

How Did Medieval Europe Respond to the Black Death Scientifically and Socially?

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Introduction

Of the three major plague pandemics, the Black Death that began in the 14th century is by far the most widely studied. Traditionally believed to be caused by the bacteria, *Yersinia pestis*, it became a concentrated and heavy outbreak resulting in the death of approximately thirty to fifty percent of European population. The outbreak triggered a large recession, and a shortage of crops and manufactured goods. The Black Death's devastating effects were a major turning point in European history, changing social structures and the role of science and medicine in society.

During the Late Middle Ages, university-educated practitioners, otherwise known as physicians, were customarily trained in ancient Aristotelian and Galenic theory. These physicians strongly favored theory over application. Medical practitioners other than these “master physicians” - including surgeons - held a lower position in society and were labeled as skilled craftsmen rather than true physicians. Their training was more through the apprentice system rather than the university system.

The highest trained physicians practicing in Europe were ill-equipped to treat the Black Death in 1348. Most physicians relied on the humoral theory, which guided most medical practices during that time. The theory was based on the idea that Earth was composed of four elements: earth, water, fire, and air. This led to physicians believing that the air, or miasma, as it was called at the time, was the vector of the disease. This idea led to treatment methods such as bloodletting or carrying around bundles of strong-smelling herbs to filter the disease. However,

when these methods failed to prevent or cure the disease, many medical practitioners turned to explanations of divine wrath for the high mortality rates.

The plague exposed European medicine's shortcomings, and this helped medieval Europe in the transition towards preventative measures and practical, tested applications of medicine.

From a societal aspect, relationships between people varied significantly during the pandemic. Quarantine failed to prevent the Black Death from spreading, raising fear among the people, and trust broke down rapidly between neighbors, friends, and families. Governments entered a state of disarray since authorities and their servants were equally affected by the plague. Europeans religiously followed mandates of divine power and practiced self-punishment to plead for forgiveness from sin. As the Black Death broke out, futile acts of repentance led to loss of trust in God and a deeper examination of commonly accepted religious behaviors. Economically, inflation took over Europe and significantly jeopardized the long-flourishing economy. The plague devastated the economy, and Europe's socioeconomic status was in a state of limbo with how and when it might make a full recovery.

Introduction to Medieval Medicine (Haley Hughes)

The Middle Ages, a time known for barbarism and overcrowding, saw a huge increase in population. Poor diets were prevalent among both the rich and poor, especially when a famine prior to the plague put people in worse health (McDonald, 2006). Often the rich had too much meat in their diets and the poor who were already eating too little almost starved. Living conditions also proved unsanitary and, at times, dangerous. Mice, rats and fleas, which spread

the plague, lived inside of many homes. These living conditions coupled with lack of medicine were exasperated with the arrival of the plague.

Early medicine was primitive and untested. The ancient Greeks, Hippocrates and Galen, became very important within the history of medicine. Their philosophy heavily influenced doctors because the Greeks had looked at diseases such as dysentery, leprosy, malaria, gout, arthritis and cancer and took notes or a medical history on how each person was affected and what treatments worked (2006). Doctors, who were expected to save those who were dying from the novel diseases, were influenced by this format and built off of this base of knowledge to attempt to cure the plague.

When the symptoms did not lessen, many turned to divine explanations about God's wrath to explain these diseases instead. The Flagellates believed that whipping themselves would help cure the world of the plague as they had gone beyond ordinary Christian practices. Catholics of the time would also whip themselves, hoping to appease God's anger. People also used charms such as the evil eye to ward off the plague. Persecution was also common as Jews were murdered in droves as Christians used them as a scapegoat.

As cures continually proved ineffective, people began finding ways to prevent the disease from spreading. For example, the citizens of Pistoia, Italy created ordinances to prevent the spread. However, not every city was successful and many fell victim to the deadly disease. In 1348 Florence, "the pestilence came and many died within 3 days and no doctors were effective

because there was either no cure or it was new; This pestilence began in March, as was said, and ended in September 1348” (Stefani, 1370-1380s).

Physicians, friars, and priests who were unaffected by the disease charged large sums and took advantage of the situation to make themselves rich even though their remedies often did not work. Many medical accounts were taken not by physicians, but rather historians, which led to the spread of misinformation on working cures.

People used many different methods to try to keep themselves safe. During this time quarantining helped slow the spread of the disease despite physicians having no theory of contagion and many contradictory explanations. While fleeing was only for the wealthy, as they could buy their way out of quarantine and move to country estates, poorer peoples were often forced to be quarantined in their homes or pest houses after being diagnosed with the disease. While it is not as innovative as other “remedies,” quarantine remains to be the only effective treatment of the time that is still used today. Many of those who did not self-quarantine had little choice because they still had jobs and did not have servants to assist them. These citizens moved about the cities trying to keep far from others. While many people believed that the sickness was spread by smell, causing a rise in popularity of bird masks amongst doctors, many others believed that touch was the primary vector of disease. This led to types of social distancing such as doctors caring sticks to prevent people from getting too close.

The first 100 years of the pandemic quickly took many lives which led to the inability to create new medicine due to the dangerous nature of the disease. Doctors did not want to study

anything related to the plague because they were fearful of catching the sickness themselves.

This resulted in most people trying to avoid the disease at all costs.

Scientific and Medical Education (Emily Bush)

The Black Death had devastating effects on European society as it was responsible for the deaths of 30 to 50 percent of the population and causing sharp economic recessions. However, it also allowed for growth and development in other areas including social classes and medical practices. In order to examine the effects of Black Death medicine on late medieval European society, the state of medieval medicine pre-pandemic must first be understood.

Before the pandemic, affording a university-trained physician was a luxury for the upper classes of society. Of the three most well-known medieval medical schools - Paris, Bologna, and Montpellier - Bologna had been highly influential in the development of medical education at the time (Bullough, 1958). It can be considered the most “scientific” of the three, adapting surgical studies into its curriculum and incorporating dissections in anatomy instruction, which was not a common practice in medieval times. However, scientific and experimental medical knowledge during that time was still scarce, and even the best medical schools still relied heavily upon the texts of ancient Greeks like Aristotle, Hippocrates, and Galen which were highly focused on theories. Before the Black Death, virtually all physicians placed great emphasis on these prevailing theories, proscribing to the Galenic opinion that reason was more important than experience in matters of medicine.

On the other hand, many of the physicians that developed the foundational curriculum at Bologna (c. 1260 and later) were also surgeons. Physician and surgeon Guy de Chauliac's writings on the three prevailing theories of surgery suggested that it was a much larger part of scholarly discourse at medical institutions. There were also records of "disputes" or debates on surgery as part of the curriculum. This indicates that even non-surgeons had a background in fundamental surgical knowledge, at least in Bologna (Bullough, 1958). This background would become significant during the Black Death specifically due to the traditional ancient Greek theories that had guided physicians' practices were failing plague patients. Physicians who adhered to practices supported by ancient Greek theories found little to no success in their treatments, and when symptoms did not lessen, many turned to divine explanations about God's wrath instead. For instance, at the request of King Philip VI of France, the medical faculty at the University of Paris issued a tractate identifying the two main causes of the plague as "celestial" and "terrestrial" (Carlin, n.d.). Their advice was based on the theory of "evil vapours," astrology, and divine influences, and referred to the theory of dryness correlating with good health.

As the shortcomings of traditional theories were revealed, many turned to those trained in surgery, who previously had a much less respectable role in society and considered as manual laborers (Vanneste, 2010). Surgeons were increasingly seen as men of practical learning who could produce more effective results than learned physicians who were more focused on theoretical disease prevention, causation, and on textual criticisms of ancient works on medicine. This trend was also reflected in works such as John of Arderne's widely read 1370 publication

Practica Chirurgiae, where he questioned traditional medical dogma. This new perspective was supported by the fact that most university-trained physicians catered primarily to the wealthy, and, during the pandemic, focused a great deal of effort on regulating the increasing amount of unlicensed practitioners who were making great profits from the poor and helpless. Meanwhile, surgeons sought to distinguish themselves from physicians through two types of surgery, “one a craft and the other a science.” These consisted of manual operations meant to restore good health, and the study of curing illnesses for which a manual operation is eventually required.

The shifts in public and scholarly views on medicine catalyzed by the Black Death continued after the pandemic. There was an increase in medical texts published in vernacular languages (rather than the traditional Latin), allowing the knowledge to become available to a wider audience. Additionally, hospitals shifted into a new role following the plague, forming closer relationships with physicians and making efforts to actually cure the sick. Ethical codes emerged, outlining standards of dress, appearance, and professional behavior that physicians were expected to follow. General hygiene improved, and public health measures became a greater priority of European governments, starting in Milan where the first board of health was established (Legan, 2015). These outcomes were able to emerge as a result of the existing potential within medical universities to shift away from theory towards reason and experience, as well as the opportunity for upward social mobility of surgeons.

Surgery became more widespread and pursued in the post-plague era as public authorities began supporting it in order to directly study the human body. Furthermore, before the plague,

hospitals were designed to isolate instead of heal. Afterwards, sanitation standards improved and hospitals began to cure their sick. Ultimately, the Black Death accelerated the process of reassessing medical standards and facilitated the journey towards the Scientific Revolution and advancement of the field.

Medical Remedies (Daisy Wang)

Although there was a general improvement in public health and a shift towards scientific perspectives, medicinal knowledge was still insufficient to counter the rapid spread and high mortality rates of the Black Death. This was largely due to the fact that in medieval Europe during the Black Death, medicine was based on the humoral theory. The humoral theory stated that the Earth was composed of four elements: earth, water, fire, and air, which are linked to the bodily fluids of black bile, phlegm, yellow bile, and blood, respectively. The fluids were believed to assume the qualities of the elements. Blood, associated with air, was assumed to be hot and moist and phlegm, associated with water, was believed to be moist and cold. Black bile, earth, was thought to be cold and dry, and yellow bile, fire, was thought to be hot and dry. Furthermore, each fluid was associated with a color, taste, age, temperament, and season.

Humoral theory believed that people should avoid moistening or heating the body. For example, hot baths, which were believed to open pores, were avoided. Open pores were believed to let out the disease, but could also let it in, so they were avoided. Excessive activity would heat the body and increase breathing which would cause people to breathe in more putrid air, believed to spread the disease. These practices often made people weaker and more susceptible to the

disease as the lack of hygiene would spread the disease more and the lack of exercise made people weaker and less able to fight off the disease. Physicians also believed that a bad mood, such as jealousy, anger, sadness, and fear, negatively affected the balance. Similarly, positive emotions were believed to strengthen the heart against poisons (Legan, 2015). Many experts offered contradictory recommendations when dealing with food and according to the records of some doctors, humors played an important role in recovering from the plague. These doctors would prescribe changes in diet and forced vomiting and urination from drugs. They thought that this would help expel the black bile from the body (Black, 2020). These measures actually hurt the patients because they lost the nutrients they need to help fight the infection and instead became very weak. The belief in the humoral theory led to the commonly found medicinal treatments that attempted to cure the bubonic plague.

Medieval Europeans attempted to cure the plague with many solutions, including animal cures; potions, fumigation, bloodletting, pastes; flight from infected areas and persecution of marginalized communities; supernatural cures; quarantine and social distancing, which was the only effective method. The most popular animal cure was the Vicary Method in which a healthy chicken had its back and rear plucked clean, the bare part was put on the swollen nodes of the sick, and was strapped in place until the chicken or patient died. Other animal cures included chopping up a snake, which was believed to represent Satan, or a pigeon, and rubbing the pieces of meat over buboes. The most sought after cure was the unicorn as drinking a potion made of ground up unicorn horn and water was thought to cure most diseases (Mark, 2020).

The unicorn potion was one of many potions used to “cure” the plague. Another “potion” included eating or drinking a small amount of crushed emeralds, a cure generally reserved for the wealthy. The less affluent would drink arsenic or mercury as a “cure,” which only helped kill the drinker faster. Another well known potion of the time was the Four Thieves Vinegar which was for protection against the plague and was made up of cider, vinegar, or wine with spices such as sage, clove, rosemary, and wormwood. The most popular potion was Theriac which contained up to 80 ingredients with a lot of opium and mixed with syrup. It was also called treacle in its liquid form and could be consumed as a liquid or applied as a paste. Actual rotten treacle, byproduct of sugar production, had to be at least 10 years old to be effective and given to sick patients. It was believed to combat the effects of the disease and rid the body of it permanently. Other paste-like remedies included a cream of various roots, herbs, flowers that was applied to buboes once they were lanced. Less sanitary versions of pastes included a paste made from a mixture of tree resins, flower roots, and poo. Medieval Europeans would also bathe in or drink urine because they believed that the urine had medicinal and healing properties (Shariff, 2013). Most of these paste cures probably led to more infection.

People of the Black Plague era thought that bad air, or miasma, spread plague, which led to much fumigation. Homes were fumigated with the incense or smoke of dry and richly scented woods such as juniper, ash, vine, and rosemary. People carried flowers to ward off the stench and fumigate one’s lungs, a practice that led to the song “Ring Around A Rosie.” People also fumigated their lungs by sitting close to a fire and attempting to sweat out disease. Some even sat

by or in the open sewer to cause the miasma to gravitate to sewage (Mark, 2020). However, this method often led to a faster death or succumbing to other deadly diseases.

The belief in the humoral theory is most obviously seen in the practice of bloodletting as people thought they could bleed out the disease. Bloodletting was often done with leeches for the wealthy, however, the poor were forced to cut themselves with knives in order to let out the blood. Cupping, the practice of heating a cup and placing it over the buboes, was also used to draw out the bad blood (Mark, 2020). Religious cures were often set by the Church and included a variety of solutions including purchasing amulets and charms, prayer, fasting, attending mass, persecution, religious processions, or public flagellation. Furthermore, belief that astrological alignment and supernatural events could affect health caused marginalized peoples such as gypsies and Jews, to be seen as witches, further justifying the scapegoating (Shariff, 2013). All in all, the only effective solution medieval Europeans found was quarantine or fleeing.

Disparities of Death Rates (Qiang Guo)

Though there is not an exact death rate for the Black Death between 1348 and 1349, there were several methods in England that gave an estimation. These calculations gave an average death rate of around fifty percent for adult males in the countryside. On the other hand, “few, virtually none, of the lords and great men died in this pestilence” (Dewitte, 2017). Royal families had the lowest mortality rate, followed by high nobility and English bishops, which raises the question of how wealth and identity play a role during the Black Death.

The first and main reason behind the discrepancy in death rate is the different precautions taken by the wealthy versus the poor. When the plague broke out, nobilities either shut down their properties immediately or retreated to their huge manors in the countryside. Many fled the city as soon as possible. On the other hand, the middle and lower classes were packed into small living quarters filled with neighbors who had already caught the plague. From the medical perspective, the Black Death mainly spread through the bite of a flea infected by the disease, quarantine effectively prevented contact with vectors and the larger living quarter provides less contact with these vectors. Thus lowered the mortality rate among the wealthy. In Boccaccio's "The Decameron," the author described the lives inside the estates of the wealthy as luxurious as usual, the rich enjoyed quality wine and food, partying and dancing with each other. Ironically, a portion of the poor were doing the same thing. The difference being that their intention was to enjoy the last days of their lives. Despite setting themselves apart from the cities, the nobles had access to contemporary scientific research results by ordering the reports of the plague. Among them, *Compendium de Epidemia* by University of Paris not only changed the medical perspective of the prevention of the Black Death, but also changed the lifestyle of its main "subscribed" audience: the nobles and royal families. Health condition was another main factor. Most nobles maintained good health before the Black Death due to their financial capabilities and were able to shift quickly to any kind of diet after the plague hit their cities. Contrastingly, after the plague arrived, the price of food and other necessities increased in general, creating a harsher condition for the middle and lower classes.

Italian people also experienced the difference between classes. By 1348, the Venetians had built a pesthouse on the Lazzaretto Vecchio island; those who caught the plague were forced to quarantine until they were dead or cured. Only a few came back alive. Sixteenth century Venetian notary Rocco Benedetti recorded that “the Lazzaretto Vecchio seemed like Hell itself. From every side there came foul odors, and indeed a stench that none could endure; groans and sighs were heard without ceasing” (Morelli, n.d.). As a matter of fact, the people in the pesthouse were generally poor people. The rich either already fled from the country, or they have authority to avoid going into the place of no return.

There was also a gap between the mortality of priests and bishops. During the plague, priests would step into plague victims’ homes, risking their lives to give any help they needed. Unlike the priests, bishops would pray separately in the church, rarely contacting anything other than the Holy Ark. Consequently, the mortality rate of the bishops was 18 percent between 1348-1349, third lowest after the royal family and nobility.

Unfortunately, we still do not have an accurate mortality rate for the COVID-19 with different agencies blocking the information. Many cases have happened where people who did not take the test received a positive result. People tested several times were recorded as a new person each time. As for the COVID-19 death toll, some states counted only those with a test result, while others recorded based on symptoms. Hospitals receive more money for COVID-19 patients, raising the possibility of coding patients with respiratory system issues as COVID-19 patients for more money. Moreover, wealth and identity still play a role today. Rich people have

better health-care plans and are able to pay more for treatment. Those with power, such as politicians, utilize their influences to open up backdoors for treatment and to avoid contacting people on public transportation (Harris, 2020).

Although science and medicine have advanced since medieval times, allowing for better treatment for those who are ill, the inevitability of social class disparities persists and thus differences in death rates between classes is a phenomenon observed even in modern times.

Civil Unrest and Aftermath (Qiwen Wang)

Facing an almost incurable disease at that time, medieval people fell into deep panic. Plentiful uncertainties turned them from rational human beings into highly emotional, easily irritated souls. However, while the epidemics could fuel violence, it caused silence afterwards. Violence and silence together directed human history into the darkest time ever.

Waves of social revolts led by different classes took place before and during the plague. In the early thirteenth century, revolts against changes in monetary policy broke out in northern France and Flanders. The revolts were led by menu people, who possessed little wealth, opposing changes in monetary policies that were only beneficial to the French royalties. Later on, the proletariat relayed the revolts as respected tradesmen gradually attained higher social status. Rising up in Italy, mobs of peasants and artisans opposed the ruling of the crown. However, similar social movements sharply declined when it came to the post-plague period (after 1348). One of the most important reasons for this sudden silence was the loss of millions of lives: “the Black Death abruptly killed off workers’ new zeal to topple governments or protest

against burgeoning capitalist exploitation” (Cohn, 2009). In France, revolts or even minor civil disturbance were also rare to see. The fatality of the Black Death struck the once heated social movement and the pursuit for liberty down into stagnance.

While people had died exploring the treatment of this deadly disease, some people exercised radical violence against themselves for the sake of relief. These people formed a group called the flagellants and it became so powerful that this movement spread across the continent rapidly. Flagellants believed that the disease was God’s punishment for human’s grave sins; thus, they performed incredibly harsh self-punishment to plead for God’s forgiveness. According to Jean leBel, flagellants were “carrying crucifixes, banners, and standards as in solemn processions, they went down roads, two by two, loudly singing songs in praise of God and Our Lady, and twice daily stripped to their underwear [sedesvestoient jusques au petits draps], beat themselves as hard as they could with whips and spike-tipped cattle-prods until blood spilled down their shoulders covering completely their flanks, all the while as they sang their songs” (Cohn, 2009). There is one specific case of Tournai exemplifying the movement of flagellants. Rather than attempting to solve the disease, flagellants relied on eliminating anxiety, fears and anger. However, the movement finally settled down when Pope Clement VI banished flagellant activities in 1349 (Model, 2020). Silence arrived after all that extreme violence, which failed to truly promote the relief of the disease. It was not just the silence of the violence, but the silence of the hope.

Besides violence against oneself, violence was also used against specific groups during the epidemics. In October of 1347, Genoese trading ships arrived at the coast of Messina, Sicily where men had died at the oars. The characteristic egg sized black swellings that oozed blood and pungent pus in the armpits and groin were found on the sailors, but as the disease trekked through the population, fierce fevers and spitting of blood replaced the characteristic buboes. This pestilence was so virulent it rapidly spread from one person to another; its “malignity ...appeared more terrible because its victims knew no prevention and no remedy” (Tuchman, 1978). Eventually, this pestilence grew into the bubonic plague. Populations were so ravaged and in such a state of despair, that a notion such as Jews poisoning the wells from which the populous drank, spread a virulent strain of anti-Semitism across Europe. The affluent indebted to the Jews aided in the conspiracy by opening gates to the “Jew killers,” and thus absolving their debts (Cantor, 2001). In Esslingen, Jews committed mass suicide by shutting themselves in their synagogue and lighting the building on fire. In Strasbourg, 900 out of 1,884 Jews were burned after being led into a house where on the way they were stripped of nearly all their clothing. Whereas the Jewish community was faced with the worst possible violence, the plague went on, leaving more dead bodies than those who died from the diseases. Underneath Jews’ wailing and hangman's cheering, human ethics and rationale are in deadly silence.

Family Value and Structure (Dillon Kim)

Research has shown the devastating effect that the Black Death had on millions of people. Medically, the nature of the disease ravished the human body and left a negative effect

on society in general. Looking back, the bubonic plague was the greatest bacterial threat to mankind. However, even today we again are being challenged both medically and economically by COVID-19. Ironically, there are striking similarities. For example, the common theme of “missing” or “falsified” information could be found between the Black Death and COVID-19. The reinforcement of misinformation was evident in a paper published in February 2020. The publication claimed that the “knowledge of the cCFR (confirmed Case Fatality Risk) is critical to characterize the severity” of the current pandemic (Jung,et.al, 2020). There are several sources in the media flaunting claims left and right about the validity of data related to coronavirus casualties. And while this remains a controversial topic, one could assume that this just proves the importance of data, and how it plays a vital role in the pandemic.

During the plague, citizens were afraid to go out in public spaces such as bathing spas or even to retrieve water from a common well. Boccaccio (1313-1375) wrote that the situation was so extreme that “fathers and mothers were found to abandon their own children, untended, to their fate, as if they had been strangers,” and this was a common occurrence. The idea of contracting the plague was psychologically tormenting for some, as “this sore affliction entered so deep into the minds of men and women,” (Boccaccio, 1313-1375) and those who did not perish faced a lifetime of depression (Wray Shoana Kelly, 2020). Religious institutions such as the Church attempted to offer mental support, but numerous people lost faith in God due to the sheer number of deaths. Within the family structure, humans no longer saw eye to eye. Rather, they viewed others as a potential threat to their wellbeing. This “every man for himself”

mentality rocked the traditional family structure. However, the existence of love and compassion was not completely lost. For example, in *Testament of a Mother during the Black Death*, a mother “leaves 20 *lire* for her daughter, Ysabetta, daughter of the late Figliocarius known as Carino.” This shows that while some were lost, others still knew how to love.

With the subsiding of the pandemic came the rebirth of the family structure and value system. While Europe lost $\frac{1}{3}$ of its population, the living “benefited from an extreme labor shortage, so serfs once tied to the land now had a choice of whom to work for,” (Whipps 2008) and as a result families began to bloom again. While populations such as the Jews did not gain any real benefits, the world’s population as a whole underwent a revival.

In conclusion, the Black Death was not only a devastation to the world’s population, but it was also a clear indication of a need for plans to cope with future pandemics. The trend continues that both infected individuals and their families are impacted physically and emotionally, and it is overall apparent that history repeats itself.

Conclusion

As one of the greatest plagues in human history, the Black Death greatly changed social structures and medical perspectives in Europe. Its effects were so far-reaching and powerful that nearly all explanations and cures were futile. The plague arrived in medieval Europe within a context of primitive and unscientific practices. Various treatments were attempted, but most to no avail. Consequently, as the disease took its toll on the population, it prompted change within the medical world. Universities began to shift their focus towards practical and application-based

teachings, and in the decades following, public health improved and traditional theories came under scrutiny, paving the way towards greater advancements in coming centuries.

Social structures also greatly shifted. Familial value and structure was flourishing before the plague, but was lost soon after the plague struck. The fear of catching the plague caused some to abandon loved ones, including children. Elderly and infantile populations were often unattended to and perished from a lack of care after contracting the plague. As this great fear rose, people responded with violence toward both themselves and others. People revolted against authority, and punished whoever they thought should be responsible for the outbreak of the disease. Both religious authorities and governments were affected as a result. Though the epidemic created tremendous social chaos in Europe, society eventually entered into deep social silence; dead bodies were thrown into mass graves and once-bustling towns and manor lands were rendered empty and quiet. In conclusion, the medieval response to the Black Death inspired scientific research as well as social reformation, which would continue to influence society hundreds of years into the future.

Reflecting on COVID-19 today, it is strikingly similar to the medieval plague. The social class disparities persist and the world has not been able to unite against this pandemic even with more advanced communications. When the pandemic turns into a political weapon and financial component, it is bitterly acknowledged that with all the medical and technological advantages, history still repeats itself.

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