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Race, War and Tropical Medicine in the Eighteenth-Century Caribbean

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In this essay we look at a group of physicians whose approach to disease reflects something of the evolution of tropical medicine in the Americas over the course of several important decades of their history. The group was composed of British physicians in eighteenth- and nineteenth-century West Indies. Some of them were identified with the treatment of British slaves, others with tending British troops; a few undertook both. But all practised under the shadow of war. And although all practised at a time when medicine was moving towards the concept of disease specificity, their writings more often than not reveal a comfortably speculative nature which disdained experimentation. Nonetheless, notions of disease specificity on the one hand, and a wartime demand for immediacy on the other, combined to provide them with some important insights on tropical diseases – and most especially insights in their observations regarding the differential treatment meted out by these tropical killers to whites and blacks.

Disease in the Eighteenth-Century Caribbean

English physicians reaching the West Indies during the eighteenth century could scarcely have been less prepared for what they were about to face. Acclimatized to a temperate island, they were now on tropical islands; accustomed to combating European illnesses, they faced an unknown enemy in African diseases; the familiar faces of white patients were frequently replaced by the darker, exotic countenances of black patients; the complaints of civilians gave way to those of soldiers and sailors; and peacetime practice in England bore little resemblance to the chaotic conditions produced by near-continual warfare in the island colonies.

Moreover, their training, even at best, was woefully inadequate. In part, of course, this was because the state of medical knowledge in general was woefully inadequate – propelling physicians to do, even when they did not know what they were doing. But in part, too, that training provided physicians with preconceptions which frequently blinded them to epidemiological, aetiological, not to mention therapeutic, truths that seem so obvious from the vantage point of the late twentieth century.

And, finally, they were confronted with a rapidly changing pool of pathogens wrought by an ever-accelerating slave trade which was 'Africanizing' the disease environment of the Caribbean under their very noses. The few doctors who left books behind at the beginning of the eighteenth century wrote that the Caribbean disease environment was more or less the same as that of England, perhaps even more salubrious. Thomas Trapham, for example, who practised in Jamaica during the last decades of the seventeenth as well as the beginning of the eighteenth century, could write in his *Discourse of the State of Health in the Island of Jamaica* (1679) that he found that island with even fewer maladies than in England. Similarly, Hans Sloane, a protégé of Thomas Sydenham made the claim, based on his experience in Jamaica during the last years of the seventeenth century, that, save for one or two ailments, he had never encountered an illness there that he had not seen in Europe.¹

Yet, a few decades later, when William Hillary published the first edition of his *Observations on the Changes of the Air, and the Concomitant Epidemical Diseases of Barbados* (1759), he wrote that the diseases he had observed in Barbados were illnesses peculiar to the West Indies and not ones that were normally found in Europe.² One of these diseases, he explained, invariably struck 'strangers', especially those that labour outdoors or 'expose themselves too suddenly to the cool Dews and Damp air of the Night....' The disease was yellow fever, spread by the female *Aedes aegypti* mosquito which frequently feeds at night. It had devastated Barbados when it first struck in 1647, killing some 6,000 whites; and, again, at the end of the century when it reportedly killed half of the white population. During Hillary's stay on the island the disease apparently smouldered among the new-born whites and the slaves who were resistant to the worst of its ravages, although it did flare up from time to time among newcomers, especially seamen.³

An account of another disease to which Hillary gave considerable attention is found in his section on 'The Elephantiasis', which describes filariasis – the infamous 'Barbados leg', also mosquito-borne.

Interestingly, he also noted that Barbados was free of the 'intermitting fevers' which plagued other islands. And he was correct that there was no malaria on Barbados – which has been variously attributed to porous soils, deforestation, and larva-destroying fish that prevented the anopheline mosquito from establishing residence there. We say 'interestingly', because although the anopheles mosquito is the usual vector of filariasis, on Barbados the disease managed to adapt to a new carrier, the culex mosquito. Medical observations from Barbados characterized the disease as one largely of blacks, yet one that was infecting more and more whites.⁴

But, if there was no malaria in Barbados, this was most certainly not the case in most other British West Indies islands – and especially in Jamaica. In the second edition of his *An Essay on Fevers* (1750), John Huxham explained that the most frequent cause of widespread fevers in the islands was 'a moist, foggy, atmosphere exhaling from a swampy, morass soil....' Charles Bisset, writing at about the same time, viewed with suspicion a 'nocturnal land-breeze [which as opposed to the daytime trade-wind] comes cool from the woods and high inland; and is fraught with dense vapours, and other unwholesome effluvia....'⁵

Certainly British physicians were not unfamiliar with the fevers of malaria, an illness that seems to have peaked in its distribution throughout Europe in the sixteenth century. But this was vivax malaria which made one burn and shake and sweat, but seldom killed (although the ghosts of James I and Oliver Cromwell might want to dispute this point). But these men were among the very small minority which vivax malaria customarily claims, whereas the new malaria physicians faced in the Caribbean – falciparum malaria – produced far more virulent symptoms and generated mortality rates many times greater than those of the other malaria types.⁶

It was doubtless the distinctive and dramatic indications of frank cases of yellow fever, falciparum malaria and filariasis, along with the spectacular, if less life-threatening, symptoms of diseases such as yaws, Guinea-worm infection and scabies that prompted Hillary and others to insist that the disease environment of the Caribbean was substantially different from that of Europe. Yet, although these African diseases were delivered to the West Indies in the same vessels that had transported African slaves to the region since 1518, they hardly settled into the region overnight. Rather, they required time to establish themselves, growing human populations to host them, and pathogenic reinforcement from Africa. It was only over the course of the eighteenth century that these requirements were met,

as the West Indies, gripped by the 'sugar revolution', imported hundreds of thousands of slaves and generated incredible wealth for their mother countries. In so doing, they became prey, prizes and pawns in imperial struggles that drew huge numbers of European soldiers and sailors into their vortices.⁷

As late as 1700, Jamaica and Barbados had only imported about 220,000 slaves, with tiny Barbados accounting for over 60 per cent of these. Indeed, 50 years earlier, Barbados was the only English island importing slaves, and it was there, where the still mostly white population had achieved a density of some 200 per square mile, that yellow fever made its first known epidemic appearance in the Western Hemisphere. No wonder, then, that Hillary, in Barbados, viewing this disease, was the first to report a significantly different disease environment in the West Indies from that of Europe.⁸

As the eighteenth century progressed, however, Barbados fell progressively behind Jamaica as a sugar producer and, consequently, as a slave importer. Between 1700 and 1810 the two islands imported close to a million slaves with Jamaica absorbing over two-thirds of them. By 1770 over 70 per cent of Jamaican slaves were African-born, and as late as 1817, a decade after the slave trade had formally ended, fully 37 per cent of the black population was still of African, rather than American, birth. And as this flood of involuntary immigrants reached Jamaica over the course of the century, so, too, did a flood of African pathogens – especially as the British did not bother with quarantine procedures as did their Spanish neighbours.⁹

War and Fevers

In view of this, it is not surprising that as the eighteenth century wore on, there was no Trapham or Sloane to any longer insist that Jamaica's disease environment resembled that of Europe. On the other hand and interestingly, James Lind, a naval surgeon stationed in the West Indies during the Seven Years' War, found the disease environment of Barbados, with its diminishing contact with Africa, to be benign. But, he cautioned, this was not the case with the other sugar islands, especially Jamaica, where yellow fever was particularly destructive of white lives.¹⁰

Yellow fever had slaughtered the bulk of Admiral Vernon's force sent against Cartagena in 1741, and then, in that same year, halved another British force that launched an equally unsuccessful attempt to take Santiago de Cuba. Two decades later yellow fever and, perhaps, malaria considerably soured Britain's success in capturing Havana as the invaders lost 40 per cent of their troops in that summer of 1762.

Lind, who had been a part of the expedition, complained that of 100 men he had landed against Cuba, two-thirds had been lost to disease, and of 17 battalions committed to the fray in its aftermath, the British could not 'muster 600 men fit for duty – they died chiefly of *fevers and fluxes*' (his italics).¹¹

This lament of Lind found its way into an account penned in 1781 by another physician, Thomas Dancer, entitled *A Brief History of the Late Expedition against Fort San Juan* and was intended as a footnote to Great Britain's then current military difficulties with the French and the Spanish in the West Indies. The disgruntled Dancer had just returned from a secret expedition sent against the Spanish Main – one that was almost totally wiped out by fevers that seem to have been yellow fever and malaria working in tandem.¹²

Shortly after Dancer's book was published, British Army surgeon John Hunter reported that as of 1782 although 'upwards of 7,000 men had been sent there [to Jamaica] during the three preceding years there were not above 2,000 men fit for duty'. He pointed out that the average annual troop mortality rate was about 25 per cent, none of it 'at enemy hands', fretted that there had not been a 'sufficient interval' of time to let London know how weak the Jamaican Command had become, and was concerned that all the dying from disease was dangerous to the war effort.¹³ It had become axiomatic in Caribbean warfare that delay in an attack would prove fatal and that if defenders could hold out for six weeks, disease would drive off, or finish off, the besiegers. But, as Hunter made clear, fresh troops from Europe were being annihilated at such a rate that they could not even be effective as defenders. The problem was, of course, that the Spanish defenders were most likely Creole-born and, thus, had already earned their immunities against yellow fever. British troops, by contrast, had had no such opportunity prior to reaching the West Indies with the cost a horrendous one in lives lost.¹⁴

In 1794 Dr Colin Chisholm published an essay on the 'History of an Uncommon Epidemic Fever observed in the Island of Grenada' which had flared up in the Caribbean the previous year. The disease, which was yellow fever, was scarcely uncommon. But the essay was, for although physicians had long suspected that yellow fever came from Africa, Chisholm managed to trace it aboard ship from the West Coast of Africa all the way to the Caribbean.¹⁵ Unfortunately, the real identity of the disease – soon unleashed on the whole of the West Indies – and knowledge of its African origin were lost as Great Britain went back to war against France and Spain and, in 1793, occupied most of St Domingue. The following year

brought more success with the capture of Martinique, Guadeloupe, and St Lucia. For the moment, at least, practically all of the French West Indies empire was in British hands. But the moment was to be brief indeed, for yellow fever had become an unwanted companion of the English troops from the outset, travelling with them from Grenada to Jamaica to St Domingue, and fanning out to infect British soldiers and sailors in the French Leewards and Windwards as well.¹⁶

By the end of 1795, British troops in the West Indies were dying from disease faster than they could be replaced. In St Domingue, initial losses were between 10,000 and 12,500 men, and by the time the expeditionary forces were withdrawn, some 45,000 to 50,000 men had been lost – mostly to disease. The French had managed to regain control of all their West Indies possessions, save for St Domingue, from the weakened British whose losses among the various West Indies Commands totalled another 30,000 to 35,000, with disease lingering to crush any hopes of reversing these defeats for the British. Indeed, between 1793 and 1796 the British lost 80,000 men in the Caribbean with over half of these to yellow fever. In the latter year Thomas Trotter, author of the three-volume *Medicina Nautica: An Essay on the Diseases of Seamen*, wrote bleakly that yellow fever was so bad that any further campaign in the West Indies 'is now considered as little better than a forlorn hope'.¹⁷

Shortly after, William Lempriere in his *Practical Observations on the Diseases of the Army in Jamaica, as they Occurred between the Years 1792 and 1797* (1799) expressed misgivings, doubtless held by others of his colleagues, regarding the worth of the Caribbean islands, when he wrote of the 'dreadful mortality' suffered by British troops 'since Great Britain has been in possession of West India Colonies'.¹⁸ But, despite such ominous depictions of the fate awaiting the uninitiated at the hands of Caribbean fevers, in 1802 the French, whether out of arrogance or ignorance, launched their own invasion of St Domingue in an attempt to regain (or retain) the black colony for the empire. Francisco Guerra reports that the pages of the *Histoire médicale de l'armée française à Saint Domingue*, written by the chief medical officer, Nicolas Pierre Gilbert in 1803, indicate no knowledge among the French medical corps of 'the sombre lesson learned by the British'.¹⁹

It was a costly blunder, for although the French landing force of 25,000 men met with initial success, it then encountered yellow fever, as did each contingent of 3,500 fresh troops that arrived from France regularly each month. Within ten months of landing, the French troops under the command of Napoleon's brother-in-law

had seen their ranks pruned by some 40,000, including 1,500 officers – and Napoleon's brother-in-law.²⁰ By the time of the final surrender of the French the toll has been placed as high as 63,000 Frenchmen, which may be excessive. On the other hand, at that point there were only 8,000 left of the entire expeditionary force, and virtually none of the 25,000 who constituted the original landing force survived. No wonder that scholars have given yellow fever considerable credit for the emergence of independent Haiti.²¹

Black Fever Resistance

Clearly, then, the French failed to learn from the disasters that tropical fevers had rained upon the British. But the British themselves had already begun to learn from their own misfortune, thanks to those physicians to whose reports we have been referring. This is because the physicians in question did not simply take note of the carnage wrought by fevers among Europeans – they also commented on the dramatic resistance black people seemed able to mount against these same fevers.

It was doubtless the differential treatment meted out by yellow fever that elicited most of that comment. Yet because tropical fevers constituted a bundle not easily untangled, it is not always possible to know whether it was malaria or yellow fever that the physicians were observing. Robert Jackson, for example, wrote at length of single tertian fevers and double tertian fevers as if they were variations of yellow fever. Hunter thought that black vomit (sometimes the result of internal haemorrhage in yellow fever) was a symptom of remitting fever (probably malaria). But this was a disease that others called 'ardent bilious fever' (probably yellow fever).²² In light of modern immunological findings it is easy enough to understand why an observer in Cuba, at about the mid-point of the nineteenth century, when malaria and yellow fever were more readily separated, could write of the black man that 'there is unquestionably something in his constitution or organic frame a something, we know not what, an influence or power of resistance which makes him proof against malaria, and the destructive fevers resulting from what we call malaria when acting on white men'.²³

The 'power of resistance', we now know, lies in blood anomalies which discourage the proliferation of the various protozoa of the malaria types. Such anomalies were vital to survival in Africa, which appears to have been the cradle of the disease. A blood enzyme deficiency, carried by almost all blacks whose ancestry lies south of the Sahara, provides near absolute protection against vivax malaria;

whereas a variety of anomalies ranging from sickle trait to G6PD deficiency, to a generalized sort of anaemia, affords resistance to the more deadly falciparum malaria. In addition, blacks also doubtless acquired resistance to falciparum malaria in the same manner as others do – by hosting the disease – and surviving it. Unfortunately, however, it requires repeated bouts with a specific strain of the disease just to earn immunity against that strain, which explains why so many whites in the West Indies – with no innate protection – faltered in such an effort.²⁴

Unlike malaria, just one encounter with yellow fever provides a lifetime of immunity against repeating the performance and doubtless many, perhaps most slaves, reaching the Americas had already hosted the disease in their (and yellow fever's) homeland. And if not, as permanent residents of the West Indies, blacks also had much exposure to yellow fever, and many of the creole-born must have experienced the mild cases which that disease tends to confer on the young – mild, but still good for perpetual protection. In addition, however, those of African ancestry in the Americas also seem to have been blessed with some sort of innate ability to dodge the worst of yellow fever's ravages, even in those instances when they were clearly bereft of acquired resistance. This was the case early on in Havana in 1649, when creole-born blacks, long removed from Africa, seemed almost impervious to the island's first outbreak of yellow fever – an imperviousness not shared by the whites. It was also the case late in yellow fever's epidemic career in the Americas when in 1878 yellow fever ascended the Mississippi River to fall on a population of whites and blacks previously out of yellow fever's range. Few would have had prior opportunities for acquiring immunities, yet the differential morbidity and mortality data generated by the disease demonstrated in resounding fashion that the blacks had some sort of powerful guardian against yellow fever that the whites did not.²⁵

No wonder, then, that European troops, with no innate protection against malaria and yellow fever, and no opportunity for acquiring resistance prior to reaching the Caribbean, died there in a veritable holocaust of fevers. No wonder, too, that blacks, armed with both genetic and acquired resistance, survived that holocaust. And no wonder that the phenomenon did not escape the notice of British physicians. When army physician Robert Jackson noted that 'it has never been observed that a Negroe [sic] immediately from the Coast of Africa, has been attacked with this disease' (yellow fever), the reason was, no doubt, that most arriving directly from Africa had already hosted the disease. But, when Dancer wrote of the mostly creole-born

black volunteers of those with 'an admixture of Negro blood' who had survived the fevers that had wiped out most of the before-mentioned expedition to Nicaragua, he seems to have been witnessing, at least in part, the blacks' ability to experience mild cases of yellow fever while whites around them died in droves. In addition, he was probably viewing a demonstration of the efficacy of genetic protection against falciparum malaria.²⁶

The observations of military physicians were confirmed by doctors concerned with the health of slaves in the West Indies. George Pinckard, author of *Notes on the West Indies, including Observations relative to the Creoles and Slaves*, first published in 1806, assured his readers that 'Negroes are not subject to this [yellow] fever; when it invades them it appears as a remittent or intermittent type'. One is tempted to speculate that, like Dancer, Pinckard had also observed the blacks' ability to tolerate yellow fever when they did acquire the disease.²⁷ Shortly after Pinckard wrote, Dr Robert Collins penned his well-known *Practical Rules for the Management of Negro Slaves, in the Sugar Colonies* (1811). In writing of the 'putrid fevers' (yellow fever) he said that 'the reason why Negroes escape their fury, in the worst seasons, and most unhealthy situations, while whites die in great numbers, is a problem which no person has hitherto attempted to solve....' He reminded his readers that the phenomenon was not limited to the West Indies but had also been observed in New York and Philadelphia and proposed his own solution. The problem was fear. In essence, whites had the good sense to be afraid of the disease which blacks did not, and it was this 'insensibility' that saved the latter.²⁸

Although Collins hardly carved out a place for himself in medical history with his theory, there is no question that fear of disease and death haunted the world of the Europeans in the West Indies. According to an early nineteenth-century observer, James Stephen, whites were 'seized with terror' whenever they were 'seized with fever' and slaves believed, like Collins, that 'fear kills Bawkra'. Hector McLean, who wrote *An Inquiry into the Nature and Causes of the Great Mortality among the Troops at St Domingo*, reported that disease and the enormous amount of dying that had taken place there had 'filled the minds of every one with terror...' News of the death of loved ones and acquaintances alike permeated diary entries, and the behaviour of planters was certainly conditioned by the threat of death – a threat heeded by those that could afford it – with notorious absenteeism of Jamaican planters the result.²⁹

The Formation of Black Regiments

But even as the physicians were indicating fear as the root cause of yellow-fever mortality, and even though they remained uncertain of the respective identities of yellow fever and malaria, and even if their cures were likely to put them in league with the disease in killing the patient, they were also saving lives – thousands in fact. For it was their observations on the different manner in which tropical fevers treated blacks and whites that prompted Great Britain to begin a policy of substituting black troops for white troops in the West Indies – a policy that put black disease resistance to work for the empire.³⁰

This is not to say that the concept of employing black troops was a new one. Slaves had been hurriedly enlisted for island defence on numerous occasions over the centuries during the many-sided and lengthy Caribbean conflicts between the Spanish, Dutch, French and English. Indeed, in the case of the Spanish, a large percentage of whites in the population of Cuba made it possible to arm a considerable number of blacks at various times and still leave them a relatively small minority. But the British, themselves a small minority in their West Indies islands, were hardly enthusiastic about arming slaves that hitherto had been prohibited by law from possessing any weapon at all.³¹ On the other hand, English troops to protect those islands were in increasingly short supply. Factories lured many young men away from military service as the Industrial Revolution got underway. So, too, did the metropolitan militia. Moreover, England's armed forces had expanded considerably over the past half-century of warfare so that there were more choices within the services. And given a choice, few were likely to opt for service in the West Indies which, given the disease environment, was regarded as tantamount to a sentence of death. Clearly, the use of slaves who could survive in that environment as soldiers would spare the lives of many white troops.³²

Some experiments along these lines had already been set in motion. Following the fall of Savanna to the British in 1779, black slaves in the area had been recruited into the newly formed 'Black Carolina Corps' which, following the war, had been relocated in Jamaica. Those who chose to remain as soldiers were shipped off to the Windwards and Leewards to become a legitimate part of the British military. In addition, as already mentioned, other blacks (those with an 'admixture of Negro blood') accompanied the mostly white Jamaican volunteers against Nicaragua in 1780. Disease destroyed the effort, but Dancer and others made the point that the mulattoes had fared far better with disease than the whites. And

then, in 1782, Barbados, where it had been the custom to use free blacks in the militia, formed the 'Prince of Wales Corps' of free mulattoes to shore up the island's defences.³³

Fortunately for the whites, such experiments proved successful in that the armed blacks and mulattoes did not use those arms against them – and army physicians stepped up their campaign to make the use of black troops in the islands a matter of policy to ease the 'terrible mortality of white troops'.³⁴ The campaign bore fruit in 1795, amid chaotic circumstances. On the one hand, Great Britain, the steady enemy of France and alarmed by French successes, felt the need to ready more troops for potential employment in Europe. On the other hand, abolition of slavery in the French West Indian islands, along with French agitation and military assistance, had triggered rebellion in some of the British islands; and all of the British triumphs of 1793 were in jeopardy as white troops were caught up in the hurricane of the prevailing yellow-fever epidemic. The result was a request from London that colonial legislatures form black regiments.³⁵ For many of the planters such an order at first seemed little short of madness. Great Britain might be worried about the French revolution on the continent, but the British colonials lived in terror of its local manifestation in the slave revolution on St Domingue which they feared would spread throughout the Caribbean.³⁶

Yet there was another side to the coin. If the St Domingue slave revolt was menacing, it was also promising in that it was destroying Jamaica's most formidable competitor – a competitor which, prior to the revolution, had been exporting almost as much sugar as all the British islands combined. The British islands could profit immensely from the French misfortune, if only they be protected from the French. Since white troops were scarce and, most likely, would succumb to disease anyway, what choice was there but to employ black troops?³⁷

Out of much wrangling and debate and with many misgivings came the formation of 12 West India regiments of black troops with the first formed in 1795, in part with survivors of the old black Carolina Corps. The others, which were to be formed as the need arose, followed fairly quickly. And with the continued presence of yellow fever there was no lack of need. The colonials continued to fume about blacks with arms and, accordingly, clashed with London about matters ranging from their recruitment, to their literacy, to their sex lives. However, they benefited greatly from the role played by the 'blackshot' Regiment in ending the 'Maroon War' in Jamaica

and were forced to acknowledge that white soldiers, especially those fresh from Europe, 'sickened and died' in the West Indies while black troops did not.³⁸

Such impressionistic evidence, however, was not confirmed statistically until 1838 when the fullness of the wisdom of those physicians, who had observed the Africans' ability to resist tropical fevers, and had recommended the employment of black troops became starkly apparent. It was the year that Army Major Alexander Tulloch published the results of his study of British troop mortality during the years 1817 to 1836. The years in question had been years of peace in the Caribbean, which meant less in the way of troop movement from one place to another where still more troops were congregating – which, in turn, meant much less exposure to yellow fever. Nonetheless, the data revealed that whites within the Jamaican command had suffered an average annual death rate during these years of 121 per thousand mean strength – data, which when adjusted for 'certain omissions', rose as high as 143. By contrast, black troops had died at a rate of only 30 per thousand mean strength. The reason for this remarkable difference was largely the impact of 'fevers' which had killed whites at the rate of 102 per thousand mean strength, but blacks at the rate of only 8 per thousand.³⁹

In the Bahamas, which had experienced more in the way of yellow fever during these years, the white death rate was 200 per thousand, the black rate 41 per thousand with 'fever' the cause of 80 per cent of the white deaths. In the Windward and Leeward islands, which had witnessed substantially less yellow fever, the white annual mortality rate was 93.5 per thousand mean strength, while the black rate was again about 40 per thousand indicating how little the presence or absence of yellow fever affected black mortality rates. Clearly the tropical physicians had saved thousands of white lives by spying the blacks' ability to escape fevers.⁴⁰

Notes

1. Trapham and Sloan discussed by and quoted in Richard B. Sheridan, *Doctors and Slaves: A Medical and Demographic History of Slavery in the British West Indies, 1680–1834* (Cambridge: Cambridge University Press, 1985), 19.
2. Hillary quoted in *Ibid.*, 24.
3. William Hillary, *Observations on the Changes of the Air and the Concomitant Epidemical Diseases in the Island of Barbados* (London: 1759; Philadelphia: 1811 edn), 145–6; G. M. Findlay, 'The first recognized epidemic of yellow fever', *Transactions of the Royal Society of Tropical Medicine and Hygiene*, xxxv (1941), 145–6; Robert H.

- Schomburgk, *The History of Barbados* (London: 1848), 80, 83, 304–5.
4. Hillary, *op. cit.* (note 3), 125; George P. Paul, *Report on Ankylostomiasis Infection Survey of Barbados: September 4 to November 16, 1916* (New York: 1917); Harry H. Johnston, *The Negro in the New World* (London: 1910), 212; Richard S. Dunn, *Sugar and Slaves: The Rise of the Planter Class in the English West Indies, 1624–1713* (Chapel Hill: 1972), 303; M. J. Ashcroft, 'A history and general survey of the helminth and protozoal infection of the West Indies', *Annals of Tropical Medicine and Parasitology*, lix (1965), 482; Todd L. Savitt, 'Filariasis (elephantiasis among South Carolina Blacks) in the United States', *Journal of the History of Medicine and Allied Sciences*, xxxii (1977), 142; R. Hoeppli, *Parasitic Disease in Africa and the Western Hemisphere: Early Documentation and Transmission by the Slave Trade* (Basle: 1969), 119–22, points out the usual confusion of this disease with leprosy.
 5. August Hirsch, *Handbook of Geographical and Historical Pathology*, translated by Charles Creighton, 3 vols. (London: 1883–86) i, 230; John Huxham, *An Essay on Fevers...* 2nd edn (London: 1750), 18; Charles Bisset, *Medical Essays and Observations* (Newcastle-upon-Tyne: 1766), 12.
 6. Frederick L. Dunn, 'Malaria', in Kenneth F. Kiple (ed.), *The Cambridge World History of Human Disease* (Cambridge and New York: Cambridge University Press, 1993), 859.
 7. Kenneth F. Kiple, 'The Caribbean', in *ibid.*, 499–500, and *The Caribbean Slave: A Biological History* (Cambridge and New York: Cambridge University Press, 1984), *passim*.
 8. Philip D. Curtin, *The Atlantic Slave Trade: A Census* (Madison: University of Wisconsin Press, 1969), 119, table 34; Kenneth F. Kiple and Kriemhild Coneè Ornelas, 'After the encounter: Disease and demographics in the Lesser Antilles', in Robert Paquette and Stanley L. Engerman (eds), *The Lesser Antilles in the Age of European Expansion*, forthcoming (University of Florida Press).
 9. Curtin, *op. cit.* (note 8), 140, Table 40; Herbert S. Klein and Stanley L. Engerman, 'Fertility differentials between slaves in the United States and the British West Indies: A note on lactation practices and their possible implications', *William and Mary Quarterly*, xxxv (1978), 372; B. W. Higman, 'The slave family and household in the British West Indies, 1800–1834', *Journal of Interdisciplinary History*, vi (1975), 263–4; Sheridan, *op. cit.* (note 1), 132; Salvador Arana-Soto, *Historia de la medicina Puertorriqueña hasta 1898* (San Juan, 1974), 205–6.
 10. James Lind, *An Essay on Diseases Incidental to Europeans in Hot Climates. With the Method of Preventing Their Fatal Consequences*, (3rd edn, London: 1779), 41–76, 278, cited in Sheridan, *op. cit.* (note 1), 26. Lind is best known today for his 1754 *Treatise on Scurvy*, but his

- Diseases in Hot Climates* was a bestseller in his own time, passing through five editions between 1768 and 1808. See Philip D. Curtin, *The Image of Africa: British Ideas and Action, 1780–1850*, 2 vols. (Madison: University of Wisconsin Press, 1964), 72.
11. Thomas Dancer, *A Brief History of the Late Expedition Against Fort San Juan* (Kingston: 1781) 20.
 12. *Ibid.*, 43.
 13. John Hunter, *Observations on the Diseases of the Army in Jamaica* (London: 1788), 57, 58, 60.
 14. John R. McNeill, 'The ecological basis of warfare in the Caribbean, 1700–1804', in Maarten Ultee (ed.), *Adapting to Conditions: War and Society in the Eighteenth Century* (Tuscaloosa, Ala.: 1986), 26–42; for a discussion of yellow-fever immunities see Kenneth F. Kiple and Virginia H. King, *Another Dimension to the Black Diaspora: Diet, Disease and Racism* (Cambridge: Cambridge University Press, 1981), 29–49.
 15. Colin Chisholm, 'History of an Uncommon Epidemic Fever Observed in the Island of Grenada', *Medical Commentaries*, 8 (1794), 499–511 and *An Essay on the Malignant Pestilential Fever* (Philadelphia: 1799), 100–1.
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 19. Francisco Guerra, 'The influence of disease on race, logistics and colonization in the Antilles', *Journal of Tropical Medicine*, lxxix (1966), 30.
 20. Kiple, *Caribbean Slave* (note 7), 168.
 21. Robert Percival Parsons, *History of Haitian Medicine* (New York: 1930), 2; Francisco Eujenio Moscoso Puello, *Apuntes para la historia de la medicina de la isla de Santo Domingo* (Santo Domingo: 1977), 31.
 22. Robert Jackson, *A Sketch of the History and Cure of Febrile Diseases: More Particularly as they Appear in the West Indies Among the Soldiers of the British Army* (London: 1791), 213, 263, 269; Hunter, *op. cit.* (note 13), 64–5; Bisset, *op. cit.* (note 5), 20.
 23. John Davy, *The West Indies, Before and Since Slave Emancipation* (London: 1854), 85–6.
 24. Kiple, *Caribbean Slave* (note 7), 14–17; A. V. S. Hill *et al.*, 'Common West African HLA antigens are associated with protection from severe malaria', *Nature* (1991) 352, 595–600.
 25. Kiple, *Caribbean Slave* (note 7), 17–20, 161–76; Kiple & King, *op.*

- cit.* (note 14), 29–49.
26. Jackson, *op. cit.* (note 22), 249–50; Dancer, *op. cit.* (note 11), 12–13, 43. See also Chisholm, *Malignant Pestilential Fever* (note 15), 97, who wrote that 'the disease [yellow fever] did not spread much among them [blacks] nor was it marked with the fatality which attended it when it appeared among the whites'.
 27. George Pinckard, *Notes on the West Indies, Including Observations Relative to the Creoles and Slaves of the Western Colonies, and the Indians of South America; Interspersed with Remarks upon the Seasoning or Yellow Fever of Hot Climates*, 2 vols, (2nd edn, London: 1816), ii, 475.
 28. Robert Collins, *Practical Rules for the Management and Medical Treatment of Negro Slaves, in the Sugar Colonies* (London: 1811), 259–61.
 29. James Stephen, *The Slavery of the British West Indian Colonies Delineated*, 2 vols, (London: 1824–30), ii, 372; Hector McLean, *An Enquiry into the Great Mortality Among the Troops at St. Domingo* (London: 1797), vii; Maria Nugent, *Lady Nugent's Journal of Her Residence in Jamaica from 1801 to 1805* (ed. Philip Wright), (Kingston, Jamaica: 1966), 122–3 and *passim*; Kiple, *Caribbean Slave* (note 7), 181–3.
 30. See especially the pleas of Hunter, *op. cit.* (note 13), for the employment of black troops.
 31. Roger Norman Buckley, *Slaves in Red Coats: The British West India Regiments, 1795–1815* (New Haven: Yale University Press, 1979), 1–4; Guerra, *op. cit.* (note 19); 34.
 32. Buckley, *op. cit.* (note 31), 2–3.
 33. Kiple, *Caribbean Slave* (note 7), 167–9.
 34. Hunter, *op. cit.* (note 13), 54–65; Buckley, *op. cit.* (note 31), 7–8, points out that Robert Jackson, another who argued vigorously for the use of black troops, had been promoted to the rank of Army physician in 1794, 'the result of the personal intercession of the Duke of York, who, in 1795, became the Commander-in-Chief of the British Army'.
 35. *Ibid.*, 16–19.
 36. Kiple, *Caribbean Slave* (note 7), 167.
 37. *Ibid.*
 38. Buckley, *op. cit.* (note 31), *passim*; Guerra, *op. cit.* (note 19), 34–5.
 39. Kiple, *Caribbean Slave* (note 7), 169–74.
 40. *Ibid.*, 169.