig. 2- Depictions of Sea Peoples captives and other prisoners. From left to right: the Lybian, Shekelesh third and fourth are assumed to be Canaanites/Syrians, and the fifth is a possible Denyen.

Harbour Types

On the Central Levantine, particularly Lebanon, harbour installations and natural modified shores are evident since antiquity on the Lebanese coast (an area of approximately 210 km long), and can be divided into four different categories:

- Shallow water natural anchorage, these types were used by modifying rock formations near the coastline such as bays or coves, abrasion platforms, etc. These features are common along the rugged Lebanese coast, and are still being utilised by fishermen today.
- On the contrary, offshore anchorages are submerged ridges, 0.2 to 2 km offshore, with a variable depth of 12 to 20 m to provide a favourable holding ground for stone anchors utilised in ancient times. Sailors chose such spots in areas where shelters, or port facilities were unavailable and the sea bottom was silty or sandy. Anchorages of this kind are discovered in different zones on the Lebanese coast where stone anchors were found on sites such as Byblos's Dahret Martine, Dahret Jbeil, Ras Anfeh in the north and on most of the southern coast of Sidon, Sarepta and Tyre.
- Slipways are modified natural beach rock which forms a type of ramp onto the shore by which ships can be pulled out of and into the water. Typically, they were utilised for repairing and building boats.
- Finally, built harbours, manmade jetties, quays, and breakwaters constitute this category and served

Northern Levant Cities	Harbour Installation	Suggested Period	LBA Pottery Imports	Sea Peoples Destruction
Ras Ibn Hani	Pavement	Late Bronze Age	Aegean style	Destroyed then continues
Tell Tweini	Natural creek	Late Bronze Age	Aegean style	Contemporary to Ugarit
Tell Kazel	NA	Middle Bronze Age	Imports and local Mycenaean	Severe destruction

Central Levant Cities	Harbour Installation	Suggested Period	LBA Pottery Imports	Sea Peoples Destruction
Arwad	Headers	Iron Age (?)	UI	Destruction
Tabbat al-Hammam	Headers	Iron Age	UI	?
Anfeh	Natural creek + possible slipway		UI	
Byblos	Natural creek + offshore anchorage	Medieval	Mycenaean	None
Beirut	Headers	Persian-Iron Age	Aegean/Minoan style	None
Sidon	Headers	Late Bronze Age (?)	Aegean style	None
Sarepta	Headers	Undetermined	Mycenaean imports and local	None
Tyre	Headers	Iron Age (?)	Mycenaean imports and local	None

Southern Levant Cities	Harbour Installation	Suggested Period	LBA Pottery Imports	Sea Peoples Destruction
Akzib	UI	Middle Bronze Age	UI	None
Atlit	Headers	Iron Age	UI	None
Dor	Headers	Late Bronze Age	Aegean style	None

Tab. 1- Sea Peoples impact on the Levantine coastal cities.

as protected docking spots and leeway for vessels seeking safety. This type of harbour facility existed on the Syro-Palestinian coast since at least the Iron Age. For example, the sites at Atlit from the ninth century BC (Marriner and Morhange 2007; Raban and Linder 1993: 119) and Tyre approximately eighth century BC; Tabbat al-Hammam, also from the ninth century BC (Braidwood 1940: 206–208; Marriner and Morhange 2007: 175).

Byblos Anchors

Six pierced stones were found on the submerged ridge of Dahret Martine during the maritime archaeological survey (Nouredine 2016: 299). These are anchors that were located after numerous dives on the relatively shallow reef floor and the probability of discovering more anchors is high. Because of

the comparatively shallow waters above the reef, surrounded by considerable depths, it's very possible that ancient mariners utilised this ridge to secure their ships/boats while waiting for the sea to become favorable to enter the harbour, or for loading and unloading cargoes. However, the depth could have changed since antiquity by tectonic activities. Seismic data indicates that at least one major earthquake has occurred in the submarine valley of el-Fidar during historical times (Goedicke 1972: 664). The pierced stones that were identified as anchors were of two different types: composite and weight. They were made of limestone, and the level of conservation varies from one to another. Even though none have a securely datable context, these stone anchors have emerged as the most important discovery of the Byblos maritime survey. The existence of these pierced stones on Dahret Martine adds to the possibility that this submerged ridge was the exterior anchorage area throughout the Bronze Age.

Built Harbour at Tyre

The mole is oriented in an east-west direction, like the modern jetty, and is located approximately 57 m north of it. Three walls related to the ancient mole structure were observed, with two walls oriented east-west and a connecting north-south wall at the eastern end of the existing structure. Each wall consisted of one horizontal row of roughly cut hewn, rectangular limestone blocks, varying slightly in size. On average, the blocks measure 1.86 m long (2.25 m maximum), 0.30 m wide (0.45 m maximum), and 0.45 m deep (0.60 m maximum). All three walls exhibited the same construction techniques with the limestone blocks laid as 'headers' (fig. 3). Only two courses were visible along most of the length of the feature, although, in some areas a third course could be discerned protruding above the existing sediment. The outside facade of the northern wall measured 66.8 m in length, with the visible portion of the southern wall measuring 71.3 m and the outside face of the eastern north-south oriented wall measured 11.8 m. The surveyed portion of the southern wall extended the furthest towards the modern shoreline

and it lies at 27.4 m from the existing concrete structure forming part of the modern sea wall to the west (fig. 4).

To perceive the lowest rows, a trench was excavated in October 2004, on the landward side of the wall jetty interior (DGA-ARESMAR Castellvi *et al.* 2011). The top hewn was beneath 2 m of water, and the trench exposed two further header courses, but the bedrock was not reached. This excavation trench exposed masons and quarrying marks on the header blocks discussed below. (Noureddine and Hélou 2005: 111–128). The mole starts due east of the al-Moubarkeh, or 'the blessed one', a square-shaped tower with 8 m sides, which is aligned with the void between the two walls described above. This suggests that the al-Moubarkeh and the jetty could have been initially part of the same structure (fig. 1). The al-Moubarkeh as it stands is a medieval tower, but its foundations are older and have not been utterly confirmed. An attempt was made to investigate the spatial relationship between the al-Moubarkeh and the submerged jetty using topographic survey data collected during the 2013 field season. When the inner walls of the ancient jetty are produced all the way to the tower, they are very close to matching the exterior tower walls, with some 50 cm of discrepancies. Recent excavations revealed at least seven courses of this massive wall. A plan to excavate and perceive the bedrock was put in place to be conducted in the next possible field season (Noureddine and Sicre, in preparation).

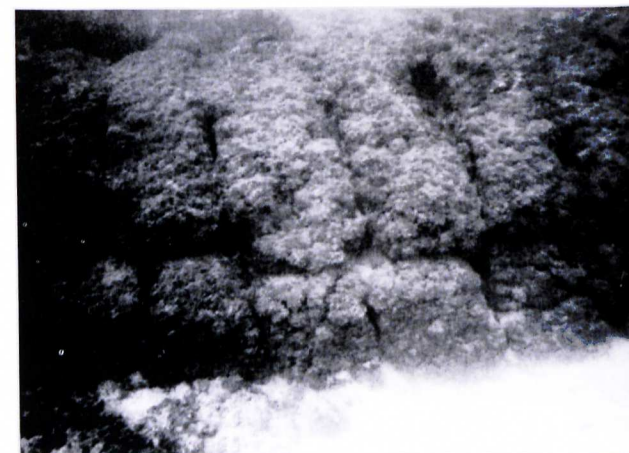


Fig. 3- Limestone blocks laid in a 'header shape' used for construction of the southern wall of jetty, looking north.

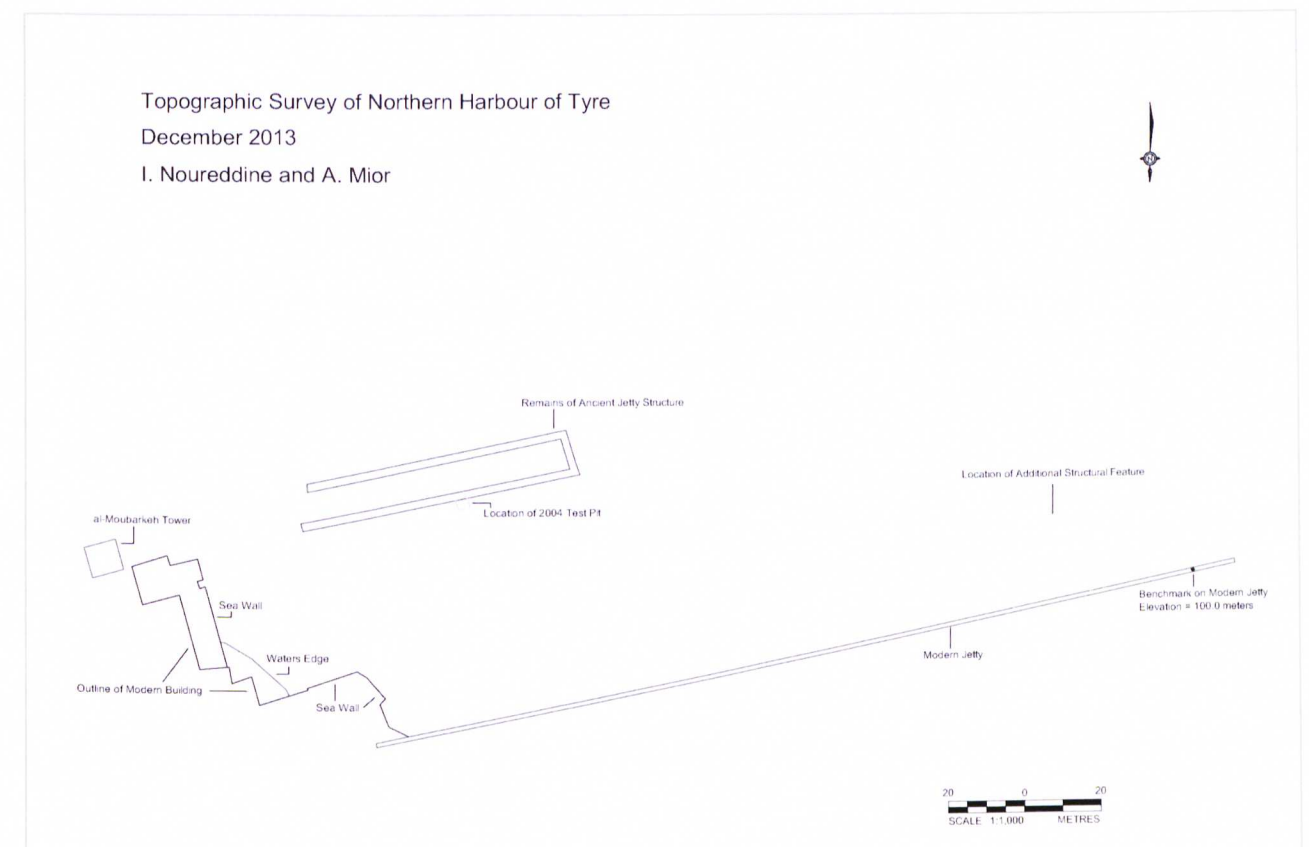


Fig. 4- Topographic map depicting the features in the northern harbour of Tyre (Noureddine and Mior 2014), surveyed in 2014, published in 2018.

Building Technique-Dating

The closest parallels to the sunken mole at Tyre are the moles at Tabbat al-Hammam and at Atlit. The Phoenician mole at Tabbat al-Hammam, 17 km south of Tartous, consists of one header-built wall, oriented east-west facing the waves, backed by a mixture of ashlar and rubble fill. It is dated to the ninth century BC based on an analysis of the stratigraphy (excavated on land; Braidwood 1940; Marriner and Morhange 2007), and this dating has been accepted by several other authors (Frost 1973; Raban 1995).

At Atlit, 30 km south of Haifa, the mole appears to be a smaller version, but built in the same manner, as the one at Tyre with its two, parallel header-built walls and a third wall of headers at their end, enclosing ashlar and rubble. This provided a breakwater against the northern winds (Raban and

Linder 1993: 117–120). The headers are of the same size as those in Tyre, with an average length of 2 m, 0.45 m width, and 0.6 m depth, but the width of the whole structure at Atlit is only 9.8 m, in contrast to about 13 m at Tyre. The Atlit mole has been dated to the 9th–8th century BC by radiometric dating of wooden fragments held between structure courses (Haggai 2006: 43–60).

Discussion

During the initial underwater investigation of the northern harbour at Tyre in 2001, a round-shaped construction measuring 1.90 m in diameter was discovered at the southern end of the north-south oriented wall associated with the ancient mole. This structure was documented and photographed

in 2001. However, when the archaeologists of the Directorate General of Antiquities returned to the site for reconnaissance, they observed that this circular feature had been subsequently destroyed and an iron 'levers' were found nearby, implying that it may have been used to 'pry' the feature from its original location. There was also a mention of hydraulic cement on some of the scattered blocks close to the round-shaped construction that could have belonged to this structure or have fallen from higher courses of the jetty (Noureddine and Hélou 2005: 116; Castellvi *et al.* 2011: 57–102). Hydraulic cement is associated with the Roman era (Oleson *et al.* 2004: 199–229). Unfortunately, no evidence of this construction remained at the site when it was visited in 2004, and although it was documented during preliminary investigations, its contextual significance could not be studied before it was removed. Additional data supporting the fact of human interference was observed in 2005.

According to Carayon *et al.* 2011, referring to the north mole at Tyre, no harbour works from the Phoenician period can be confirmed, and this is due to the relative absence of sediment from this period suggesting considerable dredging operations that would have removed sediment archives dating to the Phoenician times (Carayon *et al.* 2011: 46, 47). Yet, the mole at Tyre was considered to be at least Hellenistic and possibly earlier (Carayon *et al.* 2011: 49). In a later publication, Marriner, Morhange *et al.* 2014 proposed that the mole of Tyre could be Roman-Byzantine based on the biostratigraphical analyses that exposed a sharp increase in lagoonal species, consistent with hypersaline basins. However, it is repeatedly implied that chronostratigraphic and sedimentological indications from Tyre show extensive coastal dredging from the fourth century BC onwards (Marriner and Morhange 2014; Morhange and Marriner 2008: 23; Marriner *et al.* 2006: 164–171). Although, the contribution of direct archaeological evidence has remained quite problematic, since research revealed a gap caused by dredging activities (Morhange and Carayon 2015: 252).

To conclude this discussion, we should take into consideration the following several factors:

- The suggestions above that considerable dredging operations would have removed sediment archives

that dates to the Phoenician times, thus preventing the geomorphological studies to endorse whether this harbour is Phoenician or not. However, this does not negate the fact that the Tyre header-built construction can be from the Iron Age just like Atlit and Tabbat al-Hammam, as it was also proposed at least from the Hellenistic period or earlier (Carayon *et al.* 2011).

- During the survey of 2001 published in *the Bulletin d'archéologie et d'architecture libanaises* 2005, hydraulic mortar was identified at some of the blocks that may have been fallen from higher courses belonging to later periods i.e. Roman or Byzantine (Noureddine and Hélou 2005: 111–128) also mentioned by (Castellvi *et al.* 2011: 57–102). This fact cannot confirm the jetty to be classical since the blocks with hydraulic mortar were not seen within the main construction of the headers built with no cement or mortars, identically to the description of the Atlit jetty.

- If the harbour is dated to the Phoenician period (8th–7th century BC; Noureddine 2010: 176–181), it does not negate that it was still used in the Roman and Byzantine times and this would explain the hydraulic mortar.

- The marks found on the mole's facade are confirmed early Phoenician writing (Jidejian 2001: 143; Castelavi *et al.* 2011: 104). However, Castelavi makes the argument that these writings are supporting the identity of the masons and not the time the mole was constructed (Castelavi *et al.* 2011: 115).

Finally, it was suggested that the parallel walls at Tyre are the remains of an Iron Age mole that would go back approximately to the eighth century BC. However, geo-archaeological studies create some doubts based on the lack of sediment levels that would assure the construction date (Marriner and Morhange 2014; Morhange and Marriner 2008; Marriner *et al.* 2006). Following the initial underwater archaeological assessment at the northern side of Tyre in 2001, several subsequent assessments have occurred. These efforts have revealed the archaeological significance of the site, including identifying an ancient mole construction believed to belong to at least the Hellenistic era (Carayon *et al.* 2011) or even to the Iron Age. The northern harbour at Tyre could be the largest manmade Iron Age harbour in the Levantine realm and may also represent the oldest

Phoenician port constructions in the Mediterranean. While additional research excavations are required to confirm this and to realise the full importance of this site, it has the potential to provide comparative data that can be utilised to study Iron Age port structures around the Mediterranean proper. Finally, parallel geomorphological and archaeological investigations on the submerged structure, specifically in the area between the two header-walls can provide fundamental information and finally determine the true age of the structure. A Lebanese-French team of maritime archaeologists currently investigating the site, and supported by the Honor Frost Foundation (Noureddine and Sicre, in preparation).

The Rise of the Sea Peoples

Many scholars have mentioned that the twelfth century BC witnessed large scale unrest and a massive power vacuum in the Levantine area. One of the main changes in the Eastern Mediterranean was the arrival of the newcomers known as the Sea Peoples, adding to the complexity of the region. This is the time when the Canaanites were referred to as Phoenicians, during which time they opposed the Egyptians. Studies of the 'crisis of twelfth century BC' debate that the destruction carried out by the Sea Peoples has been exaggerated to some extent. In fact, indications relating to the 'invading newcomers' have recently developed to be less convincing, and even at Ugarit, there are some indications of internal collapse before 1200 BC (Aubet 1994: 24). Several hypotheses can be argued regarding the Phoenicians origin, their relationship with the Sea Peoples and the dilemma created during the Late Bronze Age/Early Iron Age by their arrival. For instance, scholars propose that the Phoenicians were allies¹ with the Sea Peoples (Bikai 1987; 1992), while others believe that they were competitors. Another approach is that after the massive destruction caused by the 'invasion' of the Sea Peoples, the Canaanite civilisation revived and mixed with the newcomers.

Although there has been much literature produced in the past thirty years or more about the origins of the Sea Peoples, our information is quite limited in terms of Egyptian references. The phrase 'Sea Peoples' can

only apply to those people associated closely to the sea and who were cited in Egyptian texts, namely the Sherden (Stadelmann 1984: 822). These were the first Sea Peoples groups to appear in historical records, such as the Amarna Letters, and they were also mentioned as part of the Egyptian garrison in Byblos (D'amato and Samilbeti 2015: 12).

Since sea vessels were the primary building project mastered by the Sea Peoples, and were their figurative and often literal home, it would be remarkable to discover and investigate one of their wrecks. Unfortunately, none has yet been identified from these enigmatic people (Wachsmann 2000: 103). The scarcity of the Phoenician wrecks number does not prohibit us from locating and classifying a Sea Peoples one. However, only references that we can currently discuss are the Egyptian texts and wall representations. As mentioned earlier, many scholars concluded that the collapse of the Bronze Age could be attributed to the cruel attacks by barbaric foreign raiders, including the 'Sea Peoples'. Yet, archaeological and historical evidence suggests factually that the collapse of the Bronze Age was due to existing political and economic complexities, in combination with major climate changes and scarcity of resources, than to conquests. Deprived of their home, their name probably derives from the fact that they lived on ships; the mysterious Sea Peoples are more likely to have been populations who were ousted from across the Anatolian region and displaced by the fall of various civilisations. They were probably struggling to find a contemporary homeland and resources, rather than having the intent to invade other nations. Their movements were not motivated by military or political conquests, but fairly by a search for somewhere where they could resettle.

Material Culture Influence

The Aegean/Sea People's influence on the Eastern Mediterranean and in Egypt, has not yet been deeply explored. This influence can be seen by several material cultural aspects including pottery, architecture, and maybe even arts, and can be seen in most of the Levantine cities and the Egyptian delta. It is marked by their artefacts or by their military campaigns that clearly destroyed Ugarit, Ras Ibn Hani, and

Tell Tweini. In contrast, the central and south coasts had a distinctive experience with the Sea Peoples revealed by the continuation of strata between the Late Bronze Age and Iron Age, confirmed at Tyre and other cities. That demonstrates no signs of aggression in cities such as Byblos, Sidon, or Sarepta. The presence of Mycenaean pottery on various sites across the Levantine coast associated with the Bronze Age trade networks, adds to the fact that the relation with the Eastern Mediterranean was well established and strengthened before the 1200 BC unrest and changes connected to the Sea People's arrival. The Bronze Age Aegean style of material is another solid indication of the relationship with the Canaanites who became referred to, as Phoenicians, and who eventually produced what is known as Mycenaean IIIC pottery (**tab. 1**). Similar early Mycenaean imports were found in excavations further south such as at Beth-Shean (D'Agata *et al.* 2005: 371–381; Mazar 2007: 572; Mommsen *et al.* 2009: 510–518), Acco (D'Agata *et al.* 2005: 373, 374), Tell Keisan (Gilboa 2005: 57), and in central cities such as Tyre (Bikai 1978: 65, 66), Sarepta (Koehl 1985: 25, 26, 146, 147), Byblos, further north at Ras Ibn Hani (Bell 2006: 94), and Tell Kazel (Badre *et al.* 2005: 36). Subsequently, during the Iron Age IA locally made Mycenaean IIIC: 1b (1200–1025 BC) pottery has been discovered in the settlements along the coast and can be directly attributed to the Sea Peoples. The sites that had such pottery include: Ras Ibn Hani (J. Lagarce and E. Lagarce 1988: 143), Sarepta (Koehl 1985: 120), Tyre (Bikai 1978: 65), Akko (Dothan 1986: 106), Abu Hawam (Hamilton 1935: 10), Dor (Stern 1993: 30), Ekorn (Dathon and Gitin 1990: 26), Ashdod (Dothan and Porath 1993: 12), and Ashkelon (Stager 1995: 334).

Architectural Parallels

The Sea People's contribution is manifested in the construction of the oldest mole known in the Mediterranean at Dor. Its construction technique is extremely similar to that of the Phoenician moles mentioned in this paper. The most common architectural technique used by the Phoenicians to construct harbours, docks, or jetties, employs a

sea-facing wall built with courses of headers placed without mortar. This exact type was confirmed at Dor to belong to the end of the Late Bronze Age. This style is found in some areas of the Central Levantine during the Iron Age II at Tabbat al-Hammam, Tyre, and Atlit, and of the Persian period at Beirut, and Sidon. In Beirut, the portion of the mole that was excavated under the Allenby Street (Bey039 site) demonstrates the occurrence of the construction schemes attributed to the Persian, Hellenistic, and maybe Roman periods (Elayi and Sayegh 2000: 225–230). However, in the Roman times, headers were bonded by a mortar of lime and ash.

The construction method known as header and stretcher, and as ashlar masonry (Lipiński 2006: 177), is associated with the Sea People's settlements, particularly on Cyprus and on the Levantine coast. Ashlar masonry at the public structures at Kition, Dor (Raban 1988: 272), Alalakh, and Byblos (Dunhan 2005: 272; Hult 1983: 71), and Ras Ibn Hani has been attributed to the arrival of the Sea Peoples (Bonnie 2012: 470). At Ras Ibn Hani, excavations revealed built ashlar, with headers and stretchers (Dunhan 2005: 272, 273), this style was found at Maa-Palekastro as well (Raban 1987: 126). Ashlar building at the seaport of Akko may be related to this phenomenon, although the precise dating of this structure is not yet entirely confirmed (Flinder and Hall 1993: 221). During the Late Bronze Age, ashlar blocks were present along the Levantine coast; this prototype is attributed to Crete (Philokyprou 2011: 38) and dated to the Middle Bronze Age (Raban 1988: 280, 281). Consequently, the use of ashlar blocks in the building of the Sea People's settlements on both Cyprus and the Levantine coast is another indication of the influence of the Sea Peoples (Hadjisavvas 2007: 1–5; Philokyprou 2011: 50; Hult 1983: 71), who moved to Cyprus as part of their colonisation of the island. Finally, depictions of vessels at Medinet Habu (**fig. 1** and **2**), reveal the ships of both sides, the Egyptians and the Sea Peoples, both with brailed rigs (Casson 1995: 36–38). Perhaps this fact would indicate that brailed sails are neither an Egyptian nor an Aegean innovation (Tartaron 2013: 54). However, this could be another comparable piece of evidence that gives important insight into the process of ship development that would eventually lead to various developments in

the Aegean and on the Phoenician coast, resulting in the well-known Greek and Phoenician bireme of the Iron Age (Emanuel 2014: 48; Wachsmann 1998: 174; Basch 1987: 303, 335).

Discussion

Even though Dor had a manmade harbour associated with the Sea Peoples and dated to the Late Bronze Age, the question of whether Bronze Age sailors had such a harbour is vital to this study. For decades, scholars have written about this era in detail, but have disregarded the fact that harbours may not have existed during the Bronze Age since there has been a lack of archaeological data. However, only textual references give a clue to this topic. Examples can be seen on the inscription of the Pharaoh Snefru of the 4th dynasty Old Kingdom describing vessels that were dispatched to Lebanon to obtain cedar logs for construction purposes. Additionally, the report of Pharaoh Thutmosis III from the 18th dynasty New Kingdom, illustrates the long journey and the efforts to build boats near Byblos. These examples assert the activity of ships travelling, loading, and transporting, but doesn't confirm harbouring. On the other hand, since antiquity, there are many indications to display that coastlines were modified to help sailors manoeuvre their vessels to safety. These modifying features include elements such as slipways, cothons, and using suitable natural condition near the shore for shallow anchorage (1–3 m depth) as well as offshore deeper water anchorages.

On the Eastern Mediterranean, proper manmade harbours did not emerge before the end of the Bronze Age. They appeared in the form of large ashlar-constructed hewn that were arranged by the edge of the coastline or in the water at shallow depths to minimise wave activities, thus providing boats some security. Hence, the modification of the shore continues, but now by arranging new elements in water instead of only cutting the beach rock and opening cothons. The main questions are: what was the turning point by the beginning of the Iron Age when Eastern Mediterranean sailors decided to build harbours? Did they learn a technique at once? Did they apply an advanced technique that was

already applied on land? Or they just kept trying to ultimately come up with the ashlar-building technique that is demonstrated in several cities of the Levant. These constructed jetties appear to be mainly from the Iron Age II, a time following the Sea Peoples arrival to the Levantine and becoming part of the local population, sharing their culture. Not all the Levant was 'invaded' by the Sea Peoples, destruction occurred especially in the northern Levantine. But evidence displays that there were still harmony and continuity of material culture at the end of the Bronze Age and the beginning of the Iron Age specially on the central and southern coasts (**tab. 1**). However, whether the Sea Peoples attacked the Levant or came in peace, would it make a difference in the influence of the material culture and architecture?

Closure

The scarcity of information on Bronze Age ports requires imagination to theorise that Bronze Age sailors built their own ports. There are some indications of coast modifications on the West and East Mediterranean throughout the Bronze Age with timeline discrepancies in development progress among both sides. Anthropogenic facilities used to enhance the natural formations, the distinction was made of basins (cothons) or semi-artificial-modified bays, infrastructure related to the protection of the water against the energies of the marine swells (water breakers, jetties, piers in perpendicular position to the shore and or causeways between island and mainland).

Currently, constructed moles are confirmed on the Eastern Mediterranean to belong to the Iron Age. The fact that the only other area where this construction method is attributed to the Sea Peoples, is at their settlements along the southern Levantine coast following their arrival during the Early Iron Age. This fact, would lend credence to the idea that the Sea People's technology, imported from the Mycenaean world, had influence on the local Eastern Mediterranean cities. Therefore, the ashlar-building techniques implemented in moles were introduced as a kind of integration of both cultures, where jetties of this kind has been noted clearly on the Levantine proper since the Iron Age II.

To conclude, the economic trade through the Mediterranean occurred even before the Early Bronze Age; vessels were already crossing open water in prehistoric times, obsidians from Anatolia, have been excavated from a Neolithic level in Cyprus; they are geologically foreign to Cyprus and must have been transported there by boat (Frost 2000: 64, 65). Since the Early Bronze Age, Egyptian texts confirm the existence of freight crossing to Lebanon for cedars and other products; in addition, as outlined in the Thutmosis III text, Egyptians travelled to an area near Byblos for shipbuilding. Nevertheless, the physical evidence of an actual 'built' harbour, excluding modifications of natural shoreline cannot yet be confirmed. Perhaps the emergence of the 'cothon' and 'slipway' during the Bronze Age were alternatives to a fully protected port facility. However, this prompts several questions: how did Bronze Age sailors manage to load and unload freights offshore? or more specifically: how did they pull anchors under substantial weights? did they employ a form of rollers, or reels to manage retrieving the heavy stone anchors from the deep? More studies with the focus on the methods that were used to load and unload offshore cargoes would shed light on understanding the harbour works and anchorages of this era.

Note

1- Based on archaeological finds in the relevant levels of Bikai's excavations at Tyre, this alliance provides an understanding of how various people came to be 'united' and could hint at the dawn of a historical timeframe explaining the obvious cultural connections between Phoenicians and the West.

List of References

Aubet, M. E. 2001. *The Phoenicians and the West. Politic, colonies and trade* (2nd edn), Cambridge.

Badre, L., Boileau, M.-C., Jung, R. and Mommsen, H. 2005. 'The provenance of Aegean and Syrian type pottery found at Tell Kazel (Syria)', *Ägypten Und Levante. International Journal for Egyptian Archaeology and Related Disciplines* 15, pp. 15–47.

Basch, L. 1987. *Le musée imaginaire de la Marine antique*, Athens.

Bell, C. 2006. *The evolution of long-distance trading relationships across the LBA/Iron Age transition on the Northern Levantine coast. Crisis, continuity and change*, BAR International Series 1574, Oxford.

Bikai, P. 1978. *The pottery of Tyre*, Warminster.

Bikai, P. M. and Bikai, P. 1987. 'Tyre at the end of the twentieth century', *Berytus* 35, pp. 67–96.

Bonnie, L. W. 2012. 'Iron Age civilizations in the Southern Levant', in N. A. Silberman (ed.), *The Oxford companion to archaeology* (2nd edn), Oxford, pp. 470–474.

Braidwood, R. J. 1940. 'Report on two sondages on the coast of Syria, south of Tartous', *Syria* 21, pp. 183–221.

Carayon, N., Marriner, N. and Morhange, C. 2011. 'Geoarchaeology of Byblos, Tyre, Sidon, and Beirut', *Rivista di studi fenici* 39/1, pp. 45–55.

Casson, L. 1995. *Ships and seamanship in the ancient world*, Baltimore/London.

Castellvi, G., Descamps, C., Porra-Kuteni, V., Salvat, M., Sicre, J., Camilleri, C., el-Hélou, M., Fayret, P., Francis Sicre, M., Kuteni, T., Noureddine, I. and Seco Alvarez, M. 2011. 'Recherches archéologiques sous-marines à Tyr', *Bulletin d'archéologie et d'architecture libanaises* 11, pp. 57–102.

D'Agata, A.-L., Goren, Y., Mommsen, H., Schwedt, A. and Yasur-Landau, A. 2005. 'Imported pottery of LH IIIC style from Israel: style, provenance, and chronology', in R. Laffineur and E. Greco (eds), *EMPORIA. Aegeans in the Central and Eastern Mediterranean. Proceedings of the 10th International Aegaeum Conference, Athens, 14–18 April 2004*, Aegaeum 25, Liege, pp. 371–81.

D'Amato, R. and Salimbeti, A. 2015. *Sea people of the Bronze Age Mediterranean c.1400 BC–1000 BC*, Oxford, pp. 7–18.

Dothan, M. 1986. 'Sardina at Akko?', in M. S. Balmuth (ed.), *Studies in Sardinian archaeology*, vol. 2, pp. 105–115.

Dothan, T. and Gitin, S. 1990. 'Ekron of Philistines', *Biblical Archaeology Review* 16, pp. 20–36.

Dothan, T. and Porath, Y. 1993. 'Ashdod V. Excavation of Area G', *Atiqot* 23, Jerusalem.

Dunham, S. 2005. 'Ancient Near Eastern architecture, in D. Snell (ed.), *A companion to the ancient Near East*, Oxford, pp. 266–280.

Elayi, J. and Sayegh, H. 2000. *Un quartier du port phénicien de Beyrouth au Fer III/Perse*, Paris.

Emanuel, J. P. 2014. *Sea Peoples, Egypt, and the Aegean. The transference of maritime technology in the Late Bronze–Early Iron transition (LH IIIB–C)*, Aegean Studies 1, pp. 21–56.

Finkelstein, I. and Piasetzky, E. 2009. 'Radiocarbon-dated destruction layers: a skeleton for Iron Age chronology in the Levant', *Oxford Journal of Archaeology* 28/3, pp. 373–386.

Flinder, A. L. and Hall, E. T. 1993. 'Survey of the ancient Israel harbour of Akko', in M. Dothan, M. Heltzer, A. Segal and D. Kaufman (eds), *Studies in the archaeology and history of ancient Israel in honour of Moshe Dothan*, Haifa, p. 221.

Frost, H. 1973. 'Ports et mouillages protohistoriques dans la Méditerranée orientale', *L'archéologie subaquatique, une discipline naissante*, Unesco, Paris, pp. 93–115.

_____. 2000. 'From Byblos to pharos', in *Some archaeological considerations. Underwater archaeology and coastal management. Focus on Alexandria*, Unesco publishing, Coastal management sourcebooks, Paris, pp. 64–68.

Gilboa, A. 2005. 'Sea Peoples and Phoenicians along the southern Phoenician coast. A reconciliation: an interpretation of Sikila (SKL) material culture', *Bulletin of the American School of Oriental Research* 337, pp. 47–78.

Goedicke, T. R. 1972. *Submarine canyons on the central continental shelf of Lebanon*, Beirut, pp. 664, 665.

Hadjisavvas, S. 2007. 'Who were the residents of the ashlar buildings in Cyprus?', *Patrimoines culturels en Méditerranée orientale: recherche scientifique et enjeux identitaires. 1^{er} atelier, 29 Novembre 2007. Chypre, une stratigraphie de l'identité. Rencontres scientifiques en ligne de la Maison de l'Orient et de la Méditerranée*, Lyon, pp. 1–5.

Haggai, A. 2006. 'Phoenician Atlit and its newly-excavated harbour: a reassessment', *Tel Aviv* 33, pp. 43–60.

Hamilton, R. W. 1935. 'Excavations at Tell Abu Hawan', *Quarterly of the Department of Antiquities of Palestine* 4, pp. 1–69.

Hult, G. 1983. *Bronze Age ashlar masonry in the Eastern Mediterranean, Cyprus, Ugarit and the neighbouring regions*, Studies in the Mediterranean Archaeology 66, Göteborg.

Jidejian, N. 2001. *Lebanon, a mosaic of cultures*, Beirut.

Johns, C. N. 1993. 'Atlit', in NEAEHL I, *New Encyclopaedia of Archaeological Excavations in the Holy Land*, Jerusalem, pp. 112–117.

Koehl, R. B. 1985. *Sarepta III. The imported Bronze and Iron Age wares from Area II, X*, The University Museum of the University of Pennsylvania Excavations at Sarafand, Beirut.

Lagarce, J. and Lagarce, E. 1988. 'The intrusion of the Sea Peoples and their acculturation: a parallel between Palestinian and Ras Ibn Hani Data', in *History and archaeology of Palestine*, vol. 3, Aleppo.

Lipiński, E. 2006. *On the skirts of Canaan in the Iron Age. Historical and topographical researches*, Orientalia Analecta 153, Peeters.

Marriner, N. and Morhange, C. 2006. 'Geoarchaeological evidence for dredging in Tyre's ancient harbour Levant', *Quaternary Res* 65, pp. 164–171.

_____. 2007. 'Geoscience of ancient Mediterranean harbours', *Earth- Science Reviews* 80, pp. 137–194.

Marriner, N., Morhange, C. and Kaniewski, D. 2014. 'Ancient harbour infrastructure in the Levant: tracking the birth and rise of new forms of anthropogenic pressure', *Nature- Scientific Reports* 4, pp. 1–11.

Mazar, A. 2007. 'Myc IIIC in the land of Israel: its distribution, date and significance', in M. Bietak and

E. Czerny (eds), *The synchronisation of civilisations in the Eastern Mediterranean in the second millennium BC III. Proceedings of the SCIEM 2000 – Euro Conference, Vienna, 28th of May–1st of June 2003*, Vien, Verlag der Österreichischen Akademie der Wissenschaften, pp. 571–582.

Mommsen, H., D'Agata, A. L. and Yasur-Landau, A. 2009. 'Neutron activation analysis of Mycenaean IIIC-Style Pottery', in N. Panitz-Cohen and A. Mazar (eds), *Excavations at Tell Beth-Shean 1989–1996*, vol. 3, *The 13th–11th century BCE strata in Areas N and S*, Jerusalem, pp. 510–518.

Morhange, C. and Carayon, N. 2015. 'Géoarchéologie des ports antiques en Méditerranée' in G. Arnaud-Fassetta and N. Carcaud (eds), *La géoarchéologie au XXI^e siècle*, Paris, pp. 281–289.

Morhange, C. and Marriner, N. 2008. 'Mind the (stratigraphic) gap: Roman dredging in ancient Mediterranean harbours', *Bollettino di archaeologia online, volume speciale. International congress of classical archaeology. Meeting between cultures in the ancient Mediterranean*, Rome, p. 23.

Noureddine, I. 2016. 'Stone anchors off the shore at Byblos', *Bulletin d'archéologie et d'architecture libanaises* 16, pp. 293–308.

Noureddine, I. and Hélou, M. 2005. 'Underwater archaeological survey in the northern harbour at Tyre', in C. Morhange and M. Saghié-Beydoun (eds), *La mobilité des paysages portuaires antiques du Liban*, Bulletin d'archéologie et d'architecture libanaises hors-série 2, Beirut, pp. 111–128.

Noureddine, I. and Mior, A. 2018. 'Archaeological survey of the Phoenician harbour at Tyre, Lebanon', *Bulletin d'archéologie et d'architecture libanaises* 18, pp. 95–112.

Oleson, J. P., Brandon, C., Cramer, S. M., Cucitore, R., Gotti, E. and Hohlfelder, R. L. 2004. 'The ROMACONS Project: a contribution to the historical and engineering analysis of hydraulic concrete in Roman maritime structures', *Int Journal of Nautical Archaeology* 33, pp. 199–229.

Philokyprou, M. 2011. 'The initial appearance of the ashlar stone in Cyprus, issues of province and use', *Mediterranean Archaeology and Archaeometry* 2, pp. 37–53.

Raban, A. 1987. 'The harbor of the Sea People at Dor', *Biblical Archaeologist* 50, pp. 118–126.

———. **1988.** 'The constructive maritime role of the Sea Peoples in the Levant', in M. Heltzer and E. Lipiński (eds), *Society and economy in the Eastern Mediterranean (c. 1500–1000 BCE)*, Leuven, pp. 261–294.

———. **1997.** 'Phoenician harbours along the Levantine coast', *Michmanim* 11, pp. 7–27.

Raban, A. and Linder, E. 1993. 'Maritime 'Atlit', in E. Stern (ed.), *The New Encyclopedia of Archaeological Excavations in the Holy Land*, vol. 1, Jerusalem, pp. 117–120.

Stadelmann, R. 1984. 'Seevolker', in W. Heilek and W. Westendorf (eds), *Lixkon der Agyptologie V*, Weisbaden, p. 822.

Stager, L. E. 1995. 'The impact of the Sea People in Canaan (1185–1050 BCE)', in T. E. Levy (ed.), *The archaeology of the society in the Holy Land*, New York, pp. 332–348.

Stern, E. 1993. 'The many masters of Dor – When Canaanites became Phoenician sailors', *Biblical Archaeology Review* 19, pp. 22–31.

Tartaron, T. F. 2013. *Maritime networks in the Mycenaean world*, Cambridge.

Wachsmann, S. 1998. *Seagoing ships and seamanship in the Bronze Age Levant*, Texas.

———. **2000.** 'To the Sea of the Philistines', in E. D. Oren (ed.), *The Sea Peoples and their world. A reassessment*, University Museum Monograph 108, University Museum Symposium Series 11, Philadelphia, p. 103.

The Port of Astronoe in Tyre

JULIEN ALIQUOT

The present study focuses on the port of Astronoe in Tyre. This harbour is mentioned in a series of Greek inscriptions from the Byzantine necropolis of the ancient Phoenician city. The review of all available sources leads to the conclusion that it was one of the two main ports of Tyre and that it corresponded to the harbour that Strabo called the 'closed port' and to the northern port of the island, the present-day Old Port. In Roman times Astronoe's harbour was under the protection of a local goddess, whose myth was common to several Phoenician cities, including Berytus, the great rival of Tyre, and whose cult was celebrated in Tyre either in the sanctuary of Heracles, or in a specific sanctuary located inside the city. Mother of the gods and lover of one of the Dioscuri, protectors of sailors, Astronoe was the object of special attention from civic authorities and from Tyrian dignitaries, which explains why her name remained associated with one of the two main ports of Tyre in the early Byzantine period, in the formal toponymy as in the popular language of murex fishermen.

Keywords: Phoenicia, Tyre, Astronoe's harbour, Egyptian port, Greek epigraphy, Damascius.

Astronoe's Harbour and Other Tyrian Port Facilities

In his *Geography*, completed during the reign of Tiberius (14–37 AD), Strabo briefly described the island of Tyre and its harbours (XVI, 2, 23):

Tyre is a whole island, almost organised in the same way as Aradus, and it is connected to the mainland by a jetty that Alexander built during the siege. It has two ports, one closed, the other open, called the 'Egyptian'.

There is little more to say about the Egyptian port, except that it was open towards Egypt, south of the city, and therefore that it was exposed to the swell and strong winds from the south-west. Between 1934 and 1936, by combining aerial and underwater research, Father Antoine Poidebard thought he recognised two breakwaters south of the peninsula

(Poidebard 1939). Surveys by Honor Frost, in the 1960s, and more recently by a Lebanese team, made it possible to identify these remains with the ruins of a submerged quarter of the ancient town (Frost 1971; 2005; Marriner 2009: 98–113; Nordiguian and Antaki-Masson 2017: 177, 178). The Egyptian port thus remains to be discovered.

The other port of Tyre, which Strabo distinguished from the Egyptian port, is better known. It was the northern port of the city, which is today reduced to the modest Old Port of the peninsula (**fig. 1**), but whose basin was much more extensive in antiquity (Marriner 2009: 79–98; Nordiguian and Antaki-Masson 2017: 176, 177). Its closed and protected aspect matches the situation of the intramural port that the *Periplus* of Pseudo-Scylax (104) mentioned in the Persian period ('another city, Tyre, having a port within its walls'), without this identification being certain.