Le infezioni nella Storia della Medicina

Infections in the History of Medicine

The Venetian Lazarettos of Candia and the Great Plague (1592-1595)

Il lazzaretto veneziano di Candia e la Grande Peste (1592-1595)

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BRIEF HISTORICAL NOTE

Venetians, the great beneficiaries of the dismemberment of the Eastern Roman Empire which followed the fall of Constantinople in 1204, occupied most of the Aegean and Ionian Islands, as well as a significant number of ports and castles in mainland Greece [1]. Crete was their most important naval and commercial base in the Mediterranean. After the conquest of Venetian possessions by the Ottomans, such as Chalkida (Negroponte) (1470), Methoni (1500), Koroni (1500), Nafplion (1540), Monemvasia (1540), Famagusta (Ammohostos, Cyprus 1572), and the expulsion of the Knights of the Order of St. John from the island of Rhodes (1522), Crete was the ultimate bastion of Christianity in the Eastern Mediterranean (Figure 1) [2]. Crete became a single administrative region of the Venetian state, under the name the "Kingdom of Crete" (*Regno di Candia*), the senior management of which was ceded to the elected Duke of Crete (Duca di Candia). The capital of the island, Candia (modern Heraklion), was populated mainly by Greeks (80%) and Venetians (20%), as well as by a Jewish community, while their co-existence was peaceful. According to the census of 1589, i.e. three years before the Great Plague, the population of the city was 16,733 residents [3, 4].

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Sanitary Organisation of the Venetian Possessions in the Greek Territory

The Venetian Republic soon realized the political, economic and military importance of Greek colonies. Moreover, the geographical position of Venetian possessions in the Mediterranean Sea, which is located on the border between East and

Figure 1 - The Lion of St. Marcus of Venice over the island of Crete (Collegio di Venezia, Nicolini MDCLI, fol., di cc2 e tav. 62, tav. 1).

West, made them a major gate of entrance for many infectious diseases through the commercial and military routes of the armadas [5-7].
In this context, Venice showed a great interest in preventive medicine and the protection of public health (construction of lazarettos or pest houses, establishment of welfare institutions and hospitals) [8]. Every island had its own *Proveditore alla Sanità* (Health Superintendent) and *Magistrato alla Sanità* (Health Magistrate), staffed by the following sanitary officers: *Priore* (Health Director), *Cancellier alla Sanità* (Health Secretary), *Coadiutor di Sanità* (Health Assistant), *Inspettori* (Temporary Assistants) and *Quardiani* (Sanitary Police). Every *Lazaretto* had its director (*Priore)*, *Dottori* (physicians) and a sanitary armed garrison [8-10]. The Venetian health model, which applied the concept of lazarettos, was also implemented in Crete. Furthermore, several monasteries, hospitals and charitable institutions assisted the efforts to limit and combat epidemics [11]. The pest houses of Candia were the Lazaretto of Saint Lazarus and the Lazaretto of Cape Saint George.

The Lazaretto of Saint Lazarus (San Lazzaro)
Located outside the city, to the west of the Chanioporta gate and the Pantokrator bastion, the lazaretto was connected with the monastery of Saint Lazarus and the Catholic doctrine. According to the writings of the famous geographer *Buondelmonti*: "*Dum sic loquimur ad Sanctum Lazarum extra Civitatem accedimus, respice inquid versus Occidentem ...*" [12-13].
The involvement of Venice in the wars against the Ottoman Empire led the *Signoria* and *Proveditori* to more actively engage with the fortification of the city, rather than with the reconstruction and better functioning of the lazaretto. The building was depicted for the first time in the drawing of *Domenico di Este* in 1567 [14].
The same building was depicted again in 1573, in another drawing by di Este.
It also featured in *Emanuele Mormori's* map, "*Atlante Mormori*", in 1602, as well as in the map by Giorgio Corner, "*La città di Candia*", in 1625 (Figure 2).
However, the building was not depicted in the Ottoman siege plans (1648-1669), thus advocat-

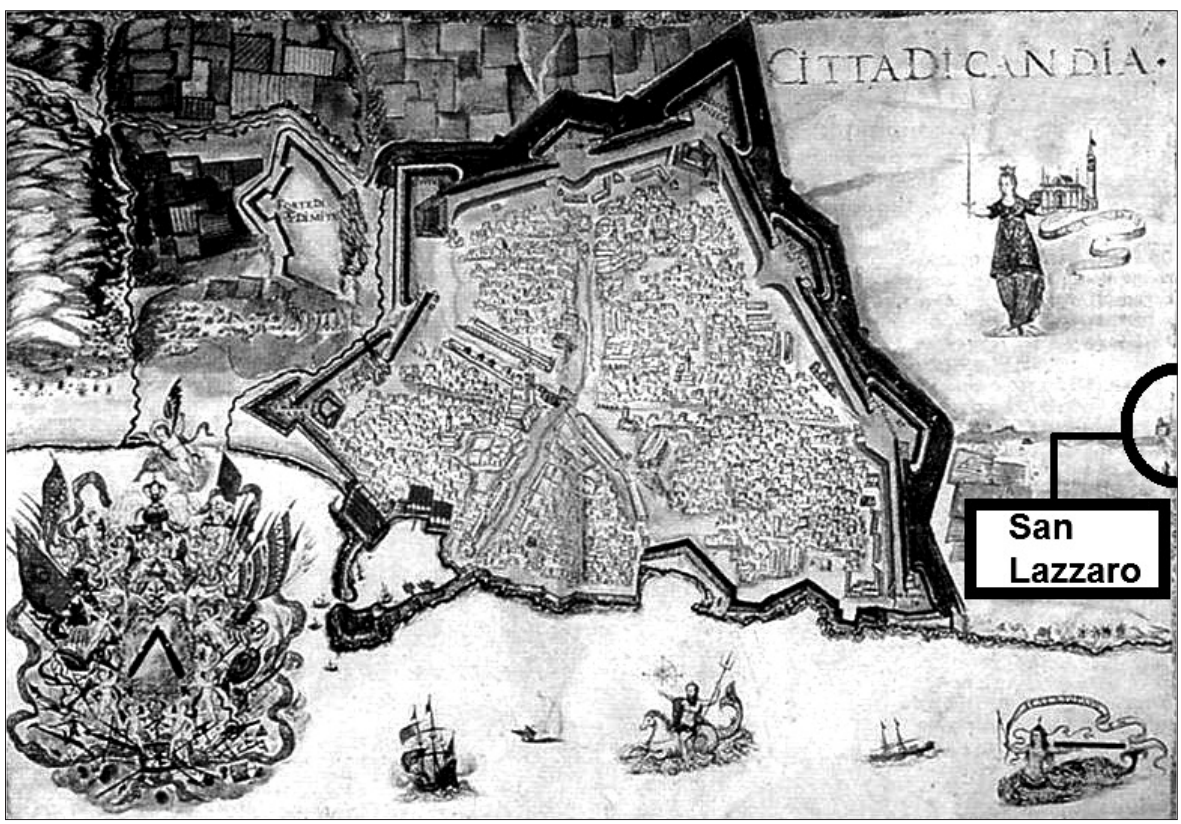

Figure 2 - The city of Candia (Giorgio Corner. La città di Candia in Il Regno di Candia, Candia 1625, dis. n. 2, cc. 6v-7r).

ing the theory that it had been destroyed by the start of the siege. By contrast, the Ottoman artillery is depicted in place of the lazaretto, which had been bombarding the bastion of Pantokrator (Figure 3) [12].

The institution is found in Venetian documents under the names *Monasterium Sancti Lazzari*, *Monasterium infermorum Sancti Lazzari*, *Ospedal delli infermi de San Lazzaro*, or more broadly *San Lazzaro* [11].

The establishment of the monastery dates approximately back to the 13th century. Following the plague of 1456, its operational inability to respond to long-lasting large-scale epidemics became more evident. The next occasion when it was used as a lazaretto dates back to the plague of 1592 [12].

The institution was administratively connected to the local Latin Church. Its head was a clergyman with a salaried office for life, whereas he was elected in collaboration with the Venetian administration [15]. The institution ceased operating in 1648 at the beginning of the siege of Candia.

The Lazaretto of Cape St. George (San Zorzi della Punta)

After the plague of 1456 and the subsequent operational problems that arose, Venetians realized the need for the creation of a dedicated lazaretto. Therefore they converted the Monastery of Cape St. George, which belonged to the Community of Nazareth, into a lazaretto. The complex is mentioned in Venetian documents under the names *Lazzaretto*, *Lazzaretto di San Zorzi della Ponta*, *Chiesa et hospidale del Lazzaretto di San Zorzi della Ponta*, *Hospedal di San Zorzi Acrotiri sive della Ponta di questa città* [11].

The lazaretto of St. George is believed to have been destroyed in the siege of 1648. Typical cases where the lazaretto is probably depicted are the drawing of the Dutch Nicolaus Baumann, "*Candiae urbis a turca 1647*", along with the drawings of the French Francois Chemitte and Pier Mallet, in 1652 (Figure 4). Moreover, in maps dating back to 1660, 1666 and 1668-1669, we may trace the same building, which supports the view that the lazaretto might not have been destroyed after all [11]. Memoranda

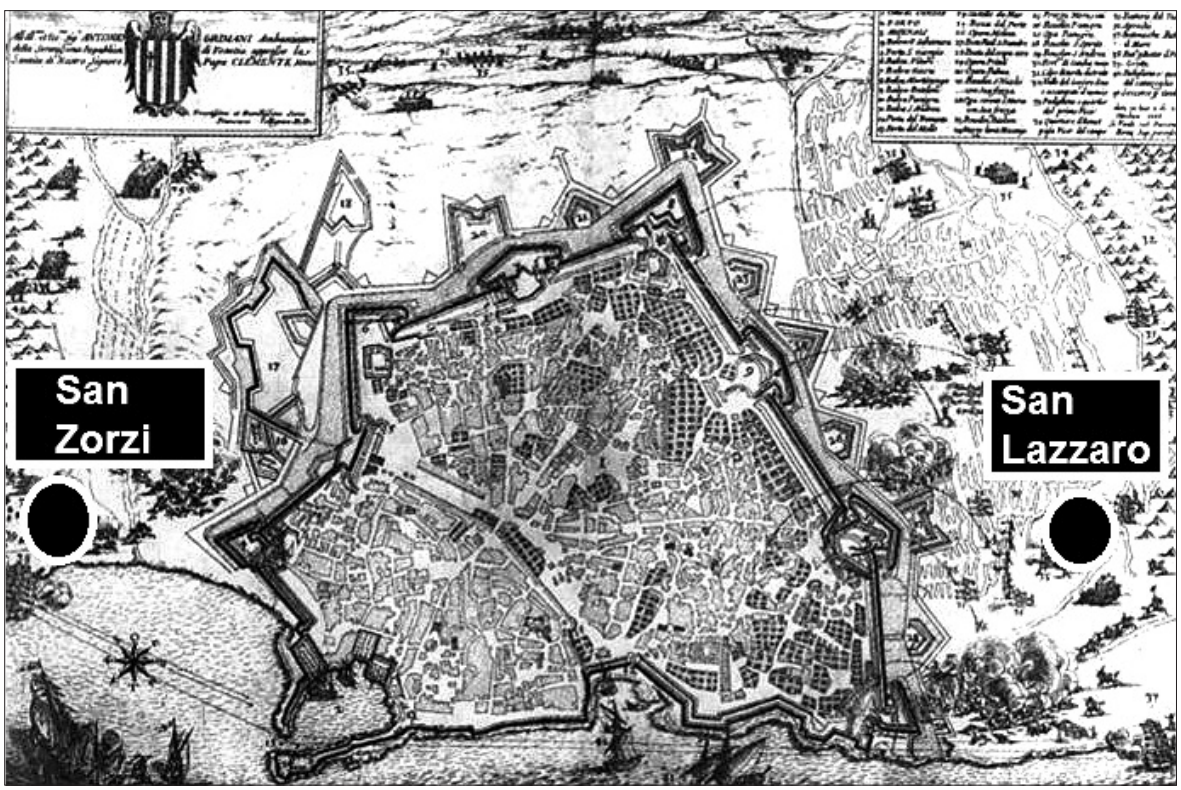

Figure 3 - The Ottoman bombardment of the bastion Sabionera from the lazzaretto San Zorzi della Punta (left) and the bastion Pantokrator from the area of the destroyed lazzaretto San Lazzaro (right) (Francesco Collignon. Pianta della città di Candia assediata da Turchi, 1668. Raccolta di cinque piante topografiche della città di Candia durante l'assedio dei Turchi, Roma 1668).

and blueprints from the time of the siege, where artillery positions, tents of Ottoman officials and trenches are illustrated, bear the word *Lazaretto*, whereas a building complex is also displayed. A battery was installed in the region around the lazaretto, whose range included the northeastern bastion of *Sabionnera*, as well as the eastern jetty of the port and the dockyards (Figure 3).

The lazaretto followed the classic Venetian administrative structure of hospitals. A head *Priore* managed the institution, with the help of two nobles who acted as economic administrators and one committee of four senior officials. In addition, a salaried doctor was present in the lazaretto on a permanent basis [14]. The lazaretto's contribution to the public health of Candia is controversial. Whereas its contribution during the plague of 1522-1525 and 1571 has been praised, its operation waned later on, due to the establishment of a permanent quarantine station on the island of *Dia* [16].

The Venetian documents indicate the rigour which governed the operation of the lazaretto in the early 16th century, whereas the abandonment, laxity and discrediting of the institution during the plague of 1592, are evident in the report of the intendant of Candia to the Venetian Senate [17]. The stringency which prevailed until 1592 is evident in examples of bounties emerging from decisions of the Administration. The most typical example is the decision of April 18th 1523, when the senior official of the lazaretto, *Thomas Patsidiotis*, was outlawed for having abandoned his post in the lazaretto, "with no respect for those who had entrusted him to govern them" [18]. After the capture of the surroundings of Candia by the Ottomans in 1648, the buildings were abandoned and the lazaretto was transferred inside the city, where

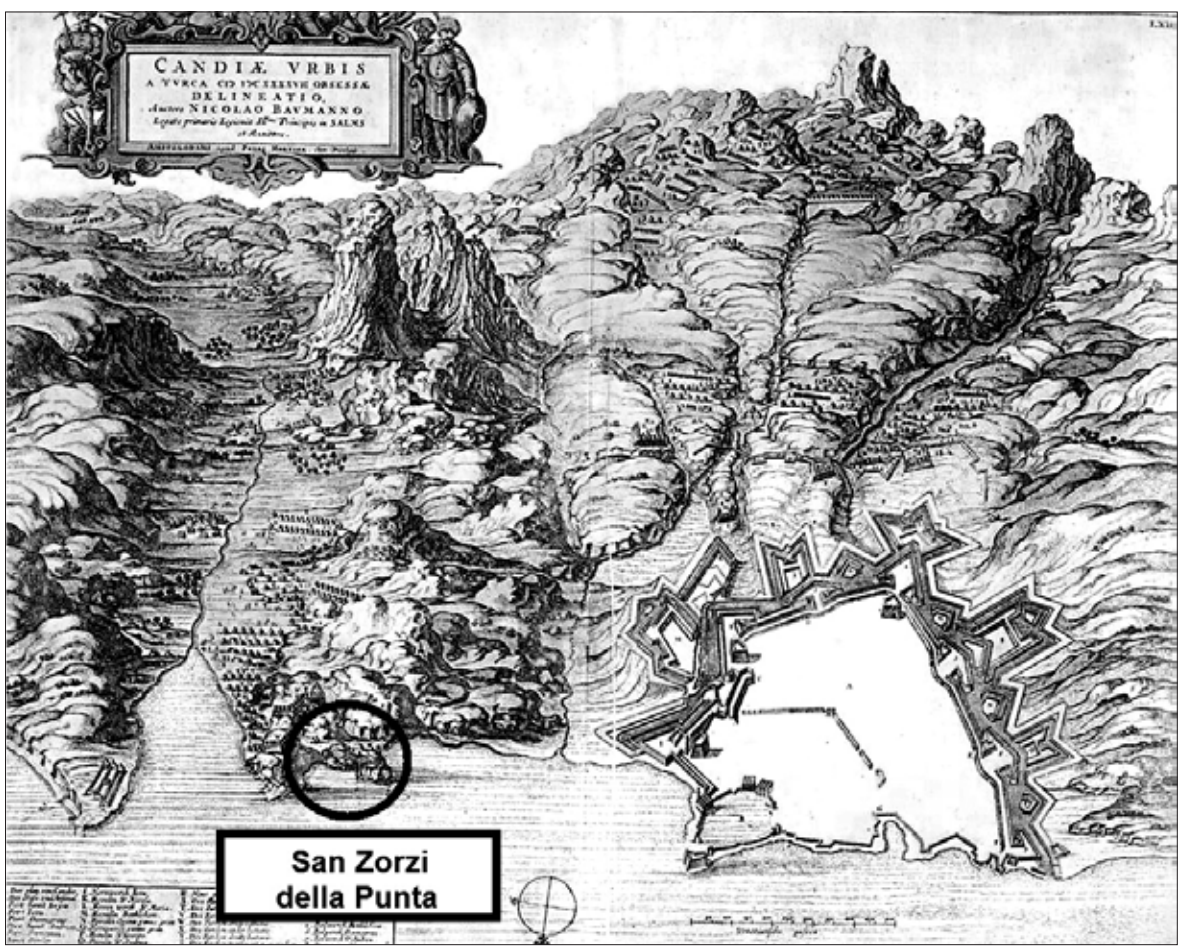

Figure 4 - The siege of Candia (Nicolaus Baumann. Candiae urbis a turca MDCXXXXVII obsessae, Delineatio, 1647).

it operated as a dockyard lazaretto and took over an important nursing role during the epic siege (1648-1669).

The Great Plague of Candia (1592-1595)

Crete and Candia had been hit by plague several times in the past, for example during the Plague of Justinian or the Black Death [19]. During the second epidemic and throughout the 16th century, Candia was struck by plague during the years 1348, 1350, 1362-1365, 1376, 1389, 1398, 1408-1409, 1416-1419, 1444, 1456-1457, 1461-1462, 1522-1525, 1556, 1571 and 1575-1576 [20, 21]. However, the plague of 1592-1595 proved to be the worst that the city had ever experienced since the time of the Black Death, despite the stringent sanitary measures that had been in place since the 14th and 15th centuries, when Italy was struck by epidemics.

The data for the study of the 1592 epidemic were obtained from two basic sources, one Venetian and one Greek. In particular, the sources used are the following: a) the report of the Venetian Capitano Generale, Filippo Pasqualigo, to the Venetian Senate; b) the work of the Greek chronicler and eyewitness, Ioannis Vergitsis, namely "*Historia della peste nel Regno di Candia 1592*", which verifies the report of Pasqualigo [17, 22]. Additionally, data were drawn from other sources by Venetian officials, as well as from the code of the Chronicle of St. Anthony's Greek-Orthodox Monastery of Apezonon [23, 24]. Pasqualigo's report is highly reliable, as it is not a simple narrative, but rather a military document. The report had to be extremely detailed - and it actually was - because Venice had to be fully aware of the disaster.

According to the report by Pasqualigo, the ship of Captain George Pachopoulos arrived in Candia on January 28 1592, after having its health documents and certificates checked before its departure from the port of Constantinople [17, 22]. The ship left Constantinople on January 19 and its journey lasted ten days. When the ship arrived at the port, the doctors ordered the crew to enter the sea and to wash their clothes with seawater, as was usual in such cases. The crew were then allowed to return to their homes, without there being any suspicion or indication of typical symptoms. A few days after the ship's arrival, one sailor of the crew fell ill; by decision of the Provveditori alla Sanità, the sailor named Lorenzo was transferred to the lazaretto of San Zorzi della Punta. However, he died on his way there while aboard, where he was said to have been coughing up blood (haemoptysis) [17, 22]. The ensuing autopsy found conceited glands in the inguinal region with black spots on the skin. The doctors identified a malignant abscess or anthrax, whereas they were persuaded that the sailor died because of travel fatigue of the journey [17, 22]. The ship was sent to the small island of Dia (located six nautical miles from Candia) for precautionary reasons, in order to be disinfected along with its sailors, while Lorenzo's house was purified and his relatives were sent to the lazaretto, for reasons of precaution as well. There, Lorenzo's wife, daughter and sister eventually passed away. The doctors were not particularly concerned about the fact that four people had died, because no new outbreak occurred during the next 42 days.

Suddenly, after 43 days, i.e. on March 22 1592, many outbreaks occurred simultaneously in Candia, along with the first deaths being reported in a village with 700 inhabitants located one kilometre from the city. According to Pasqualigo, the doctors bore the main responsibility, as they had once again identified conceited glands in the inguinal region when they conducted autopsy on the new victims, but did not realize their infectious nature, "*… pettecchie e macchie pavonazze che se ben prima erano state vedute in qualch'uno al lazaretto, non erano però da Medici stimate contagiose …"* [17]. In fact, the doctors were assertive that they were not dealing with plague, "… *negando assolutamente che fusse peste* …". After the doctors' second lost opportunity to identify its existence, the disease spread rapidly and, by a decision of Pasqualigo, the city sealed its gates and port [17]. The epidemic escalated and around 60-70 people would pass away daily, while the peasants who had visited the city would carry the disease back to their villages, "… *et per li feriti della Città, che giornalmte crescevano in quantità, morendone sessanta, e settanta al giorno* …" [17]. According to the Chronicles of St. Anthony of the Monastery of Apezonon around 200 people would pass away daily [23]. In an attempt to limit the disease, Pasqualigo ordered his soldiers to set up barricades along the boundaries of Territorio Candia. Candia was thus isolated from the outside world, preparing to experience the ensuing drama on its own.

Zaccaria Soranzo, a Venetian official, reported that the doctors, pharmacists and barbers were trying to keep patients alive by using exsanguination [24]. Inside the city, the only thing to

hear was wailing, while the first signs of social disintegration started to appear during the night time. The Venetian Guard tried to enforce order but the city was disrupted, anarchy was reigning and crime rose rapidly. Pasqualigo decided to keep a large part of the Guard isolated inside the castle, in order to protect his soldiers, while a small number of soldiers were patrolling the city. The rationale of Pasqualigo is really interesting, as it demonstrates his genuine commitment to the interests of the Venetian Republic. As he reported, Pasqualigo thought that a possible breach of the Guard with many deaths would force the Republic to make a new recruitment, thus spending more money and burdening its affairs and obligations, "*… nuova provisione di fanteria, con molta spesa, et travaglio delle cose sue …"* [17]. However, some soldiers were about to make a fatal mistake. Despite Pasqualigo's orders, the soldiers turned to ephemeral pleasures by secretly allowing prostitutes to enter the barracks at nights, without knowing that they brought the disease with them. Soon the disease started to decimate the Guard inside the city castle. The military chambers could accommodate 5-6 people. If one got sick though, the rest were automatically considered as dead, even without showing any symptoms, and they were consequently sent to the lazaretto, "*… come uno si feriva convenivano gl'altri, necessite perire …*" [17].

The doctors were by then unable to control the situation. Many of them died and in many cases their death was welcomed by residents, who deemed doctors as responsible for the spread of the epidemic and considered their death to be divine nemesis, "*Il che come si conobbe esser stato voler di Dio …*" [17]. In June and July 1592, the outbreaks and deaths declined and the city reopened its gates. However, a second wave occurred in January 1593, which made the residents start abandoning Candia. When the millers and bakers passed away and the farmers refused to transfer wheat to the city, the situation deteriorated. Since the dead remained unburied because the gravediggers had also died, each had to bury his relatives on his/her own. As we are informed by Pasqualigo, it must have been a terrible spectacle to see a father bury his own son, a brother bury his own sister, or a woman bury her own husband, "*… onde rendeva miserabile spettaculo veder il padre necessitato a dar sepoltura al figliulo, il fratello alla sorella, et la moglie al marito …*" [17]. That is when the Venetian and Greek nobles asked the authorities to allow them to leave the city, with the promise that they would return with food from the villages. Of course, the nobles and residents who left the city never returned or sent any food. A total of 1800 residents remained in the city. Criminals would steal clothes from deserted houses and carry them to other places in the city, thus spreading the disease. Violators faced serious penalties but discipline was hard to enforce, at a time when residents were burying their relatives wherever they could inside the sealed off city, "*… che non solamente andavano seminando, et ampliando il contagio, ma in tempo di note davano sepoltura alli corpi secretamente nelle case, et in diversi luochi, a stade publiche della Città …*" [17].

While all this was happening, in the midst of the epidemic, an urgent report by the Ambassador of Venice in Constantinople arrived in Candia. According to his report, the Ottoman fleet was preparing to go out in the Aegean, although no one was sure whether the Knights of Malta or Candia were their target. During the early hours of April 15th 1593, on Easter Sunday, a squadron of Ottoman galleys and heavy gunboats (*galeasas)* anchored outside the sea walls. Pasqualigo decided to take a risk, as he was not aware of their intentions. Moreover, out of a total of 100 military patrols, a sole 6 patrols were remaining on the walls for the protection of the city. The Venetian commander ordered his men to set up a spectacular carnival, in an obvious attempt to show that the city had not been affected by the disease and that the defenders' morale was thriving. Throughout the night, the city pretended that it was celebrating. At dawn, the Ottoman fleet raised its anchors and departed from Candia. The lack of historical evidence suggests that no one will ever find out the real intentions of that strange arrival of the squadron. In any case, the city was saved from a potential risk - however, plague continued its lethal course throughout 1593.

February 1594 marked a major resurgence, followed by new outbreaks in 60 houses and the death of many soldiers in the city, as well as in another 20 villages surrounding it [17, 22, 23]. The inhabitants bought food supplies for 40 days and withdrew at their homes. Candia resembled a ghost-town and the Authorities were vainly trying to arrest the thieves who removed dead people's clothes and valuable items from their houses. Theft proliferated and dead people's clothes were responsible for spreading the disease to another 200 houses [17]. The Health

Authorities demonstrated remarkable skills, as they managed to go through all houses in the city and "decontaminate" them with myrrh and aromatic fragrances, as well as with sulphur and tar, burning or boiling the contaminated items.

The consequences of the ongoing epidemic did not take long to become apparent. Work on fortifications was halted and the staffing of galleys became problematic, whereas the general commercial decline deprived the government of its profits from the revenues of duties. Pasqualigo decided to borrow money from individuals and, just like a Shakespearean "Merchant of Venice", he borrowed from the Jews of the city in order to pay the soldiers who were hospitalized in the lazaretto, who had to take care of themselves on their own and buy their own food [23]. In his report, Pasqualigo asks the Signoria of Venice to pay off his creditors, as this would prove valuable for public trust and faith in the Republic, "… *per giustitia, e per conservatione delta fede publica le piaccia dar ordene tale, che piu non s'habbia a mettervi difficolta ..."* [17]. In the summer of 1594, the terrible scourge lost its vehemence. By then, new outbreaks would occur only every six or eight days. After 111 days with no new outbreak, the embargo of Candia was finally lifted in October 20, 1594.

The last wave of plague occurred in March 1595, with an obviously weakened impetus. By the beginning of the summer, the situation had been completely alleviated. In September 1595, after three years of epidemics, the city and countryside of Candia were officially free from plague [17]. After the end of the epidemic, the inhabitants, whether Orthodox or Catholic, contributed to the building of the church of San Rocco, who had been declared as patron of plague-sufferers according to the tradition of Italian cities.

Demographic and Epidemiological Approach

Demography

The data from the censuses of the island, as set forth by Venetian officials, may prove helpful in drawing interesting conclusions regarding the mortality rates of plague. In 1579, according to Jacobo Foscarini, the population of Crete was 219,000 [25]. Based on the data by Pietro Castrofilaca, the island was populated by 206,914 inhabitants, a number which is generally considered as reliable, whereas Candia with its periphery comprised 90,179 inhabitants [26]. The

Table 1 - Deaths from the epidemic in the city of Candia (1592-1595).

	Deaths	*People recorded alive*	*Mortality rates (%) of the total population, according to the census of 1589, by sex*
Men (Greeks and Venetians)	2.228	2.762	44,6%
Women (Greeks and Venetians)	2.078	4.469	31,7%
Boys			
up to 15 years old	1.766	902	(~66.1%)
Latin Priests and Monks	50		
Soldiers	1.000	500	(66,6 %)**
Illegitimate Children (Bastardi) Prostitutes (Greeks and Venetians) Unofficial Spouses of Soldiers (Greeks and Venetians)	1.184		
Jews	294	417*	(41 %)**
Total	8.600	Total mortality rates (%) of 16,733 residents, according to the census of 1589: 51,3%	

(*) In the Venetian census of 1589, Jews were not included among the general population of the city, although their number had been recorded. However, they were included in the census of those who passed away.
(**) The data on Guards and Jews were not included in the census of the general population, in 1589.

census by Zuanne Mocenigo on the eve of the epidemic outbreak, in 1589, recorded 16,733 people in Candia. A new census was conducted by Mocenigo in late 1593; as he characteristically states, the "*Descritione delle anime di tutto il Reggim(en)to di Candia dia fatta dopo che cesso il contaggio che fu I'anno 1592,"* i.e. the census was conducted after the plague had subsided, thus indicating that the Authorities were convinced that the epidemic had taken its toll [3]. Ultimately, the total number of deaths amounted to 8,600 inside the city, i.e. a loss of 51.3% (Table 1). On the other hand, it was really difficult to measure the number of deaths in the surrounding villages. Nevertheless, the Venetians managed to count a total of 5,308 deaths in the countryside. In particular, the Authorities registered 1,128 men, 2,815 women and 1,365 children (up to 15 years old) among the victims [17]. Another 294 deaths were recorded in the Jewish ghetto (Giudecca), but due to the particular character of the district, which had its own gate that remained closed at night and thus the community lived in isolation from the rest of the city, the Jewish records could possibly shed light on various topics regarding the Jewish reactions to the epidemic. Unfortunately, the Battle of Crete in 1942 and the German invasion of the island were followed by a pogrom against the Jewish population of Heraklion, accompanied by the complete destruction of the ghetto, of the synagogue and historical records; consequently, we are content solely with the Venetian sources.

It should be noted here that the census of 1589 comprised three main categories: men, women and children up to 15 years old. However, Pasqualigo uses a different method of classification in his report, thus making it difficult to draw firm conclusions about the mortality of individual groups. A rather interesting and special social group that appears in Pasqualigo's report are the numerous prostitutes in the city, i.e. the women with whom the soldiers often lived and had illegitimate children. Unfortunately, the existence of these special groups complicates the demographic data, as we can assume that, by 1589, the women and children would logically have been included in the special categories mentioned above. Once again, children proved vulnerable to plague epidemics, indicating a very high mortality rate of 66,1%. However, this figure is not to be considered reliable. Based on Pasqualigo's report, we are not in a position to know the exact number of illegitimate children that were included in the category "children up to 15 years old", in 1589, which alters the original total number of children, as well as total mortality rates.

The censuses of the population of the city of Candia by Donato in 1598 (12,000 residents), by Sagredo in 1608 (14,000 residents), by Corner in 1627 (11,474 residents) and by Contarini in 1636 (12,662 residents), have each recorded a different number of citizens. However, the population would find it hard to reach pre-plague levels once again [27]. Such demographic decline is also reflected in the general population of Territorio Candia, where it would take many years before the population returned to the levels before the terrible epidemic.

Epidemiology

According to the accounts of the epidemic, we may distinguish four distinct waves that struck the city: a) January-September 1592, b) December 1592 - April 1593, c) February-October 1594, and d) March-September 1595. Many interesting questions emerge from a study of the epidemic.

Based on detailed descriptions, we may recall the events. The ship began its journey from Constantinople on January 19 1592, after having its health certificates (*fede di partenza*) checked at the port of departure. After a journey which lasted ten days, it arrived at the port of Candia on January 28, with no member of its crew displaying any symptoms while on board. The first outbreak occurred almost simultaneously after the arrival of the ship and involved the death of the patient and three other members of his family. We do not know the exact time of death of those four people, apart from the fact that the Authorities had been informed of the developments 42 days in advance, "… *non essendosi sentita per lo spatio di quaranta due giorni novità alcuna nella Città …"* [17]. Moreover, we cannot be sure what Pasqualigo meant by 42 days or how he calculated this period. But given that the epidemic occurred on March 22, we can travel back in time to January 29-30, that is one or two days after the arrival of the ship. Vergitsis reports that the sailor passed away a few days after his arrival, while Pasqualigo notes that after the ship's arrival, the sailor visited a nearby mountain (30 km from Candia) on foot, in order to pray in the church there. He was unable to complete the distance, though, and thus returned sick to the city, and on the ensuing day the doctors decided that he be transferred to the lazaretto [17]. Perhaps, after

all, we should count 42 days from the time when the first patient passed away onwards, i.e. January 29-30.

It is well known that the incubation period of the disease varies between one and twelve days, but on this occasion it typically ranged between two and four days [28]. After the incubation period, an acute disease appears, which may take the form of glandular (or bubonic), pneumonic or septicaemic plague. Bubonic plague presents an incubation period of two to six days and pneumonic plague of one to three days [29]. Based on the various incubation periods, it seems unlikely that the ship carried the disease, especially in the light of the fact that no other member of the crew became infected during the journey but only 52 days later, counting from the day when the ship departed from Constantinople. Concurrent sources inform us about the existence of an epidemic in Constantinople and Thessaloniki in 1592 [30]. In the year that the plague appeared in Candia, we have the information that the disease was simultaneously affecting the island of Andros, which suggests that plague might have spread or arrived through the islands of the Aegean [31]. The possibility that the ship had stopped in a nearby island should be considered as rather improbable, as such information was vital for the Authorities and thus could not have escaped the attention of an official report as detailed as that of Pasqualigo. The sequence of days in combination with the incubation period of the disease eventually raises numerous questions as to whether the ship that returned from Constantinople was the real cause of the disaster. It is more probable that another ship had carried the disease, although it was generally considered that Pachopoulos' ship was responsible, simply because the first deceased belonged to his crew. Unfortunately, we cannot be sure *which* other ships entered the port during the period in question, or *where* those ships were coming from, because there are no such data is available. By taking the period of incubation into consideration, we may presume that if the crew had been infected in Constantinople, the disease would have spread massively by the time they arrived in Crete. However, Pasqualigo reported that while the ship was docked in Dia island, in order to be disinfected along with its crew, no other death was reported among its crew during that period, namely for 42 days. Therefore, an alternative theory may support the view that either another ship had carried the disease in the previous days, or that the epidemiological cycle of the disease had already begun ashore as a result of a different cause. Moreover, the village where the first deaths appeared is located east of the city, whereas the sailor's route to the church went westwards. Thus, it seems rather hard to substantiate that he dispersed the disease in passing through the village. However, since the first sailor passed away with symptoms of plague, just like his relatives did a few days later while they were hospitalized in the lazaretto, our story becomes much more interesting, urging us to turn our attention not so much to the sea, but to the previous contacts of those people while ashore.

From the descriptions of the epidemic and the trends in the number of recorded deaths, it appears that what was going on is a typical case of bubonic plague, although it is equally probable that the disease also emerged as a secondary form of pneumonic plague, in one of the subsequent epidemic waves. The secondary form occurs in 5% of patients with bubonic plague, whereas it is not unusual for these patients to be charged with being the primary cause of the development of primary pneumonic plague, by spreading the disease through droplets. The incubation period of the pneumonic form ranges between one and three days, and what we are dealing with is a severe infection of the respiratory system, which manifests itself through high fever, intense discomfort, strong cough, dyspnoea and cyanosis [32]. In secondary pneumonic plague, these symptoms are accompanied by the symptoms of the bubonic form [22]. Expectorated sputum is haemorrhagic and contains the pathogenic bacillus. The prognosis is severe and if the patient receives no treatment, death usually occurs in 1-5 days. At the time of the Black Death, mortality because of bubonic plague ranged between 40-60% of the population, whereas pneumonic plague rates reached 95% [33-36].

Furthermore, the reading of sources and the spreading of the epidemic are equally interesting from a geographic perspective (Figure 5). Based on the names of the various regions and villages that were struck by plague, which still exist in modern Crete, we find that during the three years of the epidemic, the disease affected villages to the west (up to 55 km) and east (up to 80 km) of Candia. The disease moved easily through the plains west and east of the city, and affected part of the administrative districts of nearby towns, namely Rethymnon and Sitia.

Figure 5 - The spatial expansion of the epidemic in Crete (March-July 1592).

The distance between Rethymnon and Heraklion is 79 km and the last nearby village that was affected by plague was located 24 km from Rethymnon. Similarly, the distance between Heraklion and Sitia is 147 km, whereas the last nearby village to be affected was 67 km away from Sitia. Of equal interest is the limited spread of the disease in the southern part of the island, which is characterized by mountains, inaccessible locations and isolated villages. The geography of the area may offer a possible explanation, considering its function as a natural barrier to the spreading of the disease. As far as the Monastery of Apezonon is concerned, we should bear in mind that this was a fortified monastery founded in the 15th century and built in a mountainous area which was fairly inaccessible. The monastery is located south of Heraklion, at a distance of 63 km, but there is no source or any kind of indication that the disease spread southwards as far, while the code of St. Anthony does not report the monastery or its surrounding isolated villages being affected by the epidemic.

The gradual spread of the epidemic to all villages probably took place from late March 1592 until early July 1592. A rough calculation shows that the disease spread across 135 km within three months, i.e. at a speed of 1.49 km/day. In both cases of pandemic, the disease spread *per diem*. A very distinctive example is the journey of contagion during the Justinian Plague in England, in 664, which travelled the distance of 385 km between Dover and Lastingham in a mere 91 days (4.23 km/day), whereas the Black Death is considered to have moved at an average speed of 3.75 km/ day (1.5 to 6 km/day) [33, 37]. It seems that the speed at which the epidemic of Candia spread corresponds to the lowest "speed" limit proposed for the Black Death of the 14th century [33]. Given that the epidemic occurred two centuries later than the time for which these spread rates were proposed, perhaps the nature of plague in southern Europe during the 16th century was not significantly different from the nature of early Black Death. As mentioned above, the rates of mortality in Candia stood at 51.3% of the city's population. According to the census of 1589, the province of Territorio Candia numbered 76,000 inhabitants, excluding the city. The death of 5,308 villagers represents a mere 7% of the rural population, demonstrating the traditionally high mortality that accompanies urban-type plague diseases.

CONCLUSIONS

It becomes apparent that an *ex post facto* diagnosis based on primary, descriptive sources conceals the risk of false conclusions. In the case of the plague of Candia, the diagnosis is clear, but many questions remain as to the real gateway for the disease and hence its incubation period until the outbreak of the epidemic. One rel-

evant theory suggests that the ship, which has been held responsible for having carried the disease, may not be responsible after all. In this case, a different ship may have brought the disease to Crete. Besides, the information that the first deaths occurred in a village outside the city, while simultaneously the first symptoms appeared in Candia, raises suspicions that the disease may have ultimately not started from the port of the city but rather from the countryside. The topography of the island helped the epidemic spread in lowland villages, while it seems that the mountains functioned as a natural barrier to the further spreading of the epidemic, which was limited to the plain.

As regards the preparedness of the health system, the history of the Lazaretto of Candia seems to be rather controversial. In the epidemic of 1456, the lazaretto proved to be inefficient; in the epidemics of 1522-1525 and 1571, however, the contribution of the lazaretto proved significant, whereas during the epidemic of 1592-1595 it did not manage to contribute in any way to the health defence of the city. This change in the contribution of its health services may be explained in the framework of three variables, namely the policies adopted by the Venetians, the style of management of the institutions and the nature of the epidemics which diachronically struck the city. The involvement of Venice in lengthy wars with the Ottoman Empire (1463-1479, 1499-1502, 1537, 1540 and 1570-1573) obliged Venice to focus more on strengthening its navy and territories, rather than on public works [1]. The victory of the Europeans of *Sacra Liga Antitourka* in the legendary naval Battle of Lepanto, in 1571, was not eventually followed by the benefits that Venice had anticipated. The Turks rebounded quickly after the defeat and a new, more powerful fleet reappeared in the Mediterranean. The fall of Famagusta and the permanent loss of Cyprus forced Venice to focus more on defensive wars, by spending huge sums of money in securing its possessions.

Thus, what the Venetian administration did was to allow "private initiatives" to ensure the functioning of institutions, of course within the legal framework that it had established, whereas it intervened only in serious cases - usually of a political nature. This automatically leads us to our next field of examination which is related to the administration of the institutions. Given that

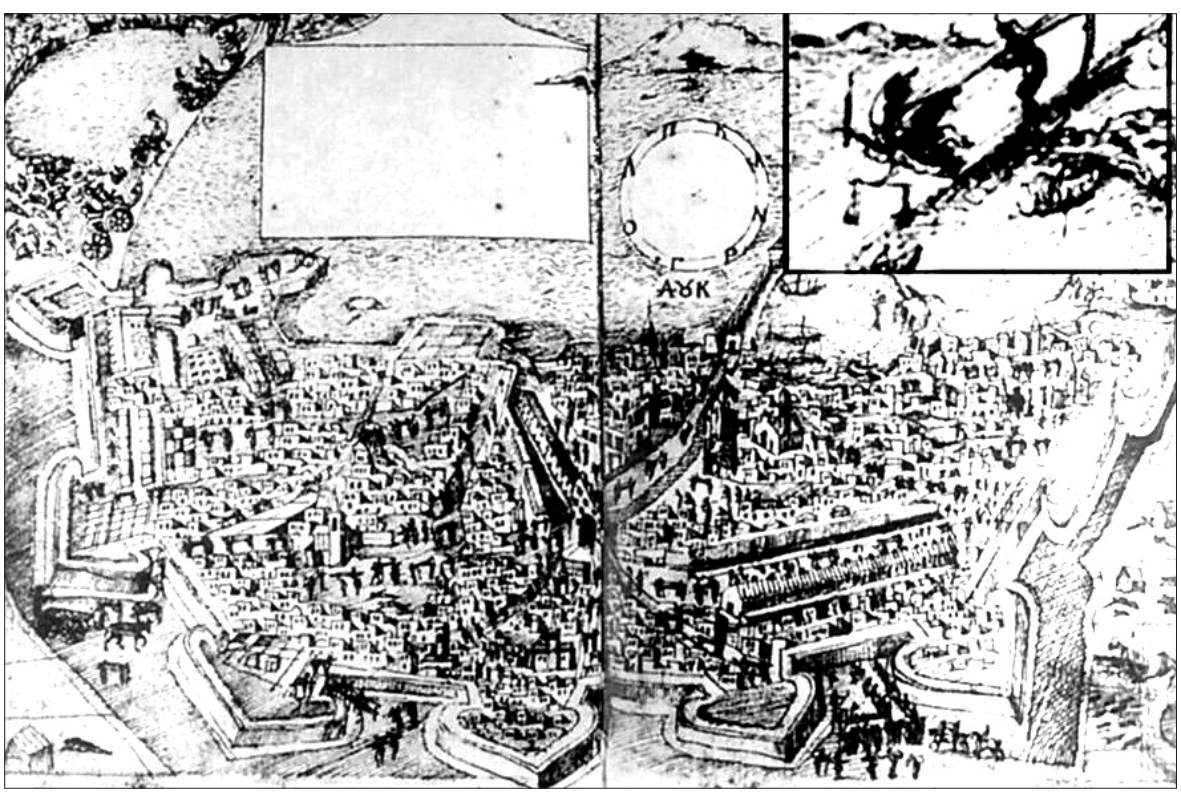

Figure 6 - Epidemic in Candia (Giorgio Clontza. Città di Candia al tempo della peste, Historia aborigine mundi, Candia 1590, c150, BMV).

hospitals in Venetian territories were basically monastic institutions, their administrations belonged to the clerical ranks of the Catholic doctrine. However, the history of Venice is full of political rivalries and diplomatic tensions with the Holy See and, at times of crisis, Venice would indirectly affect the respective Pope by expelling Papist priests from Venetian territories, as a way of showing off its strength. This tension would then spread to the other colonies as well. Therefore, Crete is one of the cases where it has been occasionally recorded that Papist priests who worked as managers of hospitals would be replaced by committees which comprised Venetian and Greek citizens [11]. The flurry of changes, along with poor economic governance, lack of resources for the improvement of facilities or appointment of persons who were incompetent of governing properly, are profoundly illustrated in the level of preparedness of these institutions in cases of epidemics [11]. The report of Pasqualigo regarding the lazaretto during the epidemic is rather indicative. He describes how the lazaretto comprised makeshift shelters by then, as it was overcrowded and could no longer accommodate all those patients, "*… non essendo quel luoco capace per tanta gente, oltre, ch'era (si può dire) distrutto, potessero gl'infermi ridursi al coperto*" [17]. Of course, in a period when knowledge of medicine and the microbial nature of diseases were limited, it would be difficult to put the blame on contemporary people for their administrative errors, with the exception of those who used these institutions for their own private gain.

Furthermore, Pasqualigo's report highlights a diachronic problem which persists until today, i.e. complacency and preparedness of health authorities. The previous "visit" of plague to the city had occurred only 70 years earlier. However, no one was able to remember that, only 20 years before, during the fourth Venetian-Turkish war, the fleet of Venice in Crete had been struck by plague and many of its crew members had been isolated in the lazaretto. The period of 70 years which marked no incidence of disease in the city had made the authorities and inhabitants complacent; even worse was the fact that precautionary measures had relaxed throughout those years, while the lazaretto had been deserted; according to Pasqualigo's report, "*E perciò dalla lunghezza del tempo non solamente erano scordate le provisioni, ma ancora il lazaretto…*" [17]. In addition, escapes from the lazaretto were a common phenomenon and the patients carried the disease with them. All these manifestations are illustrative of the complete disorganisation of the system and the lazaretto. As mentioned above, had this phenomenon occurred at an earlier time, the Authorities would have had the appropriate mechanism to identify offenders and punish them. Many patients who realized that they had been infected would conceal their infection and walk around freely in the city, because they feared the lazaretto; thus, they spread the disease, "*Perché, con tutto che si conoscevano feriti per tema di non essere mandati al lazaretto, caminavaro per la Città, occultandone il male senza alcun riguardo …"* [17].

The Venetian model of health management and protection, from the *Proveditore alla Sanità* to the simple guard of the lazaretto, was based on stringent but rational rules which had and still have a diachronic value, within the framework of public health [6, 8-10]. Further proof of the value of the Venetian system can also be found in Venetian possessions in Greece and, more particularly, in the Ionian Islands two centuries later. When the Venetians lost the Ionian Islands (1797), the next rulers of the region, i.e. the French Republicans (1797-1799), the Russians (1800) and the Imperial French (1809-1815), decided to implement exactly the same health model [38, 39]. Astoundingly, when the British occupied the islands (1815-1864), their first task was to codify the Venetian health legislation, and they also preserved the Italian titles of health officials [38-40].

However, despite proper legislation and organisation, the lack of medical knowledge of the time would ultimately determine the course, development and outcome of an epidemic. This lack of medical knowledge eventually stigmatized the role of lazarettos and caused the distrust of ordinary people. The engraving of Clontza, which depicts an epidemic in Candia, reflects the deeper understanding of the period regarding the role of a lazaretto (Figure 6). The artist painted an angel (or a demon?) in place of the lazaretto of San Zorzi della Punta, who welcomes the boats that transport patients, grasping his sword and the scale of Judgment, while Death is waiting behind him carrying his large scythe. In essence, in the minds of ordinary people the lazaretto could offer no chance of survival – it was simply the gate to an endless cemetery.

Keywords: Candia, pest-houses, plague, public health, Republic of Venice, lazaretto.

SUMMARY

The present study highlights the history of lazarettos in Candia (modern Heraklion, Crete, Greece), which was the most important Venetian possession in the Mediterranean at the time, while at the same time it recounts the terrible plague which went down in history as the Great Plague of Candia (1592-1595). The study will also attempt to give a satisfactory answer to the epidemiological questions raised by the worst epidemic that Crete had experienced since the era of the Black Death in the 14th century.

The city was about to lose more than a half of its population (51.3%), although it was saved from complete annihilation by the composure, courage and inventiveness of its Venetian commander, Filippo Pasqualigo, whose report to the Venetian Senate makes an invaluable source of information regarding the events of this dramatic period. Candia would also witness the emergence of typical human reactions in cases of epidemics and mass deaths, such as running away along with the feeling of self-preservation, dissolute life and ephemeral pleasures, as well as lawlessness and criminality. The lazaretto proved inefficient in the face of a disaster of such scale, whereas the epidemic functioned as a "crash-test" for the Venetian health system. Eventually, in an era when the microbial nature of the disease was unknown, it seems that it was practically impossible to handle emergency situations of large-scale epidemics successfully, despite strict laws and well-organized precautionary health systems.

RIASSUNTO

Il presente studio focalizza l'attenzione sulla storia dei lazzaretti a Candia (l'attuale Heraclion, Creta), che in quel periodo costituiva il più importante possedimento veneziano nel Mediterraneo, e descrive, nel contempo, la terribile peste che è poi passata alla storia come la Grande Peste di Candia (1592-1595). Questo studio cercherà di fornire una risposta soddisfacente ai quesiti epidemiologici sollevati dalla peggiore epidemia mai sperimentata da Creta dall'epoca della Morte Nera nel XIV secolo. La città perse più della metà della sua popolazione (51,3%) e fu salvata dall'annientamento totale grazie al coraggio, alla compostezza e all'inventiva del suo comandante veneziano, Filippo Pasqualigo, il cui rapporto al Senato Veneziano è una inestimabile fonte di informazioni per quanto riguarda gli eventi occorsi in quel periodo drammatico. Candia testimoniò anche il manifestarsi delle tipiche reazioni umane che si verificano nei casi di epidemie e mortalità massive, come la fuga determinata da un istinto di sopravvivenza, la vita dissoluta e i piaceri effimeri, oltre alla delinquenza e alla mancanza di leggi. Il lazzaretto si dimostrò inefficace di fronte a un disastro di tale dimensione, mentre l'epidemia agì da crash test *per il sistema sanitario veneziano. Infine, in un'epoca in cui la natura microbica della malattia era sconosciuta, sembra che fosse praticamente impossibile trattare con successo situazioni di emergenza, di epidemie di grandi dimensioni, nonostante le leggi severe e i ben organizzati sistemi sanitari preventivi.*

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