

**Silk Road Epidemics: Teaching about Plague and Population
Decline in Classical Asia**

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QLP Technical Report: QLP-TR 2013-002

Presented at the 8th Annual Association of Asian Studies Conference
2013 in Hong Kong and the World History Association Conference 2013
in Minneapolis, Minnesota



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6/26/2013



QUANTITATIVE LITERACY PROGRAM
UTSA Quality Enhancement Plan

Support for this paper has been generously granted by the University of Texas at San Antonio
Quantitative Literacy Program

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Asia”

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In 1792, in the city of Zhaoshou, Yunnan, the poet Shi Tai-nan lay ill in his bed. In his suffering, he composed a graphic depiction of his affliction:

Dead rats on the east,
Dead Rats on the west,
Dear rats are more fiercesome than tigers.
After several days
After the death of the rats—corpses litter the steppe.
Countless dead by day;
In their fear people no longer notice the sun.
If three persons work together
Two of them fall dead
At a distance of ten paces.
Numberless dead by night;
No one dates to mourn the dead.
After a visit of the demon plague
Lamps suddenly flicker out,
Leaving the soul and body in darkness.
The crows croak endlessly,
Mournfully howl the dogs.
Man and spirit are one,
When the soul has left the body.
The earth is covered with human bones,
In the fields are left ungathered harvests.

Even the landlords do not collect taxes.
I wish to leae on the red dragon,
In order to meet with the Gods in the heavens
And ask them to send a heavenly moisture
And again revive the dead.¹

¹ Daonan, Shi. *Rat Death*. <http://contagions.wordpress.com/2010/03/18/shi-daonans-death-of-rats/>

Soon after this poem's composition, the author died of the plague. This tragic account of suffering was not isolated to this man, or this era. In fact, this type of misery happened on a mass scale, more than one time in our world history. And as is so clearly demonstrated in Shi-Tai Nan's own words, the impact of epidemic left a far reaching impression on individuals, empires, and even an entire hemisphere.

In a 2010 study titled, *Yersinia Pestis Genome Sequencing Identifies Patterns of Global Phylogenetic Diversity*; a team of biologists examined the ancient DNA and proteins from massive burial grounds across Europe. These particular graves contained the dead laid to rest during the outbreaks of the Black Death. The Black Death is the middle of three great waves of plague that hit humans in historical times. The first wave devastated in the 6th century during the reign of the Byzantine emperor Justinian. This pestilence is thought to have arrived on grain ships from Egypt, and likely killed as many as half the population of Europe and even affected the Arab world in such a way, that it slowed the spread of Islam. The third wave of plague began in the Yunnan province of China in 1894, and is thought to have spread via shipping routes through Hong Kong all the way to the United States. This series of pathogen migrations, until the above study, had not yet been linked to a common source. But in the issue of *Nature Genetics* published in October 2010, scientists concluded that all three of the great waves of plague originated from China and only reached Europe and the rest of the world with help from travel along the Silk Road. In the scientific community, this work was a groundbreaking genetic experiment that used modern knowledge and technology to trace the source of pandemic germs. But for the historical community, this discovery has opened the door to the study of origins in a different way. With the privilege of this information, historians have been given an opportunity to

examine just how global exchange changed the human experience. The plague, in all of its outbreaks, shaped politics, shaped culture, and shaped economies, and through study of the demographic shifts caused by epidemic disease, historians have been given an occasion to appreciate this impact.²

Similarly, this reconstruction of the historical route of bacterial disease over centuries has offered historians a unique chance to teach about the Silk Road impact in a new and relevant way. A traditional coverage of the Silk Road in World Civilizations classes has offered students an overview of the importance these trade routes played in connecting the Eastern Hemisphere. In addition, the discussion of empire and its importance in the creation and maintenance of these channels of trade clearly overlaps. The students generally have been treated to readings and lectures that explain how the connections between empires allowed for the movement of goods, people, ideas, and yes, disease. But given the current data about disease and demography, history teachers have been afforded an opportunity to teach their students more than just what the most recent narrative says regarding Silk Road exchange. Through the use of quantitative analysis of this data, students will be able to do the work of historians, and analyze not only how disease was transmitted, but they will be offered the ability to draw their own conclusions about how disease impacted peoples in the classical world. This paper will show how quantitative methods encourage new student learning about the impact pathogens had on the major empires that participated and benefited from the Silk Road trade, and will demonstrate how data analysis, in a history setting, urges students toward a higher level of critical thinking.

² Morelli, Giovanna, and others, "*Yersinia Pestis* genome sequencing identifies patterns of global phylogenetic diversity." *Nature Genetics*, volume 42, no. 12 (December 2010).

In the study of the Silk Road, students are taught that ever since the earliest days of history, human communities have traded with one another, but only sometimes over long distances. This was because, before classical times, the stakes of that trade were a risky venture. Traders passing through the under policed regions that lay beyond ancient societies control were liable to interception by bandits and pirates. This increased the costs of long distance trade, and discouraged large scale, rapid globalization before the classical era. In turn, our earliest ancestors were relatively insulated from precipitous changes. Cross cultural exchange, and trade were slow and steady.

During the classical era though, two developments reduced the risks associated with long distance travel and facilitated a rapid expansion of trade and hemispheric exposure. Historians argue, for their students, that the first of these developments was the investment by rulers in construction of roads and bridges. Most agree that these rulers undertook these infrastructure projects primarily for military and administrative reasons. But most certainly, these same roads encouraged trade within individual societies, and facilitated exchange between different civilizations. In addition, the argument for why Silk Road trade expanded holds that classical cultures built large imperial states that sometimes stretched to the point that they bordered on one another. And even in the case where the classical empires did not encounter one another directly, they did pacify large stretches of Eurasia and North Africa. The result of this was that merchants and travelers did not face such great risk as in previous eras, and the cost of long distance trade dropped. People began moving throughout the hemisphere on a volume never seen before, and to propose the impact was startling would be an understatement.

This discourse takes students on an adventure that includes the colonization by Alexander of Macedon and the expansion of the Hellenistic world. Maps give students a visual demonstration of how the monsoon winds of the Indian Ocean facilitated the movement of goods and people but also the major religions of the east, out of India and most notably into China. They are then told how the Han Empire of China maintained order and pacified much of central Asia, opening routes through Bactria, and carrying their coveted silk all the way to the Roman Empire. The story of Buddhist missionaries and monks is then told. Through a description of Buddhist monasteries along the Silk Road, the rich history of a diverse movement of peoples is revealed to students. But what is missing in this address is a deeper exploration by the students themselves. The Silk Road and its amazing richness create an occasion for consideration and deeper analysis. In particular, the Silk Road and its assistance in the dissemination of disease during the classical era give a perfect path for quantitative evaluation of human events along these trade routes.

The purpose of quantitative analysis in teaching history, as well as other subjects, has been to enhance the quantitative reasoning and critical thinking skills of students to help them understand and evaluate data. In addition, they are learning how to assess risks and benefits and make informed evaluations of information. In particular, analysis of data, in a historical context, opens students to a broader opportunity for drawing their own conclusions about how societies were affected by certain trends. Data offered, within the traditional narrative, is enhancing the ways in which World History is being taught. Analysis of data is being used to explore circumstances and identify possible solutions for the real world problems that past peoples encountered. And through the process, students are translating the quantitative data, drawing their own assumptions, and expressing them

in written communication. When considering the Silk Road, and its role in the movement of pathogen, data about population has been collected that grants students just such a chance.

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Like goods, people, and religious faiths, contagious disease also spread along the trade routes of the classical world. As travelers moved these long-distances, germs had the opportunity to spread beyond their original environments and attack populations with no inherited or acquired immunities to the disease they caused. The resulting epidemics took a terrible toll in human lives. With an examination of the demographic changes these diseases initiated, students are asked to consider the correlation between rapid population decrease, and political and cultural shifts.

To be sure, information about human population in classical times is negligible and full of gaps. Scholars often do not have terribly accurate records to work with and must draw inferences about population size from different sources like the area enclosed by city walls, the number of houses discovered in a settlement, the agricultural potential of a region, and similar considerations. The result of this is that population estimates for classical societies tend to be rough approximations rather than precise figures. Add to this, individual regions often had very different demographic experiences. However, even for classical times, the general outline of population history is fairly clear.

During the second and third centuries c.e., the Han and Roman empires suffered large-scale outbreaks of epidemic disease. It is thought that the most destructive of these were probably smallpox and measles, but epidemics of the plague most certainly also erupted. All of these diseases, when they break out in newly introduced populations who

³ “Quantitative Literacy Program at UTSA,” last modified January 2013, <http://qlp.utsa.edu/about/>.

have no previous resistance or immunity, can be devastating.⁴ And in an examination of the demographic data, it seems clear that this was the case in both Han China and the Roman Empire, at roughly the same time.

During the reign of Augustus, for instance, the population of the Roman Empire stood at about 60 million people. During the second century, epidemics reduced the Roman population by about one-quarter, to 45 million. Most devastating was an outbreak of smallpox that spread through the Mediterranean world between the years of 165 and 180. The cities of the empire were particularly affected and the epidemic is even said to have taken the life of the emperor Marcus Aurelius. Though disease was not the only factor in population decline during the third and fourth centuries, war and invasion most certainly were contributors, by 400 or so, the number of Romans fell to perhaps 40 million people. And during the fifth and 6th centuries, with the introduction of the bubonic plague, the population of the Roman Empire continued its trend of decline.⁵

These epidemics appeared a bit later in China. The population in Han China at the beginning of the Common Era is thought to have been about 50 million, and even continued to rise, reaching 60 million by the year 200. But, as diseases found their way into populated areas, the Han population began its descent too, slipping to 50 million by 400 and 45 million by 600 c.e.⁶

This data, when shared with students in lecture and reading, offers them an empirical look at how germs would have affected the peoples of two different regions of the

⁴ US Army Biological Center. *History and Geography of Plague in China*, Translation No. 1257. Fort Detrick, Frederick, Maryland, 1964.

⁵ Tainter, Joseph. *The Collapse of Complex Societies*, (Cambridge: Cambridge University Press, 1988.)

⁶ Bentley, Jerry and Herbert Ziegler. *Traditions and Encounters: A Global Perspective on the Past*, (New York: McGraw Hill Higher Education, 2008.)

world, at roughly the same time. Their ability to see how these two societies, which were connected by the Silk Road, were so similarly altered is certainly instructive. Disease was obviously devastating. However, if the students are presented this same data with a quantitative approach, the opportunity for critical analysis of these diseases effect is opened up. Through the use of quantitative instruction and assignments, the students are asked to analyze demographic decline and in turn are invited to discover the economic and social change that is often the result of such drastic changes.

The quantitative assignment used in this particular instance presents the students with the above data regarding population changes in Han China and the Roman Empire. As part of the assignment, the students are asked to take the data and create a comparative analysis of it in the form of a chart or graph. What is interesting about this portion of the work the students are doing is that, despite the sameness of the data they are given, their resulting depiction of it is varied. Some students have created bar graphs while others show their comparison using a scatter plot. Regardless of the outcome though, each students is expected to create a visual representation of the written information, with their priority being two fold. First they must show the population change over time, in both locations, and they then must be able to compare and contrast them. In so doing, they are then able to visualize, in very short order, how similar the circumstances in China and Rome were at roughly the same point in history.

Part two of the assignment then encourages the students to express, in their own words, what this data meant for real people in these two empires. Demographic decline, in both places, brought economic and social changes. Trade within the empires declined as both the Chinese and Roman empires contracted. Through a series of questions, students

are asked to evaluate how and why disease that was transmitted over the Silk Road contributed to this contraction. Both economies were persuaded to move toward more regionally self-sufficiency as a result of the affect disease was having on the empires. Whereas previously the Chinese and Roman states had integrated the various regions of their empires into a larger network of trade and exchange, after 200 c.e. they increasingly established several smaller regional economies that concentrated on their own needs instead of the larger imperial market. The question for students then becomes, what affect did this have on empire? What would the result of such self-sufficiency be? What conclusions can they draw from this information?

In a written translation of the data and their own charts, this Silk Road quantitative assignment requires students to conclude that the population decline in both China and Rome led rather naturally to a process of decentralization of the empire. Using their data, information in their assigned reading, and the story told in class lecture and discussion, the students are asked to critically evaluate how demographic changes contributed to the decline of both the Roman Empire and the Han Dynasty. Writings by students should conclude that epidemic disease contributed to the serious instability in both China and Rome in the classical period.

The hope then is that the students will be able to draw other comparisons between these two Silk Road empires, whose experiences were thousands of miles apart, but uncannily similar. Both empires, along with being weakened by disease experienced the breakdown of central authority. In what ways could epidemic have contributed to this? Both empires suffered, during this same period, from the invasions of outside peoples. The Han dealt particularly with the problem of the Xiongnu and Uighurs, while Rome

experienced difficulties caused by Hun and Germanic nomads. Again, how did demographic decline contribute to these issues for both empires? The possibility for exploration of the issues unwrapped through a quantitative look at Silk Road epidemics demonstrates the unlimited nature of historical study for both students and instructors. Demographic data from the classical Silk Road, when quantitatively analyzed, will initiate student assimilation and assessment skills in a history class. Liberal arts and logic come together to create for student's self-induced understanding of major historical issues.

The great waves of plague that twice devastated Europe, and unchangingly affected China, transformed the course of history. And the fact that new evidence suggests that the likely origin of the plague is in China once again amends the course of historical study. Though, "The bacterium has no interest in people, whom it slaughters by accident," its affect cannot go unnoticed.⁷ By allowing students to explore the influence of pathogen through a quantitative evaluation of the classical world, instructors demonstrate the intricacies inherent in historical understanding. No part of the human experience exists in and of itself. Disease on the Silk Road and its subsequent effect on population altered the lives of all.

⁷ Wade, Nicholas, "Europe's Plagues Came from China, Study Finds," *New York Times*, October 21, 2010.