Diseases and Medical Disabilities of Enslaved Barbadians, From the Seventeenth Century to around 1838

Part II

(Continued from Vol. 57, No. 6: 605–620)

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ABSTRACT

The disease environment, health problems and causes of mortality of enslaved Barbadians are described. Data are derived mainly from documentary sources; also included are bio-archaeological data from analyses of skeletons recovered from Newton Plantation cemetery. Major topics include infectious diseases transmitted from person to person, as well as those contracted through water, soil, and other environmental contaminations, and diseases transmitted by insects, parasites and other animals; nutritional diseases, including protein energy malnutrition, vitamin deficiencies, anaemia, and geophagy or "dirt eating"; dental pathologies, lead poisoning, alcoholism, traumas, and other disorders, including psychogenic death or illness caused by beliefs in witchcraft or sorcery.

Enfermedades y Discapacidades Médicas de los Barbadenses Esclavizados, Desde el Siglo Diecisiete Hasta Alrededor de 1838

(Parte II)

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RESUMEN

Se describe el ambiente de enfermedades, problemas de salud y causas de mortalidad de los barbadenses esclavizados. Los datos proceden de fuentes documentales, e incluyen también datos bio-arqueológicos a partir del análisis de esqueletos recuperados del cementerio de la Plantación Newton. Los asuntos principales incluyen las enfermedades infecciosas transmitidas de persona a persona, así como aquellas contraídas por el agua, el suelo, y otros medios de contaminación ambiental. Asimismo se incluyen enfermedades transmitidas por insectos, parásitos, y animales; enfermedades nutricionales, incluida la malnutrición energético-proteica, las deficiencias de vitaminas, la anemia y la geofagia o el "comer tierra", las patologías dentales, el envenenamiento por plomo, el alcoholismo, los traumas, y otros trastornos, incluyendo la muerte psicogénica o las enfermedades causadas por creencias en la brujería y la hechicería.

Nutritional Diseases

Diseases resulting from dietary inadequacies formed another major problem confronting enslaved Barbadians (and enslaved West Indians in general). As with their working class descendants until fairly recent times, they were a seriously malnourished population (105). Although some plantation personnel, for instance, tradesmen and other "privileged" workers, may have fared somewhat better than gang members in terms of food varieties and quantity, nutritional quality was low even when food quantities were adequate to relieve hunger. Over the duration of the slave period, plantation workers depended on one or two major starchy staples, for example, corn and plantains (the latter particularly in the seventeenth century) which surely accounted for a consequential percentage of their caloric intake (106). A result of this high dependency on carbohydrates, particularly starches,

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as well as sugar during the crop season, was that their diet lacked adequate quantities of vitamins, minerals and other nutrients. This diet was, for example, deficient in protein and fat, and short on several B vitamins, vitamin A and possibly vitamin C; there were also iron and probably other mineral deficiencies. Documentary data on diets and issues surrounding hunger and malnutrition are supported by data from the skeletal remains at Newton plantation cemetery. These data show that for most of the year, Newton's enslaved community suffered vitamin and mineral deficiencies and experienced a number of pathologies which were directly or indirectly linked to hunger, dietary deficiencies and malnutrition (107). The narrative historical sources point to a population that often went hungry and experienced severe food deprivations.

The physical/skeletal evidence, however, gives more objective insights than the historical sources, and yields a "vivid and dramatic expression of food shortages and their consequences". All the pathologies discovered in the Newton skeletons, particularly in their dentition, "support a picture of minimal and inadequate nutrition, periodic severe dietary deprivation . . . when the body's resources were so limited that growth stopped for a period . . . with individuals on the edge of starvation for substantial periods" (108). Diseases resulting from malnutrition inflicted very heavy tolls, particularly among infants and small children.

Protein Energy Malnutrition: Kwashiorkor and Marasmus

Protein energy malnutrition (PEM) describes mainly undernourished small children under five years and primarily between ages one and three. It was undoubtedly widespread in the Caribbean, and since it is so much related to an "environment of poverty", it continued to affect working class children in Barbados seriously until modern times (109). PEM ordinarily hits children shortly after weaning, when they are put on a diet, usually starchy, that is severely deficient in protein or energy. It is important to stress that this diet does not replace the protein formerly provided by the mother's milk. Moreover, such epidemic diseases as measles and whooping cough, or an infestation of worms, can "place enough additional stress on malnourished bodies to trigger" PEM (110). Children with PEM are highly susceptible to "diarrhoeal diseases, respiratory tract infections, the common communicable diseases and parasitism"; survivors of such disorders can be impaired for the rest of their lives with various diseases (111). In fact, a modern study in Barbados of the effects of moderate to severe PEM on a child's first year of life found that in later years such children suffered, by comparison with others, the negative impact of early PEM with respect to general health, IQ performance, memory, social skills, physical appearance and emotional instability (112). Among the most common PEM disorders that unquestionably affected enslaved West Indians, and which were responsible for a great deal of infant and child mortality, were kwashiorkor and marasmus, or a condition displaying features of both (113).

Kwashiorkor is usually found in children around the age of weaning. Studies in Africa have shown that mortality from kwashiorkor in some areas was never less than 30 per cent while in other areas it approached 100 per cent. About 15 per cent of the discovered kwashiorkor cases affected children between the ages of six and twelve months but 70 per cent of the cases were in the one to three-year range (114). It should be noted that in eighteenth-century African cultures, lactation usually lasted from two to three years (115). In the Caribbean, including Barbados, historical data suggest that enslaved children were usually weaned around two years or later. Physical anthropological data from Barbados suggest that the weaning period may have averaged closer to three years. However, there is slight but suggestive evidence in Barbadian written sources that by the later years of slavery, although the lactation period for enslaved Barbadians was still higher than for contemporary Europeans, it tended to decrease. Post-emancipation changes and trends toward a shorter lactation period support this suggestive evidence. By the mid-1930s, Barbadian working class women were scarcely breast-feeding their children, on the average weaning them at one to three months, and putting them on a sugar, tea and cornmeal pap diet. This practice, in turn, continued to perpetuate PEM, but shifted it to an even earlier age group (116).

The common features of kwashiorkor include an excessive swelling of the abdominal area and various gastrointestinal disorders, particularly diarrhoea; in addition, anaemia and changes in skin and hair pigmentation can occur. In the early Caribbean, when doctors who treated enslaved people referred to the swelled bellies of children, among other features, they were probably describing kwashiorkor. When Governor Parry of Barbados reported that children "contract various disorders of the viscera and oedematous diseases, of which great numbers of them perish", he easily could have been indicating the diarrhoea and characteristic abdominal swelling of kwashiorkor. Reporting on the island's high infant mortality in the early 1800s, a plantation doctor, Henry Holder, observed that infants under a year were often fed "cold pottages prepared from the most flatulent and indigestible vegetables or eating roots which they cannot digest"; their stomachs begin to "swell" and an" incessant diarrhoea comes on". Holder found no evidence for worms, but in such cases the parents (mothers?) commonly attributed their children's deaths to the "worms". This explanation is consistent with Kiple's observation that where "kwashiorkor is prevalent, deaths are frequently attributed to diarrhoea or worms"; these afflictions together, he adds, "seem to have accounted for the bulk of the deaths of the slave young who had not perished as infants" (117).

Marasmus results from an insufficiency of food or a starvation diet, and involves progressive wasting of skin

tissue and muscle. Ultimately, it produces the extreme emaciation that gives the child a "skin and bones" appearance. The child is hungry, cries often and might also have vomiting and diarrhoea. Some evidence from Barbados suggests that the disease was observed on the plantations. Holder, commenting on lactation practices, noted that because the mother was often reluctant to "lose the privileges" of nursing her child, she nursed "the child to a very advanced age, and while the practice weakens her, and renders her prone to many morbid affections, the child, whose stomach now requires stronger foods, dwindles and becomes scrophulous, and disposed to worms, from a continuance of too meagre a diet". The volume of milk decreases the longer that lactation occurs and marasmus was probably more common than the Barbadian documentary sources indicate. Its characteristics or symptoms may have been subsumed under general discussions of children and their problems, particularly with respect to diarrhoea. Moreover, marasmus continued to be a problem of West Indian and Barbadian children well into the modern era (118).

Vitamin Deficiencies: Pellagra and Beriberi

As with those elsewhere in the Caribbean, enslaved Barbadians unquestionably suffered vitamin deficiencies. These are inferable from the nature of their diets and some of the diseases that contemporary doctors observed.

Pellagra is frequently associated with a dietary deficiency of niacin, a B complex vitamin, among people with low protein diets and dependence on corn — fundamental characteristics of the Barbadian diet. Significant numbers of enslaved Barbadians were undoubtedly afflicted with this disease, as were others in the Caribbean for whom corn played a central dietary role (119).

Pellagra is a very debilitating disease whose symptoms can include weight loss, diarrhoea, swollen tongue or mouth, a characteristic rash or body sores — especially in skin areas exposed to the sun — and mental problems that can range from depression and confusion to hallucinations; its symptomology can also be associated with intestinal disorders and a general weakness. Because of its wide range of symptoms, early Caribbean physicians did not diagnose pellagra as such, but tended to focus on its major symptoms of bowel complaints, skin problems and mental illness. "Clearly the problem with identifying pellagra in the West Indies is not a dearth of symptoms", Kiple writes, "but an abundance of symptoms indicative of all sorts of ailments, including infectious diseases and other nutritional ailments". In fact, many of the skin disorders reported for enslaved people could have been caused by pellagra and were classified under such diseases as yaws, leprosy or even elephantiasis. Although the Barbadian working class diet changed in post-emancipation times and rice assumed a much greater role than it did during slavery (120), pellagra continued to be very common in Barbados until well into the twentieth century (121).

Beriberi is normally caused by a deficiency of thiamine and is largely associated with the heavy consumption of polished rice. The disease probably existed in a number of Caribbean areas during the slave period, and, as with pellagra, beriberi was unrecognized as a separate malady because its symptoms led doctors to believe it was several diseases (122). The symptomology of beriberi includes fatigue, diarrhoea, appetite and weight loss, disturbed nerve function causing paralysis, wasting of limbs and heart failure. The symptoms can vary depending on whether the disease is wet or dry beriberi. Symptoms of the former include tissue swelling (oedema) and the development of heart failure whereas the latter can affect peripheral nerves, causing weakness of the extremities. Kiple suggests that "dropsy" and "mal d'estomach" (see below) were, in fact, frequently beriberi and the convulsions or fits observed among children could have been symptoms of, among other diseases, infantile beriberi: "of all the major nutritional diseases, save for PEM, beriberi is the only one that is capable of killing vast numbers of the very young"(123).

Because of beriberi's traditional association with polished rice, its existence in Barbados during slavery is problematic because rice played a very minor role in the diet of the enslaved (see note 120). Yet, some modern studies have suggested possible beriberi-like symptoms among peoples without a polished rice diet and beriberi was known among Brazilians who also lacked a rice-based diet. In addition, "corn-fed" enslaved workers on early nineteenth-century sugar plantations in Louisiana suffered from beriberi or, according to Dirks, "one of the great number of mixed pellagra-beriberi syndromes" (124).

In 1812 Dr Caddell provided a lengthy description of a disease that was widespread on the island and which many Whites attributed to sorcery or witchcraft. His description appears to suggest many of beriberi's symptoms. Caddell attributed the widespread mortality primarily to a condition "denominated by physicians cachexy, and in vulgar language called "swelling of the Negroes". On every Barbadian plantation, he emphasized, the disease existed to some extent. Its earliest recognizable symptom was "sluggishness". The driver complains that the Negro does not keep up his row . . . On examination, he complains of weakness, a little shortness of breath, and there is generally a little wasting of the muscular flesh. When the disease has advanced a little farther, beating of the heart takes place, increased and very evident shortness of breath on exertion, or mental agitation, evident palpitation of the heart, a dry scaly state of the skin, a death like paleness of the tongue and gums, dropsical swelling of the lower extremities, and at last dropsical swelling of the body generally, and dropsical effusion into the cavity of the chest or belly. It is only in the first stage or beginning of the 2nd stage that this disease admits certainly of a cure.

When advanced much in the 2nd stage it is with difficulty got the better of, and when it is arrived to the last stage or dropsy, it is almost, universally fatal. Caddell further

observed that plantation managements generally did not pay attention to this disease "till it exists in a great degree and to a great extent", and on a plantation where many have this condition, most of them "are sure to be cut off". The progression on a plantation of "this cachextic state of the negroes . . . is insidious", he wrote, "the estate is observed to become more sickly than it used to be, the negroes crowd in greater numbers to the sick house complaining, without any very obvious symptoms of disease, of pains and aches in the body". People easily became vulnerable to dysentery "from which they would without difficulty have recovered, had they not been attacked by them in the debilitated state so that in fact the greater of the deaths which happen and which are attributed in plantation books to dysentery, pleurisy or cough should be attributed to this disease". Believing that "at least three fourths of the adult Negroes" suffered from the disease and that it is also "the great source of the paucity of the births", Caddell attributed the prevalence of "the swelling of the Negroes" to their diet and its nutritional inadequacies (125).

Other Vitamin Deficiencies

Given their very low protein diet, enslaved Barbadians, as others in the Caribbean, were probably also riboflavin deficient (126). Such deficiency causes sluggishness, dizziness, oedema (dropsy), urination difficulties, eye and skin lesions and eye fatigue, including sensitivity to light.

Vitamin A is necessary for vision when the light is dim or absent and its deficiency in a diet low in vegetables and fruits can cause night blindness or nyctalopia. Nyctalopia was widespread among Caribbean peoples and many presumably arrived from Africa with the disease. In a description that has a modern ring to it; William Hillary described "Nyctalopia or night-blindness", which he noted was common among West Africans as well as enslaved West Indians and Barbadians. The afflicted will have normal vision during the day, but, Hillary wrote, "night-blindness comes on in the evenings, after the sun sets, with a misty dimness, which gradually increases as the night approaches" (127).

Although not explicitly mentioned in the Barbados sources, enslaved Barbadians probably suffered from other eye disorders which may have been symptomatic of vitamin A or riboflavin deficiencies (or, perhaps, parasite activity). For example, "sore eyes" (ophthalmia) involving a severe inflammation of the eye that can result in blindness, was frequently reported for enslaved West Indians, and Griffith Hughes reported on a herbal medicine that was effective in "washing sore eyes" and in treating "most disorders of the eyes" (128).

Vitamin D deficiencies were probably less common in the sun-filled Caribbean environment, but they still occurred. Such deficiencies would have manifested themselves chiefly in young children, and, along with calcium deficiencies, may have produced rickets. Deformities such as bowlegs and knock-knees are among the most noticeable characteristics of rickets. These deformities are sometimes recorded in late eighteenth-and early nineteenth-century Barbadian newspaper advertisements for runaways (129).

Scurvy is usually associated with severe vitamin C (ascorbic acid) deficiency and with countries in the northern latitudes. Its symptoms can include weakness and loss of appetite, anaemia, and swelling (oedema). However, the clearest manifestations of scurvy are swollen and bleeding gums, and, if the disease lasts long enough, loosening and loss of teeth. Despite the existence in Barbados of foods that could have prevented scurvy, there is no indication that citrus fruits and fresh green vegetables, for example, played much of a role in the diet of the enslaved; moreover, heat destroys vitamin C, and the iron pots used for cooking would have also contributed to the destruction of vitamin C. The sources do not specify scurvy as a disease of enslaved Barbadians but it may not have been recognized as such and it may have caused some of the tooth loss observed in the skeletons found at the Newton cemetery [see below] (130).

Nutritional anaemia was probably very common in the Caribbean, including Barbados, especially among women and children; in fact, it was a serious health problem in Barbados (and many other impoverished environments) in modern times (131). Newborn children and small infants as well as menstruating and pregnant women badly needed the iron required for red blood cells. The newborn, if they survived other diseases, might have received some iron from their mothers' milk, but the Barbadian diet was generally deficient in the types of foods, such as red meat, poultry, fruits, and certain vegetables, that could have significantly protected against iron deficiencies.

Some iron was probably acquired from foods cooked in iron pots. Food was roasted on the embers of cooking fires or, more commonly, boiled over open fires. Boiling was usually done in the imported iron pots that plantation managements sometimes provided (perhaps as well in pottery vessels). However, the frequency of distribution of iron pots throughout the slave period is unknown although they may have become more widespread in its final three or four decades; also, during this late period, plantations were providing cooked meals and these were cooked in iron pots (132).

The most common cause of anaemia is an iron-deficient diet but it can also result from protein and folate (a vitamin that helps the body form red blood cells) deficiencies, as well as lead poisoning, parasitic worms, childbirth and malaria. Although plantation doctors and slave masters would have been unaware of anaemia-producing conditions, as they were unaware of iron deficiencies as such, many symptoms of anaemia would have resembled other common diseases that afflicted the enslaved. Depending on its severity, anaemia can produce such symptoms as fatigue or lassitude, shortness of breath during mild physical activity, insomnia, dizziness and headaches. In 1812, Dr Jones pre-

sented his ideas on mortality to a group of Barbados planters. He described several conditions that could have been symptomatic of anaemia or a syndrome of nutritional and infectious diseases. There is a "much greater frequency of . . . diseases of debility than any others", he observed, and he did not hesitate "in considering them as the chief cause of mortality among the slaves . . . year after year and in almost every plantation, patients are to be seen (even among the young and middle ages) exhausted, emaciated and with a train of symptoms too certainly indicating their approaching death" (133). Among such wasting conditions, doctors often pointed to what they called "dirt-eating" or "mal d'estomac".

Pica/Geophagy

Pica involves a craving to eat substances not normally considered foods by modern Western society, for example, dirt, clay, chalk, glue, laundry starch and hair. It is not a disease as such, but rather it is often considered symptomatic of disease. In geophagy (dirt-eating), the craving is directed toward the chronic consumption of earth, including clays. Ancient, widespread and variable among human populations, geophagy is generally regarded by modern Western analysts as a pathological condition, reflecting deviant behaviour. However, among some African groups, for example, geophagy is viewed from a different perspective: it is embedded in a cultural complex that involves specific means of acquiring the clay, an associated belief system, specialists in preparation and marketing; moreover, the practice is often viewed as a normal response to certain physiological needs, particularly "as an adjunct nutritional mechanism especially during pregnancy" (134).

Europeans in the Caribbean viewed geophagy as a pathology, disregarding, and not reporting on, how the enslaved themselves viewed the practice. The primary sources refer to all forms of abnormal ingestion of substances as dirt-eating, usually relating the practice to a disease that was called "mal d'estomac" or "Cachexia Africana". David Mason, a doctor practicing in Jamaica, gave a detailed account of what he defined as the results of dirt-eating: it produced a syndrome of such symptoms as jaundice, "paleness of the lips and ends of the fingers, whiteness of the tongue, great indolence, palpitation of the heart . . . frequent and oppressed respiration . . . habitual coldness of the skin, and occasional giddiness" with an inclination to fainting. In actual fact, Mason implicitly described the symptoms of nutritional anaemia (135).

Doctors in Jamaica also reported that some of the dirt-eaters also consumed other types of materials, including cloth, "decayed wood, wattle-dust, woolen cloth, hair, rags, etc" (136). Pica/geophagy occurred in all West Indian (and other New World) slave societies, and was reviled by planters and plantation doctors primarily because they believed the practice caused illness and fatalities among their human property. Barbados was no exception to this general rule.

The earliest mention of geophagy in the Barbadian sources occurs in 1693 when Newton's manager complained that a number of the people on the plantation "do eat dirt", and lamented his "continual trouble in nursing and physicking" them. Over the years, other writers reported the frequency of geophagy but few details are given until the early nineteenth century. In 1812, several plantation doctors reported their views on the causes of mortality to the Society for the Improvement of West India Plantership, a small group of resident Barbadian planters. Dr Henry Holder gave "dirt-eating" as one reason for this mortality: "The disease", he reported, "pervades all ages, the tenderest as well as the more advanced". However, geophagy apparently decreased considerably after emancipation. In 1836, a doctor reported that some prisoners in the Barbados jail became "ill from eating dirt, a disease now scarcely known in the island" and in the 1840s, Davy learned that dirt-eating is "now never heard of" (137).

It is likely that West African cultural practices had considerably influenced the proclivity for geophagy (138); these practices, in turn, were probably largely related to nutritional factors. The bleak nutritional environment of the plantations also contained the ingredients that supported a continuing practice of geophagy. Whatever its cultural origins, however, geophagy became a well-established pattern among enslaved Barbadians and those elsewhere in the Caribbean.

No data illuminate how the enslaved themselves explained geophagy but it is virtually certain they did not view the practice in the same negative light as slave masters and their allies. Perhaps some engaged in it as an act of rebellion against masters who were generally very critical of the practice (and often took active steps to prevent it). Some may have rationalized their behaviour in terms of hunger, that is, dirt-eating was simply a way of filling their stomachs. Still others may have regarded it as having nutritional or medicinal value for various disorders, as occurs in many parts of the world, including West Africa (139).

From at least the late 1700s, there was recognition in Barbados and elsewhere in the Caribbean of some kind of connection between geophagy and nutritional deprivation (140). Modern medical and nutritional investigations, in turn, usually give nutritional, particularly mineral deficiency as a primary reason and these views have been accepted in major studies of Caribbean slavery. "The dominant nutritional approach", as Henry and Kwong have recently summarized, "has strongly documented the useful contribution the consumption of clay brings to the diet of pregnant women and children" (141). Support for a mineral-deficiency argument is found not only in modern studies but also in the selectivity of the mineral-laden earth types that were consumed. None of the Barbadian sources specifies the earth types. However, some indication of the propensity for minerals is given in sources dealing with other islands. For

example, in the early 1800s, a former resident of Martinique and Guadeloupe observed that the dirt is "composed of clay, of silex, and of magnesia . . . it is more or less strongly coloured by the oxide of iron"; and, according to David Mason in Jamaica, the preferred earth "is a compound of clay and carbonate of lime, tinged of a red colour, by a small proportion of oxide or carbonate or iron" (142).

That geophagy is intimately related to nutritional deficiencies is widely accepted but there are questions about the specific deficiencies it principally reflects. However, iron and, perhaps, calcium and zinc, seem to play central roles (although others are mentioned as well) even though there does not appear to be a consensus among researchers about which is the most important. Nonetheless, geophagy is most frequently associated with iron deficiency and anaemia is often viewed as its cause. In Barbados, as elsewhere in the Caribbean (and Africa), geophagy affected all age groups but was particularly noticeable among young children and women (especially pregnant women with their great needs for virtually all types of nutrients); together these two groups were also the most vulnerable to iron deficiencies and anaemia (143).

Although geophagy seems to be a response to certain mineral deficiencies, it is questionable how much it actually meets or alleviates these deficiencies. Whatever the case, geophagy can have a negative impact on individual health. It was this impact that plantation doctors observed. They saw dirt or clay eaters as being "habitually sick, complaining of stomach pains and shortness of breath. They became bloated, with discolored skin, a feeble pulse, nausea, vomiting, diarrhoea, lassitude and general depression and debility" (144). Whether or not such symptoms or signs were a direct result of geophagy, it is true, Hunter writes, that excessive geophagy can damage the gastrointestinal system "through silica irritation, retarded motility of the intestinal tract with resultant malabsorption of nutrients and possible damage by trace elements"; it can even totally block the intestinal tract and "lead to deposition in the colon". More commonly, geophagy produces severe constipation but geophagy itself, in Kiple's words, "rarely kills anyone", although in very extreme cases it can lead to death (145). Deficiency diseases, as well as infectional stresses, were also reflected in dental pathologies.

Dental Pathologies

Written sources on the health problems of enslaved Barbadians deal almost entirely with surface body afflictions and internal disorders; these sources are virtually silent on matters relating to the diseases and treatment of teeth. This absence of information undoubtedly results from the inability of early medical practitioners and others to recognize many dental pathologies, as well as their major interests in ailments that tended to incapacitate or produce fatalities. For example, James Grainger very briefly observed that in the West Indies in general "Negroes, as well as white people, are very subject to the toothach". Dr David Collins, another well-known writer on medical issues among enslaved West Indians, provides a relatively lengthy discussion of "the toothache", but most of it focusses on a method for extracting diseased teeth – virtually the only dental surgery in Europe and the New World colonies during early periods. Yet, Collins observed, there were frequent complaints of toothaches and "while the pain lasts, if severe, the Negroes are incapable of working". Barbados newspaper advertisements for "runaways" occasionally record some dental condition such as "black teeth" or "discoloured foreteeth". A variety of dental pathologies could have produced painful teeth or other dental conditions, but none is even minimally described in the documentary sources (146).

However, there is abundant physical evidence that enslaved Barbadians suffered a variety of dental ailments, many of which were related to more fundamental disease issues. It merits stressing that in general "dental pathologies are one of the few maladies affecting humans that leave clear and comparatively unambiguous signs upon the skeleton". The evidence for dental pathologies in Barbados derives from analyses of the dentition of skeletons excavated from the Newton plantation cemetery in the early 1970s (147).

Briefly, the Newton skeletal sample showed a relatively high incidence of periodontal problems. This infectious gum disease breaks down the ligament between adjacent tooth sockets in the jaws. The disease is a major cause of tooth loss in modern populations and increases in severity with age. Periodontal disease probably accounted for some of the tooth loss among enslaved Barbadians and probably largely resulted from malnutrition and deficiencies in, for example, calcium and vitamin C, as well as other dietary factors. Other dental pathologies that reflect dietary deficiencies include hypercementosis, a condition of excessive bony deposits on the tooth roots which cause them to swell and frequently fuse together. Between 84 and 89 per cent of the Newton skeletons displayed hypercementosis. It was probably caused by periodontal disease and chronic vitamin deficiencies.

Virtually, the entire skeletal sample (about 98 per cent) showed some signs of enamel hypoplasia. This condition involves markings on the teeth (growth arrest lines) which indicate where enamel deposition stopped in tooth growth, and thus periods when body growth was temporarily arrested. Enamel hypoplasia generally results from nutritional or infectious stress and specialists consider it a useful indicator of developmental stress or metabolic trauma, when growth temporarily stops because nutritional reserves are lacking. In fact, many Newton skeletons showed a severe form of hypoplasia, suggesting extreme dietary deficiency or starvation which caused a relatively extended period of arrested development. Severe hypoplasia can be related to serious, but not necessarily fatal, infectious diseases (for example, dysentery, measles, milder forms of smallpox, chickenpox, whooping cough, pneumonia) which could have seriously

debilitated people for extended periods; however, the Newton hypoplasias also could have been related to extreme dietary deficiency or starvation.

The hypoplasias at Newton may have been largely related to nutritional stress experienced during the weaning period. At Newton, individuals with growth arrest lines seem to have undergone only one period of severe nutritional stress in childhood. The most common age at which the growth arrest lines appeared (that is, the period of growth disruption) was between three and four. This age is consistent with the weaning period among enslaved Barbadians in general; they were generally weaned between the ages of two and three. It is well known that the year following weaning is a relatively stressful and high risk period, especially among impoverished populations; only the immediate post-natal period is more dangerous to life. The Barbadian historical and physical evidence underscores that the weaning period was developmentally traumatic and of high risk for children. Thus, it is very likely that the Barbadian hypoplasias reflect the PEM diseases that were ubiquitous in this population (see above) as well as periodic food shortages and famines.

In addition, many hypoplasias in the Newton sample reflect congenital syphilis. Severe oral infections caused by this disease in the first year of life produce characteristic changes in the shape of the teeth (Hutchinson's incisors and Moon's molars) that are well known in the medical literature as diagnostic of congenital syphilis (see Part I, Venereal Diseases). Less prevalent, but nonetheless significant, pathologies in the skeletal sample include various types of malocclusion — a general term for abnormalities in the chewing surface and crookedness of the teeth. These also relate to malnutrition, and in some cases reflect near-fatal or chronic starvation as the teeth grow to near-normal size while the jaws do not.

As with hypoplasia, bilateral dental asymmetry also reflects disruption in an individual's development. In this condition, the side-to-side tooth size is mismatched; for example, a large left molar and a small right molar (although the same genes determine both teeth). Asymmetry can result from several growth disturbance causes, including metabolic stress. Teeth were relatively asymmetric in the Newton sample and a clear trend in the pattern of asymmetry was that teeth growing in the jaw after birth were more asymmetric than teeth formed prenatally. This strongly suggests that despite widespread maternal malnutrition, the prenatal environment was relatively safer than the period of infancy.

Caries, or tooth decay, including what are commonly known as cavities, on the chewing surfaces of the teeth occurred in only about 20 per cent of the skeletons; however, close to three times as many showed signs of decay in the spaces between adjacent teeth (inter-proximal caries). A high incidence of dental caries was also reported for the Barbadian working class in the 1930s, another indication of their deficient diets (148).

The caries distribution at Newton also probably reflects general malnutrition as well as a high carbohydrate diet (corroborated by historical data); caries may also reflect calcium deficiencies while the infant's teeth were forming in the dental crypt. In general, however, the size and incidence of dental caries at Newton suggest that these were lesser problems than gum and root diseases.

A small minority of the Newton sample showed signs of having lost all of their teeth through natural causes (for example, periodontal disease, caries), the same condition found among modern denture-wearing populations. However, a consequential number displayed evidence of partial tooth loss involving at least one tooth; many showed tooth loss, usually molars, occurring on both sides of the mouth. This highly non-random statistical distribution of tooth loss strongly suggests that loss did not result from natural causes but rather from human intervention or some type of dentistry. The Newton skeletons also displayed a wide range of less frequently occurring teeth and jaw pathologies or anomalies. Taken together, frequent and infrequent patterns alike, the general picture of such pathologies reveals a population that, when alive, had high levels of infectious gum (periodontal) disease, lesser levels of other infections, lack of dental care and insufficient growth in the teeth and bones. The stunting of teeth and bones, as well as other dental maladies, is presumably very reflective of calcium (149) or overall caloric deficiencies. In general, the overarching conditions that affected the dental health were linked to nutritional issues; the pathologies themselves reflect a variety of frequently severe nutritional problems.

All of the dental pathologies discovered at Newton assuredly occurred throughout Barbados. Given the historical data on nutrition and disease in the enslaved population and the relative typicality of Newton as a plantation, there is no reason to suspect otherwise. None of the pathologies discussed here is mentioned in the written sources. However, they support more general observations in the historical literature that enslaved West Indians were not only generally malnourished and disease-ridden but also were frequent sufferers from the debilitating (sometimes very painful but non-lethal) effects of a variety of dental ailments.

Lead Poisoning, Alcoholism, Traumas and Other Disorders

Lead Poisoning (150)

Physical analyses of skeletal materials also yielded data on lead poisoning, another relatively common disorder among enslaved Barbadians but only barely touched on in the documentary record. Various symptoms caused by lead absorption were unrecognized by early West Indian physicians and were undoubtedly hidden in their discussions of other diseases. It is clear, however, that a form of lead poisoning, the so-called" dry bellyache", which involved extremely painful intestinal cramps, was widespread in the West Indies

(and the British North American colonies) during the seventeenth century and much of the eighteenth. Labelled "dry" because the cramps were not accompanied by diarrhoea but rather by severe constipation, the disease affected both Whites and Blacks.

This "most cruel disease" was common in Barbados by the late 1640s, and over the years it became so common that, as Dr Towne observed, "it may very justly be reckoned as endemic . . ., most people there at one time or other having felt its cruelty" (151). With the first noticeable symptoms, "the belly is seized with an intolerable piercing pain", noted Towne, and during the early phases, which might last a week or two, "the patient is on a perpetual rack, with scarce any remission or pause from pain . . . the belly continues . . . obstinately costive, very little urine is made, the strength is greatly impaired"; and "the breath stinking very offensively", added Griffith Hughes. In short, the dry belly-ache involved "excruciating torture of the bowels", and was considered, J Clark reported, "the most painful of the diseases to which the inhabitants of the West Indies are liable. . . . The torments of those labouring under this disease are beyond conception" (152).

The symptoms of dry bellyache were reported by a number of medical practitioners in Barbados and other British Caribbean and North American colonies. However, most early medical works that mention or discuss this disease almost universally imply – and sometimes explicitly state – that they are referring only to Whites. Although a few writers acknowledge it, Blacks are very rarely mentioned as victims of the dry bellyache. In the Barbados sources, in particular, all references to dry bellyache are to white victims. However, inferential historical evidence suggests that Blacks suffered from the disease. This evidence derives from 1) the prevalence of dry bellyache on the island during the seventeenth and eighteenth centuries; 2) the relatively frequent mention of it in early medical sources; and 3) the facts that although few medical accounts specifically mention the race of patients, none explicitly excluded Blacks. Moreover, the knowledgeable Griffith Hughes reported that the principal victims of dry bellyache were rum distillers, sugar boilers and plantation overseers; at the period to which he was referring, the 1730s and 1740s, distillers were generally poor Whites but enslaved people were also distillers and they also constituted the majority of the sugar boilers (153).

Inferential historical evidence, then, supports a view that dry bellyache affected enslaved Barbadians and thus they were subject to lead contamination. However, it is not possible to ascertain the nature and degree of such contamination from the historical evidence; this evidence only suggests that lead poisoning existed. But the qualitative picture is independently supported and quantified by data obtained from analyses of the Newton skeletons.

Skeletal tissue was analyzed by a trace mineral analysis method that measures skeletal lead content. The analyses yielded a lead concentration that is three to four times that found in samples of enslaved people in colonial North America and is comparable to North American colonial Whites with known lead exposure (154).

The possible health implications of this amount of skeletal lead content at Newton are suggested by modern clinical studies. These studies indicate that 73 per cent of Newton's population had no or only mild symptoms of lead toxicity, resulting in little, if any, impairment of their daily activities. However, a significant fraction of the other 27 per cent probably suffered from dry bellyache at some time; and perhaps six to eight per cent of the total sample was affected severely and frequently enough to have its work and social activities significantly impaired, possibly with some peripheral nerve defects. In fact, some of this latter group may well have died of brain toxicity with convulsions and terminal coma, not unlike the patients described by William Hillary in the eighteenth century:

They become weak and that weakness increases until those extreme parts [of the arms and legs] become paralytic, with a total loss of motion, though a benumbed sensation often remains.

The subtle cause of this disease is sometimes carried . . . to the brain, and produces a stupor, or a delirium; and soon after the whole nervous system is so affected as to produce strong convulsions which too often are followed by death (155).

The symptoms Hillary described are also reported in one form or another by other medical practitioners in Barbados and other British North American and Caribbean colonies.

In general, then, the Newton skeletal lead content suggests that the plantation's living population had absorbed lead in quantities great enough to produce some symptoms of lead poisoning at some time during their lives in perhaps as many as one-third of the enslaved people, severe enough to interfere with their usual activities, at least intermittently, in a smaller number, and to threaten or terminate life in a significant minority. The inferential historical evidence independently and generally supports this conclusion. Thus, lead poisoning was a major pathology among enslaved Barbadians, and its presence, in turn, suggests a variety of clinical symptoms.

Modern medicine recognizes a number of symptoms of lead poisoning; many of these are also indicated in the historical descriptions of dry bellyache. For example, in the intestinal tract mild lead poisoning can produce appetite loss, nausea and vomiting, but as lead levels increase, the intestine is paralyzed (producing constipation) and then stimulated into painful abdominal cramps. Higher lead levels may cause spasms of the abdominal wall muscles, generating excruciating pain. Diarrhoea is absent from this intestinal disease, hence, as noted above, the historical term "dry bellyache". Lead poisoning can also result in a weak grip in mildly affected persons but severe toxicity may cause

incapacitating paralysis ("palsy") of the muscular action in the wrists and feet producing a complete inability to lift the wrist or even the foot. Varying degrees of sensory loss may accompany the paralysis, similar to the sensation when one's foot falls asleep. Persons with mild lead contamination may show mood or behavioural aberrancies or headaches, and the most easily recognized symptoms are convulsions; in severe cases, they can become frequent and prolonged, ultimately producing coma and death. Such symptoms are among the more obvious and observable effects of lead poisoning, ones that often accompany accounts of dry bellyache found in the early Caribbean medical literature. But lead has other, albeit more subtle, toxic effects that early Caribbean medical practitioners could not recognize. For example, lead's interference with haemoglobin formation causes anaemia with its accompanying weakness, loss of energy and shortness of breath. High blood pressure has also been related to lead, as have speech loss, deafness, blindness, visions and insanity. Even after cessation of exposure, lead may be leached from the bone and excreted in the urine for many years, damaging the kidneys and resulting in fatal renal failure. Lead exposure may also decrease fertility in men and women, increase stillbirths and miscarriages, disturb the menstrual cycle, reduce average birth weight and the survival rate of newborns, and produce weak and slowly developing offspring.

Historical research has established that the people at Newton and, by extension, the wider enslaved population of Barbados, could have ingested lead from a variety of sources and imported products. However, the most likely major (though not the only) source of their lead appears to have been rum. Lead was primarily absorbed during distillation, although some lead also could have been absorbed during various phases of sugar and molasses processing. Given that the technology of rum (and molasses-sugar) manufacture was an obvious and constant source of lead exposure, the relatively large consumption of rum and rum related drinks by enslaved Barbadians seems to have been the most likely contributor to the lead contamination they experienced. It bears stressing, however, that they (as well as poor Whites) tended to drink "new rum", the raw or non-aged rum that came directly from the stills; it was so strong that contemporaries considered it particularly noxious as well as being the prime cause of the dry bellyache (156).

Dry bellyache seems to have waned in Barbados and elsewhere in the West Indies (and the British North American colonies) by the mid-eighteenth century. By the late 1700s the disorder had significantly abated in Barbados but it still may have been more common there than elsewhere. The factors responsible for this decrease are uncertain but changes in rum distilling technology were probably significant. As knowledge of lead's poisonous effects spread throughout the West Indies in the late 1700s, lead was increasingly eliminated from distilling machinery.

Whatever the relative degree of contamination among Blacks and Whites (157), the Newton evidence indicates that lead contamination in the West Indies may have been more extensive among the former than the historical sources report. This lead toxicity had a variety of implications for their health and behaviour that were unrecognized (and could not be recognized) by early medical practitioners. Moreover, the Barbadian evidence, in conjunction with historical evidence from elsewhere in the Caribbean, suggests that a similar pattern of pathology also existed in other rum-producing West Indian islands (158). The chemical bone-lead analysis of Newton's skeletons identifies lead as the probable cause of numerous other symptoms and causes of death unrecognized by early medical practitioners and later historians who relied on their writings.

Alcohol Abuse 159

The lead poisoning associated with dry bellyache also may have reflected chronic or episodic alcohol abuse. Alcoholism is conventionally defined as chronic and extreme dependency on alcohol; it is usually associated with negative health and social outcomes. This is a very broad definition and the criteria for extreme dependency and negative social behaviour will vary within particular cultures as well as from culture to culture. Alcohol abuse is generally used to describe heavy and problematic drinking which also causes social and health problems.

Rum consumption was ubiquitous in Barbados among all social classes and racial groups. Aside from a variety of fermented drinks made from local flora, enslaved Barbadians consumed quantities of rum, particularly "new rum", which, as noted above, was the powerful product of the first distillation and the most common type that they and poor Whites (as well as British military personnel) consumed; this rum had particularly noxious effects on heavy consumers. Most Barbadian plantations of any size had distilleries, and although rum was a major export, from an early period a thriving local market developed for this "noble intoxicating liquor which the Negroes as well as white servants put too much delight in"(160). Blacks obtained rum by trade or purchase from individuals or the internal markets or by theft from plantation storehouses (161). In the 1730s and 1740s, they and white servants, as Griffith Hughes observed, were "much addicted to debauch in spirits", including "punch made exceedingly strong with new rum, very acid with the juice of limes, fermented with coarse sugar" (162). In 1755, the Barbadian Richard Hall emphasized that "most of the Negro women and many of their children drink rum"; about forty years later, the visiting English naval doctor, George Pinckard, observed how, among the enslaved, both men and women "are very fond of rum", and a decade or so later a group of Barbadian planters voiced their concern over the "excessive use of strong liquor, particularly among the males" (163).

Whites were quick to castigate Blacks' consumption of rum, but the drinking habits of the latter were probably disproportionately criticized by the plantocratic class and its

allies; moreover, the White male population, in particular, was hardly a teetotalling one. However, drunkenness created anxiety among Whites because of the behavioural unpredictability and potential difficulty of controlling groups of enslaved people (particularly men) when they became drunk; moreover, as a planter reported in the early nineteenth century, the "free use of ardent spirits in which the slaves indulge" encouraged them to steal rum or other goods which could be traded for rum (164).

It is impossible to quantify how much alcohol enslaved Barbadians consumed; also, there is no way to determine how much they were psychologically or physically dependent on alcohol. The effects of serious drunkenness or acute alcoholism would have affected Blacks (and Whites) with such common symptoms as headaches and stomach pains, sometimes, perhaps, resulting in more severe illness exacerbated by under-nutrition and malnutrition. Chronic alcoholism, on the other hand, results from the regular and excessive use of alcohol over an extended period. Because most enslaved people did not have easy access to alcohol on a daily basis, alcoholism was probably rarer among them than the acute forms of alcohol abuse caused by heavy drinking; however, as indicated above, some chronic alcoholism might have been reflected in serious cases of the dry bellyache. Heavy binge drinking, especially among males as an escape from the tedium and repressiveness of every day life and as a major form of recreation may have been common, although the direct evidence is slim and inferential. Whatever the case, as Kiple has suggested for enslaved West Indians in general, "excessive alcohol consumption overtime may have damaged black livers and pancreata, just as it did the organs of island whites"(165).

Cirrhosis of the liver can result from malnutrition, hepatitis or other infections but it is also a common result of heavy drinking in either binges or chronic consumption. The symptoms of cirrhosis can include nausea, appetite loss, weight loss, weakness, stomach pain and jaundice. Jaundice itself can be symptomatic of a number of diseases but it is also a symptom of such liver diseases as hepatitis and cirrhosis. Late eighteenth- and early nineteenth-century Barbadian newspaper advertisements for fugitives quite often mention that they had "yellowish skin" or "yellow skin"; this can be interpreted as possible references to jaundice (166). If this interpretation is correct, then chronic alcoholism might have caused some of the jaundice, although jaundice could have resulted from other maladies as well.

Traumas

The bodies of enslaved Barbadians bore testimony to myriad injuries that resulted from, for example, the maltreatment and brutality of masters, work accidents and fights or assaults among themselves. Such events could result in death as well as permanent disfigurement or lameness; natural catastrophes, such as heavy storms or hurricanes, could produce similar results. "Runaway" advertisements often yield evidence of the wide array of surface wounds and physical deformities. Aside from signs of smallpox and other diseases, the ads refer to, for example, facial or neck scars caused by sword or knife wounds acquired during fights, scars resulting from whip lashes and miscellaneous body scars of unspecified origins: one woman was "branded with letters on her face", another had a "firebrand on one of her breasts", a third had a "scar on her right arm "; a man had "shriveled fingers on right hand", while another showed "many scars on his face and head"; and several were identified with "limps" (167). Wounds of one kind or another could easily become infected, causing even more serious illness.

The work environment exposed people to an assortment of situations that produced accidents; in some cases these were fatal, in other cases severe pain and permanent bodily damage resulted. Occupational hazards were many and workers in the mills and boiling houses were particularly vulnerable: "If a stiller slip into a rum-cistern, it is sudden death", reported a late seventeenth-century commentator; "If a mill-feeder be catch't by the finger, his whole body is drawn in, and he is squees'd to pieces. If a boyler get any part into the scalding sugar, it sticks like glew or birdlime, and 'tis hard to save either limb or life". In general, Grainger noted, sugar boilers were "very apt to get scalded, especially when they are obliged to continue their labours in the nighttime". As with the boiling house, the mill was also hazardous. In 1779, Joseph Senhouse described a particularly grisly accident he witnessed at Farmer's plantation. Two women, who had been chained together as punishment for some infraction, were working at the windmill. "One of them unfortunately reaching too near the rollers, her fingers were caught between them and her body was drawn thro the mill. The iron chain, being seized by the rollers, was likewise drawn through and notwithstanding every effort was used to stop the mill, yet that was impossible to be done before the other female Negroe was dragg'd so close to those cylinders that her head was severed from her body." The mill was especially dangerous at night when, dulled with fatigue from a long day of active labour, those who fed canes into the mill rollers, Grainger noted, could have "their hands ground off", or their hands and fingers crushed, or suffer loss of limbs and broken bones from other accidents. Vapours from the rum cisterns could also be severely debilitating or fatal and people could fall into wells and break their limbs or die from the injuries. At Newton, accidents resulted in a "cripple [who] walks on all fours" and another person who "lost a thumb". The carters who transported sugar and other goods could be kicked by their horses or would have other accidents with their animals and carts; others were affected by hernias or "ruptures" from lifting heavy objects; and fishermen always risked drowning as well as various injuries at sea (168). Of course, there was nothing in the Barbadian work environment that made it significantly different from other sugar-growing areas and the island's enslaved population was exposed to the

same kinds of occupational hazards as those elsewhere in the Caribbean. Barbadians experienced many similar, if not identical, types of deliberate physical abuses experienced by enslaved persons in other Caribbean areas. The island's 1826 Slave Consolidation Act penalized free people who intentionally "maim, mutilate, or dismem-ber, or cause to be maimed, mutilated, or dismembered" any enslaved person. Accidental cases were treated differently, as were cases in which the court found justifiable cause; for example, the commission of a felony such as robbery or arson. Whether, and to what extent, this clause was enforced is another matter, but it nonetheless suggests the broad types of physical, to say nothing of psychological traumas that could be inflicted through the orders or whims of white authority (169).

Enslaved Barbadians frequently displayed the scars of the whip, the ubiquitous tool and symbol of authority, which "when used with severity", William Dickson wrote, "tears the flesh, and brings blood at every stroke"; they might also have shown the effects of club or rod beatings. Ulcerous and infected wounds could be produced by chains around their legs, iron collars around their necks or the abrasive action of having their limbs placed in stocks. Body mutilation also occurred. For example, one or two ears could be intentionally severed by an overseer or master, and it apparently was not uncommon, especially during the1600s and for much of the 1700s, for punishment to include having hot sealing wax or hot syrup dropped on different body parts. Also, especially in the earlier periods, branding was inflicted. For example, Governor Lowther branded "with his own coat of arms on their breasts", and in the early eighteenth century the Church of England's Codrington plantations customarily branded "with a red hot iron upon ye naked breast of ye new Negroes . . . these letters SOCIETY in large characters" (170). Aside from the wounds and mutilations inflicted by masters, bodies could be marred by actions enslaved persons took against each other. Within their settlements or in other areas where they congregated for drinking, dances and similar social events, arguments or fights could produce knife or other wounds which might result in severe bodily damage, permanent maiming or even death (171).

Hurricanes and heavy storms could also cause death, injuries requiring medical attention, and lifetime crippling. Despite Barbados's marginal location in relation to the Caribbean hurricane zone, during the slave period the island was occasionally hit by hurricanes, some of which caused many fatalities, considerable numbers of wounded and general human misery (172). All major storms destroyed buildings, tore off roofs, etc., and the fragility of slave houses made them particularly vulnerable to the destructive effects of hurricanes. Flying debris, uprooted trees, falling buildings, if they did not result in death, caused a variety of injuries ranging from skull concussions to broken limbs and bones. Moreover, major storms or hurricanes could also result in significant crop loss, sometimes causing serious food shortages, thereby increasing the nutritional problems of an already malnourished population and making it even more vulnerable to disease.

The result of work-related and other accidents, fights, assaults by slave masters, and so forth was that many people bore the visible signs of permanent disfigurement, scars, lameness, or other kinds of surface afflictions. There were numerous cuts and puncture wounds, lacerations caused by whippings, broken bones, skull fractures, amputated limbs or toes, lame backs, ruptures and burns and scalds (sometimes resulting from cooking fires) of one degree or another.

Congenital Disorders and Degenerative Diseases

In addition to physical deformities resulting from accident or the intentional actions of others, or those caused by such diseases as leprosy, yaws, or small pox, other permanent disfigurements, impossible to quantify, resulted from genetic defects, for example, clubfoot, cleftpalate and the like. Moreover, it is safe to assume that enslaved as well as free people, regardless of racial grouping, suffered a variety of degenerative diseases ranging from failing eye sight to arthritis and rheumatism, and most adults, it can be surmised, experienced muscular aches and pains, strained backs and so forth at one time or another during their lifetimes (173).

Witchcraft and Sorcery

Physical ailments that originate in the human psyche are found in all societies and the slave societies of the Caribbean, including Barbados, were no exception. It is well known that emotional states of depression, despair, fright, *etc*. can leave an individual vulnerable, and that psychological factors can very much influence, as the ethno-botanist Wade Davis has noted, the "likelihood of becoming ill or even dying". Social science and medical literature have well established that a person who deeply believes that he or she is the object of evil magic, such as a sorcerer's spell, curse, or other action, can acquire "an incapacitating anxiety which, if not relieved, can manifest physical symptoms"; numerous accounts and reports from societies throughout the world attest the presence of "death or illness by suggestion" (174). Although the precise mechanisms by which psychological suggestion can cause death or injury are not completely known, the process involves a variety of interrelated factors that link the brain with the autonomic nervous and cardiopulmonary systems. Death or injury by suggestion, in the old literature often referred to by the misleading and ethnocentric, if not racist, term "voodoo death", but better characterized as "psychogenic death or illness", displays a consistent pattern cross-culturally: the victim shares a profound cultural belief, which has been inculcated since childhood, that illness and death will result from evil magic. When an individual believes himself, for whatever reason, the victim of such magic, his conditioning leads him to expect the worst, and he "acts out what amounts to a self-fulfilling prophecy"; "fear makes the victim psychologically

vulnerable, and this in turn affects physical health" with physiological changes ultimately leading to illness or death (175).

West African cultures, with their long-standing and traditionally profound beliefs in witchcraft and sorcery as causes of serious illness and death, fell into the wider category of psychogenic forces causing illness or death. Enslaved Barbadians, heavily influenced by their African backgrounds also succumbed to evil magic – in the primary sources often called obeah by Europeans – and occasionally displayed symptoms that conformed to the wider pattern of psychogenic illness. Obeah, it must be stressed, has been much misunderstood, even maligned, by writers in earlier periods as well as by modern scholars. The practices that Whites often characterized as obeah largely played positive functions within the enslaved community and were used for socially beneficial ends, such as treating illness, bringing good fortune, protecting against harm and avenging wrongs. Although obeah practices, which included the use of material objects and local flora, were sometimes used to harm others, Europeans distorted the positive role of obeah in the lives of many enslaved persons (176). Here, however, it is relevant to observe that many Barbadian Whites believed (probably reflecting the beliefs held by many of the enslaved themselves) that, in the words of an early law making obeah a felony, "many slaves have lost their lives or have otherwise been materially injured in their health" through the workings of obeah practitioners (177).

The psychogenic symptoms that are indicated in the Barbados primary sources reflect the universal pattern wherein, Davis writes, "the victim becomes despondent, anxious and fearful". In the mid-1700s, for example, Robert Poole, a visiting English doctor, described a woman who believed herself bewitched, and "tho' healthy and strong before, yet she wasted away extremely fast and died"; another person in a similar circumstance, he noted, "began to grow thin, and fail in his stomach". "If once a Negro believes that he is bewitched," wrote Griffith Hughes, "the notion is so strongly riveted in his mind that . . . he usually lingers till death puts an end to his fears." Years later, Governor Parry reported how "many of them despond and die when they conceive themselves bewitched", and the Barbados Council described obeah victims as having "a dejection in spirits, and a gradual decay". John Brathwaite, the island's agent, provided the most details. He described obeah victims as experiencing "loss of appetite, great listlessness, languor and debility, with a propensity to eat improper and indigestible food, declaring frequently that they are bewitched, and going moping about all day long; hence obstructions, swellings of the extremities, tympany, death"(178).

Whatever the actual clinical symptoms and aetiology, Whites considered obeah a significant cause of death and injury. Yet, it is impossible to establish if it was actually responsible for all of the physical misfortune that Whites claimed. Poisoning appears to have accounted for some of the alleged obeah deaths (although poison was not an intrinsic feature of obeah, as some modern scholars are prone to believe) but without question some enslaved persons also died as a result of psychosomatic processes.

General Observations, Widespread Symptoms and Every day Complaints

Those who survived the very dangerous years of infancy and early-childhood developed into adults who suffered from a wide array of ailments and diseases. Africans who survived the trans-Atlantic crossing and the traumas of adjusting to the plantation regimen suffered likewise. The working and living conditions of the plantations, where most enslaved Barbadians lived, were hostile to health and no plantation settlement was exempt from health problems. At any given time many in a settlement could legitimately complain of some serious disorder or another. Some afflictions caused great discomfort and pain; others severely debilitated and permanently maimed or even proved fatal. Regardless of the contemporary European medical diagnoses (or misdiagnoses) of these disorders, enslaved people experienced symptoms and physical conditions of varying degrees of severity and incapacitation. It is impossible to quantify most of these disorders. Yet, the pathologies discussed in the preceding pages offer some reasonably clear indications from which one can infer what these symptoms and conditions included.

Enslaved Barbadians regularly contracted fevers and chills, had a diversity of gastrointestinal or abdominal disorders, sometimes involving extreme pain and discomfort, often experienced mild to severe diarrhoea and constipation, and sometimes had difficulties urinating. They frequently suffered headaches, dizziness, nausea and vomiting. Not uncommonly they lost their appetites and had general feelings of fatigue or listlessness, sometimes accompanied by shortness of breath. Sore throats, coughs (sometimes involving the excretion of pus-filled sputum or blood), congested nasal passages and painful swellings in the mouth, neck and throat, abdominal areas and legs occurred as well. Aches and pains in body joints, muscles and the chest area were abundant. Backaches or back strains and hernias or ruptures – widespread among enslaved populations in the New World – existed to varying degrees of severity and frequency. Sometimes there occurred convulsions or painful body spasms, internal haemorrhages and pus flowed from the sexual organs. Skin disorders were common and often included rashes, blisters, ulcerating body and leg sores, and lesions on the face, hands, or legs. Skin irritations could produce intense itching; burns, some extremely severe, were common; and there were widespread body surface cuts and wounds or deep lacerations, broken limbs and bones, amputated limbs, and lameness. People were vulnerable to small animal and insect bites, there were dental problems, often involving painful toothaches, earaches and eye problems, including failing eyesight and blindness. In some

cases, blindness possibly could have been caused by trachoma, a bacterial infection that is still widespread in rural areas among people who live in close quarters and under impoverished conditions (179).

There are very limited specific data from Barbados on what women suffered, particularly during their pregnancies and childbirth. One can conjecture, however, that they were vulnerable to an array of gynaecological and other problems. These resulted from the limited knowledge of obstetrics, particularly when it came to difficult and abnormal deliveries, the unhygienic conditions in which they lived (including the dingy and filthy plantation "sick houses" where birth sometimes occurred), their generally malnourished state (pregnant and lactating women were especially prone to the effects of poor nutrition), disease, and the heavy labour demands and discipline of the sugar regime. Thus, women undoubtedly suffered amenorrhoea (the absence of menstruation), delayed menarche (onset of menstruation and puberty), and early menopause, high rates of sterility and low fertility, miscarriages, stillbirths, premature births, haemorrhaging, infections at delivery and even death in childbirth (180).

In general, then, Barbadians, in common with other enslaved West Indians, were often low in physical energy, suffered nutritionally induced diseases and were especially vulnerable to infectious disease because of their low nutritional levels. As with all human populations under similar conditions of poverty and material oppression, dietary deficiencies and poor nutritional conditions had forbidding consequences for general health and well-being (181).

Many of the ailments and disorders that affected the enslaved, if they did not kill, were merely endured, and, as in all human communities, the body's capacity for healing itself without medical intervention was relied upon. In other cases, however, medical problems were treated by using local plants (plant medicines were ubiquitous in African-American cultures) and other materials, and various techniques, sometimes, greatly influenced by African practices.

The practices surrounding obeah, a large part of which was devoted to healing and protection, also involved the manipulation and application of material objects and flora (182). By the late eighteenth and early nineteenth centuries slave masters on medium-to-large plantations became more regularly involved in the medical problems of the enslaved and occasionally employed European-trained doctors and other medical practitioners who provided sporadic and, usually, superficial service. However, in addition to the social distance between enslaved Barbadians and European medical practitioners and the distrust the former often had for the latter, European medicine, as many scholars have observed, not infrequently aggravated the very illness it was attempting to cure; moreover it was not necessarily more efficacious in confronting medical problems than the body's own natural defences and what the enslaved community provided for itself. "In truth," Kiple writes, "the slaves would probably have been better off with their own practitioners, for white medicine in the West Indies was, to put it charitably, of low quality." Indeed, considering the several centuries encompassing the slave period, enslaved Barbadians (as those elsewhere in the Caribbean and in slave societies throughout the New World) overwhelmingly relied on the resources of their own communities and their own medical practitioners and healers to deal with the multiplicity of medical problems and health issues they confronted (183).

NOTES

105. Frank C. Ramsey, Protein-Energy Malnutrition in Barbados (New York: Josiah Macy Jr. Foundation, 1979), xvii.
106. Their diet was overwhelmingly vegetable, despite the occasional consumption of animal products, such as imported dried salt fish and meat, or fish from local waters. Guinea corn was by far the most important food (Indian corn, or maize, played a secondary role), although during the seventeenth century potatoes and plantains (the latter was particularly significant in the seventeenth century and early eighteenth) were also very important. The triad of potatoes, yams, and eddoes, collectively referred to as "roots" or "ground provisions", also played an important role. The potato, in particular, was relied on as a back-up food when the corn crop failed or was insufficient. Plantations occasionally distributed other vegetables, but none played a significant dietary role (J. Handler, "Plantation Slave Settlements in Barbados, 1650s–1834", in Alvin O. Thompson, ed., In the Shadow of the Plantation: Caribbean History and Legacy [Kingston, Jamaica: Ian Randle, 2002], 123–61). A recent publication on the skeletal remains of an enslaved population in Bridgetown suggests that although these town dwellers consumed the same kinds of staples as their plantation counterparts, "many" of the former "appear to have had access to a wider variety and greater quantity of food" than the latter (Kevin Farmer, Frederick H. Smith, Karl Watson and Jennifer Yamazaki, "The Health and Lifestyles of Bridgetown's Enslaved Population", Journal of the Barbados Museum and Historical Society [hereafter, JBMHS] 51 [2005]: 151–65; see note 147 for details).
107. R. S. Corruccini, K. Jacobi, J. Handler and A. C. Aufderheide, "Implications of Tooth Root Hypercementosis in a Barbados Slave Skeletal Collection", American Journal of Physical Anthropology74 (1987): 179–84.
108. J. Handler, R. S. Corruccini, "Plantation Slave Life in Barbados: A Physical Anthropological Analysis", Journal of Interdisciplinary History14(1983): 78, 81. Expanding on previous research at Newton, Kristrina A. Shuler's analyses of 49 additional skeletons for her doctoral dissertation confirm the dietary inadequacy and nutritional stress of the enslaved. In general, the Newton skeletal population she analyzed yielded evidence for a substandard diet, with episodic starvation, and a highly malnourished population ("Health, History, and Sugar: A Bioarchaeological Study of Enslaved Africans from Newton Plantation, Barbados, West Indies [PhD dissertation, Department of Anthropology, Southern Illinois University, Carbondale, 2005], passim). Shuler has recently published a detailed summary of her dissertation findings in "Nutritional Health of Enslaved Africans from Newton Plantation, Barbados: New Data", JBMHS, 51 (2005):166–75. See also Farmer et al, "Health and Lifestyles" (also note 147).
109. Ramsey, xvii and passim.
110. Kenneth F. Kiple, The Caribbean Slave: A Biological History (Cambridge: Cambridge University Press, 1984), 130
111. Ibid., 29; Ramsey, 154.
112. J. R. Galler, F. Ramsey, G. Solimano, W. E. Lowell and E. Mason, "The Influence of Early Malnutrition on Subsequent Behavioral Development", parts 1 and 2, Journal of the American Academy of Child Psychiatry22 (1983):8–15, 16–22.
113. Kiple, Caribbean Slave, 129–30; Ramsey, 150.

114. J. F. Brock, M. Autret, “Kwashiorkor in Africa”, Bulletin of the World Health Organization, 5 (1952): 1–73; H. C. Trowell, Kwashiorkor (London: Arnold, 1954).
115. 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, 35(1978): 369; cf. Maurice Iwu, African Ethnomedicine (Enugu, Nigeria: USP Press, 1988), 25; Ramsey, 79.
116. J. Handler and R. S. Corruccini, “Weaning among West Indian Slaves: Historical and Bioanthropological Evidence from Barbados”, William and Mary Quarterly, 43 (1986): 111–17. Studies of malnourished Barbadian children in the mid-1960s found the lactation periods about equally short, and confirmed a more general rule that “the onset of malnutrition occurs at an earlier age as the duration of breast feeding decreases” (Ramsey, 2, 67, 72).
117. Governor Parry, Replies to Queries; “Minute Book of the Society for the Improvement of West India Plantership”, 128–34; Kiple, Caribbean Slave, 131.
118. Ramsey, 46, 149; “Minute Book of the Society for the Improvement of West India Plantership”, 128–34.
119. For example, Elizabeth Etheridge, “Pellagra”, in Kenneth F. Kiple, ed., The Cambridge Historical Dictionary of Disease(Cambridge: Cambridge University Press, 2003), 242–44; Kiple, Caribbean Slave, 94–95.
120. Rice was not grown in Barbados and was imported, usually, but not solely, from North America. As a relatively expensive food, plantations in the eighteenth century only occasionally distributed it, usually as part of a medicinal diet for the young, sick, or elderly, and sometimes for others during periods of famine or food emergencies. It may have become more common as an occasional dietary supplement for enslaved workers as well by the end of the 1700s and in the early 1800s. In the latter period, importations occasionally increased when the corn crop was precarious for lack of rain. However, rice did not become a staple of the working-class Barbadian diet until after emancipation. (The preceding paragraph is based on evidence from a variety of primary sources from the eighteenth and nineteenth centuries.)
121. Kiple, Caribbean Slave, 94–95, 225n33; Ramsey,15, 21, 24. Tropical sprue is associated with a variety of nutritional deficiencies and affects both adults and children. In this disorder the small intestine does not absorb sufficient nutrients, causing protein malnutrition and multiple nutritional shortages, frequently worsened by severe infection. Its main symptom is recurrent diarrhoea, but it also involves appetite loss, weakness, wasting away and emaciation. It can lead to progressive anaemia and death. Tropical sprue is widespread in the tropics, and in the Caribbean it has been reported for Puerto Rico and Barbados. William Hillary’s treatise on diseases in Barbados contains, according to Booth, “the earliest account of tropical sprue” in the medical literature. Although he does not specifically mention enslaved people, they often displayed symptoms that were characteristic of tropical sprue, even though such symptoms were also associated with other diseases, including pellagra (C. C. Booth, “William Hillary: A Pupil of Boerhaave”, Medical History, 7 [1963]: 297, 310–12; cf. Kiple, Caribbean Slave, 96, 226n43; Walter D. Glanze, Kenneth Anderson and Lois Anderson, The Mosby Medical Encyclopedia[New York: New American Library, 1985], 684, 753).
122. Kiple, Caribbean Slave, 96–97, 126.
123. Ibid., 99, 103, 128. Contemporary Barbadian (and West Indian) medical sources often refer to dropsy (today, oedema), a vaguely defined condition referring to bodily swellings resulting from fluid accumulation. Patterson notes that dropsy, which could be a “hopelessly vague and meaningless [term] in the context of modern terminology”, was apparently common in Barbados and affected all racial groups. There is no evidence that one racial or age group suffered more than the other. In the late 1700s and early1800s, for example, dropsy was considered one of the major killers at Newton, affecting both adults and children about equally; it was also identified as a major killer on the Codrington plantations in the eighteenth century (K. David Patterson, “Disease Environments of the Antebellum South”, in Ronald L. Numbers and Todd L. Savitt, ed., Science and Medicine in the Old South[Baton Rouge: Louisiana State University Press, 1989], 155; J. Handler and Frederick W. Lange, Plantation Slavery in Barbados: An Archaeological and Historical Investigation[Cambridge, Mass.: Harvard University Press, 1978], 98–99; J. Harry Bennett, Bondsmen and Bishops: Slavery and Apprenticeship on the Codrington Plantations of Barbados, 1710–1838 [Berkeley and Los Angeles: University of California Press, 1958], 56–57; also Joshua Steele, “Queries from . . . Governor Parry, Answered by a Planter of 1068 Acres”, Parliamentary Papers, 26 [London, 1789], 25;Richard Towne, A Treatise of the Diseases Most Frequent in the West Indies(London, 1726), 135; “Minute Book of the Society for the Improvement of West India Plantership”, 128–34, 142). Although the symptoms of dropsy are not clearly, or minimally, indicated, the term was probably applied to a variety of ailments or gastrointestinal disorders involving bodily swellings. Conjecturing about the slave period in Barbados, Ramsey suggests that many persons “eventually succumbed to the dropsy, with its swelling precipitated by hunger or famine”, directly resulting from PEM. Nutritional oedema was also one of the diseases common among malnourished Barbadian children as late as the 1940s (Ramsey, 7, 24; Kiple, Caribbean Slave, 98–99, 103).
124. John R. K. Robson, F. A. Larkin et al., Malnutrition (New York: Gordon and Breach, 1972), 35; Jacques M. May and Donna L. McLellan, “The Ecologyn of Malnutrition in Seven Countries of Southern Africa and in Portuguese Guinea”, Studies in Medical Geography, 10 (1971): 42; Melinda Meade, “Beriberi”, in Kiple, Historical Dictionary, 44–48; Robert Dirks, The Black Saturnalia: Conflict and its Ritual Expression on British West Indian Slave Plantations (Gainesville: University of Florida Press, 1987), 88–89.
125. Dr Caddell, [Report on the Health of Barbados Slaves], Meeting of 14November 1812, in “Minute Book of the Society for the Improvement of West India Plantership”, 100105.
126. Kiple, Caribbean Slave, 93.
127. Hillary, 297; Kiple, Caribbean Slave, 29, 90.
128. Griffith Hughes, The Natural History of Barbados(London, 1750), 147; Kiple, Caribbean Slave, 89–90; Richard Sheridan, Doctors and Slaves (Cambridge: Cambridge University Press, 1985), 119. Ophthalmia had a much broader meaning in earlier times, and could refer to a variety of eye diseases (see Mary C. Karasch, “Opthalmia (Trachoma, Conjunctivitis)”, in Kiple, Historical Dictionary, 230–34).
129. Kiple, Caribbean Slave, 42, 91; Barbados Mercury (newspaper), 1783–1805, passim.
130. Shuler found no evidence of scurvy; she found only one “clear” and two “possible” cases of rickets among 49 skeletons recovered from Newton cemetery (“Health, History, and Sugar”, 230, 256).
131. Ramsey, 24; cf. Kiple, Caribbean Slave, 39, 91.
132. For example, “Minute Book of the Society for the Improvement of West India Plantership”,105, 146, 151; also F. W. N. Bayley, Four Years Residence in the West Indies, during the Years 1826, 7, 8, and 9 (London: William Kidd,1832), 90; Bennett, 33; Richard Ligon, A True and Exact History of the Iland of Barbados (London, 1657), 110; Philip Gibbes, Instructions for the Treatment of Negroes, etc. etc. etc. (London, 1786; reprinted with additions, London,1797), 21; Barbados Department of Archives, Mount Gay, “Plantation and Refinery Journal”, 1809–1836, passim; British Library, Additional MSS.43507, fols. 1–5, Lowther Plantation, “The Barbadoes plantation – accompts. Commencing January 1st 1756 and ending December 31, 1756”; ibid., fols.7–30, “An Abstract of the Accounts of Lowther’s Plantation in Barbados,1825, 1827, 1828, 1829, 1833, 1835”.
133. “Minute Book of the Society for the Improvement of West India Plantership”, 58–62.
134. Jacques Henry and Alicia M. Kwong, “Why Is Geophagy Treated Like Dirt?”, Deviant Behavior: An Interdisciplinary Journal 24 (2003): 353–71 (Henry and Kwong developed a novel argument concerning differing perceptions of dirt in Western and non-Western

cultures and provided a review of recent literature); John M. Hunter, "Geophagy in Africa and in the United States", Geographical Review, 63 (1973): 170–95; Donald Vermeer, "Geophagy among the Ewe of Ghana", Ethnology, 10 (1971): 56–72; Carol L. Jenkins, "Geophagy in Fayette County, Tennessee", Tennessee Anthropologist, 5 (1980): 74; also Brian Higgins, "Pica", in Kiple, Historical Dictionary, 247–50.

135. David Mason, "On Atrophia a Ventriculo (Mal d'Estomac), or Dirt-Eating", Edinburgh Medical and Surgical Journal39 (1833): 290–92; Henry Vaillant, personal communication.
136. James Maxwell, "Pathological Inquiry into the Nature of Cachexia Africa", Jamaica Physical Journal2 (1835): 41; Mason, 290–92; J. Hancock, "Remarks on the Common Cachexia, or Leucophlegmasia, called Mal d'Estomac in the Colonies", Edinburgh Medical and Surgical Journal35 (1831): 67 ff.
137. Richard Bate, [Letter to Barbara and John Newton], 31 May 1693, in Richard Pares, "Barbados History from the Records of the Prize Courts", JBMHS, 6 (1938):10–20; Steele, "Queries from . . . Governor Parry", 26;"Minute Book of the Society for the Improvement of West India Plantership", 128–34, 142, 150; J. W. Pringle, "Report on Prisons in the West Indies", Parliamentary Papers, Papers Relating to the West Indies, 3, rept. 270 (1838): 12; Davy, 102.
138. There are some indications from the West Indian sources that "newly imported slaves were especially likely to eat clay" (Sheridan, 217).139. Henry and Kwong, "Geophagy", 355; Jenkins, "Geophagy", 75, 77, 80;Hunter, "Geophagy", 170–95; Vermeer, "Geophagy", 56-72; Kiple, CaribbeanSlave, 229n87. 140. For example, Steele, "Queries from . . . Governor Parry", 26; Davy, 102; "Minute Book of the Society for the Improvement of West India Plantership", 128–34; Mason, 290–92.141. Henry and Kwong, "Geophagy", 353; cf. Higgins, "Pica". 247–50; Hunter, "Geophagy", 188; Barry W. Higman, Slave Populations of the British Caribbean, 1807–1834 (Baltimore: The Johns Hopkins University Press, 1984), 296–98; Kiple, Caribbean Slave, 99–103, 229n95; Sheridan, 216–19.
142. Moreau De Yonnes [Junnes], "Account of the People of the Antilles who Eat Dirt", The Scots Magazine, 79 (1817): 428–30; Mason, 291–92; Maxwell,"Pathological Inquiry", 417; cf. Higman,295, 296; Sheridan, 218.
143. For example, Steele, "Queries from . . . Governor Parry", 26; Newton Estate Papers (NEP) 523/276, "List of Negroes on Seawell", 15 April 1791; Mason, 292–93, 295. For a review of various arguments concerning the nutritionalvalue of geophagy, see Henry and Kwong, "Geophagy", 353–71; Higgins, "Pica", 247–50; Hunter, "Geophagy", 173, 188–89. Kiple makes a particular case for calcium deficiency (Caribbean Slave, 101–3, 229n887); also,Jenkins, "Geophagy", 74–75, 80; Vermeer, "Geophagy", 70.
144. Sheridan, 217; cf. Higgins, "Pica", 247–50.
145. Hunter, "Geophagy", 182, 189; Kiple, Caribbean Slave, 99; Sergio Ginaldi, "Geophagia, An Uncommon Cause of Acute Abdomen", Annals of Emergency Medicine, 17 (1988): 979–81; G. P. Gudson, C. Tunca, "Pica and Mimicking Abruptio Placenta", Obstetrics and Gynecology, 43 (1974):197–99; Thomas C. Key et al., "Geophagia as a Cause of Maternal Death", Obstetrics and Gynecology, 60 (1982): 525–26. Kiple argues that the symptoms of cachexy or mal d'estomac described by early doctors could fit pica as well as other diseases, including wet and dry beriberi and nutritional anaemia (Caribbean Slave, 102–3).
146. James Grainger, An Essay on the More Common West India Diseases (London, 1764), 41; David Collins, Practical Rules for the Management and Medical Treatment of Negro Slaves in the Sugar Colonies(London: Printed by J. Barfield, 1811; 1st ed., 1803), 313–16; Barbados Mercury 1805–1806, passim; cf. Kiple , Caribbean Slave, 224n16.
147. E. C. Scott and B. R. De Walt, "Subsistence and Dental Pathology Etiologies from Prehistoric Coastal Peru", Medical Anthropology, 4 (1980): 267. Unless otherwise noted, this section is principally based on materials treated in greater detail in several publications, including R. S. Corruccini, J. Handler, R. Mutaw , F. W. Lange, "The Osteology of a Slave Burial Populationfrom Barbados, West Indies", American Journal of Physical Anthropology 59 (1982): 443–59; Corruccini et al., "Tooth Root Hypercementosis", 179–84;R. S. Corruccini, J. Handler, K. Jacobi, "Chronological Distribution of Enamel Hypoplasias and Weaning in a Caribbean Slave Population", Human Biology, 57 (1985): 699–711; Handler and Corruccini, "Plantation Slave Life in Barbados", 65–90; ibid. "Weaning among West Indian Slaves", 111–17. Subsequent analyses of the original Newton sample, completed after these publications, required some modifications of previously published findings, and I am grateful to Robert Corruccini for his assistance and comments on earlier drafts of this section. More recently, Shuler's analyses of 49 additional skeletons from Newton generally confirm earlier findings on dental pathologies, although she found even higher rates of dental decayth an observed on the earlier sample ("Health, History, and Sugar", 255, 286; also ibid., "Nutritional Health", 166–75). In addition, a recent bio-anthropological study of remains excavated in the late 1990s of about 19 enslaved Barbadians, recovered from Fontabelle and Pierhead (two burial grounds in Bridgetown), sheds additional light on pathologies. Jennifer Yamazaki, who conducted the analysis, primarily of the dentition, noted the similarities in dental and skeletal pathologies (for instance, hypercementosis, malocclusion, asymmetry, dental caries, periodontitis) between Newton and the urban population, describing them in detail but stressing that the differences in their "frequencies and severities highlight important differences between urban and rural slave life". For example, enamel hypoplasias were discovered "in only about 20 per cent" of the urban population, as contrasted with about 98 per cent at Newton. This suggests that town dwellers "experienced far fewer episodes of nutritional stress in their early years than their comrades on rural sugar estates" and that the urban diet "was better able to meet the caloric needs of the population" (Farmer et al., "Health and Lifestyles", 158, 163).
148. Ramsey, 21.
149. For example, see Kiple, Caribbean Slave, 91, 103, 224n15. Calcium deficiencies are also suggested by the degree of the lead contamination found in the Newton skeletons.
150. This section is based on J. Handler, A. C. Aufderheide, R. S. Corruccini, "Lead Contact and Poisoning in Barbados Slaves: Historical, Chemical, and Bioanthropological Evidence", Social Science History, 10 (1986): 399–425. This article provides the historical evidence not included here, and gives the physical evidence in more detail.
151. In an earlier publication (ibid.) I claimed that the earliest direct reference to dry bellyache in Barbados dated from 1660. Later, however, Ligon's observation in 1647–1650 came to my attention: "The immoderate use of rum", he wrote, "causes costiveness, and tortions in the bowels, which is a disease very frequent there; and hardly cur'd, and of which many have dyed". This appears to be a clear reference to the dry bellyache, strongly suggesting that the disorder emerged concurrently with the development to f rum distillation (Handler et al., "Lead Contact", 408; Ligon, 27; Thomas Tryon, Friendly Advice to the Gentlemen Planters of the East and West Indies [London, 1684], 58–59).
152. Towne, 88–90, 183–85; Hughes, 34; Collins, 232; J. Clark, A Treatise on the Yellow Fever [and] . . . Some Other West Indian Diseases(London, 1797), 115–16. William Hillary provided a vivid and detailed description of dry bellyache, based to some extent on Towne's earlier description.
153. Hughes, 34.
154. Arthur Aufderheide, MD, and his colleagues conducted these analyses, and Aufderheide significantly contributed to an understanding of their clinical implications and possible relevance to Newton's population. 155. Hillary, 183–85.
156. The process by which early sugar- and rum-manufacture technology contributed to lead contamination is described in Handler et al., "Lead Contact", 410–15.
157. Historical evidence is insufficient to determine which group was more affected by dry bellyache. Whites of all class levels seem to

have had greater access to alcoholic beverages and other sources of lead than Blacks, and they probably had a greater incidence of the dry bellyache. The greater incidence of the disease among Whites may also be reflected in the implications of many medical sources that the patients were white, even though racial groups are usually not specified. In any case, the frequency of white exposure to lead contamination and dry bellyache cannot be ascertained with certainty because West Indian historical sources generally omit comparative racial statements, and no white skeletal materials were available for analysis. An exception in the literature is Dr James Grainger's (p. 34) observation that "blacks are oftener tormented with the dry Belly Ach than the whites".

158. Handler et al., "Lead Contact", 399–425; Kiple, Caribbean Slave, 100–101.
159. I thank Dr Philip A. May (Center of Alcoholism, Substance Abuse, and Addictions, University of New Mexico) for his advice on an earlier draft of this section (personal communication, 10 December 1996).
160. Dalby Thomas, An Historical Account of the Rise and Growth of the West India Colonies (London, 1690), 17.
161. Plantation workers also received small allowances of rum as part of their food rations; usually these allowances were mixed with molasses. By the late eighteenth century the molasses/rum mixtures were a standard ration, usually given with the midday meal but sometimes twice a day. In addition, small amounts of undiluted rum were sometimes allocated, especially when the weather was damp or when field workers engaged in particularly arduous labour, such as digging cane holes.
162. Hughes, 36; also Richard Hall, A General Account of the First Settlement and of the Trade and Constitution of the Island of Barbados, written in the year 1755; with a foreword by E. M. Shilstone (Bridgetown, 1924), 13.
163. Ibid.; George Pinckard, Notes on the West Indies, 3 Vols. (London: Longman, Hurst, Rees and Orme, 1806), 1: 205; "Minute Book of the Society for the Improvement of West India Plantership", 128.
164. T. W. B. Hendy, An Attempt to Prove the Fallacy of Inflicting Corporal Punishment as Preparatory to its Extinction in West-India Slave Discipline (Bridgetown: The Globe Office, 1833), 34. For other references to the popularity of rum among enslaved Barbadians, see, for example, Ligon, 92–93;Anon., Authentic History of the English West Indies (London: Printed for the author, Dean and Munday [printers], 1810), 42; Henry Holder, A Short Essay on the Subject of Negro Slavery with a Particular Reference to the Island of Barbadoes (London, 1788), 22; Hughes, 36; "Minute Book of the Society for the Improvement of West India Plantership", 66, 122, 123. Some early laws attempted to curtail drinking and access to rum and other alcoholic beverages by Blacks (see William Rawlin, The Laws of Barbados [London, 1699],189; cf. Richard Hall, Acts, Passed in the Island of Barbados[London, 1764],131; Samuel Moore, The Public Acts in Force; Passed by the Legislature of Barbados [London, 1801], 239). For an overview of alcohol and its broader socio-cultural context among enslaved West Indians, see Frederick Smith, "Spirits and Spirituality: Enslaved Persons and Alcohol in West Africa and the British and French Caribbean", Journal of Caribbean History 38, no. 2 (2004): 279–308. 165. Kiple, Caribbean Slave, 153.
166. For example, Barbados Mercury, 1783–1805, passim; Barbados Gazette, or General Intelligencer, 1787–1788, passim.
167. Barbados Mercury, 1783–1819, passim. These scars are to be distinguished from the "country marks" or intentional facial and body scarifications that some times appeared on the African-born.
168. Edward Littleton, The Groans of the Plantations [London, 1689], 19–20; Grainger, 63, 65; Joseph Senhouse, quoted in Sheridan, 189. The primary sources contain many examples of the accident environment confronting enslaved Barbadians.
169. Barbados, "An act to repeal several acts and clauses of acts respecting slaves, and for consolidating and bringing into one act, the several laws relating there to", October 1826, in "Papers . . . for the melioration of the condition of the slave population in . . . the West Indies", Parliamentary Papers, Vol. 25, unnumbered Rept., clauses 41, 49.
170. William Dickson, Letters on Slavery (London, 1789), 14–15; Deposition of William Gordon, 12 February 1720, in Calendar of State Papers-Colonial Series(hereafter, CSP-CS) 1720, 353; United Society for the Propagation of the Gospel, Letter Books, Series A, Vol. 24, p. 269, Arthur Holt to Society,3 April 1732. Examples of physical punishment and torture, especially for the earlier periods, are legion. Branding seems to have ceased by the last part of the eighteenth century, and mutilation and extreme forms of torture evidently decreased by this period as well.
171. For example, Forster Clarke, [Letter to the Secretary of the Society for the Propagation of the Gospel], 7 May 1828, Annual Report[for 1827] (London: Society for the Propagation of the Gospel in Foreign Parts, 1828), 218; Littleton, 19–20; Pinckard, 1: 260–61; United Brethren, Periodical Accounts (1832): 86.
172. Destructive storms or hurricanes are recorded for the mid-1650s, 1675, 1731, the mid-1730s, 1780, 1786, 1819 and 1831. The hurricanes of 1780 and 1831 were particularly devastating. In the former, over 2,000 enslaved people perished, and another 1000 died afterwards because of food short-ages and famine. Over 1000 died as a result of the 1831 hurricane – see, for example, F. Berg, Letter, 18 October 1819, in United Brethren, Periodical Accounts, 7 (1819): 175–77; James Bovell, "Observations on the Climate of Barbadoes . . . with remarks on . . . Barbadoes leg", British American Journal of Medical and Physical Science4 (1848): 170; Anon., A Continuation of the State of New-England(London, 1676); CSP-CS (1574–1660), 451; ibid. (1675–1676), 294–95; [John?] Fowler, A General Account of the Calamities Occasioned by the late Tremendous Hurricanes and Earthquakes in the West India Islands (London, 1781), 32; The Gentleman's Magazine (London, 1786), 987–88; J. Handler, ed., "Father Antoine Biet's Visit to Barbados in 1654",JBMHS, 32(1967): 65; Samuel Hyde, Account of the Fatal Hurricane by which Barbados Suffered in August 1831 (Bridgetown: Printed for the author, Thomas Ellis [printer], 1831); Robert Schomburgk, The History of Barbados (London: Brown, Green and Longmans, 1848), 45–63, 696.
173. For example, Barbados Mercury, 1783–1805, passim; cf. Higman, 293–94; J.B. S. Jackson, "Diseases of the Island of Barbadoes", Boston Medical and Surgical Journal 76 (1867): 447.
174. Wade Davis, Passage of Darkness: the Ethnobiology of the Haitian Zombie (Chapel Hill: University of North Carolina Press, 1988), 198, 205. See ibid., 197–207 for a review of the basic literature and related issues. For "socially based illness" on plantations in the United States South, see Sharla M. Fett, Working Cures: Healing, Health, and Power on Southern Slave Plantations(Chapel Hill, University of North Carolina Press, 2002), 85–100.
175. Davis, 199, 204, 207. 213.
176. J. Handler, "Slave Medicine and Obeah in Barbados, ca. 1650–1834", New West Indian Guide, 74(2000): 57–90; J. Handler and Kenneth Bilby, "On the Early Use and Origin of the Term Obeah in Barbados and the Anglophone Caribbean", Slavery and Abolition 22 (2001): 87–100; Kenneth Bilby and J. Handler, "Obeah: Healing and Protection in West Indian Slave Life", Journal of Caribbean History 38, no. 1 (2004): 153–83. Broadly speaking, "conjuring" in the United States South bore striking similarities to what was called obeah in the British West Indies. It played a similar role for the enslaved community and evoked similar negative reactions from Whites (Fett, 84–108 and passim).
177. National Archives, London, Colonial Office documents (CO) 30/18, no. 262, "An Act for the Punishment of Such Slaves as Shall be Found Practising Obeah", 4 November 1806; ibid., CO 30/20, no. 367, "An Act for the Better Prevention of the Practise of Obeah", 28 June 1818. The National Archives was formed in 2003 by a merger of the Public Record Office and the Historical Manuscripts Commission.
178. Davis, 206; Robert Poole, The Beneficent Bee(London, 1753), 300–301; Hughes, 15–16; Parry, Replies to Queries; Barbados Council, Replies to Queries; Brathwaite, Replies to Queries; also

Caddell in “Minute Book of the Society for the Improvement of West India Plantership”, 101.179. For example, Karasch, “Opthalmia”, 230–34.

180. Midwives who were enslaved themselves or white women hired by plantations assisted most women in childbirth. By the late eighteenth to early nineteenth centuries a European medical practitioner of one kind or another might be called in the case of especially difficult births, but there was no guarantee his techniques would be successful. An overview of plantation “sick houses” is given in Handler, “Slave Settlements”, 139–40. For an instructive and sophisticated recent study of the impact of the sugar plantation on the lives of women in Louisiana, see Richard Follett, “‘Lives of Living Death’: The Reproductive Lives of Slave Women in the Cane World of Louisiana”, Slavery and Abolition26 (2005): 289–304.

181. For example, Handler and Corruccini, “Plantation Slave Life in Barbados”,80; cf., Kiple, Caribbean Slave, passim.

182. Handler, “Slave Medicine and Obeah”, 57–90; J. Handler and JoAnn Jacoby, “Slave Medicine and Plant Use in Barbados”, JBMHS, 41 (1993): 74–98. 183. Kiple, Caribbean Slave, 154; Handler, “Slave Medicine and Obeah”, 57–90; cf. Higman, 260–61. For a discussion of these issues, which were broadly similar, on plantations in the United States South, see Fetts, 84–108, 147–58 and passim. For an evaluation and vivid description of the “hopelessly hit-and-miss” state of medicine in England, where many West Indian medical personnel were trained, from the mid-1600s through the early 1800s, see Dorothy Porter and Roy Porter, Patient’s Progress: Doctors and Doctoring in Eighteenth-Century England (Cambridge, England: Polity Press, 1989), passim.