

5 DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN

XV to XVIII Centuries

Víctor ECHARRI IRIBARREN (Ed.)



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The Mediterranean vanguard of Modern fortification: Benedetto da Ravenna and Portugal – Vila Viçosa and Mazagan

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Abstract

Benedetto da Ravenna (c. 1485 – 1556) was one of the most requested military engineers of his time, serving Carlos V and Isabel of Portugal, the Consort Queen of Spain since 1526 and also Empress Roman-Germanic (1530-1539) - a powerful Lady and a beloved wife, perhaps being why Benedetto was borrowed to her brother, the King John III.

We don't sure dates, although it can be admitted that the construction of the very new "Artillery Castle" of Vila Viçosa for the Duke of Bragança, could happen in 1535. That was the returning time (accompanying the commander Infant Luís of Portugal, Chief of the Portuguese branch of the Knights of the Hospital) after the glorious campaign of Tunes (with an important Portuguese participation), on the way for his resting in Seville.

The request of the Portuguese king to his brother-in-law was newly attended in 1541, when Benedetto made an important (and better known) inspection in some Portuguese cities in Morocco (Septa, Tangier and Mazagan). The vanguard's tracing that he gave for Mazagan' plan is the first perfect European bulwarked fortification (even if it was accomplished in Africa).

We intend to contribute to the discussion of the astonishing biography of Benedetto, which crossed all the Mediterranean to imprint his genius in the Modern Military Architecture.

Keywords: Vila Viçosa; Mazagan; architectural heritage; modern fortification; proto-bulwark; bulwark.

1. Introduction

Benedetto Scaramuzza, of Ravenna, was an engineer at the forefront of modern military architecture, native to the center of the Mediterranean. The geographical reach of his performance was enormous. He fully assumes the role of a free professional, rendering services and receiving fees for the orders commissioned to him, providing the know-how to correctly diagnose situations and to present reputed solutions. Once his reports were completed and discussed locally with the operatives on the field, he was on his way to a new destination. One may, therefore, give him the profile of an international expert for military strategy and fortification reformulation. Many sources refer to his activity. Perhaps the most novel case may be the discussion about the possible authorship

of a little known fortification (dated 1535), located in Vila Viçosa, an interior area of Portugal, near the border with the Spanish Extremadura. The second example of his relationship with Portugal, following a chronological order in 1540, and more directly related to the Mediterranean, is Mazagão (El Jadida) on the Atlantic coast of Morocco.

The achievements under observation are the result of the melting pot of experiences that took place within a supranational military organization, established as a reigning power, with a unique governing structure when compared to the sovereign political forms experienced by European Civilization: the Knights of St. John of Jerusalem.

2. The Order of the Hospital

As a result of an action to combat Islam and the reconquest of the hierophanic epicentre of religion¹, a foundational structure was created in the shelter financed by Amalfi merchants in Palestine² in 1048. It is a unique organization, primarily military but organized under religious rules, the "Order of the Hospital of St. John the Baptist of Jerusalem". Its organic structure offered the most advanced exchanges of experience in the field of fortification. Rhodes (the Order's headquarters from 1310, after successive defeats³) catalogued the different ways of interpreting a new engineering of war, following the progress of powder artillery while, at the same time, enormously developing its naval power. In the islands of the Aegean, and especially in the one that houses the central structure of the Knights, we will find proposals of French, Germanic, Italian, Spanish and Portuguese engineers, with alternative interpretive design⁴, from round bastions to the first pentagons with casemates for shooting, as well as the normalization of the role of the ditch and its active defence. After being expelled from Rhodes (1522), the Knights settled in 1530 on the island of Malta, given by Charles V as

¹ Jerusalem is regarded as the primordial Holy Place for any of the three monotheistic religions, revising itself in a hierophanic legitimacy to claim its possession. The hierophany is here according to the conception of Mircea Eliade in his book «Traité d'histoire des religions» (1949), underlining the importance of the possession of the manifest sites of a sacredness, founder of the identity order of the community.

² At the end of the 11th century it was a Benedictine religious house, receiving donations from Godofredo de Bulhão (Boulogne-sur-mer, 1058 - Jerusalem, 1100), first ruler of the "Latin Kingdom of Jerusalem" as a result of the First Crusade, with Pope Pascoal II, in 1113, granted autonomy of Congregation under the invocation of St. John, the Baptist. Seven years later, the 1st Grand Master, Raimundo de Puy, conferred military status to the Order.

³ Jerusalém – 1187, Margat – 1191, Crac des Chevaliers – 1271, Acre – 1308, Chipre – 1310.

⁴ Please refer to the research and dissemination work persistently conducted by Stephen C. Spiteri through publications such as "Fortresses of the Cross: Hospitaller Military Architecture (1136-1798)", 1994; "Fortresses of the Knights", 2001; or "The Art of Fortress Building in Hospitaller Malta, 1530-1798: A Study of Building Methods, Materials, and Techniques", 2008.

sovereign fiefdom of Naples' kingdom. It is the period of modern affirmation of the Order, managing the destinies of a shared sea together with an intense activity of affirmation of the new European states, from the last third of the 15th century until the end of the first third of the 16th century, when the first systematizations of principles emerge (Medina del Campo, Salces, Costanza of Ferrara), showing a new era in the art of fortification.

During the participation of Benedetto in the sieges of Suleiman II to Rhodes (1522), he rendered relevant services to the Order⁵, while at the same time reinforced his brilliant magisterium in the mature phase of a life practice as engineer, across the entire Mediterranean.

3. Biographical profile of Benedetto (Ravenna, c. 1485 - Seville, 1556)⁶

His activity focused on a life at the service of the Emperor⁷, as a reputed technician, rendering

⁵ He strived in the position of lieutenant-general of the Artillery, in such a way that the Order admitted him as Knight of the Tongue of Italy, with an annual pension of 130 gold ducats.

⁶ Main sources and references used: Archivo General de Simancas, Guerra y Marina, legajo ii, 11. 102, 197; legajo 13, f. 86; legajo 37, f. 71; C. A. Maggiorotti, "Architetti e architetture militari. III. Gli architetti militari nella Spagna, nel Portogallo e nelle loro colonie", Roma 1939, passim; Giuliana Finizio, "Fortificazione e città: la marca italiana nell'urbanistica portoghese del XVI secolo nell'oltreoceano", Dottorato in Teoria e Storia dell'Architettura, Fac. de Ciências e Tecnologia, Coimbra, 2006.

⁷ Benedetto recalled such fact to Charles V, in a date already near his death: "...y todo lo deje por ir al servicio de vuestra magestad cuando [1524] Borbon y el marques de Pescara fueron sobre Marsella y desde alli pase a España y sempre he estado en servicio de Vuestra Magestad..." - Letter to the Emperor from Perpiñan. 3rd of November, 1551, asking for delayed payments of his jobs, quoted in Edward Cooper, 1991, "Castillos Señoriales en la Corona de Castilla y León", Consejería de Cultura y Turismo, Junta de Castilla y León, p. 62. Even seven years before he already claimed for his compensations, writing to the Emperor on the 16th of June, 1544, about the fortifications of Rosas and La Trinidad, and profiting to say that "...en Palamos vuestra magestad me hizo merced de escribir al duque de Alva y al comendador mayor (Francisco de los Cobos) para que tuviesen cuidado de mí para que mis negocios eviesen efecto. Ellos determinaron

reports of major relevance to the defensive strategy, or executing innovative fortified structures. He participated in the attack on Tripoli in 1511, and he is active in Naples the following year, with the position of Engineer of the Kingdom. "He represents the largest Italian influence on Spanish fortification in the first half of the 16th century"⁸. In 1512 he probably began his military career, allegedly being incorporated into the court of Fernando of Aragon, at the Ravenna battle⁹. In 1517 he accompanies the armies of Spain in the campaign of Lombardy, being then called to Pamplona to elaborate a project of reinforcement of the capital of Navarre. After his stay in Rhodes (1522), his connection with the Emperor continued, becoming, at the service of the Marquis of Pescara, the commander of the artillery in the attacks of Provence, directing the siege to Marseille and the conquest of Toulon. Later, as artillery engineer, he took part in the sieges of Empoli, Volterra and Florence.

In 1529 he is again in Spain to reinforce the fortress of Villalpando / Leon, where the children of Francisco I of France will remain as hostages¹⁰. "*It seems that he was sponsored during his first years in Spain [after the decease of the Marquis of Pescara, died in 1526] by the Condestable of Castille*"¹¹: the result of this

que de la hacienda de los reveldes franceses se me daría parte de ella y así el príncipe nuestro señor (after Filipe II) me lo há prometido y al fin no he recebido nada...", op. cit., p. 63.

⁸ Edward Cooper, 1991, p.62.

⁹ Between a coalition of the Holy See States and the Catholics Kings against the King of France, supported by the Duchy of Ferrara, it was fought on the 11th April 1512, being the most important battle of the «Italian Wars (League of Cambrai). Although the clear victory of the French armies, it was not sufficient to ensure the domination of the North of Italy, and they were expelled on next August.

¹⁰ For the liberation of Francis I, King of France, after being imprisoned at the Battle of Pavia (24.02.1425), it was established (Treaty of Madrid, 14.01.1526) that his two eldest sons would be held hostage as collateral. Francis did not comply and a new treaty was celebrated on 05.08.1529 (Peace of Cambrai), returning the princes to Amboise and reconfiguring the borders of Europe, ruling Carlos V over the possessions of Italy and Flanders.

¹¹ Íñigo Fernández de Velasco y Mendoza (1462 / 1528), IV conde de Haro, VIII condestable de Castilla, II Duque de Frías, succeeded by his son Pedro Hernández de Velasco y Tovar (1485 / 1559).

patronage (the project of Villalpando castle by Benedetto) has a better correspondence with Berlanga, another fortification of the Condestable [with a remarkable parallelism with the new fortress of Salces] – although both buildings have failed to incorporate the bulwarking rules, the most salient aspect recommended by the Italian engineer".¹²

Nevertheless, he continued to apply some old fashion method, coming from the round bastions, or "cubos", implemented in Spain and Portugal in the last quarter of the 15th and beginning of the 16th century, as it happens with his probable intervention in Vila Viçosa. But, as before at Pamplona, in Perpignan (when he was commissioned, on 25th April, 1530, to inspect its fortifications), he presented an evolution to reinforce the defenses of the site with 9 artillery bulwarks. Those pentagons were the first modern bulwarked fortifications made in the Iberian Peninsula, those works being carried out in 1533.

In the same year Benedetto proposed a series of renovations in the fortifications of Perpignan, Colliure, Belaguarda, San Sebastián, Behobia, Pamplona, Estella, Cadiz, Gibraltar and Cartagena, all presenting important reports, pointing out the concerns towards a contribution to the modernization of the State: the renewal of the old medieval structures, reinforcing the defensive capabilities with a clear perception of the huge development of the artillery.

And at the end of that same year of 1534, he left to inspect the African strongholds of Oran and Mazarquivir (Mers-el-Kebir) and, during his return, Gibraltar, Cadiz, Malaga and Cartagena, presenting, for each of these squares, the respective projects for the reinforcement of the fortifications. Barely returned to the Court, he was forced to move, because of a new threat at the Navarre border, for another reform in Pamplona. He then checks the fortifications of Monzón de Campos, in Old Castile, and has also produced a detailed report presented to the Emperor.

In 1535 he participated in the expedition against Tunis, led by Charles V himself, distinguishing

¹² Edward Cooper, 1991, "Castillos Señoriales en la Corona de Castilla y León", Consejería de Cultura y Turismo, Junta de Castilla y León, p. 62.

himself in the capture of Goletta, Bona and Bugie, and then giving his advice for the renewal of the fortifications, introducing bastions and turning them into solid positions. As we shall see, we discuss the hypothesis that Benedetto was in Portugal after the Tunisian campaign. On his return to Spain he spent some time in his residence in Seville. But in 1537 he went back to Perpignan, where he continued to work to finish his project presented four years earlier. Later he also worked in other fortifications of the border with France, especially in Pamplona and Fuenterrabía. In 1540, after the assault and looting of Gibraltar by the pirate Hayreddin Barbarossa, the Spanish court decided to immediately begin the work of reinforcing the defenses of the main commercial cities of the south, proposed in 1534 by the royal engineers, being particularly important the works carried out by Benedetto in Cadiz.

*“In 1536 he works at Perpignan and makes another trip to the North of Africa. In the next year his presence was crucial to the fortification of Perpignan. In 1538 he could be working simultaneously in two different places: following one source from 25th April, he was in the capital of Roussillon, organizing the defences, but it seems that he travelled in January from Perpignan to Gibraltar [on 29th March he decided to repair the «torre del tuerto»]. On 14th May, he was in Seville writing to the Emperor, justifying his delay about the new visit to Perpignan. Nevertheless, that urgency does not prevent the next notice about him from being far away from French Catalogne: on 17th November, 1538, he wrote a letter to the Emperor about the fortification of Fuenterrabía, showing the degree of intervention of the works, on the experimental basis of his expertise”.*¹³

In 1540, after the Barbarossa incursions, the Spanish court decided to implement the recommendations contained in the reports produced by Benedetto in 1534, and sent him to Gibraltar and Cadiz, where he was requested by D. João III of Portugal to extend his strategy on the external entrance of the Mediterranean, having produced reports and projects for Cepta, and Mazagan, the latter being more extensive, since it is a matter of planning *ex-novo* an entire urban organism, taking advantage of a nucleus

of scarce population next to a castle of the Manueline transition period¹⁴.

In 1542 Benedetto participated in the defense of Perpignan against the French. When they finally retreated, the campaign's balance showed the need to urgently reinforce the entire defensive system of the region between Perpignan and Barcelona. Benedetto attended a meeting of military commanders and technicians convened by the emperor himself, where he studied a vast work plan, whose management was entrusted to Benedetto himself. Thus, he began to work, in 1544, on the defensive belts of Barcelona, Rosas, Colliure and Perpignan. During the work in this last stronghold, as a result of the limestone powder, a substance to which he had been exposed all his professional life, he became blind. It was in 1555: after 44 years of uninterrupted service, he was forced to retire to a private life in his residence in Seville, where he died the following year.

4. Benedetto and Portugal

This pilgrimage by the biography of the Italian engineer leads us to his relationship with Portugal. Portuguese forces had participated in the above mentioned expedition to Tunis, at the request of Carlos V, where an important role was played by the navy and the galleon S. João Baptista, joined by 20 caravels and 8 galleys. The brother of the king of Portugal, D. Luís (1506-1555), Duke of Beja, Constable of the Kingdom and head of the Portuguese Hospitalers, commanded the fleet lent by D. João III to his brother-in-law, Carlos V. The Emperor could be

¹⁴ Interesting is that this late medieval castle was built by the Duke of Braganza, D. Jaime, following the capture of Azamor, at the end of August, 1513. For the conquest of Azamor we have a very interesting source, which reads: *...«mandou fazer huma poderosa armada, de mais de quatrocentas vellas, & dezoito mil homens de pé, de que três mil erão do Duque de Bragança Dom Gemes, que hia por General desta armada, que também levava quatrocentos, & cincoenta homens de cavallo, & cento acubertados, & todos seus criados, & vassallos: além destes hião mais de dous mil de cavallo, & duzentos acubertados, todos criados delRey affora a pionagem, que estes todos levávão. Partido o Duque com esta fermosa companhia, foy surgir duas léguas de Marzagão a 28 de Agosto»* - Pedro de Mariz, “Diálogos de Vária história”, Em coimbra, Na Officina de António de Mariz, 1598.

¹³ Op. cit., pp. 62-63.

found in the main ship, also known as "Botafogo", being the galleon¹⁵ under the command of D. Luis when it was broken the defense of the port of La Goletta, on 13th July, 1535.

It may be an interesting hypothesis to consider that during his return, after the reports to the African fortifications, he took advantage of a trip by sea that would have brought him to Portugal and from there on to Vila Viçosa. This would thus give way to the possible relation of his presumed stay in the country, having followed the Vila Viçosa route to reach his residence in Seville, where we know he rested until being called again due to emergencies (taking place in Perpignan, Pamplona and Fuenterrabía in 1537). The proximity of Benedetto with the entourage taking part in the Tunis expedition could have enabled Carlos V to accede to the will of D. Luís de Portugal: the Duke of Beja wished to assign new qualifications to the military structures of the Ducal House of Bragança, with a view to the solemn occasion of the affirmation of the position of the House in case of substitution of the government of the country. In fact, it was in preparation the marriage of the brother of King João III to the daughter of the Duke D. Jaime (1483 - 1532), Isabel de Bragança, although accomplished in the time of the fifth successor of the duchy, D. Teodósio I of Bragança (1532 - 1563).

His contact with Portugal was reestablished in 1541, in response to the request of the Portuguese King João III (1521-1557) to his brother-in-law Charles V, wishing that the Italian engineer studied the reinforcement of the Portuguese fortresses on the Atlantic coast of Morocco, continuously attacked by Dutch and British corsary ships, and Barbarian pirates. The emperor granted permission and Benedetto inspected the defences of Tangier, Ceuta and Mazagão. At the end of the commission he sent a detailed report to the Court in Lisbon,

¹⁵ The "Botafogo" was expressly requested by the Emperor. According to a description ("Panorama" magazine, 1841, Vol. 5, p. 384), it was the largest ship that would sail the European seas, with "366 pieces of bronze, and containing 600 musketeers, 400 sword and rod soldiers, and 300 Gunners; but it is also famous for the «talhamar», or great fine steel saw, which had in the bow, to break the chain of Goleta (...) on July 13 of the year 1535."

illustrating the shortcomings of the existing fortifications and proposing various works of reinforcement: Benedetto predicted an extensive use of new ramparts and bulwarks. He also presented a project for the expansion of the Mazagan Fortress-City (May, 1541), the works of which were entrusted to architects João Ribeiro and Juan de Castillo, under the coordination of Miguel de Arruda, who accompanied Benedetto during the Maghreb inspection¹⁶, and perhaps was his acquaintance since Benedetto's probable stay in Vila Viçosa.

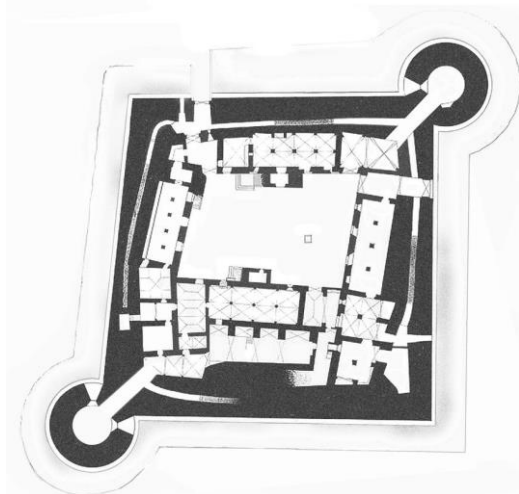
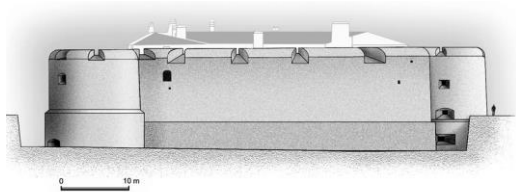


5. The authorship of the Artillery Castle

Basically, Portuguese historiography points to two dates, separated by a decade, 1525 or 1535. The discussion about authorship ends up falling on the Alentejo's elite brother architects, especially Francisco de Arruda¹⁷, as the author of a model shared with his younger brother, Miguel, and probably still relying on the opinion

¹⁶ "In 1541, Miguel de Arruda had gone with Benedetto de Ravena, a well-known Italian engineer, to visit the fortress of Ceuta. The letter of the Governor Afonso de Noronha, characterizes the merit of both technicians, saying that "*Benedetto de Ravenna was a musician in his art, when he spoke of it*", and the Portuguese architect drank "*the secrets of the science*". (...) The Governor wished that he would stay more time to provide more insights, «... mas não pode mais ser pela pressa que o Imperador lhe mandava dar nas obras de Gibraltar, que logo se começam...»" - Sousa Viterbo, F. M. de, "Dicionário Histórico e Documental dos Arquitectos, Engenheiros e Constructores Portugueses ou ao Serviço de Portugal", 3 V., I. N.- Casa da Moeda, Lisboa, 1988, Vol I, p. 68.

¹⁷ The brothers Diogo and Francisco de Arruda (who had been occupied with the fortifications of Safim, Azamor and Mazagão, 1513-14, at the orders of D. Jaime, Duke of Bragança) and Miguel de Arruda, the youngest, considered the more qualified modern Portuguese military architect of his time.

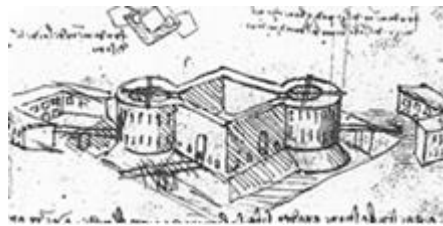


Floor plan and elevation of the Artillery Castle of Vila Viçosa (F. Bilou, 2016)

or tracing of Benedetto de Ravenna, as well as a presumed origin in a Leonardo da Vinci's project. The references to the latter, still involving the action of Benedetto are clearly presented: *"I started the hypothesis that in this period [beginning of the second quarter of the 16th century] Benedetto may have been at the service of a nephew of the constable of Castile¹⁸, namely D. Jaime, fourth Duke of Braganza (1479-1532), to design the remarkable "Artillery Castle" of Vila Viçosa, which follows closely, both in layout and in dimensions, the drawings by Leonardo da Vinci dating from c.1490 and c.1507".¹⁹*

We may also look for similarities in the ostentation of the Châteaux of Amboise or

Chambord (with Leonardo da Vinci and Francis I), as it will be plausible and perhaps fairer, not to forget Salces and Ramiro Lopez, in the Perpignan (1497-1503)²⁰, for all these and for the previous cases can be associated the principles of the studies of Leonardo da Vinci²¹. And already before, in Medina del Campo (1476-1483) extraordinary achievements appear to respond to the tactics of the introduction of great fire capacities that artillery foundries began to make technically possible. Always walking around the advance in pyroballistics, all this takes place when the drawings by Leonardo da Vinci²² come to light. (see the Codex drawing below) But in such case, a large production would have to be attributed to the genius artist of the Renaissance, since it was carried out all over Europe (from the Castilian models with ditches and gunner cubes in the last quarter of the



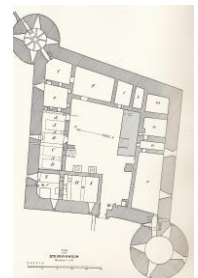
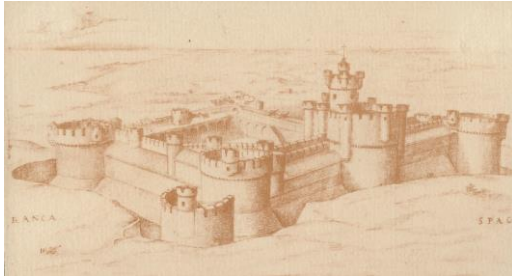
²⁰ An advanced piece for the artillery according to the majors developments of the Spanish engineering was constructed here at the end of the 15th century, ordered by Fernando the Catholic, Count of Barcelona and King of Castile and Aragon,. In 1642, during the crisis of frontiers in which, simultaneously in the West of the Peninsula, the Portuguese independence revolt took place, this fortification was lost to the French.

²¹ We have dealt on this matter with in the wording of ch. 2 ("Pre-Modern Experimental Exchanges") of our doctoral dissertation, 2008, available at [https://estudogeral.sib.uc.pt/.../Doutoramento%20João%20Campos%20Arquitectura%20Militar%20na%20Pésia%20\(1\).pdf](https://estudogeral.sib.uc.pt/.../Doutoramento%20João%20Campos%20Arquitectura%20Militar%20na%20Pésia%20(1).pdf)

²² *"La relación de Leonardo, primero con la familia del Papa español Alejandro Borgia y luego con los franceses possibilita hipotéticamente tanto el conocimiento y el intercambio como el puro espionaje de ideas, pero sin entrar en un debate de fechas posibles para los dibujos del artista italiano (entorno a 1505), es evidente que lo construido por Ramiro López proviene de un desarrollo técnico propio y bien anclado en obras hispanas anteriores"* – Fernando Cobos, "Artillería y Fortificación Ibérica de Transición en torno a 1500", in AA VV, Isabel Cristina F. Fernandes, Coord., «Mil Anos de Fortificações na Península Ibérica e no Magreb (500 -1500)» - 2002, C. M. Palmela, Ed. Colibri, Lisboa, p. 682.

¹⁸ D. Jaime, Duke of Braganza, was the son-in-law of the Castilian Constable.

¹⁹ John Bury, "A Leonardo Project realized in Portugal", in The Burlington Magazine, vol. CXXVI, 1984, pp. 499-501 / firstly announced in Diário de Notícias, Lisboa, 22/06/83 - in John B. Bury, "Benedetto da Ravenna (c.1485-1556)"- in AA VV, A Arquitectura Militar na Expansão Portuguesa, Comissão Nac. para as Comemorações dos Descobrimientos Portugueses, 1994, Porto, p. 131.



Fortress of Salces (15th/16th C.) in the frontier between Spain and France, Sketches by L. da Vinci and Steinvikholm castle outside Skatval in Stjørdal, Norway.

fifteenth century, to Steinvikholm (Norway, 1522-25), to which we add the Portuguese cases of the reform of the frontier of the first decade of 1500 (Castro Marim, Olivença, Almeida, etc.), along with the expedited quadrilaterals, generally without ditches, (Kilwa Kisiwani, Tanzania, 1507), to Aguz (Souira Kedima, Morocco, 1519), passing through the Manueline castle of Mazagão (1514, this one with four round cubos at the angles).

Rui Carita also indicates the possible relation of the castle of Vila Viçosa with the castles of Villalpando and Berlanga de Duero: all three cases "have low and massive «torrioni» at the angles of the walls, in accordance with the treatise of Albrecht Dürer, published in German (1527) and translated into Latin in Paris (1535); it was only from the 1940's that the superiority of the polygonal bulwark was recognized internationally, and the turrets were more or less replaced".²³

This observation (which does not mean anything against the documented experiences of pentagonal bastions, in particular those that Francisco de Holanda reproduces from his trip to Italy²⁴) reinforces the hunch that the tracing belongs to Benedetto de Ravenna. And while Edward Cooper²⁵ revisits his position²⁶ on Benedetto as the author, we suppose we must under-

line the fact that, as the historian quoted above says, particularly in the castle of Vila Viçosa we find characteristics demanded by the new military architecture, namely: "there are the elongated merlons with rounded masonry, stepped shot openings, and the small embrasures, recommended by Benedetto." And then, adding "But neither there, nor in Vila Viçosa there is any element in the plan"; we would like to counterpose that bulwarks, allegedly pentagonal, may be dispensed in favour of the maintenance of round surfaces, at that time considered as effective to counter the impact of the projectiles. The polygonal shape was only adopted regularly a few years later, in the development of the concepts of active defense that were associated with a geometry that took into account the rigor of the trajectory and the range of the shot. At this point we must also pay attention to an aspect, usually not very expressive in the drawings of the plants that run to illustrate Vila Viçosa: the ditch of the Artillery Castle is a modern work, unprecedented in the country, with the characteristics presented there.²⁷ In fact, the construction of the

²³ www.arquipelagos.pt/arquipelagos/newlayout.php?mode=imagebank&details=1.

²⁴ Original belonging to the Library of San Lorenzo de El Escorial (28-I-20), published by TORMO, Elias, "Os Desenhos das Antighalhas que vio Francisco 'Ollanda pintor português' (1539-1540), Ministerio de Asuntos Exteriores, Madrid, 1940.

²⁵ Edward Cooper, "El dominio de la pólvora en la arquitectura militar a finales de la Edad Media", IV

Congreso de Castellología, Asociación Española de Amigos de los Castillos, Madrid, Mar. 2012, pp. 97-110, underlining his changing of opinion, p. 105.

²⁶ In "Castillos Señoriales de Castilla de los siglos XV y XVI", vol. I, Madrid, 1980, p. 215, as well in "Castillos Señoriales de Castilla de los siglos XV y XVI", vol. I, Madrid, 1980, pp. 62-63, attributed the project of Berlanga (and Vila Viçosa) to Benedetto.

²⁷ However, from a quarter of a century before, with the Manueline reform of the castles on the Portuguese border, examples of tests on the addition of ditches (such as in Olivença or in the case of Almeida, here with constructive aspects of great impact, being a rare example of granite ashlars on the scarps, counterscarps and paving of the bottom). The ditches were, however, set aside in most cases from the reformulation of Gothic structures (they posed serious problems of

Artillery Castle of Vila Viçosa was made from scratch, maintaining a program and an image that reinforces the mark that the House of Bragança is imprinting to its affirmation in the national framework. The other Castle of the Duchy, in Evoramonte (in the territories of Vila Viçosa), was recently done with the landscaping and edifice grandiloquence²⁸, carrying an intense semiotic load. The modern fortification of a few years later shows changes in the principles to reconcile with the new directions of engineering: careful implantation, sensitive changes in the pre-existing urban device taking into account poliorcetics, decrease in overall height, orientation of the walls, casemates for artillery in the cylindrical turrets from the level of the ditch, in addition to the characteristic parabolic merlons with openings for embrasures oriented to the shooting angles, and wide terraces for the movement of artillery pieces.

There are several provisions that bring us closer to a conclusion by a modern conception, constituting an avant-garde example in the Portuguese panorama. Considering certain details of construction, focusing the concern on the advantages of artillery, such as the fact that *"the ramping staircase that reaches the terrace on the western face, was formerly just a ramp for easy movement of the artillery pieces, at the end presents the loft of gunpowder"*.²⁹ The most curious thing is to refer to the description of the sixteenth century³⁰ by mentioning the ingenious



Evoramonte castle-palace, V.Viçosa - Bragança House, 1520's, Francisco de Arruda (J.Campos)

manufacture of gunpowder in the place referred to as a loft: *"one climbs a ladder leading up to the top of the Castle, with rooms and barracks of soldiers. One room had all the gunpowder, and the other room was continually manufacturing it, with a millstone to grind the materials, where a beast would always be walking in the mill, making the stone work, and it was able to raise and to descend artillery, and it was not difficult a horse to rise above."*

Regarding authorship, it is finally necessary to address the position of Túlio Espanca, reverting his attention to strictly national production³¹; notwithstanding *"the Italian type, but following the model of the African and Indian places that the Portuguese had introduced in its overseas conquests (...) may have been inspired by an Italian prototype of which the artillery fortress of the city of Pesaro is a striking example, which Francisco de Holanda knew and reproduced in his famous «Book of Antigualhas»."* The Italian influence could be imported from the knowledge acquired by Francisco de Holanda in particular and also by Miguel de Arruda, half of dozen years before traveling through Italy³², and it is

stability for the existing building) and, in general, in the erection of the expeditis forts of the overseas Expansion of the early 16th century, due to the situation on the beach, not claiming for this device (Quíloa, Sofala, Hormuz, Chale, etc.).

²⁸ It has a fortification corps, *"an artillery platform"*, but, *"it is more certain, however, that, with its archaic and Manueline decor, it is no more than a sumptuous building, a rhetorically military palace, landscaping and power signal of the Duchy, visible for miles away, hunting residence rather than a war device"*- Paulo Pereira," Évoramonte: The Fortress. Monografia "(Catalog), Portuguese Institute of Cultural Patrimony, Lisbon, 1989, p. 12.

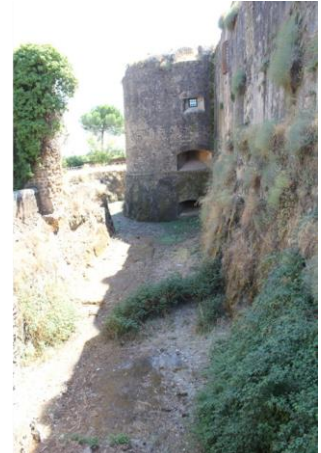
²⁹ Túlio Espanca, "Inventário Artístico de Portugal. Distrito de Évora, Zona Sul", Vols. IX - X, Academia Nacional de Belas-Artes, Lisboa, 1978, p. 520.

³⁰ António de Oliveira Cadornega, "Descrição de Vila Viçosa", Introdução, proposta de leitura e notas por Heitor Gomes Teixeira, Biblioteca de Autores Portugueses, Imprensa Nacional - Casa da Moeda, 1982, pp. 108-109. The use of animals was intended

not only for the transportation of the cannons, but mainly as a driving force for obtaining gunpowder (a singular aspect, never found in other installations), underlining the vocational orientation of the fortification for artillery.

³¹ Túlio Espanca, "Inventário Artístico de Portugal. Distrito de Évora, Zona Sul", Vols. IX - X, Academia Nac. Belas-Artes, Lisboa, 1978, p. 515 e pp. 516-517.

³² *"...one knows (or is strongly suspected) of the voyage that [Miguel de Arruda] makes to Italy in 1532 in the service of the king and the instance of the Duke of Braganza, perhaps already D. Teodósio"* - Francisco Bilou, «As fortalezas de Évora Monte e Vila



Round bastion South / East, with artillery casemates and terrace with parabolic merlons, view to the angle direction and from the ditch (João Campos)

this latter architect who will undoubtedly be linked to the works of the castle. Bilou says³³: *"And this journey (...) may have as a purpose to update on what is best done in the art of Italian fortification, thinking, precisely, of the great work with which the fifth Duke of Braganza, D. Theodosius, plans to inaugurate his fortunate government - the new fortress of Vila Viçosa."*

And in Spain, there are also those inclined to assign the intervention in the castle of Cardenete (Cuenca) to Benedetto de Ravenna, built between 1520 and 1540, constituted by a barrier with four circular artillery cubes³⁴. The proximity of the voluminous appearance of the fortifications of the early sixteenth century, belonging to the Marquis of Berlanga and Duke of Frías (the family of the Condestable of Spain, with ties to the House of Bragança), and the similarity of those with Vila Viçosa, seem to appeal to a recognizable authorship by Benedetto de Ravenna.

Regarding chronology, it seems that this remarkable and little-known Portuguese fortification is one of the pieces of the ambitious affirmation program of the Ducal House of Bragança

undergoing an extraordinary reinforcement of socio-cultural representation and military capability, as well as to connect with the ruling House. In this particular case, the documents indicate that at the date of the marriage of D. Duarte, the brother of the king, with D. Isabel, sister of the Duke heir (already acting D. Teodósio, succeeding D. Jaime), the new equipped fortress was visited on 16th September 1537, with royal artillery salvos.

6. The European novelty of Mazagan

The question of Mazagan is less doubtful than Vila Viçosa and, despite being located in Morocco, it has a superlative importance in the context of the modern fortifications of Europe.

For political reasons of sovereignty and control of the seas, Portugal maintained a number of fortified cities near the entrance to the Mediterranean. In the course of time, its number will be reduced until only Mazagan survives, being abandoned in 1769. In the period from 1541 until after the mid-eighteenth century, the fortified city proved to live up to the demands of its defense.

As we have seen, Benedetto was requested to the Emperor Charles V, a close relative of the Portuguese king, to produce his opinion about the strategic protection of the entrance of the Mediterranean Sea. In the framework of his activities, he made a trip along the coasts of the

Viçosa. Alguns elementos de análise histórica e artística», in "Património Artístico no Alentejo Central. Obras, Mestres e Mecenas, 1516-1604". Ed. Colibri, Lisboa, 2015.

³³ Op. cit., p. 130.

³⁴ This castle belongs to the dominions of Berlanga, being Maria de Tovar that realized it in 1527, instigated by Carlos V face to threats of the French.



Sea front of the city-fortress of Mazagan, with the Bulwark of the Angel at the entrance of the harbour (with its Sea Gate) protecting the ditch, at left side (João Campos)

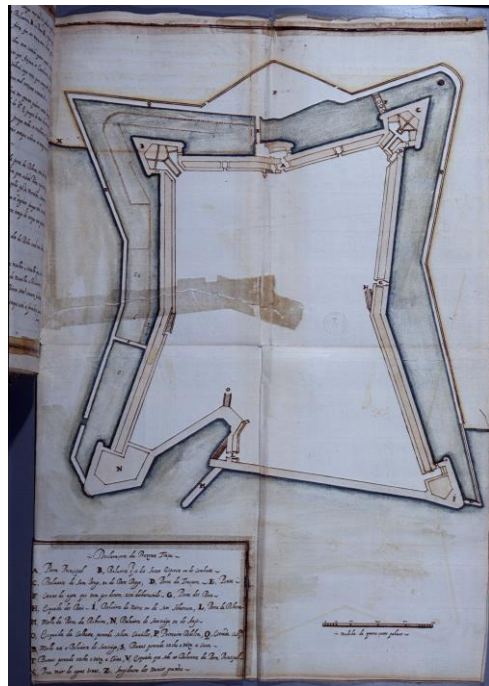
Portuguese Maghreb, and he carried out an important report to the reform of Cepta and gave the tracing for a stronghold in Mazagan. Here, the Italian engineer considered in the centre of the plan the castle of transitional architecture, erected a quarter of a century earlier to serve as a rear-guard of the city of Azzemour, in the vicinity of a small bay that was approaching a landing beach.

When looking at the geometry of the city, one notes that the quadrilateral of the small fort indicates a careful and very daring choice of the fortress implantation, since a large percentage of the city was realized with the sea front penetrating into maritime territory. This resulted in the creation of an easy-to-use port³⁵ for the city, directly linked by the axis of the Sea Gate with the inner castle. From 1547 onwards, a large cistern was conceived in the courtyard of the primitive fortification, shortly after the modern fortification was completed, with its aquatic ditches, the strong triangular ravelin in front of the entrance, the spigot of the shelter of the port and the angular bulwarks of the irregular quadrangle, due to the adaptation of the tracing to adapt the foundations of the walls.

The construction of the city-fortress was achieved in a very short time, through a contract

³⁵ Soon after the conquest of Azamor the decision was made to fortify Mazagão, saying D. Jaime to D. Manuel I in the letter sent with the date of September 13, 1513: “*Aja V. A. que he o melhor porto do mundo*”, justifying Mazagan as an advanced point for the sovereignty of the conquest (Carta do Duque de Bragança a D. Manuel I, IAN-Torre do Tombo, Corpo Cronológico, parte I, maço 13, doc. 62, in “Les Sources Inédites de l’Histoire du Maroc”, Première Série, Dynastie Sa’dienne, Archives et Bibliothèques du Portugal, 5 Tomes, Paris, Paul Geuthner, 1934-51.

The oldest plan of Mazagan still remaining (Plan of the Citadel of Mazagan, 1611, Codex Cadaval, PT-TT-CCDV-29_m0001. IAN - Torre do Tombo, Lisboa), drawn to prepare the works of cleaning the debris from the ditches.



signed since August 1541 by the business logistics of João de Castilho based³⁶ on the design of Benedetto de Ravenna (performed on

³⁶ In a letter addressed to the king he guarantees to be faithful to the determinations of the Italian architect:



The prominent Burwark of the Angel in the sea and the inner harbour occupied with debris (J. Campos)

May) and supervision and adaptation by Miguel de Arruda³⁷, assisted by Diogo de Torralva and inspectorate of João Ribeiro. It was a highly qualified team, in which Francisco de Holanda, newly arrived in Lisbon from Italy, wished to participate, with his up-to-date knowledge of the military achievements he learnt.³⁸ Jorge Correia, in a synthesis work that is a reference on the enterprise of Mazagan³⁹, states: *"At the end of the same year [1541] the so-called Baluarte dos Medãos, forty spans high, was finished (...) which was «hua das fortes he fermosa cousa que a em espanha»⁴⁰(...) once secured the land front, the first half of 1542 was dedicated to the end of the band of the sea, with two bastions, one entirely inside water, among which was sheltered the «calheta» (bay) or port. The design*

"(...) E quanto ao que V. A. espreveuo que na obra não saya dos apontam_tos de Benito de Reuena, eu asy o fiz sempre e farey (...)" - IAN-Torre do Tombo, Corpo Cronológico, I, maço 72, doc. 32, in Sousa Viterbo 1899-1922, Vol. I, pp. 194-195.

³⁷ Miguel de Arruda was the greatest Portuguese expert on fortification. The experience added by the accomplishment of the modern Mazagan led him to go, seven years later, to Tangier, to carry out the reform of the city's defenses.

³⁸ *"He came from Italy to where he had been sent by King João III to draw fortresses, like Pesaro, and in the Portuguese capital he claimed the architectural solution for the Portuguese fortification."* – in Jorge Correia, "Mazagão: A última praça Portuguesa no Norte de África", Revista do IHA, N.4, pp.184-211, Edições Colibri / Instituto de História da Arte - Faculdade de Ciências Sociais e Humanas/UNL, 2007, p. 198.

³⁹ Jorge Correia, "Mazagão: A última praça Portuguesa no Norte de África", Revista do IHA, N.º 4, pp.184-211, Ed. Colibri / Instituto de História da Arte – Fac. de Ciências Sociais e Humanas/U.N. de Lisboa, 2007.

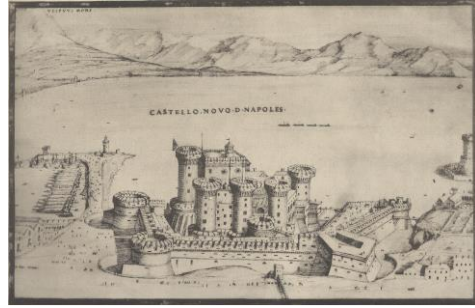
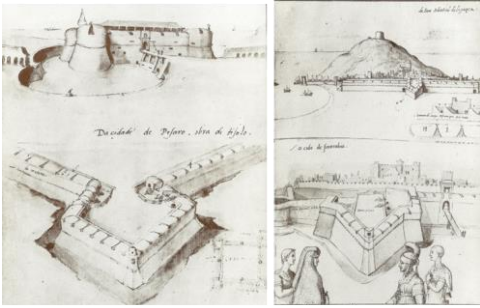
⁴⁰ Translating the writing of the Biscay technician and entrepreneur, from a long time working in Portugal and for life: *«one of the strongest and beautiful things that there is in Spain».*

the Biscay master, as a point of situation (Carta de João de Castilho ao rei D. João III, datada de Mazagão, 18 de Julho de 1542 - IAN-Torre do Tombo, Corpo Cronológico, I, maço 72, doc. 68 – in "Les Sources Inédites de l'Histoire du Maroc", Première Série, Dynastie Sa'dienne, Archives et Bibliothèques du Portugal, 5 Tomes, Paris, Paul Geuthner, 1934-51. Vol IV, pp. 70-74)".⁴¹ And the quoted author concludes: *"The model was based on the fundamental principle of the elimination of dead or blind angles, by crossing lines of fire, flush and parallel to the horizontal planes of the water of the moat, and the vertical wall, fired from two gun levels placed on the orillions of the bulwarks. The system assumed itself as a true warlike organism through the multiplying of firing directions from the upper platforms of the ramparts, crowned with their cavaliers, and along the walks of the inter-mediate bodies of the walls, as proved by the different directions of the cannonries (...). The concept had been tried out in some military architectural arrangements in fortresses conquered and remodeled by the Portuguese - the Gate of Cepta (Alcácer-Ceguer), the Bulwark of the Pata de Aranha (Arzila) or the Bulwark of Raio (Azamor) But the essays were not yet a formal launch of the modern bulwark"*.⁴²

The walled polygon delimits an urban area with a little more than 5 hectares, with a geometry that wisely reconciles the rationality of the principles of the artillery with the organicity of the place. The old castle, with the large courtyard adapted to the cistern, is the structuring element of the urban fabric, leaving half of the built structure already inside the sea, with the consequent technical difficulties of

⁴¹ Jorge Correia, op. cit., p. 196.

⁴² Id., ibid., pp. 198-199.



Pesaro (T. Espanca should refer to the upper drawing, not the new bulwark), Fuenterrabía and Naples (Castel Nuovo), from the Codex of Francisco de Holanda «Livro das Antigualhas», 1539-40.

execution. This is not only important because of the extraordinary quality needed for the foundations of the walls, but also because of the enormous landfill work inside the perimeter. At this point one can see the importance of the creation of the ditches, a work appearing in Mazagan to collect the ships, worked in the tops with floodgates for the relation with the waters of the sea.

The urban fabric relates and adapts to the shape of the city walls. The organization of streets and blocks starts from an orthogonal mesh parallel to the cistern building – indeed a symbol of life and continuity, remaining today in its beauty, outside Time⁴³.

7. Conclusion

The boldness of the solution envisaged by the designers of modern Mazagão is imbued with a deep sense of functional response and understanding of the site. This allowed the design to follow innovative paths for the drawing of the European city of the Renaissance.

The demonstration of the results was so overwhelming that all the production of military architecture in Portugal and its overseas possessions, in Spain as in the rest of Europe, adopted the principle of the pentagonal bulwark and moats (aquatic or earth), in a creation that will make the novel architectural style lasting the most time in the history of architecture, going from the sixteenth century a path of successive affirmation, by its capacity of

adaptation throughout the ages, and even entering the twentieth century.

In Mazagan, 1541, it was not a piecemeal contribution, a pentagon in the reform of the existing wall, as those portrayed (Pesaro, Fuenterrabía, Naples⁴⁴...) by Francisco de Holanda in the famous "Book of Antigualhas" (1539-40). Not even the 9 ramparts added by Benedetto in Perpignan, in 1533, when remodeling its fortifications. In Mazagan it was a project of epistemological rupture with the military and urban architectural tradition, leading to the possibility of inventing fortified cities based on the advances of the art of war, without solutions of continuity with the evolution maintained until then, when the question was hesitating of the round cubos, just as Benedetto de Ravenna might have confronted himself in Vila Viçosa.



⁴⁴ The "Castel Nuovo", which caught the attention of Francisco de Holanda, with its round and huge towers and its bastioned barrier (with round cubos and a deep moat connecting to the port), including a surprising pentagonal bastion - showing the directions of arrival and departure for the new adventure of European military architecture.

⁴³ Since 2004 the "Cité Portugaise de Mazagan" is inscribed in the World Heritage list of Unesco.

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