



# TROPICAL MEDICINE THROUGH THE AGES

**Stephen Mortlock** goes global and analyses the rich history of tropical medicine.

*“All nature is alive and seems to be gathering all her entomological hosts to eat you up as you are standing out of your coat, waistcoat and breeches. Such are the tropics.”*

*The Nautical Magazine* (1857). CR Maclean

**I**nternational travel is not only increasing but is often to more exotic destinations for those travellers who want to challenge themselves. Unfortunately, depending on the travel destination, travellers may be exposed to a number of infectious diseases that they may not have encountered before. Of course the risk of becoming infected will vary according to the purpose of the trip and the itinerary within the area, the standards of accommodation, hygiene and sanitation, as well as the behaviour of the traveller. Travel to exotic countries with associated illness is not a new phenomenon.

When Alexander the Great crossed the Beas River in 327 BC and entered India, his army, already reduced from a mainly Greek army to a mixed bag of mercenaries of different nationalities, was stricken

with many new diseases, including smallpox. According to contemporary records Alexander was able to employ local doctors and healers who were experts in these diseases to treat his men many of whom returned to Greece with the army to continue their work. Certainly, during this time Hindu medicine was at its zenith and there is unmistakable evidence in the works of the great scholars like Dioscorides (40–90 AD) of the influence of Ayurvedic medicine. But by the end of the campaign the fighting and the diseases took their toll and the army that returned to Greece was only a few hundred men.

## The Middle Ages

By the end of the 11th century, Western Europe still lagged behind other Mediterranean civilisations, such as that







**Previous page.** The phalanx attacking in the Battle of the Hydaspes, by André Castaigne  
**Left.** The Battle at Ptolemais – Turkish cavalry attacks the vanguard of the army of Hugh III, King of Cyprus, August 1268.

## Crusaders brought back with them leprosy (*Mycobacterium leprae*), considered to be an expression of the wrath of God

of the Byzantine Empire (formerly the eastern half of the Roman Empire) and the Islamic Empires of the Middle East and North Africa in many aspects. In 1095, Pope Urban II called on Western Christians to take up arms to aid the Byzantines and recapture the Holy Land from Muslim control. This marked the beginning of 200 years of the Crusades and started a mass migration of tens of thousands of people from Europe to the eastern Mediterranean.

The overland and sea journeys were hazardous themselves, which could lead to malnutrition, frostbite and drowning but the travellers would also encounter new diseases for which they had little knowledge such as trachoma, schistosomiasis and dracunculiasis, all of which were probably endemic in the area. Also, for a medieval army it must have been very difficult to maintain personal hygiene or eat an adequate diet and chronicles suggest epidemics of scurvy, dysentery and fevers in army encampments. A disease that returning Crusaders brought back with them was leprosy (*Mycobacterium leprae*), considered

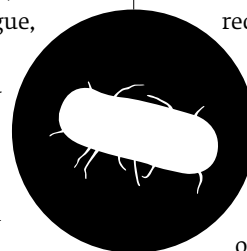
to be an expression of the wrath of God and the sufferers were often left to the ministrations of priests and monks. Segregation was thrust upon those suffering from the disease and the sick, already regarded as dead, were often cast out of the cities and forbidden to mingle with the healthy folk. In consequence, thousands appear to have died from such diseases during and following the Crusades.

Europeans were a comparatively backward people and isolated from the world around them compared to other civilisations of this time, like the Muslim civilisations and the Chinese. But the Crusades encouraged the Europeans to interact and trade with these new countries. This brought many things into Europe like silks, spices and also, unfortunately, the bubonic plague, or Black Death. It is believed that the Black Death originated in central China in 1333 as the population succumbed to starvation, but new research shows that it probably began in the spring of 1346 in the Steppe

region, where a plague reservoir stretches from the north-western shores of the Caspian Sea into southern Russia. People occasionally contract plague there even today. At this time China was one of the busiest of the world's trading nations and it did not take long for the outbreak to spread to western Asia and Europe. In October 1347, several Italian merchant ships returned from a trip to the Black Sea, one of the key links in trade with China. When the ships docked in Sicily, many of those on board were already dying of plague. Within days the disease spread to the city and the surrounding countryside. The chronicler Agnolo di Tura relates from his Tuscan home town that "in many places in Siena great pits were dug and piled deep with the multitude of dead [...] And there were also those who were so sparsely covered with earth that the dogs dragged them forth and devoured many bodies throughout the city".

He lost his wife Niccoluccia and his five children in the plague outbreak. Before long the plague was spreading across Europe reaching London by November 1348. The following February, 200 people were being buried every day in the plague pits of Bishopsgate and East Smithfield. Joan (or Joanna), the daughter of King Edward III, died of the plague in Bordeaux on her way to marry Don Pedro, heir to the throne of Castille. During the 1300s and 1400s Europe was hit very hard with plague outbreaks and as many as 33% of Europe's population died. This depopulation started to cause a social change in many countries. With all the deaths much of the farmland went into disuse and the farm animals died,

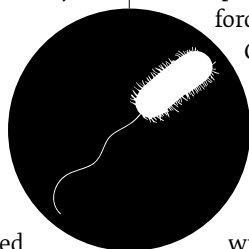
reducing the output of food. In Western Europe, with fewer people to work the land, the demand for labour increased, as did the wages. Landlords in need of people to work their lands began renting out their land to peasants for



sharecropping, and great estates were being replaced by small farms. In cities, workers rose against the wealthy merchants who had been running the city halls for better pay and working conditions. Peasants and workers revolted in Spain, The Netherlands, southern Germany, Italy, and ultimately, in England, the Peasants Revolt of 1381.

### European expansion

It was the continued European exploration and early settlement from the 15th and 16th centuries that started physicians investigating those diseases that occur in countries with tropical or subtropical climates. When Hernando Cortes (1485-1547) and his army conquered Mexico in 1519, there were roughly about 25 million people living in the area. A hundred years later, after a series of epidemics decimated the local population, perhaps as few as 1.2 million natives survived. Records show that there were smallpox epidemics in 1519 and 1520, immediately after the Europeans arrived, killing between five and eight million people. But the diaries kept by Francisco Hernandez (1514-1587), the surgeon general of New Spain, described a highly-contagious and deadly epidemic in 1576 that killed the infected person within days. The disease caused raging fevers, jaundice, tremors, dysentery, abdominal and chest pains, enormous thirst, delirium and seizures. "Blood flowed from the ears," the physician observed, "and in many cases blood truly gushed from the nose." These symptoms are not indicative of smallpox or any other known European disease but are more like those of a haemorrhagic fever. The Spanish army was unlikely to have brought it with them, so it is probably safe to assume that it was already in the country. So did the Spanish themselves fall ill with the same disease? Spanish conquistadors, missionaries and writers recorded



## THE PLAGUE IN NUMBERS

# 1333-1346

The period in which the plague originated.



# 200



The number of people buried per day in Bishopsgate and East Smithfield during the plague.

# 33%



of Europe's population is estimated to have died due to the plague.

the presence of yellow fever, malaria and cholera in the Americas long before their arrival, certainly translations of pre-Columbian records by Martín de la Cruz and Bernardino de Sahagún seem to suggest that the Aztecs were stricken with many diseases including syphilis, tuberculosis, typhus and other rickettsial infections. The Spanish arrival certainly brought exposure to new diseases like smallpox, influenza, measles and, much later, cholera, which may have overshadowed the persistent mortality by endemic infectious diseases already present in the country.

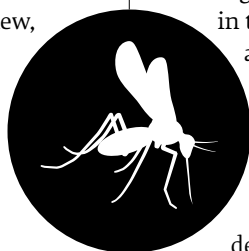
Infectious and tropical diseases have been a problem for military expeditionary forces ever since the Crusades.

Outbreaks were especially common on British Navy ships from the 16th to 18th centuries due to poor living conditions and travel to the tropics. Dr Henry Marshall (1775-1851) wrote extensively in the post-

Waterloo era about the health of soldiers, he began his service career as a surgeon's mate in the Royal Navy, then transferred to the 89th (Princess Victoria's) Regiment of Foot, which participated in expeditions to Cape Town, Buenos Aires and Colombo. While in the East Indies, Marshall accumulated detailed records about the incidence of mortality in the troops resulting from disease in the tropics, Marshall studied the medical history of the 40,000 British troops who participated in the ill-fated Walcheren expedition (1809) to the Dutch coast during the Napoleonic Wars. He noted that sickness rates varied considerably from regiment to regiment and he asked: "What can have been the cause why some corps on the same service and exposed to the same climate suffered so much more than others did?" In a commentary Marshall wrote: "We dread, and justly dread, the influence of epidemics, such as the plague and cholera, while we submit with apparent indifference to the perennial consequences of malaria in unhealthy localities." In 1817-18, in an effort to provide relief to the many unemployed and distressed mariners who were found in large numbers in London, the Seamen's Hospital Society (SHS) was formed with an emphasis on the management of illnesses (especially fevers), which were introduced into the city from tropical and subtropical countries. A series of ships, HMS Grampus, HMS Dreadnought and HMS Caledonia (later renamed the Dreadnought) were commissioned to establish permanent floating hospitals on the Thames for the exclusive use of sick mariners. Although they served a very valuable function, there were major practical problems: ventilation was poor, and there was nosocomial spread of disease; lack of light was a major drawback during the winter months, and other problems which were associated with being situated in the midst of an extremely busy part of quite a polluted

river. In 1832, John Lydekker (1778-1832), a member of Lloyds and prominent ship owner suddenly died of cholera, and he left the SHS nearly £60,000 (about £5m today) which led to a successful approach to Parliament for an Act of Incorporation (1833); this gave greater legal status to the organisation and conferred a number of additional rights on the SHS. In 1870, the Commissioners of the Admiralty granted the SHS a 99-year lease of the infirmary (and adjoining Somerset ward) of the Royal Hospital, Greenwich in lieu of the loan of the ship(s). This offer was initially made because they felt that the number of pensioners residing in the hospital was declining to low numbers during the peaceful years following the battle of Waterloo in 1815. Unfortunately, these numbers began to increase following outbreaks of infectious and tropical diseases that occurred in the Army during the Crimean and Boer Wars and the colonial era. Tropical medicine itself emerged as a new disciplinary field at the beginning of the 20th century and was deeply involved in the political and social aspects of the European empires. Europeans, especially soldiers, public servants and officials, were moving to the tropics, where the contraction of a life-threatening disease was a real danger. And this led to improved healthcare, which included the provision of hospitals and efforts to control tropical diseases by the draining of swamps and other mosquito-breeding areas. These and other environmental measures were among the most effective available, although these were initially for the military, they expanded to include expatriates and finally for the indigenous population.

From the scientific point of view, knowledge about tropical diseases became defined, both from an aetiological perspective and with respect to their transmission mechanisms, through the work of Alphonse Laveran (1845-1922)

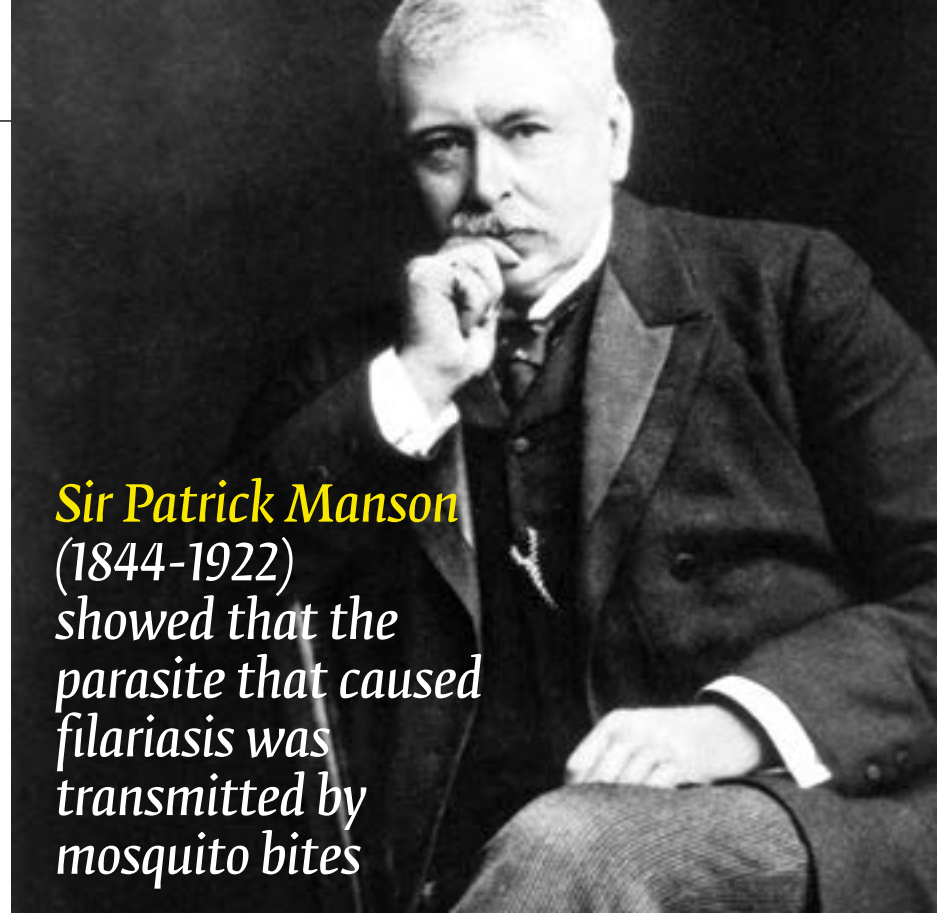


and his discoveries of parasitic protozoans as causative agents of diseases, such as malaria and trypanosomiasis, and Sir Patrick Manson (1844-1922), who showed that the parasite that caused filariasis was transmitted by mosquito bites. Other tropical diseases were also soon shown to be spread by mosquitoes, including yellow fever. Within a few years the role of the tsetse fly in transmitting sleeping sickness, the sand fly in kala-azar, the rat flea in plague, the body louse in epidemic typhus, and the snail in spreading schistosomiasis were also discovered.

### Conclusions

Although Europeans were responsible for introducing new diseases to countries where they had never been prevalent causing massive death and morbidity there is another side to the story, the effects of indigenous diseases on foreign invaders and traders. Stories of invading forces being overcome by mysterious diseases go back to biblical times and in the writings of Greek, Roman and Persian physicians, but become more common and reliable with the advent of European explorations. All colonial powers experienced the same problems, excess deaths among their troops, civil

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servants and traders. At first these deaths were attributed to the climate and the inability of Europeans to survive in the tropics, but this changed as a result of scientific advances during the second half of the 19th century when it became apparent that these diseases were caused by infectious organisms, and that mosquitoes and other insects could transmit diseases. This knowledge led to the development of drugs, vaccines and methods of insect control and on disease control programmes. In 1898, the SHS Committee of Management received a letter from the Colonial Office requesting the formation of a School of Tropical Medicine; it said: "At present the newly appointed medical officers receive no special training in the diagnosis and treatment of tropical diseases before they proceed to West Africa, [...] and that the experience and training to be obtained at the Seamen's Hospital would be the most suitable in the present instance." It was against this background that the Royal Society of Tropical Medicine and Hygiene and other similar societies around the world came into existence. **BMS**

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