NATURAL HISTORY MUSEUM

Slavery and the natural world

Chapter 7: Fevers

Context

This material is part of a wider project on slavery and the natural world, carried out at the Natural History Museum, 2006–08. The information is based on documents held in the Museum's libraries, and explores the links between nature (especially the knowledge, and transfer, of plants), people with an interest in natural history (mainly European writers from the sixteenth to eighteenth centuries) and the history and legacies of the transatlantic slave trade[1].

More can be found in the original documents, written by natural historians at the time of slavery. Contact the Natural History Museum Library www.nhm.ac.uk/research-curation/library/ +44 (0) 20 7942 5000. The additional references section has other useful sources such as relevant articles, books, journals and websites.

Please note that the information given is for historical interest only. The Natural History Museum cannot endorse any of the medicines, medical claims or advice given here. Do not take any medicines or treatments without first consulting a qualified practitioner.

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1 For more background information see Chapter 1: The project.

1. Introduction

Fevers were one of the most obvious symptoms of illness, but they were associated with a number of different diseases caused by entirely different organisms.

Fevers of various sorts were very common in tropical areas. They included those brought on through infection by parasites, such as malaria (caused by several species of *Plasmodium* protozoa) and sleeping sickness (caused by various subspecies of *Trypanosoma brucei*). Yellow fever and dengue fever (both caused by members of the Flaviviridae family of viruses) were also common. Fever was also a symptom of many other illnesses such as colds and beriberi[2].

Many Africans and indigenous peoples in the Americas had treatments for fevers using herbal remedies. Africans also had some natural resistance (immunity) to the diseases that existed in Africa (including malaria and yellow fever). However, when Europeans travelled in Asia, Africa and the Americas they suffered particularly badly, especially from malaria and yellow fever to which they had little or no resistance. Europeans carried many viral diseases such as smallpox, chicken pox, measles and influenza as well as respiratory diseases such as tuberculosis, and these caused the deaths of many African and indigenous people in the Americas[3].

So many Europeans were affected by malaria and yellow fever (including thousands of soldiers sent to the Caribbean to fight wars such as the revolution in Haiti and the Maroon wars in Jamaica[4]) that finding remedies became an important business. Natural historians, who were also trained doctors, like Hans Sloane[5], were often looking for medicinal cures from plants when they travelled to the tropics.

2. Malaria

At the beginning of the transatlantic slave trade, it was thought that malaria was caused by bad air from marshes and bogs (malaria is from the Italian *mal aria*, meaning 'bad air'). Malaria was also known in Europe as ague or tertian fever6. The scientific causes of malaria were only identified in the 1880s.

Malaria is caused by infection with parasites. These are transmitted to people when female mosquitoes bite through human skin and draw blood[7].

The symptoms of malaria are shaking chills and fever, sweating, and may also include headaches, muscle aches and tiredness. Malaria can cause anaemia and jaundice (when it may be confused with yellow fever). It can also cause organ failure, coma and death.

The parasite *Plasmodium falciparum* causes the most severe symptoms and most deaths from malaria.

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2 See also Chapter 5: Diet and nutrition.

3 Most Europeans survived measles and tuberculosis and most west Africans survived yellow fever and malaria; indigenous peoples in the Americas were most susceptible to smallpox (Crosby, 2003, p37 and 46). Syphilis originated in the Americas, and spread rapidly among European and African people (Desowitz, 1997, p94).

4 African resistance to diseases such as malaria and yellow fever led to their employment as soldiers to fight in many tropical regions of the British Empire, see for example, Kiple, 1984, and Hochschild, 2005.

5 See Chapter 2: People and the slave trade.

6 Tertian fever is a fever that recurs on the third day.

7 The parasites are mainly *Plasmodium falciparum* and *Plasmodium vivax*. These *Plasmodium* parasites are transmitted to humans by several species of mosquitoes of the genus *Anopheles*.

It is the commonest cause of malaria in Africa[8]. *Plasmodium vivax* is less likely to cause death but those affected can suffer repeated attacks of fever, many years after the initial attack, because the parasites survive in the liver for a long time. Today *Plasmodium vivax* is the commonest cause of malaria in Central America but occurs less frequently in Africa, especially in western and central areas[9].

It is uncertain if malaria existed in the Americas before the arrival of Europeans. While the mosquitoes that transmit malaria to humans were already in the Americas, there are no references to malaria in the 'medical books' of the Mayans or Aztecs, and it is thought that parasites that cause malaria were taken to the Americas through colonisation and the transatlantic slave trade[10].

Mosquitoes breed in water and multiply in the rainy season, but other factors connected to colonisation and the cultivation of land caused a very rapid increase in mosquito populations. Deforestation, wet agriculture such as rice farming in the southern states of America, the growth of populations and the increase in outdoor containers for catching water provided mosquitoes with ideal breeding grounds[11].

3. Yellow fever

Yellow fever is caused by a virus, which is transmitted by mosquitoes of the genus *Aedes*, particularly *Aedes aegypti*. It is thought that yellow fever was transported inadvertently to the Americas by both European and African people, as well as by mosquitoes:

> 'The virus could have come from Africa by human and by mosquito. It could have come in the blood of slaves who were... carriers as well as of sick sailors. It could have come in the *Aedes aegypti* themselves who fed successively, from generation to generation on infected slaves and sailors.' (Desowitz, 1997, p98–9).

Recent research has shown that the mosquitoes can pass the virus on to their eggs, which are laid in still or stagnant water. Therefore, the yellow fever virus may also have been transported in the eggs and larvae of mosquitoes in the water barrels on slaving ships[12].

The *Aedes aegypti* mosquitoes transmit the yellow fever virus when they bite, spreading the disease between humans. They can also transmit the virus between monkeys and humans[13], so people living in forested areas may have been most badly affected with the disease. Yellow fever causes similar symptoms to malaria, and severe cases cause bleeding, kidney failure and, often, death[14].

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8 In what is now Mali, cattle were sometimes kept in houses to reduce the risk of humans catching *falciparum* malaria. The cattle were an alternative host for mosquitoes in search of blood so humans were less likely to get bitten (Carney, 2001, p188).
9 See www.ncbi.nlm.nih.gov/pubmed/11425182.
10 See Desowitz, 1997, p89.
11 See Desowitz, 1997, p91.
12 See Desowitz, 1997, p98–9.
13 All primates can be infected with the yellow fever virus, and, for some reason, so can hedgehogs (Desowitz, 1997, p96).
14 In 1740, Dr John Williams, a surgeon on a slaving ship, and Dr Parker Bennett in Jamaica fought a duel over whether blackwater fever was the same as yellow fever. Both men were killed. Williams was correct. Blackwater fever can cause blood in the urine but it is a severe form of malaria not yellow fever (Desowitz, 1997, p96–7).

Indigenous peoples in the Americas were devastated by many European diseases, as well as by yellow fever, and epidemics often led to the destruction of whole communities[15]. The first recorded epidemic of yellow fever in the Caribbean was in Barbados in 1647 and more than 5,000 people died. In Jamaica, an epidemic in 1655 killed at least 1,000 indigenous people and many of the Spanish and English who were fighting for control of the island. The disease remained a serious problem in the Caribbean for the next 250 years.

4. Effect of fevers on Europeans

Europeans travelling to tropical regions often suffered from fevers[16]. They included slave traders, plantation holders, sailors and soldiers as well as natural historians[17]. Finding cures was an important business and many natural historians were looking for medicinal cures from plants in the tropics.

The doctor and natural historian Hans Sloane recorded his observations of malaria (which he called intermitting fever) in Jamaica. He described how abundant mosquitoes were following periods of rain. He also mentioned that people covered their beds with gauze nets at night to prevent being bitten by mosquitoes and that Africans used to keep fires burning at night to keep the mosquitoes away. However, many people still suffered from the disease:

> 'Intermitting fevers of all kinds, were very epidemic all over the islands when I was there, so that the third part of mankind were taken ill of them, from children at the breast to old aged people.' (Sloane, vol 1, 1707, pcxxxiv)

Hans Sloane stated that Africans from Guinea did not die as frequently from fever as did enslaved labourers from the East Indies and Madagascar, but this was probably reported to him rather than a personal observation he made at the time. Hans Sloane identified other fevers as due to malaria, but the jaundice he observed may mean he saw cases of yellow fever. Many of the accounts of the time refer to fevers in general, some of which may have been malaria but others could have included yellow fever and other tropical diseases such as sleeping sickness, dengue fever and beriberi.

Natural historians were often personally affected by malaria or other tropical fevers. The natural history collector Henry Smeathman[18] spent many years in Sierra Leone and the Caribbean. He was due to return to Sierra Leone to set up the anti-slavery settlement of European and African settlers, but he died of fever on 1 July 1786.

Sarah Bowdich[19] lost a baby to fever on her first visit to Africa between 1816 and 1819. She subsequently had three more children, two of whom survived, and the family returned to the Gambia from Paris in 1823. Two months after they arrived Sarah's husband Edward died of a fever, on 24 January 1824.

Maria Merian[20] had to leave Suriname after only two years after she contracted malaria, but she lived for a further 16 years to the age of 69.

15 See also Chapter 2: People and the slave trade and Desowitz, 1997, p99.
16 Slaving ships tried to arrive in west Africa between November and May, the dry period, to reduce the risk of catching malaria (Carney, 2001, p71).
17 See for example Hochschild, 2005, p 272–4, 292–3 and 294–5, who described the devastating effect of malaria on French and British soldiers fighting against the revolution in St Domingue (Haiti) and also Desowitz, 1997, p103–4.
18 See also Chapter 2: People and the slave trade.
19 See also Chapter 2: People and the slave trade.
20 See also Chapter 2: People and the slave trade.

The soldier John Gabriel Stedman suffered with fever in Suriname and attributed his recovery to Joanna, who became his mistress[21]:

'I was seized suddenly with a dreadful fever; and such was its violence, that in a few days I was no more expected to recover. In this situation I lay in my hammock until the 17th [May 1773], with only a soldier and my black boy to attend me, and without any other friend: sickness being universal among the newcomers to this country, and every one of our corps having so much to do to take care of themselves, neglect was an inevitable consequence, even among the nearest acquaintance. ... had it not been for the happy intervention of poor Joanna, who one morning entered my apartment, to my unspeakable joy and surprise, accompanied by one of her sisters. She informed me that she was acquainted with my forlorn situation; that if I still entertained for her the same good opinion, her only request was, that she might wait upon me till I should be recovered. I indeed gratefully accepted her offer; and by her unremitting care and attention had the good fortune so far to regain my health and spirits, as to be able, in a few days after, to take an airing in Mr. Kennedy's carriage.' (Stedman, vol 1, 1806, p110–111)

5. African resistance to fever

It is widely accepted that humans originated in Africa, and it follows that many diseases also evolved there including malaria and yellow fever[22].

There are a number of genetic factors that we now know give African people some immunity to malaria. These include sickle-cell trait, thalassaemias, Duffy antigens, G6PD, HLA and interleukin-4. Most west Africans have immunity to *Plasmodium vivax* (via Duffy negative factor) and some Africans have genetic immunity to *P. falciparum* (through sickle cell and G6PD). These genetic predispositions often bring other problems (for example, the distorted shape of the red blood cells in sickle-cell anaemia typically causes great pain when the body is deprived of oxygen and can result in a shortened lifespan). Despite this, the resistance to malaria gave carriers of these conditions an advantage in evolutionary terms.

There may be some genetic immunity among Africans to yellow fever but it has not been identified in the same way as malaria.

As well as genetic immunity, it is possible to build up resistance to malaria and yellow fever by being exposed to it repeatedly over time. This is called acquired immunity, but is usually only established after the age of five. Most African people are exposed to a mild form of yellow fever in childhood, which prevents them suffering a more severe form of the disease later in life.

Both genetic and acquired resistance to malaria and yellow fever were weakened when African people were born in the Americas, or if they lived outside Africa for a significant period of time. If they returned or resettled in Africa after achieving their freedom[23], they were more likely to contract these diseases.

21 See also Chapter 2: People and the slave trade for more information on Joanna.
22 See for example, Desowitz, 1997, p89 and p94.
23 This was the case for enslaved Africans who fought for the British in the American War of Independence 1775–1783 and who were promised their freedom. They were repatriated to Sierra Leone from Nova Scotia (see Hochschild, 2005, p209). 15,000 emancipated Africans were also repatriated to Liberia where many died of yellow fever as they had lost their immunity (Desowitz, 1997, p95).

Europeans and indigenous peoples of the Americas had little or no genetic immunity (only some Mediterranean populations show malaria resistant genes), and only those Europeans from malarious areas in Europe would have any acquired immunity. The doctor, Thomas Winterbottom, reported the different effect fever had on Africans and Europeans in Africa, the Caribbean and on returning to Sierra Leone in 1800:

'Fever is the most frequent and most fatal disease to which Europeans are subject upon this coast: it is less common among the Africans, who also suffer less from its attacks. In them, it is generally the sequel of a debauch, and very frequently follows the excessive intemperance in which they indulge at the funeral of their friends... They have no idea of the nature of fever, as a general disease, nor have they any word in their language to express it, but name it from any of its urgent symptoms, as *sick head*, *sick belly*, &c. On that account it has been supposed that the Africans are not liable to the attacks of remittent fever, an opinion which is contrary to fact. It is not uncommon to see the natives affected with slight, but distinctly formed paroxysms of fever, which sometimes terminate within twenty-four hours, and are considered as common head-achs...

Intermittents are very uncommon among the Bulloms and Timmanees [peoples of Sierra Leone], many of them having never seen the disease, except perhaps among Europeans. Hence they have no specific name for an ague, but generally term it the 'shaking sickness.' In the Foola country, intermittents are more usual than in the Soosoo or Mandingo countries, and they are said to be rather frequent at Teembo during the rainy season. The Mandingos and Foolas call this disease gondeea, and the Soosoos term it forakee. When it occurs, their mode of cure consists in exciting a profuse perspiration; this is done by causing the patient to sit over a large pot in which some leaves have been boiled, the steam being confined by a large cotton cloth thrown over the patient's head, and reaching to the ground. Among the Soosoos it is usual to boil the leaves of a species of bean tree called killéeng, previously bruised, with which the body is bathed as a cure for this disease.

Aguish complaints are equally uncommon among the negro slaves in the West India Islands. Dr. Curten, physician at Rio Bueno, Jamaica, speaking of the negroes, says, 'I have not met among them with a pure tertian intermittent in the whole of my practice, though white people are often affected with them. I have been informed by practitioners of forty years experience, that it is a rare occurrence among negroes; that they have not met with more than one or two instances in the whole of their practice; and that even these few have been confined to mulattoes and house negroes, or those who live in the same manner as white people.' The Nova Scotian blacks settled at Free Town are, however, very liable to agues: the only difference between them and Europeans in this respect is, that the former appear to suffer less from the disease, and that in the remittent fever, the remissions are more perfect among the Nova Scotians, and more disposed to assume the form of an intermittent.' (Winterbottom, vol 2, 1803, p13–22)

The difference in death rates caused by yellow fever can be seen in Havana, Cuba, which showed the numbers of European 'whites' that died in 1649 was 536 compared to 26 Africans[24]. However, the deaths among 'blacks' may have referred to indigenous peoples, people of dual heritage or enslaved Africans born in the Americas who had lower resistance to the disease. This comparison does not show total population size either so it can only be used as a guide to suggest Europeans suffered far higher death rates from yellow fever than Africans.

The relative immunity of African people to malaria and yellow fever contributed to their enslavement. They were able to work while Europeans and indigenous peoples of the Americas suffered and often died.

6. Fevers and cures

Indigenous people in South America used the bark of *Cinchona* trees[25] as a treatment for fevers. These trees grew in Peru on the slopes of the Andes mountains, and the bark contained a natural source of quinine. The Spanish saw how effective *Cinchona* was as a cure for fevers, caused by diseases such as malaria, and introduced it to Europeans at the time of the transatlantic slave trade[26]. It was so effective that European nations, especially the Spanish, French and English, all tried to control access to *Cinchona* trees and to cultivate them elsewhere[27].

As a doctor, as well as a natural historian, Hans Sloane listed a number of European and African people suffering from malaria whom he treated and cured with *Cortex Peru* (which was obtained from several species of *Cinchona*). Sloane did not collect any material of *Cinchona* in Jamaica; he probably used bark prepared and imported from South America.

'This fever run very high, affecting his head very much, but by the *Cortex Peru* given him as it ought to be, came to be very well.' (Sloane, vol 1, 1707, pcxxxvi)

▲ Quinine (*Cinchona officinalis*), Picture Library reference 1869 ©The Natural History Museum

The South American *Cinchona* trees were considered the most valuable, but there were many species of *Cinchona*, including an indigenous Jamaican species (*Cinchona jamaicensis*) only identified in 1777 by the British physician and botanist William Wright.

Many of the fevers that affected Europeans were not in fact malaria, however, they were also often treated with plants or tree bark. The natural historian Henry Barham reported this account of European treatment by an enslaved African:

24 See Kiple, 1984, p162.
25 *Cinchona* is also called Jesuits' bark, Peruvian bark, fever tree or quinine.
26 See: www.nhm.ac.uk/jdsml/nature-online/seeds-of-trade/index.dsml.
27 See for example, Drayton, 2000, and Schiebinger, 2004.

'In the year 1716, after a severe fever had left me, a violent inflammation, pain, and swelling, seized both my legs, with pitting like the dropsy; I used several things, to no effect. A negro going through the house when I was bathing them, said, 'Master, I can cure you,' which I desired he would; and immediately he brought me bark of this tree, with some of the leaves, and bid me bathe with that. I then made a bath of them, which made the water red as claret, and very rough in taste: I kept my legs immersed in the bath as long as I could, covering them with a blanket, and then laid myself upon a couch, and had them rubbed very well with warm napkins; I then covered them warm, and sweated very much: I soon found ease, and fell asleep. In five or six times repeating this method, I was perfectly recovered, and had the full strength and use of my legs as well as ever…' (Barham, 1794, p148–9)

An enslaved African called Kwasi also knew about a South American root that was a good anti-fever medicine[28]. Carl Gustaf Dahlberg, a Swedish soldier in Suriname, took the plant to the scientist Carl Linnaeus[29]. It is unclear what fevers it actually cured, but it was described as being similar to quinine:

'Dahlberg, visiting his home country, gave Linnaeus a Surinam tree bark that he claimed was as powerful as quinine bark in curing fevers. In Lignum qvassiae, a 1763 dissertation, Linnaeus named the tree species after Qvassi, a slave of African descent owned by Dahlberg's mother-in-law. As Linnaeus told the story, 'an unknown Negro slave named Qvassi discovered a medicine that he began using for his fellow slaves' severe fevers, and that with such success, that even the masters sought his help. But he was so completely against disclosing this cure that he rather sought to keep it secret as the most holy Arcanum'.' (Rausing, 2003, p194–5)

It has also recently been shown that other South American plants, such as the peacock flower (*Caesalpinia pulcherrima*) which was used medicinally,[30] are also effective against fevers:

'Other recent studies demonstrate that extracts from the flower, stem, leaf, fruit, root, and seed of *Caesalpinia pulcherrima* are also effective against wheezing, bronchitis, malarial infection, tuberculosis, other bacteria, fungi, and some parasites.' (Counter, 2006)

28 See Chapter 2: People and the slave trade for more information about Kwasi and the plant *Quassia amara*.
29 See also Chapter 2: People and the slave trade and Chapter 10: Attitudes and acknowledgement.
30 See Chapter 8: Medicines, and also Chapter 6: Resistance for the use of the plant in abortions.

Cotton (*Gossypium barbadense*), Majoe bitters (*Picramnia antidesma*), soursop (*Annona muricata*), worm-grass (*Spigelia anthelmia*) and attoo (*Gouania lupuloides*) were all used as treatments for fevers by indigenous people and enslaved Africans[31].

▲ Flos pavonis (*Caesalpinia pulcherrima*), Merian, 1705 © The Natural History Museum, London

▲ Cotton, de Tussac, 1808 © The Natural History Museum, London

▲ Majoe bitters (*Picramnia antidesma*), Sloane Herbarium, collected 1687–89, ID 896 © The Natural History Museum, London

▲ Soursop (*Annona muricata*), de Tussac, 1808 © The Natural History Museum, London

31 See Chapter 4: Everyday life and Chapter 8: Medicines.

6.1 Malaria and yellow fever today

Malaria is still an enormous problem in Africa and other parts of the world. It affects 300–500 million people worldwide each year (80 per cent in Africa), and up to 2.7 million of these die annually. No vaccine is yet available against malaria, and prevention relies on controlling the mosquitoes that cause its spread.

A vaccine exists for yellow fever, which is less common worldwide than malaria. Outbreaks occur in South America and Africa when mosquito-control methods break down. Approximately 10,000 people are still affected by yellow fever each year.

Many thousands of specimens of mosquitoes that transmit malaria and yellow fever are held in the collections at the Natural History Museum. Scientists at the Museum are working to identify and understand the mosquito species so that the spread of these diseases can be prevented in the future[32].

7. Alternative interpretations

This chapter presents research information and context. The evidence itself can be seen in different ways and raises many questions and some further areas for research. Through the Natural History Museum's slavery and the natural world public programme alternative interpretations and questions relevant to this chapter have been collected and some of these are summarised below[33].

Malaria

The various ways to prevent contracting malaria were discussed. '*Moringa oleifera* is a prophylactic for malaria in west Africa.' Neem was well-known as 'an insect repellent' for 'keeping mosquitoes at bay'. Participants had experienced, 'side effects of malaria medicine – weird dreams'. It was felt that many artificial anti-malarial drugs lacked the 'natural checks and balances of the plant' and homeopathic alternatives were becoming preferred.

A question left for further discussion and debate was:

- Was the comparative immunity of African people to malaria and yellow fever a reason why they were enslaved, or used as a justification for enslavement?

32 See: www.nhm.ac.uk/nature-online/insite/discovering-understanding/F31.html and www.nhm.ac.uk/about-us/news/2007/september/news_12372.html.

33 See also Chapter 8: Medicines.

8. Additional references

There is a full list of references, including all of the research documents, in Chapter 1: The project. These references offer additional reading specifically relating to this chapter.

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