

Session 1: Malaria in Britain – Past and Present

History of malaria in England

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Malaria has long been one of the most debilitating diseases of mankind. Over the centuries malaria has accounted for innumerable deaths and has shaped the course of human history in regions far beyond its present geographical distribution¹⁻³.

The history of malaria in England has recently attracted the attention of a number of scholars but few studies have examined the true extent and impact of malaria on English society in the past^{1,4-7}. This paper summarizes the findings of a large historical survey of patterns of disease and mortality in England⁸⁻¹⁰. It is based on a wealth of literary and quantitative sources and pieces together clinical, demographic and geographical evidence to form parts of a fascinating epidemiological puzzle. From the complete set of evidence there appears no doubt that malaria was once indigenous to the coastal and estuarine marshes of England, that its prevalence was sharply controlled by the distribution and habits of the English *Anopheles atroparvus* mosquito and that within its geographical bounds malaria had a profound effect on the marshland populations of this country for several hundreds of years.

As early as the 16th century the English marshlands were singled out for their extreme unhealthiness (Figure 1). Residents and visitors described the 'marsh fevers' of these districts, variously calling them 'agues', 'tertian fevers', 'quartan fevers' or 'intermittent fevers' and attributing them to the noxious vapours of the stagnant marshes. The topographer, John Norden, visited Essex in the 1590s but was unable to 'comende the healthfulness of it: And

especiallie nere the sea coastes . . . and other lowe places about the creeks which gave me a most cruell quarterne fever¹¹. In the 17th century Thomas Sydenham wrote that 'if one spends two or three days in a locality of marshes and lakes, the blood is in the first instance impressed with a certain spirituous miasma, which produces quartan ague. . .¹². Daniel Defoe related a story of Essex marshmen taking their brides from the uplands but losing them soon afterwards as they succumbed to the ague fever:

'the reason, as a merry fellow told me, who said he had had about a dozen and a half wives (though I found afterwards he fibbed a little) was this: that they, being bred in the marshes themselves and seasoned to the place, did pretty well with it, but that they always went up into the hilly country or, to speak their own language, into the uplands for a wife. That when they took the young lasses out of the wholesome and fresh air they were healthy, fresh and clear and well: but when they came out of their native air into the marshes among the fogs and damps, there they presently changed their complexion, got an ague or two, and seldom held it above half a year or a year at the most . . .¹³.

And an anonymous poem by a Fenman read:

'The moory soil, the watry atmosphere
With damp, unhealthy moisture chills the air.
Thick, stinking fogs, and noxious vapours fall,
Agues and coughs are epidemical;
Hence every face presented to our view
Looks of a pallid or a sallow hue¹⁴.

Even by the early 19th century, Edward Hasted writing of the north Kent marshes, could still describe

'the severe agues which the inhabitants are very rarely without, whose complexions from those distempers become of a dingy yellow colour, and if they survive, are generally afflicted with them till summer, and often for several years, so that it is not unusual to see a poor man, his wife, and whole family of five or six children, hovering over their fire in their hovel, shaking with an ague all at the same time¹⁵.

Hasted's vivid description reminds us of the illustration by Thomas Rowlandson which forms Figure 2.

Many documents describing tertian and quartan fevers in early modern England have been examined and this set of clinical and epidemiological information - albeit limited by modern standards - does tend to confirm that marshland ague was, indeed, plasmodium malaria⁸. The alternating hot and cold fits and the periodicity of the fever according to type were notable features of the disease. Many observed the characteristic enlargement of the spleen, the anaemic and lethargic condition of the patient, and the relapse several months after the primary attack. The expression 'ague-cake' was often used to describe the

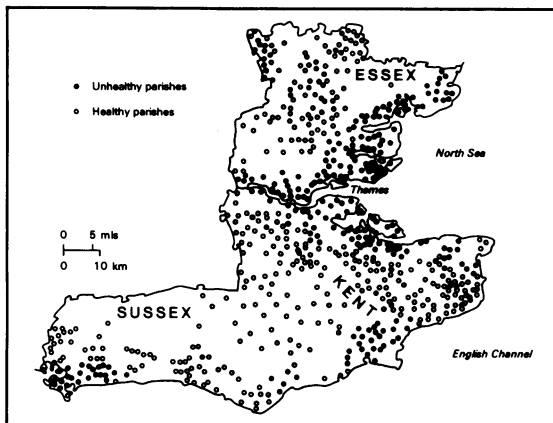


Figure 1. Parishes in Essex, Kent and Sussex described as 'unhealthy' or 'healthy' by 18th-century topographers. Parishes along the North Sea coast of Essex, the Thames, Medway and Stour estuaries, and the low-lying coastal marshes of Kent and Sussex are deemed very 'unhealthy' and constantly subject to 'agues'

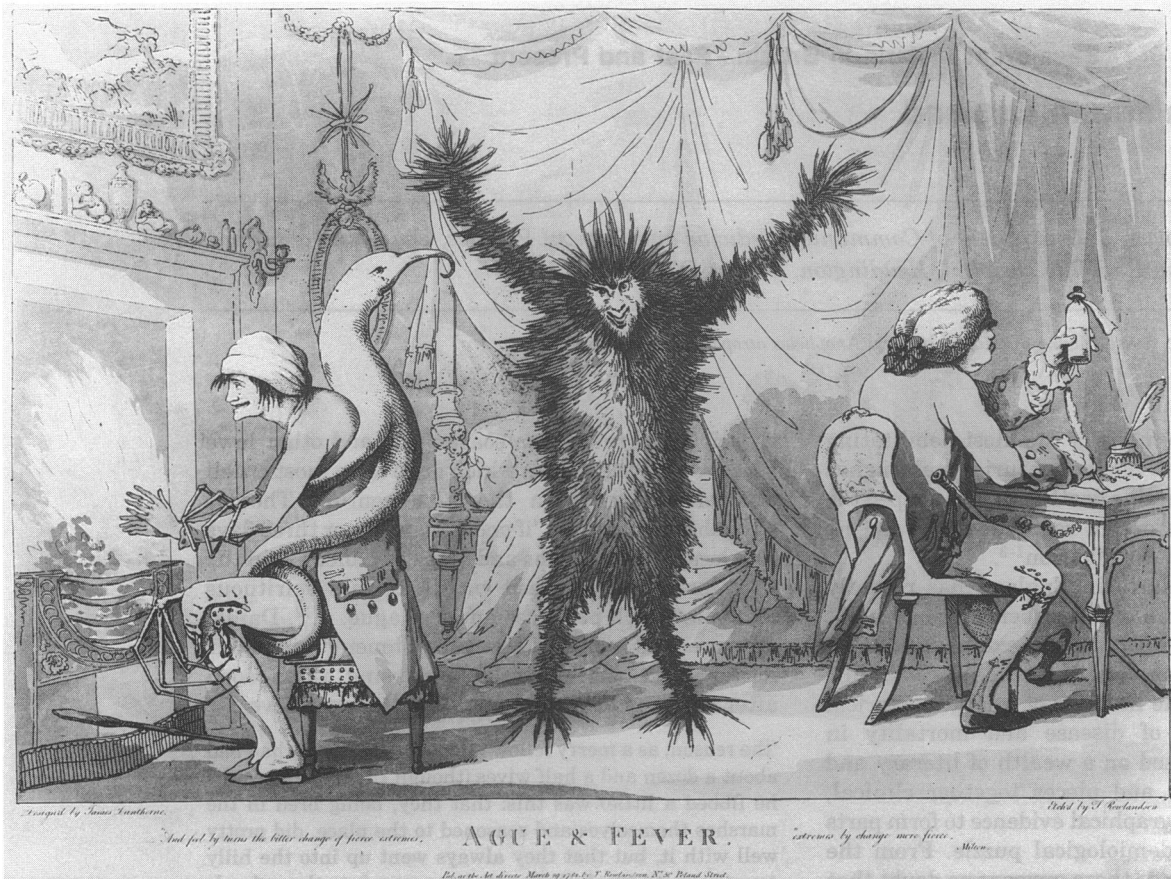


Figure 2. 'Ague and Fever'. Etching by Thomas Rowlandson, after a design by J Dunthorne (1788), describing the characteristic stages of malaria beginning with a fit of shivering and succeeded by dry heat and finally copious sweating (published with kind permission of Wellcome Institute Library, London)

prominent spleen of a malaria victim. It was noted, too, that the marsh fever was non-contagious and was confined to low-lying, slightly salty estuarine and marshy environments. It displayed two seasonal peaks - the primary attacks occurring in the autumn and the relapses the following spring. Its highest fatality rates were amongst children and strangers or the non-immunes while those repeatedly attacked by the disease were left in a permanent cachectic state. Physicians also realized that the marsh fever, unlike most other acute fevers, would yield to large doses of cinchona bark though they noticed that the bark could not completely eradicate the disease once the patient stopped taking it. This bark had been brought back from Peru by the Spanish in the 17th century and was later to be the source of the alkaloid quinine. Observers like Robert Willan who 'took the trouble to compare minutely' the marsh agues with other English fevers (such as typhus, relapsing fever, typhoid and influenza) were convinced that their clinical and epidemiological characteristics were as different as their 'exciting causes'¹⁶ but when comparing the English marsh fever with the notorious tropical fever they astutely noticed that 'whether on the marshy coasts of Essex and Kent, or the more dreadful banks of the Gambia and Niger, it is not improbable that the fever so destructive to European life is of one character'¹⁷. English malaria was thought to cause fewer direct fatalities than its tropical counterpart and almost always 'when marsh-malaria destroys life' in the English climate 'it is by secondary, not by primary effects'¹⁸. It seems likely that *Plasmodium vivax* and *P. malariae* were the

endemic English forms rather than the more fatal *P. falciparum*⁸.

And yet, one of the most striking findings of this study has been the extent to which malaria affected its marshland victims. Few other areas of the English countryside were subject to such extreme levels of sickness, suffering and death. Mortality rates for over 500 marshland and non-marshland southeast England parishes have been measured and compared using 17th and 18th century English parish registers and techniques of historical demography. On every count, the marshland populations recorded the highest adult and child mortality rates. Average crude death rates were as high as 60, 70 or 80 per 1000 - levels which could be two to three times those of neighbouring non-marshland parishes (Figure 3). Life expectancy at birth was little more than 30 years for the sickly marshland residents and nearly half of all recorded deaths occurred at age 10 years or below. Burial patterns from year to year occurred at age 10 years or below. Burial patterns from year to year and season to season were also extremely volatile in the marshes and there was a very close correspondence between fluctuations in summer temperatures and the level of mortality in the autumn and following spring. The hottest summers were always followed by the unhealthiest and most mortal times in the marshlands. The parish registers contain little information on cause of death but from time to time the vicar scribbled in the burial record that the deceased died from 'fatigue' or was just 'worn out'. If the vivax form of malaria did not kill its victims outright, then it certainly had a profound indirect effect on the

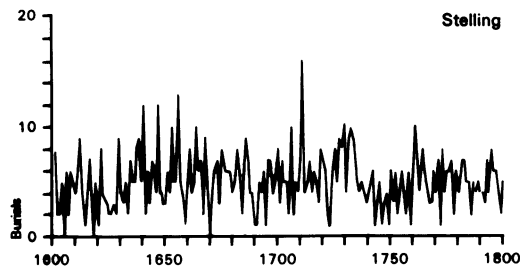
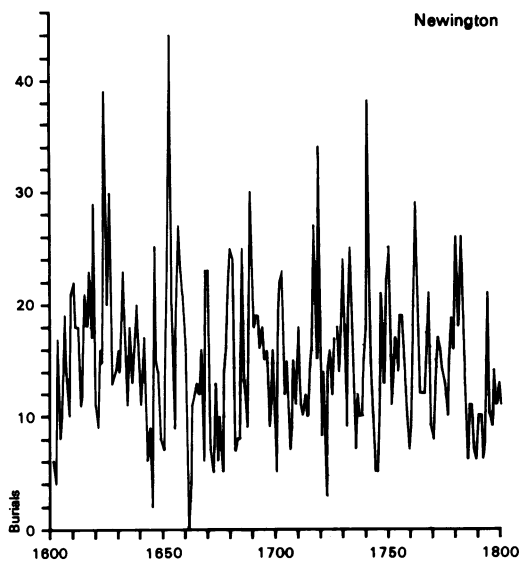


Figure 3. Annual burials in two Kent parishes in the 17th and 18th centuries. Both communities had approximately 250 inhabitants but Newington, a marshland village in north Kent, suffered a far higher toll of mortality than Stelling, an upland village on the North Downs

demographic variables. Malaria acted as a great debilitator. It was a disease which the people of the marshes constantly had to live with and which they often had to experience in combination with a host of other infections prevalent in England at this time (including smallpox, pulmonary infections and many other fevers). The marsh folk were generally in a weakened state of health and eventually succumbed to their frequent and intense bouts of sickness. The toll of energy and life which malaria imposed on marshland communities was dramatic. As many a Kentish person was reminded:

'He that will not live long,
Let him dwell at Murston, Tenham or Tong'.

These regions, by their very nature, acquired a strange demographic and social structure. Men of wealth and education avoided a residence in the marshes. Vicars, though frequently obliged to attend the burials of their parishioners, rarely resided permanently in their marshland parishes. When questioned by their Bishop, many explained that they had been forced away by the unhealthiness of the air and the prevalence of agues (Figure 4). The Vicar of Ashledham, Essex, in 1723, wrote saying that he and his family had been obliged to leave the parish 'being so violently afflicted with the worst of agues and languishing so long under it that our constitutions were almost broke and I brought so low that I was

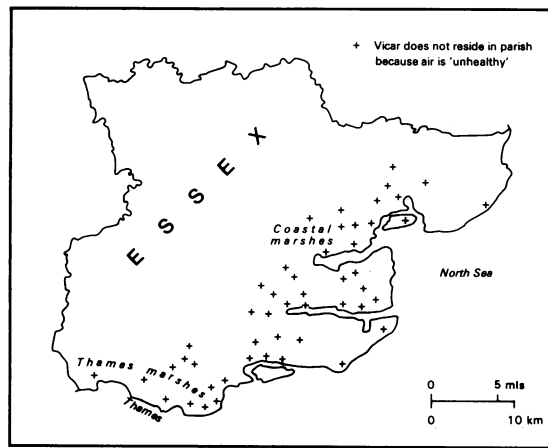


Figure 4. Vicars in 18th century Essex refused to live in the coastal marsh parishes because the air was 'unhealthy' and 'much subject to marsh agues'

rendered incapable to reside in the cure and the physicians assuring me that I must wither leave it or die.' The incumbent of Northfleet, Kent, complained that 'the Thames having a very foul shore in this parish . . . I soon found myself attacked by so many repeated agues that my physicians . . . told me I must not pretend to reside there . . .' while the curate from Aldington, Kent, summarized the general opinion: 'so unhealthy a situation as to be absolutely unfit for any curate'⁸. Visitors were wary of entering these unhealthy tracts. The parish of Lower Halstow in Kent was 'unhealthy to an extreme, the look of which the inhabitants carry in their countenances; indeed it seems so enveloped among creeks, marshes and salts, the look of which extends as far as the eye can see that it seems a boundary beyond which the traveller dreads to hazard his future safety'¹⁵. Even the landowners avoided living on their farms leaving the care of flocks and crops to local marshmen or 'lookers'. These folk were described as 'stupid, apathetic and fatalistic' seeking only a good reward from rich farmlands and illicit smuggling and caring little whether they lived or died. The parish of Wigborough Salcot, Essex, was described as 'an hospital being little else than a rendezvous of poor and ignorant wretched people'⁶. Some 'lookers' adopted strange folk charms and remedies to try and suppress the debilitating effects of malaria. Stinking worms, bed bugs, herbal powders, alcohol and opium were all used in various ways to ward off the fever attacks. One lady with malaria, kept tied round her neck a note given to her by a wandering charlatan. When the minister of the parish opened the note he found written the words: 'Ague farewell, till we meet in Hell'. The minister feared the lady had been visited by the Devil, he threw the note into the fire and subsequently witnessed her death from an ague attack¹⁹.

The medical and demographic sources provide a clear idea of the geographical distribution of malaria in England. Indeed, it appears that English malaria was unique in its geography. It was a disease endemic in the marshlands but rarely contracted in other parts of the country. Its prevalence was limited to a number of well-defined localities: the Fens, the Thames, the coastal marshes of southeast England and, more marginally, the Somerset Levels, the Ribble district of Lancashire, and the Holderness of Yorkshire (Figure 5). Its striking geography and

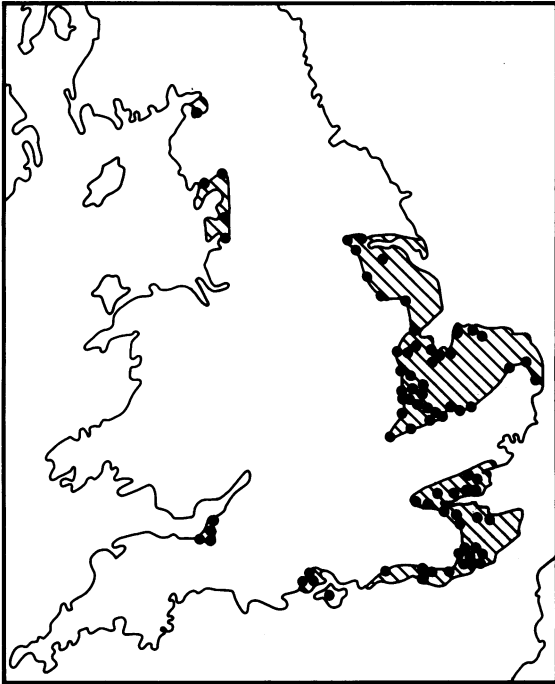


Figure 5. The geographical distribution of indigenous malaria in early modern England

abrupt boundaries are the key to differentiating the true plasmodium malaria from the many other 'agues' and 'fevers' which spread across all parts of early modern England.

It is precisely in those marshland parishes that the necessary ecological conditions for malaria transmission are met. Five species of anopheline mosquito capable of carrying the malaria parasite are indigenous to Britain today (*Anopheles claviger*, *A. atroparvus*, *A. plumbeus*, *A. messeae* and *A. algeriensis*). One species, *A. atroparvus*, breeds in sufficient numbers and in close association with humans to act as an efficient vector amongst human populations²⁰. And it is this species which is found breeding in the slightly saline waters of our coastal marshes and is caught resting in the dwellings of marshland communities. The presence of the *A. atroparvus* mosquito in the exact regions once subject to 'marsh fevers' provides a crucial piece of evidence for this epidemiological investigation.

Malaria flourished in the coastal and estuarine marshes of England for several centuries, its geographical limits determined by the natural habitats of the *A. atroparvus* species of mosquito. There is clinical proof that a mild form of vivax malaria was still indigenous in parts of Kent during the early 20th century. A patient from Romney Marsh found in 1910 to have malaria parasites in his bloodstream protested 'But it's only the marsh-fever!'²⁷. Nearly 500 indigenous cases of vivax malaria were detected in England during the First World War. Soldiers returning from Greece and India with malaria were inadvertently sent to convalesce in the north Kent Marshes. The local *A. atroparvus* mosquitoes successfully spread the parasite amongst the local population and investigators of this outbreak confirmed that malaria was, and still could be, endemic along the *A. atroparvus* regions of England^{22,23}.

Although indigenous cases of malaria were still found in the early decades of this century, the disease had ceased to be the subject of frequent comment or

the cause of extreme unhealthiness and high mortality. Indeed, the marshlands experienced one of the steepest declines in mortality of any rural area of England and by the mid-18th century were seen to equal the rest of the country in terms of their health. The reasons for this change are undoubtedly complex and this study concludes that many factors probably worked together towards a reduction of both the frequency and severity of malaria. Drainage may have reduced the density of *A. atroparvus* in some localities though today this species is still to be found in abundance in marshy areas of England. Better ventilated houses and separate dwelling quarters for humans and animals may have led to the transference of mosquitoes to cows and horses for their blood meals. The wider use and cheaper availability of quinine in the 19th century would certainly have helped to control the disease and many marsh folk regularly visited the parson or chemist for a supply of quinine powders. The prevalence of several other infectious diseases (notably smallpox) was declining in parts of rural England during this period and the general improvements in health status and standards of living may have been critical factors explaining the diminished severity of malaria.

By the time Laveran, Manson, Ross and others elucidated the mosquito cycle in the late 19th century²⁴, malaria was no longer considered an important cause of suffering in the English marshes. Malaria's recession and eventual disappearance from the English shores began before there was any real understanding of the aetiology of the disease, in a country where there had been little attempt at eradication and in an environment which still continues to harbour a vicious mosquito population²⁵.

Today, indigenous malaria in England is not considered a hazard to health. But imported malaria and jet-setting mosquitoes are posing a new threat to the British population²⁶. In view of the topic of the next paper in this symposium, it is perhaps pertinent to end this historical introduction with the warning of John MacCulloch who first introduced the word 'malaria' (literally meaning 'bad air') into the English literature in 1827:

'there is no work more wanted in medical statistics, than a geography of malaria; a work which . . . seems of pressing urgency from the increase of travelling as well as of migrating residents abroad, and from the mass of misery, added to the considerable mortality, which results from this ignorance²⁷.

MacCulloch's words echo the theme of these proceedings.

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