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Recent observations on the Phoenician harbor at Tyre

IBRAHIM NOUREDDINE

The maritime activities on the Lebanese shoreline (210 Km) started at least during the early Bronze Age period. These activities are marked in many areas of the shoreline making it one of the richest coasts in the eastern Mediterranean in terms of marine civilization. Harboring ships used since antiquities in the area can be divided into four different categories. Tyre alone displays all four of these categories.

Coasts of the eastern Mediterranean have been full of activity for maritime civilizations since the dawn of time. During historical periods (early Bronze Age) these coasts served as highways trading routes of many civilizations. Millenniums of commerce, seafaring, marine wars, and fishing have left an enormous amount of archaeological remains and artifacts on the coast and seabed in the heart of the eastern Mediterranean namely Lebanon where shipwrecks, ports, anchorages, and submerged rock-cut coastal installations have marked the Marine archaeological heritage of Lebanon, representing an important section in the history of humanity, since the exportation of the alphabets.

Harbor installations and natural formations used since antiquities on the Lebanese shoreline (210 km) can be divided into four different categories as follows: 1, shallow water natural anchorages (1-3 m depth). 2, offshore anchorages. 3, slipways and finally, man-made built harbors. Examples on these types are many, but despite the rest of the Lebanese shoreline, Tyre individually has the four different harbor categories given that Tyre holds the only built harbor installation until now. This harbor is located on the northern side of the peninsula where the southern side or what is so called "Egyptian Harbor" cannot yet be confirmed and still considered controversial.

Pioneer surveys by different scholars such as Ernest Renan who produced the main database leading to direct investigations of a harbor remains. Antoine Poidebard detected the ports of Tyre and Honor Frost also worked on Tyre's ports and brought light on the surveys done by Poidebard using her diving photography skills. Looking down from a fishing boat through two meters of water, Renan was confused by columns lying in what seemed to be absurdly small and unsheltered harbor, attached to the south of the peninsula (Frost 1971). In 1930's, Poidebard

detected ports of Tyre from an airplane. Poidebard did not finish the work, but he listed several various outstanding questions. (Bolt 1992)

As well known, the original island of Tyre- before Alexander joined it to the land by a causeway- was the central portion of a reef that extended North and South from it. Poidebard thought that he found walls of colossal masonry on the natural rock some two kilometers from land, he noticed two alignments of blocks, separately 500 and 390 (Poidebard 1939) at depth of 9 and 15 meters. Traditionally, Phoenician ports had closed harbors for their own ships and outer harbors for foreign ships. In 1966 Honor Frost found out that the so called "walls" could just be natural formations and not actual manmade walls as Poidebard had previously concluded and Frost's conclusion was confirmed in 2002 during the investigation led by a Lebanese-French crew of Archaeologists divers. However, Poidebard's conclusion was based on the information provided to him by his divers. Still Honor Frost's observations do not totally dismiss Poidebard's conclusion that the reef might once have served as an outer anchorage (Frost 1972). As for the Northern harbor, his contribution was limited to detect a submerged jetty located on the northern side of Tyre, as mentioned above. This jetty appears in one of his aerial photographs and was confirmed in 2001 by DGA survey (Noureddine & Helou *BAAL* 2005) During the 2001 investigations on Tyr's Northern harbor at Tyre, it was noticed that this area holds enormous amount of man made features such as cut blocks, columns, and a variety of pottery. In addition to large areas of sands and sedimentations covering manmade features and masonry blocks. This massive amount of sands and sedimentations are due to the existence of the actual concrete jetty that measures 340 meters in length, thus, causing the accumulation of a most of sediments brought by currents.

As mentioned above, the categories of harbors on the Lebanon shoreline are four and they are as follows:

Shallow water, Natural Anchorage

These types of Anchorages were able by modifying and using natural formation near the coastline such as: (natural bays or coves, abrasion platforms, etc.). These features are common along the rugged Lebanese shoreline, and have been used since antiquities and still used by fishermen today.

Offshore anchorages

Submerged ridges, 0.2 to 2 kilometers offshore, with a variable depth of 12 to 20 m to provide a favorable holding ground for stone anchors since antiquities. Ancient cargos purposely chose such places for anchoring in areas where shelters or port facilities were unavailable and the sea bottom was silty or sandy. Anchorages of this category are found in different area on the Lebanese shore and stone anchors were found on such sites at Byblos' Dehret Martine, and Dehret Jbiel and ras Anfeh in the North and on most of the southern coast between Saida Sarepta and Tyre (**Fig. 1**).

Slipways

Modified natural beach rock in a ramp manner on the shore by which ships or boats can be pulled out from and to water. Typically, they were used for repairing and building boats. Anfeh cape at the north of Lebanon represents a major example on Slipways since a large slipway is located on the northern side of the cape (**Fig. 2**)

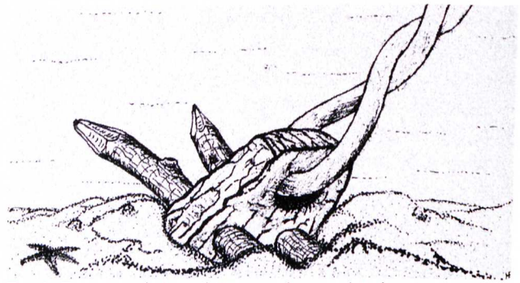

Fig. 1- Function of pierced stone anchors and its function on sandy and or rocky seabed. Examples were found in different areas on ridges varied in depth between 12 and 20 m.

Fig. 2- Large slipway located on the northern side of the Anfeh cape.

Man-made built harbors

Manmade jetties, quays and breakwaters represent this category that serve as protection and create leeway for vessels entering to safety. This kind of facilities are known on the Syro-Palestinian coast since at least the Iron Age period such as at "Atlit" 7th century BC and "Tabbat el-hammam" 9th century BC which are considered a semi identical to the Tyre Jetty Initially identified as the Phoenician harbor 7th to 8Th century BC. The jetty at Tyre was built on a large scale to serve several purposes such as Breakwater, Pier, Dock, Moor, etc. The area around the jetty varies in depth between 1 and 4 m, and the seafloor around the jetty is covered with scattered masonry blocks over a thick layer of sedimentation that can reach over 4 m thick. The jetty consists of two parallel walls built from headers, preserved for a length of 85 and 70 m, respectively, and connected at their eastern extremity by a 13-m long wall that closed the structure. The walls are submerged between 1.5 to 3.5 m deep, with the area between them partially filled with rubble and scattered blocks. All three walls were built in the same manner, from carefully prepared headers varying in size from 1.9 to 2.25 m in length and 55 and 45 cm in height and width. The top header was submerged in about 2 m of water. Excavations revealed at least five courses of the wall, or more than 2.5 m, are preserved at the excavated site. The area between the parallel walls is filled with a mixture of rubble and ashlars to give more strength o he jetty against the violent northern winds and to have its paved surface strong enough to maneuver heavy weight carriages and carts (**Fig. 3**).

There are many scattered blocks around the header built walls, perhaps as a result of falling from the higher courses that must have reached above the sea level. The construction of the headers is typical of Phoenician harbor work (Carayon 2005). As mentioned above, the closest parallel to the sunken jetty at Tyre in terms of building technique and usage, would be the jetties at Tabbat al-Hammam near Tartous and Atlit some 68 Kilometers south of Tyre. The Phoenician jetty at Tabbat al-Hammam, consists of a one header–built wall facing the waves, backed by a mixture of ashlars and rubble fill. It is dated to the ninth century B.C.

Given the fact the size of the jetty, the building system and the position, it is more apt to conclude the follows possible used of the jetty: firstly, a break water for the northern winds so that it protect form the violent northern winds and provide a leeway for boats and ships to enter the harbor from the eastern side. Secondly, the width of the jetty is over 12 meters wide so it allows cattle pulling wagons full of goods to maneuver easily back and forth to load and unload cargos. Thirdly, the deep end of the jetty allows considerable sized boats and ships to safely moor (**Fig. 4**).

Finally, after 6 years of completing the plan view of the harbor remains at Tyre, recent visits to the site shows a considerable change in the structure due to constant vandalism committed by locals. Thus, jeopardizing the loss of much important information that may still lay underwater and maybe still protected.