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**WAS THERE REALLY A SIEGE OF KAFFA BY THE MONGOLS
IN 1346 THE FIRST BIOLOGICAL WAR?
AND WHAT WAS THE AFTERMATH?**

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On the basis of the 14th century manuscript by the Genoese Gabriele de' Mussi many historians widely believe that plague called the Black Death had to have reached European continent from the port city of Kaffa (modern-day Theodosia) on the Crimea peninsula as a result of a biological warfare by the Mongols. This is not only a historical interest but also relevant to current efforts to evaluate the threat of military or terrorist use of biological weapons. Based on published translations of the de' Mussi's manuscript and other 14th-century accounts of the Black Death it can be concluded that the Mongol attack was a biological warfare at Kaffa and provides the best explanation of the plague entry into the city. However, questions arise. Even though such a theory is consistent with the technology of those times and in a way with contemporary notions about the dangers and necessary caution in the treatment of such diseases, the report has a number of weaknesses in terms of practical implementation. This paper sheds light on the dark points of Gabriele de' Mussi's manuscript of the siege of Kaffa in the year 1346.

Keywords: Gabriele de' Mussi, Kaffa, plague, Black Death, Theodosia, biological warfare, Mongols, Greeks, Republic of Genoa, Byzantine Empire, Huns, Italian city-states, Golden Horde.

**БЫЛА ЛИ ОСАДА КАФФЫ МОНГОЛАМИ В 1346 Г.
ПЕРВОЙ БИОЛОГИЧЕСКОЙ ВОЙНОЙ?
И КАКОВЫ БЫЛИ ЕЕ ПОСЛЕДСТВИЯ?**

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Основываясь на рукописи генуэзца Габриэля де Мусси XIV в., многие историки считают, что на самом деле чума или «Черная смерть» распространилась по Европе из портового города Каффы (современная

Феодосия) на Крымском полуострове в результате биологической войны, устроенной монголами. Это представляет не только исторический интерес, но также связано с современными оценками угрозы военного или террористического применения биологического оружия. Основываясь на опубликованных переводах рукописи де Мусси и других описаниях «Черной смерти» XIV в., можно сделать вывод, что нападение монголов на Каффу стало биологической войной, что объясняет проникновение чумы в город. Однако возникают вопросы, хотя такая теория и согласуется с технологиями того времени и в некотором смысле с современными представлениями об опасностях и необходимой осторожности при лечении таких заболеваний, в докладе есть ряд недостатков с точки зрения практической реализации. Эта статья проливает свет на темные стороны рукописи Габриэля де Мусси, описывающей осаду Каффы в 1346 г.

Ключевые слова: Габриэль де Мусси, Каффа, чума, Черная смерть, Феодосия, биологическая война, монголы, греки, Генуэзская республика, Византийская империя, гунны, итальянские города-государства, Золотая Орда.

Prologue – the city of Theodosia, Kaffa and Theodosia

Modern Theodosia is a sleepy tourist and spa city with around 70,000 inhabitants. The city is sparsely populated during the winter months and most cafes and restaurants are closed. However, once upon a time, the Black Sea was as important, perhaps even more important, than the Mediterranean Sea, as the world's most important trading hub between Europe and Asia. It was therefore important that the leading trading powers had so-called trading posts in the Black Sea. The Crimean peninsula has a very important strategic location in the area and therefore had the first priority for constructing trading posts. The Black Sea had its greatest importance in two periods of world history: during the heyday of the Greeks about 2,400 years ago and about 1,700 years later in the Middle Ages.

In the 6th century BC the Greek colony of Theodosia was founded around 100 km east of the Kerch Strait, the important entrance to the Azov Sea. The colonists

mainly came from the city of Miletus on the western coast of Anatolia. What probably attracted the colonists most were the very fertile soil which is very characteristic of the Russian-Ukrainian land area south of the Moscow region and down towards the Black Sea. Theodosia essentially functioned as a loading and storage area to seafarers and traveling merchants overland. But at the same time, Theodosia served as a strategically important point for the Greeks, who wanted to control the Black Sea and the Azov Sea [6].

Therefore, the city suddenly became quite interesting to those who ruled the great steppes – the Huns, and also to Rome and the Byzantine Empire. Around the year 400, Theodosia was almost completely destroyed by the Huns. The next nine hundred years Theodosia remained a minor village. The villagers were mainly agrarians. It was at times part of the sphere of influence of the Khazars and of the Byzantine Empire. In the 1230s the city was conquered by the Mongols during the reign of Genghis Khan. For the next forty years Theodosia was a Mongol city.

The Middle Ages brought about a tremendous increase in trade worldwide. The way to Asia became very important again. Already at the time of the Mongols a settlement called Kaffa was existed surrounding Theodosia. Kaffa was at western terminus for the great Silk Road and the sacking of Byzans (Constantinople) by crusaders in the beginning of the 1200s left a vacuum, where the Italian city-states such as Venice, Florence and Genoa filled the empty area. And Kaffa was prior to the penetration of the Republic of Genoa into the Black Sea [6].

The Genoese wrested control or maybe purchased Theodosia from the Mongols around 1270. The golden era of Kaffa began. The city became the Genoese chief port, a major slave market and their administrative centre from which they destroyed or seized the Crimean coast settlements of their rival Venetians and virtually monopolized Black Sea trade. Beyond its strategic importance, Kaffa was a melting pot of cultures and religions. The city's population included Genoese, Greeks, Armenians, Jews and Muslims, making it a vibrant hub of cultural exchange. The city's prosperity attracted merchants and settlers from across the Mediterranean and beyond, further enhancing its significance as a trading hub.

The Genoese made Kaffa their chief port, a major slave market and their administrative centre where they as well destroyed or seized the Crimean coast settlements of their rival Venetians and virtually monopolized Black Sea trade. Kaffa became one of most important cities in the Euro-Asian region. The population reached 80-90 thousands inhabitants. Portions of the magnificent Genoese citadel in Kaffa remain. Its massive walls were rendered necessary by the occasional hostility of among others Tatar khans [6].

The plague and its origin

The plague called the Black Death was one of the deadliest pandemics in history, but its origins have long been mysterious. Now the bacteria that started it all may have been found in three graves from 1338 in modern-day Kyrgyzstan in central Asia. However, in 1331 plague broke out in Hubei Province in central China. The source was probably a latent infection among small rodents in Yunnan and Burma 800 km further south. Over the next twenty years the infection spread to the rest of China. According to censuses at least 20 million people died. Camel caravans along the Silk Road brought the infection westward. In 1345 in Sarai (the capital of the Golden Horde) there was a large outbreak of plague. In the following two years the plague spread to Crimea and the Middle East area. In October 1347 the Black Death reached Messina on Sicilia and devastated Europe [11, s. 8-9].

The Black Death was a complete mystery to the time and the explanations were therefore as diverse as they were incorrect. They can be divided into theological explanations, scientific explanations and conspiracy theories. The scientific explanations were led by the Faculty of Medicine in Paris. One explanation was based on astrology. In particular, a bad astrological constellation in 1345 was considered the cause [10, p. 30-31].

The theological explanation was that the plague was God's punishment for man's sinfulness. The Bishop of Würzburg believed that the epidemic was caused by people's blasphemous swearing. There was a general doomsday atmosphere, which resulted in extreme religiosity among some and extreme licentiousness among others – as is also depicted in the *Decameron* by Giovanni Boccaccio. The extreme

religiosity led in many places to the procession of flagellants as an expression of dissatisfaction with the clergy and religious fanaticism [10, p. 31].

The conspiracy theory was that evil people poisoned the drinking water. This was particularly fatal for the Jews, and there was a violent persecution of Jewish inhabitants in European countries. But other population groups were also affected. In Catalonia beggars were blamed. The rumour of the poison conspiracy may have originated in Provence in the spring of 1348. In a letter dated April 27, 1348 the Flemish canon Louis Heyligen wrote from the Papal Court in Avignon that people found with suspicious powder had been burned at the stake. At Easter of the same year a massacre of the Jewish community in Toulon took place, perhaps as a result of accusations of a poison conspiracy. From the end of April and the following months, spontaneous massacres occurred in Provence and Dauphiné [11, s. 9].

It was the French-Swiss bacteriologist Alexandre Yersin who in 1894 found the plague bacteria in rats and humans in Asia, in connection with a wave of bubonic plague that had spread from Hong Kong to India. *Yersinia's* pest was also identified as the killer that claimed millions of lives during the Black Death in the Middle Ages. At the time it was believed that rats and fleas played a crucial role in the spread of the disease. However, in 2024 a team of bacteriologists from the National Institute of Allergy and Infectious Diseases (NIAID), a government institute in the United States based in Maryland, shed new light on the possible spread of the plague. Their experiment showed that body lice consume a larger amount of blood than fleas and eat more frequently, thereby increasing the number of bacteria that can be spread. [10, p. 33].

The researchers also mentioned that bites from body lice cause itching, which often results in abrasions on the skin, which can provide easier access to the plague bacteria. The spread of plague was so fatal to the high mortality rate in the Middle Ages that it may have been driven by infection from parasites that lived on humans, including body lice. As early as 1984 zoologist Graham Twigg questioned the widespread assumption about the Black Death, arguing that there were simply not enough rats in medieval Northern Europe for the plague to spread at the rate known

from 1347 to 1350. Written sources from that time also do not testify to the prominent role of rats, but instead place great emphasis on human-to-human transmission [4, s. 32-34].

A few researchers have questioned the traditional explanation for the Black Death. First, bacteriologist J.F.D. Shrewsbury in 1970; later biologist Graham Twigg in 1985 and historian David Herlihy in 1997. Susan Scott and Christopher Duncan argued in their 2004 book *“Return of the Black Death”*, that a virus was the cause. Among the arguments put forward for an alternative cause of the Black Death is that the mortality rate in the Middle Ages was far greater than that in the early 20th century, when the mortality rate only reached 2%, and then only in exceptional cases [12, s. 103-105].

The first siege of Kaffa (1307-1308) and afterwards

In the 1300s trade between the continents increased explosively again, especially between Europe and Asia. The Black Sea got more and more important. However, Tensions frequently marked the interactions between Italian merchants and their Mongol hosts. In 1307 Toqtai Khan, the Khan of the Golden Horde, ordered the arrest of Italian traders in Sarai and launched a siege against the Genoese-controlled port city of Kaffa. The conflict stemmed from Toqtai’s objection to the Italians’ involvement in the trade of Turkic slaves, who were being sold to the Mamluk Sultanate for military purposes. Despite resisting for a year the Genoese ultimately abandoned Kaffa in 1308, setting the city ablaze as they retreated. Relations remained hostile until Toqtai’s death in 1312.

Under Toqtai’s successor, Özbek Khan, relations improved. Özbek welcomed the Genoese back and granted them land in Tana to expand their trading network. By the 1340s Kaffa had been rebuilt into a thriving hub of commerce, fortified with dual concentric walls. These defences protected a bustling, cosmopolitan population that included Genoese, Venetians, Greeks, Armenians, Jews, Mongols and Turkic peoples. The city’s inner walls sheltered 6,000 homes, while the outer perimeter encompassed an additional 11,000.

In 1343 hostilities resurfaced when a clash between Italians and local Muslims in Tana escalated into violence. In response Jani Beg Khan, who had succeeded Özbeğ in 1340, initiated a siege of both Tana and Kaffa. Italian merchants fled Tana and sought refuge in Kaffa, whose strategic coastal location ensured continued maritime access despite the siege. The siege dragged on until early 1344, when an Italian relief force arrived, inflicting significant losses on Jani Beg Khan's army. The Mongols suffered 15,000 casualties and their siege engines were destroyed, forcing them to withdraw [14, p. 972].

The second siege of Kaffa (1345-1346)

Jani Beg Khan renewed his assault in 1345, but this second siege was cut short by a plague outbreak that devastated his troops. By 1346 the siege was abandoned and the Italians retaliated by blockading key Mongol ports. The resulting stalemate forced Jani Beg Khan to negotiate.

By 1346 the plague had reached the Mongol army, which was besieging the Genoese port of Kaffa. The siege was broken off by the severity of the plague and the Mongols withdrew. But now the disease broke out inside the city and in panic, the survivors set off for their homeland. When they sailed into the port of Messina in October 1347 they took the infection with them to Europe [2, s. 70-71].

During a yearlong siege of the city starting in 1346 by an army of Tatars and Venetians the invading forces of Kipchak Jani Beg Khan suffered an epidemic of the Black Death. With his forces quickly succumbing to disease, the invading forces resorted to desperate measures the next year for defeating the Genoese: they catapulted bubonic plague-ridden corpses over the walls of the Genoese defenders using trebuchets. Hoping to escape the spreading epidemic some of the Genoese left Kaffa in four ships erroneously believed to be free of the disease. These infested ships took the plague to Genoa, where it contributed to the spread of the disease throughout Italy and elsewhere in Europe. The catapulting of corpses into Kaffa by Jani Beg Khan's forces in 1347 is often cited as the earliest documented use of biological warfare [2, s. 72].

Gabriele de' Mussi and his manuscript

Gabriele de' Mussi, born circa 1280, practiced as a notary in the town of Piacenza, over the mountains just north of Genoa. His practice was active in the years 1300-1349. He is thought to have died in approximately 1356. A principal source on the origin of the Black Death is his manuscript that has been published as well several times in its original Latin as into English. This narrative presents some striking claims: that the Mongol army catapulted plague-infected corpses into the besieged Crimean city of Kaffa, infecting its inhabitants, and that survivors fleeing the siege subsequently spread the plague to the Mediterranean Basin [14, p. 972].

If accurate, this account would mark Kaffa as the site of history's most dramatic act of biological warfare, with the Black Death as its catastrophic aftermath. After examining these assertions we find it plausible that the biological attack occurred as described and infected the city's residents; however, this event likely played a minimal role in the broader spread of the plague pandemic. While this does not entirely rule out a journey to Kaffa later in 1346, the textual evidence indicates otherwise. De' Mussi does not claim first-hand knowledge of the Asian events he describes and often employs passive voice in his accounts. Following his description of the siege of Kaffa, he wrote: "now it is time that we passed from east to west to discuss all the things which we ourselves have seen" [14, p. 972].

One of the main points of the manuscript is described as follows. In 1346 in the countries of the East countless numbers of Tartars and Saracens were struck down by a mysterious illness which brought sudden death. Within these countries broad regions, far-spreading provinces, magnificent kingdoms, cities, towns and settlements, ground down by illness and devoured by dreadful death, were soon stripped of their inhabitants. An eastern settlement under the rule of the Tartars called Tana, which lay to the north of Constantinople and was much frequented by Italian merchants, was totally abandoned after an incident there which led to its being besieged and attacked by hordes of Tartars who gathered in a short space of time [14, p. 972].

The Christian merchants, who had been driven out by force, were so terrified of the power of the Tartars that, to save themselves and their belongings, they fled in an armed ship to Kaffa, a settlement in the same part of the world which had been founded long ago by the Genoese. The de' Mussi account is thought to have been composed in 1348 or early 1349, based on its sense of immediacy and the limited time frame it covers. Although the original manuscript is lost, a copy survives within a compilation of historical and geographic texts by various authors, created around 1367 [14, p. 972].

Furthermore, the manuscript states that the dying Tartars, stunned and stupefied by the immensity of the disaster brought about by the disease, and realizing that they had no hope of escape, lost interest in the siege. But they ordered corpses to be placed in catapults¹ and lobbed into the city in the hope that the intolerable stench would kill everyone inside. What seemed like mountains of dead were thrown into the city and the Christians could not hide or flee or escape from them, although they dumped as many of the bodies as they could in the sea. And soon the rotting corpses tainted the air and poisoned the water supply, and the stench was so overwhelming that hardly one in several thousand was in a position to flee the remains of the Tartar army. Moreover one infected man could carry the poison to others, and infect people and places with the disease by look alone. No one knew, or could discover, a means of defence [14, p. 973].

Biological warfare at Kaffa?

Limited historical evidence suggests that the army used catapults to hurl their dead over the walls of the city upon the besieged residents and this directly led to the spread of infection and the successful ousting of the Genoese. Fleeing Genoese who were able to leave by sea took the plague with them back to Italy. It is also proposed that this was the start of the Black Death of 1347-1350 in Europe. Could this have happened? Did the corpse missiles work? Was this the start of germ bio-warfare and the primary cause of the Black Death?

In the 1340's plague has come to the Black Sea. In typical human fashion blame was assigned to a convenient target: foreigners. The Genoese had an

established counting house and trading port that processed the goods moving westward to the Mediterranean. There had long been a tense truce between the Genoese Christians and the local Mongols. As tensions rose a fight broke out in a nearby town and someone died in the tussle. The order was given to oust the Genoese. They were chased back to their stronghold at Kaffa and besieged by the Mongols. The Genoese had the sea to their backs and the locals had no navy, so the siege failed and the encamped army dispersed [15].

Two years later the siege was renewed and that is when things got ugly. The Mongol troops living in the squalor of their makeshift encampment began to die in startling proportions of a resurgence of the plague. The army began to lose its resolve yet again. It was thought that the Genoese were safe and healthy in their stronghold, partly due to their religious beliefs, and the dying army was bitter for this. They wanted the enemy to see how horrible a fate had befallen them and hoped to transmit the death inside the walls.

However, the inevitable death was not announced as in the Orient by nosebleeds, but at the beginning of the disease, tumours appeared in the groin or armpit of both men and women, some of which reached the size of an ordinary apple or an egg, and were called plague boils by the common people. In a short time the deadly boils also began to appear on all other parts of the body and at the same time the disease changed character and also appeared in many as black or yellow spots on the arms or thighs or any other part of the body; only a few recovered and almost all died about three days after the onset of the symptoms, usually without fever or other complications [3].

If historically correct the deed would amount to one of the first cases of biological weapon use. Its consequences would have been huge: up to a third of the European population may have perished in the pandemic. Until today no contemporaneous eyewitness accounts of events inside Kaffa have surfaced. A narrative written in 1348 by the Genoese notary Gabriele de' Mussi was discovered in the university library of Breslau in 1842. It described how the Mongol besiegers disposed of diseased bodies by hurtling them with catapults over the city wall and the

population fled to Italy. Although originally thought that de' Mussi was among the escapees, it was later established that he had not left his hometown of Piacenza near Genoa, where he witnessed the arrival of the plague in Italy [5].

The opportunity to project body parts or whole cadavers depended on then available weapon technology. Two types of trebuchet are central to the present discussion, namely the mangonel or traction trebuchet using rope pullers, and the counterweight trebuchet relying on gravity for dropping the counterpoise. All descriptions of hurtling body parts before the 14th century concern heads of decapitated individuals. This is essentially an expected situation because of the limited throw weight of mangonels. With one exception, no narrative suggesting the projecting of complete corpses precedes the start of the Hundred Years' War in 1337. By then, counterweight trebuchets were attaining their maximal destructive power [3].

Next we come to the issue of who was going to hurl the bodies. In medieval times artillerymen were contractors. They were not slaves or conscripts, but valued employees. It was believed in that time that the disease was transmitted through the air around the dead and dying. No healthy soldier was going to voluntarily retrieve, haul, load, and fire a rotting corpse of his comrade emitting all of the putrid smells and fluids of the plague. This leads to the conclusion that this might have been a myth generated as part of the propaganda of warfare or the embellished memories of horrible days gone by amplified by time [3].

Then comes the issue of whether a dead body can transmit plague. With our current understanding of the zoonotic cycle of bubonic plague transmission, it seems highly unlikely that dead bodies could vector plague. As the temperature of a corpse falls, fleas leave the body. If direct bite transmission for the fleas was to happen, the window of contagiousness would be small, as most or all of the fleas would have jumped ship. There is a chance that there was fluid transfer to those inside the walls. There is the possibility that the speed and force of impact of a flung body is enough to cause splatter. Estimates show that a 200 lb. object could be thrown more than 100 yards. If a body strikes a stone wall or street at that high a speed it is feasible that

liquid amounts of bacteria could contact victims near the point of impact, and those given the task of removing and dumping the bodies back over the wall would certainly get quite messy. Undoubtedly the rats found the scraps of this mess tasty and this would have helped to boost their population inside the walls, which would have had a great effect on the transmission of plague [13, s. 10-12; 14, p. 973; 15].

Did bodies fly through the air with the greatest of ease? Did these bodies start the Black Death of Europe? It seems unlikely that this is how things happened. Rats would have moved freely through the walled city of Kaffa, and the fleeing people probably took those rats with them in their ships' cargo. This most likely is how the plague came to the Genoese and to Italy and ultimately the rest of Europe [15].

Several questions need to be addressed if this theory of how plague moved from the Black Sea to Italy is deemed credible. The first aspect of this question removes the importance of the rest of the argument. Were the Genoese healthy at the time of the plague outbreak around Kaffa? Even though the Genoese were holed up in their walled city, the rats most likely had free issue to come and go over and under the walls at night. Catapults or not, if the plague was in the camps outside the walls, it was inside the walls as well. So the thoughts of the besieging army, that those inside the walls were well, were wrong. When the siege began anew the second time, which probably coincided with the onset of the area plague, Genoese residents fled back to Italy by ship. All ships with food cargo had pests, and the likelihood that these cargo rats brought the plague to the ports of Italy seems high. Trade ships travelled the area all the time. If plague was in the shipping routes, it was destined for distribution by the commerce of trade, regardless of the events at Kaffa [1, p. 151; 15].

Aftermath of the plague in Kaffa

The siege of Kaffa is significant for several reasons. First, it highlights the use of biological warfare in medieval times, illustrating the lengths to which military leaders would go to achieve their objectives. The deliberate use of plague-infected corpses as a weapon of war underscores the desperation and brutality of the conflict [7, p. 1]

Secondly, the siege marks a pivotal moment in the history of the Black Death. The event at Kaffa serves as a crucial link in understanding how the plague spread from Asia to Europe. The siege's role in facilitating the transmission of the disease underscores the importance of studying historical events to comprehend the dynamics of pandemics and their impact on human societies [7, p. 2].

Lastly, the Siege of Kaffa underscores the interconnectedness of the medieval world. The trade routes that brought prosperity to cities like Kaffa also facilitated the spread of diseases. The movement of people, goods, and pathogens along these routes had far-reaching consequences, shaping the course of history in ways that continue to be studied and understood [8, s. 108-109].

The aftermath of the siege had lasting effects on trade and diplomatic relations in the region. The fall of Kaffa and the ensuing plague led to a significant disruption in trade networks between Europe and Asia. The Black Death's spread resulted in a re-evaluation of trade practices and the implementation of new health regulations in the Mediterranean. This period saw a shift in the balance of power in the region, with increased emphasis on securing trade routes and improving sanitary measures to prevent future outbreaks. The lesson learned from Kaffa influenced how subsequent sieges and conflicts were conducted, highlighting the crucial interplay between military strategy, disease management, and international trade relations [9].

Conclusion

Facing the dire situation of a plague-ravaged army and a fortified city, Jani Beg resorted to a desperate and unprecedented tactic: biological warfare. The Mongol forces decided to use the bodies of their plague-infected soldiers as weapons. They catapulted these bodies over the city walls, aiming to infect the inhabitants of Kaffa with the deadly disease.

This act is considered one of the earliest recorded instances of biological warfare. The introduction of plague-infected corpses into Kaffa had a catastrophic effect on the city's population. The disease spread rapidly among the inhabitants, causing panic, death and chaos. The Genoese defenders, unable to contain the outbreak, were forced to abandon their positions and flee the city.

However, it is also worth noting that one must question whether the plague entered Kaffa via dead bodies, which are technically difficult to handle. Visitors have come in from the sea with goods and weapons. One must also question the extent to which Kaffa was the cause of the great plague attack in 1347-1348 in Europe, as there was trade in the area from all corners of the world.

The fleeing Genoese survivors boarded ships in a desperate attempt to escape the plague-ridden city. Unknown to them, they were carrying the plague with them, setting the stage for the pandemic's spread to Europe. As these ships docked at various ports along the Mediterranean, the Black Death began to take hold in Europe, leading to one of the deadliest pandemics in history.

The spread of the plague from Kaffa to Europe had catastrophic consequences. The Black Death is estimated to have killed between 30% and 60% of Europe's population over the next few years. The pandemic caused massive social, economic, and political upheaval, altering the course of European history. The rapid and widespread transmission of the disease demonstrated the vulnerability of interconnected trade networks to the spread of infectious diseases.

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