

Definition of History

“Evidence is always partial. Facts are not truth, though they are part of it – information is not knowledge. And history is not the past – **it is the method we have evolved of organising our ignorance of the past.** It’s the record of what’s left on the record. It’s the plan of positions taken, when we stop the dance to note them down. It’s what’s left in the sieve when centuries have run through it – a few stones, scraps of writing, scraps of cloth. It is no more “the past” than a birth certificate is a birth, or a script is a performance, or a map a journey. **It is the multiplication of the evidence of fallible and biased witnesses, combined with incomplete accounts of actions not fully understood** by the people who performed them. It’s **no more than the best we can do,** and often falls short of that.”

Hilary Mantel, writer of historical novels.

Man

versus

Beast

... how malaria has shaped the world we live in

Archie Kerr

7 June 2023

Dangerous Predators

- **Sharks** kill **10 people a year**
- **Lions** **100 per year**
- **Hippos** **500**
- **Crocodiles** **1000**
- **Dogs** **25,000**
- **Humans** **475,000**
- **Mosquitoes** **1-2,000,000**

Currently about 750,000

Guardian Weekly, 8.7.2022

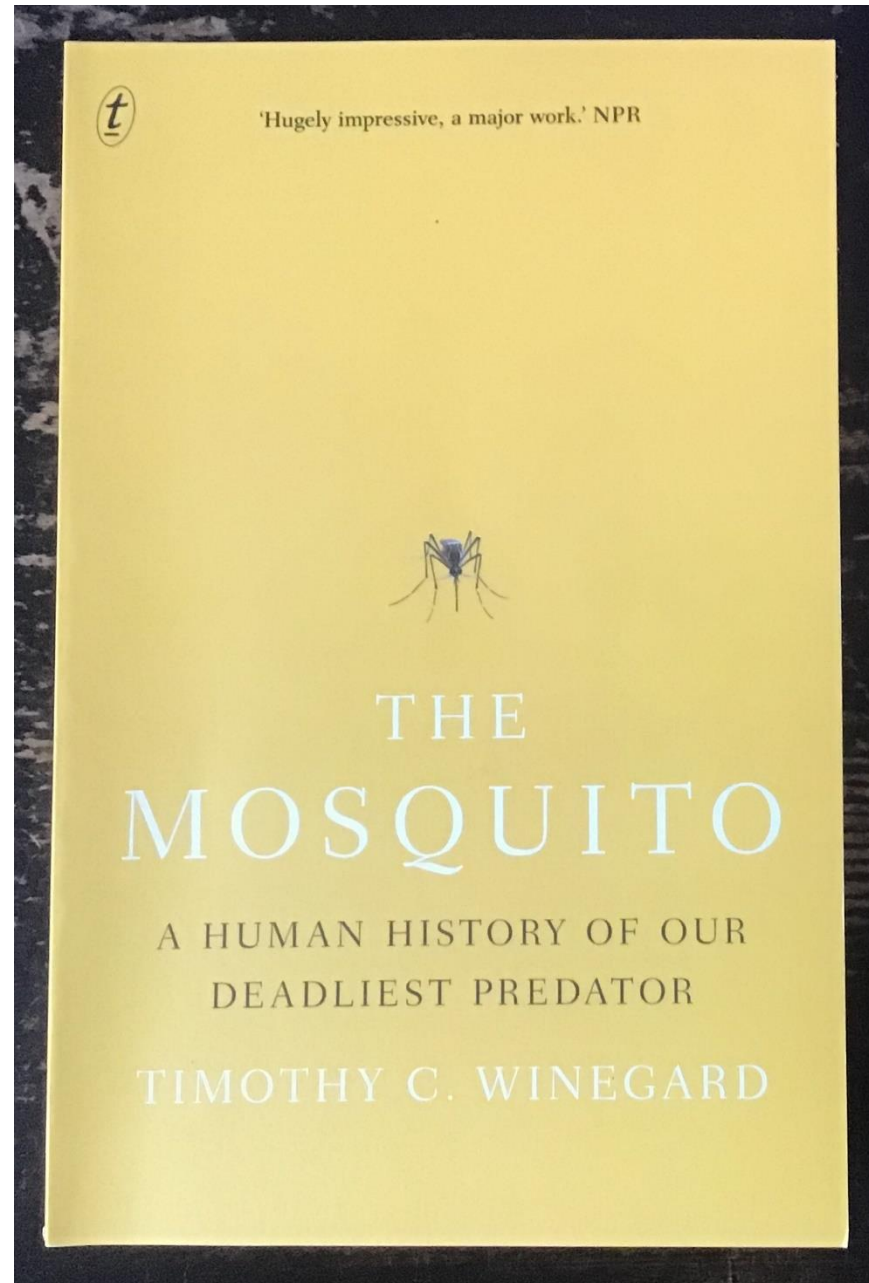
- Jenner Laboratory at Oxford University have produced a vaccine against malaria
- Same Lab that produced the Covid 19 vaccine with AstraZeneca
- Previous malarial vaccine (RTS,S) gave 39% protection
- The new vaccine, R21, produced 77% protection in a 2009 trial
- Excited response at the prospect of reducing deaths by 75% by 2030
- Rueful comments about why so long? (nearly 100 years)
 - A) Malaria is much more complex than a virus
 - B) The other cause – a third world problem

The Questions That Came to Mind:

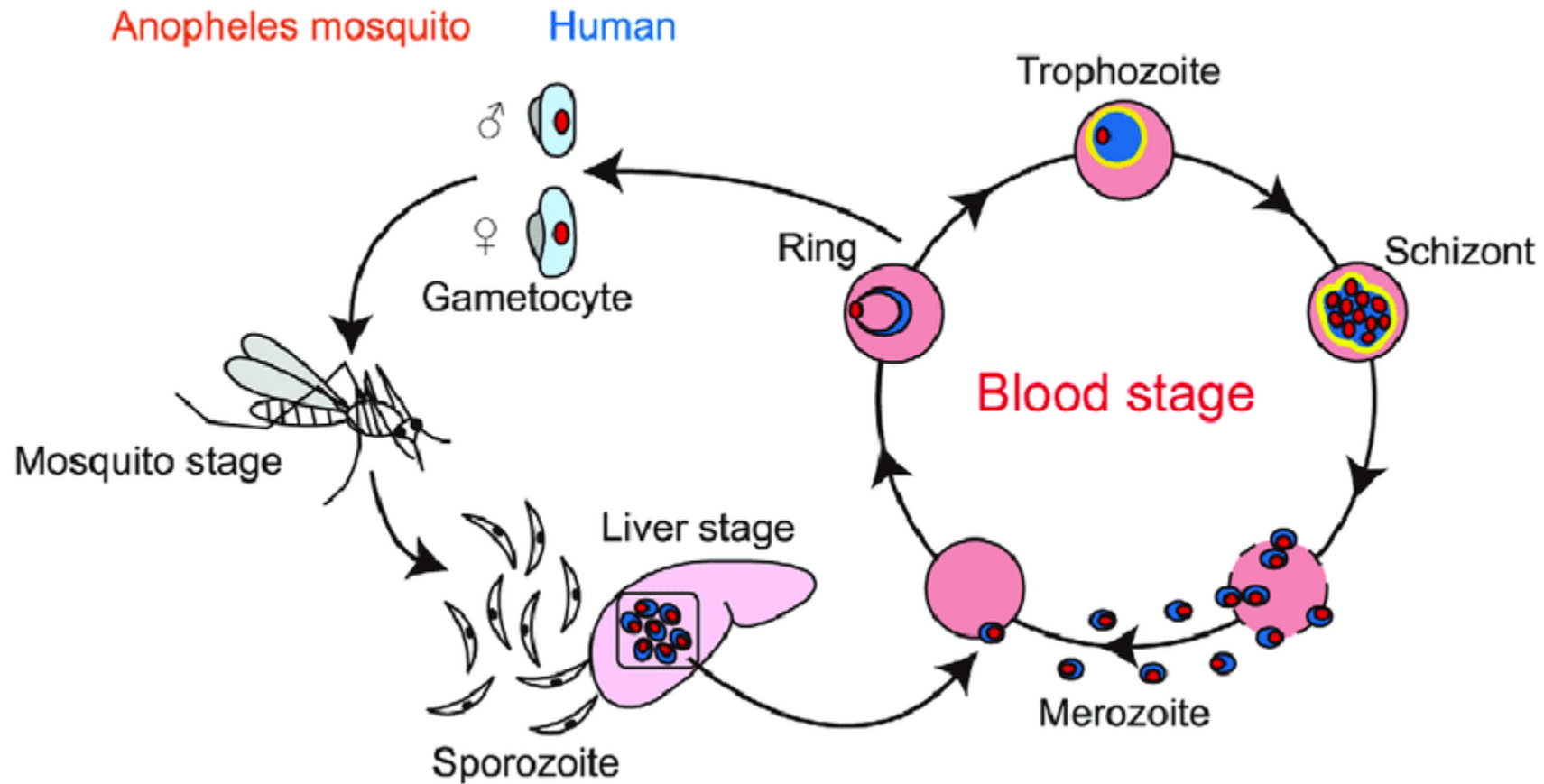
Did malaria have an effect on world history?

If so, what role did it play and how much influence did it exert?

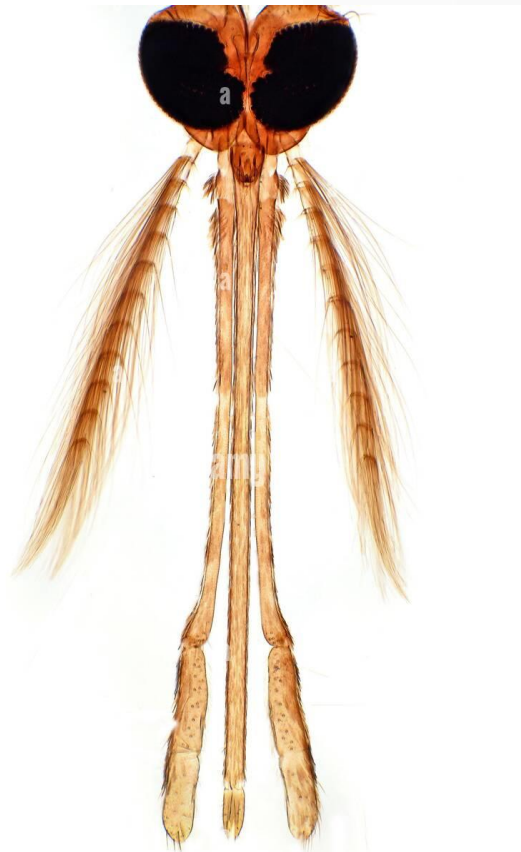
An Illuminating Book on the Subject



Malaria Life-Cycle



Anopheles and Aedes



Animals that fought back

As Bantu opened up central African lands for agriculture (8000 BCE) more mosquitoes thrived and spread malaria, but humans evolved to fight it.

Elephants “with their wrinkled mothproof hide and their teeth on upside down, outside”

Humans

- **Sickle Cell trait (90% protection from falciparum).**
- **Duffy antigen negativity (97% + immunity to vivax),**
- **Thalassaemia (50% risk reduction against vivax),**
- **G6PD Deficiency (similar protection to thalassaemias),**
- **‘seasoning’ (decreased symptoms with repeat infections)**

Dinosaurs

- **Reigned from 230 M to 65 M years ago**
- **Plenty of mosquitoes, sandflies and other insects there**
- **Dinosaurs thin-skinned, especially between keratin plates**
- **Amber-encased mosquitoes contain dinosaur blood with malaria**
- **Also malaria parasite in blood of a T. rex and in coprolite**
- **Malaria relatively new and dinosaurs had little immunity**
- **It is thought that 70% of species were extinct or threatened before the asteroid hit**

Ancient Egyptians

- Always a hotbed of malaria



Rameses III, Temple of Luxor, 1175 BCE

- Tutankamun died of *falciparum* malaria in 1323 BCE
- Steady decline of Egypt from the Middle Kingdom period (1550-1070 BCE)
- Herodotus (5th Century BCE): the Egyptians battled against the mosquito in great numbers.
- Built towers (rich) or used their fishing nets (poor in the swamps)

Mesopotamia

- Until 1200 BCE, Babylonian, Assyrian and Hittite Empires were supreme
- Then the 'Sea Peoples' with help of droughts, famines, earthquakes took over



**Amarna letter EA 35 from Cyprus to Egypt
(Titled *The Hand of Nergal*)**

**Do not let my brother be concerned that the amount of copper is too little,
for in my land the hand of Nergal, my lord,
has killed all the men of my land, and so there is not a
(solitary) copper-worker.**

Was this more help from the mosquitoes and malaria?

Persia

- **Next came Cyrus the Great in 6th Century BCE**
- **100 years later an over-ambitious Darius took on the Athenians at Marathon with 26,000 men (2x Greek army)**
- **Disembarked and camped in the swamps, left 6,400 corpses behind (Herodotus)**
- **Repeated the attack directly on Athens but lost another 6,500 (cf 1,500 Athenians)**
- **In 480 BCE, Xerxes tried again with 400,000 men with initial success apart from losing his fleet trapped at Salamis**
- **He was soundly defeated at Platea after he had lost > 40% of his men in the swamps of mainland Greece, at the hands of General Anopheles.**

Alexander the Great

- The first malariologist, Hippocrates detailed ‘tertian, quartan & quotidian’ malaria associated with the miasma of swamps – hence “*mal aria*”
- Athens v Sparta called off in 430 BCE by the ‘*Plague of Athens*’ -
? malaria
- And again in the next Peloponnesian Wars.
- Enter Alexander (aged 16) from Macedonia to sort out those ‘mice’
- Phillip sent him off to conquer Darius III’s Persia
- And on to ‘the ends of the world and the Great Outer Sea’

The Roman Empire

The pontine marshes – a major contribution to Rome’s growth and importance.

Reputation created ‘fear and horror’ from ‘swarms of bloodsucking insects waiting for you.’

King Brennus (390 BCE) and his Gauls sacked Rome and left

Protected Rome from the Punic Wars to WW ii



0 200 400 km
0 100 200 miles

Hannibal of Carthage



Hannibal's route of Invasion
(Third century B.C.)

- Hannibal's route
- ✕ Major Battles



The Roman Empire's Decline

- **The 1st Century Germans and Scots used the marshes to harry the Roman legions**
- **The Pontine marsh mosquitoes made the most of the upgrades in Rome with gardens, fountains and ponds.**
- **The rich went out of town to hillside retreats and the poor stayed home and died.**
- **By the 5th Century, Visigoths, Huns and Vandals did a bit of pillaging and looting before going home because of the malaria**

Christianity and the Crusades

- Christianity had grown in the 3rd, 4th and 5th centuries, partly because of the prevalence of malaria and that it “preached care of the sick” and those nursed back to health were grateful.
- The Vatican hospital overflowed with malaria patients.
- Popes, Holy Roman Emperors and poets (Dante) often succumbed to the ‘Roman Fever’.
- Crusades – malaria rife in the Levant and Holy Land and Crusaders had to develop immunity which the Muslims already had.
- Legacy – Trade
 - Muslim knowledge - scientific eg. compass, sails, sternpost rudder

Ghengis Khan and Mongols

- **Mini Ice Age necessitated expansion**
- **Genghis into Europe in 1220 and then retired.**
- **Son, Ogedai, tried again - further but also gave up.**
- **Grandson, Kublai, got as far as the Middle East and went back to China and SE Asia to get his malaria there!**
- **Genghis' legacy: 8 – 10 % of people in the former Mongol Empire are his direct descendants!**

European colonisation in Africa, India and Southern Asia

- In India (from a 2001 review by Ira Klein, American University, Washington) British policies brought “Death by development”
- Without any immunity, relied on cinchona bark – 700 tons a year by 1840s. Plus gin of course!
- By 1914, 1,200 civil servants & 77,000 troops were controlling 300 million Indians
- Malaria was the main cause of the decline in life expectancy to 20 years by 1921, to rise to 35 years by the end of colonisation.
- During British rule: at least a third of the population had malaria, causing 1 million deaths per year until WW I when the epidemics reduced

The Columbian Exchange

- Columbus hit Hispaniola on Christmas Day, 1492
- Left 39 men behind when he went home in the *Nino* and *Pinta*
- He returned 11 months later – all dead and native Taino people decimated.
- Local Anopheles did not have malaria but soon got it for spreading
- Within 30 years, malaria was spread from the Great Lakes to Cape Horn
- Spanish census in 1514: population 26,000 cf 5 to 8 million before Columbus
- Exchange – tobacco, corn, tomatoes, cotton, cocoa, potatoes
- In 1570s, *quinine* from the cinchona tree brought to Europe by Jesuit missionaries.

Problems

- **In 1502, Columbus brought -**
 - **Bartolome de las Casas , a Spanish Priest, with him**
 - **He wanted the Taino people treated fairly.**
- **Also brought African slaves**
 - **Bartolome was less concerned about them**
- **Malaria and Yellow fever so prevalent that indigenous peoples and colonisers without immunity, both succumbed**
- **Not enough workers for tobacco, sugar, coffee and cocoa plantations**
- **Slaves from Africa had immunity – Sickle cell trait, Duffy negativity, thalassaemias, G6PD, etc.**

Caribbean Conflicts

- **Everyone vying for islands**
- **Huge death tolls from malaria & yellow fever**
- **Eg. In Cartagena (in modern Colombia) – British ‘invaded’ in 1727 with 4,750 men, 84% died before they landed! Worse 14 years later!**
- **In June 1762, British besieged Havana with 15,000 men.
Late rainy season and no mosquitoes, so initial success.
By October, only 880 (6%) fit for duty.
Treaty of Paris, 1763, saw Cuba back with Spain**

The Transatlantic Slave Trade

- Previously slavery was ‘spoils of war’
– amalgamation common
- Christians and Muslims were trafficking slaves to Southern Europe, Middle East & China (20,000 in total by 1300 CE)
- By mid-18th century, French & English each imported 40,000 per year
- By 1820, Brazil imported 45,000 per year (5 to 6 million total)
- Overall 12.5 m shipped, only 10.7 m survived the trip



End of the Slave Trade

- **Britain abolished the trade in slaves in 1805**
- **Slave ownership became illegal in 1833**
- **In America, locally born slaves continued to be bought and sold**
- **Breeding was encouraged – often with the help of the owners**
- **This led to dilution of their genetic advantages against malaria**
- **Consequently became sicker, but still had to work**
- **Opened them to the accusation of laziness!**

War of Independence

- **Boston Tea-party (1773) –coffee preferred as local and ‘protected against malaria’**
- **Declaration of Independence in 1777**
- **Cinchona bark key –Washington stacked up supplies**
 - British supplies blocked by French, Dutch & Spanish**
- **Nelson’s base in Nicaragua had 3,000 men → 500 within 6 months**
- **By 1781, British attempting to finish it off in the southern swamps with 8,700 men had only 3,200 (37%) after a month**
- **American loyalists fled to Canada which British took from the French as a consolation prize**

Civil War

- Lincoln was elected in 1860 – 7 (later 4 more) states ceded from the Union
- His initial aim was to keep the Union together
- North blockaded the South and better armed.
South better led – Robert E Lee
- Going badly for the North in southern swamps.
- In 1863, Lincoln emancipated the slaves, enlisted them, depleted the south's workforce
- Ulysses Grant took over plus 19 tons of quinine & 19 tons of cinchona bark
- Sick soldiers worse than dead ones!
- War ended in 1865 – 750,000 Americans dead!

Identification of the Pathogen

- In 1880s, Pasteur, Koch and Lister producing new ideas
- In 1877, Patrick Manson coupled mosquitoes with filariasis
- In 1880, Alphonse Laveran, identified Plasmodium in blood and suggested mosquitoes responsible
- In 1882, Albert Freeman Africanus King – ‘You can have mosquitoes without malaria ... but you can’t have malaria without mosquitoes.’
- In 1894, Ronald Ross, found that mosquitoes caused avian malaria
- In 1894, Giovanni Grassi showed that Anopheles spread human malaria
- In 1897, Robert Koch showed that quinine cleared human blood of malaria

Finally Some Control

- In 1904, William Gorgas and team cleared the Panama canal zone of yellow fever and malaria rate reduced to half that of US.
- Between WWs, global death rate sky-rocketed to 3.5 to 4 million
- In 1939, Paul Muller discovered DDT – killed everything
- Used by Americans in Pacific and Italian war theatres + *Atabrine* and *Chloroquine* - Drs Paul Russell and Seuss.
- In 1945, made available for farmers
- In 1955, WHO set up the Global Malarial Eradication Programme – DDT + *Chloroquine*
- Effective world wide

Whoops

- **Rachel Carson's "Silent Spring" in 1962 warned of the effect of widespread use of DDT**
- **Planet bathed in 1.8million tons of DDT**
- **Banned in 1972 by USA (it was useless by then anyway!)**
- **WHO abandoned their Malaria Eradication Programme in 1969 because of the resistance of Mosquitoes to insecticides and Plasmodium to drugs.**

Current Drug Treatment

- **Widespread resistance in the 1960s**
- **Project 523 (Tu Youyou and team) in China was looking at all sorts of old and new remedies**
- **2,200 years ago Chinese writings recommended a shrub *Artemisia annua* as treatment**
- **Artemisinin (1971) from this used by the Vietnamese during the war with USA**
- **WHO accepted it in 1980s but manufacture thwarted because US insisted on control and profits and China declined!**
- **Still a key drug used in triple therapy but very expensive.**
- **Interest waned with more exciting SARS, Ebola, Zika, West Nile, Covid**

Approaches

- **Children in high-risk areas sleep in insecticide treated nets → improved situation over last 2 decades with reduced or milder cases.**
- **Controlling water deposits**
- **CRSPR (clustered regularly interspaced short palindromic repeats) – ie. cut and paste of the genome**
 - **Sterile aggressive males to cause extinction**
 - **Or CRSPR the Anopheles to prevent malaria going through the salivary gland**
- **Vaccines – backed by Bill Gates, Warren Buffet, et al.**
 - **RTS,S from GlaxoSmithKline after 28 years → 39% protection (4.4% after 7 years)**
 - **R21 from AstraZenaca → 77% efficacy in a 2019 trial in Burkina Faso**

What effects has this history had on us?

- **Would we have been Mongol, Greek, Roman? Or even dinosaurs wandering around.**
- **There would not have been the transatlantic chattel slave trade without malaria and we have benefitted from the wealth created by it.**
- **In Africa and SE Asia colonisers have returned mainly tropical countries to their indigenous inhabitants**
- **The temperate colonies in America, Southern Africa, Australia and New Zealand made comfortable living for Europeans and they soon became the dominant population – return is impossible.**
- **We have to look at other ways of dealing with the history of colonisation.**

