

**TECHNOLOGICAL AND CULTURAL TRANSFER OF AFRICAN IRONMAKING  
 INTO THE AMERICAS  
 AND THE RELATIONSHIP TO SLAVE RESISTANCE**

Paper presented to *Rediscovering America 1492 - 1992*

Conference at Louisiana State University

Department of Foreign Language and Literatures

Baton Rouge, Louisiana

February 28, 1992

Included in *Rediscovering America: National, Cultural, and Disciplinary Boundaries Re-examined*  
 published in 1993 by Louisiana State University Dept. of Foreign Language and Literatures

Prepared for Afrigeneas online papers on slavery, January 2000

Revised for Allies for Freedom website publication February 2007

by Jean Libby

[jlibby@alum.calberkeley.org](mailto:jlibby@alum.calberkeley.org)

**ABSTRACT**

This paper discusses technological transfer (diffusion) of African sacred ironmaking science into the western hemisphere by enslaved Africans. The historical scope follows *de cadinho*, African iron technology introduced in 16th century New Spain and Brazil, to the transformation of the Ogun belief system in the Caribbean - especially Haiti -- to African Americans workers at furnaces in colonial and revolutionary North America.

This paper emphasizes the occupational clan similarities which served to strengthen the continuation of traditional practices and the self-congruity of African American ironmakers. The skills required to fashion wrought iron, for which African technology was superior to European, were abundant among slave workers from all areas of Africa. The experience of women in North America, who held direct occupational functions with the furnaces and byproducts in a manner similar to African complex iron societies, is key to this process. Collective bargaining and payment (including credit toward manumission) increased the occupational identity of the group.

Records show that African workers in North American furnaces (where they predominated in the northern and southern colonies during the early period) were clustered at forges. A recent archaeological examination of a slave cemetery at Catoctin Furnace, Maryland, revealed a genetically intact African population of men and women in equal proportion. The mean date of burial was 1800.

The purpose of this paper is to show the relationship of African ironworkers in the Americas to organized slave resistance. Mine workers Brazil were *quilombo* leaders; production of iron implements maintained Palmares and other traditional African settlements which fugitives organized in South America and the Caribbean. Revolutionary fugitives from mines in Mexico established *cimarrones*; this group later negotiated civil status and became soldiers. Successful slave revolutionaries in Haiti made iron weapons and transferred the iron-centered Ogun belief system from Africa. Advertisements for fugitives in North America show a number with iron furnace or blacksmithing reference at four and one-half times their proportion in the population.

Continuation of the Atlantic slave trade brought new African influence into the Americas throughout the slave centuries. New enslaved Africans into the Caribbean accelerated at the time of the Haitian Revolution (and certainly aided it), and also generated a slave artisan diaspora with refugee whites. This is the author's suggested explanation of the West African origins of the Catocin Furnace skeletal population.

### **INTRODUCTION: Technological Transfer Hypothesis**

The primary purpose of Europeans in Latin America, beginning with Columbus, was the extraction of gold. Consideration of iron smelting by enslaved Africans in the Americas conquered by Spain and Portugal (and later Holland) cannot be separated from mining gold, silver, and diamonds (A.J.R. Russell-Wood, interview 1992). Nor can the subject be developed without the concurrent experience of forced mining labor of indigenous Americans.

Smelting of gold and smelting of iron in Africa were often accomplished by the same occupational clan. This sacred science was controlled by blacksmiths and iron smelters, an elite and marginal group in all regions of Africa ((Johnson 1980; Russell-Wood 1982; McNaughton 1988; Larick 1991). S. Terry Childs states "This skill of creation and transformation ... was eclipsed only by the reproductive powers of women" (1991,338).

African skills in ironmaking were a universal characteristic of the populations raided for slave importation throughout the continent (Querino 1978; Yansané 1985; Miller 1988). Distinct areas for slave selection were chosen because of the known skills of blacksmiths, other craftsmen, and farmers (Klein 1971,108; Craton 1988,15). Ironmaking, particularly blacksmithing, skills were needed for vast sugar plantations in Brazil, Mexico and the Caribbean (Craton 1978,232; Carroll 1991,62). These tasks were assigned to Africans and their enslaved descendants.

The genius of African ironmaking was its steel core, the technology of making a steel interior through temperature control in the smelting with *tuyeres*, tubes to induct air into the furnace to make it hotter, removing carbon (Park 1800; Tylecote 1976; Schmidt and Avery 1978; Van der Mwere 1980; Rostoker 1990). The product was higher quality than European steel of its time.

Development of superior African ironmaking was an indigenous process, beginning in the Niger River delta, which is also among the first regions on earth to create societal living (Drake 1986,127; McIntosh and McIntosh 1988,158). Blacksmith and smelting clans grew powerful, as the process was a religious as well as an artifactual one. Hearths are places of sanctuary in Africa; furnaces and forges are believed to have regenerative power (Zahan 1979,30; Fernandez 1982,514).

Linguistic evidence of the universal importance of ironmaking in African civilization continues into the present day. Among the Fang in Gabon the word for furnace means "mutual aid among men" and the forge has sexual imagery: "Life and potency can be restored to Banzie by heating up the chapel-forge of Bwiti identity" (Fernandez 1982:507,514). According to linguist P.E.H. Hair (1975,81) *Fache boga oni*, a 17th century iron-related philosophical saying among the Temne is found still used in Africa today.

Trading in a sophisticated economic system based upon individual needs and small group participation is another African universal. Women especially were creators of this traditional system (Awe 1972; Sudarkasa 1981; Yansané 1985). Iron trading became integral to this process in international trade. *Dade* (iron bars, Akan) was a currency unit -- measured with feet -- said Dutch sailor-observer Pieter de Marees([1602]1987,11).

African craftsmen were well known to the classical Mediterranean civilizations; slaves were sought for their skills since at least Roman times (Yavetz 1988,2). Many of the Africans enslaved in Europe were ironmakers -- in 1493 Hieronymus Munzer wrote from Portugal: "There were so many blacks working at the forges that you might believe them to be Cyclops and the shop the cave of the Vulcan" (Saunders 1982,83 quoting *Archivo dos Acores* 1878/80,444-7).

The evidence of Africans working at forges in Portugal is critical corroboration for the technological transfer of African technology in the Americas. That process began with African artisans from Europe attached to the armies of the *conquistadores* making weapons and tools in the field. Consistent placement of Africans at forges in the European colonies of southern and northern America is a key factor for the hypothesis of technological transfer of African ironmaking techniques.

Cultural transfer is the other critical link to this hypothesis. Artisan workers often developed occupational clans in slavery that were culturally similar to those remembered in Africa. The cultural similarity in the hostile environment served to strengthen the *nommo* -- collective identity -- or the self-congruity<sup>1</sup> of the enslaved mineworkers. Eugene D. Genovese calls it "an organic combination of practical needs from the aesthetic they had brought to America from Africa" (1972,395).

Artisan identity among Africans and their descendants was sometimes fostered by slaveholders, who found it served their economic interests. More importantly, artisan work within slavery served the economic interests of the enslaved through opportunity to purchase freedom not available to the vast majority in field labor. But many more thousands with these skills and cultural background were lost to early death without reproduction in the extreme gender imbalance of the early slave trade, and regression of these skills when placed at menial labor. Its counterpart, technological regression of ironmaking in Africa, was noted by Walter Rodney (1982), as caused by the massive removal of persons with these skills during slavery.

The technology which survived among those placed at forges and furnaces in the Americas adapted, subsumed to European management (although technological expertise among colonial managers was scarce (Paskoff 1983; Pang 1990), or combined with techniques learned from the indigenous metalworkers. In the Americas, iron was first smelted and fashioned successfully by Africans. They did it well because they knew how to do it.

### **NEW SPAIN -- Peru**

Cultures under conquest by Spain in America had long histories of gold and copperworking expertise, especially those in Peru. The Moche (who developed maize) traded goods and gold artifacts into Mesoamerica, where they soon spread northward through the continent. Moche metalsmiths also used tuyeres in smelting (Fagan 1991,175,225). But the Andeans did not mine or work iron. Tools and weapons were obsidian or copper, and the intricate religious artworks were of gold.

American Indians were required to labor in gold mines by royal decree of Spain; this forced, or tribute labor (*encomienda*) specified mining as a responsibility of the indigenous population (Simmons 1929,31). Due to the rapid genocide of the Indian population mineral extraction lagged. As early as 1517 large-scale African slavery was considered necessary for mining labor.

In 16th century Peru, skilled Africans who were acculturated to Europe accompanied *conquistador* armies to manufacture iron weapons (Bowser 1974,9). The common interpretation of this kind of specialized slavery is that the Africans were good learners. However, it is argued that ironmaking originated in Middle Africa and absorbed and spread by Moors into the Mediterranean rather than the opposite route (Forbes 1933; Rogers 1962; Baer 1969).

---

<sup>1</sup>Self-congruity is a behavioral science term which describes the "psychophysiological ... processes which act to resolve cognitive dissonance, the ego defense mechanisms, and all other functions designed to protect and preserve self-consistency (Sirgy 1986 in Germana 1989,233).

In establishing African slavery in Peru the perpetrators found gold mining operations succeeded (that is, the work force survived) when an equivalent number of women were included at the furnaces (Bowser 1974). The Spanish mine owners had a model in the Indian workers who were fulfilling their tribute in mines in the highlands. These workers brought wives and other relatives with them to aid in providing food and other survival necessities in order to endure the dreadful conditions (Stern 1982,84).

Africans mining in coastal Peru had the same Indian model of kinship groups (Stern 1982,5). Women were (and are) integral to African ironmaking societies. Blacksmiths married potters, who also inherited their occupational status (McNaughton 1988). Indian kinship groups were familiar to their own experiences.

This identity grew as mining became one of the few avenues by which slaves could free themselves by self-purchase. A free artisan class who were descendents of Africans grew in Lima, many of whom were seen as wealthy by the early nineteenth century (Humboldt 1811,176).

#### **NEW SPAIN -- *New Grenada (Colombia)***

The principal need for iron in all of New Spain was to make tools to assist the mining of gold, silver and copper. Gold mining in New Grenada was part of a traditional culture, and accomplished with economy of scale -- moderation of labor and product. When disease and forced labor quickly decimated the Indian population, Africans were again imported as mining labor for gold. Today descendants of these Africans practice placer mining techniques used during the seventeenth and eighteenth centuries, methods developed by Colombian Indians which suit the geological attributes of raw metal (West 1957,174). Added to the indigenous technique is the use of iron bars (*barras*) to excavate the gold into sluices, which women wash. Early creation of these *barras* would require the technology of African forge iron smelting and blacksmithing.

Nina de Friedmann (1976; 1982) has shown the development of an hereditary occupational clan among descendents of African mineworkers in the Choco region of Colombia. Called the *troncos*, this clan represents a "cognatic group ... [who use] an adaptive strategy for survival....Evidence suggests that its roots reach ... to well before abolition of slavery" (1982,222).

#### **NEW SPAIN -- *Mexico***

The greatest numbers of Africans enslaved in Mexico were established in sugar plantations in the sixteenth century. Africans were utilized in the skilled tasks of this operation, including blacksmithing and caldron-making, and many types of milling, whereas Indians were employed in the menial tasks as part of their tribute labor (Carroll 1991, 62-64). With these skills Africans could buy their freedom; soon these functions were filled by free people of mixed race. Most *Bozales* (first generation) originated in Angola, whose Kongo culture was rich in traditional ironmaking art (Thompson 1982) and the complex trading economy of the region (Miller 1988).

Mining in Mexico began with Africans in the early colonial period. Many men (*cimarrones*) successfully resisted slavery by forming fugitive strongholds, *palenques*, which later gained civil status when stable families, produced by coerced Indian women, emerged. According to Patrick J. Carroll, descendents of these Africans brought to work gold mines were frequently members of Mexican revolutionary forces (1991,91-92,xii).

Silver mining technology in Mexico was dominated by medieval European techniques and a labor-intensive alleuvial method. Alexander de Humboldt, a German mining expert employed to report to the Spanish king, Charles IV, in 1801, traversed the colonies and wrote the voluminous *Political Essay on the Kingdom of New Spain* (1811). Humboldt used a census taken in 1793, which enumerated "not six thousand Negros, and not more than nine or ten thousand slaves" in all of Mexico (1811,71-72).

Humboldt described the wage workers in the silver mines (slaves or tribute workers had not been used for decades) he saw in 1801 as Indians and Mestizos (Indian-European). Very little iron was used, except for a system of portable forges which stood at the entrance of the mines to repair a specific tool called a *pointrole*, a wedge very like the adze developed in African iron technology (1811,188). Such forge and adze use is consistent with African ironmaking technology.

### **BRAZIL - *de Cadinho***

The largest numbers of Africans brought to the New World -- one third -- came to Brazil. The strongest technological transfer of African ironmaking occurred in Brazil among this population. Linguistically, this transfer is evident in a new word for the Africans' iron technology, *de cadinho* -- crucible, or hearth.

Brazilian historian Gilberto Freyre found sources which credit African iron technology as the shaper of iron manufacture in that country, which holds twenty-five percent of the world's known iron reserves. He cites the observations of M. C. von Eschwege and others on the African origins of blacksmiths' tools and ironmaking in the interior regions (1954,310-11).

In *The Development of the Brazilian Steel Industry*, Werner Baer (1969,54) also cites Eschwege, a German who came to Brazil in the early 1800s after directing iron smelting in Portugal. (Spelling variation is from sources.) In 1821 there were thirty forges in Minas Gerais, most using the traditional African *de cadinho* technique. As late as 1879 African iron smelting technology was predominant at Brazilian forges.

Many skills contribute to African ironmaking technology. Charcoaling, for fuel, is an important one that was practiced by many Africans sold into slavery. Skilled Africans in many fields became known in Brazil as *negros de ganho*, described by historian Donald Pierson (1967,39) as "semi-independent, lived apart from their masters, and arranged their own employment...." These ironworkers, masons, carpenters and others "often banded together to mature schemes of revolt, to buy the freedom of a favorite friend, or to work under a leader for the liberation of all." They determined whose freedom was purchased with their retained earnings by lot, the first remaining with the group until the last. Sometimes they then returned to Africa.

Historian A.J.R. Russell-Wood (1982) examines African slavery and gold mining in 18th century Brazil in great detail, including the African origins of the miners. There was ongoing need for ironmaking at the gold mines, although the Portuguese did not allow industrial development. The powerful goldsmith guild in Lisbon obtained a ban in 1621 on nonwhite goldsmiths (specifying blacks and Indians, slave or free) in any land claimed by Portugal (Conrad 1983,247).

Although the slave system for gold miners allowed payment, a major separating factor between skilled and unskilled slaves, there is no evidence of better conditions for the workers. The mining areas were demographically male. Russell-Wood argues that the gender imbalance of the slave trade was generated by the large numbers of adult men brought to Brazil to work in the gold mines. This imbalance increased because only 50% of the enslaved mineworkers lived ten years (1982,112,118). This high mortality and gender imbalance worked against development of the traditional occupational groups as seen in Colombia among descendants of African artisans.

### ***QUILOMBISMO***

Mineworkers in Latin America, whether African or Indian, resisted slavery and forced labor. A staggering 12% of tribute mine laborers in the Peruvian highlands escaped the deplorable conditions. A majority of those who left were single men (Stern 1982). Although often far from their home regions, many Andeans were nevertheless able to return to their original groups.

Fugitive Africans could not return to their ancestral homes. They created fortified settlements in Brazil which contained many remembered elements of their African heritage, called *quilombos* (Fontaine 1985,159; Bastide 1973,199). The persistence of these communities testify to their societal legitimacy. Not only were they frequent, they were long lived -- the most well-known, Palmares, nearly a hundred years, from the early 1600s to 1695.

The most relevant aspect for this study is the use of iron by quilombo societies. Recent studies on Palmares in Brazil bring this history to the forefront. Eduardo Fonseca, Júnior (1988) describes a metal cap made by the quilombolas which contains religious elements from the Nok culture in Africa, the earliest known ironmaking group. A film by Nelson Nodotti (1984), directed by Carlos Diques, portrays the society in Palmares and the development of the heroic Zumbi. He is represented by iron implements made in the African manner, demonstrated in the film Quilombo. Ivan Alves Filho (1988,14) details the growth of metallurgy at Palmares in the 1630s and the subsequent self-sufficiency of the society. Filho also illustrates his history with metal artwork of strong African content.

Quilombos were most frequent and successful near Brazilian mines. The massive importation of African mineworkers occurred during the 18th century, after the destruction of Palmares in 1695. The Minas Gerais region became a center of quilombos, an escape mechanism for the mineworkers throughout slavery. A.J.R. Russell-Wood describes the long-lived quilombo of Ambrosio, in Campo Grande, with 600 people in 1746. He suggests that "quilombos provided an ambience more conducive to stability and permanent relationships between the slaves" than their working together (1982,125). The African American ethos, then, was molded by mutual resistance and then self-government based upon their African heritage.

#### **THE CRUCIBLE: OGUN**

A prominent mechanism for the cultural transfer of sacred ironmaking tradition to the Americas was the emigration of Ogun, the powerful West African deity who represents the development of iron technology. It can safely be said that this was a deliberate response, for in the Ogun belief system when he is angered, Ogun goes into the forest and technology stops. The slave trade and colonialism effectively halted -- almost irreparably -- traditional iron smelting in Africa (DuBois [1902] 1975; Rodney 1982; Roberts 1987).

The reappearance of Ogun in the forests of the American continent brought change to the social organization which helped adaptation in the new environment. Anthropologist Sandra Barnes has analyzed the organization of the Ogun belief system, hypothesizing:

**... the sacred iron complex was a belief system that validated and justified the technology of ironmaking and the "deviant" social practices -- mobility, marginality, and isolation -- the craft required of its practitioners ... it would appear that it accompanied one of tropical Africa's earliest revolutions: the technological revolution brought about by the introduction of ironmaking and the occupational role specialization necessary by that innovation**  
(1980,44)

Ogun is associated with the Yoruba and Dahomey societies in West Africa, from which many persons were removed to the Americas. The belief system can be seen to be a West African universal of social development.

The cataclysmic disruption of African societies due to the slave trade brought people to forced labor which was not necessarily their original occupational caste. Ogun, as a belief system that underlay social development through ironmaking, carried across an internal stability, or self-congruity, to these traumatized individuals who needed to either give up, or take on, new roles. Africans in the Americas mentally survived these changes by altering the structure of the Ogun belief system: he became the God of resistance and revolution. Rather than calling Ogun an African survival, better semantics would be an African continuity.

The artistic rendition of Ogun in the Americas is well-known and its fascinating story is therefore only noted here (Thompson 1982). Note should be made of the choice of Ogun as a cultural representation by Nigerian writer Wole Soyinka (1976), who received the Nobel Prize for Literature in 1986.

Linguistic application of Ogun in folk poetry and song, and the several names by which Ogun is manifested in northern Brazil is detailed by Octavia da Costa Eduardo (1948,85,92). More recently, Eduardo Fonseca (1989), compiler of *The Yoruba/ Nagô/Portuguese Dictionary* and director of the Yoruban Theological Society of Afro-Brazilian Culture, found strong linguistic continuity. He writes that Ogun applies to other African origins, such as the Bambara, as well as to the Yoruba.

#### **SAINT DOMINGUE (Haiti)**

The crucible of African continuity is the Caribbean. Ogun has flourished here among "the complex mosaic of cultures shaped by the exigencies of fifteenth century mercantilism -- manifest specifically in the quest for gold" (Coleman 1991,4).

It is in the Caribbean that the transformation of Ogun can be most readily observed in religion and political life. The position of Ogun in *Vodun* ceremony and thought influenced the slave revolution in Saint Domingue from 1789 to 1803 which created the nation of Haiti.

Most of the slaves in Saint Domingue were born in Africa (Fick 1990,279n). Planters in the French colony were among the worst in maintaining an environment of survival for their laborers, preferring the economy of replacement in a depressed market (Foner 1975). As well as providing a fresh revolutionary force, the Africans brought a freshening of the traditional culture into the Caribbean milieu.

The power of Vudun was (and is) political as well as religious in Haiti (Laguerre 1989). Toussaint L'Overture had as his personal *loa* the saint Ogou, now also merged with Catholic beliefs. Patrick Bellegarde-Smith states that the national flag consists of colors taken from Vodun, the red representing Ogou-Feray (Haitian spelling), spirit of war and iron (1990,9).

In the early settlements in Barbados and Jamaica, there is evidence that Africans made iron products for plantation use (Craton 1975; Handler et al, 1978). By the end of the seventeenth century, however, slaves were prohibited from craft work in Barbados and Jamaica to encourage retention of freed white indentured workers (Dunn 1972,242). As well, slaveholders began to advance Creole craftsmen (including relatives) as a means of controlling this occupational force (Craton 1978, 231).

Africans in the Caribbean transferring the Ogun belief system needed iron for ritual uses. Those in Saint Domingue brought some pieces with them, and made some from artifacts they could obtain locally (Michel Laguerre, interview 1986).

The most pressing need was iron for weapons. All areas had significant communities of maroons who had escaped slavery and needed protection. These groups also needed tools for cultivation of food, as depending upon cooperative slaves risked recapture. Caribbean marronage studies detail many social aspects of this life (Price 1973; Genovese 1979; Fouchard 1981; Geggus 1983; Fick 1990; Bush 1990). Iron is mentioned as a chronic need for the maroon enclaves. The communities were usually too marginal (and natural ore too scanty) for smelting. Smithing of previously-tooled implements was a normal part of these societies. Elsa Goveia writes of a "growing trade in stolen iron, copper, lead, and brass" by slaves in Antigua which whites attempted to stem by passing laws with severe penalties (1965,163). Carolyn Fick's recent work on the population base of the Haitian revolution includes many of the primary sources she found. The address of the Colonial Assembly of Saint Domingue to the National Assembly of France describing the August revolt at Bois-Caiman in 1791 indicates the conspirators "prepared the iron and the torch destined for the execution of the horrible projects" (1990,[261]). Clearly, iron weaponry was of utmost urgency in developing the eventually successful resistance.

The occupation of the vast majority of slave workers in the Caribbean was field work producing sugar. Nonetheless it should be remembered that most adult slaves in the French colonies were African-born. Their skills from home, often unknown to the enslavers, would be available for their own sustenance in the maroon communities.

The Caribbean crucible for African ironmakers to continue their traditional work lay in the English slave trade to North America. With passage of the Constitution of the new United States prohibiting African slave commerce after 1808, speculators in human cargo obtained open ports for a period of two years in Santo Domingo, Venezuela, and Cuba and for five years in Saint Domingue in 1789. The British slave traders Perkins and Burling operated from Cap François directly to Baltimore merchants encouraging "Guinea Speculations" for purchase and requesting "Tradesmen (as Carpenters, Blacksmiths and a Cooper) ... as we intend sending them to the Natchez" (Donnan [1935]1969 4:47).

The reinvigoration of African culture would thereby occur in the new republic as well as on the islands destroyed by Columbus nearly three hundred years previously.

#### **THE HEARTH: *Catoctin Furnace, Maryland***

Archaeologists who excavated a slave cemetery at Catoctin Furnace, Maryland, in 1979 were astonished to find a population that was evenly distributed by age and gender at the location historically used for slave furnace workers. Further examination by physical anthropologists at the Smithsonian Institution revealed no European mixture among the group -- they were first or second generation West Africans. Their longevity was greater than average slaves of the period, and males (41.2 years) greater than females (34.6 years). The mean year of the burials

was 1800 (Kelley and Angel 1983,1987). Dating was made through coffin nails, which were internally fine steel (Epstein 1981). The unmixed African heritage found may be the result of a small sample size, according to one of the Smithsonian examiners, Jennifer Olsen Kelley (interview, 1991). Only a third of the burials, thirty-one persons, were removed; the rest are intact. The Catoctin furnace and forges were built in 1774 by the first revolutionary governor of Maryland, Thomas Johnson, and his three brothers. Created in defiance of British colonial laws, the furnace soon became a supplier of ammunition for the revolutionary army of the European Americans.

The gathering of slaves for Catoctin Furnace took a number of years. Some were purchased jointly by four Johnson brothers, who also built two forges and two other furnaces within relative proximity of the fast-growing city of Frederick. The result of such disparate and gradual gathering of the African and African American ironworkers at Catoctin Furnace would likely have included some European genetic relationship among the burials in the workers' cemetery.

Slag materials from Catoctin Furnace were analyzed by metallurgical archaeologist Helen Schenck at the University of Pennsylvania (1982,1983). In a personal communication (1991), Dr. Schenck found the idea of a transfer of African technology by the workers at their daily tasks worth further consideration:

**I suspect your hypothesis of a deliberate searching out of skilled African ironworkers could still be quite accurate, and that their knowledge could well have played a part in the technology of iron production at Catoctin. Certainly knowledge of the appearance and behavior of iron at a range of temperatures and with a range of carbon contents is one that they would have commanded which would have been desirable and useful to their owners. I think I would look for their knowledge to have transferred most readily in forges -- whether finery or bloomery; possibly also blacksmith shops.**

Forges as a medium for African technological transfer was noted by Schenck from a Pennsylvania study at which the slave workers were seen concentrated at the forge. At the Mount Joy Forge in Valley Creek<sup>2</sup> in 1757, three slaves -- Ish, Pomp, and Prince -- and an indentured Irish servant, Henry Saleighman, performed two-thirds of the annual work (Stone 1984). Pennsylvania ironmasters were the largest northern slaveowners during the colonial period (Berlin 1982).

Looking for forges in relationship to slave workers brought a number of additional examples. A forge advertised for sale in 1767 specified the "slaves used to work there as finers, hammersmen, and colliers, and well acquainted with the business, and two valuable blacksmiths" (*Virginia Gazette* May 14, 1767).

During the American revolutionary war the Principio Furnace was confiscated by the Maryland General Assembly. The ironmaster, Thomas Russell, was exempted with a share of "enough buildings, machinery, utensils, Negroes and livestock be set apart to enable him to carry on the business" (May 1945,70).

Clearly, the way to operate an iron furnace in colonial North America was with African and African American labor. It is evident that as soon as Africans and African Americans were placed at the forges and furnaces they became associated with ironworking skills and sold within the colonies with their expertise known. They also were frequently sold as a group.

The immediate occupational identity that accrued was a direct African cultural tie that slaveholders unwittingly perpetuated. Pride in workmanship and honest appreciation of the skills and monetary value of the artisans by the ironmasters reinforced the elite group traditions. Ronald Lewis writes that "many slaves at Oxford Iron Works in Virginia had multiple skills" (1977:144).

---

<sup>2</sup> This is the location of two forges owned by the Potts family, which would become the encampment of the Continental Army during the American Revolution known as Valley Forge.



Another practice which reinforced African cultural identity from the beginning was the inclusion of women in the labor force. Most enslaved women performed sex-specific duties in food and textile production, but there is substantial evidence of women assigned furnace and forge work in the Chesapeake area (Lewis 1977; Kulikoff 1986). Charles Dew (1974:199) found that at the Oxford Iron Works in Virginia, women who did actual furnace work were wives or daughters of furnace men.

One way to consider African origins is to look for burial practices. The archaeologists excavating the Catoctin Furnace cemetery found the people in a circular, rather than row pattern, making a random appearance on their grids (Thomas 1980; Burnston 1981). The presence of food seeds near the heads of some of the population should be acknowledged as culturally African.

Some lithic Indian material, stones and a quartz scraping tool, were found in some of the coffins. In the view of Ronald Orr (interview 1991), archaeologist for the Maryland Historical Trust, this material is intrusive and not deliberate. It should be noted that the cemetery was also locally known as an Indian burial site. However, Africanist cultural anthropologist Peter Weil (interview 1991) at the University of Delaware feels the intrinsic value of these ancient pieces would be of great spiritual value to African ironworkers and may well be offerings. Iron Hill, Delaware, near the Maryland border, offers a previous ironworking community with a continuing African American presence. During the 1760s there was marked African importation into the Delaware valley, resulting in a "reinvigorating of the African culture" (Smith and Wojtowicz 1989:8). Members of the men's choir at the Iron Hill Church of God in the present day use a traditional African ring step. As well, they sing of the proper measurements for a city as foursquare, a measurement noted as a cultural spacial pattern of African Americans that is African in origin by archaeologist James Deetz (1977).

Finding cultural evidence about the workers relies also on the experiences of nearby iron furnaces with slave populations. Records of slaves mortgaged by John Semple, a Scotsman who owned the Antietam Ironworks, indicate a number with African names who were moved as a group from the failed Occuquan Forge in Virginia.

When the Johnson brothers sold Catoctin Furnace, they did not sell slaves associated with it, but passed their property holdings to their heirs. The present-day black community of Buckeystown in Frederick County can be associated with the Johnson iron enterprises. African American communities can be identified by the historic presence of black churches.

At this writing, I suggest consideration that the buried workers of unmixed ancestry came accompanying refugee whites from Saint Domingue who settled in Frederick (Hartride 1943). This group of whites was so large that the Declaration of Independence for Haiti by Dessalines was printed in full on the front page of the *Frederick-Town Herald* (June 16, 1804). Most adult slaves in Saint Domingue were born in Africa because the death rate on the sugar plantations was so high that the average life expectancy of a kidnapped African brought to Saint Domingue was five years.

The association of Africans from the West Indies with the Catoctin Furnace slave workers comes from a primary source found by local historian Elizabeth Y. Anderson (1985), researching a history of Harriet Chapel, an Episcopal parish which is still in the community today. The diary of a white Moravian minister, Brother Schlegel, who preached to the slave community there in 1799 shows a possible common origin of the group, and an African and/or West Indies identification. It also reveals the working conditions when the furnace was in blast -- seven-day work weeks.

**James Johnson, his brother and sons and particularly with the poor Negroes whose inward and outward conditions are troubled ... a little group of them gathered around me at the top of the furnace opening. I depicted the Saviour as He redeemed them from sins upon the cross through his**

**suffering and death ... how so many of their countrymen in the West Indies, through belief in the Saviour, have achieved bliss through His death. They wept very much because they were bound to work so hard during the week as well as on Sunday in the iron smelter and thus were seldom able to hear the Word of God. My conversation came to an end, the signal was given for the pouring and each of them had to go back to work.** (Anderson 1985,6)

### REVOLUTIONARY IRONWORKERS

The Haitian Revolution (1791-1804) was the ideological conclusion to that of the Anglo Americans in 1776 and the French in 1789. To the African and African American population, the slaves' revolution was a unifying topic carried by boatman and wagoners, and even among popular musicians in travelling bands on "the common wind of Afro-American communication" to other slaves in the hemispheric diaspora. Julius Scott of Duke University argues that "the rapid spread of news was absolutely central in shaping the political climate in New World slave societies at the end of the 18th century" (1986).

Thomas Jefferson, warning James Madison in 1799, wrote that travelling Haitian slaves would be "missionaries to the southern states" of the "combustion" of resistance to tyranny shown by blacks in Haiti (Jordan 1968,381). According to Eugene Genovese (1979), his prophecy of Haitian influence was proved correct in the mass revolution planned by Gabriel, a blacksmith, in 1800.

There is no better example than enslaved ironworkers in North America for the statement by Angela Y. Davis: "The master needs the slave far more than the slave needs the master" (1971,10). There is also no better example of slave resistance.

The number of iron-related fugitives -- blacksmiths and workers at specific forges -- is startling at nearly 10% in the *Maryland Gazette* (Windley 1983), four and one-half times their number in the general population.<sup>3</sup> A study by Foner and Lewis (1978) of runaway advertisements in *Virginia Gazette* revealed 5% (more than twice their population representation) in forges, mines and ropewalks. Skilled workers comprised 32% of fugitives in the Virginia listings. The data for fugitive white indentured workers is equally strong in this area. David Skaggs (1973,58) found half the advertisements for white runaways mentioned skills, and iron furnaces predominated as the location.

Gerald Mullin, in *Flight and Rebellion; Slave Resistance in Eighteenth-Century Virginia*, states that these skills represent assimilation to the Anglo American culture, and that the common denominator for success as artisan slaves and self-liberation was proficiency in the English language: "Using the criteria for cultural change -- the slave's task, facility in speaking English, and a distinctive 'sensible' demeanor (itself a function of his clear and fluent English)" (1972,89). Mullin feels that the more a slave became like the master, the more likely he was to resist slavery. For the artisan, mobility "diminished his fear of whites and their world by narrowing the difference between him and free men." English provided "understanding the nuances and shades of meaning of colonial society" (1972,90-91).

The interpretive issue is that English is regarded as the exclusive purview of its originators -- others adapted to it rather than changing it together to a common cultural tongue. In a devastating criticism by Manthia Diawara, this is called "Englishness ... the privileging of a certain use of language, literature, ideology, and history of one group over populations that it subordinates to itself" (1990,830). Englishness negates the contributions of cultures other than Anglo American in the common language spoken today in America.

---

<sup>3</sup> The slave population for Maryland and Chesapeake Virginia is estimated at 203,500 in 1790 (Kulikoff 1986). Ironworking slaves in this population numbered about 4500 (Lewis 1979).

The self-congruity that an African American achieved by practicing a craft, living in a community that was similar to those in remembered African culture, especially being regarded as part of an occupational group from without and within the slavery environment, formed the ethos of personal and group identity.

### **JAMES W.C. PENNINGTON**

A fugitive blacksmith from Washington County, Maryland, in 1827 became a famed Presbyterian clergyman and antislavery orator in New York and London (Pennington [1850]1971; Blackett 1986; Swift 1989). He was the first published African American historian on African origins and civilization (Pennington [1841]1969). He completed the course of study at the Yale University School of Divinity without being permitted to participate in classes or use the library (Blackett 1986,10).

Pennington (formerly Pembroke) was apprenticed to a slave blacksmith at the wheat farm of Frisby Tilghman in the Hagerstown suburb now known as Tilghmington, as a youth in 1820. The literary strength of his antislavery message and the excitement of the story of his successful escape from slavery in his narrative obscure some important points -- his African identity and self-congruity.

Bazil Pembroke, Pennington's father, was the son of an enslaved Mandingo chief. He was skilled in African crafts and made baskets and other goods at night which were sold within the slave community. Both his parents were born in Maryland and were fortunate enough to persuade Tilghman, who inherited the mother and children, to purchase Bazil when he moved from the Eastern Shore to western Maryland. This was the extent of their fortune in slavery, as Tilghman was a physically harsh slaveholder and vindictive to the family after James escaped in 1827.

As difficult as his decision was to leave his family, with the likelihood of never seeing them again, the blacksmith James Pembroke was bound as well by the love of his work:

**My blacksmith's pride and taste was the one thing that had reconciled me so long to remain a slave. I sought to distinguish myself in the finer branches of the business by invention and finish; I frequently tried my hand at making guns and pistols, putting blades in penknives, making fancy hammers, hatchets, sword-canes, &c &c.** ([1850]1971,8)

He was firmly acculturated in his work as part of his African heritage; in *A Text Book on the Origin and History of the Colored People*, which Pennington wrote in 1841, the history of ironmaking in Africa is part of the story. It is likely that he learned this from his father, and from Africans on the Tilghman farm whom he mentioned by name in his autobiography. The viewpoint he expressed, with the origination of iron smelting occurring in Africa, is the same used by African American historians Carter G. Woodson ([1933]1977,21), St. Clair Drake (1986), and African scholar Cheikh Anta Diop (1974).

### **REV. THOMAS W. HENRY**

African Methodist Episcopal minister Thomas W. Henry was a slave blacksmith in Washington County, Maryland before his freedom at age twenty-one. In his 1872 *Autobiography*, an internal social history of the African American ironworking community evolves due to Henry's understanding of the ironmaking process. He served the slave community at Antietam Ironworks, a few hours by horse from Catocin Furnace and owned by the same family during his tenure (Libby 1978, 1991). Thomas Henry's primary account is a microcosm of the history of industrial slavery (Starobin 1970; Lewis 1979) -- payment for overwork, responsible positions for skilled slaves, and increasing interracial hostility among workers during the 1830s and 1840s.

**EPITAPH**

The 1840s saw the end of charcoal ironmaking in the country due to increased use of European ironmaking techniques. These techniques were used earlier in sections of the country with more European workers, and as this group grew in areas where slaves worked in the furnaces, their methods took hold as well. By "puddling," pouring molten iron directly from the furnace into molds and stirring it, the need for forges was eliminated. Most forges in Maryland soon disappeared (Thompson 1986). Historical archaeologist John D. Light suggests: "The general blacksmith of 1800 probably had more in common with his ancestor of 1,000 years than he did with his direct descendent of 100 years" (1977,662). He notes the traditional techniques of smiths in Africa were more like those used in America in 1800 than the changed methods required of smiths due to new technology..

African American ironworkers learned the new technology but were hampered by increasing racism from European workers who were economically threatened by a slave work force. An incident described by Rev. Thomas Henry (1872,26) involved a physical fight (which he called a "young insurrection") between black and white workers over the issue of task responsibility .

W.E.B. DuBois stated in *The Ante-Bellum Negro Artisan* [1902]1975,178) that whites rioted in Philadelphia objecting to skilled blacks obtaining jobs. This pressure was enacted into racial preference laws in Maryland and Pennsylvania.

Blacksmiths in Philadelphia in the 1856 Pennsylvania Abolition Society census were from Maryland, Delaware or Washington D.C. In a comparison of occupations among free-born blacks and former slaves, Theodore Hershberg (1975,410) found that more blacksmiths and metal-workers were among ex-slaves.

Some former black ironworkers from the western Maryland furnaces moved to western Pennsylvania following the Civil War and worked in the steel industry until white unions grew powerful (Dickerson 1986). Many skilled black laborers were brought to from Virginia iron and steelworks during the late 19th century; company officials encouraged racial hostility and separation among workers to retain authority (Cayton and Mitchell 1939). During this period young urban African Americans were apprenticed to skilled trades, including blacksmithing, by the Orphans Court of Maryland, to provide labor for Baltimore industry (Wright 1921,155). Some in the western Maryland communities of this study began work on the railroads. This group has an occupational brotherhood with strong kinship ties today in the same area that workers at the Antietam Ironworks lived.

**CONCLUSIONS**

Transfer of technological techniques of African ironmaking occurred when slave workers were charged with making iron in the Americas. Slaves were often placed at work at forges, which more closely approximated the African iron experience than furnaces. Charcoal technology, which matched the experience of Africans, remained operative longer in furnaces which used slave labor.

The occupational elite characteristics of this group as artisan slaves in America reinforced the similar African clan traditions. Reinvigoration of African culture, and exposure to that ironmaking culture by African Americans, occurred when new groups were enslaved and brought across the Atlantic.

The Ogun belief system developed into active revolutionary and defense organizations in Brazil and Haiti. Communities of fugitives in South America and Mexico, *quilombos* and *palenques*, were prevalent in the vicinity of mining operations. Those enslaved at iron furnaces in North America escaped in larger proportion to their representation in the general slave population, and often resisted slavery as a group. Freedom from slavery, by self-purchase or revolt, was a universal priority.

#####

## REFERENCES

- Anderson, Elizabeth Y. 1985. *Faith in the furnace; a history of Harriet chapel, Catoctin Furnace, Maryland*. Thurmont: Catoctin Furnace Parish.
- Aptheker, Herbert. [1943] 1968. *The colonial era*. New York: International Publishers.
- Awe, Bolanle. 1972. The economic role of women in a traditional African society; the Yoruba example. In *The civilization of the woman in African tradition*. Paris: Presence Africaine.
- Baer, Werner. 1969. *The development of the Brazilian steel industry*. Nashville: Vanderbilt University Press.
- Barnes, Sandra T. 1980. *Ogun: an old God for a new age*. Occasional Papers in Social Change 3. Philadelphia: Institute for the Study of Human Issues.
- , ed. 1989. *Africa's Ogun; old world and new*. Bloomington: Indiana University Press.
- Bastide, Roger. 1971. *African civilizations in the New World*. 2nd ed. Translated from the French by Peter Green, with a foreword by Goeffrey Parrinder. New York: Harper & Row.
- Bellegarde-Smith, Patrick. 1990. *Haiti; the breached citadel*. Boulder: Westview Press.
- Berlin, Ira. 1982. Time, space, and the evolution of Afro-American society. In *The underside of American history*., ed. Thomas R. Frazier. Vol. I to 1877. New York: Harcourt, Brace, Jovanovich.
- Blackett, R.J.M. 1986. *Beating against the barriers; biographical essays in nineteenth-century Afro-American history*. Baton Rouge: Louisiana State University Press.
- Bowser, Frederick P. 1974. *The African slave in colonial Peru 1524 - 1650*. Stanford: Stanford University Press.
- Burnston, Sharon Ann. 1981. The cemetery at Catoctin Furnace, MD: the invisible people. *Maryland Archeology* 17:19-31.
- Bush, Barbara. 1990. *Slave women in Caribbean society 1650 - 1838*. Bloomington: Indiana University Press.
- Carroll, Patrick J. 1991. *Blacks in colonial Veracruz; race, ethnicity, and regional development*. Austin: University of Texas Press.
- Cayton, Horace R. and George S. Mitchell. 1939. *Black workers and the new unions*. Chapel Hill: University of North Carolina Press.
- Childs, S. Terry. 1991. "Style, technology, and iron smelting furnaces in Bantu-speaking Africa." *Journal of Anthropological Archaeology* 10(4):332-357.
- Coleman, Floyd W. 1991. Persistence of African influence in artistic expression in the Caribbean: a dynamic cultural mosaic. *International Review of African American Art* 9:4-21.
- Conrad, Robert Edgar. 1983. *Children of God's fire; a documentary history of black slavery in Brazil*. Princeton, N.J.: Princeton University Press.
- Craton, Michael B. 1975. Jamaican slavery. In *Race and slavery in the western hemisphere: quantitative studies*. Stanley L. Engerman and Eugene D. Genovese, eds. Princeton: Princeton University Press.
- , 1978. *Searching for the invisible man; slaves and plantation life in Jamaica*. With the assistance of Garry Greenland. Cambridge: Harvard University Press.

- , 1988. The African background. In *Dictionary of Afro-American Slavery*, Randall M. Miller and John David Smith, eds. New York: Greenwood Press.
- Davis, Angela Y. 1971. Reflections on the black woman's role in the community of slaves. *The Black Scholar* 3 (4,December):3-15.
- Deetz, James. 1977. *In small things forgotten; the archaeology of Early American life*. New York: Anchor Books.
- Dew, Charles B. 1974. David Ross and the Oxford Iron Works: a study of industrial slavery in the early nineteenth-century south. *William and Mary Quarterly* 31:189-224.
- Diawara, Manthia. 1990. Englishness and blackness; cricket as discourse on colonialism. *Callaloo* 13:830-44.
- Dickerson, Dennis C. 1986. *Out of the crucible; black steelworkers in western Pennsylvania, 1875 - 1980*. Albany: State University of New York Press.
- Diop, Cheikh Anta. 1974. *The African Origins of Civilization: Myth or Reality?* New York: Lawrence Hill.
- Donnan, Elizabeth, ed. 1969. *Documents illustrative of the history of the slave trade to America. Volume IV. The border colonies and the southern colonies*. 2nd ed. Vol. IV. New York: Octagon Books. Originally published 1935 by Carnegie Institution of Washington as Publication No. 409.
- Drake, St. Clair. 1986. *Black folk here and there*. Vol. 1. Los Angeles: Center for Afro-American Studies.
- DuBois, W.E.B. [1902]1978. The ante-bellum Negro artisan. The African artisan. In *The other slaves; mechanics artisans and craftsmen*. James E. Newton and Ronald L. Lewis, eds. Boston: G.K. Hall.
- Dunn, Richard S. 1972. *Sugar and slaves; the rise of the planter class in the English West Indies, 1624-1713*. New York: W. W. Norton.
- Epstein, S. M. 1981. A coffin nail from the slave cemetery at Catocin, Maryland. *MASCA Journal* 1:208-10.
- Fagan, Brian M. 1991. *Kingdoms of gold, kingdoms of jade; the Americans before Columbus*. New York: Thames and London.
- Fernandez, James W. 1982. *Bwiti: An ethnography of the religious imagination in Africa*. Princeton: Princeton University Press.
- Fick, Carolyn E. 1990. *The making of Haiti; the Saint Domingue revolution from below*. Knoxville: University of Tennessee Press.
- Filho, Ivan Alves. 1988. *Memorial dos Palmares*. Rio de Janeiro: Xenon.
- Foner, Philip S. 1975. *History of black Americans from Africa to the emergence of the cotton kingdom*. Westport: Greenwood Press.
- Foner, Philip S., and Ronald L. Lewis, eds. 1978. *The black worker; a documentary history from colonial times to the present. Vol. I. The Black Worker to 1869*. Philadelphia: Temple University Press.
- Fonseca, Eduardo Júnior. 1988. *Zumbi dos Palmares; a história que nao foi contada*. Rio de Janeiro: Yorubana Do Brasil Sociedade.
- Fouchard, Jean. 1981. *The Haitian maroons; liberty or death*. Preface by C.L.R. James. New York: Theo. Gaus.

- Fontaine, Pierre-Michel, ed. 1985. *Race, class and power in Brazil*. Los Angeles: Center for Afro-American Studies, University of California.
- Forbes, Robert H. 1933. The black man's industries. *The Geographical Review* 23: 230-247.
- Frederick-Town Herald*. June 1802 - January 1832.
- Friedemann, Nina S. de. 1974. *Mineria, descendencia y orfebreria artesanal litoral Pacifico Colombia*. Bogota: Universidad Nacional Facultad de Ciencias Humanas.
- Friedemann, ----- . 1985. *Troncos among black miners in Colombia*. In *Miners and mining in the Americas*. Manchester: Manchester University Press.
- Freyre, Gilberto. 1956. *The masters and the slaves; a study in the development of Brazilian civilization*. New York: Alfred A. Knopf.
- Geggus, David. 1983. *Slave resistance studies and the Saint Domingue slave revolt: some preliminary considerations*. Occasional Papers #4. Miami: Latin American and Caribbean Center, Florida International University.
- Genovese, Eugene D. 1979. *From rebellion to revolution; Afro-American slave revolts in the making of the modern world*. Baton Rouge: Louisiana State University Press.
- Germana, Joseph. 1989. The biological significance of behavioral learning from a systems view. *Behavioral Science* 34: (3):228-237.
- Gomes, Francisco Magalhes. 1983. *História da siderurgia no Brasil*. Belo Horizonte: Editora Itatiaia Limitada.
- Goveia, Elsa V. 1965. *Slave society in the British leeward islands at the end of the eighteenth century*. New Haven: Yale University Press.
- Grébénart, Danilo. 1988. *Les premiers metallurgistes en Afrique Occidentale*. Abidjan: Nouvelles Editions Africaines.
- Hair, P.E.H. 1975. From language to culture: some problems in the systematic analysis of the ethnohistorical records of the Sierra Leone region. In *The population factor in African studies*. R. P. Moss and J.A.R. Rathbone, eds. London: University of London Press.
- Handler, Jerome S., Frederick W. Lange, and Robert V. Riordan. 1978. *Plantation slavery in Barbados; an archaeological and historical investigation*. Cambridge: Harvard University Press.
- Hartride, Walter Charlton. 1943. The refugees from the island of St. Domingo in Maryland. *Maryland Historical Magazine* 38:103-22.
- Henry, Rev. Thomas W. 1872. *Autobiography of Rev. Thomas W. Henry of the AME church*. Baltimore: A.M.E. Book Rooms.
- Hershberg, Theodore. 1975. Free-born and slave-born blacks in antebellum Philadelphia. In *Race and slavery in the western hemisphere: quantitative studies*, Stanley L. Engerman and Eugene D. Genovese, eds. Princeton, N.J.: Princeton University Press.
- Humboldt, Alexander de. 1811. *Political essay on the kingdom of New Spain*. Translated from the original French by John Black. New York: I. Riley.

- Hunt, Alfred N. 1988. *Haiti's influence on antebellum America; slumbering volcano in the Caribbean*. Baton Rouge: Louisiana State University Press.
- Johnson, Marian Ashby. 1980. Black gold: goldsmiths, jewelry, and women in Senegal. Ph.D. dissertation, Stanford University.
- Jordan, Winthrop D. 1968. *White over black; American attitudes toward the Negro, 1550 - 1812*. Chapel Hill: University of North Carolina Press.
- Kense, Francois J. 1983. *Traditional African ironworking*. University of Calgary, Canada. African Occasional Papers No. 1.
- Kelley, Jennifer Olsen, and J. Lawrence Angel. 1983. The workers of Catoctin Furnace. *Maryland Archeology* 19:2-17.  
-----, 1987. Life stresses of slavery. *American Journal of Physical Anthropology* 74:199-211.
- Kent, R. K. 1979. Palmares: an African state in Brazil. In *Maroon societies; rebel slave communities in the Americas*, Richard Price, ed. Baltimore: Johns Hopkins University Press.
- Klein, Herbert S. 1986. *African Slavery in Latin America and the Caribbean*. New York: Oxford University Press.  
-----, 1982. *Bolivia; the evolution of a multi-ethnic society*. New York: Oxford University Press.  
-----, 1971. Patterns of settlement of the Afro-American population in the New World. In *Key issues in the Afro-American experience*. Nathan I. Huggins, Martin Kilson, and Daniel M. Fox, eds. New York: Harcourt, Brace, Jovanovich.
- Kulikoff, Allan. 1986. *Tobacco and slaves: the development of southern cultures in the Chesapeake, 1680 - 1800*. Chapel Hill: University of North Carolina Press.
- Laguette, Michel. 1989. *Voodoo and politics in Haiti*. London: Macmillan.
- Larick, Roy. 1991. Warriors and blacksmiths: mediating ethnicity in East African spears. *Journal of Anthropological Archaeology* 10(4):229-331.
- Lewis, Ronald L. 1979. *Coal, iron, and slaves; industrial slavery in Maryland and Virginia, 1715-1865*. Westport: Greenwood Press.
- Libby, Jean. 1978. Reverend Thomas W. Henry of Hagerstown. *Negro History Bulletin* 41:848-49.  
-----, 1991. African ironmaking culture among African American ironworkers in western Maryland, 1760 - 1850. M.A. thesis, San Francisco State University School of Ethnic Studies.
- Light, John D. 1987. Blacksmithing technology and forge construction. *Technology and Culture*: 658-65.
- Lowe, Edgar. 1967. Negro resistance to Spanish rule in colonial Mexico. *The Journal of Negro History* 52 (1, April): 89 - 103.
- Mellafe, Rolando. 1975. *Negro slavery in Latin America*. Translated by J.W.S. Judge. Berkeley: University of California Press.
- Marees, Pieter de. 1987. *Union Academique Internationale Fontes Historiae Africanae. Varia V, Description and historical account of the gold kingdom of Guinea (1602)*. New York: Oxford University Press.
- May, Earl Chapin. 1945. *Principio to Wheeling 1715 - 1945: A pageant of iron and steel*. New York: Harper & Brothers.



- McIntosh, Roderick J., and Susan Keech McIntosh. 1988. From Siecles obscurs to revolutionary centuries on the Middle Niger. *World Archaeology* 20:141-65.
- McNaughton, Patrick R. 1988. *Traditional arts of Africa, The Mande blacksmiths; knowledge, power and art in West Africa*. Bloomington: Indiana University Press.
- Miller, Joseph C. 1988. *Way of death; merchant captialism and the Angolan slave trade 1730 - 1830*. Madison: University of Wisconsin Press.
- Moura, Clovis. 1959. *Rebelioes da sensala; quilombos, insurreicoes, guerrillhas*. Sao Paulo: Edicoes Zumbi.
- Mullin, Gerald W. 1971. Religion, acculturation, and American Negro slave rebellions: Gabriel's insurrection. In *Explorations in the Black Experience., American slavery: the question of resistance*. John H. Bracey, August Meier, and Elliott Rudwick, eds. Belmont, CA: Wadsworth.
- . 1972. *Flight and rebellion: slave resistance in eighteenth century Virginia*. New York: Oxford University Press.
- Nodotti, Nelson. 1984. *Quilombo: roterio do filme e cronica das filmagens*. Carlos Dignes. Rio de Janeiro: Achiamé.
- Pang, Alex Soojung-Kim. 1990. Oral history and the history of science: a review essay with speculations. *International Journal of Oral History* 10: 270-85.
- Park, Mungo. 1800. *Travels in the interior districts of Africa in the years 1795, 1796, and 1797*. 4th ed. London: W. Bulmer & Co. for the author.
- Pennington, James W. C. [1841]1969. *A text book of the origin and History, &c. &c. of the colored people*. Second edition. Original edition Hartford: L. Skinner, Printer, 1841. Detroit: Negro History Press.
- . [1850]1971. *The fugitive blacksmith; or, events in the history of James W.C. Pennington, pastor of a Presyterian church, New York, formerly a slave in the state of Maryland, United States*. 3rd ed. Reprinted from 1850 edition. Westport: Negro Universities Press.
- Pierson, Donald. [1942]1967. *Negroes in Brazil; a study of race contact at Bahia*. Carbondale: Southern Illinois University Press.
- Pole, L. M. 1985. Furnace design and the smelting operation: a survey of written reports of iron smelting in West Africa. In *African ironworking--ancient and traditional*. Randi Haaland and Peter Shinnie, eds. Oxford: Oxford University Press.
- Price, Richard, ed. 1979. *Maroon societies; rebel slave communities in the Americas*. 2nd ed. Baltimore: Johns Hopkins University Press.
- Querino, Manuel Raimundo. 1978. *The African contribution to Brazilian civilization*. Translated with an introduction by E. Bradford Burns. Tempe: Center for Latin American Studies, Arizona State University.
- Robbins, Michael Warren. 1972. The Principio company: iron-making in colonial Maryland, 1720 - 1781. Ph.D. dissertation, George Washington University.
- Roberts, Richard L. 1987. *Warriors, merchants, and slaves; the state and the economy in the middle Niger valley, 1700-1914*. Stanford: Stanford University Press.
- Rodney, Walter. 1982. *How Europe underdeveloped Africa*. Washington DC: Howard University Press.

- Rogers, Edward J. 1962. The iron and steel industry in colonial and imperial Brazil. *The Americas* 19:172-184.
- Rostoker, William, and Bennet Bronson. 1990. *Pre-industrial iron: its technology and ethnology*. Philadelphia: Rostoker.
- Russell-Wood, A.J.R. 1982. *The black man in slavery and freedom in colonial Brazil*. New York: St. Martin's Press.
- Rustad, John A. 1980. The emergence of iron technology in West Africa. In *West African culture dynamics: archaeological and historical perspectives*, B.K. Swartz and Raymond E. Dumett, eds. The Hague: Mouton Publishers.
- Saunders, A.C. De C.M. 1982. *A social history of black slaves and freedmen in Portugal 1441 - 1555*. Cambridge: Cambridge University Press.
- Schenck, H. R. 1982. Evidence for a nineteenth century forge at Catoctin, Maryland. *MASCA Journal* 2 (Archaeometallurgy): 42-44.
- , 1983. Analysis of cast iron from Catoctin, Maryland. *MASCA Journal* 2:107-11.
- Schenck, H. R. and R. Knox. 1985. Wrought iron manufacture at Valley Forge. *MASCA Journal* 3:132-41.
- Schmidt, Peter, and Donald H. Avery. 1978. Complex iron smelting and prehistoric culture in Tanzania. *Science* 201:1085-89.
- Scott, Julius Sherrard III. 1986. The common wind: currents of Afro-American communication in the era of the Haitian Revolution. Ph.D dissertation, Duke University.
- Simmons, Lesley Byrd. 1929. *The Encomienda in New Spain; forced native labor in the Spanish colonies, 1492-1550*. Berkeley: University of California Press.
- Sirgy, M. Joseph. 1986. *Self-congruity: Toward a theory of personality and cybernetics*. New York: Praeger Publishers.
- Skaggs, David Curtis. 1973. *Roots of Maryland democracy 1753-1776*. Westport: Greenwood Press.
- Smith, Billy G., and Richard Wojtowicz, eds. 1989. *Blacks who stole themselves: advertisements in the Pennsylvania Gazette, 1728-1790*. Philadelphia: University of Pennsylvania Press.
- Soyinka, Wole. 1976. *Ogun Abibman*. London: Rex Collings.
- Starobin, Robert. 1970. *Industrial slavery in the old South*. New York: Oxford University Press.
- Stein, Robert Louis. 1988. *The French sugar business in the eighteenth century*. Baton Rouge: Louisiana State University Press.
- Stern, Steve J. 1982. *Peru's Indian peoples and the challenge of Spanish conquest; Huamanga to 1640*. Madison: University of Wisconsin Press.
- Sudarkasa, Niara. 1981. Female employment and family organization in West Africa. In *The black woman cross-culturally*, Filomina Chioma Steady, ed. Cambridge: Schenkman Publishing.

- Swift, David E. 1989. *Black prophets of justice; activist clergy before the Civil War*. Baton Rouge: Louisiana State University Press.
- Terborg-Penn, Rosalyn. 1986. Black women in resistance: a cross-cultural perspective. In *In resistance; studies in African, Caribbean, and Afro-American history*, Gary Y. Okiihiro, ed. Amherst: University of Massachusetts Press.
- Thomas, Ronald A., Sharon Ann Burnston, John P. McCarthy, and Glen Scott Mellin. 1980. Archaeological investigations at Catoctin Furnace, Frederick County, Maryland. Part 3 of final field reported submitted to Kenneth Orr, Orr and Son, Thurmont, Maryland, May 1980. Baltimore: Maryland Department of Transportation, State Highway Administration.
- Thompson, Michael D. 1976. *The iron industry in western Maryland*. Monograph printed in limited edition by the Washington County Historical Association.
- Thompson, Robert F. 1982. *Flash of the spirit; African and Afro-American art and philosophy*. New York: Random House.
- Tylecote, R. F. 1976. *A history of metallurgy*. London: Metals Society.
- Van der Mwere, Nikolaas J. 1980. The advent of iron in Africa. In *The coming of the age of iron*, Theodore A. Wertime and James D. Muhly, eds. New Haven: Yale University Press.
- Vaughn, James H. 1973. Blacksmiths as artists in Marghi society. In *The traditional artist in African societies*, Warren L. d'Azevedo, ed. Bloomington: Indiana University Press.
- Virginia Gazette and General Advertiser*. variable dates.
- Vlach, John Michael. 1978. *The Afro-American tradition in decorative arts*. Cleveland: The Cleveland Museum of Art.
- West, Robert C. 1957. *The Pacific lowlands of Colombia; a Negroid area of the American tropics*. Baton Rouge: Louisiana State University Press.
- Windley, Lathan A., ed. 1983. *Runaway slave advertisements: a documentary history from the 1730s to 1790. Virginia. Maryland*. Westport: Greenwood Press.
- Woodson, Carter Godwin. [1933]1977. *The mis-education of the Negro*. Washington DC; reprint of 1933 edition; New York: AMS Press.
- Wright, James M. 1921. *The free Negro in Maryland, 1634 - 1860*. New York: Columbia University Press.
- Yansané, Aguibou Y. 1985. Cultural, political, and economic universals in West Africa. In *African Culture and the rhythms of unity*, Molefi Kete Asante and Kariamuwelsh Asante, eds. Westport: Greenwood Press.
- Yavetz, Zvi. 1988. *Slaves and slavery in ancient Rome*. New Brunswick: Transaction Books.
- Zahan, Dominique. 1979. *The religion, spirituality, and thought of traditional Africa*. Chicago: University of Chicago Press.

## ACKNOWLEDGMENTS

I gratefully acknowledge scholarly advice. At San Francisco State University: adviser/ professor Angela Y. Davis, Women's Studies; major adviser Aguibou Y. Yansané, professor of Black Studies and International Relations; John T. Johnson, professor of Journalism; and professor of Black Studies Mary R. Hoover. In western Maryland: John C. Frye, archivist and iron industry specialist; at Stanford University: History of Science postdoctoral fellow Alex Soojung-Kim Pang; at the University Museum, University of Pennsylvania: metallurgical archaeologist Helen R. Schenck. At the conference *Rediscovering America* at Baton Rouge in 1992, comments of Armin Schwegler, University of California Irvine, led to further resources in Latin America.

## AUTHOR'S BIOGRAPHY

Jean Libby is a retired instructor of African and American History classes at community colleges in northern California. In retirement she has initiated publication of materials on John Brown and African Americans through Allies for Freedom. In 2006 she established an online bookstore, Internet Bookselling, (dba registered) which has affinity titles of John Brown and the Underground Railroad; American Biographies with an emphasis on communities histories; Vietnamese literature of Nguyen Chi Thien, dissident poet. A blog, Viet-Am Review, is a volunteer service of announcements of interest to Vietnamese Americans.

Jean Libby edited periodicals for western branches of CORE and the NAACP in the 1960s, earning publication prizes at annual conferences of the NAACP in 1966, 1967, and 1968.

Associate of Arts degree in Professional Photography from De Anza College, 1978.

Bachelor of Arts degree in African American Studies from the University of California, Berkeley, 1986

Master of Arts degree in Ethnic Studies, Black Studies Concentration, from San Francisco State University, 1991. (This essay is a revision of the thesis for this program.)

## AUTHOR'S FULL TITLE PUBLICATIONS

*Black Voices from Harpers Ferry: Osborne Anderson and the John Brown Raid*, 1978. privately published; out of print. Photocopies available from the author.

\*\**Mean to be Free: John Brown's Black Nation Campaign*. educational videotape. African American Studies Dept. and the UC Berkeley TV and Radio Studio. 1986. author and photographer . 53 minutes, color, DVD.

\*\**From Slavery to Salvation: The Autobiography of Rev. Thomas W. Henry of the A.M.E. Church* (University Press of Mississippi, 1994) discoverer of document at Howard University, transcriber (it was nearly illegible) in verbatim large type, and editor with expanded documentation. Foreword by Edward C. Papenfuse, chief archivist of Maryland. Reprinted by Allies for Freedom in 2005. 139 pages, maps, illus., index. Paper.

\*\**John Brown Mysteries*, with nine teachers, librarians, artists and community activists called Allies for Freedom Pictorial Histories Publishing, Inc., 1999. 123 pages, maps. illus. Paper.

\*\**John Brown's Family in California; A journey by funeral train, covered wagon, through archives, to the Valley of Heart's Delight; including the years 1833 – 1926 and honoring descendants of the Woman Abolitionists of Santa Clara County, now known as Silicon Valley*. Jean Libby, editor and principal author, with April Hablerstadt, Eric Ledell Smith, John M. Lawlor, and Louis A. DeCaro, Jr. Allies for Freedom, 2006. 40 pages, large format, illus. Paper.

\*\* distributed by Baker & Taylor for libraries and bookstores. Publisher's website: [www.alliesforfreedom.org](http://www.alliesforfreedom.org)