



The Year of the Elephant

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Abstract

Based on historical interpretations of the *Sūrat al-Fil*, the 105th Meccan Sura of the Qur'an, an epidemic occurred near Mecca circa 570 CE (Common Era), the Year of the Elephant in Islamic history. The five verses of the Sura are thought to be an allegorical description of the "Elephant War epidemic", so named because invading Axumite (Ethiopian) forces from present-day Yemen included one or more war elephants. The elephants refused to enter the city, causing the Axumites to halt the attack. Interpreted literally, divine intervention then defeated the invaders by sending a flock of birds (*ababil*) that dropped pellets—a possible allusion to pustules—onto the Axumites, maiming and killing them, and ending the siege of the city. Early historians interpreted the Sura as allegorical for either a smallpox or measles epidemic; available descriptions favor smallpox. The residents of Mecca were spared. Descriptions of the birds and use of the term *ababil* for birds are consistent with barn swallows (*Hirundo rustica*, subspecies *rustica*), which collect clay pellets to make nests. They are attracted to flies following domestic animals. We consider the zoonotic origins, geographical distributions and clinical presentations of two types of smallpox virus, and propose that the epidemic was due to *Variola major*. Since the prophet Muhammad was born in 570 CE, the events played a critical role in the birth of Islam.

Editor's note: *The peer reviews of this article are focused on the hypothesis that an epidemic such as by smallpox could have explained a failed invasion of Mecca that is described in the Qur'an. A full review of the accuracy of other historical hypotheses is beyond the scope of the journal.*

Introduction

Smallpox has probably existed in the human population for thousands of years, but the first reasonably clear descriptions appeared in documents in the 4th century CE (Common Era) by Ko Hung in China and in the 7th century by Vagbhata in India.^{[1][2]} The most influential treatise, *al-Judari wa al-Hasbah* (On Smallpox and Measles), was written by the renowned physician-scholar Muhammad ibn Zakariyā Rāzī, or Rhazes (860–932 CE) at the beginning of the tenth century. He is credited with first clearly distinguishing between smallpox and measles, a differential diagnosis that continued to confuse Western physicians until well into the second millennium.^{[1][3]} The disease seems to have first entered the Arabian Peninsula before 570 CE, brought across the Red Sea by the Christian Axumites (Ethiopians), who conquered the region of present-day Yemen. In 570 BC, Āmu l-Fil or the Year of the Elephant, the Axumites in-

vaded Mecca, but the attack was thwarted, an event described only in five verses or ayats of the *Sūrat al-Fil*, Sura 105 of the Qur'an. The Scottish physician-explorer James Bruce found an Ethiopian chronicle entitled the *Siege of Mecca* that describes the defeat of the Axumite army in which the author El Hamessy reckoned the Sura had to be a parable for an epidemic disease, possibly the first description of a true smallpox epidemic.^{[1]p214 [4][2]}

The so-called "Elephant War epidemic" is an otherwise obscure event in a long history of smallpox that was to follow. Others have described previous outbreaks in the Mediterranean of what may have been smallpox; subsequent, well-documented epidemics also occurred in the latter part of the first millennium that led to a spread throughout Europe, North Africa, the Middle East, and Asia.^{[1]Fig 5.1} Other writers through the centuries have interpreted the allegorical passage as a description of an epidemic disease—smallpox in particular, but the evidence for smallpox has been deemed "flimsy" as recently as 2004.^[5] The event might remain a minor historical curiosity, except that it had an important historical implication—it took place in the same year that the Prophet Muhammad was born. The presumed outbreak occurred during a battle between an invading Axumite army and pre-Islamic Arabic tribes

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around the city of Mecca. We re-analyze the evidence relating to the cause of the presumed epidemic and its place in history.

Historical background

By the sixth century CE, the Byzantine Empire included protectorates in Asia Minor, Syria, Egypt, Nubia, and Axum (parts of present day Ethiopia and Eritrea). Axum had converted to Christianity two centuries earlier, and was in its ascendancy. The kingdom had an alliance with Emperor Justinian in Constantinople. A major rival to the Eastern Roman Empire was the Persian Empire under the Sassanid Dynasty. The Persians controlled vassal states along the western Arabian Sea, including most of what is now Yemen and Oman, but they were also sympathetic to the pre-Islamic tribes throughout Arabia. A small independent Jewish kingdom of Himyar (present-day Yemen) existed on the southwestern coast of the Arabian Peninsula facing the African continent and Axum.

Early in the 6th century, an Axumite army attacked Himyar by crossing the Red Sea. Christian King Kaleb sent the army to conquer the Jewish kingdom that had committed pogroms against Christian minorities. Munro-Hay, citing the Byzantine historian Procopius and Guillaume's translation of Ibn Ishaq's *Sirat Rasul Allah*, mentions that large forces, as many as 70,000 men, were sent to attack Sana'a—the Himyarite capital—and to subjugate other nearby cities.^{[6][7]} The Axumite army was traditionally organized into *sarwe* (regiments), each with a provincial or tribal name. Each regiment was led by a general commanding large numbers of spear-carrying infantry, archers, camel cavalry, and water-carveé support units (water bearers). Some accounts also mention a contingent of up to 80 elephant-fighters. Kaleb ordered his generals to conquer Himyar and to kill a third of its men and to lay waste to one-third of the country, then seize one-third of its women and children.^[7]

The attack against Mecca in the Year of the Elephant was led by Abraha, a viceroy who had been overseeing Himyar since the earlier Axumite victory. He was instructed to attack the city as revenge for the defilement of a Christian shrine in Sana'a by Arab pagans incensed over a previous insult to the Kaaba in Mecca. The time of year, duration of battle and strength of his army are not known, but troop size and contingent forces were probably similar to the earlier conquest of Himyar. (The Year of the Elephant is most often cited as 570 CE, but estimates vary by a few years and are debated among scholars.) Mounted on an elephant, Abraha led his army

overland through desert terrain from Sana'a northwards to Mecca, some four hundred miles across arid land and through mountain passes.

By the late sixth century, Mecca had become an important trading center for merchants who chose to avoid dangerous overland caravan routes between Europe, Egypt, India and China. African ivory, Asian silk, locally produced frankincense and myrrh, and imported spices were prized items of trade between the East and West. Mecca had established communications and trade between Himyar to the south, and Gaza, Damascus, and Aleppo to the north. Mecca's population was primarily composed of the Quraysh tribe, which consisted of dozens of clans allied with nearby tribes living in the surrounding hills and mountains. There were also non-Arab craftsmen, merchants and visitors from the Byzantine Empire living in the city, but the size of this population is not known.

The term "Elephant War epidemic" derives from an allegorical passage in the Qur'an referring to Abraha, mounted on an elephant. Allah smote the enemy army with small "stones":

أَلَمْ تَرَ كَيْفَ فَعَلَ رَبُّكَ بِأَصْحَابِ الْفِيلِ
أَلَمْ يَجْعَلْ كَيْدَهُمْ فِي تَضَلُّيلٍ
وَأَرْسَلَ عَلَيْهِمْ طَيْرًا أَبَابِيلَ
تَرْمِيهِمْ بِحِجَارَةٍ مِّن سِجِّيلٍ
فَجَعَلَهُمْ كَعَصْفٍ مَّأْكُولٍ

*Have you not considered, how your Lord dealt with the companions of the elephant?
Did He not make their plan into misguidance?
And He sent against them birds in flocks,
Striking them with stones of hard clay,
And He made them like eaten straw.*

Qur'an 105:1-5

Flocks of birds flew overhead, dropping clay pebbles on the enemy and crushing them. Some have suggested the pebbles may refer to the lesions of measles. The spelling of the two words is different but pronunciation is similar (Table 1).

English	Arabic
smallpox	جدري
pebbles	الحصى
measles	حصبة

Table 1 | Translations

The distinction between the two diseases awaited Rhazes' description a few hundred years later. The two diseases are easily conflated since both cause a skin eruption. Ibn Ishaq, referring to another historian, states (Mention of these botanicals indicates trade existed from countries where smallpox may have been brought to the southwestern Arabian peninsula; the



herbs are native to Eastern Europe, the Mediterranean basin and Iran, which suggest that they had been recent importations from these regions).

Utba told me that he was informed that year was the first time that measles and smallpox had been seen in Arabia; and too, that it was the first time that bitter herbs like rue, colocynth and Asclepias gigantea were seen.^[7]

One of the earliest historical descriptions was by the Roman Eusebius in 302 CE, which Willan concluded were due to the confluent form of smallpox.

It was characterized by a dangerous eruption which unlike the true plague spread over the whole body and which often affected the eyes and resulted in the loss of sight, which had a profound effect of protecting against a second attack of the same disorder, and whose eruptions were accompanied by a very offensive smell.^[8]

Descriptions specific to a differential diagnosis, clinical signs, complications, immunity, and mortality estimates specific to the elephant war epidemic (detailed in Table 2) include:

... as they brought him (Abraha) along the retreat, his limbs fell off piece by piece, and as often as a piece fell off, matter and blood came off.^[9]

... as they withdrew they were continually falling by the wayside dying miserably by every watering hole. Abraha was smitten in his body, and as they took him away, his fingers fell off one by one. Where the fingers had been, there arose an evil sore exuding pus and blood, so that when they brought him to Sana'a, he was like a young fledgling.^[7]

The metaphor "like eaten straw" has been interpreted as referring to stubble remaining in a barren field, or broken blades seen in animal dung—both interpretations implying useless, decaying and fetid remains. This image reinforces the previous descriptions of death and dying. The only citation suggesting the size of the army and extent of its devastation comes from a poem listed in Ibn Ishaq's narrative:

*He who knows what happened will tell the ignorant.
Sixty thousand men returned not home.
Nor did their sick recover after their return.^[7]*

Discussion

The variola virus causes smallpox. Based on its DNA, scientists have proposed that the virus may have originated from the camel pox virus sometime in the remote past.^[11] Alternatively, studies of hundreds of smallpox isolates support a rodent-borne original source.^[12] Two separate smallpox viruses have distinct geographical origins and different fatality rates. *Alastrim minor* may

have originated in West Africa 18,000-70,000 years ago and has a one percent mortality rate. *Variola major*, which may have originated in East Asia 400-1600 BCE (Before the Common Era),^[1] has a 20-50 percent mortality rate in an unvaccinated population.^[10] Descriptions from ancient and classical literature suggest that the latter, more virulent type, probably spread from Central Asia through migratory and trade routes into the Middle East and Mediterranean basin around 1000 BCE.^[1]

Sign/symptom	Smallpox	Measles	Ref
Eruption over entire body	++++	++++	[1]
Pebble-like skin lesions	++++	++	[6]
Bloody lesions	++++	+	[9]
Pustular lesions	++++	+	[8]
Offensive smell	+++	+	[8]
Blindness	+++	++	[8][6]
Permanent immunity	++++	++++	[6][7][10]
Mortality	++++	++	[7][10]
Mortality range	20-50%	10-30%	[10]

Table 2 | Differential diagnoses, clinical presentations, complications, immunity, and mortality estimates of the elephant war epidemic.

Alastrim appears to have been confined to its west African origin until very recently and was not involved in early Middle Eastern epidemics. (All future references to smallpox refer to *Variola major*.) Hopkins has proposed that *Variola major* may have been responsible for the failed invasion by Carthage on Sicily (395 BCE), and the later success of Rome during the Punic Wars (262-146 BCE).^{[2][13]} It may have been responsible for other early Middle Eastern outbreaks, including the early Syrian epidemic mentioned by Willan.

Independent of its animal origin, ultimate source, and geographical spread, smallpox had become an endemic disease throughout the Old World by the first few centuries of the Common Era. It may have been introduced many times from Asia into eastern European, and Middle Eastern regions, eventually becoming focal. Lack of sufficiently large and densely populated communities may have limited large epidemics since most people were living in isolated villages or traveling by small nomadic tribes. The potential to cause major epidemics may have required larger non-immune communities where its introduction would allow for rapid spread. Hopkins notes that by the time of Roman ascendancy there were seven million people living in the Nile valley, 58 million in China, and 25 million in India, many living in cities. Communication among these regions was well established by the sixth century by Middle Eastern-Asian caravan routes, and by ocean voyages through the Red and Arabian Seas to and from India and the Far East. The prerequisites for major epidemics—large,



concentrated non-immune populations and introduction of the virus by peoples via land and sea—were in place by the time of the Roman Empire (perhaps even earlier) and certainly were present in the latter part of the first millennium.

The unique physical stigmata of smallpox (purulent lesions and pitted pockmarks) have allowed historians to deduce its presence from ancient Chinese writings and Egyptian papyri. Chinese and Indian physicians recognized that inoculation using scabs produced immunity to the disease. Microscopic analysis of mummified skin scrapings support the theory that Ramses V died of the disease in 1157 BCE,^[13] but early physical descriptions may not have been associated with epidemics—or at least this is not recorded. Classical works of Hippocrates (c. 460-370 BCE) and other ancient Greek and Roman scholars do not describe these lesions or epidemics. In the second century CE Galen may have referred to its physical presentation, but although his description may have been of smallpox, it does not appear to be associated with a major outbreak.

Before the germ theory, the cause of a disease was based on its physical signs (viz: bubos of plague). Diseases producing a rash (smallpox, measles, typhus) were often conflated with each other. Ancient DNA may be recovered from victims, but it cannot answer the question whether they died *of* a disease or *with* it. Retrospective diagnoses of epidemics are often impossible when distinctive signs are not described, but circumstantial evidence often points to a probable cause. Historical references and oral traditions about the circumstances surrounding the Mecca epidemic suggest a deadly disease of some sort did occur, but are not sufficient to differentiate between smallpox and measles.

Nearly three centuries after the birth of Muhammad, Rhazes wrote copiously on many subjects, primarily medicine, and is one of the most revered figures of the Islamic Golden Age, considered a genius of medieval medicine. According to Rhazes

Smallpox appears when blood 'boils' and is infected, resulting in vapours being expelled. Thus, juvenile blood (which looks like wet extracts appearing on the skin) is being transformed into richer blood, having the color of mature wine. At this stage, smallpox shows up essentially as 'bubbles found in wine' - (as blisters) - ... this disease can also occur at other times - (not only during childhood) - . The best thing to do during this first stage is to keep away from it, otherwise this disease might turn into an epidemic.

Although Rhazes' remarked on the writings of Galen and other early discourses on diseases that probably included smallpox,^[8] to our knowledge he never mentioned the Elephant War epidemic in his writings. He was among several scholars of the Golden Age known

as Faylasufs (who later included Ibn Sina, or Avicenna), who stressed rational argument and free thinking.^{[14][15]} Rhazes also had an interest in mythology and interpretation of allegory, but never mentions the Sura or its interpretation as the Elephant War epidemic.

The Sura refers to the flocks of birds as *ababil*. Some descriptions of the birds include a leonine appearance, although this is clearly a legendary embellishment. Other early accounts mention the *ababil* as having black and green coloring with white and yellow beaks. "*Ababil*" is a Middle Eastern term that can apply to the common barn swallow (*Hirundo rustica*, subspecies *rustica*)—which has similar markings mentioned above, with dark orange throat feathering. Barn swallows are found throughout the world, including Arabia.^[16] Ornithologists have documented large flocks consisting of over 100,000 birds. Millions of Eastern European barn swallows migrate to and from South Africa every fall and spring of the year, passing through the Arabian Peninsula. Although they are not known to carry objects in their talons, both males and females collect mud and grass in their beaks to create cobbled, cup-like nests composed of hundreds of clay pellets. Nests are built in the eaves of buildings, manmade and natural overhangs, and in cave entrances. Swarms of these insectivorous birds are attracted to animal herds that produce manure, drawing flies; moving herds disturb resting flies, making them easily caught on the wing. These swallows would have favored the friendly environment around Mecca both before and during the siege, providing them with harborage, nesting materials, and flies attracted to the manure of local sheep, cattle, goats, camels, and Abraha's animal retinue.

The elephant that Abraha rode was probably the North African elephant (*Loxodonta africana pharaoensis*)—now extinct, which had been used by the Carthaginians centuries before. Its original range extended across North Africa and down the grasslands of the Sudan. Some have questioned the claim that elephants could not survive a long cross-desert sojourn because of their need for water. However, according to the parable, Abraha may have brought only a single elephant with him. His water bearers, oases, and wells along the northern march would have provided sufficient water for both the large army and its animal retinue, including at least one, but many elephants, and hundreds of horses, camels, and beasts of burden.

The various tribes living in and around Mecca had traded with many Middle Eastern countries for centuries, which in turn had contact with populations further east. If Willan is correct about an earlier Syrian epidemic, the disease may have spread along trade routes from the interior of Asia to the southeastern coast of



the Mediterranean, thence to the eastern coast of the Red Sea, becoming endemic in Arabian pre-Islamic populations, including the tribes in and around Mecca.

Historians are not able to conclude which disease felled the Axumite army. Smallpox complications include blindness, hemorrhages and permanent pockmark scarring. Measles does not typically produce pustular lesions or scarring, although blindness may be a complication. Whether the epidemic was due to smallpox or measles is largely moot, since either disease can produce serious illness and death. Some suggest that the infection was brought with the Axumites from Himyar. With the exception of its connection to its African homeland, Sana'a and the other Himyarite cities were largely isolated; they did not interact with their Persian adversaries along the eastern portion of the Arabic peninsula. Since its occupation of Himyar 40 years before, two generations of Axumites had been born in its cities. If smallpox (or measles) had been present there (or in Axum), exposure should have provided some sort of immunity, but its soldiers may have been immunologically naïve for both diseases.

Conclusions

It is evident that an epidemic of some sort—smallpox or measles—crippled the Axumites during the siege of Mecca in 570. Fragmentary evidence supports smallpox. Subsequent larger outbreaks in North Africa and the Mediterranean littoral region were definitely smallpox. The Mecca outbreak was minor in comparison to later epidemics, but was historically important. Had the Axumites succeeded in conquering Mecca in 570, they would have instituted measures similar to those inflicted on Himyar four decades before—killing women, razing crops and enslaving its captives. In that same year an infant was born—the future Prophet Muhammad (peace be upon him). The child and His mother may have been killed or enslaved. In the Bible it states that Yahweh divinely intervened to help His people in Egypt by inflicting ten plagues on the Egyptians. In the

Qur'an, Allah divinely intervened to save His future Prophet with a single plague.

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