

Harbour Installations at Tyre North

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This paper focuses on the first underwater investigation of Tyre harbour since Honor Frost's early works. Frost advised on scientific and historic principles during the 2001 season of investigations within the northern harbour at Tyre and subsequently provided guidance. The Phoenician harbour of Tyre has been the focus of interest of many scholars for more than a century. This paper will shed light on the historical background of Tyre, previous investigations, the 2001 and later investigations, and future projects.

Keywords: Phoenician harbour, Sea Peoples, headers, Tyre.

The local name of the city of Sour (*Sur*) has its roots in Phoenician times; it was also called *Suru* in Akkadian. The name Tyre is derived from the Latin *Tyrus*. The first certain record of the island settlement comes from the texts of curses made by Asian princes in the 19th century BC (Pritchard, 1969: 239). The city reappears in sources in the Late Bronze Age, especially during the reign of Abimilki in the mid 14th century BC, when a regular correspondence with Amenhotep IV is found within the Amarna letters (Moran, 1992: EA 144: 232, EA 155: 241) and in a letter sent by Rib-Hadda of Byblos (Moran, 1992: EA 89), which emphasize the power of Tyre.

Initially, the historical settlement of Tyre encompassed the small island located between 500 and 700 m from the continental shoreline, and the mainland settlement known as Ushu. Later, during the siege of Tyre by Alexander in 332 BC, a mole or causeway was constructed connecting the island to the mainland (Fig. 1).

Following this period, both the mainland settlement and the former island community were known collectively as Tyre. Archaeological evidence suggests the mainland settlement extends back to the Early Bronze Age (Bikai, 1978), with textual evidence also suggesting the island was occupied during this period. Despite rumours of attack by the so-called Sea Peoples at the end of the Bronze Age (1200 BC) (Neumann & Parpola, 1987:



Figure 1. Image of Tyre, 1934, showing how the former Island of Tyre is connected to mainland. (Poidebard, 1939).

161-182; Ward and Sharp, 1992: 208; Yakar, 2006: 33-51), Patricia Bikai, who conducted a major archaeological excavation of this site down to bedrock, clearly documented that there was no widespread destruction at that time (Bikai, 1978). On the contrary, there was a clear continuity of strata, indicating the local society continued to live in the same way through the Late Bronze Age and into the Phoenician Early Iron Age period.

During the reign of Zimredda of Sidon, Abimilki's major foe, Tyre was mentioned in several of the Amarna letters (EA 77, 92, 101, 114). Also, Tyre had a close relationship with the kingdom of Ugarit, under the influence of the Hittites. Indeed, Tyre replaced Ugarit as the commercial capital in the eastern Mediterranean in the 11th century BC (Aubet, 2000: 70-120). We also learn from Papyrus Anastasi III, dated to the end of the 13th century, the role that Tyre probably played in Asiatic campaigns and how it supplied troops to Seti I of Egypt (1318-1304 BC) (Pritchard, 1969: 258-259). Tyre was mentioned in the Wenamon report, even though the Egyptian envoy did not stop there (Pritchard, 1969: 25-29, Katzenstein 1973: 71).

During the 8th century BC, the Assyrian Empire began to assert control over the northern Levantine coast. The Assyrian ruler Tiglath-Pileser III (744-727 BC) demanded tribute from the King of Tyre Hiram II, and influenced the maritime commercial enterprises of the Phoenicians. Maritime enterprises connected to the port of Tyre continued to flourish into the 7th century BC. The influence and prominence of Tyre's maritime activities can be interpreted from the Assyrian 'Treaty with Ba'alu of Tyre' (Langdon, 1929: 189-194). Historical and archaeological sources suggest Tyre continued to be identified as an important settlement throughout the Hellenistic, Roman, Byzantine, and later periods

(Le Lasseur, 1922; Rey-Coquais, 1977; Nouredine and el-Hélou, 2005). Today, the city of Tyre still incorporates both the former island and mainland settlement, with the causeway connecting them.

The maritime context of Tyre, and hence its harbour, was certainly very active throughout the ages as a result of the island's location. Since the Late Bronze Age, its dependence vis-à-vis the mainland is highlighted in the Amarna letters (Moran, 1992: EA 148: 235), the Ras Shamra tablets, and the Papyrus Anastasi I, which also evokes the richness of fish in the waters of 'Tyre-the-Harbour' (Pritchard, 1969: 475-479). During the Iron Age, the Assyrian annals of Shalmaneser III (858-824 BC) describe that tribute from Tyre and Sidon was transported by sea (Pritchard, 1969: 276-281). The scene was depicted on the doors of his palace at Balawat (Bunnens, 1983: 10; Basch, 1987: 305-306). The annals of Esarhaddon (680-669 BC) once again emphasize Tyre's dependency on the mainland (Pritchard, 1969: 289-294).

Summary of investigations

Historical documents suggest that, like other Phoenician cities, Tyre would have possessed both a northern and southern harbour installation (Frost, 2005). The northern shore of the island was traditionally identified as the 'Sidonian' harbour, with the southern coast known as the 'Egyptian' harbour (Frost, 1971).

While the potential existence and possible location of the southern harbour structure was advocated by Antoine Poidebard (1939), a brief study of the sediments, along with underwater archaeological survey carried out in 2002 was not able to confirm any physical evidence indicating a man-made harbour structure in this area (El Amouri et al., 2005: 91-110). This may suggest the southern 'harbour' identified in historical records (Poidebard, 1939: 5-75; Frost, 1971: 103-111) constituted an offshore anchorage rather than a physical man-made harbour installation close to, or connected to the island of Tyre (Frost, 2005). In contrast to the southern coast of Tyre, the existence of a harbour installation on the northern side of the island was documented in the 19th century by Jules de Bertou (Bertou, 1843), John Kenrick (Kenrick, 1855) and Ernest Renan (Renan, 1864), who may have observed several courses of the structure extending above the water-line. In the early 20th century, Poidebard began his exploration around the area of Tyre using aerial photography (Poidebard, 1939). While his conclusions regarding the southern harbour may have proved inconclusive, his documentation of the appearance of a submerged jetty structure on the northern side of Tyre provided more favourable results (Fig. 2). Although the underwater structure identified by Poidebard could not be confirmed as man-made at the time, it did provide the impetus for further investigations into the nature of the feature and surrounding underwater landscape.

Beginning in the 1960s, Frost initiated investigations aimed at identifying the existence of harbour installations around the coast of Tyre. While her initial exploration focused on the southern side of the former island, she also identified the significant archaeological potential for harbour facilities along the northern coast of Tyre (Frost, 1971). Later, she encouraged me to continue this research and mentored me when I was appointed by the Directorate General of Antiquities (DGA) in 2001 to undertake the first underwater investigations. The underwater survey and mapping conducted by our team confirmed the existence of a man-made structure within the northern harbour

area of Tyre, in addition to confirming the high potential for the existence of significant submerged archaeological resources in the surrounding area (Noureddine & el-Hélou, 2005). Based on subsequent research and underwater investigations in 2004, which included the excavation of a test pit on the southern facade of the southern wall of the structure (ARESMAR-DGA) (Castellvi, 2007) and further mapping in 2005 (Noureddine, 2008), this underwater structure has been interpreted as representing a harbour jetty installation estimated to date to the Iron Age period. This is based on several attributes, including comparable construction methods and materials used for Phoenician harbours identified at Tabbat al-Hammam and Atlit (see below).

Between 2005 and 2013 no further archaeological investigation of the northern harbour was carried out, with the exception of underwater site reconnaissance visits which consisted only of a number of scuba dives to assess the preservation and structural integrity of the archaeological features associated with the ancient jetty structure. In 2013, a further survey season at the northern harbour of Tyre was supported by the Honor Frost Foundation. All fieldwork was completed under an archaeological permit issued by the DGA. There is a high risk of disturbance from treasure hunters to the submerged jetty at the northern harbour at Tyre, which could result in the significant loss of valuable archaeological knowledge and data. Therefore, excavation is recommended to document the archaeological integrity and significance of the site, as well as additional investigations to explore the structure's relationships to surrounding potential and known historic features.

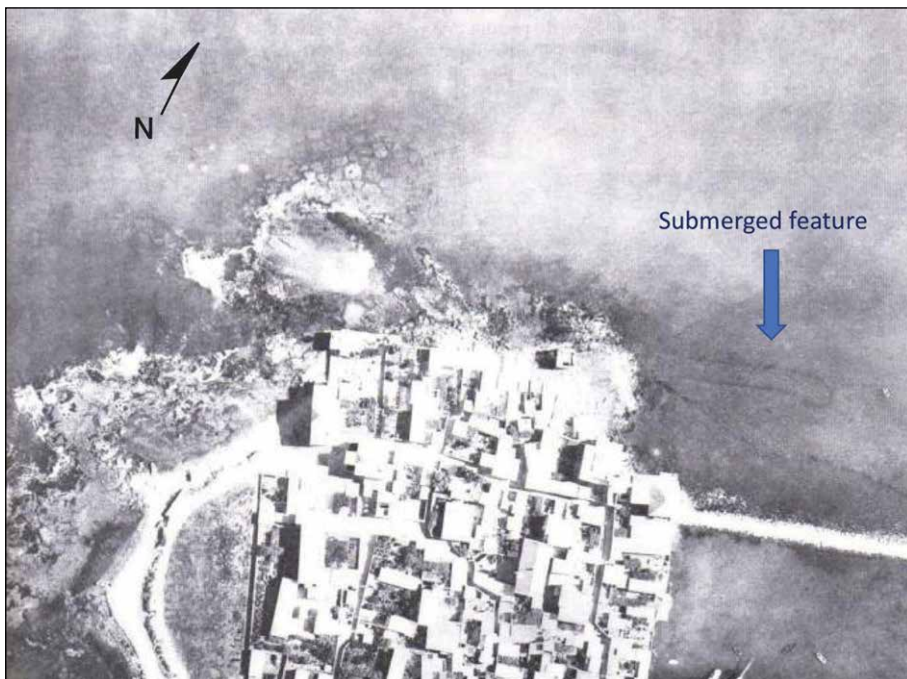


Figure 2. Aerial photograph of the northern harbour at Tyre, Lebanon. (Poidebard, 1939).

Site description

The ancient jetty is oriented in an east-west direction, 57 m north of a modern jetty that has a similar orientation (Fig. 3). Three walls related to the ancient jetty 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

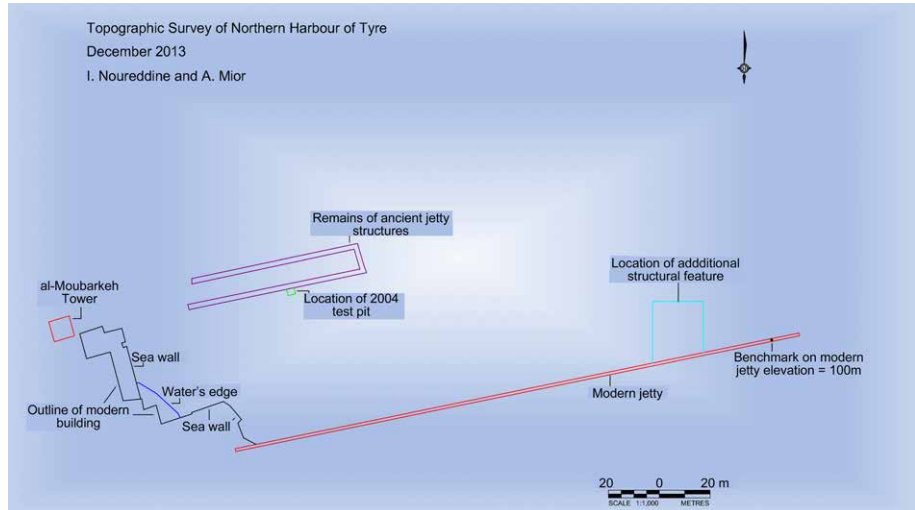


Figure 3. Topographic map depicting features in the northern harbour of Tyre, 2013. (I. Noureddine & A. Mior).

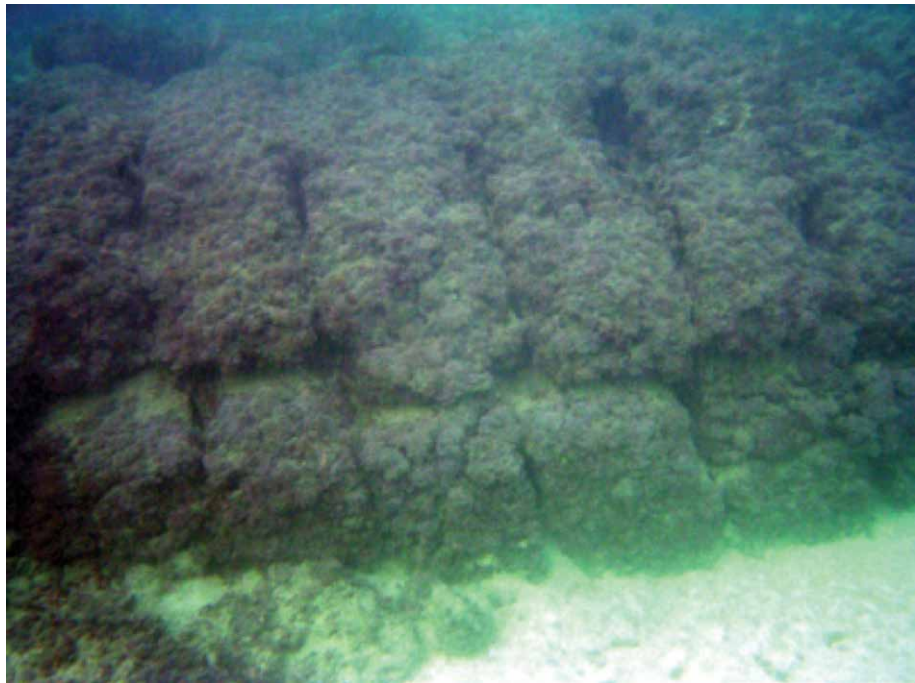


Figure 4. Limestone blocks laid as headers used for the construction of the southern wall of the jetty, looking north. (Photo A. Mior).

of roughly hewn, rectangular limestone blocks, varying slightly in size. On average, the blocks measure 1.86 m long (maximum 2.25 m), 0.30 m wide (maximum 0.45 m) and 0.45 m deep (maximum 0.60 m). All three walls exhibited the same construction techniques with the limestone blocks laid as 'headers' (Fig. 4). Only two courses of stone were visible along most of the length of the feature although in some areas a third course could be discerned protruding above the sediment. The outside facade of the northern wall measured 66.8 m in length, the visible portion of the southern wall measured 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 a distance of 27.4 m from the existing concrete structure forming part of the modern sea wall to the west.

The shallow depth of the site facilitates easy access to the submerged archaeological resources at the northern harbour of Tyre. While this benefits the archaeological investigation of the area, it also creates a problem as the archaeological site is also accessible to those interested in carrying out illicit and illegal activities. Crowbars used to move the stones in the hope of finding 'treasures' have been found on site on several occasions throughout the years of investigations from 2001 to the present day.

While additional archaeological investigations are required to realize the full importance of this site, the Tyre jetty also has the potential to provide comparative data that can be utilized to study harbour structures around the Mediterranean.

Discussion and conclusions

The closest parallels to the sunken jetty at Tyre are the jetties at Tabbat al-Hammam and at Atlit. The Phoenician jetty 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 9th century BC based on an analysis of the stratigraphy (excavated on land) (Braidwood, 1940; Marriner & Morhange, 2007), and this dating has been accepted by several other authors (Frost, 1973; Raban, 1995). The Phoenician jetty at Atlit, 30 km south of Haifa, appears to be a smaller version, but built in the same manner as the jetty at Tyre with its two, parallel, header-built walls and a third wall of headers at their end, enclosing ashlar and rubble. At Atlit this provided a breakwater against the northern winds (Raban & Linder, 1993: 117-120). The headers are the same size as those at 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 jetty has been dated to the 9th-8th century BC by radiometric dating of wooden fragments held between courses of the jetty (Haggai, 2006: 43-60).

Since the jetties at Tyre and Atlit both indicate technological advances over that of Tabbat al-Hammam, with a more sophisticated construction method using larger blocks and a double wall, the Tabbat al-Hammam jetty could provide a *terminus post quem* for their construction dates.

Moreover, since Atlit was either a Tyrian or a Sidonian colony (Johns, 1993: 112-117), and since the two jetties are constructed in the exact same manner, it would be reasonable to estimate that both were constructed around the same period.

To the west, a similar construction method is provided by the Hellenistic harbour at Amathonte or Amathus, Limasol, Cyprus. The jetty was built with the same header

technique, but using substantially larger blocks (3 m in length), showing that this method of construction was used at least until the end of the 4th century BC (Kozelj, 1988: 3-80; Empereur & Kozelj, 2017: 5-172).

Masons' and quarrying marks

As revealed by the excavation of a test pit in 2004 (ARESMAR-DGA) (Castellvi, 2007: 57-102), the headers at Tyre have some quarrying and masons' marks on their sides (Figs 5-6). Attempts to date the marks stylistically have not yet provided clear results with suggested dates ranging from early Phoenician to Hellenistic periods (Jidejian, 2001: 143; Castellvi, 2007: 75-102; Nouredine, 2010: 180-181). A funerary stele found during the American University



Figure 5. Quarrying and masons' marks on the inner facade of the southern wall. (Photo I. Nouredine).

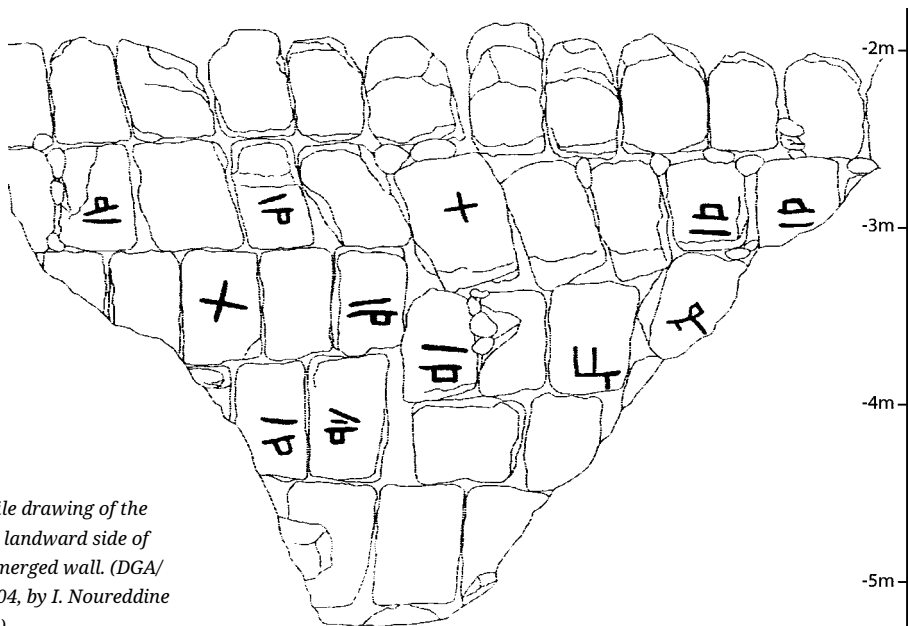


Figure 6. Profile drawing of the test pit on the landward side of the inner submerged wall. (DGA/ARESMAR 2004, by I. Nouredine and M. Salvat).

of Beirut's excavation at Tel El Burak dated back to the mid 7th to mid 6th century BC (Sader, 2005: 22-24 and 53), does, however, have similar marks to those found on the jetty blocks (Fig. 6). Further study and observation of these markings could provide important data on the Phoenician building techniques and on dating this jetty.

According to Carayon *et al.*'s study of the geomorphology, no harbour-works dating from the Phoenician period can be confirmed with respect to the north harbour jetty at Tyre (Carayon *et al.*, 2011: 46-47). They suggest the relative absence of sediment from this period is due to considerable dredging operations dating from the Phoenician period onwards. Yet, they consider the jetty at Tyre to date at least from the Hellenistic period and possibly earlier (Carayon *et al.*, 2011: 49). In a recent study Marriner *et al.* suggested the possibility that the jetty could be Romano-Byzantine, based on a bio-stratigraphical study that showed a sharp increase in lagoonal species, consistent with hyposaline basins (Marriner *et al.*, 2014). However, it is also suggested repeatedly that chronostratigraphic and sedimentological evidence from Tyre shows extensive coastal dredging from the 4th century BC onwards (Marriner & Morhange, 2006: 164-171; Morhange & Marriner, 2008: 23; Marriner *et al.*, 2014: 6). The contribution of direct archaeological evidence to solving the dating issue has remained problematic, since research revealed a gap in the sediment sequence caused by dredging activities (Morhange *et al.*, 2015: 252).

To conclude, we should take into consideration several factors:

1. The suggested considerable dredging operations would have removed sediment archives dating from the Phoenician period, thus preventing the geomorphological studies from confirming a Phoenician date for the structure. The lack of sedimentary evidence does not negate the fact that the header-built structure at Tyre could date from the Iron Age period, as seen at Atlit and Tabbat al-Hammam. As yet no excavation has been conducted of the ashlar or the rubble fill between the two header-built walls; this is where dating evidence was located at Atlit where an Iron Age date was confirmed (Haggai, 2006: 43-60). Moreover, Carayon *et al.* suggested that the northern harbour at Tyre dates at least from the 4th century BC or earlier (Carayon *et al.*, 2011: 2).
2. During the survey conducted in 2001, published in BAAL in 2005, hydraulic mortar was identified on some of the scattered blocks that may have been fallen from higher courses in the structure, which belong to later periods – that is, Roman or Byzantine (Oleson *et al.*, 2004; Nouredine & el-Hélou, 2005: 111-128; Castellvi, 2007: 57-102). This does not date the origins of the jetty to the Classical period, however, since the blocks with hydraulic mortar were not seen within the header-built structure. The header-built walls were built with no cement or mortar, as seen at the Atlit jetty.
3. If the harbour is dated to the Phoenician period (7th-8th century BC) (Nouredine, 2010: 176-181), this does not negate its use in the Roman and Byzantine period (Nouredine & el-Hélou, 2005).
4. Finally, the symbols found on the jetty's blocks are possibly early Phoenician writing (Jidejian, 2001: 143; Castellvi, 2011: 104), however Georges Castellvi makes the argument that these writings confirm the identity of the masons but not the time the jetty was constructed (Castellvi, 2011: 115).

It is suggested that the parallel walls at Tyre are the remains of an Iron Age Phoenician jetty, dated approximately to the 8th century BC. Unfortunately, geoarchaeological studies revealed a lack of sedimentation, likely due to later dredging, so sediments cannot be used to confirm the date of construction of the jetty (Marriner & Morhange, 2006; Morhange & Marriner, 2008; Marriner *et al.*, 2014). Despite these problems, it is important to stress that among the three Levantine jetties mentioned in this paper, Tyre, Atlit, and Tabbat al-Hammam, the Tyre jetty is the largest in size and was built with double walls, suggesting Tyre was a substantial and busy harbour that could handle large cargo vessels.

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