

Plagues, Pestilence and War A History of Pandemics: The Long Fox Lecture 2017: (Part 1)

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ABSTRACT

Plagues and pestilence particularly affect history by wiping out whole armies and even by killing the leaders of countries in conflict. But it also works the other way round: wars, revolution and famine, due to man's inhumanity to man, predispose to pandemics.

Lists of the worst pandemics in world history and of famous people killed by plagues are presented and correlations of epidemics with wars and conflicts demonstrated.

INTRODUCTION

This paper is based on the Long Fox Lecture delivered to the Bristol Medico Chirurgical Society, November 8th, 2017. I was very pleased to have been asked to give the 2017 Long Fox lecture. I consider this to be a singular honour and thank our president for inviting me.

I will start by explaining three good reasons why "*Plagues, Pestilence and War*" is an appropriate title for this particular lecture.

Firstly, I believe that Dr. Long Fox would have approved.

Edward Long Fox (1832 – 28 March 1902) was physician to the Bristol Royal Infirmary for some twenty years ⁽¹⁾. I quote now from the inaugural Log Fox lecture, delivered in 1904 by Dr. John Beddoe MD, also formerly physician to the Bristol Royal Infirmary ⁽²⁾.

"A few years after he had begun practice a serious epidemic of typhus fever broke out in the lower parts of East Bristol. There was no organisation ready to meet and cope with such a calamity...The better educated people in the slums - nurses and Bible readers and the like - stayed in their posts, but the infection was very fatal among them - brains are a disadvantage in true typhus....Edward Fox...created an organisation to meet it...the plague was stayed and doubtless many lives were preserved."



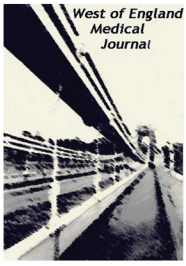
Figure 1
Edward Long Fox (1832 – 28 March 1902) (from Wikipedia)



Figure 2
Cartoon of Donald Trump (© P.Goddard 2016)

The second reason I present here in cartoon form: "*President Trump*". President Trump was elected on November 8th 2016, exactly one year to the day before the presentation of the lecture. It is my sincere desire that Trump does not live up to his name and bring on the four

horses of the Apocalypse. These, and the last trump, are described in the Book of Revelation of St. John the Divine. "*They were given power over a fourth of the earth to kill by sword, famine, plague, and by the wild beasts of the earth.*" ⁽³⁾



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Thirdly: the hubris of medical scientists and doctors. On the front cover of the New Scientist it recently stated *“The Next Plague: We don’t know where it’s coming from but we know how to beat it.”* ⁽⁴⁾

That hardly seems credible when you see the headline in the New Scientist in September 2017. *“Thousands of new lifeforms discovered that redraw the tree of life.”* ⁽⁵⁾ Using the Polymerase Chain Reaction (PCR) twenty new phyla have been discovered revealing the fact that only 5% to 10% of organisms in the soil and in the sea have previously even been named yet alone investigated. *“DNA analysis has unmasked thousands of them and made life’s story far more complex”* ⁽⁵⁾.

The lecture covered:

- The Definition of Plagues
- The worlds worst pandemics (numerically) and how they are related to wars and revolution
- Details about three major plagues: Bubonic Plague, Tuberculosis, Influenza
- Vaccination and Antibiotics
- Emerging and Future plagues

This paper deals with the first two topics listed above. The following three topics will be covered in future articles.

THE DEFINITION OF PLAGUES AND FACTORS AFFECTING SPREAD OF INFECTIONS

Plague

‘The plague: a contagious bacterial disease characterized by fever and delirium, typically with the formation of buboes and sometimes infection of the lungs’ ⁽⁶⁾ (Pages dictionary). Bubonic plague (also pneumonic and septicaemic forms)

‘Any contagious disease that spreads rapidly and kills many people. Diseases like smallpox wiped out the indigenous people in a succession of plagues.’ ⁽⁶⁾

Other minor definitions were not discussed in the lecture.

Factors Affecting Spread of Infections

The World Health Organisation has stated that : *“A number of environmental factors influence the spread of communicable diseases that are prone to cause epidemics.”* ⁽⁷⁾

According to the WHO the most important of these are:

- water supply
- sanitation facilities
- food
- climate.

However many of the largest pandemics have taken the world by surprise. Stephen Morse has described *“Factors in the Emergence of Infectious Diseases”* ⁽⁸⁾

“Emerging infectious diseases are those that have newly appeared in a population”.... “ecological, environmental, or demographic factors that place people at increased contact with a previously unfamiliar microbe or its natural host or promote dissemination”

I would add that to create a pandemic you must have

1. An organism that is sufficiently contagious or spread sufficiently by a vector
2. A large enough reservoir of infection in the original host community
3. Unusual movement of people into an area where the population has no resistance to the disease or weakening of the population by previous disease, starvation, war or deprivation.

I will present the evidence for this in the rest of this paper and that Samuel von Pufendorf was right: *“More inhumanity has been done by man himself than any other of nature’s causes.”* ⁽⁹⁾ This, of course, has been paraphrased as *“Man’s inhumanity to man”*, first documented in a Robert Burns poem. called *Man was made to mourn: A Dirge* in 1784.

THE WORLDS WORST PANDEMICS AND HOW THEY ARE RELATED TO WARS AND REVOLUTION.

A list is presented here of the world’s worst pandemics of an individual infection. Some of the figures are conjectures or *“best guess”* as we are often dealing with ancient history. Even today it is difficult to get precise figures of mortality caused by infections such as malaria.

The worlds worst pandemics (numerically)

-1-

Smallpox

Smallpox killed more than 300 million people in the 20th century alone. As recently as 1967 two million died (WHO). ⁽¹¹⁾

Killed a large proportion of the native Americans, perhaps 80 to 90%...

Antonine Plague AD 165. Five million or more.....

Eradicated 1979.

(Note well: still kept alive in two laboratories, one each in the United States and Russia, from whence it could be weaponised.)

-2-

Malaria.

About 3.2 billion people – almost half of the world’s population – are at risk of malaria. In 2013, there were about 198 million malaria cases (with an uncertainty range of 124 million to 283 million). Estimated 584 000 malaria deaths (with an uncertainty range of 367 000 to 755 000)(WHO) ⁽¹²⁾

-3-

Plague

The three major pandemics of the Plague (Bubonic and Pneumonic):

- Justinian Plague: 541 AD,
- The Black Death. 1347-1351
- “Third Pandemic” began in China in 1855. ⁽¹³⁾

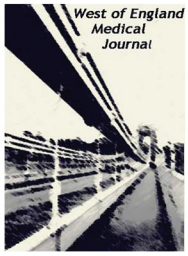
The subject of the Plague will be addressed in a separate paper as Part 2 of the Long Fox Lecture 2017.

-4-

Tuberculosis (TB)

Tuberculosis is still one of the top ten causes of death worldwide.

In 2016, 10.4 million people fell ill with TB and 1.8 million died from the disease (including 0.4 million among people with HIV). Over 95% of TB deaths occur in low- and middle-income countries (WHO). Globally, the TB mortality rate fell by 37% between 2000 and 2016. ⁽¹⁴⁾.



During the middle of the 19th century during the Industrial Revolution up to one third of Londoners died from tuberculosis. The subjects of Tuberculosis and Influenza will be addressed in a separate paper as Part 3 of the Long Fox Lecture 2017.

-5-

Spanish Flu:

Near the end of the First World War in 1918 between 50 to 100 million people died from the so-called Spanish Flu (H1N1 influenza virus) (15). To be addressed in a separate paper as Part 3.

-6-

HIV /AIDS

Since 1980, the beginning of the epidemic, more than 70 million people have been infected with the HIV virus and about 35 million people have died of HIV (16).

-7-

Cholera

Cholera Deaths in India between 1817 and 1860, in the first three pandemics of the nineteenth century, are estimated to have exceeded 15 million people. Another 23 million died between 1865 and 1917, during the next three pandemics. Cholera deaths in the Russian Empire during a similar time period exceeded 2 million. (17).

-8-

Epidemic Typhus

In Russia, during the civil war between the White and Red Armies, typhus killed 3 million people, mainly civilians. During World War II, many German POWs after the loss at Stalingrad died of typhus. (18)

-9-

Syphilis:

“In 1495 an epidemic of a new and terrible disease broke out among the soldiers of Charles VIII of France when he invaded Naples in the first of the Italian Wars, and its subsequent impact on the peoples of Europe was devastating – this was syphilis, or grande verole, the “great pox.” (19)

-10-

Hepatitis C.

By 2013 Hepatitis C had risen above HIV, Tuberculosis and Malaria in the annual world ranking of causes of death. Many of the patients with Hepatitis C were infected by medical treatment, vaccinations, blood transfusion etcetera.

Fortunately treatment is now available: ledipasvir–sofosbuvir. Unfortunately the cost of an eight-week course is £26,000 and a 12-week course is £39,000 (plus VAT). An additional drug that may be needed is called ribavirin. Some people may need a 24-week course, costing £78,000. The UK’s National Health Service (NHS) is rationing these drugs such that only the sickest patients get them. (20, 21).

Also Ran...

That’s the top ten individual diseases causing pandemics but other ways of assessing problems will give a different answer. For example, group together all the gastro-intestinal diseases causing catastrophic diarrhoea (eg. typhoid, paratyphoid, cholera, typhus, shigella, amoebiasis, norovirus, enterobacter, E.coli). In that case diarrhoea would be number one. Or look at the certified reported causes of death and one might assume that pneumonia was first on the list of pandemics even though the organisms causing death are endemic in the population and are rarely identified individually on the certification and in the developed world the pneumonia usually occurs when the individual is near death from some other condition such as heart failure or metastatic disease.

There are many diseases that cause pandemics but arguably not resulting in death frequently enough to rise into the top ten. The following is an incomplete list of such diseases in no particular order:

- Diphtheria
- Measles
- Typhoid
- Polio
- Leprosy
- Lyme disease

Just a short word about the last two diseases.

Leprosy (Hansen’s disease)

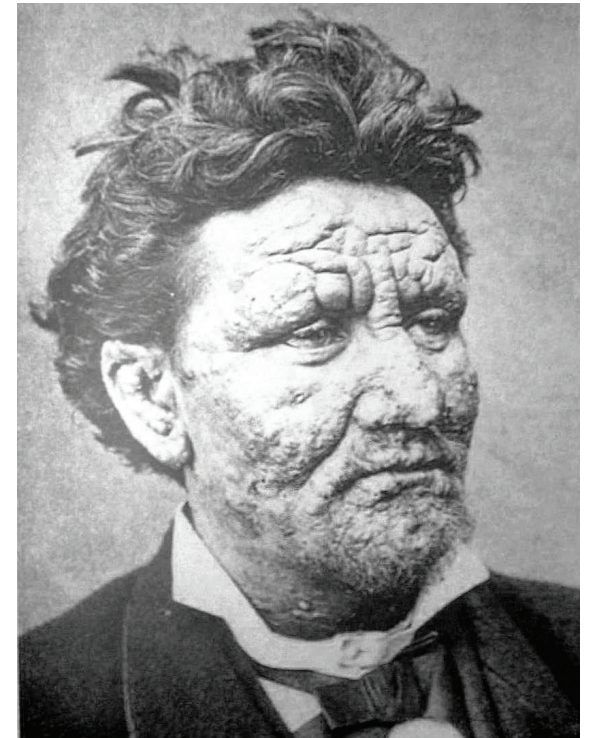


Figure 3
A 24-year-old man with leprosy (1886)
By Pierre Arents [Public domain],
via Wikimedia Commons

Leprosy due to *Mycobacterium leprae* has always captured the imagination because of the horrible later sequelae. Since the antibiotic era and the discovery of Dapsone and Rifampicin the early infection has been treatable but nerve damage cannot be mended. Interestingly 90% to 95% of human beings are said to be immune to leprosy although this is based on relatively poor evidence. (22)

A new strain of *Mycobacterium leprae* was discovered in 2008 and this may account for some of the variability of leprosy. (23)

Recently it has been reported that red squirrels harbour leprosy (24) and that it is the same strain that was prevalent in Britain in the Middle Ages.



Figure 4 The red squirrel (By hedera.baltica (25))

Leprosy has always been a disease of poverty and it may be that direct involvement with squirrels (trapping, skinning, eating) spread the disease amongst the poor. Red squirrels have been declining in the UK for centuries, hastened in the past 140 years by competition with the imported grey squirrel but primarily due to destruction of the conifer woods and mixed forests that are the red squirrels preferred habitat.

The highest incidence of leprosy in the world occurs now in India but Brazil also has a high incidence. When we were in Brazil recently we saw people with the appearance of active leprosy passing us in the street. One of the only animals to easily catch and spread leprosy is the armadillo, native to South America and the south of North America. This is reputed to be due to the armadillo's low body temperature.



Figure 5

A Nine-banded Armadillo in the Green Swamp, central Florida.
(Acknowledgement birdphotos .com Reference ²⁷⁾)

In addition to the red squirrel and the armadillos some other mammals can catch leprosy including mangabey monkeys, rabbits, and mice (on their footpads). The sooty mangabey model of leprosy led to the discovery that rhesus monkeys were more susceptible to leprosy when co-infected with simian immunodeficiency virus (SIV), but that leprosy may play a protective role against acquired immunodeficiency syndrome (AIDS) mortality. ^{26.}

Lyme Disease



Figure 6

Deer Tick, Photo by Scott Bauer. [Public domain], via Wikimedia Commons for the Agricultural Research Service (ARS).

Lyme disease, or Lyme borreliosis, is an infection spread to humans by infected ticks.

It has massively increased in prevalence in the UK since the reduction in culling and hunting of deers. The infected ticks can now be found on a variety of other mammals and free on grassland.

The bacterium is a spirochete called *Borrelia burgdorferi* and it can be successfully treated with a course of antibiotics if caught in the early stages.



Figure 7

The typical (though not always present) target lesion of Lyme Disease ⁽²⁸⁾.

It has been suggested, controversially but with some compelling evidence, that accidental release of ticks during experiments at Plum Island Animal Disease Center eight miles south of Lyme in Connecticut led to the sudden emergence of the disease and subsequent spread. ²⁹

Some of the Famous people who are said to have died from the Plague

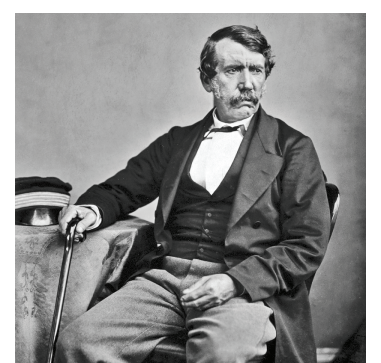
- Hostilian Roman Emperor. Died at 21 (230-251)
- Pope Pelagius II was Pope from 26 November 579 to his death in 590
- Louis King of Sicily. Died at 18 (1337-1355)
- Joan II was Queen of Navarre from 1328 until her death age 37 in 1349
- Joan of England was a daughter of Edward III Died at 15 (1333-1348)
- Hans Holbein the Younger , German artist Died at 46 (1497-1543)
- Hamnet Shakespeare, the only son of William Shakespeare aged 11 in 1596

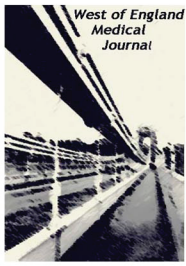
Some Famous people killed by Malaria³⁰ Kings/Popes etc.

- Genghis Khan suffered from a type of malaria in the spring of 1227 while nursing battle injuries. After several months of sickness, the Great Khan died at the age of around sixty years old
- Oliver Cromwell 1599-1658 Died aged 59 from Malaria contracted in Ireland
- Colonel Prince Henry of Battenberg Died at 38 (1858-1896)
- Pope Urban VII Died at 69 (1521-1590)
- Giovanni de' Medici the Younger Died at 18 (1544-1562)
- Henry VI Holy Roman Emperor from 1191 until his death. Died at 32 (1165-1197)
- Otto III Holy Roman Emperor (June/ July 980 – 23 January 1002)
- Conrad IV King Of Germany and Sicily Died at 26 (1228-1254)
- Louis III was titular King of Naples 1417–26 Died at 31
- Possibly Alexander the Great (died of a fever, unknown type).

Other Famous people killed by Malaria

- Amerigo Vespucci Died at 58 (1454-1512)
- Mary Livingstone Died at 41 (1821-1862)
- David Livingstone Died at 60 (1813-1873)





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Famous people who are said to have died from Syphilis

- Henry VIII (possible)
- George Washington (unlikely)
- Al Capone (definite)
- Ivan the Terrible (possible)
- Beethoven (possible)
- Stalin (likely)

The lists above show the ways in which pandemics affect history. But does human intervention by way of wars, revolution and famine affect the outbreak of pandemics? Some correlations show that this is very likely. Clearly also other disasters such as earthquakes and volcanic eruptions can weaken populations and their infrastructure so that the people become susceptible to plagues.

TEN CORRELATIONS BETWEEN PLAGUES AND WAR

1. The biggest single population devastation from Smallpox occurred during the conquest of the Americas by the Spanish
2. The Hundred Years' War was a series of conflicts waged from 1337 to 1453. Black Death broke out in 1347.
3. Spanish flu broke out towards the end of WW1.
4. A new genetic history of HIV shows how the Aids pandemic probably originated in about the 1920s in Kinshasa in the Democratic Republic of Congo, Leopold II's administration of the Congo Free State became one of the greatest international scandals of the early-20th century. It had led to the death of perhaps 20% of the population (10 -15 million people) by 1908.
5. The Justinian plague broke out during wars to retake the Roman Empire
6. The Third pandemic broke out in China between the two Opium Wars
7. Tuberculosis was the principal cause of death in 1650 (civil war in Britain) but probably reached a peak in the middle of the Industrial Revolution.
8. Syphilis first appeared in Europe after the conquest of the Americas
9. Cholera and Typhus are closely associated with wars, revolutions and disasters.
10. The plague of Athens (probably Typhoid, DNA from Teeth) occurred during the Peloponnesian War 430BC.

Only Malaria seems indifferent to wars, killing with or without wars.

CONCLUSION

Pandemics have been responsible for billions of deaths throughout history. The last century saw great achievements in the reduction of such deaths, particularly with the eradication of Smallpox and the successful treatment of bacterial diseases with antibiotics and prevention of disease by immunisation.

New findings about old diseases such as leprosy continue to fascinate and inform.

The story continues in the next part of the talk to be published in the March 2018 issue of WEMJ.

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