

# HISTORICAL NOTES

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CHALLENGING ENTRENCHED POSITIONS

## de Mussi and the Siege of Caffa Origin of a Biological Warfare Allegation

A WORKING PAPER SERIES ON THE HISTORY OF CHEMICAL AND BIOLOGICAL WARFARE

ISSUE # 1

19 DECEMBER 2021

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The *HISTORICAL NOTES* working paper series contains passages from an ongoing, wide-ranging research project into the history of chemical and biological warfare whose story starts out with the question when our ancestors began manipulating poison. The research project focusses less on the discussion of individual incidents than on identifying and characterising social, cultural, political and scientific trends that helped to shape narratives of chemical and biological use through human and civilisational evolution. It also aims to critically review our present-day (re-)construction and understanding of past events.

Being research in progress, the working papers do not necessarily reflect future conclusions. As part of the overall effort, new sources of information may be found. Or work on other parts of the project may lead to new insights or uncover trends and linkages between historical trends. As a result, certain sections may require revision.

From this perspective, I welcome and encourage questions, comments or criticism on the *HISTORICAL NOTES*.

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The plague pandemic that hit central and western Asia, the Mediterranean societies and western and northern Europe in the middle of the 14th century features in all present-day historical narratives of chemical and biological warfare. To many writers those events underscore the potential of massive destruction in terms of both human and economic losses to societies. They also tend to ascribe the pandemic's origin to a specific deed, namely the catapulting of diseased bodies into the Crimean town of Caffa by Mongol besiegers in 1346. Fleeing citizens carried what became known as the 'Black Death' to Mediterranean ports from where it spread throughout continental Europe and North Africa.<sup>1</sup> The pandemic may have killed up to two-thirds of the European population.

Reconstruction of circumstances surrounding this allegation of historical biological warfare is challenging. For instance, was the medieval pandemic caused by the plague, and if not, what are the implications for the narrative of biological warfare? In the final years of the 20th century some authors began questioning whether 'plague' in the sense of the disease caused by the *Yersinia pestis* bacterium was responsible for the medieval pandemic and subsequent outbreaks. The scepticism was not new: several 18th and 19th-century writers had already noted divergencies in descriptions of symptoms as recorded in different places or times. However, it faded with the discovery of the causative bacterium and the roles played by rats and fleas in the plague ecology and transmission. This breakup of the early 20th-century consensus pitted academics from multiple disciplines against each other for more than a decade. Advancements in molecular biology, genome studies and paleobiology combined with new approaches to studying contemporary records and narratives opened a possible path towards a new consensus. Yet, fresh findings in the late 2010s, such as strong pointers to an extinct strain of *Yersinia pestis* in an old southern French reservoir, may once more challenge accepted and emerging narratives of the medieval plague. Notwithstanding, all new evidence in these debates invites reconsideration of the Black Death's biological warfare origins. It increasingly appears likely that a fast-spreading pestilence overtook Caffa and its environs.

While the new insights may have mooted the biological warfare question, writers broadly referencing the history of biological weapon use are given to mentioning the Caffa siege in passing. This comes because the contextual factors of the siege of Caffa, the tactics deployed by the Mongols and the city defenders, or the military hardware in the field have not been subjected to the same level of scrutiny as the biological origins of the pandemic. Mark Wheelis, a professor in microbiology, seems to have written the final consolidative view on events in the Late Middle Ages in 2002. Considering the scientific debate on the plague's origins, he concluded that 'the claim that biological warfare was used at Caffa is plausible and provides the best explanation of the entry of plague into the city. This theory is consistent with the technology of the times and with contemporary notions of disease causation; however, the entry of plague into Europe from the Crimea likely occurred independent of this event'.<sup>2</sup> In an earlier chapter on biological warfare

before the First World War, he described in more detail other incidents involving the projection of human bodies and animal carcasses over fortifications during medieval and early modern age sieges in Europe, thereby lending additional credence to the overall Caffa narrative while being critical of certain specific claims.<sup>3</sup>

This first issue of *HISTORICAL NOTES* explores the origin of the biological warfare allegation involving plague-infested corpses catapulted over the walls of Caffa. The working paper forms part of a chapter on chemical and biological warfare from the Middle Ages until the end of the 18th century in a broader ongoing historical study.

## Chronicle by de Mussi

Caffa (today: Feodosia) was a major Genoese Black Sea trading post on the Crimean Peninsula. In 1266 the Italian city state had acquired the lands from Möngke Temür, khan of the Golden Horde. Following settlement shortly thereafter until its conquest by the Ottomans in 1475, Caffa grew into the centre of the Italian city state's network of colonies, trading stations and overseas domains supporting the long-distance trade with Asian civilisations. The city also became a centre for Catholicism. With the ascension of Muhammad Özbek Khan to the throne in 1313, the khanate adopted Islam as the state religion. Özbek adopted a degree of tolerance towards the Catholics, but the city's complex multi-cultural and -religious composition did not always keep it safe from conflict with the surrounding Mongols.<sup>4</sup> After his father's death in 1441, Janibeg became the next khan and moved aggressively to consolidate his grip on the territory of the Golden Horde. A major conflict erupted after a Venetian noble killed a Tatar merchant in Tana (today: Azov) in September 1343.<sup>5</sup> Not satisfied with the pillaging and massacre of Italians there, the authorities of the Golden Horde embarked on the systematic destruction of Italian colonies in the region. Caffa had already survived two sieges in February 1344 and the summer of 1345 when Janibeg launched a third campaign against the city in the winter of 1346-1347.<sup>6</sup> This beleaguering coincided with the westward spread of the plague, which would reach the Mediterranean several months later.

What happened in the Genoese outpost Gabriele de Mussi<sup>7</sup> described in his work on the plague's arrival in Italy *Istoria de morbo sive mortalitate quae fuit Anno Dei MCCCXLVIII* (History of the disease or the great dying in the year of our Lord 1348).

Oh God! See how the heathen Tartar races, pouring together from all sides, suddenly invested the city of Caffa and besieged the trapped Christians there for almost three years. There, hemmed in by an immense army, they could hardly draw breath, although food could be shipped in, which offered them some hope. But behold, the whole army was affected by a disease which overran the Tartars and killed thousands upon thousands every day. It was as

though arrows were raining down from heaven to strike and crush the Tartars' arrogance.

All medical advice and attention was useless; the Tartars died as soon as the signs of disease appeared on their bodies: swellings in the armpit or groin caused by coagulating humours, followed by a putrid fever.

The dying Tartars, stunned and stupefied by the immensity of the disaster brought about by the disease, and realising that they had no hope of escape, lost interest in the siege. But they ordered corpses to be placed in catapults 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.<sup>8</sup>

Several elements in de Mussi's chronicle are worth pointing out. First, he viewed the siege of Caffa as a single event rather than three separate campaigns mounted by the khanate. Second, the Mongols were dying in droves from the plague before Caffa's inhabitants became afflicted. He thus established a clear causal relationship between the catapulting of Mongol corpses across the city's defences and the subsequent spread of the disease among the besieged population. Third, according to his narrative, the inhabitants could not flee the bombardment with diseased corpses. Notwithstanding, de Mussi noted that the city could be resupplied, presumably by ships as the inhabitants were able to dump the bodies in the sea. Given his treatment of the siege as a single rather than three events, it follows that the city did not suffer an interruption of provisions. Finally, the writer combined different understandings of disease causation and propagation. The Mongols, in his view, suffered divine retribution as the image of arrows raining down from heaven to punish their arrogance suggests. In contrast, the plague struck inhabitants through miasma from rotting corpses while individuals could carry the poison to other persons and places. No divine wrath for the Catholics and Orthodox Christians, but instead a suggestion of deliberate intent on the Muslim Mongols' part to kill them. It is worth noting that when describing in a later passage on how to treat an infected person, he asserted that certain natural phenomena may make the infection more dangerous. In this respect, he mentioned calamities in China and India.<sup>9</sup> The paragraph feels disconnected in this part of his writing but links the recounted events in Caffa to the source of the pandemic in eastern Asia. Overall, de Mussi's narrative corresponded with contemporary understanding of events and infection, and societal perceptions of people professing a different religion. The key questions are therefore the extent to which the account is historically accurate and how much it established a basic narrative for centuries to come.

Gabriele de Mussi (ca. 1280-1356) was a notary in Piacenza (northeast of Genoa).<sup>10</sup> He belonged to a prominent local family that produced not only jurists but also doctors and clergymen. Having attended university, he would have had a certain level of medical knowledge to help him describe and make sense of the unfolding pandemic. He probably wrote *Istoria de morbo* a few years after the plague had reached Genoa and Piacenza (1347-48). According to Russian historian Alexander Emanov, his chronicle may have been the earliest recorded evidence about the onset of the plague.<sup>11</sup> The original manuscript remains lost, and the only extant copy was discovered in 1842. This undated version without references to other contemporary sources forms part of an anthology and may have been altered with religious or classical themes.<sup>12</sup>

Augustus Henschel, professor and discoverer of the manuscript in the Rediger Library of his university in Prussian city of Breslau (today: Wrocław in Poland), edited the first publication of de Mussi's chronicle.<sup>13</sup> He assumed that the author had been staying in Caffa between 1344 and 1346 and consequently saw in the account a primary source for the onset of the plague pandemic written shortly after the jurist's escape by sea to Genoa. In the preface to his reprint of the *Istoria* in 1884, A. G. Tonomi contradicted Henschel by placing de Mussi in Piacenza based on local archival evidence of numerous deeds he had drawn up almost daily during those two years and afterwards. He surmised that de Mussi got the tidings from some fellow villagers trading overseas together with the Genoese.<sup>14</sup> Interestingly enough, de Mussi never claimed he had ever been in Caffa. Somewhat further in his narrative, he introduced his shift of focus from the Black Sea to developments in Italy as follows: 'Now it is time that we passed from east to west, *to discuss all the things which we ourselves have seen, or known, or consider likely on the basis of the evidence*, and, by so doing, to show forth the terrifying judgements of God.' (Emphasis added.)<sup>15</sup> So, regarding events in Caffa, de Mussi was a secondary source, but absent other write-ups, his remains the only contemporaneous account.

Whether de Mussi was a primary or secondary source for our knowledge of what transpired in Caffa is immaterial for determining whether the Mongols perpetrated one of the earliest reported acts of biological warfare. No other contemporary document corroborating his depiction of a specific instance of siege warfare and assertion of the Mongols' deliberate intent to expose Caffa's inhabitants to the plague is known to exist. Instead, the key questions are why and how de Mussi's write-up became so central to the narrative about the origin of the 14th-century plague pandemic.

## Growing discourse on the plague and its containment

A first observation is the general absence of contemporaneous treatises in the 14th century. Despite the Black Death's eradication of about two-thirds of the European

population, few if any descriptions or analyses of the pandemic's origins or – even local – social or economic impact have traversed the ages. This stands in contrast to the many surviving literary, religious and medical texts on 17th-century plague eruptions, especially in England.

Some reasons for this discrepancy are straightforward. In the Middle Ages, few could read and write, and many manuscripts were in Latin. Most still-existing documents are hand-written administrative or church records of deaths, which because of their nature had limited distribution. One major work from during the pandemic was the *Compendium de Epydimia* (1348) of the Paris Faculty of the Colleges of Medicine, written by command of King Philip VI.<sup>16</sup> Another account was *Nuova Cronica* on the history of Florence written between the first decade of the 14th century and 1348, the year in which its author, Giovanni Villani, succumbed to the plague. His final, incomplete entry referred to galleys with infected sailors returning to Genoa from the Black Sea, which seems to make it besides de Mussi' writing the only contemporaneous reference placing the source of the outbreak in Asia.<sup>17</sup> During the second half of the 14th century several more treatises were written in different countries. No writing, however, described the societal consequences of the 'Great Pestilence'. They all addressed the causes of plague outbreaks and its propagation and discussed prevention and treatment of infection.<sup>18</sup> The printing press with its opportunities for sharing experiences among more people over wider distances was not to arrive until almost a century after the pandemic. Only then some of the earlier hand-written treatises received wider circulation, often in local vernacular.<sup>19</sup> So, witnesses to the pandemic who did chronicle events around them, most likely had no intention of leaving a historical narrative for posterity. Likewise, de Mussi's account was personal, and he probably never meant it for wider circulation. From this perspective, the absence of references to his narrative is unsurprising.

Why this situation changed between the mid-14th century and the end of the 16th century was the outcome of interactions between several societal developments provoked or stimulated by subsequent plague outbreaks. First, a succession of multiple minor outbreaks interspersed with some major eruptions made people discern certain recurring patterns in the spread of the disease. Particularly in Britain, an island, they began noticing its foreign provenance, its arrival via ports and its overall slow progression. From the second half of the 15th century on, the observations prompted English physicians to hypothesise on the origins and nature of contagion beyond divine retribution. This led to a syncretic amalgamation of views, which in turn fuelled contentious social debates on containment measures taken by secular authorities.

Second, the Reformation early in the 16th century schismatised Christianity. Veneration of saints in Catholicism accepted the agency of mediation between God's wrath and mortal humans. Through prayer, plague saints like Saint Sebastian interceded with God to meliorate the epidemics. Statues of saints and paintings depicting saintly intercessions

during plague visitations offered the population comfort and explanation of their lot. In contrast, Protestantism in its various manifestations generally rejected the invocation of saints to intercede on behalf of humans. This meant that it had to account for the burden of disease.<sup>20</sup> This not only stimulated the debate on the nature of disease, but also created the space for secular authorities on the level of the nation and that of the cities to take charge of prevention and mitigation. Protestantism also redefined the linkage between sin and divine retribution as an individual matter, which led to harsh and highly discriminatory containment measures. Whereas the Great Plague affected everybody equally and invigorated (Catholic) piety in all classes, the landed and commercial elites now escaped to rural areas in the knowledge of the disease's slow and modest progression outside city walls. They began noticing that impoverished parts of cities were oftenest the source of (minor) plague outbreaks. Those containment measures, which forced the poor families into long-term isolation inside their houses, and the flight of the upper classes challenged Christian notions of charity and fired the debates on the political legitimacy of containment and the morality of the wealthy. However, the choice of countermeasures also depended on the conception of contagion public authorities accepted, which thus politicised the debates on the origins and propagation of disease. These polemics, generally absent during the Black Death, energised production of scientific tracts, militant pamphlets, and even political literary works, of which Daniel Defoe's *A Journal of the Plague Year* (1722) was a clear example. After the 'Great Visitation' of 1665, London and England remained spared from major plague outbreaks. Many parts of continental Europe did not fare as well.

A third factor why plague unlike other diseases afflicting late medieval and early modern societies received attention from chroniclers were its unique and profound, long-term demographic and economic consequences. Each time these interacted with ongoing religious, political and social changes on the local and national levels.

Thus, from the 16th century on, evolving science and medicine combined with social and political transformations stimulated the production of treatises and tracts on the plague.<sup>21</sup> In the 18th and 19th centuries scholars also looked into the disease's past manifestations, in part to discern common patterns and characteristics to distinguish *the* plague from other 'fevers', i.e. deadly epidemic diseases like smallpox or measles. Their discussions took the latest conceptions of disease and contagion into account.

## Reconstructing the plague's arrival in Europe

Richard Mead (1673-1754) was a member of the Royal Society and personal physician to King George II. In the latter capacity he became very influential in the further development of Britain's plague prevention and containment regulations. In 1744 he published



*A Discourse on the Plague*.<sup>22</sup> It expanded on his earlier *A Short Discourse Concerning Pestilential Contagion* (1720), which had limited itself to clinical descriptions of the plague and ways to prevent infection.<sup>23</sup> A new opening part contained a lengthy disquisition on the origins of the disease wherein he firmly rejected the conceptions of divine visitation and natural disasters. He also weighed in on the provenance of plague epidemics and strongly disagreed with de Mussi's contemporary, Giovanni Villani. In the final and – because in 1348 he succumbed to plague while writing – unfinished paragraph in *Nuova Cronica*, he described how infected sailors on galleys returning from the Black Sea had brought the epidemic to Genoa and hence to Italy. He also suggested that the disease had come to the Black Sea from farther east as he listed Tartary, an expanse that reached as far as the Pacific Ocean, as one of the badly affected regions.<sup>24</sup> Writing over 180 years after the first printing of the complete set of volumes of *Nuova Cronica* in Florence in 1559,<sup>25</sup> Mead posited that the epidemic arose either in Ethiopia or Egypt and then spread by trade to other parts of the world.

He supported his argument by referring to Pliny's observation that the pestilence always travelled 'from the southern parts of the world to the western, that is [...] into Europe'. He also cited Thucydides who posited that the plague of Athens began in upper Ethiopia and then passed through Egypt. He further pointed to Evagrius Ponticus, a 4th-century theologian, and especially Procopius of Caesarea, a 6th-century Greek scholar, who both put forward that the Justinianic Plague (541-750) had its origins in Ethiopia or Egypt.<sup>26</sup> (Mead's reference to Ponticus is anachronic.) Thus, he concluded:

Now since Africa had a share of this Plague in the very beginning, I question not but it had its first rise in that country; and not in China, as M. Villani, in his history of those times, relates from the report of Genoese seamen, who came from those parts, and said it was occasion'd there by a great ball of fire, which either burst out of the Earth, or fell down from Heaven. But this relation is so very incredible, that I cannot think we ought at all to rely upon it: seeing we have no instance of a plague, which was originally bred in that country.<sup>27</sup>

The French Orientalist Joseph de Guignes (1721-1800) contradicted Mead less than 15 years later. In the fourth volume of his magistral *Histoire générale des Huns* (1758) he cited Arab sources and Chinese annals testifying that the plague broke out in Tartary. He also noted natural catastrophes in China in the preceding years in which over 13 million Chinese perished:

there had been considerable overflows which had devastated the whole country & carried away many people, violent earthquakes, several mountains had been blown up, lakes unknown before had suddenly formed, & the country was full of insects that ravaged it. The smell of corpses spread everywhere.<sup>28</sup>

Then, the plague moved via the trade routes west from China and Tartary to the Kipchak Khanate (Golden Horde) in western Asia and onto Constantinople.

de Guignes' account is important in several ways. First, he confirmed the spread from eastern Asia to the west as already suggested by de Mussi and Villani. Second, his sources – Chinese and Arab – differed from the European classical authors or sailors returning from the Black Sea usually cited until then. Third, he described one or more disasters in China that led to great human loss. This is consistent with de Mussi and Villani (both of whom probably heard it from returning sailors), but a proposition rejected by Mead. However, de Guignes did not link the plague eruption directly to the natural catastrophes but instead implicated their consequences, namely the countless decomposing corpses that must have overwhelmed local communities. Finally, neither he nor Villani or Mead referred directly or indirectly to armed conflict between the Genoese and the Golden Horde.

Moving into the 19th century, writers no longer seemed to dispute the pandemic's east-west progression in the mid-14th century. For instance, in his treatise on the Black Death originally published in German in 1832, Justus Hecker reconstructed its general movement from Asia to Europe and within Europe via some contemporaneous sources and 18th and early 19th century accounts from different countries, some of which drew on original local sources.<sup>29</sup> He too did not mention the siege of Caffa nor did he suggest that warfare contributed to the outbreak, but merely noted that late in the autumn of 1347 'four ships full of plague-patients returned from the Levant to Genoa'.<sup>30</sup>

The detail and development of the argument where the pandemic started is less relevant to the present analysis. Rather, it seems safe to conclude that by the second half of the 18th century a broad consensus had emerged on how the Black Death had spread. Yet, it was because occasional outbreaks in European cities and eruptions in overseas territories that scientists and historians developed a growing interest in plague historiographies. It prompted them to scour university libraries and archives for original accounts of past events. Thus, a mere decade after Hecker's book came out, Henschel discovered and published de Mussi's chronicle.

## Impact of de Mussi' origin stories

de Mussi's narrative appeared first in *Lehrbuch der Geschichte der Medicin und der Volkskrankheiten* published in 1845 by the eminent physician and professor Heinrich Haeser. Haeser was also the editor of the periodical *Archiv für die gesammte Medicin*, which three years earlier had published Henschel's archival find. In a first passage, he summarised the events leading to the Mongol siege of Caffa, the plague outbreak and the catapulting of diseased corpses into the city, and the flight of the city's occupants via the sea, after which the epidemic spread further.<sup>31</sup> The second and third passages confirmed

the prevalence of bubonic plague and described its pathogenesis based on de Mussi's details.<sup>32</sup> Absent are any references to the Italian's apocalyptic, religion-infused analysis of the how the pandemic broke out and descriptions of how the Black Death moved onwards to Genoa, showing the ostensible obsolescence of medieval conceptions of disease and familiarity with the pestilence's subsequent trajectory. Presuming de Mussi's presence in Caffa during the described events, Haeser considered the siege and its details as new facts. He thus accepted the Crimean city's historical relevancy in the plague's spread. He also concluded based on de Mussi's descriptions that the disease's symptomatology was by and large identical at different locations as the pandemic pressed westwards.

In 1882 Haeser published the third edition of his historical study as *Lehrbuch der Geschichte der Medicin und der epidemischen Krankheiten*. The historical review now made up the third part of a three-volume work. He expanded greatly on first-hand testimonials about the Black Death, including the one by de Mussi, which he described as 'the most important document from the time the disease first appeared in Europe'. de Mussi, he described as an observer of the outbreak of the pestilence in the Crimea who then fled from the epidemic with other Italians only to transmit the infection.<sup>33</sup> This time he dwelt on de Mussi's descriptions of natural catastrophes that preceded the pandemic in the Far East, added details, and confirmed the general correctness of the assertions by referring to credible authors who recounted similar phenomena preceding the introduction of plague in other parts of Asia, Africa and Europe.<sup>34</sup> The summary recapitulated the different conceptions of disease during the Middle Ages, but the author concluded that the origin of the Black Death remained shrouded in the 'most impenetrable darkness'. He next repeated the summary of the siege of Caffa from his earlier work but followed it up with listing all the peoples in East and West Asia, the Near East and East Africa, and the eastern Mediterranean who fell prey to the pandemic, before cutting away to the Arab traveller and chronicler Ibn Battuta who described the plague's effects on North Africa. It led Haeser to conclude with the greatest certainty that overseas trade carried the infection to southeast Europe and the Mediterranean.<sup>35</sup> The remainder of the passage concerned de Mussi's first-hand descriptions of the plague in Italy and further developments on the European continent.

In this third edition of his study, Haeser thus reaffirmed de Mussi as an eyewitness and bolstered the credibility of his narrative by referring to several contemporary authors. In so doing, he also promoted the Crimea as a primary way point for the further dispersal of the Black Death, which implied the historical correctness of the Mongol's siege with the lobbing of diseased corpses across Caffa's the city walls. Haeser, however, presented no supplementary testimonials confirming events in and around Caffa.

Equally noteworthy is that no other physicians or historians seem to have taken up de Mussi's narrative.<sup>36</sup> In his *Compendium der Geschichte der Medicin* (1862), Bernhard Hirschel mentioned the Crimea as one area traversed by the Black Death and merely listed

the Italian chronicler as one among several contemporaries whose descriptions were valuable.<sup>37</sup> Another book, *Grundriss der Geschichte der Medicin* (1876) by Johann Baas, stated more precisely that ‘from 1347 the plague spread from the Crimea via Constantinople to Greece and Italy’.<sup>38</sup> No reference to de Mussi in this book. Karl Lechner referred in *Das grosse Sterben in Deutschland* (1884) to de Mussi only in the context of his description of a commonly used medicine against the pest in the Middle Ages.<sup>39</sup>

Overall, the Italian chronicler seems to have exerted limited influence on medical historiography thus far. As a contemporaneous witness statement his account handed 19th-century authors backward confirmation of a narrative they had broadly reconstructed before the discovery of the narrative. Scholars like de Guignes and Hecker had already posited based on oriental sources that the plague came from China and moved west via the land routes travelled by merchants. Caffa and its siege added historical precision, thereby bolstering the case for the plague’s origin in the east, which in the middle of the 19th century was still far from settled (mainly because of the ongoing debate about contagion).<sup>40</sup> When in 1884 Tonomi published archival evidence that de Mussi had never left Piacenza before or during the plague outbreak in Genoa, he essentially degraded him from an observer of events in the Crimea to a secondary source. But it did not affect de Mussi’s status as eyewitness to the plague’s effects in Italy. His location in Piacenza near Genoa made it likely he encountered sailors who had escaped the Crimea and journeyed back home. While the significance of Tonomi’s communication took time to filter through, it ultimately did not affect the thrust of de Mussi’s backstory.

During the final quarter of the 19th century mostly non-German authors continued the research into the history of epidemics. When discussing the Black Death, most seemed unaware of Tonomi’s archival investigation. Charles Creighton accepted de Mussi’s presence in Caffa in his book *A History of Epidemics in Britain* (1891) but doubted that ‘the plague began [...] among the nomadic hordes outside the fort’. He argued that ‘In sieges it has been not unusual for both sides to suffer from infective disease; and although it is not always easy to say where the disease may have begun, the presumption is that it arose among those who were most crowded, most pressed by want, and most desponding in spirit’. He allowed for the possibility that ‘the Tartar besiegers of Caffa had bred a pestilential disease in their camp; the nomades of the Cyrenaic plateau have bred bubo-plague itself more than once in recent years in their wretched summer tents, and plague has appeared from time to time in isolated or remote Bedouin villages on the basaltic plateaus of Arabia’. However, he also noted that such outbreaks in camps were usually ‘local, sporadic and non-diffusive’.<sup>41</sup> In consequence, a wider epidemic must have struck the Mongol besiegers.

About the hypothesis linking the origin of the Black Death to calamities in China advanced in many publications and confirmed retroactively with the discovery of de Mussi’s chronicle, Creighton had strong reservations. He noted that none of the years with

catastrophic events and great mortality listed by de Guignes were associated with plague outbreaks; not until 1352 (i.e. six years after the siege of Caffa) did Chinese records mark plague outbreaks.<sup>42</sup> He also failed to correlate more recent plague epidemics in Africa, Asia and Europe with prior disasters. Indirectly, this finding might have returned the Caffa siege closer to the centre of the Black Death narrative and enhanced its instrumentality in the plague's westward propagation. Creighton at least accepted that the region covering the Black and Caspian Seas in which the Genoese and Venetians had established trading posts functioned as a portal for the plague's arrival in Europe.<sup>43</sup>

Such a conclusion, however, did not explain the pandemic's origin. Creighton aligned himself with the theory that views several epidemic diseases as soil poisons. It held that the products of human, animal or plant decomposition make the ground unwholesome. Disturbances of the land (like floods, droughts, earthquakes), movements of ground water, or interactions between the soil, water and the air may disperse those pestiferous products. Peoples weakened by famine or human-made disasters would be more susceptible to such poisoning. To him, bubonic plague was a soil poison.<sup>44</sup> This disease conception broke the direct causative link between calamitous events and epidemic outbreaks, because emergence of the infection depended on environmental factors. With decomposition of organic materials, forces of nature still had to disperse the infectious particulates and create the conditions in which people might become infected.

This construct allowed for two independent possibilities. First, the poisonous particulates might gather in a particular area without an immediate link to any calamity from which the disease might emerge under the right environmental circumstances. This conception approached that of a natural reservoir. Second, the particulates might collect on certain things, travel to a different location, and exert their pestilential influences whenever conditions were sufficiently favourable. Creighton discussed both possibilities in his book. He noted, on the one hand, that the Mongols were the first victims of a furiously raging plague, which 'put forth a degree of virulence which must have been native to it, or brought with it from its place of engendering'. On the other hand, he remarked that 'a soil-poison of foreign origin makes straight for the most likely spots in the line of its travels; it may not, and often does not confine itself to these, but it gives them a preference'. Living conditions in medieval Europe were ideal as the Black death arrived 'in the age of feudalism and of walled towns, with a cramped and unwholesome manner of life, and inhabited spots of ground choked with the waste matters of generations'.<sup>45</sup> Creighton's acceptance of poisonous particulates thus implied there was nothing 'improbable in the seeds of an infection being carried thousands of miles across the deserts of Central Asia' before reaching the Crimea. However, unaware of Tononi's refutation of de Mussi's claim that the Mongol siege had been going on for three years, he also wondered whether 'seeds of plague lurking in bales of goods' being stored in the city might have become a source of the outbreak. He preferred the latter possibility over the Mongols

besieging Caffa. He did not elaborate his preference, but clearly dismissed the materiality of the catapulted corpses in the Black Death narrative.

Two years after Creighton, Francis Aidan Gasquet, a British Benedictine monk eventually elevated to cardinal, published his extensive history of *The Great Pestilence* (1893). He wasted few words discussing the origin of the Black Death and simply quoted from Hecker's book half a century earlier and expressed quasi certainty that 'the contagion was first spread by means of the great trade routes of the East'.<sup>46</sup> Although Gasquet was the earliest historian (among the works consulted) to refer to Tononi,<sup>47</sup> he reinforced de Mussi's origin story by identifying the Italian ports established on the Crimea as a clear way point for the plague's spread into Europe. Despite Tononi's archival research, Gasquet did not challenge de Mussi's credibility, describing him as an 'eyewitness of the first outbreak of the plague in Upper Italy' who had gathered from the surviving sailors his information about the outbreak of the plague among the Tartar tribes and its appearance at Caffa. He then quoted the Italian chronicler at some length, including the siege passage. Although he did not elaborate, he offered a slanted translation of de Mussi's words (emphasised in the quote):

At first the Tartars were paralysed with fear at the ravages of the disease, and at the prospect that sooner or later all must fall victims to it. Then **they turned their vengeance** on the besieged, and in the hope of **communicating the infection to their Christian enemies**, by the aid of the **engines of war**, they projected the bodies of the dead over the walls into the city. **The Christian defenders, however, held their ground**, and committed as many of these plague-infected bodies as possible to the waters of the sea.<sup>48</sup>

Compared to the original Latin text and the translation by Horrox cited earlier, he replaced the Mongols' lost interest in the siege with the powerful motive of 'vengeance' and identified the target as 'their Christian enemies' (instead of 'everyone inside' – Caffa had a cosmopolitan population). Gasquet's interpretative slant also surfaced when rendering 'the Christians could not hide or flee or escape [the corpses]' as 'the Christian defenders held their ground'.<sup>49</sup> About the plague, he replaced de Mussi's references to miasma with a clear late 19th-century conception of disease transmission. This is an interesting shift. While the Italian chronicler had to awkwardly introduce the alternative theory of miasmatic disease causation to avoid suggesting that the Christians had also been the subject of divine wrath, Gasquet could simply call disease transmission a reasonable consequence of the Mongols' act of vengeance. His use of 'engine of war' instead of 'catapult' was truer to the Latin original.<sup>50</sup>

In 1908 Gasquet produced a second edition of his work as *The Black Death of 1348 and 1349*. Between both books science had accepted the germ theory as a fact and East China and India had suffered major plague epidemics, during which both the causative

agent and the enzootic cycle involving rats and their fleas were identified. He left his original rendition of the passage on the projection of corpses unchanged.<sup>51</sup>

With the turn of the century the number of publications on plague increased markedly. Instead of individual physicians and historians, the authors – often British or American – were in government employ. Epidemic diseases in colonies and overseas territories were their primary concern. The so-called third great pandemic, which had begun in Yunnan, a province in southwest China bordering India, in 1855, had by the mid-1890s spread to east China and Hong Kong, reached deep into India, and eventually affected all continents. Many of the new publications reported on experimental bacteriological and medical research, etiology and epidemiology, and containment, infection prevention and treatment. Discussion of the Black Death was typically limited to the introduction or opening chapter and contained references to alternative hypotheses for the nature of the disease, the possible places of its origin, and the different routes the pandemic might have taken before overwhelming Europe. In consequence, interest in de Mussi's narrative was close to non-existent because science had by now overtaken his observations of disease progression and Caffa might have been just one among many way points the plague passed on its westbound trajectory.

Besides the second edition of Gasquet's volume, searches identified only two publications discussing de Mussi's chronicle in the period leading to the First World War. Both authors were primarily interested in the place of origin of the Black Death, if for different reasons. In *A Treatise on Plague* (1905), William John Simpson reviewed the calamities earlier authors mentioned in explaining the origin of major epidemics and how the Black Death reached Europe. He examined de Mussi's tractate considering and mostly agreeing with Creighton's critical commentary. He concluded that 'the tendency at all times is to locate the origin of rare diseases in some distant and unknown country' and 'all that is known of the origin of the plague of 1348 is, that having prevailed in a malignant form for several years in the East, it entered Europe by the Black Sea, and probably also by the caravan routes of Mesopotamia and Asia Minor, and that it occurred at a time when the division of the Mogul or Tartar empire on the death of Kublai Khan caused large portions of Asia to be a constant seat of warfare'.<sup>52</sup> Ernest Hanbury Hankin, who worked the Government Laboratory at Agra India, explored in a journal article entitled *On the Epidemiology of Plague* (1905) whether the Black Death might have originated in India. He dismissed China as the place of outbreak and ruled out India based on analysis of Indian histories in which he failed to connect a pilgrimage at Nashik in August 1344 or the suppression of a rebellion in 1341 at Ma'bar with the plague pandemic.<sup>53</sup>

Interestingly, neither author appeared aware of Tononi's refutation of Henschel's claims that de Mussi was in Caffa during the siege and that the Mongols had been beleaguering the city for three straight years. Whereas Simpson wondered how de Mussi could have survived the flight to Genoa on a ship with plague victims, Hankin noted that until

the publication of the tractate by Henschel in 1842, the exact circumstances of how the Black Death was brought from the Crimea were unknown. They both mentioned the Mongols' throwing of 'the bodies of the dead into the town by means of their catapults'.<sup>54</sup>

## The catapult origin story

Whereas de Mussi's mention of Caffa and by extension, the Crimea and Black Sea became part of the historical debate on the Black Death's origin and westward path in the second half of the 19th century, this was not the case with his description of the Mongol's lobbing diseased cadavers over the city's walls. A possible explanation is that by when Henschel published the chronicle, historians had already broadly established that the pandemic reached the Caspian and Black Seas through the Kipchak Khanate and progressed via Constantinople into the Mediterranean Sea. Whether the Mongols launched those corpses or not therefore played no part in the discussions on where or how the plague originated. Even when authors mentioned the alleged incident, they did not discuss it in depth. They also never explicitly confirmed, rejected or questioned the claim. Creighton, when advancing his alternative hypothesis that poisonous particulates in stored merchandise might have caused the plague outbreak inside Caffa, did not deny the catapulting. He ignored the incident because it was immaterial to whether the plague came from outside or inside the city. The establishment that de Mussi never set foot in Caffa did not challenge the claim. First, most of the cited authors were unaware of Tononi's archival research. Second, by 1884 the utility of de Mussi's backward confirmation of the Black Death's provenance from the East had expired because medicine had advanced and more sources from other cultures had become available, none of which cited Mongol actions at Caffa.

So, how did de Mussi's second origin story gain traction in the 20th century? During the second half of the 1800s another historiographical trend was gaining traction, namely the description and analysis of ancient, medieval and early modern weapons and warfare. These authors inventoried weaponry, tried to determine their application on the battlefield as part of tactics and strategies, and established their lineages through different civilisations. One area of considerable interest was the evolution of artillery. Just like their colleagues writing up medical history, they turned to archives and came across the occasional description and depiction of medieval besiegers catapulting body parts or entire carcasses across castle or city walls. And just like their colleagues, they were mostly unaware of de Mussi's chronicle.

Probably the first publication bringing together several narratives of discharging human or animal corpses in a historical overview of medieval siege artillery was *The Projectile Throwing Engines of the Ancients* (1907) by British engineer and historian Sir



Ralph Payne-Gallwey. He also identified the siege engine: ‘Numerous references are to be found in mediæval authors to the practice of throwing dead horses into a besieged town with a view to causing a pestilence therein, and there can be no doubt that trebuchets alone were employed for this purpose.’ To emphasise the trebuchet’s throw weight, he estimated that a small horse weighs about 10 cwt (long hundredweight) or 508 kg and reproduced an image by Leonardo da Vinci of a trebuchet being prepared to cast a dead horse into a besieged town.<sup>55</sup> He further noted that a catapult (an onager) ‘was not powerful enough to project the body of a man’,<sup>56</sup> thereby stressing the unequalled power of the trebuchet.

An article in the *Journal of the American Medical Association* six decades later was the first to link Payne-Gallwey to de Mussi’s chronicle. Vincent J. Derbes, a medical doctor, subtitled his piece *De Mussis and the Great Plague of 1348* (1966) as ‘A Forgotten Episode of Bacteriological Warfare’. In it, he iterated Payne-Gallwey’s estimation of the trebuchet’s sling power and concluded ‘there is every reason to accept the feasibility of hurling plague-ridden cadavers over the city walls’.<sup>57</sup> Interestingly, Derbes still thought that de Mussi was an eyewitness in Caffa, as attested by the opening sentence of his epilogue: ‘Thus the Black Death came to Italy carried on de Mussis’ ship and undoubtedly on many another’.<sup>58</sup>

The first of six volumes of the seminal work on chemical and biological warfare published by the Stockholm International Peace Research Institute, *The Rise of CB Weapons* (1971), summarised Derbes’ deduction.<sup>59</sup> Meanwhile several historians and engineers continued to research the trebuchet and carried out field experiments and computer-based calculations to determine the siege engine’s capabilities. People with an interest in biological warfare, like Marc Wheelis, took in the trebuchet research results and updated the Caffa plague narrative at the end of the 20th century, basically consolidating de Mussi’s second origin story despite some critical comments.

Whereas the first backstory had lost most of its relevancy by the start of the 20th century, this one now continues as a little challenged, plausible historical fact. None of the authors cited so far have investigated the circumstances of the siege of Caffa, considered whether trebuchets in the field could generate the energy to throw a human body over a city wall (especially given that the siege weapons ideally had to be deployed beyond the reach of the defenders’ countermeasures), or established that the Mongols actually possessed the types of trebuchet that could match de Mussi’s narrative of events he did not personally witness.

## Notes

1. Usage of the term 'Black Death' seems to postdate the plague pandemic in the 14th century. Many authors link the phrase to the blackening of the skin as a consequence of necrosis. However, several Ancient Greek and Roman, as well as some European medieval authors already associated 'black' and 'death', albeit in the broader connotation of an epidemic rather than a specific reference to plague. A direct connection between 'black death' and the great pestilence of the 14th century may have emerged in Scandinavia towards the end of the 15th or in the early 16th century when 'den svarta döden' (Swedish) and 'den sorte død' (Danish) from where the expression seems to have expanded across Europe over the next few centuries. d'Irsay, S. (1926). Notes to the Origin of the Expression: «Atra Mors». *Isis* (8:2), 328-32.
2. Wheelis, M. L. (2002). Biological Warfare at the 1346 Siege of Caffa. *Emerging Infectious Diseases* (8:9), 971.
3. Wheelis, M. L. (1999). 'Biological warfare before 1914'. In Geissler, E. and van Courtland Moon, J. E. (Eds.) *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945*. SIPRI Chemical & Biological Warfare Studies, no. 18. Oxford, Oxford University Press, 10-13.
4. Khvalkov, I. A. (2015). *The Colonies of Genoa in the Black Sea Region: Evolution and Transformation*. PhD Dissertation, Department of History and Civilisation. (Florence, European University Institute), 14, 82 and 88.
5. It should be noted that while today 'Tatar' or 'Tartar' refers to narrowly defined related ethnic groups in central and west Asia, medieval sources apply the term more broadly to designate any inhabitant of north and central Asia. With Genghis Khan having unified the steppe tribes under his rule, 'Mongol' and 'Tatar' or 'Tartar' became quasi synonymous. The Golden Horde only broke up after the siege of Caffa and the plague pandemic. Therefore, this study uses 'Mongol' as the primary designator and 'Tatar' or 'Tartar' only in reference to cited sources.
6. Grinberg, M. (2018). Janibeg's Last Siege Of Caffa (1346-1347) And The Black Death: The Evidence And Chronology Revisited. *Turkological Studies* (1:2), 26.
7. The author appears in the literature as 'de Mussi' or occasionally 'Musso'. The family was collectively known as 'Mussi' (hence *Gabriel de Mussi*); each individual's family name was 'Musso'. The publisher of his text, August Henschel doubted that the author was a single person and intimated that the text might have been written after 1375 and completed by relatives after 1402. Henschel, A. W. (1842). Document zur Geschichte des schwarzen Todes. Haeser, Heinrich. *Archiv für die gesammte Medicin*. Zweiter Band, (Jena: Verlag von Friedrich Mauke), 27-28. The form 'de Mussis' is also often encountered. It may draw on the original Latin text ('per Gabrielem de Mussis'), have been derived from the family name's genitive inflection in German, or have evolved into a double plural used by later English authors.
8. Full text: Henschel (1842), 45-59. Translation from Latin in Horrox, R. (1994). *The Black Death*. (Manchester, Manchester University Press), at 17.
9. Horrox (1994), 25.
10. Tonomi, A. G. (1884). La peste dell' anno 1348 [The plague of the year 1348]. *Giornale Ligustico de Archeologia, Storia e Letteratura* (XI), 141-42. Gasquet, F. A. (1893). The Great Pestilence (A.D. 1348-9) now commonly known as The Black Death. (London, Simpkin Marshall), 5 (fn).
11. Emanov, A. G. (2013). The Great Pandemic of the middle of the 14th century as the finale of medieval history. *Tyumen State University Herald* (2), 40.
12. Ditrich, H. (2017.) The transmission of the Black Death to western Europe: a critical review of the existing evidence. *Mediterranean Historical Review* (32:1), 2-3. Grinberg (2018), 21-22.
13. Henschel (1842), 26-59.
14. Tonomi (1884), 141-42.
15. Horrox (1994), 18.
16. Singer, D. W. (1916). Some Plague Tractates (Fourteenth and Fifteenth Centuries). *Proceedings of the Royal Society of Medicine* (Section of the history of medicine) (IX), 178-79.
17. 'Nuova Cronica', section 'Black Death of 1348'. *Wikipedia*, URL <[https://en.wikipedia.org/wiki/Nuova\\_Cronica#Black\\_Death\\_of\\_1348](https://en.wikipedia.org/wiki/Nuova_Cronica#Black_Death_of_1348)>, accessed 23 November 2021.
18. Singer (1916), 161-89.
19. The most notable example was *Regimen contra pestilentiam* (1357) by Joannes Jacobi (Jean Jacmé), which Bengt Knutsson, Bishop of Västerås, adopted wholesale and expanded after 1450 and was first published in England as *A litil boke the whiche traytied and reherced many gode thinges necessaries for the pestilence* (ca. 1485). Extremely successful, it had several reprints and was also published in other European countries.

- Knutsson, B. with introduction by Vine, G. (1910). *A litil boke the whiche traytied and reherced many gode things necessaries for the pestilence*. (Manchester: At the University Press). Singer (1916), 183. Byrne, J. P. (2012). *Encyclopedia of the Black Death*. (Santa Barbara, CA: ABC-CLIO), 67.
20. Gilman, E. B. (2009). *Plague Writing in Early Modern England*. (Chicago: University of Chicago Press), 26 and 73.
  21. For a bibliographical collection, see: 'The Black Death: The Plague, 1331-1770', Bibliography: Works displayed at the John Martin Rare Book Room Open House, March 28, 2013, John Martin Rare Book Room, Hardin Library for the Health Sciences, Iowa City, IA. URL <<http://hosted.lib.uiowa.edu/histmed/plague/bibliography.html>>, accessed 22 November 2021.
  22. Mead, R. (1744). *A Discourse on the Plague*. Ninth Edition corrected and enlarged. (London: A. Millar and J. Brindley).
  23. Mead, R. (1720). *A Short Discourse Concerning Pestilential Contagion, And The Methods To Be Used To Prevent It*. (London: S. Buckley & R. Smith).
  24. Bartlett, K. R. (1992). *The Civilization of the Italian Renaissance*. (Toronto: D. C. Heath and Company), 38.
  25. Italian Wikipedia, 'Nova Cronica', last modified 15 July 2021. URL <[https://it.wikipedia.org/w/index.php?title=Nova\\_Cronica&oldid=121889215](https://it.wikipedia.org/w/index.php?title=Nova_Cronica&oldid=121889215)>, accessed 23 November 2021.
  26. Mead (1744), 22-23 and 30-31.
  27. *Ibid.*, 26-27.
  28. de Guignes, J. (1758). *Histoire générale des Huns, des Turcs, des Mongols et des autres Tartares occidentaux, avant et depuis Jésus Christ jusqu'à présent*. (General History of the Huns, Turks, Mongols and Other Western Tartars, Before and Since Jesus Christ Until Now), Volume 4. (Paris: Desaint & Saillant), 223-24.
  29. Hecker, J. F. K. (1833). *The Black Death: An Account of the Deadly Pestilence of the Fourteenth Century*. Translated from German by B. G. Babington. Humboldt Library of Science. (New York, Humboldt Publishing Co.), 6.
  30. *Ibid.*, 41.
  31. Haeser, H. (1845). *Lehrbuch der Geschichte der Medicin und der Volkskrankheiten*. (Textbook of the History of Medicine and Common Diseases). (Jena: Verlag von Friedrich Mauke), 266.
  32. *Ibid.*, 271 and 273.
  33. Haeser, H. (1882). *Lehrbuch der Geschichte der Medicin und der epidemischen Krankheiten*. (Textbook of the History of Medicine and Epidemic Diseases), Volume 3, Third edition. (Jena: Verlag von Gustav Fischer), 99-100.
  34. *Ibid.*, 106-12.
  35. *Ibid.*, 113-15.
  36. The online research began with structured searches (Google; JSTOR) to identify primary authors and titles. Electronic versions of original copies were retrieved from digital libraries (Bayerische Staatsbibliothek, Digitale Bibliothek; Forgotten Books; Internet Archive; and Wellcome Collection). Titles for downloading were selected based on references to de Mussi, Caffa or more generally, the medieval plague pandemic and then processed with OCR software to enable precise text searches.
  37. Hirschel, B. (1862). *Compendium der Geschichte der Medicin von den Urzeiten bis auf die Gegenwart mit besonderer Berücksichtigung der Neuzeit und der Wiener Schule*. (Compendium of the history of medicine from prehistoric times to the present with special consideration of the modern age and the Viennese school.) Second revised and expanded edition. (Vienna: Wilhelm Braumüller), 158.
  38. Baas, J. H. (1876). *Grundriss der Geschichte der Medicin und des heilenden Standes*. (Stuttgart: Verlag von Ferdinand Enke), 253.
  39. Lechner, K. (1884). *Das grosse Sterben in Deutschland in den Jahren 1348 bis 1351 und die folgenden Pestepidemien bis zum Schlüsse des 14. Jahrhunderts*. (Innsbruck: Wagner), 69-70.
  40. Creighton, C. (1891). *A History of Epidemics in Britain*. (Cambridge: Cambridge at the University Press), 144.
  41. *Ibid.*, 147.
  42. *Ibid.*, 150 and 153.
  43. *Ibid.*, 144.
  44. *Ibid.*, 149-50 and 162.
  45. *Ibid.*, 175.
  46. Gasquet (1893), 2.
  47. *Ibid.*, 4 (fn).
  48. *Ibid.*, 5-6.
  49. Contemporary historians heavily criticised Gasquet's historical studies. One book even contained a 46-page appendix entitled 'A Rough List of Misstatements and Blunders in Cardinal Gasquet's Writing'. Coulton, G.

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- G. (1915). *Medieval Studies*. Second Revised Edition. (London: Simpkin, Marshall, Hamilton, Kent & Co.), 80-126
50. Another partial translation from Latin published in 1905 also uses 'engines'. Simpson, W. J. (1905). *A Treatise on Plague Dealing with the Historical, Epidemiological, Clinical, Therapeutic and Preventive aspects of the Disease*. (Cambridge: Cambridge at the University Press), 137.
51. Gasquet, F. A. (1908). *The Black Death of 1348 and 1349*. Second Edition. (London: George Bell and Sons), 6-7.
52. Simpson (1905), 139.
53. Hankin, E. H. (1905). On the Epidemiology of Plague. *Journal of Hygiene*. (5:1), 58-61.
54. *Ibid.*, 59.
55. Payne-Gallwey, R. (1907). *The Projectile Throwing Engines of the Ancients*. (London: Longmans, Green, and Co.), 29-30.
56. *Ibid.*, 40.
57. Derbes, Vincent J. 1966. De Mussis and the Great Plague of 1348. *Journal of the American Medical Association* (196:1), 181.
58. *Ibid.*, 62.
59. SIPRI. (1971). *The Rise of CB Weapons*. The Problem of Chemical and Biological Warfare. Volume I. (Stockholm: Stockholm International Peace Research Institute and Almqvist & Wiksell), 215.