„AL.I. CUZA" UNIVERSITY IAŞI
FACULTY OF HISTORY

DOCTORATE THESIS

Typology and functionality of maritime harbours on the Levantine coast during Hellenistic and Roman period

Summary

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Introduction

For a long time, the study of harbours was generally approached by the traditional archaeology[1] with special focus on the research of harbour infrastructure and analysis of maritime trade[2]. Concurently, a reconstitution of ancient paleo-geography was attempted, based on writings of ancient geographers (Strabo and Ptolemy)[3]. This state of facts was bypassed in the 80's, with the setting up of interdisciplinary teams (archaeologists, historians, geologists, geomorphologists and biologists), aimed at exhaustive research of harbours from the Caesarea Maritima and Marseille. Furthermore, corroborating information obtained by geologists as a result of analyzing the sedimentological cores from the ancient harbours with those obtained by archaeologists in their researches, led to a reconstitution of human impact, as well as the directions, variations and changes on the harbours in different historical periods. Nowadays, geo-archaeology, viewed from an economic point of view, respectively that of effectiveness, as well as that of the abundant information, is considered to be a „revolutionary" advance in the archaeological research in general, and of harbours in particular[4].

[1] Grenier 1934.
[2] Rougé 1966.
[3] Ardaillon 1896.
[4] Marriner, Morhange 2007a: 138.

b. Sources

b.1. Literary sources

The Greek and Roman ancient texts, surviving through their use within the medieval rhetoric schools and transcriptions made by the copyists from the European Medieval monasteries, determined, in the case of historical writings, the realization of a more or less continuous chain of historical narratives in which the harbours and harbour installations on the Levantine coast are described in detail or just incidentally mentioned.

In the present study, an important role in identifying and placement of harbours is played by the works known as *periploi* or *itineraria*, containing systematic information concerning harbours, anchorages, geographical landmarks, trade routes and distances between harbours in stadia[5]. The scarce information revealed by a *periplus* written at the end of IVth century BC by Pseudo Schylax and another one from the IIIth century BC with unknown author[6], are completed by works with geographical character from the I century, namely Strabo's *Geography* and Ptolemy's *Geography* from the II century.

In contrast with *periploi*, the works of geographers, historians and ancient writers provide detailed descriptions regarding the morphology, configurations, the functional manner of the harbours, as well as the harbour construction techniques. Illustrating this category, the description of harbours from Alexandria, realized by Strabo, from Caesarea Maritima, by Josephus and from Carthage, during the Roman siege by Appian. In a similar manner, Herodotus described earlier, the dam fom Samos, while Suetonius and Pliny the Elder presented the

[5] Lipiński 2004.

[6] *Anonymi Stadiasmus Maris Magni* in Karl Otfried Müller 1855.

construction of break-water from Ostia, realized by Trajan at Centumcellae.

Writings about harbour technology are scarce, although they are documented. We can mention the work entitled *Limenopoeica* by Philon from Byzantium (approximately 280-220 BC), as well as the geographical compilations known as *Harbours*[7], by Timosthenes from Rhodes, commander in the ptolemaic fleet at the end of III century BC. The only work describing the harbour construction methods dates from the Roman period. Vitruvius, in *De Architectura*, presents, in the excerpts dedicated to harbour and naval shipyards, details regarding the place where a harbour is most suitable to be constructed, the orientation of harbour installations and useful construction materials (*puzzolana*).

b.2. Epigraphic sources

In contrast with Antiquity's historical works passed on through the recopied manuscripts over the centuries, the inscriptions are primary documents. The epigraphic sources can provide a varied range of information, from harbour regulations or maintenance activities to official titles and specific activities.

b.3. Iconographic sources

Mural paintings and Egyptian reliefs are the main iconographic sources from pre-Roman period in which harbours and often ships are represented: for example, the mural painting discovered in Kenamon from Thebes tomb (XIVth century BC) documents Syrian ships anchored in an Egyptian harbour, longshoremen unloading goods and merchants arranging an itinerant market near the shore, but no harbour installation. At that time and, surely, afterwards, the merchants used to unload

[7] Fraser 1972: 522; Blackman 1982a: 79.

the goods directly on the beaches, although it is unlikely that this method was applied in the case of larger ships. For the II millenium BC, there is only one mural painting available, discovered in the Egyptian tomb from Amarna, in which a pier with bollards, onto which the ships were anchored is depicted[8].

The maritime and harbour representations from the Roman period can be found mainly on coins, precious stones, lamps, bottles, reliefs, nosaics and mural paintings. Some coins depict harbours in their entirety; for example, the bronze coin (sestertius) issued in 64 AD (?), with an effigy that depicts the image of Portus harbour and the coin issued in 144 AD (?), on which the harbour from Pompeiopolis-Soli is illustrated [9].

The coins from the imperial period offer close dating to the moment in which the harbours were build. The emperors ruling at the beginning of II century AD encouraged the construction or improvements of harbours in the Empire, the coins being the only dating elements that also confirms the information provided by the literary sources.

Often, along the ships, the numismatic sources offer representations of lighthouses, due to the limited space available on the coin surface. The lighthouses from Alexandria, Laodiea ad Mare, Ostia, Akko are depicted[10].

b.4. Archaeological and geo-archaeological sources

Geo-archaeological researches.

c. Methodology

This study proposes a synoptic and exhaustive analysis of the maritime harbours from the Mediterranean shore of Levant (Map

[8] Blackman 1982a: 80.

[9] Boyce 1958.

[10] Rosen, Galili si Zviely 2012.

1), from the south to the Taurus Mountains to Gaza, which were already functional (for example the Phoenician harbours) and those which were build or reused within the urbanistic activity during Hellenistic and Roman period, between 332 BC to 335 AD.

In the initial stage we have approached the ancient and modern literary sources in order to identify the mentions and/or descriptions of harbours from the above said geographical space and the harbour construction techniques used in the Hellenistic and Roman periods. The next step consisted in analyzing the works containing studies and archaeological researches from the maritime archaeological sites in Syria, Lebanon and Palestine. We used the material and obtained information in a study on the typological and functional aspects specific for the Levantine harbours and not in the least, their roles in the geo-political context during Hellenistic and Roman periods.

d. Thesis structure

The thesis is structured in four chapters. In chapter I, entitled *The geopolitical context in the Oriental Mediterranean space (IVth century BC – III century AD),* we analysed the conquests of Alexander the Great, the political regime of the Seleucids and the urbanization phenomenon during Hellenistic and Roman periods.

In chapter II, *Harbours, harbour installations and other hydrotechnical installations,* we analysed the ancient harbour terminology, as well as *realia* regarding the harbour installations, ancient harbour construction techniques and harbours location areas.

Chapter III, *Typology of Levantine harbours,* presents the information identified in the literary and archaeology sources published until now in the professional literature along with a classification of Levantine harbours based on morphological criterion (artificial and natural harbours) and on the number of

harbour basins (one, two, three or more basins). Concurently, we adopted the chronological aspect of harbours that were in use during Hellenistic and Roman periods (Pre-Hellenistic, Hellenistic and Roman harbours), from north to south.

In the fourth chapter, we dealt with the *functionality* of Levantine harbours, as well as with their *role* in *the political relations context from Oriental Mediterranean space during Hellenistic and Roman periods.*

e. Novelty degree

From the methodological point of view, we tried to encompass all relevant categories of sources for the historical reconstitution of harbours: epigraphic, literary, archaeological and geo-morphological.

In the Romanian professional literature the issue of Levantine harbours was never taken into consideration. We believe that our study offers a solid referential pattern and also a stimulus for the research regarding the harbours from Pontus Euxinus.

Final considerations

Technological limitations from Pre-Hellenistic periods forced the naval engineers to place and build the harbours in locations that naturally ensured protection against dominant winds and marine streams. The Levantine coast, generally linear and exposed to violent action from the sea, has a limited number of bays and peninsulas that can protect the ships when needed. Following the analysis of harbours built in Pre-Hellenistic periods, it can be observed that, in their majority, are located either in a small gulf (Myriandros, Berytus, Byblos, Tripolis), or on a side of an island (Arados, Ras Ibn Hani, Tyr), or on a peninsula (Sidon), or even at some river mouth (Balaneion,

Botrys, Palaetyr, Paltos). The only exception is Marathos, where the harbour basin was artificially realised through digging behind the shore line.

The harbours that were built on the Levantine coast (and not only) with an island or peninsula acting as a shield (the Phoenician harbours) present a specific location pattern; that is why their fame as good seafarers, naval builders and traders spread even from the iron age. The Phoenicians were mainly concerned with commercial exchanges and used the islands and peninsulas in order to ensure an efficient maritime traffic and protection against potential attacks from the land (Arados, Tyr, Sidon). Acting as breakwater, these landscape elements offered opportunities for building harbour basins (generally one in the north and another in the south), while making possible to anchor ships regardless of meteorological conditions: for example, when the dominant winds were blowing from the south, the northern basin could be used.

Alexander the Great campaign, followed by a shifting and conflicts between the Hellenistic kingdoms, were the main factors in erecting new harbours, most of them being placed directly above abandoned settlements from earlier periods (Alexandreia ad Issos, Akko Ptolemais). The political conflicts from the beginning of Hellenistic period, when Ptolemy the First Soter takes control over the Phoenician port-cities, on one hand, and the rural character of the new kigdom, on the other, forces Seleukos the First to initiate an urbanisation project, that started in 301 BC with the four „sisters" being built: Antiochia, Laodicea ad Mare, Apameia and Seleucia Pieria. Laodicea ad Mare and Seleucia Pieria were conceived with the main purpose of being the base of maritime activities, with unusual activities for the Levantine coast being carried out, respectively digging harbour basins behind the shore line. The same construction technique, specific for the *cothon* type of harbours, although a Phoenician

invention (for example Motya, Carthage, Kittion), was introduced in the Levantine space in the Hellenistic period.

During Hellenistic period, an advance in the evolution of harbour construction techniques can be observed, brought about by the artificial breakwater, made up of blocks of stone raised directly from the bottom of the sea (sometimes from considerable depth) and sometimes on foundations consisting of submerged reefs. These installations presented a natural slope that hampered the erosive effect of the waves, as well as a rugged and permeable surface which, along with the appropiate angle alignment towards the dominant winds, ensured the necessary resistance for blocking the wave's force. This innovation paved way to locating the harbours in deeper waters in order to protect the trading ships along with the commencement of new commercial routes to the west; these harbour installations became bigger and bigger, such as those at Tabbat el-Hammam and Akko.

In contrast with the Pre-Hellenistic and Hellenistic periods, during Roman times, a highly marked novelty character regarding the harbour construction techniques can be observed. The most important technological advances appear once the hydraulic cement, made up, as Vitruvius informs us, of a mixture from vulcanic powder, lime and plaster, was invented. The chapters in which Vitruvius treats the harbour construction techniques describe the Hellenistic practices and the novelty character introduced by the Roman architects.

The extraordinary qualities of hydraulic cement, along with the technological innovations from this period, allowed the Roman architects to build harbours wherever they were needed, depending on the context of political, economic or military interests and natural elements were present. An illustrative example for this study is the harbour built by Herod at Caesarea Maritima, Sebastos.

Sebastos represents the prototype and the archetype of the harbour called *emporium* during the Roman Empire, being also emblematic for the progress in the evolution of harbour construction techniques from the beginning of imperial period. Herod required and received from Rome specialised engineers in harbour installations with hydraulic cement which, faced with topographic, geological and the clogging process specific for the Levantine coast, extended the Roman technological tradition even further, while experimenting new construction techniques in building harbour installations necessary for the new harbour of Caesarea Maritima.

In the case of the Levantine harbours, the taxonomy can be realised depending on the typological and functional criteria.

From the technological point of view, within the analysed geographical area, the existence of two categories of harbours can be determined – natural harbours and artificial harbours. Natural harburs can also be divided in harbours with one basin, two basins, three basins, while the artificial harbours, scarcely present could have one basin or double basin. In the case of the first category, the hypothetically located harbours which were not researched by the archaeologists until now, determining the exact number of basins remains a necessary condition in order to complete the knowledge regarding the location and construction of Levantine harbours.

At the level of the functional taxonomy of the studied harbours we have observed the existence of two dynamic roles, respectively a commercial and military one.

From the commercial point of view, in the analysed periods, the harbours were linked to the following types of commerce: the local trade, between an urban center, a *hinterland* and the administration representatives in the region. This type of commerce has been practiced between Arados and the

continental settlements, between Tripolis and Orthosia and Botrys, as well as between Tyr and Palaetyr.

The intra-regional trade implies commercial exchanges between urban centres from a certain zone (different from activities within the local trade) and is influenced by the transportation costs, by the diversity of products and the relative instability of supplies in the area. These elements are present at all port-cities in the studied area, where the agricultural or industrial products have a limited diversity, the maritime transportation is relatively cheap and the supplies (especially grain) tend to fluctuate.

The inter-regional trade, similarly with the intra-regional trade, was conditioned by the cheap price of transportation and by the diversity of commercial products. This type of trade was specific between Byblos, Berytus, Sidon, Tyr and Alexandria.

Long distance trade implied exchanges or the transit of products between the important commercial routes during Hellenistic and Roman periods transporting precious products from Orient to the Mediterranean markets. In this contexts, we have observed that the Levantine port-cities became trans-Mediterranean connection points, through which the goods passed between terrestrial and maritime routes. This type of trade was especially carried out by the large port-cities that were dispatching commercial products brought on terrestrial routes, from Orient to the harbours from the southern Anatolia, the Aegean basin, Adriatic Sea and Egypt. An exceptional case is repesented by the island cities that possessed inland territories. At Arados, the products were unloaded in the harbour deposits from the island, with the use of smaller boats, from the harbours belonging to the cities from *Perea*. In this context, the continental cities held a *punctus terminus* function for the terrestrial routes.

In the Hellenistic period, the development of trade caused by the emergence of new commercial routes, as well as the

increasing in the volume of transported goods, led to the construction of larger and larger transportation ships. Within this context, some harbours, especially arranged for the Pre-Hellenistic needs, were slowly abandoned or limited to coasting, instead bays with deeper waters were searched, although, in many cases, the harbour navigation was difficult. During Roman times, the commercial function of harbours experienced insignificant changes, except for the appearance of Caesarea Maritima. Sebastos represented the prototype and archetype of *emporium* harbour in the Roman Empire: through the maritime ways of transportation, it was connected with other port-cities from the Mediterranean Sea, exchanging goods, people and ideas on an unprecented scale until the XIXth century.

Concerning the military role of Levantine harbours, what focused our attention was the Hellenistic period, deeply affected by conflicts, when the military character was greatly expanded. A certain inter-relation was observed beween the rapid growth of naval powers and the decisive role of military fleets (three-banked and quadriremes), which led to the necessity of building harbour installations of *νεώρια*/*navalia* and closed harbours *limen kleistos*.

Within the studied space, an important military role for the Hellenistic kings were played by the harbours from Seleucia Pieria**,** Marathos, Ras Ibn Hani and Orthosia. The Phoenician port-cities were actively involved in the conflicts between the Seleucid and Ptolemaic kings, the ancient sources confirming the activity of their naval shipyards, which provided military ships to the fleets belonging to the two belligerent states. During these conflicts, the strategic location of some harbours determined the establishment of new military bases.

In Roman times, once the *Pax romana* was enforced, Rome ceased to be interested in maintaining a permanent fleet inside *Mare Nostrum*, while the idea of sustaining a poweful fleet on the

Levantine coast was also ignored in the first decades of I century AD; the *Classis Augusta Alexandria*, founded during Vespasian reign, had to ensure Egypt's loyalty and transport dignitaries in different provinces and Italy or to escort the commercial convoys around Alexandria. Seleucia Piera was the only city where the presence of *classis Syriaca* was proven and it became a συναρχίς during Vespasian, when the city provided military ships to the Roman fleet.

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