# 8 DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN

Anna MAROTTA, Roberta SPALLONE (Eds.)

# DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN

Vol. VIII

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# DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN

Vol. VIII

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# The rectangular tower with machicolations of Kyrenia city walls (1191-1228), Cyprus

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**Abstract**

The ruins of a rectangular stone construction are visible in the old city of Kyrenia; the tower was part of the walled urban defensive system. The city had been already fortified in Byzantine times but during the Longobard war, before the city seize, Frederick II's party, under the direction of Captain Philippo Genardo improved the defences. It is in this phase that we hypothesised the construction of the round southwest corner tower of the city walls (1211-1232). The rectangular tower with machicolations seems to belong to an earlier phase, tentatively placed between the Byzantine and the Frederician one. This chronological framework narrows the available time lapse for the dating (1191-1228), with *the terminus post quem* corresponding to the arrival of the crusaders in Cyprus and the *terminus ante quem* given by the beginning of the Longobard war. The Venetians in the XVI century demolished the city walls concentrating in the Castle their defensive system. The remaining elements of the older defensive system include two other towers still visible today in the urban tissue of the city. It is possible therefore to reconstruct the complete perimeter of the city walls of Kyrenia overlapping data from the survey, the modern cadastre and the ancient city plans. The research includes the digital survey of the tower using a structure from motion software, the comparative documentation of the masonry types, the historical research on the tower and the transformations of Kyrenia's medieval defensive system in modern times.

**Keywords**: Fortifications, digital survey, medieval architecture, Cyprus

## 1. Introduction

Enlart, which remains to this day the starting point of any research on the history of medieval architecture in Cyprus, dated the construction of the city walls of Kyrenia 1192-1212 using solely the documental approach. As *terminus post quem* he adopted the arrival of the Lusignans to Cyprus, as *terminus ante quem* he used instead the year in which Willbrand of Oldenburg visited Kyrenia describing it as "Primo introitu Scherins applicuimus, que est civitas parva et munita, castrum habens in se muratum et turritum, atque maxime in suo bono portu gloriatur" (Pringle, 2012). This datation has been generally accepted. We do not question the date, but the method: there is no evidence that the walls had not been already erected before the Lusignans' arrival, and we are not sure that the enceinte described by the German bishop, does completely correspond with the last phase as reconstructed by different authors (Camiz et al, 2017). The survey and documentation of the physical consistence of the artefacts, the close analysis of the masonry types, the metrological analysis, accompanied with the comparative method are an experimental approach in writing a material history, as opposed, yes opposed, to the documental one.

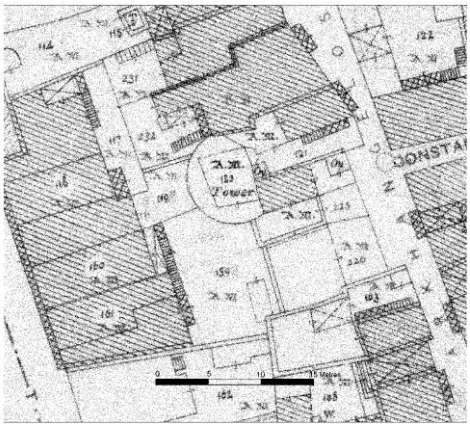


Fig. 1- Machicolation tower, cadastral plan detail (Department of Lands and Surveys, 1918, revised 1930)

Fig. 2- Textured mesh of the Lusignan Lion on the wall of the building adjacent to the North side of the tower. (Camiz, 2018)

The contraposition between the *Magistri lathomorum* and the *magistri litterarum* (masters of stone vs. Masters of letters) was a medieval debate developed in the stonecutters' environment, a place where the understanding of stone was far more advanced than the understanding of letters was in the courts and cloisters. This *nouvelle histoire de l'architecture*, based on material methods, as a discipline, not only gets closer, but also *de facto* superimposes itself with the medieval archaeology. There is scarce written documentation on the medieval period in Cyprus, in addition, the medieval Kyrenia fortifications considered as material documents, where demolished in the XVI century by the Venetians. We can therefore only analyse the remaining towers to attempt an historical reconstruction of the urban enceinte. Cerines (Kyrenia) is still appearing on Renaissance maps as a significant walled city, however in the middle 18th century Mariti described it as a poorly populated village with an episcopal Greek church, and a Turkish mosque. "Like all defensive works in historical countries, those of Kyrenia have undergone continual changes and modifications, as from time to time alterations may have been suggested by successful attacks." (Baker, 1879: p. 182).

### 1.1. Interpretation of the architectural form

The tower has an eccentric irregular circular plan of roughly 9 m. diameter on the outside and an oblique rhomboid plan in the inside. The longest inside wall measures 5,64 m which corresponds to 7,5 masonry *pikis*, (1 masonry *piki* = 0.750 m[1], the measure in use in Byzantine times). Following the metric analysis, it was possible to hypothesize a Byzantine dating for the inside phase of the tower. The tower is roughly 9 meters tall even though the existing ground level in the inside is apparently higher than the original one, as can be inferred by the three inner niches that have at a very low height. There are two different ground levels, with a difference of 1,5 m ca. belonging to the inside and outside of the city walls. The three niches follow the obliquity of the plan, even though do not correspond to the walls direction, suggesting that they do belong to the Byzantine phase. Two different series of holes in the masonry suggest the levels of the corresponding wooden slabs inside the tower. The rectangular window on the front appears too big as an opening in a defensive structure, and might be interpreted as a latter modification of the structure for residential purposes.

Fig. 3- Billon Denier, King Hugh III, Cyprus (1267-1284)

On the top of the tower, which is entirely built using the local calcarenite stone; three sets of superimposed stone corbels are layered and decorated with a very simple double round circular moulding on the top. These where supporting an overhanging parapet with the openings for the machicolation and the vertical defence system.

The survey campaign we conducted revealed the obliquity of the inner walls, and the eccentricity of the outer curtain of the tower. It was also possible to recognize the connection between the tower and the former city walls. We may interpret the oblique plan of the rectangular room inside the tower in two different ways.

The late reuse of the medieval structure as a residential unit, determined this form, by following the property lines as restrained by the surrounding urban tissue. On the opposite, we can interpret the round wall and the corbels on the coronation as built around a pre-existing walled structure with an oblique plan determined by the restraints imposed by property boundaries and urban structure. The rectangular tower used to be closed by walls in the inside of the city, these structures were demolished, but the remains are clearly visible in the elevation of the tower.

Fig. 4- View of the coronation system of the tower (Camiz, 2018)

During the direct survey using a compass, we noticed that the orientation of the two different oblique walls of the inner part follow meaningful directions: the short sides are oriented 250°, the same direction of the street reaching the tower, confirming that the direction is given by the urban constraints. The other direction is instead 330°. On the left side of the inner structure the junction with the city walls is still visible, a structure oriented at 60° built in stone ashlars with an inner core in rubble, measuring ca. 95 cm in width.

On the opposite side of the tower, the structure was incorporated in the adjoining row house, which we could not survey. However, on the outside the tower is delimited by a wall following the oblique direction of 105°. The wall, that we tentatively interpreted as the junction with another building now not existing anymore, has a finished surface on the outside and could be another remain of the city walls even though the interpretation of its direction gives some perplexities.


Fig. 5- Back elevation (Griffo, 2018)

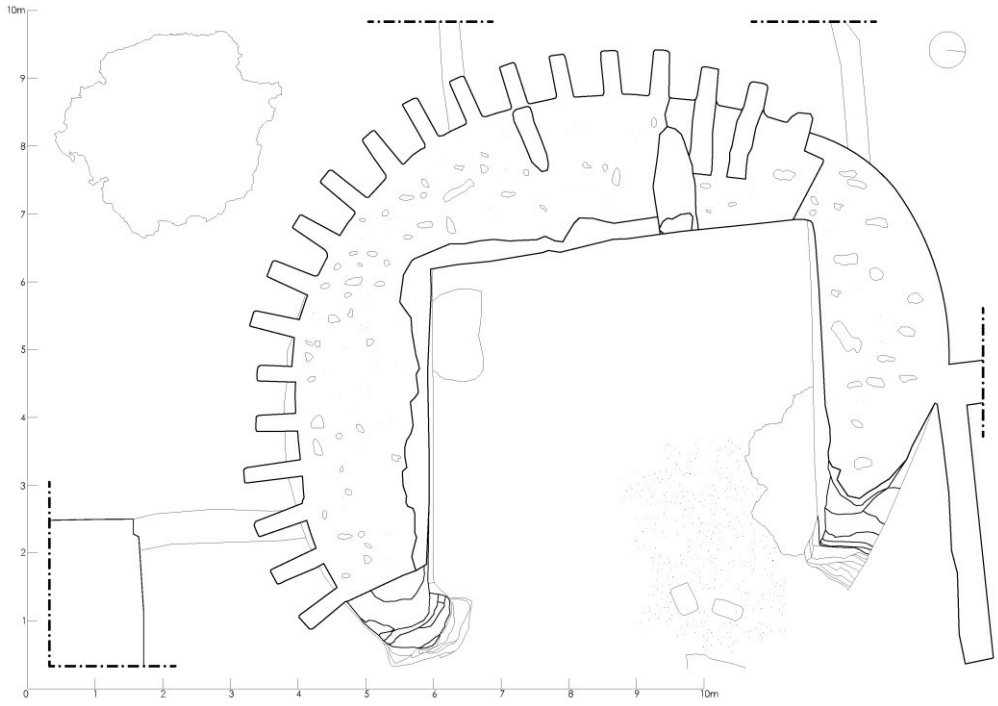


Fig. 6- Roof plan (Griffo, 2018)


Fig. 7- Front elevation (Griffo, 2018)

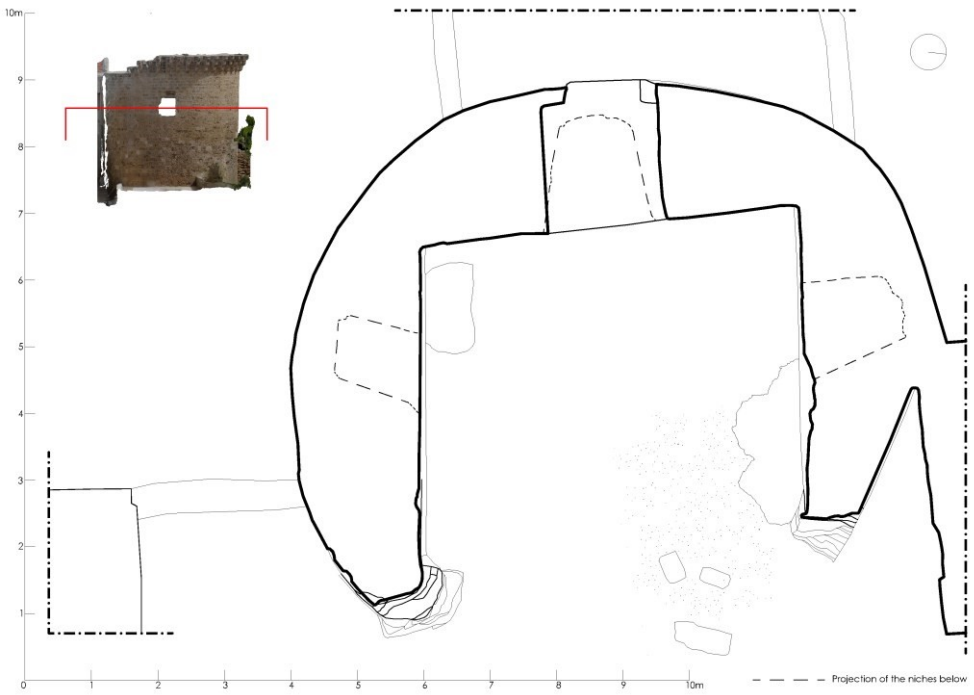


Fig. 8- Second level plan (Griffo, 2018)

Fig. 9- A rendered view of the 3D model (Griffo, 2018)

## 2. Structure from motion survey

We conducted the survey on the tower to analyse its metrical and geometrical features. Today photogrammetric processes have greatly improved thanks to the digital revolution and the increased power, memory and speed of computers. Thanks to the Structure from Motion procedures, by using low cost technologies as an RGB camera and even just analogic measuring tools, it is possible to reconstruct a 3D point cloud. This revolution changed the way we can acquire information but it did not affect the interpretation and the communication of raw data that remains substantially a critical activity. The point cloud and the texturized mesh model derived from SfM procedures are the main database of metrical and geometrical information. The elaboration of the 2D drawings was possible in a manual way thanks to the correct reading of points, alignments, surfaces and constructive elements. We accomplished the survey of the Machicolation tower by integrating direct survey with photogrammetric process. Starting from 218 Pictures2, the SfM software produced a dense point cloud of more than one million points and a mesh surface of 877.675 faces. The software generated the dense point cloud after we introduced the dataset metrical data acquired on site. This procedure allowed the software to make a bundle adjustment and give back a 3D point cloud corresponding metrically to the real object. We then drafted the 2D drawings starting from the 3D point cloud to analyse the building and its own feature.

## 3. Restoration

The Municipality of Kyrenia has recently restored the tower, by removing the plants that were growing on it, cleaning the surfaces, replacing some of the damaged stones, following the Brandian principles of Restoration (minimum intervention, compatibility, recognisability, reversibility) and filling the mortars joints. The restoration was of great importance for the monuments' preservation in the future. Now it is necessary to enhance its setting in the centre of Kyrenia with a project.

## Notes

(1) Cardarelli, F. (2003). *Encyclopaedia of Scientific Units, Weights and Measures. Their SI Equivalences and Origins*. London: Springer. p. 95.
(2) Pictures were acquired with a compact camera (SONY DSC-W730), ISO value set at 80, focal length: 4.5, F-stop: F/3,3 and F/8, shutter speed: variable.


Fig. 10- Detail of the corbels, side elevation (Griffo, 2018)


Fig. 11- Cross section (Griffo, 2018)

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