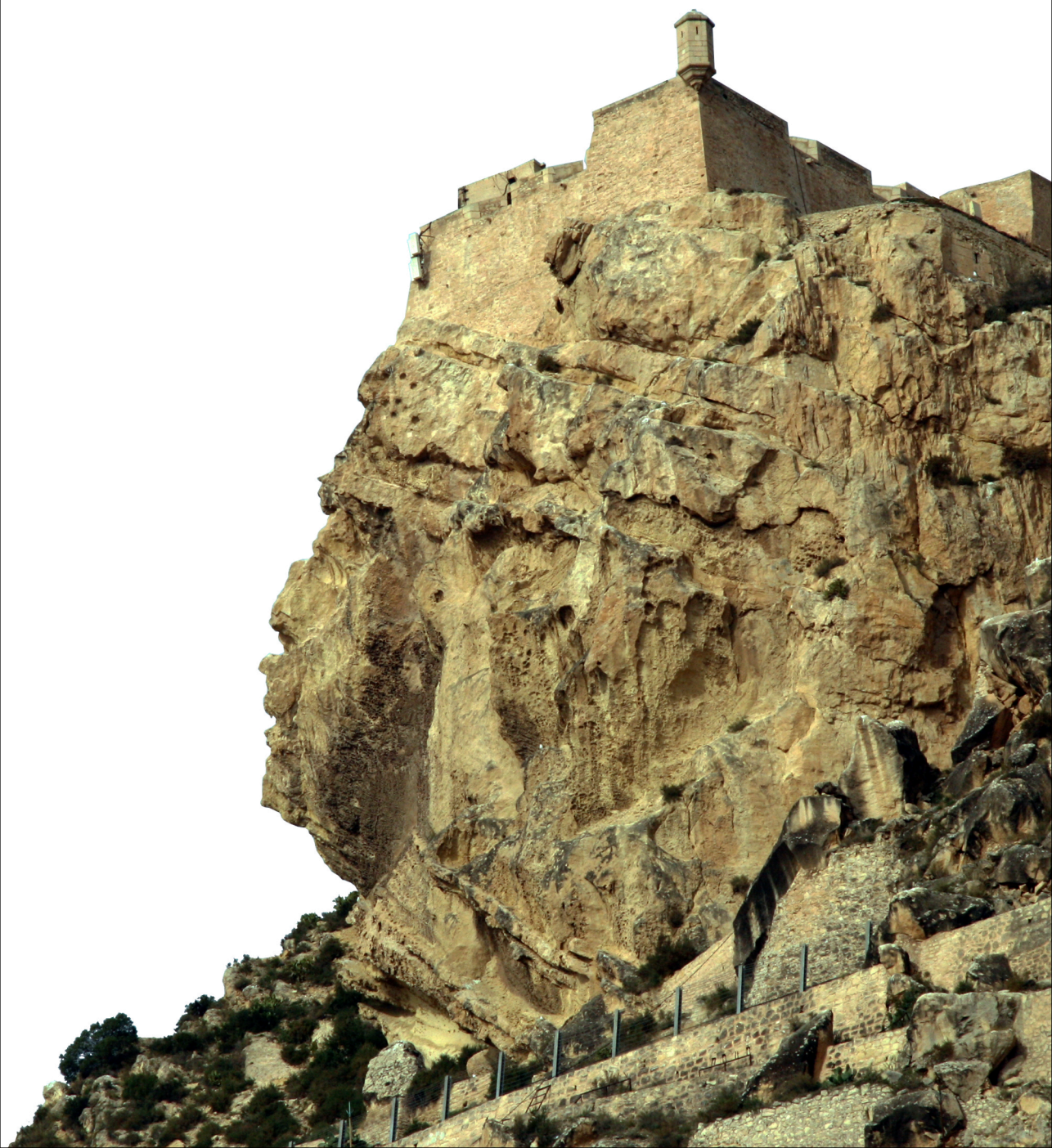


# 5 DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN

XV to XVIII Centuries

Víctor ECHARRI IRIBARREN (Ed.)



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## Venetian Island-Fortresses – Renaissance Innovation of Military Architecture

Dragos Cosmescu

### Abstract

The paper seeks to demonstrate the importance of the Venetian island-fortresses for the history of military architecture, as well as their innovative character. It will take into account both finality, and their components, to observe the architectural elements chosen to form the layout, as well as its overall positioning.

Starting from the idea for the sea rock used as gun position, the Venetian architects and engineers took this further and produced entire small islands covered in defensive walls. The development of the Venetian island-fortress encompasses the forts San Andrea (Lido) and San Nicolo (Sebenico), but also the lesser studied Suda and Spinalonga (Crete). They share not only a commonality of function, but they also present similar design features stemming from the philosophical approaches to defense architecture of the Renaissance.

**Keywords:** Venetian, islands, fortification, Renaissance.

### 1. Strategy of deployment

The role of the island-forts (*scoglio-fortezze*) is to command naval access and protect traffic, either the passage towards the harbor (like S. Andrea, S. Nicolo) or to natural harbors of suitable anchorage (like Suda, Spinalonga). These are not just coastal towers or simple gun batteries mounted on sea rocks, but militarized islands with the purpose to cover entry into harbors or sheltering bays. The functions of the Venetian island-fortress is to act like a detached fort, to push further from the asset the line of fire and to engage the enemy away from the asset it protects. These are state -not private- defenses, whose targets are external and consist of pirates and belligerent navies. They are not connected to a particular urban settlement, and thus easier to fulfill their role to protect and control maritime traffic.

Examples of this series include fort San Andrea (Venice), fort San Nicolo (Sebenico), forts Suda and Spinalonga (Crete), although a strong case can also be made for fort San Felice (Chioggia), the forts on the islands of Grabusa, Turlulu and Marathi (Crete), and the project of fort San Andrea (Pola). Also in the philosophy of constructing strong compact and independent defense positions to cover sea lines should be included the Octagons of the Lagoon of Venice.

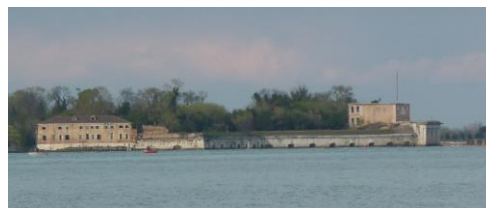


Fig.1. San Andrea fort

There are of course medieval predecessors for structures like these— designed to cover the entrance of the port, but there a definite innovation in the use of isolated rocky islets to build self-standing forts designed to defend safe anchorage bays behind them.

The *scoglio-fortezze* are independent fortifications, they are not connected to an urban settlement (most visible in the case of the Cretan islets) and are focused on providing control over a safe harbor. Such control is easier to maintain operating from an islet rather than from the coast, even from an isolated peninsula, since the complete surrounding with water makes the island-fortress many times more defensible and difficult to siege and virtually impossible to storm (with the capabilities of the Renaissance military force).

There is also an advantage in terms of the expected constraints of time, resources and expenses, since due to the small nature of these rocks, there is a relatively small area to cover with defenses (except perhaps in the case of Spinalonga), which make them more compact, cheaper to build and easier to man and provision. Also you remove the anchorage from the port harbor, thus you don't need to construct and maintain substantial infrastructure- arsenals, walled towns – just to offer your ships a safe haven. From a military approach, displacing the defense of the area to an islet, isolated from terraferma, renders it more secure with less extensive and less expensive fortification works.

The fort San Andrea of Venice is the more recognizable structure, yet shares only part of these functions with the rest of the *scoglio-fortezze*. The fortress is not a stand-alone defense, it was supposed to work in conjecture with the fort San Nicolo del Lido, opposite the mouth of the gulf, but his importance resides in its character as prototype to building a fort on an entire islet and in the architectural elements employed in its design. San Andrea, built in the period 1543-45, is in fact part of a large defensive system created around the Lagoon, gradually increased by Venice throughout the

XVIth century, and later by Austria and Italy, so that today there are over 50 fortifications of different types and epochs around Venice. Out of these, from the period of the Renaissance and the class of sea defenses, come the fort San Felice guarding the gulf entrance near Chioggia, as well a series of innovative floating battery-style positions called Octagons.

The Octagons are basically floating batteries anchored on patches of solid ground in the lagoon, stringing the main canals parallel to Malamocco, thus covering the communication lanes between the main mouths of the gulf, protected there by San Andrea in Lido and San Felice in Chioggia. The octagons are Poveglia, San Pietro, Ca'Romano, Campana, and their construction starts in 1571. Their octagonal shape, quite suitable for water level gun platforms, is also reprised in the design of the coastal fort of Avlemonou on Cerigo.

The importance Venice confers to these defenses is visible in the fact that it assigns some of its best architects and engineers to this task. The great renaissance architect Michele Sanmicheli worked on San Andrea and his nephew Giangiolamo Sanmicheli on San Nicolo, at a time when they were also involved in the major fortification works, town-size, developed by Venice across its territory, from the city walls of Verona to the bastions of Famagusta. To a later phase of island fortification belong the partially realized projects by foreign engineers in Venice in the mid XVIIth century, like the Dutchman van der Wert and the French Antoine de Ville.

Work on the fortress of St. Nicolo started the same in 1540s, under the guidance of Giangiolamo Sanmicheli, at the entrance of the narrow straits canal that leads from the Adriatic to the bay of Sebenico. In the case of San Nicolo, it replaces earlier, smaller, medieval structures, placed on both sides of the strait, at the Sebenico end. Now, with only one self-sufficient fort you can secure the entire access to the area.

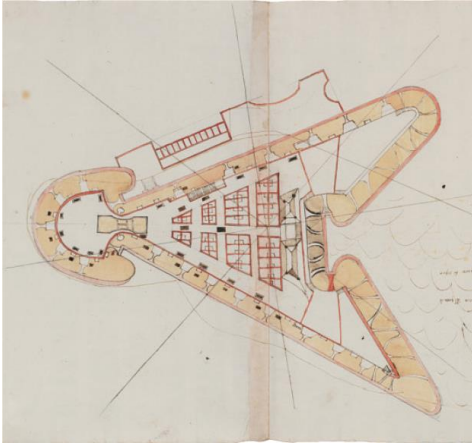


Fig.2. Map of San Nicolo fort, Biblioteca Treviso

San Nicolo is the prototype of these *scoglio-fortezze*. It set the rules to shape the fort along an axis leading from the land side to the open sea, and sets the design of the land front in the form of two facing demibastions, linked with curtains to the round artillery position covering the maritime approaches. After this, the other island-fortress will only follow its guidelines, albeit observing the constraints set by the morphology of their island.

latter program belong, amongst others, the fortresses of Spinalonga and Suda, projected and implemented by governor Latino Orsini. Both islands close off large and welcoming natural harbors.

The importance of such forts is visible from the fact that Venice insisted to keep them after the fall of Candia (1669). In fact, during the few peace overtures that existed during the extended war of Crete (1645-1669), the Turks even offered to leave the great city-port of Candia to Venice, in exchange for receiving the islands of Grabusa, Suda, Spinalonga and Tinos.

These island-fortresses are solid, reliable structures that have passed the test of time and have proven their military efficiency and prowess in accordance with their role of strategic importance. While only the Cretan forts on our list show active combat, these were subject to more one siege during the Venetian-Turkish wars of the XVII-XVIIIth centuries. In fact, in 1715, when the forts of Suda and Spinalonga were surrendered to the Turks, they were lost after several months of siege whose main tool was the blockade that forced them into surrender.



Fig.3. North view of Suda fort

This is visible in the case of the forts in the Cretan Sea. The island of Crete was one of the top possessions of Venice and thus significant attention was given to its safeguarding. The island suffered two significant Muslim raids, during the wars with Turkey in the XVIth century, and both instances prompted Venice to embark on two large fortification building programs, in 1540 and 1572, respectively. To the

## 2. Designing the defenses

The choice of architectural defensive features deployed in these island-forts is conditioned by the military roles envisioned and by the constraints of the terrain.

The fort **San Andrea** of Lido was designed by Sanmicheli in the rough shape of an isosceles triangle, with a wide curve curtain extending



towards the sea to the bastion. The curtains added to the artillery bastion of San Andrea form a span of 180 degrees, offering a tremendous broadside in the event a ship tried to slip through the mouth of the canal and into the lagoon proper. It set up a system consisting of a series of forty pieces of artillery at ground level, with terreplein walls giving the possibility to double the volume of fire.

The design of building the fort with flying curtains, anchored only to the central artillery tower but opened at the other ends, was only reprised much later, in an unfulfilled project to fortify the islet covering the entrance to the gulf of Trepano (Drapano, Argolida), but here the curtain were at a closer angle to the sea tower.

Inside the fort, parallel to the bastion, a gallery extends along its sides, with casemates servicing the gun ports, which open at the water level, in the wall. Same gunports at water level were introduced into the layout of fort San Nicolo in Dalmatia, but in the Sea of Crete, the fortresses have regular design casemates and embrasures.



Fig. 4. Section model of San Andrea fort, Naval Museum Venice

One of the main challenges of the fort was building the foundations in the murky waters of the Lagoon, and at a point with strong currents, close to the junction with the open sea. The layers of construction and the exhaustive task of building an artillery fort in the shallow waters around the canals can be seen on a cross-section model of San Andrea in the Naval Museum of Venice, showing the timbers drove vertically

into the mud, the layers of stone followed at sea level by the walls of heavy Istrian stone boulders. Likewise in the case of building the Octagons, there occurs the same necessity to support the heavy rock and brick structure with a dense network of timbers deep into the ground, since the perimeter of the octagons is set on the very edge of the islet.

Giangirolamo Sanmicheli designed fort **San Nicolo** in the shape of a triangle with prominent bastions, with wall foundations of stone. The fort is entered through an embellished gate with Renaissance decorative characteristics, which is located in the east curtain wall, accessed through a drawbridge. On the part closer to land there were placed to long demibastions, at an acute angle, and facing each other across a small straight curtain.

The fort ensures two tiers of fire, one at water level, another from the platform on top. On the ground floor, there are large gun ports covering the approaches, particularly in the *Torrione*, which forms the sea defense of the fort. This artillery tower is round and presents *orrechioni*, albeit extremely reduced since the layout does not allow it. They are placed there to cover the fort gate, and they do not sport *piazza-bassa*, although an embrasure is placed there on both sides. The gunports at sea level required adequate ventilation system, as well as light openings to the upper terrace above the casemates.

Basically this prototype of island fortification, with the philosophy to defend the land approaches with two facing demibastions and support them with long curtains reaching the seaward position at the other end of is deployed in Corfu as well, where we can even encounter the *mezzaluna* perched on a rock high above – just like in Spinalonga.

The sea front at San Nicolo is ensured by a strong artillery *torrione*, whose structure, thickness and interior casemates are closer to the similar post in Rocca a Mare in Candia, than the future solutions adopted in Crete, where the sea lanes are covered by means of *mezzalune*. The



round design of the seaward defenses is not however present in the case of fort San Felice of Chioggia, where the land defenses are the expected demibastions facing each other. On the sea side, however, the front is insured by two salients.

The island fortresses of Crete are a great example of engineering and resolution. The architects of the Serenissima identified islands where the morphology allowed crowning them with a set of walls all around them, leaving no place to land siege equipment, and thus making them virtually unassailable: Suda and Spinalonga.

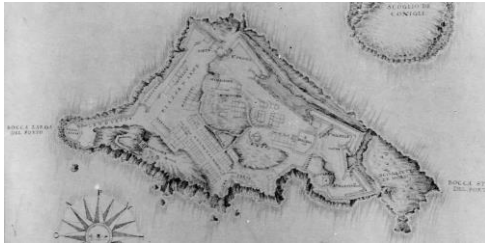


Fig.5. Map of fort Suda, Angelo di Oddi, BNMV

**Suda** fort is a remarkable design, with a complex structure and significant architectural features. Today, the state of heavy forestation of the island makes it impossible to grasp the extensive works undertaken by the Venetians at all the levels of the island, which feature bastions, demibastions, rectangular cavalier, *linguetta* with *mezzaluna*, auxiliary buildings and a larger than expected *piazza d'armi*.

The construction of the fortress on the island was started in 1573 by the Venetians, in order to reinforce the defense of the gulf. The architect and supervisor of the constructions was Latino Orsini, in charge of the large defensive building program in the aftermath of the loss of Cyprus. The compound is an example of excellent fortification work, taking advantage of the islet's morphology. Its strategic construction provided smart solutions to possible threats from the neighboring coast and against naval attack.

On the northern, shorter, side of the island of Suda are the demi-bastion Martinengo and the bastion Michele, both with *orecchioni* facing each other. In this case, Michiel is a complete bastion, with two retired flanks covered by *orrechioni*. The walls are made of stone faced masonry covering revetted earth, with a cordon separating the parapet from the scarp. Their lower part is built on stone outcrop, while the top is crowned with gun embrasures. Behind them was built the Mocenigo cavalier, a square structure which provides firing cover for both bastions. Michiel has an *orecchione* also on its western side, which leads to the bastion Orsini, with its recessed flank, and the Venier bastion, at an angle, with straight flanks. Parts of the curtains are doubled by a *falsabraga*, and in traverses were used on the bastions.

The Mocenigo cavalier is quite impressive, raising high over the terreplein, with several cannon embrasures on its walls. In shape and design it is quite similar to the Camposanto and Andruzzi cavaliers in Famagosta, only much taller. At the southern end of the circuit there is a *mezzaluna*, connected with a *linguetta* to the main enclosure. This forms the sea defense platform, and its layout is similar to the same structure employed, in the same position and function, in Spinalonga.



Fig.6. Interior of *mezzaluna* Michiel, Spinalonga

The *mezzalunas* deployed in Suda and Spinalonga present similar layout and composition: semicircular, situated at a lower level than the connecting structures, with casemated gunports at the base and a wallwalk above them with handgun firing position. In fact, in Spinalonga, the casemates are not present,

only the wall is thick enough to provide space for a parapet above. In fact, the casemates in the sea bastion of suda are closer in design to the casemates employed in the *mezzaluna* Mocenigo of Spinalonga, rather than its corresponding counterpart in role, position and role, namely the *mezzaluna* Michiel

The island of **Spinalonga** is located at the entrance to the long bay of Mirabello in eastern Crete, and it does present a morphology similar to a “long spine” like the namesake. Initially, Spinalonga evolved from a tip of peninsula, and was separated from the mainland by removing the narrow causeway that connected it to dry land. Even today, many rocks are observable protruding from the water on the area that was excavated to create the island and thus increase manifold its defensive qualities and capabilities.

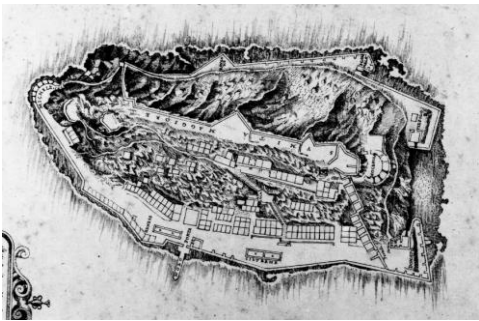


Fig.7 .Map of Spinalonga, Angelo di Oddi, BNMV

The land front is secured by two very large demi-bastions were built: Tiepolo and Donato. The latter bastion features an orecchione on its eastern flank, and a postern opens here from the inside. The eastern, Tiepolo bastion, is all square with a more simpler shape, without the *orrechione* like its counterpart Donato - in whose case it was useful to cover the sortie in its recessed flank. From the series of historical paper-mache models of territories and towns in *Stato da Mar*, you can see how the initial islet has been enlarged on the land side to support the building of the two large demibastions.

On the southern side, towering above these bastions, is the large *mezzaluna* Mocenigo, a massive circular structure with several robust gun ports, very similar to the one perched midheight on the rock of the Land Castle in the Old Fortress in Corfu. The construction rather is disproportionately large, which walls very thick and long casemated gun ports.

On the western side the circuit is rather unassuming, with no specific defensive structures, while on the eastern side, from the Donato bastion forward, is followed by the half-bastion Scaramella, with an orecchione on its south side, and the Molino bastion. At the end of the enclosure stands the Michiel *mezzaluna*. The bastions have embrasures, but the curtain is narrow and only features a wallwalk.

Another specific feature of Spinalonga is the fact it strives to split the fort into two sections, separate by a long curtain on the summit, and communicating through the Carbonarra Gate on the west, towards the Donato bastion, and the now lost Molin Gate in the north. The positions on this second enclosure include the curtains Mema and Falier, towards south, and the *piazas* Mosta and Moretta, on eastern side of the island peak. Behind the Mocenigo *mezzaluna* are the cavalier Miani and the Venier curtain. From here, northwards, the Orsini cavalier towers over the Molino bastion.

### 3. Organizing the space

The organization of the space differs depending on the size of the fort and its proximity to significant port cities, which also determines its role. This is most visible in the case of the Cretan bases, which, being left the only Venetian establishments in the area after 1669, began acquiring a larger civilian role, seen by their population with buildings such as storehouses, private houses, churches.



Fig. 8- Gate and gunport, San Nicolo fort

The Renaissance ornaments and decorations are more present in the forts of the 1540s, than the later ones. The gate of the fort San Andrea is similar in size and design to the land gates of Zara and Candia, with a decorative facade with three arches with Doric columns, while the gunports in the curtains are decorated with big *mascheroni*. The gate of San Nicolo presents a frieze with trilobes and decorated metopes, and above it stood, until the 1920s, a large statue of the lion of St. Mark as symbol of the Venetian Republic. The aesthetic value, present in San Andrea and San Nicolo, is reduced later, and the gates lack the architrave ornated with bucrania. The gate in Spinalonga, situated in the middle of the western curtain, with rusticated stone and

two pillars supporting a metope bearing a Latin inscription.

The space was used with much efficiency. Even on the very small space afforded by the platform level of the fort San Nicolo of Sebenico, there were constructed a storehouse, several lodging buildings, a house for the castelano and one of the gouverneur of the fort, munition storage, as well as small church. In Spinalonga, the buildings were concentrated inside the interior enclosure mentioned, meaning almost all of these were on the west side of the fort.

Suda contained *quartieri* (barracks) around a small *piazza*, which also features small magazines and a church dedicated to the Annunciation, along with several warehouses, cisterns and a house for the commander. After 1669, Suda became the center of the remaining Venetian possession in the Sea of Crete, adding inside a chancellery, palace for the *Provveditore Estraordinario*, prison, armory and six churches, of which three for the Orthodox Greeks. The Naval Museum of Venice has a very large and detailed model of the fort, from the late XVIIth century, showing the concentration of buildings and the use of the space.



Fig.9. Donato and Tiepolo bastions, with Mocenigo *mezzaluna* in background, Spinalonga

### 3. Conclusion

The role of the island fortress is to establish fire control over the maritime approaches and thus

control access to the sheltering it guards. It does so all the while observing the requirements of defending the landward side with the means of Renaissance military architecture. Strong design

similarities emerged from this, visible in most of the *scoglio-fortezze* built by the Venetians.

The main importance of these islands was that they were positioned in great anchorage bays and thus could protect ships seeking shelter from

adversities (storms, attackers). This can be seen in the case of the Cretan forts that became essential for Venetian trade routes as sole their sole possession in the area for almost half a century after the peace of 1669.

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