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*Jerome S. Handler and Robert S. Corruccini*

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## **Plantation Slave Life in Barbados: A Physical Anthropological Analysis**

Research on slave life in the New World has depended largely on written and, to some extent, on oral sources. To a much lesser degree, albeit with increasing frequency in recent years, scholars interested in New World slavery and Afro-American culture have conducted archaeological field research in plantation slave sites. Although these archaeological investigations are still in their relative infancy, particularly in the Caribbean, such studies have shown how an archaeological approach, when combined with information derived from historical sources, can provide useful data and raise new questions and perspectives on various aspects of slavery and the sociocultural life of slaves.<sup>1</sup>

A few archaeological field studies of Caribbean plantations which had slave populations have been made. Some are still ongoing projects; the most completely reported study to date, by Handler and Lange, occurred in Barbados. Even this research, however, has not realized the full potential of archaeology in dealing with various issues of slavery and slave life.<sup>2</sup>

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1 The applicability of archaeology to studying slavery and slave life is discussed in Charles H. Fairbanks and Sue A. Mullins, "How Did Slaves Live?," *Early Man*, II (1980), 2–6; John Solomon Otto, "A New Look at Slave Life," *Natural History*, LXXXVIII (1979), 8–30; *idem*, "Afro-American Archaeology," *Plantation Society in the Americas*, I (1981), 440–444.

2 Douglas V. Armstrong, "A Progress Report on the 'Old Village' at Drax Hall, St. Ann's Bay, Jamaica," *Archaeology at UCLA*, II (1982), 1–4; Barry W. Higman, "A Report on Excavations at Montpelier and Roehampton," *Jamaica Journal*, VIII (1974), 40–45; Lydia

By the end of the seventeenth century, the tiny southeastern Caribbean island of Barbados, settled in 1627, had become England's richest colony in the New World. Barbados' prominent position in England's Caribbean Empire was later preempted by Jamaica, but during its preemancipation history, until 1834, Barbados was a classic slave society. Its economy rested on the production of sugar, which was primarily cultivated on large-scale plantations by tens of thousands of African-born slaves and their New World descendants.

Archaeological investigations in Barbados during the early 1970s formed one phase of a larger historical project concerned with a detailed reconstruction of the social and cultural life of the island's slaves from the middle of the seventeenth century to emancipation. This project seeks an understanding of the processes by which Africans and their descendants in the New World lost, modified, or retained their cultural heritages and created new cultural and behavioral systems in environments characterized by European colonialism and plantation slavery. The archaeological research was specifically designed to yield information not available or barely mentioned in written sources, and to provide a more objective check and another perspective on the ethnocentric biases of these sources. Although work was conducted on several sugar plantations, excavations ultimately focused on a slave burial ground at the Newton plantation.<sup>3</sup>

Newton was chosen as a site because extensive historical documentation was available on the plantation, and because it contained an undisturbed slave cemetery. The plantation still grows sugar today and has a history that extends deep into the seventeenth century. During the slave period, Newton's slave

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M. Pulsipher and Conrad M. Goodwin, "Galways: A Caribbean [Montserrat] Sugar Plantation. A Report on the 1981 Field Season," unpub. ms. (Univ. of Tennessee, 1982). Handler and Frederick W. Lange, *Plantation Slavery in Barbados: An Archaeological and Historical Investigation* (Cambridge, Mass., 1978).

See also, for example, reviews of *ibid.* by Leland Ferguson in *American Antiquity*, XLIV (1979), 384-385; Carter Hudgins in *Historical Archaeology*, XV (1981), 119-121; Otto, "Afro-American Archaeology."

3 Handler, "African Immigrants and Their Descendants in Barbados: The Social and Cultural Life of a West Indies Slave Population, 1640-1834," *American Philosophical Society Yearbook*, 1969 (Philadelphia, 1970), 384-386; *idem*, "An Archaeological Investigation of the Domestic Life of Plantation Slaves in Barbados," *Journal of the Barbados Museum and Historical Society*, XXIV (1972), 64-72; *idem* and Lange, *Plantation Slavery in Barbados*, 2-4.

population typified medium- to large-scale Barbados sugar plantations in all major physical, agricultural, social, labor organizational, and demographic characteristics. Because the plantation so well reflected island-wide plantation characteristics and because its slave community also seems to have typified the Barbadian pattern, the major features of the analysis of Newton's slaves may be generalized to other plantation slave populations on the island.<sup>4</sup>

Many of the bones excavated from Newton's cemetery were poorly preserved and disarticulated. Although the bones were analyzed in the field as they were excavated, the analysis was largely limited to a determination of the age and sex of the burials. Permanent storage for the skeletal remains could not be found in Barbados, and budgetary limitations prevented shipping all of the materials back to the United States. Eventually most bones were carefully reburied at Newton cemetery, but some of the more complete ones, several semi-complete skulls, and all of the recovered teeth were transported to Southern Illinois University, where they remained in storage for several years.

The dental materials received some additional laboratory analysis prior to the publication of the Handler-Lange book, but this analysis was not done by specialists; thus, the information obtained was minimal, sometimes incorrect, and for all intents and purposes the teeth remained in storage with their full informational potential yet to be exploited. (Teeth are the most durable parts of the human body. Over the years physical anthropologists have developed a variety of methods for analyzing teeth and for deriving from such analyses data pertaining to, for example, demographic characteristics, pathologies, body growth, and genetic or inherited peculiarities and characteristics.)

In 1978, Corruccini, a physical anthropologist with a specialty in dental morphology, became interested in the Newton materials, and in collaboration with Handler, a cultural anthropologist specializing in historical anthropology and the ethnohistory of Caribbean slave cultures, he embarked on a systematic analysis of the skeletal and, especially, the dental specimens.

When the skeletons were excavated in Barbados, field anal-

4 Handler, "Sources for the Study of Preemancipation Sugar Plantations in Barbados: Manuscripts Relating to Newton and Seawell Plantations," *Caribbean Archives*, V (1976), 11-21; *idem* and Lange, *Plantation Slavery in Barbados*, 58-102.

ysis determined that the burial population comprised ninety-two individuals; however, the laboratory analysis yielded nine additional burials, producing a total of 101. This population constitutes the largest group of African and African-descended slaves yet excavated from any archaeological context in a New World site. It is also the earliest such group, spanning an interment period from about 1660 to 1820. Thus, the Barbados skeletal collection is unique. Combined with other archaeological data and a relatively rich array of information derived from historical sources, the collection offers a singular opportunity to investigate various problems associated with slave life. It also offers an opportunity to apply biological techniques to the study of a slave population, an approach which, to even a lesser degree than archaeology *per se*, has only been minimally used in New World slave studies.<sup>5</sup>

The laboratory analysis used the Newton skeletal and dental materials as fully as possible to describe the general skeletal biology of the slaves, including demographic characteristics, diseases, infections, dental problems, growth and maturation, nutritional crises, and starvation. The analysis also yielded information or raised questions on such cultural practices as dental mutilation and tooth extraction, dentistry, pipe smoking, weaning and infant care, and family burial patterns; some new perspectives were also gleaned on the survival of African cultural patterns in the New World.

The procedures and results of our work have been discussed in detail in a separate technical presentation aimed at an audience of physical anthropologists.<sup>6</sup> In the present article we review the major findings of our laboratory analysis, enlarging our compar-

5 Projections to the entire cemetery area (most of which was not excavated) from the statistically randomly selected excavation units suggest that the cemetery actually contained approximately 570 burials (*ibid.*, 104–109, 282). Recent physical anthropological studies employing limited samples of slave skeletal remains are cited in Corruccini, Handler, Robert J. Mutaw, and Lange, “The Osteology of a Slave Burial Population from Barbados, West Indies,” *American Journal of Physical Anthropology*, XLIX (1982), 443–459. Some historians of slavery have also employed anthropometric data, gathered from written documents, to deal with slave growth, nutritional levels and related issues, e.g., Stanley L. Engerman, “The Heights of Slaves in the United States,” *Local Population Studies*, XVI (1976), 45–50; David Eltis, “Nutritional Trends in Africa and the Americas: Heights of Africans, 1819–1839,” *Journal of Interdisciplinary History*, XII (1982), 453–475; Higman, “Growth in Afro-Caribbean Slave Populations,” *American Journal of Physical Anthropology*, L (1979), 373–385.

6 Corruccini et al., “Osteology of a Slave Burial Population.”

ison of these biological data with information derived from historical sources and archaeological inquiry. We are particularly concerned with sharing some of the results of our work with a wider audience of historians and other historically-oriented scholars interested in slave studies and with illustrating a particular interdisciplinary approach in historical inquiry: how the methodology and techniques of physical anthropology can be applied to historical issues; and how a different type of data base than is normally employed in slave studies, when combined with archaeological data and information derived from historical research, can generate new information and perspectives on slave life.

The skeletal and dental data base comprises: ninety-four sets of teeth (varying in number from the full thirty-two teeth to one), only twenty-one sets of which are associated with substantial portions of the jaw bones; partial to semi-complete braincase portions of the skulls of twenty-seven individuals; and only three or four post-cranial (e.g., arm and leg) bones of any substantial completeness. Probably well over 50 percent of the individuals represented by these physical remains had been born in the New World (rather than in Africa), although we cannot establish frequency and place of birth with certainty. Within the limitations of our data base and sample sizes, we discuss our major evidence and findings in skeletal biology, and their historical ramifications, with respect to various demographic issues, pathologies, and cultural practices.

**DEMOGRAPHY** Laboratory analysis first involved an estimate of the sex and age of the skeletal population. Sex was ascertained by simple skeletal robusticity and bone size, although such determinations are subject to error. The data derived from the laboratory analysis suggested a roughly equal ( $\pm 5$  percent) sex proportion of females to males, which is consistent with ratios derived from historical sources for Barbados as well as the Newton plantation. Age at death was estimated by eruption of teeth and loss of milk teeth, and by observing the flatness of teeth (due to grinding and wear) against a known gradient.<sup>7</sup>

<sup>7</sup> For historical demographic data, see Handler and Lange, *Plantation Slavery in Barbados*, 67–68, 69–72, 285–286; a more detailed discussion of the demographic issues is given in Corruccini et al., “Osteology of a Slave Burial Population.”

Important and interpretable features for modern paleodemographers are relative mortality, survivorship, and age-specific life expectancy. In terms of relative mortality, age-at-death estimates derived from the laboratory analysis suggested low infant mortality, mortality increasing steadily with age, and showing sharp increases at ages thirty and fifty-five. However, excellent historical demographic data on Newton's slaves helped evaluate the demographic patterns from skeletal remains. These data showed vastly greater and very high infant and child mortality, comparable mortality from ages ten to thirty, and consistently greater mortality by age forty than was indicated by skeletal aging.

Skeletal age-at-death estimates also suggested that the average life expectancy at birth was twenty-nine years; expectancy decreased gradually and consistently in later years. Once again, a sharp difference existed between the skeletal and historical mortality data; the latter indicated life expectancy at birth of twenty-one years, a sharp rise in expectancy with child survivorship, and a higher expectancy compared to the skeletal estimation from about the age of ten onward.

Interpretation of survivorship, traditionally an important paleodemographic parameter, was influenced throughout by inaccurate archaeological estimates of infant mortality. Again, the historical and skeletal data from Newton were dissimilar, the former undoubtedly being more accurate. Historical data on slave deaths at the plantation indicated much less infant survival (50 percent) than was indicated by the bones (95 percent), and somewhat less child survival; relative survival rates became roughly equivalent only at age forty.

The Barbados skeletal demographic data typify data from archaeologically recovered burial populations in that almost all of the infant mortality was missed (exaggerating survivorship for the entire curve), and individuals over forty were consistently underaged. Although the skeletal aging in conjunction with the relatively rich historical demographic data raises a variety of issues regarding the reconstruction and interpretation of demographic patterns from mortuary remains, little is learned demographically from Newton's skeletal population that is not more accurately inferred from historical sources on the plantation.

**SKELETAL PATHOLOGY** In terms of new substantive information our study of pathology was more significant. Skeletal and dental pathologies were a major objective of our study. Because of the nature of the preserved materials, however, most observations were derived from a study of the teeth so that, of necessity, most recorded pathological conditions are dental. "Dental pathologies are one of the few maladies affecting humans that leave clear and comparatively unambiguous signs upon the skeleton."<sup>8</sup>

The primary historical sources on Barbados are relatively rich in information on the medical problems and diseases of slaves, but these sources deal almost entirely with surface bodily afflictions and internal disorders of one kind or another; they are silent on matters relating to the diseases and treatment of teeth. In fact, modern historical scholarship on the medical problems of West Indian and North American slaves has provided little information on dental pathologies, although the widespread prevalence of such problems, particularly tooth aches and tooth decay, has been reported. That the subject has not been treated in any detail probably reflects the lack of discussion in primary sources, which may be due to the unrecognized nature of many dental pathologies in earlier periods (as well as a major concern with diseases and infections that tended to produce fatal results in those who suffered from them). For example, one well-known primary source on West Indian slave medical problems provides a relatively lengthy section on "the tooth-ache," noting the frequency with which slaves complained of it; although "life is not threatened . . . while the pain lasts, if severe, the Negroes are incapable of working." A variety of dental pathologies could have produced painful teeth, yet most of the "tooth-ache" section focuses on a method for extracting diseased teeth.<sup>9</sup>

Widespread in the Barbados skeletal sample and observed in virtually all of our adequately preserved jaw specimens was periodontal disease, an infectious gum disease caused by bacteria, which breaks down the bony walls between adjacent tooth sockets in the jaws. This process is the leading cause of tooth loss in older

8 Eugenie C. Scott and Billie R. DeWalt, "Subsistence and Dental Pathology from Prehistoric Coastal Peru," *Medical Anthropology*, IV (1980), 267.

9 Kenneth F. Kiple and Virginia H. King, *Another Dimension to the Black Diaspora: Diet, Disease, and Racism* (Cambridge, 1981), 76, 77, 117, 118. Cf. Todd L. Savitt, *Medicine and*



members of modern populations. Its presence implies the lack of systematic dental hygiene as well as natural stimulating and cleaning elements—fiber, for example—in the diet.

Another widespread abnormality, evident in 60 to 80 percent of the individuals, was hypercementosis. Nearly all molars were affected by this condition, in which there are excessive bony deposits on the tooth roots, causing them to become bulbous or swelled and frequently fused together. There are several known causes of hypercementosis but what was observed in the slave population was most likely related to infectious gum diseases and deterioration (periodontal degeneration), and malnutrition.

Hypoplasia is a condition of arrested development in which an organ remains below the normal size. In the case of teeth, enamel hypoplasia involves a deficiency in the formation of enamel on the growing tooth, thus retarding its genetically determined growth potential. Enamel hypoplasia results from nutritional or infectious stress, although there is no ready consensus among specialists concerning the factors which produce it. Nonetheless, hypoplasia is considered a useful indicator of prenatal developmental metabolic stress, when the body temporarily stops growing because it lacks nutritional reserves.

Hypoplasia was pervasive in our sample: about 98 percent of the individuals showed signs of it. These signs were to be found in the pitting, mottling, and bands and lines on teeth where enamel deposition stopped suddenly during a tooth's growth in its crypt. These markings thus indicate the periods when tooth growth was temporarily arrested.

There are two distinct types of hypoplasia. In its milder form, the tooth displays faint encircling bands; modern dentists often consider these "fever lines," because they result from brief infection-related stoppages of tooth growth. Some of this hypoplasia occurred in the Barbados slave population but the extreme or severe hypoplasia was by far the most common type. The second type's most usual manifestation are deeply indented horizontal depressions running completely around the tooth (Fig. 1). These

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*Slavery: The Diseases and Health Care of Blacks in Antebellum Virginia* (Urbana, 1978), 135, 161, 181–182, 211–212; Kenneth M. Stampp, *The Peculiar Institution: Slavery in the Antebellum South* (New York, 1964), 304–305; [Dr. Collins], *Practical Rules for the Management and Medical Treatment of Negro Slaves in the Sugar Colonies* (London, 1811), 313–316.

*Fig. 1* Typical hypoplasia on upper premolar and canine teeth of a Newton burial.



growth arrest lines are generally considered indicative of extreme dietary deficiency or starvation, which cause growth to cease for a relatively prolonged period. Thus the extreme form of hypoplasia found among slaves may have been related to a nutritional episode rather than to disease (although the two are interrelated in underprivileged populations). Growth arrest lines may also reflect severe (but not fatal) diseases such as dysentery, measles, yellow fever, and milder forms of smallpox, which seriously debilitated slaves for relatively extended periods; epidemics and “contagious fevers” of one kind or another were common throughout the period of slavery. However, we believe that the periodicity of the growth arrest lines, reflecting a single episode of severe metabolic crisis in early childhood, supports the nutritional argument advanced above.

When compared to other skeletal populations, the Barbados slave growth arrest lines are of unprecedented severity and intensity as well as frequency. We are not suggesting that in this respect Barbados’ slaves were unique among Caribbean slave populations;

although we lack comparative skeletal data from other Caribbean areas, the Barbados situation might suggest a more widespread pattern among Caribbean slaves.

The growth arrest lines can be best interpreted for the slave population in age-specific terms. The modal age for occurrence was between three and four, which historical sources suggest was about the first year after Barbados slaves were weaned (see below). There tended to be only one growth arrest event per individual, with frequencies lower for ages one to three and four to ten. It is well established for anthropological populations that the post-weaning year is relatively stressful, with only the immediate post-natal period being more dangerous to life. It may also be that the Barbados hypoplasias reflect, among other diseases, kwashiorkor and marasmus, widespread forms of protein-calorie malnutrition the victims of which are generally small children.<sup>10</sup>

Bilateral dental asymmetry is another useful measure or indicator of developmental disruption in an individual. In this condition, there is a mismatch in side-to-side tooth size; for example, a large left molar and a small right molar (although both teeth are determined by the same genes). Asymmetry can result from infectious diseases, malnutrition, or any type of “accident” that affects normal metabolic processes.

Teeth were relatively asymmetric in the Barbados slaves. For example, only about 30 percent of the variance in size of premolars and molars was *shared* variance (i.e., shown in common by correlation analysis). The figure is closer to 60 percent in other worldwide nonindustrial populations. Another clear trend in the slaves was for teeth that grew in the jaw postnatally to be more asymmetric than prenatally formed teeth. Clearly, despite probable maternal malnutrition, the prenatal environment was safer for slaves than early childhood, an unusual trend.

Malocclusion is a general term for abnormalities in the chewing surfaces and crookedness of the teeth, and is much commoner in industrialized urban societies than in rural ones. Seventeen individuals in our sample showed irregular wear patterns on the tooth surfaces, suggesting a failure of the cusps and basins to fit properly against each other when chewing. This condition (oc-

10 See K. Kiple and King, *Black Diaspora*, 111–112.

clusal disequilibrium) involves a clenching or clashing of the tooth cusps and can cause such problems as stress on the tooth roots (possibly leading to tooth looseness and root hypercementosis) as well as jaw joint pain.

The examples of malocclusion in the Barbados slave population probably relate to malnutrition. About 40 percent of the mandibles display a syndrome consisting of malformed (reduced, flattened, and impacted) third molars (wisdom teeth) combined with stunted growth of the rear part of the jaw. There was a general lack of space in that part of the jaw bone which grows most from ages six to twelve. Experiments with animals show that an identical process results from a defined period of severe starvation. The high incidence of malocclusion among modern urbanized populations, however, results from a *general* lack of sufficient growth throughout the jaw because of insufficient chewing exercise; modern United States blacks show this tendency, but the Barbados slaves did not.<sup>11</sup>

The physical anthropological evidence on the nature and consistency of the slave diet is supported by more extensive information derived from the historical sources. Throughout the slave period, the major portion of the slaves' diet derived from the rations that were formally distributed by plantation managements. Even by European standards of the period the diet was, as Oldmixon wrote, "very coarse," and was composed of a consistency, if not a monotony, of food types. The overwhelming staple was corn, primarily "Guinea" corn and, to a lesser extent, Indian corn, which was supplemented by root crops and other locally-grown vegetables. Slaves also regularly chewed or sucked sugar cane during the harvest season and received unfermented cane juice; the latter became a dietary supplement, sometimes constituting the bulk of the diet for short periods. Small amounts of rum and molasses, and other beverages with sugar or molasses as the primary ingredients, were also distributed periodically. Meat played an extremely small dietary role and, although sun-dried salt fish played a somewhat greater part, the slave diet, as

11 Corruccini and L. Darell Whitley, "Occlusal Variation in a Rural Kentucky Community," *American Journal of Orthodontics*, LXXIX (1981), 250-262; Corruccini and Handler, "Temporomandibular Joint Size Decrease in American Blacks: Evidence from Barbados," *Journal of Dental Research*, LIX (1980), 1528.

formed by plantation allocations, was overwhelmingly vegetable.<sup>12</sup>

Slaves occasionally augmented their plantation rations and introduced some variety into their diets by consuming the small livestock, poultry, and food crops raised on the small plots of land that were sometimes made available to them by plantation managements. They also exchanged or sold the produce of their labors, or what they had stolen from plantations, within the island's internal marketing system, and occasionally collected local flora or marine animals. Thus, although there was some variation in foodstuffs "to relieve the constant diet of Indian and Guinea corn," as the English medical doctor Pinckard effectively summarized in 1796: "the food of the Negroes is very simple and but little varied; breakfast, dinner, and supper being similar throughout the year. It consists mostly of Guinea corn, with a small bit of salt meat or salt fish."<sup>13</sup>

Tooth decay (caries), including what are commonly known as cavities, on the chewing surfaces of the teeth (occlusal surface caries) was found in only about 20 percent of the slaves. Decay in the spaces between adjacent teeth (interproximal caries) was much more frequent (57 percent), as in most non-industrialized populations, but still not at an uncommonly high level when compared to urbanized groups. From this distribution it is clear that the slave diet was largely carbohydrate (which corroborates the historical data), with perhaps less of the raw vegetable matter and roots that help keep teeth clean in simple hunting and gathering societies. The size and incidence of caries in the Barbados slaves suggest that these were lesser problems than gum and root pathologies.

Skull fragments were examined for evidence of osteoporosis, a porosity of the bone caused by disease (anemia or infection). No evidence was found for this condition, perhaps indicating an absence of infectious blood-borne diseases or anemia. Osteoporosis

12 Handler, "Food and Diets of Plantation Slaves in Barbados," unpub. ms. (1979); *idem* and Lange, *Plantation Slavery in Barbados*, 86–90. Cf. Robert Dirks, "Resource Fluctuations and Competitive Transformations in West Indian Slave Societies," in Charles D. Laughlin and Ivan A. Brady (eds.), *Extinction and Survival in Human Populations* (New York, 1978), 130–140. John Oldmixon, *The British Empire in America* (London, 1708), II, 131.

13 S. Wood to T. Lane, April 22, 1800, Newton Papers 523/401, Univ. of London Library; George Pinckard, *Notes on the West Indies* (London, 1806), II, 115–116.

is considerably more frequent in other archaeological populations and is attributed to unvarying corn-based diets deficient in green vegetables and some minerals. The physical anthropological evidence suggests that Barbados slaves may have absorbed adequate minerals, although the historical evidence on diets indicates that they were mineral deficient. The practice of geophagy may have provided minimal mineral quantities to compensate for the relative lack of minerals in their food. Although we offer this conclusion tentatively, one adaptive explanation for geophagy in non-literate populations, including Africans and New World slaves, has been mineral intake and hunger alleviation. Geophagy, involving “the devouring [of dirt], but more especially chalk or pure clay,” was apparently very common among all Barbadian slave age groups (as it was among West Indian and North American slave populations in general), and started in childhood.<sup>14</sup>

Only three of the twenty-one reasonably complete jaws showed evidence of the loss of all teeth among older people (elderly complete edentulism), the same condition found among modern populations who wear dentures. Partial tooth loss, however, was much more widespread in our sample, and 51 percent of the fifty-five individuals with the most teeth lacked at least one tooth. This estimate is conservative since so many of the skeletons were partially preserved; with additional cases of more complete jaws a higher incidence of tooth loss would probably have been observed. A majority (75 percent) of the tooth loss occurrences, largely molars of one kind or another, were bilateral (occurring on both sides of the mouth). This highly nonrandom statistical distribution suggests that tooth loss was not the result of teeth dropping out of their sockets during the course of archaeological fieldwork or through natural loss, but rather the result of human intervention or some type of dentistry (see below).

Aside from the above pathologies, several other less frequently occurring pathologies or anomalies were observed in the

14 Society for the Improvement of West India Plantership, “Minute Book,” June 1, 1811–April 16, 1816, Raymond Richards Collection of Miscellaneous Material, Univ. of Keele Library, 128–134; William Dickson, *Mitigation of Slavery in Two Parts* (London, 1814), 153. Cf., Kiple and King, *Black Diaspora*, 74–75, 113, 119–122; K. Kiple and Virginia H. Kiple, “Deficiency Diseases in the Caribbean,” *Journal of Interdisciplinary History*, XI (1980), 207–209.

teeth and jaws.<sup>15</sup> In general, the slaves displayed a high incidence of pathologies that caused insufficient or abnormal growth in most individuals. Taken together, the pattern of tooth pathologies revealed a living population with high levels of infectious bacterial gum (periodontal) disease, lesser levels of other infection, lack of dental care, and insufficient growth in calcified tissues (teeth and bones). Moreover, the pathologies described above are the most detailed examples available of dental problems from which a New World slave population suffered. These examples support more general observations in the historical literature that West Indian and North American slaves were frequent sufferers from the debilitating, but non-lethal, effects of a variety of dental diseases.

Especially revealing in the Barbados sample was the apparent disruption in growth. The teeth display an erratic pattern of sufficient and insufficient nutrition, with periodic episodes of severe nutritional stress and near starvation when the body's resources were so limited that growth stopped for a period; fairly normal growth and healing followed these episodes. Since the pattern of tooth formation in humans is closely determined by genetic factors, the slave skeletal remains indicate extreme nutritional conditions with individuals on the edge of starvation for substantial periods in between much longer periods of more adequate caloric nutrition. In addition, there was a peak period of body stress and marginal growth in the year following weaning. United States slave skeletal collections that Corruccini examined in the National Museum of Natural History (Smithsonian Institution) lack such a frequent or severe pattern of growth-stoppage pathologies.

These findings are consistent with historical data. The Barbados plantation slave diet was overwhelmingly vegetable and consistent in the major food types consumed. The general picture with respect to food types and the quantities distributed by plantations was comparable to other British West Indian islands in all major respects. In a recent comparative study, based on historical sources, of the diets and nutrition of plantation field slaves in the British West Indies, Dirks calculates caloric levels and protein intake. He concludes that plantation food allowances were clearly inadequate "to the total energy required by the average field laborer," and that protein rations were also "marginal at best and

15 See Corruccini et al., "Osteology of a Slave Burial Population," 450-451.

more likely inadequate to the extraordinary demands of life and labor on a West Indian estate.” Moreover, the foods that the slaves provided for themselves did not augment plantation food allowances sufficiently to produce “an overall level of nutritional adequacy.” Dirks’s findings can be extended to Barbados, where the historical and physical anthropological evidence support a view of a malnourished slave population.<sup>16</sup>

In Barbados, as elsewhere in the British West Indies, this population was hungry. Although the slave diet was consistent in terms of major food types, the amounts of food slaves received from plantation managements fluctuated and were, as Dickson observed in the last quarter of the eighteenth century, “far from being proportioned to the toil they undergo.” Plantation allocations varied as a result of a variety of factors within the control of individual managements: for example, what they were willing to spend on food in their efforts to maximize profits and reduce costs and how much acreage they were prepared to plant in food crops. Factors beyond their control also affected food allocations as, for example, when a disruption in trade patterns caused an increase in imported food prices with a concomitant skimping on slave rations, and when droughts, storms, and hurricanes affected the supply of locally grown foods and severely reduced the slaves’ diet, sometimes to the point of producing famine conditions.<sup>17</sup>

Seasonality and the agricultural cycle also affected food supplies. For example, Dickson, who arrived in Barbados in 1772 and lived on the island for about thirteen years, described how

the field-negroes divide their year into the *crop-time* and the *hard time*. During the former, though they labour almost incessantly, the nutritious effects of . . . the sugar cane are very visible on them. But, should the dry weather continue long after the crop is over, as is often the case, the poor creatures, having nothing but their bare [plantation] allowance to subsist on, soon begin to prove, by their famished looks, the total insufficiency of that allowance for their support. Before the end of the drought, they are often quite emaciated.<sup>18</sup>

16 Dirks, “Resource Fluctuations,” 138, 140, 141. (This inadequacy undoubtedly also extended to deficiencies in several specific vitamins and minerals.) Cf., *ibid.*, 140–147; K. Kiple and King, *Black Diaspora*, 79–95, 111–112; K. Kiple and V. Kiple, “Deficiency Diseases in the Caribbean,” 200–211.

17 Dickson, *Letters on Slavery* (London, 1789), 13–14.

18 *Ibid.*, 7.



Similar effects of seasonality and the agricultural cycle were evident throughout the British West Indies: during the “hard time . . . the visible signs of hunger were most acute” among plantation field laborers, and frequently these months “meant outright starvation—a caloric deficit.”<sup>19</sup>

In his study, Dirks provides an array of evidence for malnutrition and hunger among plantation slaves in the British West Indies but, he writes, the physical and behavioral symptoms of hunger “are rarely clearcut. Even among modern-day populations, the detection of specific hungers is a complex diagnostic problem. For historic populations [e.g., slaves] the positive identification of cases of hunger, short of outright famine, is next to impossible.” Dirks, like most other researchers in this area of historical inquiry, relied on written sources to reach a general assessment of the nutritional state of plantation field slaves and degrees of hunger and starvation. His evidence derives from a variety of contemporary accounts of medical disorders and of diseases which reflected nutritional inadequacies and starvation. Dirks is careful to stress that he is not implying that all slave disease and mortality was caused by malnutrition. However, the evidence that he gleans from the historical accounts yields “a strong suggestion that lethal disorders related to malnutrition were at various times and places both endemic and epidemic in the sugar islands. In addition, it seems likely that the severity of many infectious diseases was enhanced by poor nutrition.”<sup>20</sup>

Barbados’ slaves were also plagued by infectious diseases and both historical and physical anthropological evidence support a view that their susceptibility and resistance to disease was affected by low nutritional levels. Both lines of evidence also favor Dirks’s wider conclusions concerning inadequate nourishment and hunger. The physical anthropological evidence, however,

19 Dirks, “Resource Fluctuations,” 142. Dirks adds: “On islands almost exclusively devoted to the production of a low-cost, high-energy food such as sugar, the presence of caloric starvation at first seems incredible. Nevertheless, evidence suggests that slaves were victims of starvation on a consistent basis, stemming from the fact that no abatement in the demand for labor accompanied the seasonal decrease in the availability of locally produced foodstuffs. . . . Seasonal access to an energy-rich diet of cane was not a cure-all for the plantation slave. ‘Sugar disease’ or ‘plantation sickness,’ a form of beriberi or beriberi-pellagra syndrome, seems to have been common” (*ibid.*, 142–143).

20 *Ibid.*, 141, 146. Cf., K. Kiple and King. *Black Diaspora*, 71–73, 136; K. Kiple and V. Kiple, “Deficiency Diseases in the Caribbean,” 205–214.

provides an independent source of information as well as a check on narrative or literary historical sources; the latter point to a Barbados slave population which often went hungry and experienced severe food deprivations. Although the sources sometimes give a qualitative indication of the scantiness of food allowances, the severity of food deprivation, and occasional famine, the physical anthropological evidence gives more objective insights than those provided by the observations of European contemporaries. This evidence also yields the most vivid and dramatic expression of food shortages and their consequences: the various pathologies described all support a picture of minimal and inadequate nutrition, periodic severe dietary deprivation, and occasional near starvation.

**CULTURAL PRACTICES** In addition to evidence for various pathologies, the skeletal remains yielded evidence of such cultural practices as dental mutilation, pipe smoking, weaning, and possible dentistry. By applying statistical techniques we also attempted to discover if there were any indications of family burial plots or units within the Newton cemetery.

*Dental Mutilation* The intentional deformation of teeth is one of a variety of ways in which human populations have traditionally altered the body's natural appearance. Three major broad forms of dental mutilation occurred in African societies, including those in West Africa, the ancestral home of the majority of Caribbean slaves.

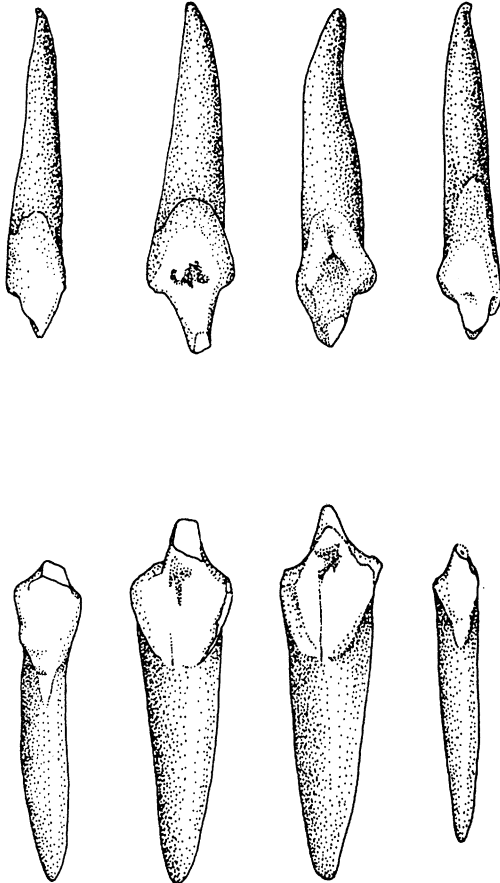
Only two of about fifty Barbados anterior jaw fragments show possible evidence of incisor evulsion, the removal of the incisors to produce a gap in the front teeth. This evidence, however, is not strong, and tooth evulsion was not particularly common in West Africa.

Five additional individuals (adult males and females) show signs of filing or chipping, widespread forms of mutilation among West and West Central African populations during the period of the slave trade. Although small in number, these five cases constitute the largest sample of tooth mutilations yet reported from early black skeletal populations in the New World.

In our sample, mutilation only occurred on the incisors and never on the canines or other teeth. The filing and chipping

produced at least three different mutilation patterns (including single sharp points, notching, and semi-circular or angular notches [Fig. 2]) comparable to those also reported in West African populations. However, we do not believe that particular cultural or tribal identifications can be effectively demonstrated from our tooth sample, given the poor preservation of the mutilated teeth and the variable quality and quantity of descriptive anthropological materials on West African dental mutilation practices.

*Fig. 2* Newton burial with pointed incisors resulting from dental mutilation. During the individual's lifetime the teeth had probably been precisely and painstakingly filed.



Various historical sources confirm that dental mutilation was sometimes present among Barbados' slaves. However, the combination of archaeological, historical, and skeletal evidence leads to the tentative conclusions that such mutilation only appeared in African-born slaves, and that neither they nor their Barbados-born descendants carried on the practice on the island; that is, the custom disappeared in Barbados (and other Caribbean slave societies) after Africans were transported across the Atlantic. Elsewhere we discuss in detail this multiple evidence for dental mutilation and place of birth and also suggest several possible explanations for the apparent disappearance of dental mutilation (and body scarification). These explanations relate to adaptive responses to various features of the slave society and to changes in aesthetic values as a result of the creolization process. We also describe the physical features of the five Barbados dental mutilation cases as well as those known from other skeletal remains in the Caribbean.<sup>21</sup>

*Dentistry* In our discussion of tooth loss, we noted a high incidence of partial tooth loss in which the jaw lacked at least one tooth and usually the same tooth from both sides of the jaw. This loss pattern, which largely involved molars, suggested that it was the result of some type of human intervention, or dentistry, in which painful or diseased teeth were intentionally removed.

Although Barbados plantations (as those elsewhere in the British Caribbean and North America) usually employed white medical personnel to perform various services for slaves and whites, we are uncertain if these services extended to dental matters. Yet, judging from practices in other slave societies, plantation doctors in Barbados probably were also involved in such rudimentary dental practices as tooth extraction.<sup>22</sup> Nonetheless, Barbados' slaves, as those elsewhere, treated their own medical problems as well; the historical sources, however, provide few details on the specific practices that slaves employed to cope with their many and varied ailments, including the dental problems

21 Handler, Corruccini, and Mutaw, "Tooth Mutilation in the Caribbean: Evidence from a Slave Burial Population in Barbados," *Journal of Human Evolution*, XI (1982), 297–313.

22 E.g., Kiple and King, *Black Diaspora*, 167; also, [Collins], *Practical Rules*, 314–316.

which the physical anthropological analysis has so clearly revealed.

Barbadian slaves, however, developed a pharmacopoeia from local flora and concocted various types of medicaments. Curing often took place within a magico-religious context in which Obeah practitioners played a fundamental role. Obeahmen or “Negro doctors” were prominent members of plantation slave communities and much of their effort was devoted to the diagnosing and curing of various ailments and medical problems. “The Negroes . . . sometimes perform notable cures,” wrote Hillary, an English medical doctor who lived in Barbados in the mid-eighteenth century, and in 1796 another English doctor observed how “Negro doctors of the estates . . . justly vie with [some of the local white doctors] . . . in medical knowledge.” Whether these “Negro doctors” (or other slaves) also involved themselves in dentistry is unknown.<sup>23</sup>

Whatever the case, the physical anthropological data suggest dental practices, and some tempting historical evidence for slave dentistry in particular is offered in a brief passage from a mid-eighteenth century discussion of “diseases most prevalent among Negroes in the West Indies and remedies for same.” Grainger, a medical doctor, noted that “Negroes, as well as white people, are very subject to the toothache,” and that “Negroes are sufficiently expert” at the removal of bad teeth. Although Grainger refers to the West Indies in general, without mentioning specific islands, much of what he describes of the ailments and medical problems of West Indian slaves is also reported in the historical sources which specifically deal with Barbados’ slave population; it is quite likely that Grainger’s observation on teeth can also be applied to Barbados.<sup>24</sup>

*Pipe smoking* Ample historical evidence shows that slaves valued tobacco, most of which was imported and distributed by

23 William Hillary, *Observations on the Changes of the Air and the Concomitant Epidemical Diseases in the Island of Barbadoes* (London, 1766), 341; Pinckard, *Notes on the West Indies*, I, 389. Also, Richard Towne, *A Treatise of the Diseases Most Frequent in the West Indies, . . . Particularly . . . in Barbadoes* (London, 1726), 191.

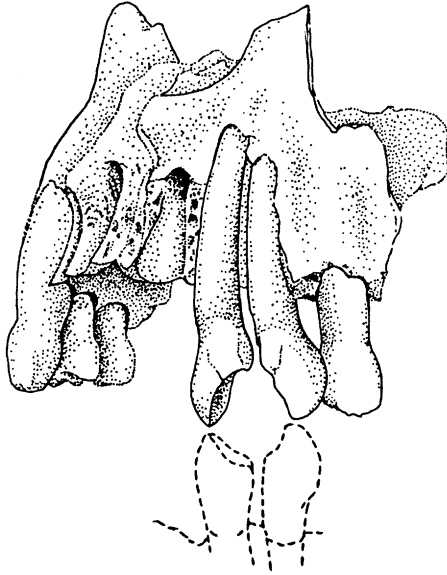
24 James Grainger, *An Essay on the More Common West-India Diseases* (London, 1764), 41. Another general source on the British West Indies also implies that slaves practiced tooth extraction: [Collins], *Practical Rules*, 314–316.

plantation managements as a treat and as a reward or incentive for behavior that slavemasters considered appropriate. Tobacco was smoked as cigars or in clay pipes. Abundant archaeological evidence, as well as historical information, indicates that the majority of pipes were manufactured in Europe and were made of white clay, or kaolin. Barbados imported such pipes by the thousands during the slave period (and into more modern times). Slaves acquired pipes in several ways, including direct distribution from plantations as part of the plantation governance system; that is, slaveowners or plantation managers periodically distributed clay pipes as incentives or rewards for conformity to disciplinary and labor norms or regulations. For the slaves, pipes were significant in a variety of contexts—as exchange items in the internal marketing system, as part of the paraphernalia used by Obeahmen, and in the mortuary complex where they were employed, along with other items, as grave goods interred with burials. Tobacco ash from pipes (and cigars) was used in the treatments that slaves developed for removing chiggers, a ubiquitous insect which frequently afflicted them, and pipe smoking was important during times of rest and relaxation.<sup>25</sup>

The physical anthropological evidence provides some indications of pipe smoking habits among individuals. The abrasive action caused by the habitual clenching of clay pipes resulted in tooth wear and the creation of facets on the teeth most commonly used to hold the pipes. Such facets were observed on nearly 42 percent of the individuals in our sample; there may have been more cases, however, since it was difficult to detect with certainty very slight evidence of pipewear. Pipestems were nearly always gripped either between the incisors and adjacent canines (i.e., between the front teeth) or between the canine and adjacent front premolar. The pipe was habitually held on one side of the mouth only, there almost always being a single position between the teeth where the pipe was clenched. Pipes were chewed significantly, judging from the sizeable facets which formed a round hole among the two lower and two upper front teeth after about five to ten years of the habit (Fig. 3).

25 Pipes and their cultural contexts are discussed in Handler, "A Ghanaian Pipe from a Slave Cemetery in Barbados, West Indies," *West African Journal of Archaeology*, forthcoming; *idem* and Lange, *Plantation Slavery in Barbados*, 133–135, 199–201, 251–273.

*Fig. 3* Front view of upper jaw of a Newton burial showing a well-developed and typical pipewear facet. When clenched together, the upper and lower teeth would have displayed a large circular opening, as shown in the reconstruction of teeth missing from the archaeologically-recovered jaw.



A couple of burials and their tooth sets permitted us to reconstruct the development of pipe smoking habits in individuals. The early signs of facets in these burials, when compared to the distribution of facets in the rest of our sample, indicate that the habit began approximately at the age of twenty, perhaps slightly earlier, and was an adult, not a youth, phenomenon. (By the time slaves were in their late teens they had joined the “great gang,” which constituted the plantation’s most important labor force; people on the “great gang,” as well as tradesmen and other privileged slaves, were most likely to benefit from the plantation reward system, which included the allocation of clay pipes.) Since pipe smoking started at around the age of twenty, when all the permanent teeth had erupted, the habit did not cause malocclusions or outwardly projecting teeth, as is seen in other anthropological populations in which pipe chewing begins early. The

most pronounced facets, accordingly, were in the older individuals.

The sparse historical evidence on pipe smoking also suggests that it was an adult phenomenon. The historical evidence for the sex of pipesmokers, however, is even more limited, although it suggests that both men and women smoked pipes. In our dental sample males constitute about 59 percent and females about 41 percent of the individuals showing pipewear facets. This distribution provides the clearest evidence that habitual pipe smoking was associated with both men and women; it also suggests that the habit was more common among the former than the latter.

Archaeological research demonstrated that pipes were occasionally interred with burials and were used as grave goods. Whole clay pipes were found with nineteen individuals, but only seven displayed pipewear facets on their teeth. Thus, burial of pipes with individuals does not necessarily mean that these individuals used pipes during their lifetimes.

*Weaning* The skeletal evidence confirms the historical record which indicates a relatively late weaning in slaves and a comparatively lengthy (when compared to European populations) lactation period.

In our discussion of hypoplasia, we noted that the teeth showed unique striations or lines that probably relate to episodes of malnutrition in the lifetimes of the individuals concerned. The average slave apparently experienced not only general periodic hunger but also a single episode of prolonged metabolic crisis, when there was a temporary stoppage of body growth. The approximate age of the individual at the time of this nutritional episode was ascertained through the use of conventional physical anthropological methods for determining age from the developmental stage of dentition. The episode usually occurred between the ages of three and four, which is roughly one year after slaves were customarily weaned from their mothers.

Of the many primary historical sources treating Barbados slave life, only a handful provide any information on lactation and weaning. This information derives from the observations of contemporary white planters and medical doctors who treated plantation slaves. The sources indicate that the lactation period during the first few decades of the nineteenth century, and un-



doubtedly earlier as well, was normally between eighteen and twenty-four months, or even longer. In this relatively lengthy period, Barbados' slaves were following an African pattern that also existed in other British West Indian societies where breast-feeding normally lasted at least two years, if not longer.<sup>26</sup>

By the early nineteenth century, over 90 percent of Barbados' slave population was native-born; in the earlier periods of slavery, when a much greater percentage of slaves was of African birth, African patterns were followed to a much greater extent. In eighteenth-century African cultures, as today, "the period of lactation was generally two to three years." There is suggestive, but far from definitive, historical evidence from Barbados that two years or longer might have been more normal in the earlier periods of slavery; thus the slave lactation period may have decreased slightly toward the later years of the slave period, although it still remained considerably higher than for contemporary Europeans.<sup>27</sup>

*Family Burial Plots in Newton Cemetery* A great deal of the Barbados slave mortuary complex, especially in the earlier periods of slavery, reflected West African cultural influences, and the possibility of family segregation in the cemetery is suggested by what is known of West African practices from the anthropological literature; the primary historical sources on Barbados, however, are silent.

Within the Newton cemetery area, there was a non-random concentration of burials in certain areas, as well as two primary skeletal clusters (one of seventeen burials and the other containing over forty) existing among the randomly scattered remaining

26 Society for the Improvement of West India Plantership, "Minute Book," 119, 128–134; Barbados Council, *A Report of a Committee of the Council of Barbadoes Appointed to Inquire into the Actual Condition of the Slaves in this Island* (London, 1824), 109–110, 114–115. Cf., Thomas Rees, "testimony," in *Minutes of the Evidence Taken Before a Committee of the House of Commons . . . for the Abolition of the Slave Trade*, British Parliamentary Papers, XXX (1790), 248–249. Herbert S. Klein and Engerman, "Fertility Differentials between Slaves in the United States and the British West Indies: A Note on Lactation Practices and their Possible Implications," *William and Mary Quarterly*, XXXV (1978), 357–374.

27 Pronounced African patterns were found, for example, in mortuary behavior (Handler and Lange, *Plantation Slavery in Barbados*, 171–215), and music and dance (Handler and Charlotte J. Frisbie, "Aspects of Slave Life in Barbados: Music and its Cultural Context," *Caribbean Studies*, XI [1972], 5–46). Klein and Engerman, "Fertility Differentials," 369. J. Walduck, letters to J. Petiver, Nov., 1710–Sept., 1712, Sloane Mss. 2302, British Library.

burials that were excavated. Applying statistical techniques to several genetically determined discrete dental traits (such as cusp number), we tested these traits against each other within the two burial clusters as well as against those of the remaining, randomly scattered burials in the cemetery. The aim of the chi-square testing was to see whether these traits formed statistically valid non-random patterns or associations which might suggest that the burials in the clusters were biologically related to a greater degree among themselves than might be expected by chance; if so, this would suggest family groups and, by extension, family burial plots.<sup>28</sup>

The result of these tests was that the dental traits show patterns which could have resulted from biological relationships, and suggest that at least two family burial plots probably existed. (One of these, Mound 2, contained about 39 percent of the total number of burials that were excavated; it was extensively used over a long period of time, and grew slowly through the addition of new burials over the years.) Thus, the evidence yielded by an analysis of the teeth suggests an *occasional* West African type of family burial plot in at least *some* Barbados plantation slave cemeteries. These plots would reflect not only another dimension of African influence in slave mortuary patterns, but also a hitherto unsuspected aspect of slave family continuity and solidarity. A larger mortuary sample, however, would be required in order to deal conclusively with this issue.

In this article we have stressed findings that might be of interest to historians and other historically-oriented scholars concerned with New World slavery, particularly slave sociocultural life. In no way do we pretend to have offered a complete picture of these demographic, pathologic, and cultural issues. Although we have sometimes included information from other sources of data, a fuller picture would require a much greater emphasis on the incorporation and integration of historical and archaeological materials. The physical anthropological analysis has shed light on certain dimensions of slave life (including the survival of African practices), has provided a variety of information not available

28 Excavation unit 30N9W and Mound 2 were the primary skeletal clusters; see Handler and Lange, *Plantation Slavery in Barbados*, 112–116, 117–123.

from other lines of inquiry, and has raised questions that can be explored and tested against other bodies of data. Taken in conjunction with information derived from written sources and archaeological research, the physical anthropological findings will permit a more complete picture to be drawn of Barbados slave life as well as generate questions that can be applied to other Caribbean and New World slave populations.

We are aware of various shortcomings of our skeletal and dental data base; some of these shortcomings have been mentioned in the preceding pages, others in the technical presentation published elsewhere.<sup>29</sup> We are also aware that comparative data from Barbados whites (and West African born populations) would be valuable in treating some of the issues that we have covered here. Although we lack such comparative data, the new data that we have presented outweigh the difficulties of not having larger sample sizes and comparative materials from other populations.

We hope that we have demonstrated not only the utility of physical anthropology (and archaeology) in dealing with historical research problems, but also the potential value of collaborative efforts between scholars with different specialties. Such an interdisciplinary approach, which incorporates several methodologies and integrates diverse data bases, can enhance an understanding of New World slavery and the past of those who did not produce written historical records of their own.

29 Corruccini et al., "Osteology of a Slave Burial Population."