

The development of Spanish military engineering techniques And embodying it on the fortifications of the city of Oran.

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Abstract:

After the occupation of the city of Oran in the year 1510 AD and during the three centuries to the Spanish control of it, the Spanish defense fortifications were built and its defensive system was gradually formed, a period that corresponds to the history of military architecture with the so-called 'modern fortification' or 'fortified fortification', so the city's fortifications became a city Oran is a unique model for this type of fortifications in North Africa; Where all theories of modern military engineering were applied in addition to the advanced architectural elements, Military engineers have made a qualitative leap in defense construction, and Spanish military engineering techniques, which were embodied on the fortifications of the city of Oran.

Keywords: Oran city, military techniques, Spanish military architecture, fortifications, military theories.

1. INTRODUCTION

A new art is the art of war clearly that appears in the contemporary period reviewing the principles of tactics and strategy, transmitting knights and facilities as a fateful weapon in the battles, the absolute priority of the firearm, and the armed forces are among the primary elements that will push the art of war to another place and here we can of course talk about The development of architectural technologies due to these factors, which are apparent cases of the fortifications of the city of Oran, and because the theory and application are in conjunction with the acquisition of rapid and crucial developments, which will completely change the military facilities by establishing a new type of war¹.

This is what led to the emergence of new theories and schools that developed the architectural techniques of contemporary military architecture, in line with the development of war techniques and weapons, respectively. These theories were applied with distinction to the Spanish defensive fortifications in the city of Oran². The topic of the article is of great importance, represented in enriching the research aspect related to the Spanish defensive fortifications in the city of Oran and the development of Spanish military engineering techniques and their embodiment in the fortifications of the city of Oran, with the aim of

¹- Epalza, Mikel de-Vilar, Bautista Juan-Planos y Mapas Hispánicos de Argelia-siglos XVI- XVIII- Madrid- Instituto Hispano-árabe de cultura- Madrid- 1998-p. 97.

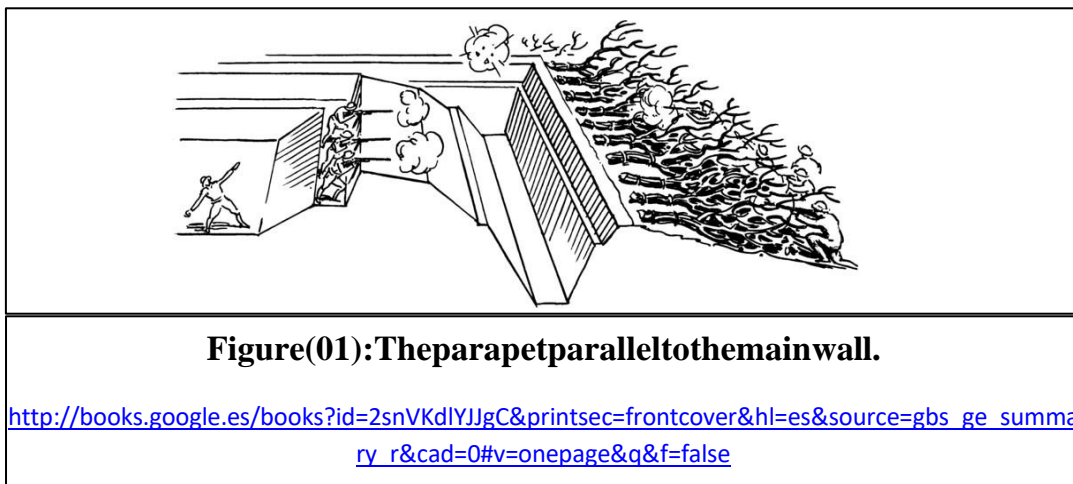
²- Cámara Muñoz Alicia-Moreiro Rafael-Vigano Mrino-Leonardo Turria ingeniero del Rey- Madrid- Fundacion Juana la Turriano- 2010- p 100.

preserving them as a historical, archaeological and architectural heritage that distinguished this city. From the above, a general problem comes to mind, which is as follows: To what extent were Spanish military engineering techniques applied to the fortifications of the city of Oran? The sub-questions were as follows: **Did artillery have an impact on this development? What are the most important techniques that were applied?**

2-The invention of artillery and the development of military engineering techniques:

With the invention of artillery, traditional defense systems became fragile. It became easy to open the gaps that penetrate forts, and the size of the gaps increased to accelerate the process of the collapse of the wall, as well as the collapse of the upper part of the fort and its penetration. The solution to this problem was to develop an architectural technique represented by building a barrier parallel to the main wall, thus making it difficult for the enemy to approach the foot of the wall or defensive line¹

Figure01.



The second goal of artillery was to break the door, the entrance to the castle, or the fort, so the engineers required to find special architectural techniques that would protect the entrance, and these elements began to build with a stone while providing the towers with a special backer capable of receiving their own cannons, and put them as well The door, drilling trenches and corridors to avoid the enemy fire and build towers with donor, elderly, five - shape and quadruple forms².

According to the engineer Halo, the problem that had to be solved for military architecture and its architectural techniques in the Renaissance era was to adapt the path of military walls to the needs of defense against firearms, and the plan of castles had to be changed in order to

¹- **Cámara Muñoz (Alicia)**, “ Las Torres del litoral en el Riendo de Felipe II una Arquitectura para la defensa del territorio, espacio tiempo y forma”, *historia del Arteserie*, VII, TIII, 1990. P59.

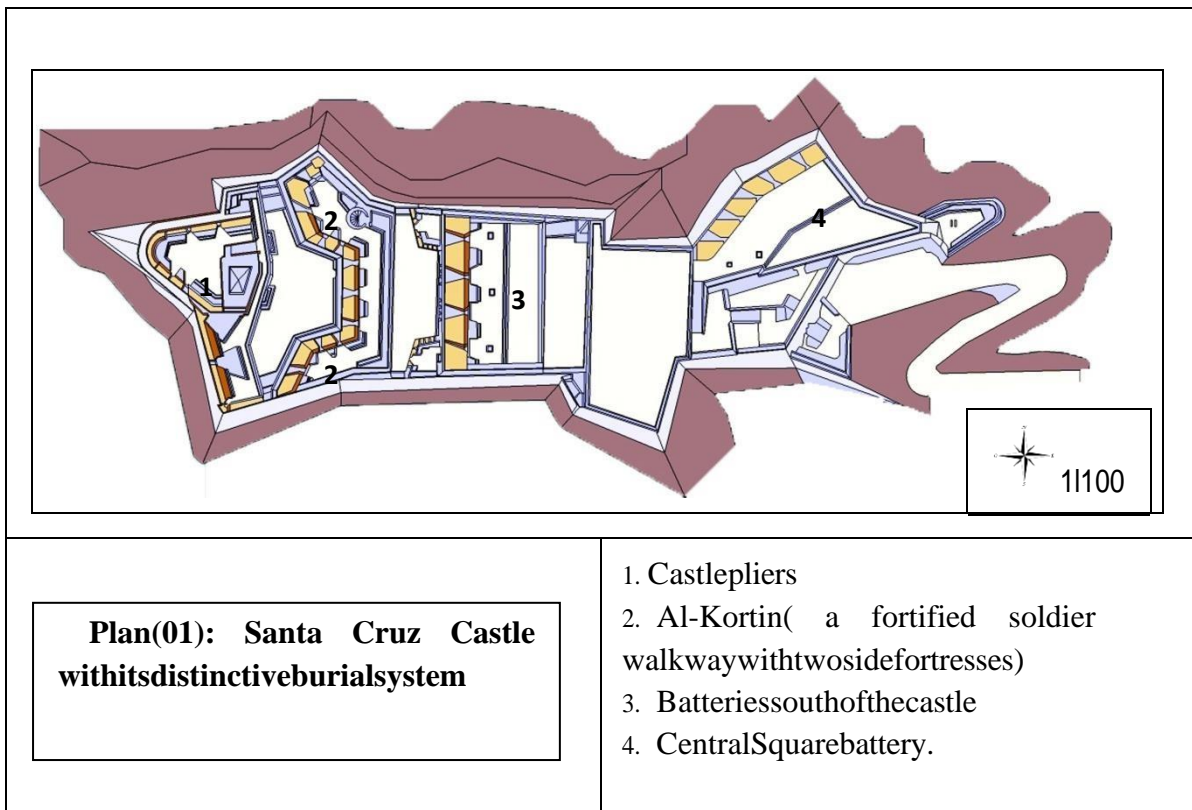
²- **Vilar (Bautista Jaun), Lurido (Rike)**, *Relaciones entre España y el Magreb siglos XVII- XVII* Madrid: Mapfre, Madrid, 1994 ,p 256.

obtain regular equilateral sides and cover the corners with blunt corner towers where the weapons were attached to runways. They are

Facilities placed on top of the towers in the middle of part of Al-Jand Walk¹ With all

of the foregoing, the destroyed enemy artillery cannot be prevented from the besieged castle, and for this reason the thinking of digging trenches and corridors as we mentioned earlier, so that the next step for military architectural technologies will be the process of 'burial' in its literal sense and this solution was considered the most distinguished for the transitional stage²

Plan 01



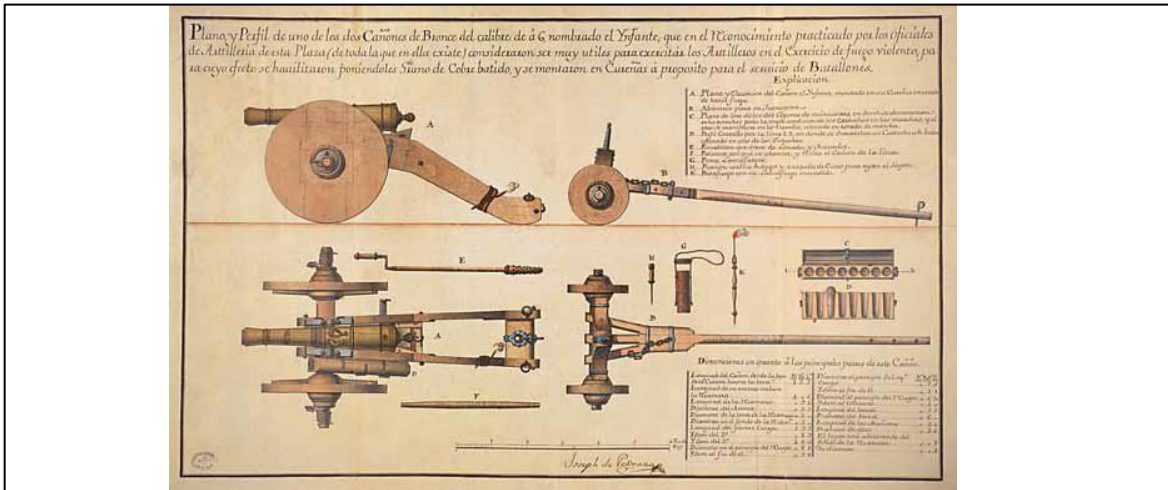
Of course, the defensive function of all these castles has not changed since previous periods, but they are forced to develop according to the development of firearms, which have become more powerful and hit the target more accurately. In reality, the invention of gunpowder, or at least the first use of these means in war, led to a revolution. Where, when and by who were cannons invented, and in which sieges they were first used, whether for defense or attack, are questions that have not yet been answered exactly, some historians claim. It was the idea of the German monk Albert of Wolstadt, who

¹- Henri (leon Fey), Histoire d'Oran avant pendant et après la domination espagnole, Oran, paris, 1927, p254.

²- KHelifa (Mohammed Amine), Oran y Mazalquivir: unahistoriade fortificaciones Espanolas Memoria de Magister opcion - Civilizacion- universidad de Oran- Oran- 2012.2013- p 186.

invented hand-held cannons in the 13th century. According to others, the appearance occurred in the mid-14th century at the hands of the famous Berthold

Schwartz. Heuer says in his book „History of the Art of War“; that the Arabs could have been the inventors of firearms, because in 1342 AD they besieged the Spaniards in Algeciras with cannons¹. **Plan2**

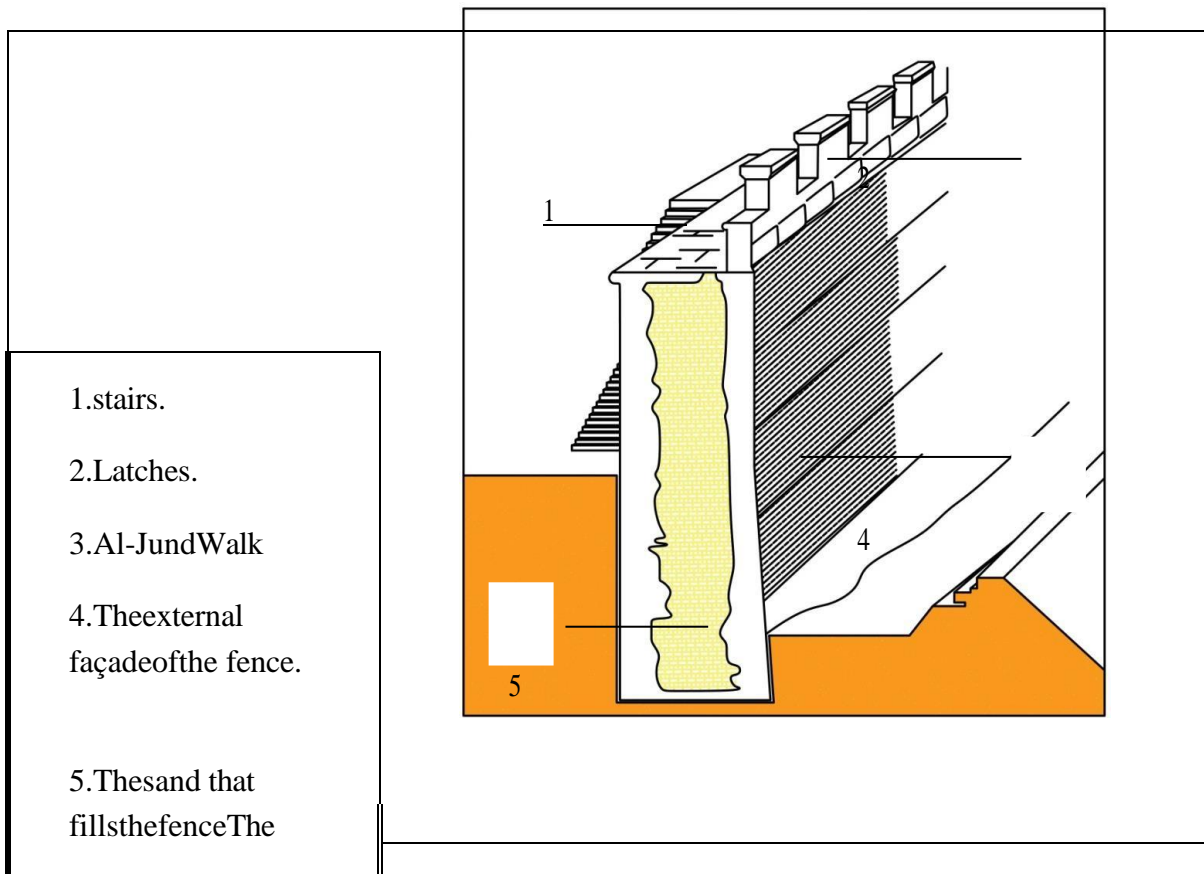
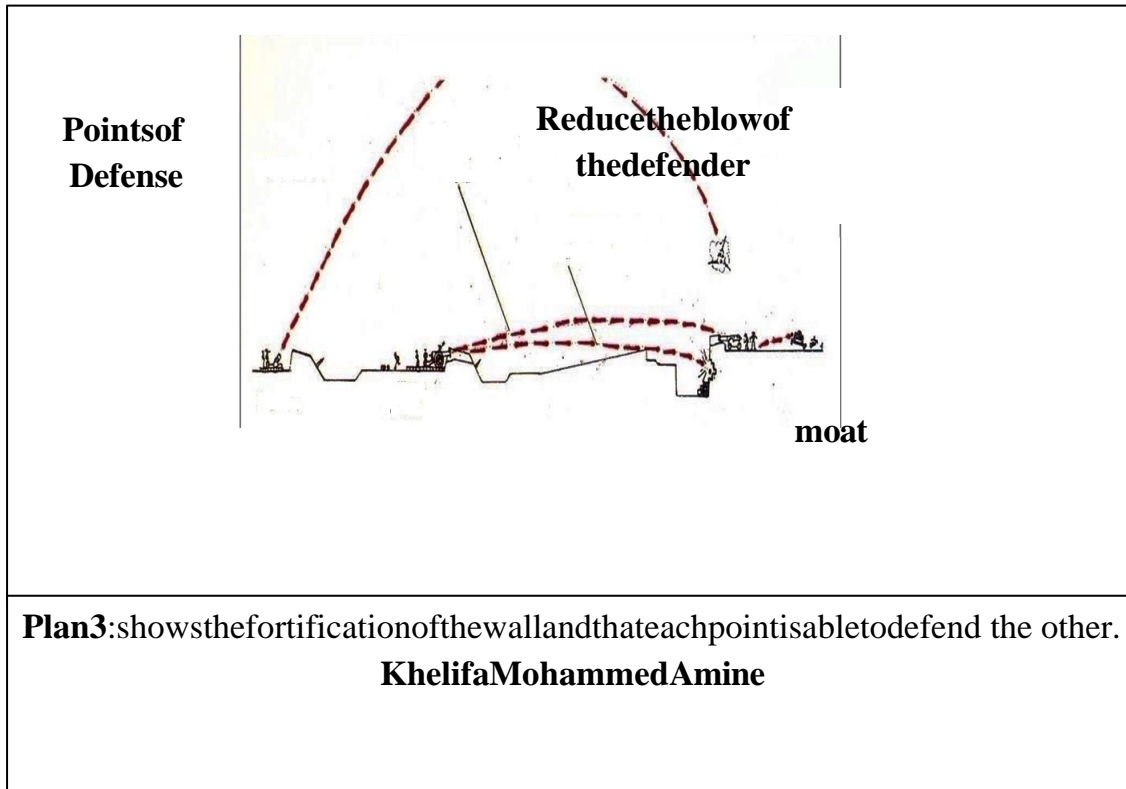


**Plan2:Plan drawn up by José de Brazza in 1765 for a bronze cannon 06 caliber
-Camara Muñoz Alicia-**

For this reason, a special architectural technique created in building the fences that made it lose from its height and increase in its thickness, as it was believed that with this technique his resistance will increase the bombs and give freedom of movement and the ability to deal with the situation for the soldiers, but with reducing the altitude of the fences, it reduced a field. Or the field of vision, which led to the development of another technique, which is trenches, and is considered a defensive technique against earthly attacks, and the more thick the fence would be difficult to control, which led to the formation of forts, which was generally present in the corners of the corners, which were batteries to prevent Trying to climb the walls, and therefore it is possible for every fortress that contains a battery to secure the defense for apart of the wall and the field of seeing the fortified fortress² **Plan3.**

¹- Cámara Muñoz (Alicia), "Las Torres del litoral", p26

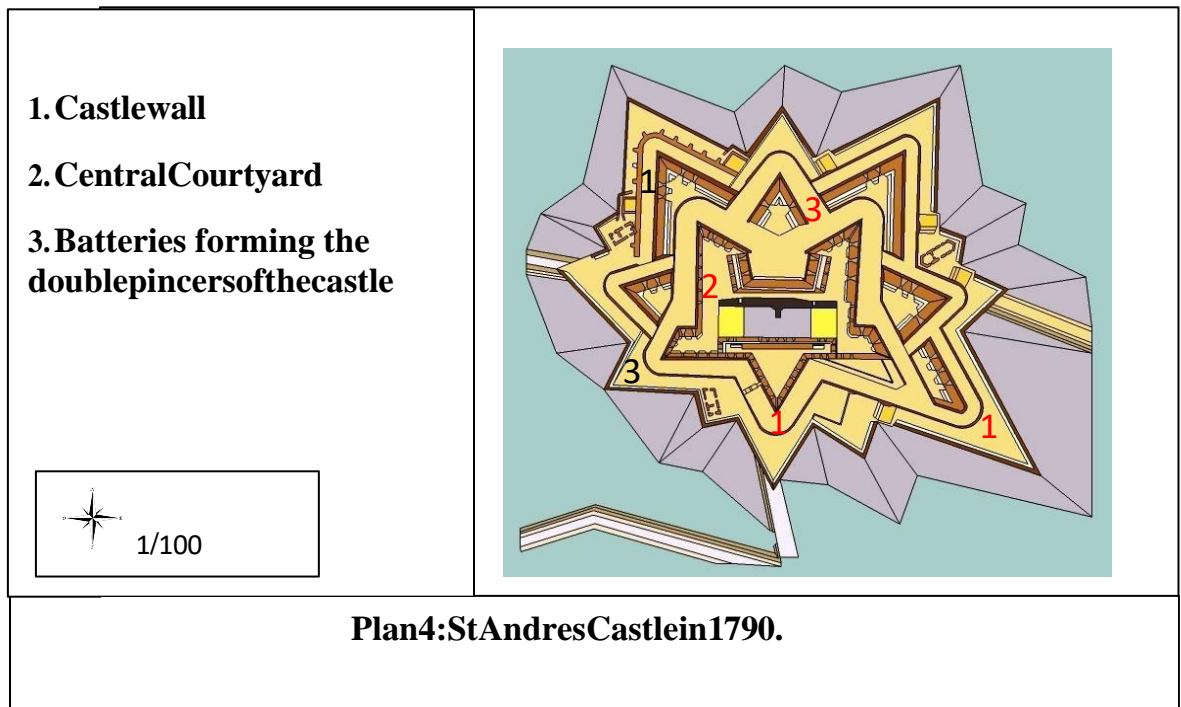
²- Hontabat (Hernaldo), "Relación general de la consistencia de la Plaza de Mazalquivir"



external façade of
the fence.

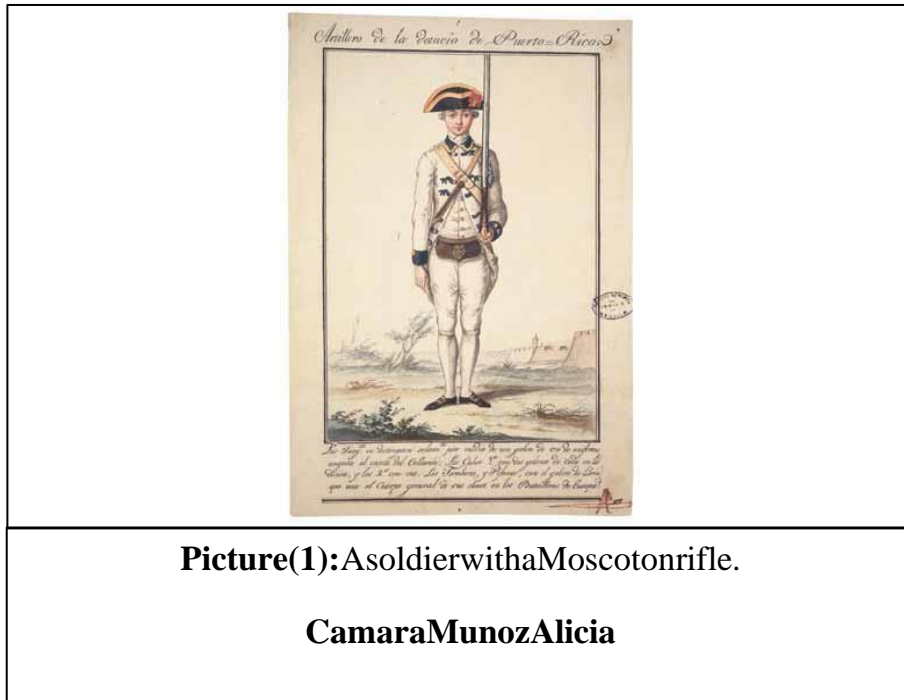
Figure02: Components of the outer wall of castles

The circular fortress with the origin of the medieval era left its place for the existing angle fortress, this technique was used for the first time in Rhodes in 1496 AD, to protect the island from the repeated Ottoman attacks, and it was implemented in the castles of the Mers El Kébir and Oran starting from the year 1510 AD that were exposed to the defensive problems themselves¹ **Figure 02 · Plan 4**

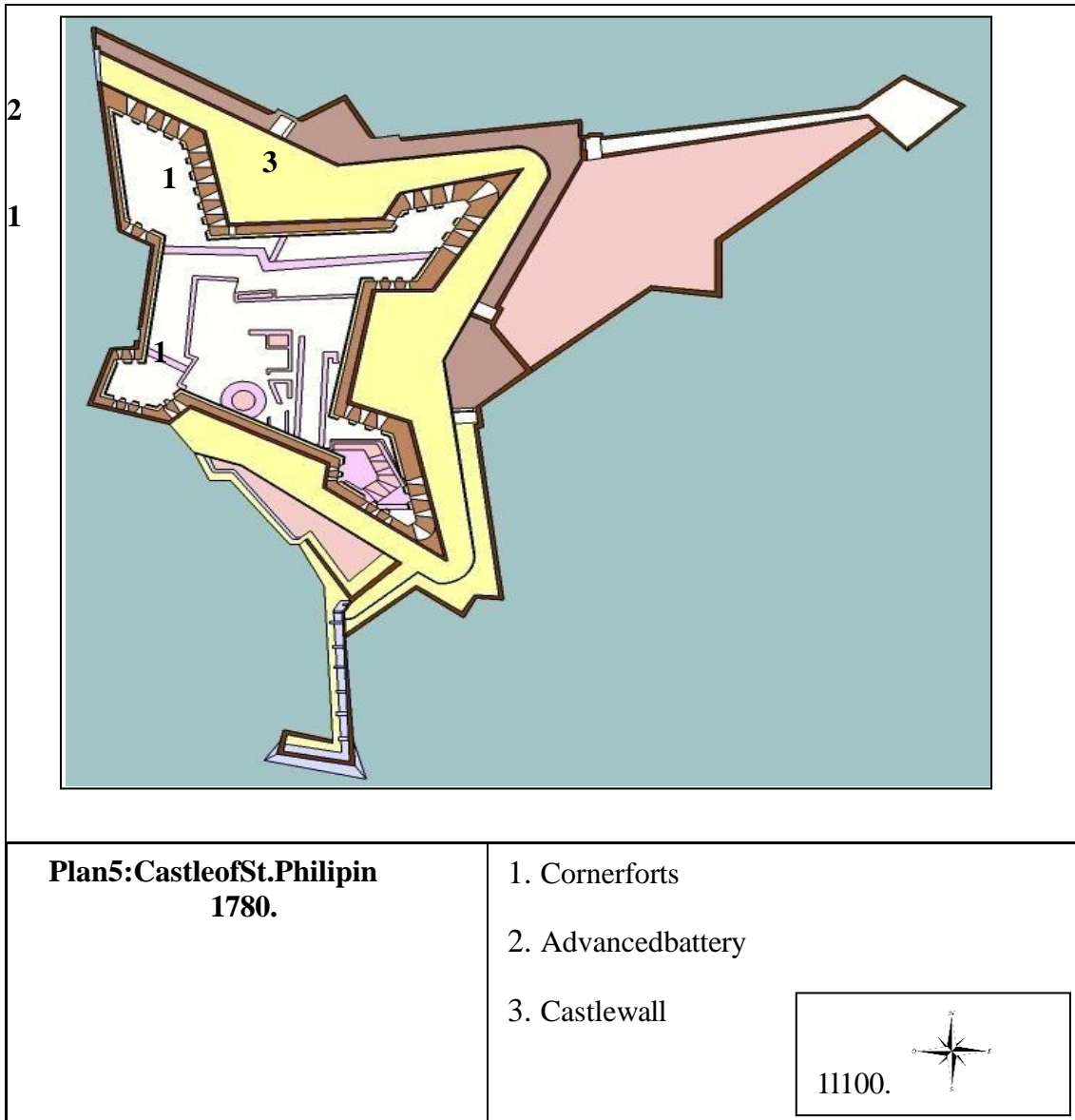


The defensive wall is considered a step in the transformations witnessed by the architectural techniques of military engineering, as it was composed of a group of walls that united two forts and were regularly spaced. This distance was calculated by means of the force of the artillery strike in that period, or by using only the distance of 250 meters, which is the average range for firing a rifle from Moscotontype²

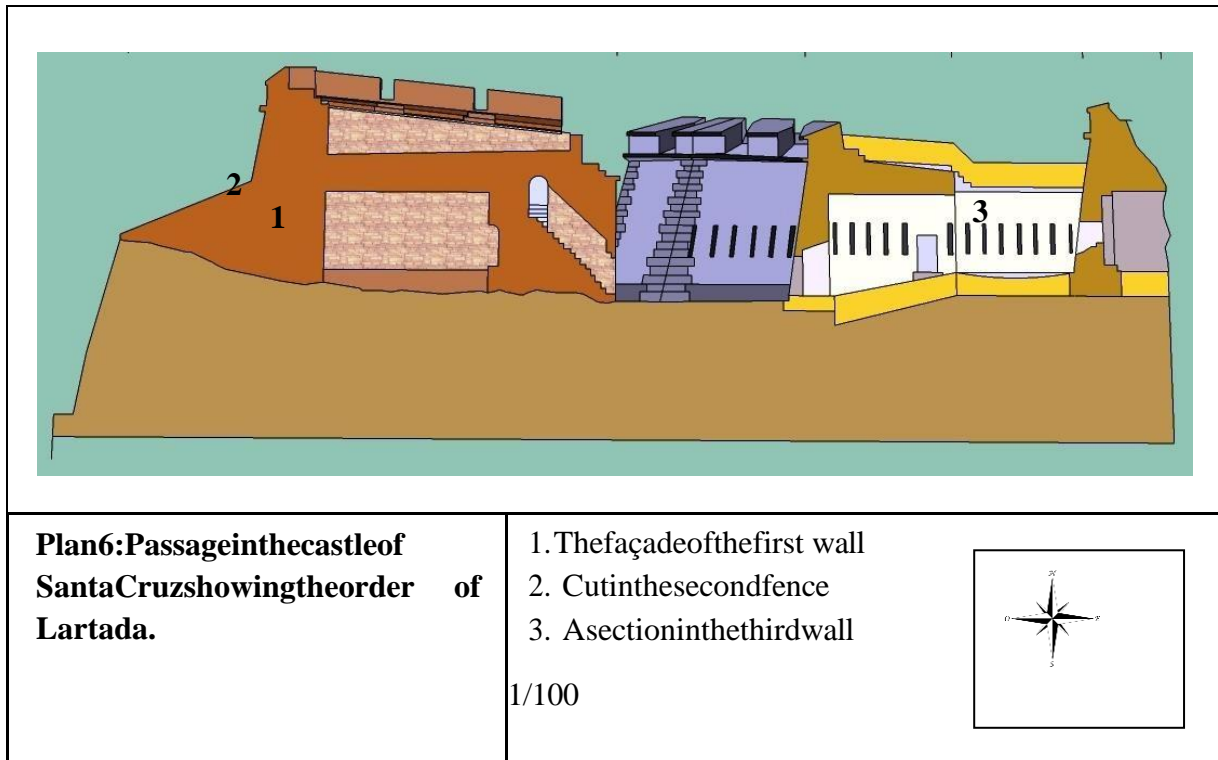
Picture 1



From the above, we see the architectural techniques that gave the characteristics of the new fortification, as we find it to be a regular polygonal structure when the terrain allows it. If this is not possible, the castle was adapted to the characteristics of the terrain, replacing the regular fortress wall with a large cliff, and creating tunnels that sometimes reached... The burial used other elements that appeared in the transitional phase, such as caponeras, “a ditch between two forts,” and casemates, “a ditch in the middle of the soldiers” path,” and finally the transformation of cylindrical and solid towers resulting from the development of forts
¹. **Plan5**

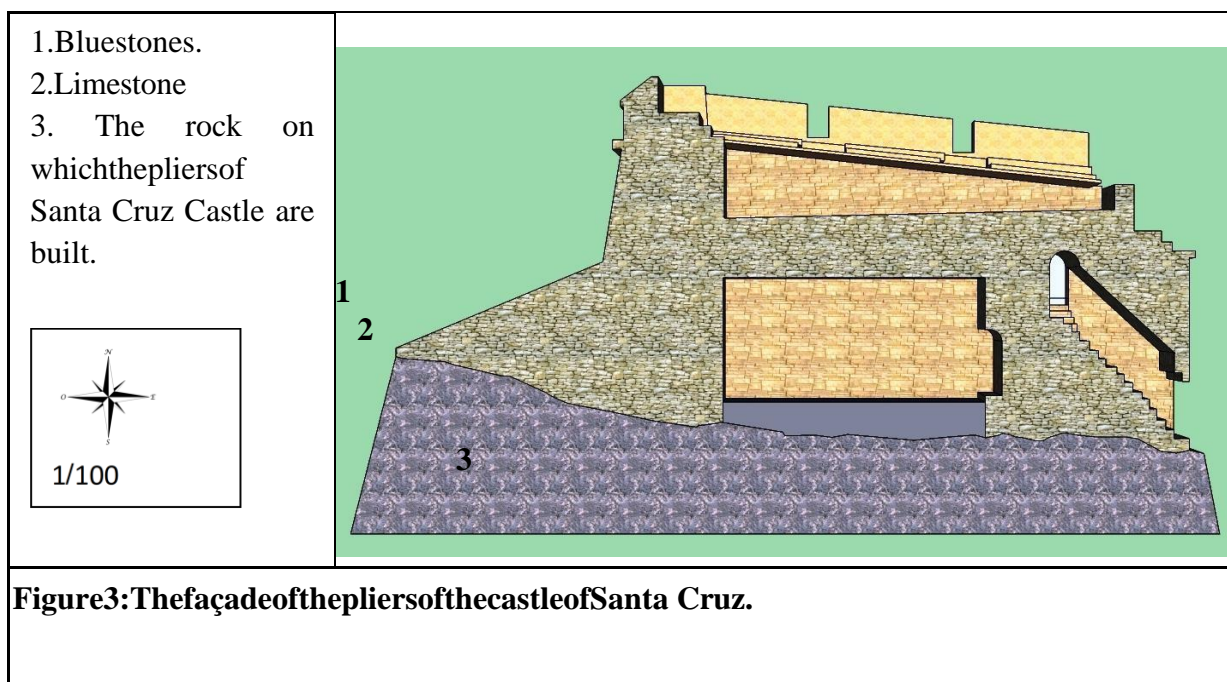


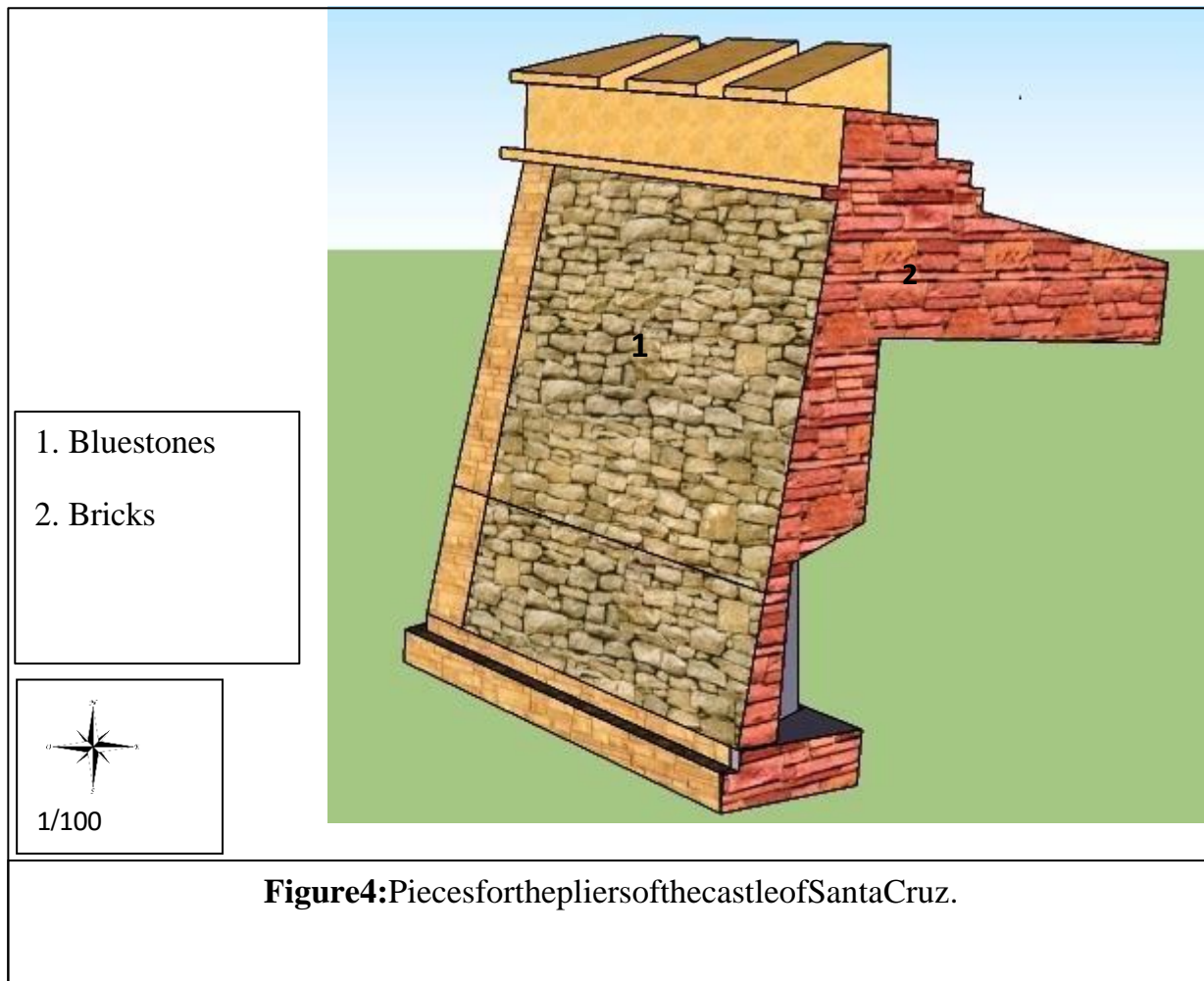
As for during the sixteenth and seventeenth century, this period was characterized by the inclusion of the immunization system in what is known as the Lartada, is the system of overlapping fences, forts and batteries to return artillery strikes, and its most important characteristics are the simplicity of design **Plan 6**.



The regular fortification system was also replaced by the pincer system, which is considered the most important architectural technique for this period and is of a distinctly defensive nature, which we find in most of Oran's fortifications, such as Santa Cruz Castle¹. **Figure3 and Figure4.**

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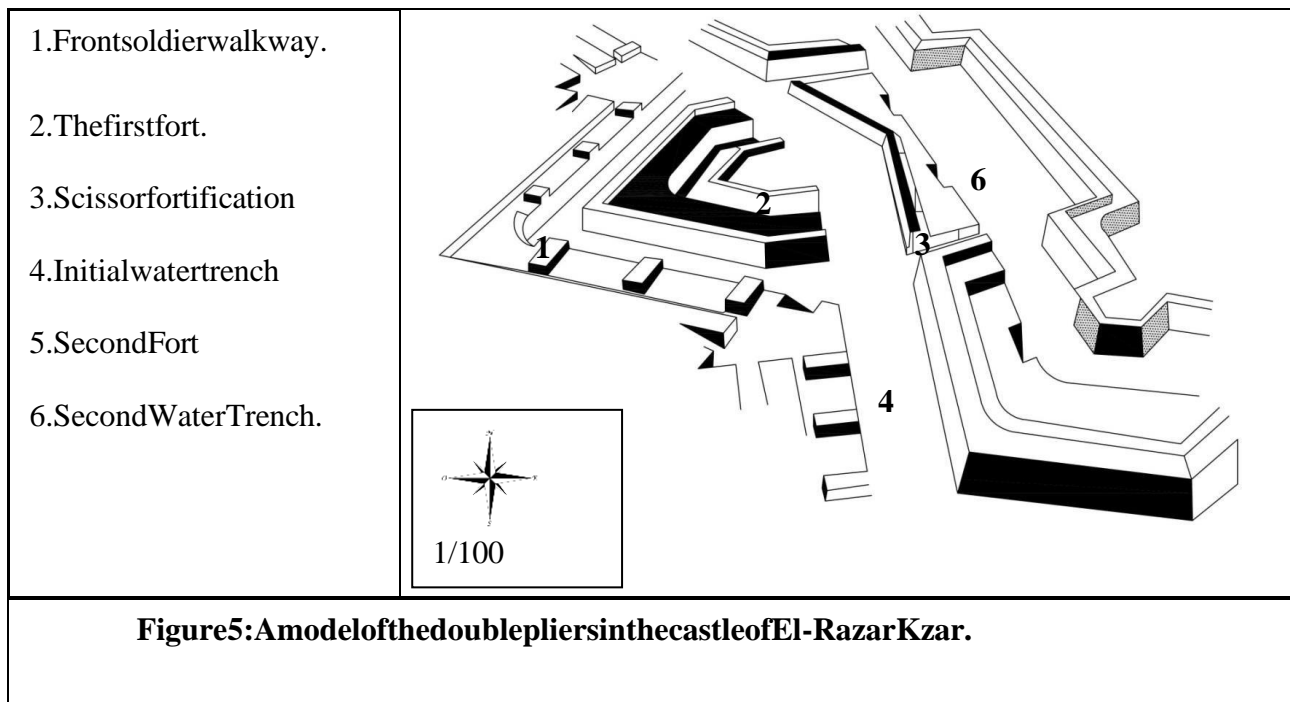


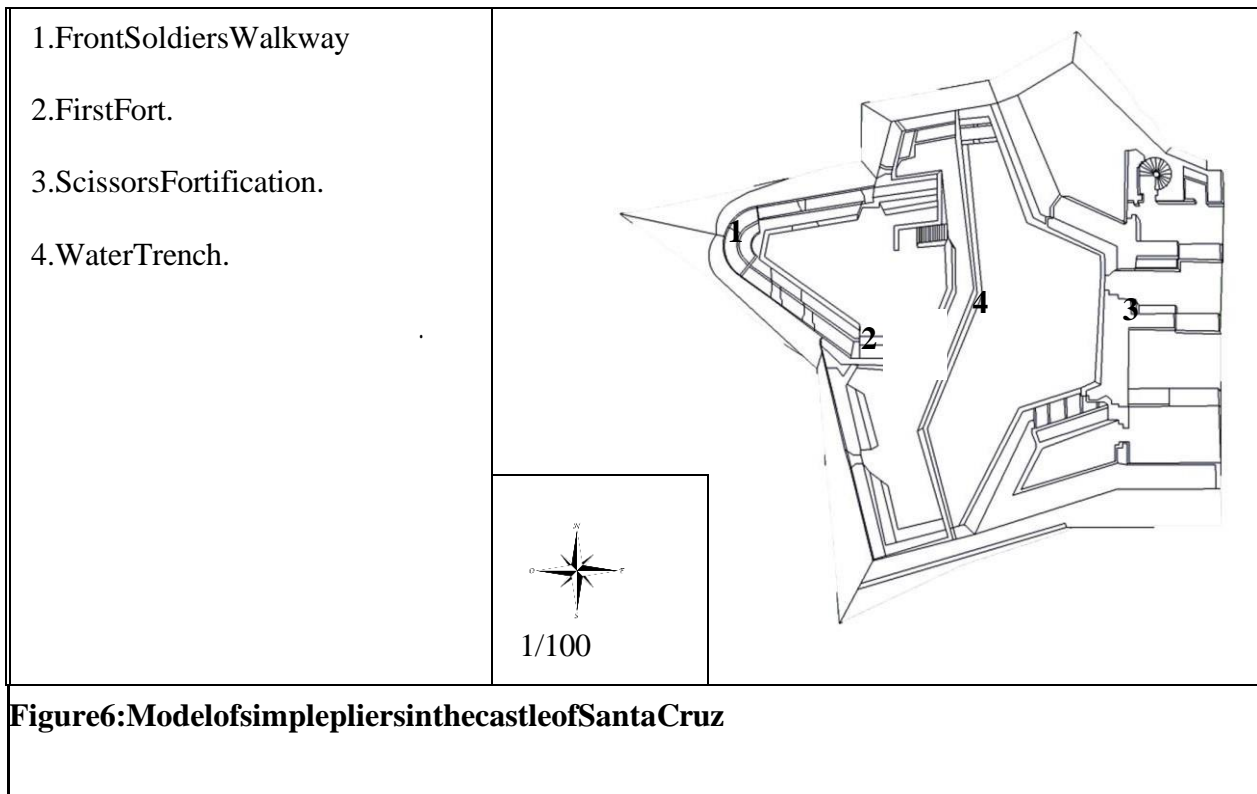


Luis Besanto in 1541 AD modified the RosaKzar Castle and gave it a defensive combat front with a privilege, and in-Mers El -Kébir after the siege of Hassan Korsu, Juan BAUTISTA ANTONLLI in 1563 AD increased the peninsula's defenses with strong construction with four Strongholds in the same square. In 1574 AD, Vespaciano Gonzaga modified the internal front, and finally in 1580 AD, the engineer Juan Bautista Calvién enlarged the castle of RosaKzar in Oran, strengthened the double and¹ simple pincers of the castle of Santacruz, and raised two forts in Annaba

and **Figure6.**

Figure5





The improvement and formation of the technique of defensive wall stock place in areas such as Oran, where the previous military architecture was demolished and the wall was started using only the strategic value of the site. In fact, the new theory of military architecture was presented especially in the writings of the Italian Nicolás Latratfalia and the Spaniard Druja personalizadas, who knew The enemy must never be close to the wall that connects two forts and the fortified soldiers' walk, nor to the tower, and the attacker or invader must always be under fire from at least four batteries¹

.Figure7 and Figure8.

¹- Vallejo (José), "Mémoires sur l'état et la valeur de la Placé d'Oran et Mers-el-kébir dans les premiers jours de l'année 1734 - après www.psychologyandeducation.net Vallejo - commandant général - traduction de Jean Cazenave" - Revue Africaine n° XVI - Alger-1925-, p230.

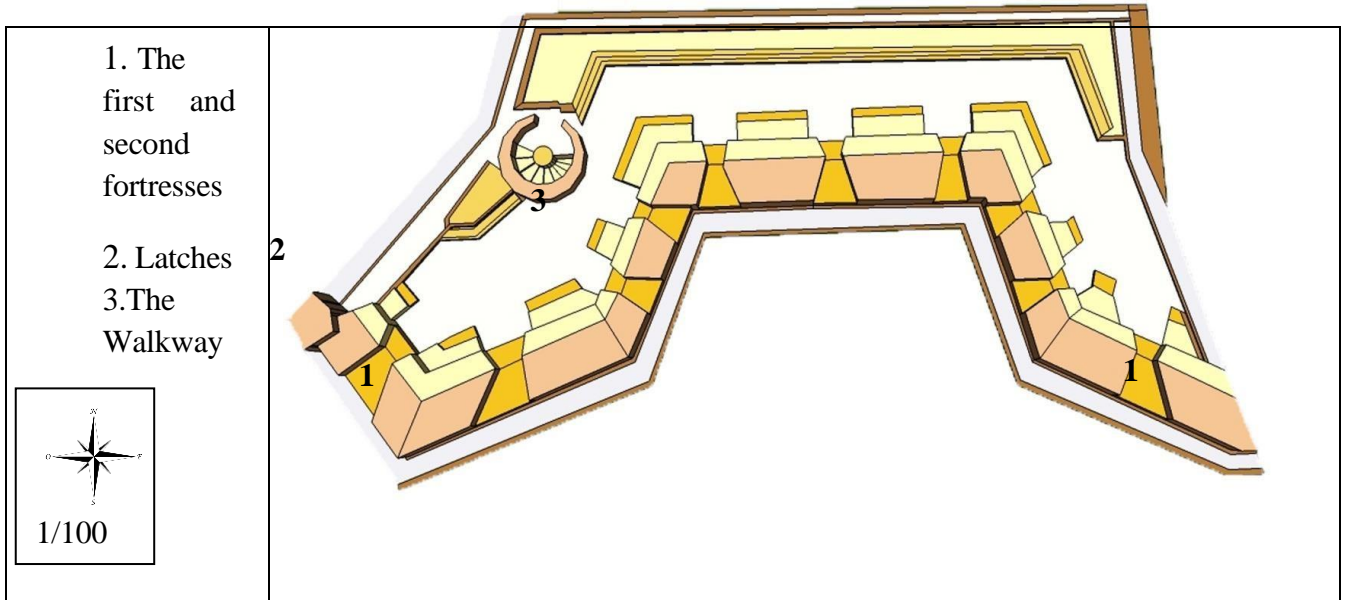


Figure7: A model of the fortified soldiers' walkway Santa Cruz Castle with 2D technology.

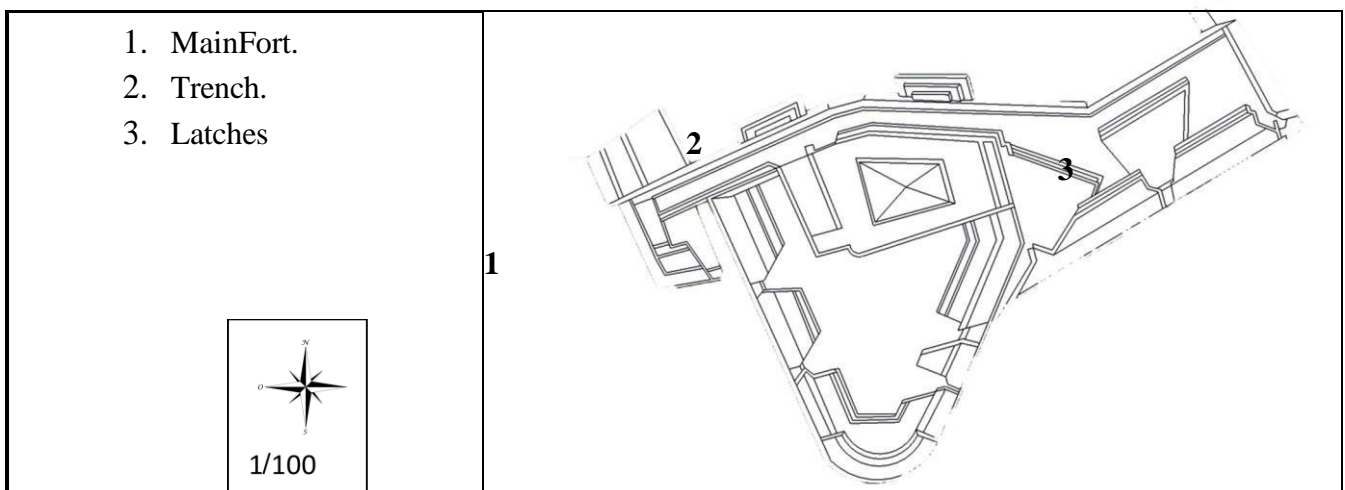


Figure8: A model of the simple fort with the pliers of the castle of Santa Cruz

In about the year 1500 AD, what is known as the explosive bomb appeared, in addition to new types of fire arms. Before that, light military weapons had priority in wars because they were easy to move and more accurate in aiming. It is possible to name all the different types of weapons in that period, as they reached more than 50 types of weapons were used by the Spanish armies until about 1520 AD. This made it very complicated to choose and transport stone or iron projectiles, and military techniques

and engineering did not develop until the beginning of 1600 AD, when very noticeable developments were known ¹picture2



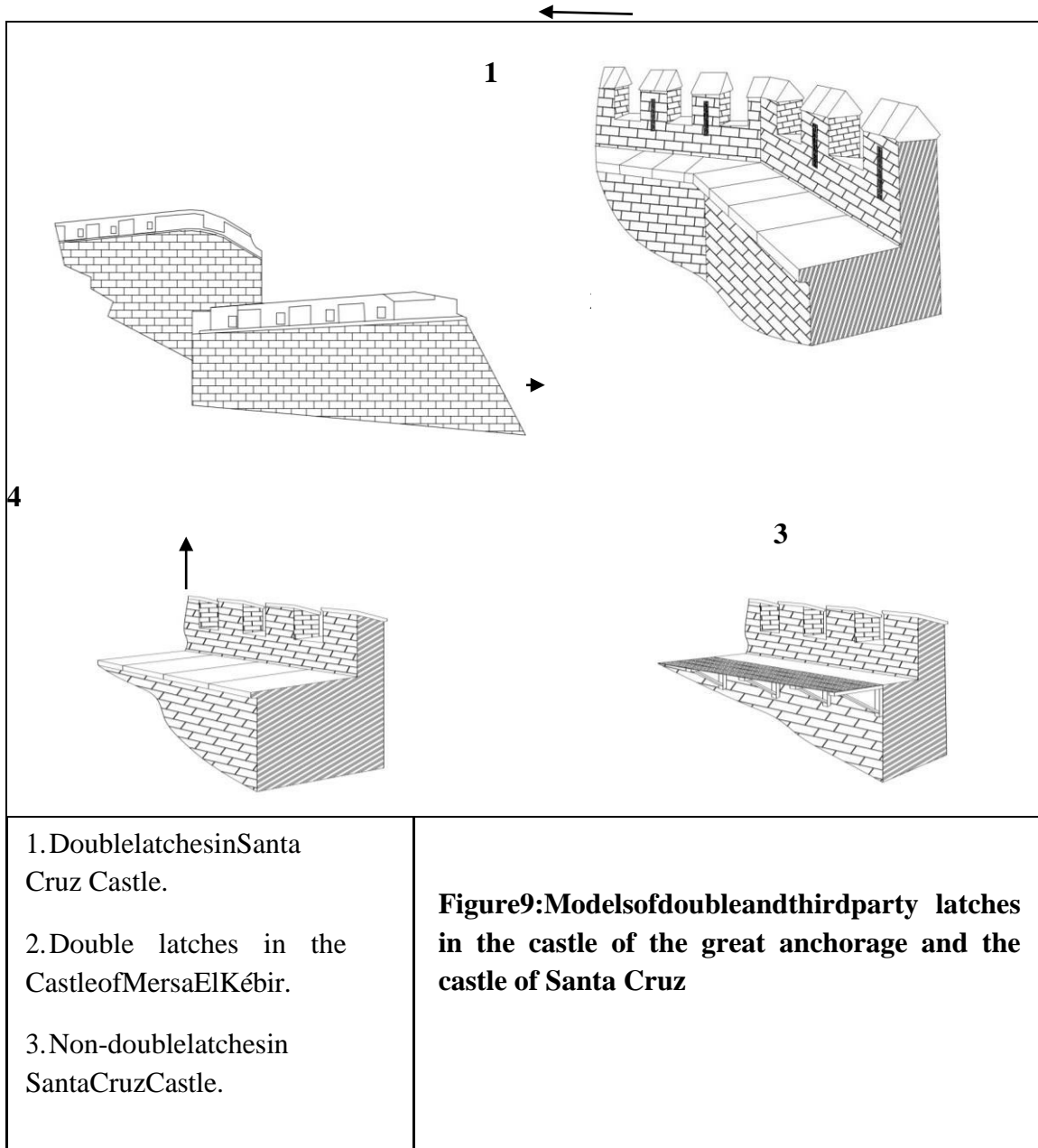
picture2: Calculation of the firing angles of shells and the power of artillery strikes from these angles.

Camara Munoz Alicia

While the Italians and the Spaniards maintained at the beginning of the 18th century AD the defensive function of the fortresses according to the principle formulated by Von Clausewitz, who says: 'Protection is easier than profit' German schools and DNACPECKALE, Simon and Stevin, and then the French Foupans showed a new look at the arts of fortifications, they changed tectonic engineering structures and architectural technologies, and they also changed the structure of the rigid military architectural plan. In a way that makes it have an offensive function as well, by reducing the dimensions of the soldiers' path and strengthening the role of the forts by building external towers, the enemy becomes dispersed by the wider distance of the forts and it becomes difficult for him to attack the main target, even if he is able to penetrate the surrounding security complex, but for a long time, the Italian and Spanish model, with its polygonal plan and simple triangular towers, easy to change, flexible and quick in construction, was the most widely used on the international scale, and the Antonelli family contributed to spreading this type of building along the coast.

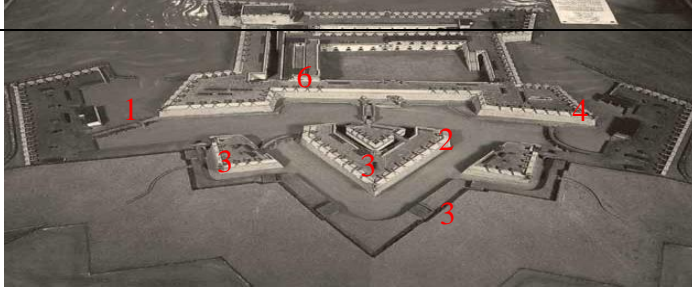
of the Spanish Empire from Enver. To Oran and from Sicily to the New World¹.

Figure 9.



The eighteenth century would produce the golden age of the Apalartado system, to which would belong all the defense works built in Spain, North Africa and its overseas possessions and which forced new developments in artillery, both in terms of

range and power of cannons, leading engineers to design New defensive systems, even with the basic elements of fortified forts, added a defensive system, forcing the enemy to lift sieges as in Oran and Melilla .**picture 3.**

<p>1/3Front forts 2/5,4Fortresses 6/ReflinOHalal F/Trench</p>	<p>5</p>	
<p>Picture3:Doubleplierscomponents.</p>		

3. MilitaryengineerswhoworkedinOranandMersaEl –Kébirduringthefirst and second occupation of the city:⁽¹⁾

Names	Years	Business
DiegodeVera	1425	ThecastleofMersaElKébir andthecastleoftheRosakzar.
JuanBautistaCalví	2447	Mersa El Kébir Castle, Al RosakzarCastle,SantaCruz Castle.
AntonelliBautistajuan	2451	Mersa El Kébir Castle, Al RosarkzarCastle,SantaCruz Castle
Franciscovalencia	2454	GrandMarsa
GispayanoGwanzaga	2475	ElMarsa
JaycomBallerioFratien	2475	MersEl-Kébir,RosaKzar, .SaintGregario,SantaCruz,´
LeonardoToriano	2487	RosaKzar,SantaCruz,Sait, Mers El-Kébir Castle,Gregario.
MontaigudeluPérille.antonio	1732/ 1733	SantaCruz/SanFelipe/ San Gregorio

⁽¹⁾Epalza,(Mikelde), Vilar,(BautistaJuan),op,cit,p97.

Nebas.pauscal	1733	OranSquare
Araunaymalles.Franciscode	1735	MersaEl-KébirFort
Ayliner.Ricardo	1780/1783/ 1784	Yard/Rod/Academy//Shops /Oran
BallesteryZafra.juan	1734/1736/1737	Castles/FortandHospital /Oran
Bordick.Diegode	1736	OranSquare
Dufresne. José	1769	SanAndrésCastel
Gaver.Antoniode	1741/1743/1745	SanAndrésCity/Barrack or Fort
GonzálezDavilla	1771	OranSquare
Guascalmeigar.Juande	1789	SantoDomingochurch
Hontabat.Arnaldode	1770	OranSquare
Hurtado.Antonio	1790/ 1791	OranSquare
Mac-Evan.JuanBaustista	1738/ 1739	PortandcityofOran
Masdeau	1775	SanCarlosFort
MontaigudeluPérille .antonio	1732/ 1733	SantaCruz/SanFelipe/San Gregorio
Nebas.pauscal	1733	OranSquare
Rado.Geaquin	1740	OranSquare
Sanchez.manuel	1775	MersaEl-KébirFort
Santiesteban.manuel	1745	Cavalrybarrachs inOran
Terreiro.torus	1772	Placed'armesOran
Troncoso.Antonio	1775	SanCarlos.SanMiguel
Verboom.JorgeProspero. Marquis de	1732	OranSquare
Zermeao.JuanMaitin	1771	OranSquare

4. Conclusion:

Through what we studied previously, we find that the interaction of the military architect with the natural environment in which he was led to the development of engineering thought with what is in line with its intellectual components in order to develop building techniques and military architecture alike. Therefore, the environment represented the constant factor that remained and did not change according to the mechanisms of functional transformation, as well as cultural and architectural in the history of military engineering, its materials and techniques, Throughout the ages and since different historical decades and until now, the military engineer has taken an active role in creativity and work with the principle of

perfection and creativity in the construction process, which is the result of the intellectual creativity of the military engineer with the employment of castles and forts as a striking force in the face of the enemy, as well as their compatibility with the environment and the ocean, in which he lived.

5. Bibliography list:

Alonso (Acero), «Oran-Mazalquivir, 1589-1639: una sociedad española. Las rentas del tabaco en Oran y Mazalquivir: fortuna y fracaso de estanco pionero». Cuadernos de historia moderna n.º 17, Madrid, 1996.

Bravo Nieto, «La Cazaba o cuartel rifeño de Jénada, un modelo de arquitectura militar islámica», Melilla: Akros, n.º 9, 2010.

Cámara Muñoz Alicia-Moreiro Rafael-Vigano Mrino-Leonardo Turriá ingeniero del Rey-Madrid-Fundación Juanelta Turriano- 2010.

Cámara Muñoz (Alicia), «Las Torres del litoral en el Reino de Felipe II una arquitectura para la defensa del territorio, espacio, tiempo y forma», historia del arte serie, VII, TIII, 1990. P.59.

Cazenave (Jean), «Les Présides Espagnols d'Afrique, leur organisation au XIII^e siècle Alger»: revue africaine, n.º IXIII. p.100.

Epalza, Mikel de- Vilar, Bautista Juan - Planos y Mapas Hispánicos de Argelia-siglos XVI-XVIII- Madrid- Instituto Hispano-árabe de cultura- Madrid- 1998.

Ordóñez (Vergara), La Alcazaba de Málaga: Historia y Restauración Arquitectónica Málaga: universidad de Málaga, 2000.

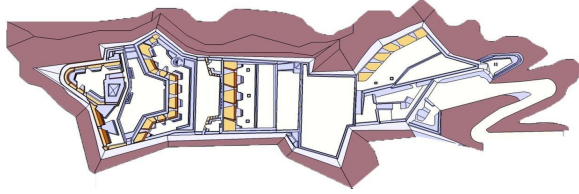
Henri (Léon Féy), Histoire d'Oran avant pendant et après la domination espagnole, Oran, Paris, 1927.

Hontabat (Hernaldo), «Relación general de la consistencia de la Plaza de Mazalquivir (31 de diciembre de 1772)», bulletin de la société de géographie et d'archéologie d'Oran, T. XIV Oran: Fouquet, 1924.

Khelifa (Mohammed Amine), Oran y Mazalquivir: una historia de fortificaciones españolas. Memoria de Magister opción - Civilización- universidad de Oran- Oran- 2012.2013.

Vilar (Bautista Juan), Lurido (Rike), Relaciones entre España y el Magreb siglos XVII- XVIII Madrid: Mapfre, Madrid, 1994.

Vallejo (José), «Mémoire sur l'état et la valeur de la Place d'Oran et Mers-el-kébir dans les premiers jours de l'année 1734-après son inspection générale- par exc^o don José Vallejo-commandant général-traduction de Jean Cazenave»- Revue Africaine n.º XVI -Alger- 1925.



Plan(01): Santa Cruz
Castle
with its distinctive burial system

5. Castlepiers
6. Al-Kortin(a fortified soldier walkway with two fortresses)
7. Battery south of the castle
8. Central Square battery.