

“BARBADOES LEG”: FILARIASIS IN BARBADOS, 1625–1900

by

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HUMAN SETTLEMENT FROM 1625

About the year 1625 the *Olive*, a ship returning to Britain from Pernambuco and driven by bad weather, arrived at Barbados. The island was found to be uninhabited, although the presence of fruits and hogs suggested earlier visits by other ships. The ground “they found by tryalls in several parts, to be so overgrown with Wood; as there could be found no Champions or *Savannahs* for men to dwell in”.¹ The crew of the *Olive* claimed the island for King James I by carving on a tree and setting up a cross. John Powell, the master, then reported this discovery to his wealthy employer Sir William Courteen. Sir William and others financed settlement on the island and the second expedition was successful when, on 17 February 1627, the ship *William and John*, captained by Henry Powell, landed 80 settlers on the island, including 10 Negro slaves captured from a prize taken during the sea voyage from England.²

The settlers made clearings and they named the settlement Jamestown. Most of the original forest remained untouched; “the place is a plaine ground, growne over with trees and undershrubs, without passage, except where the Planters have cleared”. Captain Henry Powell obtained crops from the Dutch in Guiana and persuaded about 40 Indians to return with him to Barbados. A further shipload of 90 immigrants had arrived with Captain John Powell from England in May 1627, and by 1629 there were between 1,600 and 1,800 people living in the settlement founded by Sir William Courteen. With the accession of Charles I, the lease of Barbados came into dispute and by 1630 clearing of the forest was not going well; “here a great timber tree half burned”. The Captains John and William Powell were in and out of captivity. Tobacco was the main cash crop and the years 1630–1 were known as “the Starving Time”,³ but by 1640 cotton equalled tobacco in importance as an export crop, and Britain tried to impose

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¹ R. Ligon, *A true and exact history of the Island of Barbados 1647–1650*, (1657), repr. *Caribbean Affairs*, 1950, no. 6.

² V. T. Harlow, *A History of Barbados, 1625–85*, Oxford, Clarendon Press, 1926. The quotations are from this or Ligon, op. cit., note 1 above; J. S. Handler, *The unappropriated people: freedmen in the slave society of Barbados*, Baltimore, Johns Hopkins University Press, 1974.

³ Harlow, op. cit., note 2 above, p. 9.

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controls on the export of these to the Dutch and other European countries. There were some 4,000 tenants, 2,000 servants and 20 slaves on the island in 1638. Slaves then cost more to import from Britain than indentured labour.⁴

At about this time, some of the tenants in Barbados learned from the Dutch in Brazil⁵ how to lay out sugar cane in shallow trenches. Sugar had been grown earlier but not as a cash crop and only to produce “fire water” or alcohol. “The Holland^{ers} furnished the island wth Negroes, Coppers, Stills, and all other things Appertaining to the Ingenious for making sugar”. Ligon in 1657⁶ published an account of sugar refining in Barbados, where he had lived between 1647 and 1650. He commented that potatoes, plantains, maize, and tobacco gave little or no return but that sugar cane, 3–4 years old, was then the principal plant. Cultivation on the island was still primitive. “Potatoes, Maize, and Bonavists planted between the boughes, the Trees lying upon the ground”. The new sugar production required a different treatment, larger acres of land, and a plentiful supply of labour.⁷ The industry of the yeoman farmer was no longer economic and during the latter half of the seventeenth century many left for other Caribbean islands, Surinam, or South Carolina. Labour for work in the sugar fields came from another source, with the importation from Africa of the Negro slaves. Some 500 slaves were brought in during 1640, and by 1645 the Barbadians “have brought this year no lesse than a thousand negroes, and the more they buie, the more they are able to buye, for in a yeare and a halfe they will earne with God’s blessing as much as the cost”. By the 1650s the plantation slave system was firmly established and the number of European tenants decreased from 8,300–11,200, in the mid 1640s, to 2,639 landowners in 1679.⁸

Slaves were imported at this time from “Guinny and Binny, some from Cutchew, some from Angola and some from the River of Gambia”. The map published by Ligon (plate 1) shows the extent of the deforestation that had taken place within twenty years of the first settlement. Some rebellious and runaway slaves were able to hide in ground still uncultivated. The Negro population in 1645 was given as 5,680 persons and this increased to some 20,000 in the 1650s, about the same as the number of Whites. By the 1660s the Negro population had doubled (table). Unrepentant Royalists were also shipped over from Britain during and after the Civil War, as servants in virtual slavery. Prisoners taken by the Commonwealth forces in the Scottish and Irish campaigns were also dumped in Barbados. Following the Restoration in 1660, numbers of Nonconformists, Quakers, and the survivors of the Monmouth Rising were exported to the island from Britain. In 1663, Lord Willoughby wrote to the French Governor of Martinique that Barbados was “finding itself overburdened with people”. In 1668 there were estimated 20,000 Whites and 40,000 Blacks on the 166 square miles of the island.⁹ Time-expired Whites were forced to move on or to return home but Negro slaves could not do this.

⁴ G. A. Puckrein, *Little England. Plantation society and Anglo-Barbadian politics, 1627–1700*, New York University Press, 1984, chapters 3 and 4.

⁵ C. R. Boxer, *The Dutch in Brazil, 1624–1654*, Oxford, Clarendon Press, 1957, p. 19.

⁶ Ligon, *op. cit.*, note 1 above.

⁷ Puckrein, *op. cit.*, note 4 above, described the transformation caused by the introduction of sugar.

⁸ Handler, *op. cit.*, note 2 above, pp. 7–8.

⁹ Harlow, *op. cit.*, note 2 above, provides a table of population (appendix B).

Table: NUMBERS OF PERSONS DESCRIBED AS WHITE AND NEGRO IN BARBADOS, 1627–1786

Years	Negro	White
1627–1629	10–50	1,400– 1,800
1643–1645	5,680–6,400	36,600–37,200
1655	20,000	23,000–25,000
1666–1671	40,000–50,000	20,000
1673–1680	32,473–38,352	21,309–21,725
1684–1748	46,400–47,132	15,192–23,624
1757–1786	52,953–76,275	16,139–18,419

Figures obtained from Curtin, *op. cit.*, note 10 below; Davies, *op. cit.*, note 12 below; Harlow, *op. cit.*, note 2 above; D. H. Makinson, *Barbados. A study of North-American–West-Indian relations, 1739–1789*, The Hague, Mouton, 1964, table 1; and Puckrein, *op. cit.*, note 4 above. Authors' differences for certain years are within the limits shown.

After the Restoration in England, there were also problems with the supply of slaves due to the conflict between the newly established British slave trading company and the Dutch, who held firmly the trade on the West African coast. Lord Willoughby, in 1667, petitioned the King to open free trade with Guinea “by wch the Inhabitants may bee as plentifully and at easy rates furnished as formerly. Soe excessive scarce and deare are they now here that the poore planters . . . will bee forced to goe to fforaigne plantations for a livelyhood”. The quality of some slave cargoes was poor and ships from Africa landing at Barbados contained “refuse cargoes” of exceptionally young or diseased Negroes: “How bad and useless the sorts that are bought”. The origins of the slaves imported by the Royal Africa Company in the years 1673–89 were much the same as those recorded earlier by Ligon: 12% from Senegambia and Sierra Leone, 27.3% from the Windward Coast (Ivory Coast and Liberia), 20.9% from the Gold Coast, 15.7% from Ardra and Whydah (Benin), 6.7% from Benin and Calabar (Nigeria), 12% from Angola, unknown origin 5.4%.¹⁰ Some were shipped even from Madagascar.¹¹

Mortality of slaves was high. Edward Lyttleton wrote in 1689 that the master of 100 slaves had to buy six new ones each year in order to maintain his stock.¹² Between 2,030 and 3,640 slaves, most aged between 15 and 45, were imported into Barbados each year between 1645 and 1766.¹³ Their expectation of life was low, some 17 years.¹⁴ There were two major epidemics on the island, in 1692 “a terrible contagion” and in 1694 “the plague”. During the early part of the eighteenth century, the slave population on the island remained between 46,400 and 47,132 and then increased to between 52,953 and 76,275 in the latter half of the century (table). By the late eighteenth century, the estimated loss of slaves per year had been reduced to one per cent.¹⁵

DISEASE TRANSMISSION

In 1726, Richard Towne, a local doctor in Barbados, published his treatise on the

¹⁰ P. Curtin, *The Atlantic slave trade: a census*, Madison, University of Wisconsin Press, 1969, is my main source for slave origins, and the numbers imported into the Caribbean islands.

¹¹ B. Lubbock, (transcriber), *Barlow's journal* . . . , London, Host and Blackett, 1934, p. 364, records a ship bound for Barbados from Madagascar in 1684.

¹² K. G. Davies, *The Royal African Company*, London, Longmans, 1957, p. 300; Puckrein, *op. cit.*, note 4 above, p. 161.

¹³ Curtin, *op. cit.*, note 10 above, table 13.

¹⁴ Davies, *op. cit.*, note 12 above.

¹⁵ W. Dickson, *Letters on slavery*, Connecticut, 1789, repr. Negro Universities Press, 1970, p. 107.

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diseases of the West Indies, especially Barbados,¹⁶ in which he mentioned “the Elephantiasis” as a disease of the Negroes, having “a great Affinity to the best Accounts we have of the Lepra of the Arabians”. It was “no rare thing to be met with among Negroes”; several persons had a history of infection for twenty years and white people in reduced circumstances could also have the disease. At this time there was considerable confusion between leprosy and filarial elephantiasis, the “lepra” and “elephantia” of Rhazes, which continued well into the nineteenth century.¹⁷ Yet, as can be seen from the first chapter of Benjamin Niesius’ inaugural medical disputation at the University of Strasbourg in 1673, most authors distinguished the “elephas” of the Greeks from the elephantiasis of the Arabs, which they associated with the Greek “lepra”.¹⁸ Towne may have been using the name of *Lepra arabum* in its strict meaning of “leprosy”. He described, however, the initial symptoms of filarial infection and the later swelling of the foot and leg. When William Hillary, a medical practitioner in Barbados from 1747 to 1758, published his *Observations on the changes of the air, and the concomitant epidemical diseases of the Island of Barbadoes*, he included a section on ‘The Elephantiasis’.¹⁹ He gave an account of the infection in man and wished that the Arabs had described the disease more fully. “However we are certain that the negroes first brought it from Africa to the West Indies, where it is now but too frequent among them, and among white people also, who are not exempted from it”. Transmission of the disease was clearly taking place. He makes the revealing observation that tertian and quartan fevers were very rarely seen (anopheline mosquitoes which transmit malaria were not found on Barbados until the 1920s) unless they came from islands which were “less cultivated and not yet cleared of Woods”. The deforestation of the island was thus almost complete. The Reverend Griffith Hughes, rector of St Lucy’s parish, recorded in 1750 that “The Elephantiasis is likewise a Disease very common among the Blacks and hitherto incurable . . .”.²⁰

Towne in 1726 mentioned elephantiasis as an imported curiosity which could infect Europeans; Hillary in 1759 devoted a complete section of his book to the disease; James Hendy, Physician to His Majesty’s Naval Hospital at Barbados and Physician General to the Militia of the island, wrote a whole book about it. His *Treatise on the glandular disease of Barbadoes, proving it to be seated in the lymphatic system* was published in London in 1784.²¹ In it, Towne is dismissed as superficial and erroneous,

¹⁶ R. Towne, *A treatise of the diseases most frequent in the West-Indies and herein more particularly of those which occur in Barbadoes*, London, J. Clarke, 1726.

¹⁷ See ‘On elephantiasis’, in vol. 2 (1846) of F. Adams, *The seven books of Paulus Aegineta translated from the Greek; with a commentary . . .*, 3 vols., London, Sydenham Society, 1844–7.

¹⁸ O. E. Denney, ‘Inaugural medical debate [sic] on elephantiasis or lepra arabum by Benjamin Niesius, University of Strassbourg, July, 1673’, trans. Benedict Stetter, *Ann. med. Hist.*, 1927, 9: 267–76. The argument and the distinction between the two terms was begun by N. Leonicensis in his *De epidemia quam morbum gallicum vocant*, Venice, Aldus, 1497, and the equation of Greek *elephantiasis* and *lepra arabum* was commonplace in the seventeenth century.

¹⁹ W. Hillary, *Observations on the changes of the air and the concomitant epidemical diseases in the Island of Barbadoes*, Philadelphia, B. & T. Kite, 1766, repr. 1811.

²⁰ G. Hughes, *The natural history of Barbados*, book 2, printed for the author, London, 1750, pp. 40–1.

²¹ J. Hendy, *Treatise on the glandular disease of Barbadoes, proving it to be seated in the lymphatic system*, London, C. Dilly, 1784.

but Hillary is much praised although “since the time of his *publication*, however, this *malady* has become very general . . .”. Hendy was very specific about the disease and gave a complete account of the clinical symptoms of filarial elephantiasis, relating 26 case histories. The *Treatise* is illustrated by woodcuts illustrating typical cases of elephantiasis, including an early dorsal oedema of the foot (plate 2). Hendy showed that the filarial fever associated with infection had nothing to do with intermittent fever (the name “ague” is still used by Barbadians for filarial fever).²² According to Hendy, the first white person to be affected in Barbados was Francis Briggs, a native of Ireland, who had elephantiasis for 20 years. “The *Glandular* disorder was unnoticed in the *Island* till about *eighty* years ago”: this statement takes clinical manifestations of the disease back to 1704. Hendy recognized that the same condition was called “St Thomas’s leg” in India²³ and that the condition was to be found also in Ceylon and Japan. His information came from Engelbert Kaempfer, who had described the *Andrum* or hydrocele and the *Perical* or elephantiasis found in Malabar in South India in a thesis presented to the University of Leiden in 1694.²⁴

Hendy noted that infection was more widespread amongst the Negroes but the wealthy inhabitants (the Europeans) “often carry their indiscretion so far, as to sleep with their windows open the whole night”. Those who drank strong liquor to excess were most subject to the disease, he thought, echoing a contemporary association with drinking palm wine in West Africa. (They no doubt slept outdoors at night.) He wondered about the reasons for the prevalence of the condition and supposed that the destruction of the woodland over the previous century had created an ideal climate for the propagation of the disease. He recommended a lace stocking as beneficial in reducing the swelling. Even today, bandaging is used to reduce the swelling in filarial elephantiasis.

Thereafter, “Barbadoes-” or “Barbados leg” became synonymous in the medical literature with Arabian or filarial elephantiasis,²⁵ and with “Cochin leg” which Hendy associated with the same condition.²⁶ It was nearly a century before Timothy Lewis described the adult filarial worms taken from a patient in Bengal²⁷ as *Filaria sanguinis hominis*, and Cobbold one month later in the same journal²⁸ described as *Filaria bancrofti* the adult female worm he had received from Joseph Bancroft in Australia. Manson in 1914 decided to use Cobbold’s name and the worm is now

²² P. E. C. Manson-Bahr and F. I. C. Apter, *Manson’s tropical diseases*, London, Baillière Tindall, 1982, p. 154.

²³ B. R. Laurence, ‘The curse of Saint Thomas’, *Med. Hist.*, 1970, 14: 352–63.

²⁴ J. Z. Bowers and R. W. Carruba, ‘The doctoral thesis of Engelbert Kaempfer on tropical diseases, oriental medicine, and exotic natural phenomena’, *J. Hist. Med.*, 1970, 25: 270–310. The Tamil word *perunkal*, or *perical* of Kaempfer, for elephantiasis is wrongly applied to Madura foot by these authors.

²⁵ R. Dundas, *Sketches of Brazil; including new views of tropical and European fever, with remarks on a premature decay of the system incident to Europeans on their return from hot climates*, London, John Churchill, 1852, refers to *elephantiasis arabum*, or the “Barbadoes leg”.

²⁶ R. B. Sheridan, *Doctors and slaves*, Cambridge University Press, 1985, p. 63, mentions that Hendy was criticized by Dr John Rollo, another medical officer from Barbados.

²⁷ T. Lewis, ‘*Filaria sanguinis hominis* (mature form) found in a blood-clot in naevoid elephantiasis of the scrotum’, *Lancet*, 1877, ii: 453–5.

²⁸ T. S. Cobbold, ‘On *Filaria bancrofti*’, *ibid.*, 495–6. Cobbold published the name but no description in a letter to the *Lancet* on 14 July 1877.

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known as *Wuchereria bancrofti*.²⁹ The adult filariae live in the lymphatic system and elephantiasis follows the release of antibodies in response to the presence of adult worms, with pathological changes resulting in a disturbance of the lymph flow after some 20 years of infection.

This disease of the lymphatic system or glandular disease of Hendy was shown by Patrick Manson in 1877 to be carried by mosquitoes.³⁰ When one of his students from the London School of Tropical Medicine, George Low, visited the island of Barbados at the turn of the twentieth century,³¹ there were no anopheline mosquitoes but myriads of the culicine mosquito *Culex fatigans* (*Culex quinquefasciatus* in modern terminology). These were breeding in tanks, barrels, and tubs kept for watering gardens in the larger houses and as water for domestic use around native huts. This mosquito also thrives in the polluted water found in septic tanks and drains; there was also pollution from the waste water produced by the sugar mills. In 1750, Griffith Hughes described “the Muschetto-fly” which made a noise with its wings.³² This exactly describes the biting attack of *Culex* mosquitoes at night in the tropics. *C. fatigans* today is the well-known vector of Bancroftian filariasis under urbanized conditions. The adult worm in the lymphatic system produces larvae called microfilariae which appear at night in the peripheral blood of infected persons and are then taken up in the blood meals of mosquitoes. In the mosquito, the microfilariae develop in the thoracic musculature to infective third-stage larvae that then migrate into the mosquitoes’ mouthparts. The larvae are transmitted when the mosquito comes to feed again on human blood. Over the developmental period, about ten days in the mosquito, mosquito mortality is high and few mosquitoes (about 10%) survive to be infective to man. In man, male and female worms have to meet to reproduce. Consequently, continual exposure to mosquitoes carrying infective filarial larvae is needed to establish the infection in man, and clinical symptoms of elephantiasis only appear after several years. Figures obtained in West Africa indicate that 100–500 infective bites a year, in a total of some 30,000 bites per year, will maintain Bancroftian filariasis in an endemic area³³ when anopheline mosquitoes are the vectors. Comparable or higher figures of biting rates have been found for *C. fatigans* vectors in South East Asia.³⁴

²⁹ P. Manson, *Tropical diseases*, London, Cassell, 1914. The problem of the correct nomenclature of the parasite was discussed by M. Sasa, *Human filariasis*, Baltimore, University Park Press, 1976, but is still unresolved by the International Commission on Zoological Nomenclature.

³⁰ P. Manson, ‘On the development of *Filaria sanguinis hominis* and on the mosquito considered as a nurse’, *J. Linn. Soc. Zool.*, 1878, 14: 304–11, gives greater detail of his first paper in *China Marit. Cust. Rep.*, 14th issue, 1877. Manson believed the infective mosquito died in drinking water used by man, who then became infected.

³¹ G. C. Low, ‘Malarial and filarial diseases in Barbados’, *Br. med. J.*, 1901, ii: 687–9.

³² Hughes, op. cit., note 20 above, book 3, p. 87.

³³ J. Brengues, ‘La filariose de Bancroft en Afrique de l’Ouest’, diss., University of Paris, 1973; H. J. Maasch, ‘Quantitative Untersuchungen zur Übertragung von *Wuchereria bancrofti* in der Küstenregion Liberias’, *Z. tropenmed. Parasit.*, 1973, 24: 419–34.

³⁴ N. G. Hairston and B. De Meillon, ‘On the inefficiency of transmission of *Wuchereria bancrofti* from mosquito to human host’, *Bull. Wld Hlth Org.*, 1968, 38: 935–41; D. J. Gubler and N. C. Bhattacharya, ‘A quantitative approach to the study of Bancroftian filariasis’, *Am. J. trop. Med. Hyg.*, 1974, 23: 1027–36.

ORIGINS OF THE DISEASE AND ITS EPIDEMIOLOGY IN BARBADOS

Within 70 years of the deliberate importation of slaves into Barbados, mostly from West Africa, the mosquito-borne filarial disease, affecting the lymphatic system and resulting in the clinical manifestations in man known as elephantiasis, was established on the island. In view of the number of slaves imported, some 2,000 per year, perhaps this is not surprising but the disease cannot be established by casual infection. Neither Europeans or Amerindians had met this disease before.³⁵ Bancroftian filariasis is not a universal infection in West and Central Africa, although some districts have many persons carrying microfilariae. Microfilarial infection rates in the Gambia can be as high as 40–50% of the population, in Sierra Leone 20%, in Liberia 16.7%, Ivory Coast 8%, Nigeria 4%, and at the mouth of the Congo River 17–19%.³⁶ These findings were made in the early twentieth century. Ogilby in 1670, in his description of Africa,³⁷ remarked on elephantiasis of the scrotum in the inhabitants of the Kingdom of Quioia (Sierra Leone and Liberia), and Winterbottom also found this condition on the coast there at a later date.³⁸ The condition of elephantiasis was well described by Francis Moore, Factor for the Royal African Company, in the Gambia in 1738, who drew attention to the age at which the deformity is formed.³⁹ Elephantiasis was also seen in West Africa by Mungo Park.⁴⁰ Deformed slaves should have been selected out at the port of embarkation although Houstou in 1725 mentioned that old and lame slaves were shipped “more fit for an Hospital than a Voyage”,⁴¹ so that they died away from the custody of the Agent on the West African coast. “Refuse cargoes” of slaves were sold in Barbados in the years when the supply of slaves was limited. Most carriers of microfilariae, however, would appear to be healthy and the microfilarial rate would have been highest in the most useful 20 to 40-year-old age group exported from Africa.⁴²

The adult worm is long-lived in man⁴³ and continues to produce microfilariae for several years. In Africa the main mosquito vectors of Bancroftian filariasis are *Anopheles gambiae* and *An. funestus*, the common domestic man-biting species which also transmit human malaria. These did not exist on Barbados. Hillary observed that “intermitting fevers, especially Tertian and Quartans, are very rarely or never seen in this Island now, unless they are brought hither from some of the Leeward Islands or some other places . . .”. Had anopheline mosquitoes been present then, malaria would surely have been transmitted. Low found no anopheline mosquitoes on the island, but

³⁵ P. M. Ashburn, *The ranks of death. A medical history of the conquest of America*, New York, Coward-McCann, 1947, p. 173–4.

³⁶ F. Hawking, ‘The distribution of bancroftian filariasis in Africa’, *Bull. Wld Hlth Org.*, 1957, 16: 581–92.

³⁷ J. Ogilby, *Africa: being an accurate description of the regions of Aegypt, Barbary, Lybia, and Billedulgeid, the land of Negroes, Guinee, Aethiopia, and the Abyssines . . .*, London, Tho. Johnson, 1670, p. 394.

³⁸ T. Winterbottom, *An account of native Africans in the neighbourhood of Sierra Leone to which is added an account of the present state of medicine among them*, London, F. Cass, 1803, repr. 1969, p. 110.

³⁹ F. Moore, *Travels into the inland parts of Africa . . .*, London, E. Cave, 1738, p. 130.

⁴⁰ M. Park, *Travels in the interior districts of Africa: performed under the direction and patronage of the African Association in the years 1795, 1796, and 1797*, London, W. Buhner, 1799, p. 275.

⁴¹ J. Houstou, *Some new and accurate observations of the coast of Guinea*, London, J. Peele, 1725, p. 28.

⁴² Manson-Bahr and Apted, *op. cit.*, note 22 above, p. 150.

⁴³ P. Guptavanig and C. Harinasuta, ‘Spontaneous disappearance of microfilaria *Brugia malayi* and *Wuchereria bancrofti* living in non-endemic area’, *S. E. Asian J. trop. Med. Hyg.*, 1971, 2: 578; R. H. Webber, ‘Theoretical considerations in the vector control of filariasis’, *ibid.*, 1976, 6: 544–8.

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instead an abundance of the man-biting *Culex* in which the worm developed. He found 23 infected mosquitoes in a sample of 100 that he dissected and one of these contained mature third-stage infective larvae.⁴⁴ Since in Africa the filarial worm does not develop well in *Culex fatigans*,⁴⁵ the parasite must have adapted to the new *Culex* mosquito host it encountered after the migration of its human host from Africa to Barbados. The adaptations of filarial worms to their mosquito hosts are very specific associations,⁴⁶ although it has been shown in the laboratory that selection to a new mosquito host can take place after passing the parasite through the new vector for four generations of filarial worm.⁴⁷ Only pre-adapted microfilariae survive during this process. Such a selection must have taken place when the parasite arrived in Barbados.

The domestic *Culex* could also have been introduced to Barbados by sailing ship, perhaps even from West Africa. Mosquitoes could survive in the water casks aboard eighteenth-century ships,⁴⁸ and there is even a record of a ship's captain in the Pacific deliberately leaving ashore a water cask containing mosquito larvae,⁴⁹ in retaliation for presumed bad treatment. The human inhabitants of Barbados provided abundant breeding places for this mosquito, as Low discovered two centuries later. The need for water storage, the less than adequate sanitation on the island in the seventeenth and eighteenth centuries, with the highest density of human population in the Caribbean,⁵⁰ and the additional pollution from the sugar mills, would have provided ideal breeding sites for this species of mosquito. *C. fatigans* can breed in water grossly polluted by man, and this is one of the reasons why this mosquito is such an important urban vector of the filarial parasite *Wuchereria bancrofti* today. The deforestation of Barbados, which opened up the island to dense human settlement, also played its part. When, in 1854, Duchassaing tried to make sense of the epidemiology of elephantiasis in the Americas, he noted the dryness of Barbados compared to the forested island of Guadeloupe. He supposed that the use of rainwater or stagnant water predisposed to infection,⁵¹ since he found the crustacea *Cyclops* and *Cypris* as well as confervae in the water, but no mosquito larvae!

⁴⁴ Low, op. cit., note 31 above.

⁴⁵ B. Juminer, P. Camerlynch, and S. Diallo, 'Evolution complète des stades larvaires de *Wuchereria bancrofti* (Cobbold, 1877) chez une souche dakarose de *Culex (C.) pipiens fatigans*, Wiedemann, 1828', *Arch. Inst. Pasteur Tunis*, 1968, 45: 441–7; H. M. Gelfand, 'Studies on the vectors of *Wuchereria bancrofti* in Liberia', *Am. J. trop. Med. Hyg.*, 1955, 4: 52–60; Maasch, op. cit., note 33 above; E. Zielke and F. Kuhlow, 'On the inheritance of susceptibility for infection with *Wuchereria bancrofti* in *Culex pipiens fatigans*', *Tropenmed. Parasit.*, 1977, 28: 68–70.

⁴⁶ Sasa, op. cit., note 29 above.

⁴⁷ B. R. Laurence and F. R. N. Pester, 'Adaptation of a filarial worm, *Brugia pateri*, to a new mosquito host, *Aedes togoi*', *J. Helminth.*, 1967, 41: 365–92.

⁴⁸ J. D. Hooker, (ed.), *Journal of the Right Hon. Sir Joseph Banks Bart., K.B., P.R.S.*, London, Macmillan, 1896, p. 417.

⁴⁹ H. Melville, *Omoo. A narrative of adventures in the South Seas*, (1847), Evanston and Chicago, Northwestern University Press and The Newberry Library, 1968, p. 215.

⁵⁰ A. Burns, *History of the British West Indies*, London, Allen & Unwin, 1954, gives the populations and areas of the Caribbean islands.

⁵¹ P. Duchassaing, 'Études sur l'elephantiasis des arabes et sur la spiloplaxie', *Arch. gen. Med.*, 1854, 4: 412–29.

Barbados could have become the centre from which Bancroftian filariasis was spread to other islands in the Caribbean, to Surinam and Guiana, and to South Carolina,⁵² all of whom received immigrants from Barbados during the seventeenth century. Jamaica escaped, although odd cases of elephantiasis were found there.⁵³ There was, however, an abundance of flowing water from the mountains in Jamaica, and the main town Port Royal was liable to hurricanes, earthquakes, and flooding from the sea. Thus Jamaica was not such an ideal habitat for man-biting *Culex*. Sir Hans Sloane found a conspicuously banded mosquito there,⁵⁴ which was possibly *Aedes* or *Anopheles*, but does not appear to have been *Culex fatigans*. Bancroftian filariasis is a disease difficult to establish in the human body, due to the bisexual nature of the parasite and to the hazard of transmission by its mosquito host. The combination of continual immigration of infected human hosts into Barbados from Africa plus an abundance of eventually susceptible *Culex* mosquitoes breeding in the static water supply of a crowded human population provided the environment for the transmission of Bancroftian filariasis on the island; and this manifested itself as elephantiasis, or Barbadoes leg, within some 70–80 years of the initial human settlement in 1627.

⁵² T. L. Savitt, 'Filariasis in the United States', *J. Hist. Med.*, 1977, 32: 140–50.

⁵³ Sheridan, *op. cit.*, note 26 above, p. 92.

⁵⁴ H. Sloane, *A voyage to the Islands Madera, Barbados, Nieves, S. Christophers and Jamaica . . .*, London, printed for the author, 1725, vol. 2, p. 225.



Reproduced from Richard Ligon, *A true and exact history of the Island of Barbadoes*, London, 1657

Plate 1. Map of Barbados, from Ligon's *True and exact history of the Island*, (1657).

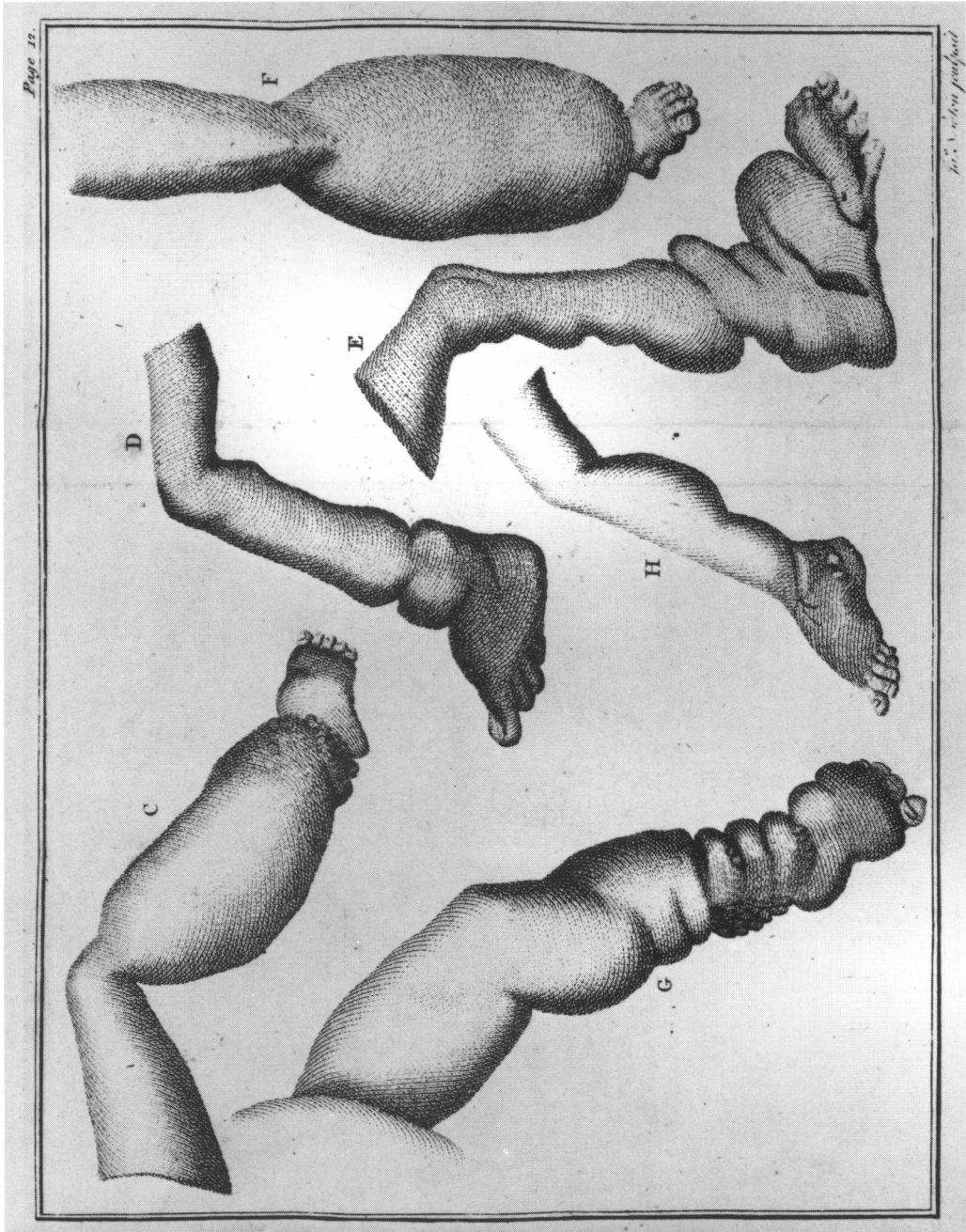


Plate 2. Illustrations of elephantoid legs from Hendy's *Treatise on the glandular disease of Barbadoes* (1784). Note the early swelling of the foot depicted at "H". (Photo: The Wellcome Institute Library, London).