History and Technology

An International Journal

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ghat20

Black metallurgists and the making of the industrial revolution

Jenny Bulstrode

To cite this article: Jenny Bulstrode (2023): Black metallurgists and the making of the industrial revolution, History and Technology, DOI: 10.1080/07341512.2023.2220991

To link to this article: https://doi.org/10.1080/07341512.2023.2220991

Published online: 21 Jun 2023.

HISTORY AND TECHNOLOGY
https://doi.org/10.1080/07341512.2023.2220991

Routledge
Taylor & Francis Group

Black metallurgists and the making of the industrial revolution

Jenny Bulstrode

Department of Science and Technology Studies, University College London, London, UK

ABSTRACT

Metallurgy is the art and science of working metals, separating them from other substances and removing impurities. This paper is concerned with the Black metallurgists on whose art and science the intensive industries; military bases; and maritime networks of British enslaver colonialism in eighteenth-century Jamaica depended. To engage with these metallurgists on their own terms, the paper brings together oral histories and material culture with archives, newspapers, and published works. By focusing on the practices and priorities of Jamaica's Black metallurgists, the significance and reach of their work begins to be uncovered. Between 1783 and 1784 financier turned ironmaster, Henry Cort, patented a process of rendering scrap metal into valuable bar iron. For this 'discovery', economic and industrial histories have lauded him as one of the revolutionary makers of the modern world. This paper shows how the myth of Henry Cort must be revised with the practices and purposes of Black metallurgists in Jamaica, who developed one of the most important innovations of the industrial revolution for their own reasons.

ARTICLE HISTORY
Received 6 December 2021
Accepted 30 May 2023

KEYWORDS
Iron; currency bundles; innovation; Jamaica; Henry Cort

Introduction

> We saw a great workshop with many furnaces where they made anchors, caskets, and every sort of marine equipment. There were so many [B]lack workers at their forge that you would think them cyclopses in Vulcan's cave. Finally we saw their innumerable big and fine caskets in four large buildings also missiles, shields, breastplates, mortars, small cannons, bows, lances, and everything well made and plentiful. I say nothing of other equipment which is dispersed on ships on every sea. Nuremberg's stores are nothing in comparison. How much lead, copper, saltpetre, and sulphur!
>
> Hieronymus Münzer [1494-5][1]

When the Feldkirch physician and trader, Hieronymus Münzer, visited Lisbon in late November 1494, he saw for himself that some of the most advanced ironworking technology in Europe depended on the skill of Black metallurgists. The king of Portugal had the best of everything, and that meant Black artisans in the royal ironworks.[2] This paper is concerned with a group of 76 Black metallurgists who

CONTACT Jenny Bulstrode j.bulstrode@ucl.ac.uk

ran another enslaver's foundry, established nearly three centuries later just west of Morant Bay, Jamaica. There is a significant and rapidly growing literature on the contributions of artisans and healers of African descent to innovations historically credited to white practitioners and institutions in Northern Europe and North America.[3] This paper identifies the Black metallurgists in Jamaica as the authors of one of the most significant innovations of the British industrial revolution, but this identification is only possible because the paper engages with the practices and purposes of those Black metallurgists on their own terms. Over two decades ago, David Edgerton called for historians of technology to shift their attention from innovation to use. Among the many important implications of this shift, he highlighted the potential to change whose history gets promoted – to move beyond the clamour of patents and priority claims that serve hegemonic groups; and, perhaps, in doing so, to identify truly innovative ideas and applications based on use.[4] Between 1783 and 1784, British financier turned ironmaster, Henry Cort, patented a process of rendering scrap metal into valuable bar iron that has been celebrated as one of the most important innovations in the making of the modern world.[5] Here, the concern is the 76 Black metallurgists in Jamaica, who developed the process for which Cort took credit.

To understand what these metallurgists were doing, it is necessary to engage with some of the many different material, technical and conceptual resources they drew upon. By 1780, 842,724 documented individuals had been trafficked from Africa to Jamaica alone. Of those, one in six were transported via the Bight of Benin; more than one in five via the Bight of Biafra; and almost one in three via the Gold Coast.[6] The names denote the principal regions targeted by British enslavers, but not the complexity and reach of the systems that brought people to these coasts or the skills and knowledge they carried with them. In focusing on these regions, British enslavers targeted some of the most significant iron working cultures in world history.[7] The first section of the paper introduces some of the history and significance of pre-1800 iron working in these regions. Section two documents the political and economic structure of iron working in eighteenth-century Jamaica, both in the regions under British colonial rule and slavery, and in the autonomous regions under Maroon sovereignty. These first two sections provide necessary context and resources to understand section three, which sets out the activities of the 76 Black metallurgists who ran a white enslaver's foundry just west of Morant Bay, Jamaica. Sections four and five then, respectively, consider how Henry Cort came to learn about the Black metallurgists' activities in Jamaica while based in the Solent region of England's Channel coast, and how he was able to present their innovation as his own.

Black Jamaicans came from many different places and experiences. As Vincent Brown has so compellingly shown in his scholarship on the coordinated political resistance of enslaved people in Jamaica, their powerful political communions were hard won through negotiation across many different languages, practices and conceptual frameworks.[8] This paper argues that the innovation for which Cort took credit was one such communion, forged by the 76 Black metallurgists making connections across their many different expressions of heritage and experience. Responding to but never determined by their conditions, these Black metallurgists

developed one of the most important innovations of the industrial revolution for their own purposes.[9]

The principal African iron working heritages among Black Jamaicans pre-1800

By the time Münzer visited the royal ironworks in Lisbon in 1494, Europeans were already bringing large quantities of copper manillas, cowries and cloth to African coasts, seeking to imitate pre-existing currency forms and trade for African captives.[10] While these currencies could be exchanged as they were, African artisans often transformed or incorporated them into artworks and tools that articulated changing experiences and identities – not least the rise of powerful states alongside and entangled with European enslavement and traffic of African people. The Benin bronzes are a famous example. From at least the sixteenth century onwards, Edo craftsmen in the Oba's palace melted African copper currencies together with their poor-quality European imitations,[11] to cast depictions that included reference to the new European presence and influence among the scenes of the kingdom's history.[12] Other bronzes featured stylised cowrie shells. In these ways craftsmen used both material and form to express changing experience.[13]

The incorporation of copper and cowries has been identified with a range of artistic, economic, and ritual uses. Less recognised, however, is the place of iron in these articulations. The Benin bronzes are perhaps the most famous example of the artistic expression of the cross-cultural encounter of the Atlantic trade, but the most powerful of these forms were not only made of prestige materials like copper and cowries. In the busts of Benin royalty, the pupils of the eyes are inlaid with iron to connect living royalty to departed ancestors, to deify their person and embody in them the power to protect or to destroy (Figure 1).[14] The ritual altar rings of the Benin palace have iron in their core.[15] It is significant that the material of base purposes, from agricultural tools to shackles and chains, was also the material of highest ritual; just as it is significant that the industrial-scale expansion of these base uses was accompanied by the cautious application of small quantities of iron to expressions of transcendental power. Across West and Central Africa, iron materials often had the potential to embody both principles of the sacred and of the profane, while the skill of the metallurgist was to separate the two.[16] For many such groups, iron was not a material of prestige in the same way as cowries or even as copper. Iron was a material of power.[17]

Reaching deep into the iron-rich Togo Hills of Ghana's Northern Volta Region are some of the most extensive pre-colonial iron mines in Africa. The Mawu, Lolobi and Santrokofi who occupy these hills are linguistically and culturally distinct from the Akan and other surrounding groups. Yet in common with other ironworking societies in southern Ghana, and the major iron industry centres of neighbouring Bassar, Togo, they hold differing expressions of the concept that to manage iron is to separate the sacred from the defiled.[18] These, or closely related groups, once mined the hills from settlements distributed across the Volta region. However, from the mid-seventeenth century they began to leave for the safety of the mines. The growing lowland states continued to provide a market for their intensive iron industries, but the expansionary wars that accompanied this demand had entered a new phase. Prior to this point, gold had been the eponymous Gold Coast's principal export, and the frequent conflicts between its polities had been short-lived.[19] But this changed in the second half of the

Figure 1. Thought to represent Queen Mother Idia, the eyes of this bust are inlaid with iron. Brass commemorative head, Edo, Benin City, early sixteenth century. British Museum No. Af1897,1011.1. Courtesy of the Trustees of the British Museum (CC BY-NC-SA 4.0).

seventeenth century with a succession of major conflicts between different states corresponding with the Gold Coast, the Bight of Benin and the Bight of Biafra. Europeans and above all the British fuelled these wars, distributing weapons to all sides so they could profit from the turmoil.[20] As enslaved people overtook gold as the principal export, settlements became targets for raiding parties seeking captives to sell. Of the specialised ironworking societies of the Volta region, the Mawu, Lolobi and Santrokofi people who left for the hills between 1650 and 1750 were those who got away.[21]

Northern Igboland is considered the cradle of ironworking in Nigeria, and one of the regions where the concept of ironworking knowledge as the skill to purify the sacred from polluting influences was most strongly developed.[22] It is also among the areas that were most intensively raided for Europe's human trade. An estimated 75 percent of the people transported from the Bight of Biafra to the Americas between 1640 and 1800 were taken from Igboland, with the majority from this northern region most renowned for its ironworking skill.[23] Against this onslaught, communities developed diverse strategies of

resistance. As with the people of the Volta region of Ghana, moving on was one tactic. Still others found ways to stay – forming vigilante militias; planting poison to trap and destroy raiding parties; and deploying medicine associated with the work of smiths to prevent incursions.[24] From villages and industrial works to royal palaces, the European appetite for African people was understood as a sickness. The priest-king of Nri laid down a powerful curse upon the raiders[25]; while the Oba's court, decorated with the cast copper wealth of the Euro-African trade and under the iron gaze of former kings and queens, recalled an ancient prediction that the Benin kings would die at the hands of a European.[26]

When Europe's transatlantic human trade hit the Gold Coast relatively late,[27] the reaction was no less marked. African traders responded by making bars of iron 'the standard coin' against which all European trade was valued.[28] This market shift ensured significant regulatory systems. With iron bars the standard, European enslavers found themselves 'inforced [sic] to make use of their [African] Smiths, to cut [the bars] to proportion'.[29] The use of iron called for an African metallurgist to manage the pathology of this trade.[30]

The West and West-Central African regions most targeted by Britain are notable for their linguistic diversity. Yet across the many Bantoid languages of West-Central Africa, including the Kongo River catchment; Cameroon; and extending into Nigeria, use of the proto-Bantu stem word *-*túd*- 'to forge' and its derivative *-*túdi*- 'smith' are almost ubiquitous.[31] In Igboland, West Africa, smiths and traders were also linguists mastering multiple languages in reflection of the long distances they travelled.[32] Further west, it has been suggested that the Akan language served as a means of communication among associations of itinerant traders of diverse ethnic origins, contributing to the consolidation of Akan economic and political power in this period.[33] As the human trade dominated the markets of the Gold Coast and the Bights of Benin and Biafra, the words that dominated negotiations in shared languages; the words that captives heard in snatches of intelligible conversation; and the words they could use to begin to forge political communions across diverse heritages were often words of iron and its working.[34]

In 1657, the British East India Company began to ship extraordinary quantities of iron to Fort Cormantyn on the Gold Coast.[35] A survey of substantial slag deposits suggests that specialised iron-producing centres on the coast, such as Nsadwer Bosomtwi, stopped smelting ore around this time.[36] Instead, these coastal metallurgists began to transform the European iron, separating out the sacred and the profane to make blades of ritual and war alongside the shackles of the human trade.[37] The Royal African Company took over Britain's African trade from the East India Company in 1662. By 1708, they were shipping 52,900 iron bars to the Gold Coast in a single year.[38] Writing from Southampton in 1711, the French enslaver, Jean Barbot, updated his 1688 account of the African trade for the British market, warning of the discernment of Gold Coast traders who followed the expert judgment of their smiths to accept only the best quality iron.[39] His revision suggested this connoisseurship was a new development, but the East India and Royal African Company records show otherwise. With its poor-quality domestic iron production, Britain had relied on imported Swedish iron to meet these metallurgists' high standards since at least the 1650s,[40] while frequent letters from Company factors show they could only sell the best quality branded iron without

flaws.[41] With other trade goods, counterfeit was a regular part of Company profits, even involving the sale of bales of scrap iron concealed under a coating of brass.[42] But with iron, the fine judgment of African smiths kept the Company at the mercy of continental markets. On 7 January 1724, the Company shipped 20,269 bars to Whydah and Sierra Leone,[43] but just three months later struggled to find even 1,800 bars of the requisite quality for their Cape Coast Castle, paying a significant premium to be able to complete the modest order.[44]

West and Central African traders could afford to be discerning: their own iron was simply better.[45] The same influx of European iron that saw Gold Coast iron industries focus on smithing prompted a massive expansion in all stages of production further inland. From the highlands of the Northern Volta Region of Ghana and Togo, to Igboland and Western Cameroon, monumental furnace complexes produced and exported iron of superior quality to Europe. While many existing sites increased production, many more new sites were established as smiths proliferated and travelled, adapting modes of expression in response to new experiences as they did their technology and skills.[46] The famous eighteenth-century abolitionist, Olaudah Equiano, came from one such smithing settlement in Igboland.[47] Just as European accounts admired the sixteenth-century bronzes of the Oba's palace that expressed the cross-cultural encounter in melted copper,[48] they wondered at the ritual swords of the Gold Coast – forged in iron from different continents.[49] By the 1730s, the presence of iron in the British Gold Coast trading forts was much reduced;[50] but for Akan people, the significance of the metal was every bit as salient.

The Asante rose to power on the Gold Coast towards the end of the seventeenth century, when the iron standard of the human trade dominated. For this fiscal military state, swords (*afena* singular; *mfena* plural) were masterpieces of the ironworker's art and among the most important ritual expressions.[51] To hold *Bosomuru*, the sacred sword of Osei Tutu, taken from Onoo Adu Gyamfi and consecrated after his defeat, was to rule the Asante. But Osei Tutu's successor, Opoku Ware I, instituted a new sword that took even greater significance under his reign.[52] Oral history relates that when Opoku Ware I was born in 1700, 'his right hand stood upright shaking all the time' until the mythological priest advisor, Komfo Anokye, 'ordered that a sword should be forged for the baby, and he showed them with what assembly of materials that sword should be made'. Forged at the height of the iron standard for the human trade, the 'assembly of materials' in Opoku's sword spoke to the presence and significance of European iron just as the Benin bronzes spoke to the lives spent in European copper. The sword was named *Mpɔnpɔnsɔn*, meaning 'responsibility'. Marking Opoku's destiny, oral history narrates that only 'when [*Mpɔnpɔnsɔn*] was forged and put in the tight hand of the baby his hand ceased to shake'.[53]

Opoku Ware's sword and its ability to articulate meaning played a crucial role in establishing his legitimacy after Osei Tutu's death in 1717. The strongest of Asante state oaths (*ntamkɛsee*) derive their power from recalling past events of such pain and dread that they must not be spoken aloud. To bring grief to presence without putting it into words, Komfo Anokye made Opoku address *Bosomuru* and *Mpɔnpɔnsɔn*, invoking the status of the iron sword's material embodiment and bringing to presence the heterogeneous political and material relations articulated in the legend of its forging. From Opoku Ware's enstoolment in 1720, *Mpɔnpɔnsɔn* was used for the most powerful oaths of allegiance, where vassals pledged their lives for the king of kings (the *asantehene*), and

the *asantehene* pledged his life for the kingdom.[54] The detail of a miniature sword next to *Mpɔnpɔnsɔn*'s hilt instantiated the fractal relation of Opoku's oath with respect to the oaths of allegiance taken by vassals[55]; but it was the iron of the blade that connected *Mpɔnpɔnsɔn* to the polity. Speaking in avoidances and allusions recalled the unutterable pain of Osei Tutu's death in enemy ambush, but as the *asantehene* stood for his people, so the grief of losing him also stood for the grief of their losses generally. Minor oaths (*ntam*) are drunk rather than sworn. Europeans reported that these drinking oaths were used in the human trade to bind captives and to seal their exchange for iron bars with European enslavers,[56] a testament to how European commodification distorted complex pre-existing forms of obligation and peonage. In 1719, several Asante villages were enslaved by rival forces in the region.[57] When Opoku spoke his great oath just months later, *Mpɔnpɔnsɔn*'s blade embodied and brought to presence the unspeakable pain of all the lives pledged on the iron.

The political and economic structure of iron working in eighteenth-century Jamaica

When the newly appointed commander-in-chief of the fleet, Sir Chaloner Ogle, wrote from Port Royal, Jamaica, in May 1733, railing against 'all Iron Works done by the People of this Island running the Government to vast Expense',[58] he referred to the contract system that underpinned much of the infrastructure of plantation production in the West Indies. In this system a master workman would undertake a commission and then sub-contract the work to 'his own people': Black artificers both free and enslaved; and to Black artificers whose skilled working time he bought from another enslaver. At the time Ogle wrote, the British were in open war with the Maroons – Black fugitives from enslavement who had forged free autonomous communities in the interior of the island. But in the uneasy peace that followed the Maroons' famous victory in 1739, Black metallurgists were also recruited from Maroon towns.[59]

It was Jamaica's Leeward Maroons, under the leadership of Kojo (Cudjoe),[60] who first forced the British to treaty in 1739.[61] Just a few years later, a white observer reported on Kojo's Leeward Maroons that

> [t]hey forge their Own Iron Work, making Knives, Cutlasses, Heads of Lances, Bracelets ~ Rings & variety of other kind of necessaries; they have Bellows, made of Wood about six feet high & 16 inches thro' which they make hollow and an hole at the Bottom thro' which the Air Passes to the Fire, having for that purpose two [Maroons] who (with two more) are always working them up & down the hollow Wood by which means they have manufactured fire.[62]

Taking the shackles, chains and agricultural implements of the enslavement system, Maroon metallurgists remanufactured them into ritual objects with the most powerful practical purpose. The knives and cutlasses that the observer reported were *afana*. The Maroon word for a machete that is both the most mundane tool and mediator of the most dangerous sacred rites, *afana* directly recalls the Akan word for sword, '*afena*'.[63]

At the point they forced the British to treaty, the Leeward Maroons were themselves on the brink of starvation. Under these desperate conditions, Kojo accepted terms to act on behalf of the British against external invaders, against Maroons who had not yet come to terms and against fugitives from enslavement, and so defined the terms that other

Maroon groups could negotiate.[64] They were co-opted as enforcers of enslavement and enacted in their polity the warring principles of the sacred and the profane materially embodied in the iron of their weapons.

After the peace treaties of 1739 and 1740, British colonisers increasingly sought to infiltrate the autonomy of Jamaican Maroons and encroach onto Maroon land, expanding their extractive reach. While sugar became Britain's most valuable import, Jamaica became the most valuable of its American sugar islands[65]; and with this expansion there came a hunger for iron. The two were bound together. Ferrous metal was not just the currency of the human trade, and the shackles and chains that held people in bondage, but was also the agricultural implements and machinery of plantation production, from hoes and cutlasses to the great grooved iron rollers that crushed the sugar cane.[66] Above all, the sugar cane. The intensity of sugar production consumed more iron and more Black skill than any other plantation crop. While coffee or indigo were grown with fewer than a dozen hands, the cultivation of sugar saw hundreds bound to a single estate,[67] more cutlasses, more chains, more crushing iron rollers. The skill of Jamaica's Black metallurgists in the 'formal reshaping and functional repurposing' of imported iron products has been identified as among the most important material cultures of colonial plantations.[68] But this retooling cannot be understood without attention to metallurgy's many meanings and purposes in the Caribbean context.[69] In Jamaica, the material science of metallurgy was also a political science. Transforming iron was a powerful force within Jamaican Maroons' political organization; and from when Taíno, African and Afro-Caribbean fugitives from enslavement first forged Maroon communities, this culture of transformative remanufacture was always also in interaction with geopolitical forces.

By the earlier eighteenth century, iron was of such inflated value in the West Indies that it was usual practice for aging merchantman vessels to be broken up and sold on their arrival. The surplus made on the sale of ferrous scrap was so substantial it could buy and fit out new ships of equal build.[70] British vessels were in essence mobile stores of this surplus-making metal. Through the period of the Atlantic trade, the famously 'wooden walls' of maritime Britain were increasingly held together with iron. Knees – the angular brackets supporting the framework of a ship – were wrought for new builds, and retrofitted in the maintenance of existing vessels.[71] Iron hoops stayed the casks, and great iron nails, well over a foot long, held in place the copper sheathing ubiquitous among vessels of all European nations engaged in the human traffic.[72] Artillery pieces were made almost exclusively of cast iron,[73] while blocks of slag and voyage iron served as both ballast and resource. Since 1720, vessels in breach of British customs and excise regulations on distilled sugar were liable to be seized, broken up and sold. In 1779, amid a critical escalation of tensions with American and European powers, this regulation was extended to all vessels seized by the customs and excise and not wanted for service.[74] The word 'remanufacture' originated in the eighteenth century in reference to the remnants of a plantation product: used tea leaves, tinged, rolled and dried for re-sale.[75] By the early 1800s, the term had come to specify the recycling of scrap iron sold by dealers in marine stores.[76]

The scale of remanufacture meant the massive imports of Baltic iron went beyond even the re-exported bars and manufactured articles catalogued in the business papers of iron traders. Import metrics miss the ballast, hoops, nails, and

knees that were the material of making surplus in an economy based on remanufacture. Nor can the organisation and distribution of the remanufacture economy be understood through listing commercial and government foundries and forges. To understand the patterns of iron production and use in eighteenth century Jamaica, an island economy and infrastructure focused on sugar, it is first necessary to understand the framework of colonial legislation in which they developed.

In 1719, the British government ruled that,

> none of the plantations should manufacture iron wares of any kinds, out of any sows, pigs, or bars whatsoever, under certain penalties. . . [and that] no forge, going by water, or other work whatsoever, should be erected in any of the plantations for making sows, pigs, or cast-iron into rod or bar-iron.[77]

Though only a kind of crude cast iron called 'pig iron', plantation iron was made with timber and crop residues and, according to the Lieutenant Governor of Virginia, 'mixed at the forge with the English [metal]' using the skill of enslaved Black artificers it could be transformed into material 'as tough and good as the Sweedish [sic] iron'.[78] But the threat that a plantation iron industry, built on Black skills and knowledge,[79] might outcompete Britain in manufactured wares and bar iron was too great. In 1750 Britain's protectionist parliament reacted by passing an act banning 'the erection of any mill or other engine for slitting or rolling of iron; or any plateing [sic] forge to work with a hammer: or any furnace for making steel in any of [his Majesty's colonies in America]', subsequently reinforced by restrictions on the movement of artisans and export of machinery. Known as the 'Iron Act', this colonial legislation is generally only considered in relation to the history of the United States. Yet it contributed to the legislative framework of the Americas more generally. The same colonial legislation that made and protected great iron foundries and mills in Britain suppressed their development in the Americas and interacted with the demands of sugar production and the dependence on Black skill to shape a very different organisation and distribution in Jamaica.

Even after Ogle significantly expanded the works at Port Royal and Lynch's Island,[80] they continued to be operated by contract, depending on the skill of sub-contracted Black artificers.[81] Meanwhile, estates included works for their own maintenance, to be leased or to take on contracts from other estates. In the 1760s, Richard Taylor advertised his services, including 'anything . . . in the Foundery way', from the estate of John Gardiner in Jamaica[82]; while in the 1780s George Cameron, previously of St Elizabeth's, advertised from Deane's Valley Estate, Westmoreland.[83] John Stewart, in Savanna-la-Mar, proposed 'to engage with any Gentleman to visit estates, or pens, regularly once a month and always', and further to offer free farrier-work for '[t]hose who favor him with their . . . Foundery Business'.[84] On the death of enslaver William Tait, his house and land in Jamaica were sold together with 'an extensive business in the Blacksmith and Coppersmith line, and 35 [Black] blacksmiths, coppersmiths and domestics'.[85] Newspaper notices and the *Journals of the House of Assembly* give a glimpse of the commercial smiths and foundries that operated throughout the island to take the old-iron infrastructure of dockyards and plantations – ballast, boilers, hoops, chains, and knees – and render them again into workable material.[86] Even iron-guns were purchased as 'old-iron', to be 'melted down and cast into some kind of metallic ware at an air furnace'.[87]

These same traces of use expose the colonial dependence on the skill of Black metallurgists, such as Scotland and Fortune, enslaved to John Graat's forge in the Parish of St James, [88] and Cornwall, to a works in Portland.[89] Survey of metal-working advertisements in accessible newspapers for established businesses or sale of old concerns reveals a very significant number of cases of those following a shop-based model on a scale permitted by British colonial policy. But this evidence represents only a small fraction of the range of smiths and foundries at work. The notice of Smith & Logan's foundry in Alley, Vere, took over the 'Foundry business' formerly run by Thomas Cockburn 'in all their branches'. Yet there is no advertisement for Cockburn's works in the earlier accessible newspapers or notice of its closing and sale.[90] Meanwhile, the contract system Ogle faced in 1733 still dominated production five decades later when the newly appointed Lieutenant Governor of Jamaica, Archibald Campbell, sought to reorganise the way the military works were paid for and run, denouncing their expense and poor management.[91]

Just as for Ogle; for the British-colonised Caribbean; and for sugar production generally,[92] iron produced under the contract system depended on the skill of Black metallurgists, free, enslaved and Maroon. To measure Jamaican iron production in terms of monolithic works and foundries, imports of pigs or exports of manufactured articles is to miss the system of remanufacture and to misunderstand the meaning of these transformations. Just as smiths in West and Central Africa transformed European iron to take on new properties and purposes, Black metallurgists in Jamaica saw in old iron hardware the potential to make new materials and novel applications. It is these patterns of use,[93] which help reveal the full implications of the rise and fall of 'Reeder's Pen', a lucrative foundry established just west of Morant Bay in 1772.[94]

The Black metallurgists' innovation

John Reeder arrived in Jamaica circa 1770, in the company of a 'West India Proprietor' named 'Bailey', likely William Baillie, a major St. Thomas enslaver. 'Not long after his arrival', the House of Assembly sought to erect a works on the island that would supply boilers and rollers for the manufacture of sugar and so sever the dependency on imported British apparatus enforced through British colonial policy. Bailey identified Reeder as young, monied and active, and recommended him for the job. Reeder initially declined, pointing out that he was 'quite ignorant of such a business' and lacked the necessary capital. In response, the Assembly 'proposed to advance him £3,000 currency on Bond' thereby assuring their support for this contravention of colonial policy.[95] Reassured, Reeder began to erect a foundry. The works included three buildings, respectively, of 66 ft by 33 ft; 63 ft by 47 ft; and 66 ft by 38 ft with reinforced walls '14 inches thick' and 'best hard timber'; 'a large crane strongly bound with iron'; 'Four forges containing about 3000 bricks each and two ditto containing about 20,000'; a water wheel[96]; at least two reverberatory furnaces (a furnace where the metal being heated is not in direct contact with the fuel, also called air furnaces)[97]; and rolling mills, for which supplying water was the significant preoccupation of the lease.[98] At the same time, Reeder sent to England to engage 60 white artificers for the instruction of Black metallurgists in using this specialist machinery,[99] but rapidly found their services unnecessary. Within a few years, the Black metallurgists were 'sufficiently acquainted with the business for Reeder to dismiss all the

white men but two & a perfect foundry was established where not only sugar utensils were made but cannon manufactured'.[100]

In 1774, as the British government sought to use restrictive tariffs to secure its dominance over American colonies, the Assembly formalised its subversion of the Iron Act and awarded the £3,000 bond. Two years later, with North American colonies in revolt against British colonial rule and an unofficial source of imported utensils jeopardised,[101] Reeder began to extract ore for smelting.[102] As already mentioned, in the critical escalation of this and other geopolitical tensions, all vessels seized by the customs and excise and not wanted for service were broken up and sold for remanufacture.[103] By 1781, amid this sea of scrap and plantation iron,[104] the skill of Black metallurgists in running the multiple reverberatory furnaces of Reeder's Pen was producing 'bar iron',[105] and turning a clear profit of £4,000 a year,[106] equivalent to a relative annual income of £7.4 million in 2020 sterling.[107]

Writing long after the completion of the 'Great Foundery [sic]' and with its success not only proven but having exceeded all expectations,[108] Reeder recalled three principal objections to establishing such a monolithic foundry in Jamaica: the 'want of coals'; the 'difference of labour'; and the 'want of iron'. In each, he found an advantage.

> Coals may be imported from Wales & Newcastle at a lower price than they are sold at in London. The advantages the manufacturer has here which he has not in England are the low price of wood and Charcoal with Loam on the spot ...
>
> The difference of labour ... is obviated by my being possessed of [Black metallurgists] sufficient, many of which are perfect in every branch of the Iron Manufactory.

While, in answer to the objection that Jamaica lacked the iron for a manufactory, Reeder wrote:

> more than three thousand tons are in Jamaica useless to its owners, but was there not a pound, pig iron may be obtained from the ore on easier terms than it can be in England from the abundance of wood being near to the ore which is very rich.[109]

Reeder distinguished between 'the ore' he extracted and smelted into that kind of pig known as plantation iron; and the 'three thousand tons' of scrap metal, which the 'perfect' skill of Black metallurgists in Jamaica had remanufactured into 'barr [sic] iron' for his profit.[110]

In 1782, with the island under martial law, Reeder's foundry was dismantled by order of the emergency lieutenant governor, General Archibald Campbell. A year later, in 1783, Reeder claimed that 'the engines and implements' together with 'the necessary artificers' had cost him 'thirty thousand pounds'.[111] In 1788 the Assembly's representative in Britain, Stephen Fuller, recommended Reeder value 'the Expences of the Works' at '£15,000 st[erlin]g only; deducting the first cost and the occasional work of 30 white artificers' together with '76 [Black metallurgists] (which he estimates at £7,000 st[erlin]g) as being principally employed in carrying on the operations of the Foundry',[112] equivalent to a labour cost of £11.2 million in 2020.[113] Reeder only followed Fuller's advice in part. In a petition to the House of Commons supported by Fuller,[114] he deducted the first cost and occasional work to bring thirty thousand down to 'twenty two thousand pounds sterling' for the completion of the iron foundry,[115] but refused to forgo the cost of assembling his huge workforce of skilled Black metallurgists that would have further

reduced the value of the foundry to Fuller's suggested 15,000. This gives a sense of the sheer scale of African and Afro-Caribbean skill on which Reeder's foundry depended. Here are just some of those Black metallurgists' names before baptism: Devonshire; Mingo; Mingo's son; Friday; Captain Jack; Matt; George; Jemmy; Jackson[116]; Will; Bob; Guy; Kofi (Cuffee)[117]; and Kwasi (Quashie).[118]

Reeder himself observed that the 76 Black metallurgists who ran the foundry had their own expressions of value that spoke to experiences remembered and new identities being forged.[119] West and Central African currencies embodied many different forms of value, from tokens of exchange and practical uses to ritual and artistic expression. Alongside the cowries and copper and iron bars, these societies often used currencies in the form of bundles of manufactured iron goods. Bride wealth presentations might take the form of bundles of identical iron hoes in a promise of industry and bounty, or of identical delicate iron sculptures in praise of the bride's beauty. But when exchanges forged an alliance in the face of impending war and marked that there would be struggle ahead, West and Central African societies often made bundles of iron blades (Figure 2).[120] All these forms might be used as they were – for agriculture, for prestige, and for war – but they could also be reforged, even hammered together to take on new value.

Iron and sugar mills have been understood as serving different technical functions. The crushing action of the sugar mill's grooved rollers separated the cane into two parts: the juice and the husk. By contrast the smooth rollers of the traditional European metal mill flattened and made uniform the iron sheet passed through them.[121] But in the Atlantic world of the African diaspora these European classificatory conventions were challenged, and sugar and iron shared much overlapping conceptual space.[122] Just as

Figure 2. Bundles of iron rods/currency blades, Fang, Bene. Museum Purchase, Huntington Frothingham Wolcott Fund, 1920. Courtesy of the Peabody Museum of Archaeology and Ethnology, Harvard University, 20-29-50/B2167.

Gold Coast metallurgists separated bars of European iron into polluting shackles and sacred blades, Black Jamaicans bound to sugar plantations fed bundles of cane into grooved rollers that separated the juice of enslaver values from the husks Black insurgents lit when they burned enslaver infrastructure to the ground.[123] When West and Central African societies tied iron blades in currency bundles to forge alliances between divergent groups, they marked the impending struggle. So too in Jamaica: tying sugar cane in bundles forged a common experience between differing African heritages and marked an injustice to be repaid with just war. The Black metallurgists who ran John Reeder's foundry saw its old European technology in the light of their present experiences and living histories. They were not bound by European classificatory conventions and their practices and purposes were their own. They tied scrap iron in bundles like sugar cane, heated the bundles in the reverberatory furnace, and then fed them through grooved rollers like those found in a sugar mill. In doing so, they transformed scrap metal into valuable bar iron.

The Black metallurgists' actions, through which Henry Cort learned of the innovation

Except for Kwasi, the names of the Black metallurgists who ran Reeder's foundry come from the records of two group baptism events that took place on 2 July and 31 December 1780, respectively. Devonshire took on the name William Baillie; Mingo, Malcolm Laing; Mingo's son, Nathaniel Reeder; Friday, John Reeder; Captain Jack, John Reeder; Matt, Samuel James; George, Thomas Champneys Gooding; Jemmy, Henry Gallimore; Jackson, Robert Jackson[124]; Will, Charles Spencer; Bob, David Bryce; Guy, John Reeder; and Kofi, Mark Sinclair.[125] The description of these events indicates that these individuals were enslaved and suggests that the two group baptisms cannot be considered a matter of their free choice.[126] By contrast, Kwasi was baptised alone on Christmas day, the only christening to take place in St. Thomas in the East that day and was described not as 'property' or 'belonging to', but as a Windward Maroon from Nanny Town who took the name John Reeder.[127] All three baptism events took place the same year the foundry was described as having attained perfection; and no other equivalent events associated with the white John Reeder were recorded before or after.

Kenneth Bilby's work has shown how a repertoire of ritual songs record Windward Maroon sacred histories through the performance of the traditional ceremony of Kromanti Play. The ritual name, Kromanti, recalls 'Coromantees': once a British designation for captives of diverse heritages traded via Fort Cormantyn on the Gold Coast, but subsequently reclaimed by Black Jamaicans forging powerful political communions that fought back against British enslavement.[128] Central to Kromanti Play is an instrument known as the *adawo* or 'iron', which usually consists of the blade of a machete (*afana*) and a small piece of scrap metal. As Bilby explains, almost any metal object can be adapted and used, so long as it resonates sufficiently. Working the weapon and the scrap together, the instrument takes on a paralinguistic capability: in skilled hands, iron will 'speak'. In the living history of Kromanti Play, white men set an African smith to making handcuffs and shackles to trap the Maroons. But when the Maroons came, the African smith took up the iron that was meant to shackle them and instead used it to 'speak'

a warning in a shared African language.[129] Within this science,[130] playing the iron transformed shackles and chains into a warning to preserve Maroon freedom.

The songs of Kromanti Play are particular to Kwasi's Nanny Town Maroons, but they record how iron was made to speak for a broader purpose: to forge political communions. Oathing played a central role in Gold Coast politics – from the minor oaths (*ntam*) taken through a drink to the major oaths (*ntamkɛsɛɛ*) sworn by speaking in allusions with a sacred sword (*afena*) to express pain at events that cannot be put into words. These oaths increase over time as new histories and new swords are added,[131] such that scholars of the Asante have argued that *ntamkɛsɛɛ* must be understood as a 'fasces or a bundle of oaths',[132] recalling the bundles of blades through which a fighting-alliance might be forged. When Bilby undertook a sacred oath transforming him 'from a categorical enemy to a conditional friend', the ordeal instantiated the complex ways in which Kwasi's Nanny Town Maroons adapted the material and social relations of *ntamkɛsɛɛ* and *ntam* and articulated them with new experiences in the diaspora. The ordeal culminated in a blade being placed inside Bilby's mouth, 'sharp side in' while sweet fluid made of sugar and water was poured down his throat.[133] This single act combined the minor oaths that are made by drinking and the major oaths that are sworn to an iron blade in pain and dread that must not be put into words; the iron bundles forged into blades and the cane bundles crushed into sweet juice; the sacred and the profane. Here, African heritages were reinterpreted to take on new significance and applications. Recognising this is crucial to understanding how Henry Cort learned of John Reeder's foundry: through a revolution led by a freedom-fighter who carried a powerful protection that the British called 'Obi'.

The first published account of the insurgents was a proclamation by the governor of Jamaica in early August 1780 warning that 'above 40 men, and about 18 women [fugitives]' have formed a settlement in the recesses of Four-mile Wood in St David's'. The British identified the revolutionaries as 'chiefly Congos' and under the leadership of a man called 'Bristol, alias three-fingered Jack'. The revolutionary leader known as Three-Finger Jack may well have come from Congo, but the British enslavers marked him out as such to alienate him from the political communions of Black Jamaicans where Akan cultural referents often dominated.[134] Citing the terms of the treaties, the governor denounced the insurgents and called for the Maroons to be 'sent out against them'.[135]

Over the subsequent months, newspapers from Jamaica to Ireland reported tales of Three-Finger Jack,[136] and with every new report of Jack's resistance, the reputation of the powerful protection that the British called 'Obi' grew among Black and white Jamaicans alike.[137] The threat posed by Jack and his science so concerned the Assembly that in early December 1780 they announced a reward of one hundred pounds with a further five pounds for each man belonging to his group.[138] On 23 December 1780, it was announced an enslaved man christened John Fouracres had been killed attempting Jack's capture.[139] In response, the Assembly increased the bounty, offering two hundred pounds for the revolutionary leader.[140] Even against this onslaught, Jack's science protected him and his reputation grew. Until on 27 January 1781, following a desperate struggle, Jack was killed by a Windward Maroon named John Reeder.[141]

As already noted, Kwasi was a Maroon employed by the white enslaver, John Reeder, for his metallurgical expertise. Though Kwasi did not know his exact age, local papers reported him saying he was 'a stout boy at the first peace with the

Maroons in the year 1739', placing him around the age of 45 when he recorded 'Nanny Town' in the Parish register.[142] Government records usurped the names of Maroon towns with colonial monikers,[143] but Kwasi asserted the Maroon name even as he gave up his own to take on the name of the foundry's owner. Other Maroons found favour with the colonial authorities by taking an anglicized Christian name and surname, such as Edward Crawford, leader of the eponymous Crawford Town from around 1746.[144] But it is Kwasi's reasons that are so significant here.

Benjamin Moseley, a white physician who knew the individuals involved and witnessed the party return having killed Jack, is considered to have written the only accurate contemporary account of Jack as part of his 1799 *Treatise on Sugar*.[145] In it, he described how the sick would apply to an 'Obi' man or woman whose skill it was to apprehend spiritual agents for a cure. To do this, the Obi-man or -woman would treat the body of the afflicted person in a process Moseley called 'rough *magnetising*', where an iron bar is struck to take on magnetic influence.[146] In the medicine of West-Central African *minkisi* (power figures, plural), iron shards were driven into the wooden body of the *nkisi* (power figure, singular) to resolve social transgressions in the material itself.[147] Moseley described an inversion of this process in the Jamaican context, whereby the 'Obi-man or woman 'brings out an old rusty nail . . . from the [afflicted] part; and the patient is well the next day'. According to Moseley, Jack's protection was such a science. Through material practices he was able to apprehend spiritual agents and ally their power and agency to his purposes. It was prophesised that only '*white* Obi' could defeat him.

Kwasi chose to be baptised not only to protect himself from Jack's 'Obi', as the British put it, but to use '*white* Obi' against him.[148] The death of the enslaved man John Fouracres had shown that a western name was not in itself sufficient to protect from Jack's science. The power of Reeder's name for Kwasi was not its whiteness or Christian ritual, but in its metallurgy. The foundry that was run by the Black metallurgists and through their skill had the power to transform properties and relations, also carried Reeder's name. Nor did Kwasi get baptised on any day. Christmas in Jamaica was a time for carnival of the 'spirit-regarding' kind,[149] a time for the reversal of power relations where the spirit of Jon Conny, an Akan war lord who had once held significant power on the Gold Coast, would ride the science-man in leading the dance.[150] As the enslaver Edward Long had reported just six years before[151]:

> In the towns, during the Christmas holidays . . . several tall robust fellows dressed up in grotesque habits, and a pair of ox-horns on their heads sprouting from the top of a horrid sort of vizor or mask, which about the mouth is rendered very terrific with large boar tusks. The masquerade carrying a wooden sword in his hand, is followed with a numerous crowd of drunken women, who refresh him frequently with a sup of aniseed water, whilst he dances at every door, bellowing out John Connu! with great vehemence, so that, with the liquor and the exercise, most of them are thrown into dangerous fevers.[152]

In Jamaica, objects named 'John' or variants of the sound, such as *jun-*; and *jan-*, belong to the spirit of Jon Conny.[153] When Kwasi took John Reeder's name on Jon Conny's day and led the procession in the hunt for Jack, he took possession of the foundry's spiritual power. Moseley saw Kwasi carry the trophies of his victory over Jack to Kingston, 'a vast concourse' following in his wake. Within days the news was all over the island.[154]

Two months later, master of the ship *Abby*, John Cort, arrived in Kingston.[155] He had been there when the Assembly announced the reward for Three-Finger Jack in August 1780,[156] and now traded news of British scandals for the dramatic story of Jack's death just as he exchanged the shoes, fine clothes, mahogany furniture, curled hair and candles of Lancaster for the sugar, coffee, rum, cotton, and *lignum vitae* of Jamaica.[157] Later that same year he was returning from Jamaica in convoy,[158] when the *Abby* was separated and taken off course. '[L]eaky, sickly and short of provisions', they abandoned their intended destination of Lancaster. By dint of 'incessant pumping', with just 'three days bread' to spare, they weighed in at Portsmouth,[159] where John Cort's 'cousin',[160] Henry, ran a struggling ironworks.

When John Cort arrived in Portsmouth, he found his cousin an imminent bankrupt, deep in debt, surrounded by heaps of Admiralty scrap iron and no way to work it without incurring further losses.[161] As Henry Cort watched his investments sink in the heaps of rusted scrap, he heard the latest news from Jamaica: the dramatic death of Jack at the hands of a baptised Maroon, christened John Reeder after a foundry where a team of 76 Black metallurgists had developed an ingenious way to turn scrap metal into valuable bar iron. He learned of John Reeder's foundry, turning a clear profit of £4,000 a year,[162] equivalent to a relative annual income of £7.4 million in 2020 sterling.[163]

Henry Cort's patents, Britain's enslaver capitalism, and John Reeder's foundry

As a young man, Henry Cort inherited a 'private fortune' from his father who was 'extensively involved in trade at Lancaster'.[164] Britain's fourth largest port for the human trade, the enslavement system has been described as Lancaster's 'staple' and 'life-blood'.[165] Cort and his family members were embedded in this system. His older cousin and patron, Jane Cort of Lancaster, accumulated property and capital investing in the human trade and enslavement. Her brother and his son were Lancaster-based West Indies merchants, together with their cousin shipmaster of the *Abby*, John Cort.[166]

Family money and connections made through Britain's enslaver capitalism bought young Henry Cort a lucrative job in finance age 16; a partnership age 21; and his own firm by the age of just 24. After twenty years banking for high-powered officers, including the King of England's brother and several other admirals,[167] he took over the ironworks of one of his naval officer clients in 1775. Located on the Solent region of England's Channel coast, the works were a substantial operation supplying ironmongery to Portsmouth, one of the six Royal Navy dockyards; and closely connected to Southampton, where some decades earlier Jean Barbot had updated his account of the African trade for the British market's focus on iron.[168] But five years later, as John Reeder's foundry in Jamaica reached perfection, Cort was struggling to break even. In 1780, he was approached by one of the Commissioners of the Navy Victualling Board, James Kirke, to take on a new contract making mast hoops for the Admiralty. Cort noted that he only had water-powered forge hammers but would be prepared to erect the rolling and slitting mills necessary for making mast hoops 'if he were assured of proper encouragement'. The contract was agreed on 1 October 1780, and, to build the required mills, Cort borrowed substantial sums from another powerfully connected Navy pay agent, Adam Jellicoe.[169]

Cort had imagined a lucrative monopoly, either converting new iron into smooth sheets and slitting those sheets into the strips that the shipyard would bend into hoops; or otherwise trading new strips already rolled and slit in other works. But over the months that followed it became apparent that the realities of the contract were not what he had hoped. Far from making a quick profit, he had committed to receive the Admiralty's scrap and exchange it for new. By January 1781, Cort found himself surrounded by 'extraordinarily large quantities of old iron hoops' and 'not an opportunity of working them in any ordinary way without incurring a great loss'. Reaching this impasse alone had already lost him nearly £10,000, equivalent to a relative cost of £1.3 million in 2020. Now heavily in debt to Adam Jellicoe, Cort agreed to take Jellicoe's son, Samuel, into partnership as security.[170]

Later, Cort's son Richard would claim that his father had no idea the money he was borrowing came from public funds and not from Adam Jellicoe's own accounts.[171] But protestations of ignorance surrounded the early nineteenth century enquiry into the embezzlement,[172] and Cort knew Jellicoe's business better than he knew the work of an iron foundry – it had been his own for almost two decades.[173] In October 1780, Cort had needed assurance before taking on the Admiralty contract.[174] In November 1781, the news of a Jamaican foundry that turned scrap metal into valuable bar iron appears to have assured him of another way to change his fortune, because after his cousin's visit Cort did what he knew best, and borrowed more money.

Between 3 March and 3 May 1782, the British government imposed martial law on Jamaica.[175] In this period, Lieutenant Governor Archibald Campbell ordered John Reeder's foundry to be destroyed out of concern it might be 'employed towards the reduction of the island by a powerful enemy at that time daily expected'.[176] While the agent for Jamaica referred to the threat presented by 'the united powers of France, Spain & Holland',[177] Campbell himself identified a further even more substantial threat, internal to the island. According to his survey, if armed men took up positions in the mountains, as Jack had and the Maroons maintained, they would become 'formidable'. Black skill had made the foundry, and now the threat of Black retribution saw Campbell order it broken up by 'Black pioneers'.[178] Reeder's reverberatory furnaces were 'demolished'; his 'works levelled with the ground'; his machinery for making 'barr [sic] iron' rendered 'totally useless'[179]; and anything 'that might be of use to the Enemy … carried on board his Majesty's ships',[180] absorbed into a maritime infrastructure that transported unused Naval stores and equipment, from Jamaica to the Naval base in Portsmouth,[181] where Cort operated.

Before he entered the iron trade, many of Cort's high-powered clients held posts in the Caribbean, such as William Burnaby, commander-in-chief of the West India squadron and Jamaica station 1763–6.[182] An agent and attorney with Cort's contacts in Jamaica was valuable to an officer with a West Indies posting. These connections would help ensure they received a good rate and their portion of the money from any prizes – the equipment, vehicles, vessels and cargo captured during armed conflict.[183] John Cort himself shipped prize cargoes of goods captured off Jamaica to England.[184] In 1783, Henry Cort would claim that the innovation for which he took credit was the product of 'great study, labour, and expence [sic], in trying a variety of experiments and making many discoveries'.[185] Yet no account has been found of what the alleged study, labour or experiments might have involved.[186] When questioned, years on, as to the costs involved he 'seems not to have known'.[187] But Cort's financial records for 1782 document that, after his cousin's visit in

November 1781, Henry borrowed a total of £27,000 from Jellicoe.[188] This was an outlay comparable to the great Jamaican works which John Reeder valued at £30,000 in total and £22,000 without the first cost and occasional work.[189] John Reeder's foundry was dismantled and loaded onto ships between 3 March and 3 May 1782, and it was not until 14 December 1782, with the £27,000 laid out, that Cort was able to declare to 'brother projector' and steam engineer James Watt of Boulton & Watt that he had 'found out some grand secret in the making of Iron'.[190]

Timeline of events	
1775	Navy financier, Henry Cort, takes over the Portsmouth works of one of his debtors. His losses are substantial.
Dec 1780	John Reeder's foundry reaches 'perfection': 76 Black metallurgists, equipped with water-powered rolling mills, remanufacturing several thousand tons of scrap into valuable bar iron. The foundry turns a clear profit or £4,000 a year, equivalent to a relative income of £7.4 million in 2020. Among other apparatus Reeder's foundry manufactures grooved sugar rollers.
Dec 1780	Cort, struggling to break even, invests substantial sums to erect a rolling mill. His losses are substantial, amounting to nearly £10,000.
Dec 1780	Kwasi takes the name John Reeder.
Jan 1781	Kwasi kills Jack.
Nov 1781	John Cort arrives in Portsmouth with news from Jamaica and finds his cousin, Henry, facing bankruptcy and drowning in scrap iron from a Navy contract.
Nov/Dec 1781	Henry Cort begins to experiment.
Spring 1782	Reeder's foundry is dismantled and loaded onto ships set for Portsmouth.
1782	Cort lays out £27,000, equivalent to the value of Reeder's foundry.
Dec 1782	Cort declares he has 'found some grand secret in making iron' using grooved rollers, normally associated with sugar mills, in his Portsmouth Navy works.

On 7 January 1783, Cort applied for a patent to cover what he had 'found out'. The patent specified different techniques of 'bundling' scrap iron; bringing the bundles to 'welding heat' in 'a common air furnace, usually denominated a balling furnace'; and then forging them under the hammer or fining them through rollers. For commentators then and since, the striking innovation of the 1783 patent specification was its focus on scrap iron, and where Cort followed careful bundling and heating with feeding the bundles through 'grooved rollers'. Under the grooved rollers 'iron decayed or eaten by rust … will produce exceedingly good iron without any other process'; while 'Pig and sow metal, commonly called cast iron, and old cast iron … is perfectly refined'. In this way,

> the worst ordinary iron … being passed through the simple opperation [sic], becomes instantly of a good quality … pieces of impure iron heated in the same manner, and passed through the rollers together, become at once welded into one solid body, and meliorated into good tough iron.[191]

According to a contemporary of Cort's and fellow iron master, '[a]ttempts had been made to roll round iron in hollowed turned in rollers, but never to roll bar iron in

grooved roll, which is very different'.[192] Yet here were rollers grooved like those in the sugar mills, fed with old mast hoops cut and folded like bundles of sugar cane. Cort had 'found out' how to transform bundles of scrap into valuable bar iron. But John Reeder's now dismantled works had achieved this mechanical alchemy years before, with scrap iron, reverberatory furnace and rolling mills,[193] and the skill of the 76 Black metallurgists, including Devonshire; Mingo; Mingo's son; Friday; Captain Jack; Matt; George; Jemmy; Jackson[194]; Will; Bob; Guy; Kofi[195]; and Kwasi.[196]

In February the following year, Cort elaborated on the use of the air furnace described in the earlier, 1783 specification with a first Scottish patent and a second English patent.[197] The kind of indirect heat produced by the air furnace and its effect on the bundles had been important in his first patent, where the bundles were specified as heated to 'welding heat' (i.e. a white heat where distinct pieces will cohere). But in this second English patent he went into greater detail, describing how the metallurgist would heat the metal until molten and then stir the liquid metal through an aperture in the bottom of the furnace door. By stirring, the metallurgist would shift a surface crust of iron and expose impurities that would gradually burn off with the heat. As the impurities burnt off, the melting point of the iron would rise so that it solidified, ready to be scooped into lumps of the desired size and drawn out the furnace door.[198]

That this process was widely known is even indicated in Cort's first, 1783 patent, where he explained that 'a common air furnace' was 'usually denominated a balling furnace' – 'balling' describing the transformation of the metal.[199] What Cort and subsequent commentators claimed to be innovative was the specific combination of processes brought together in bundling scrap metal and crude pig iron; heating it in an air furnace that burned raw pit coal; and then passing it through grooved rollers to produce valuable bar iron.[200] Yet the Black metallurgists of John Reeder's foundry had at least two reverberatory furnaces[201] (what Cort principally referred to as an air furnace) that they heated by burning raw pit coal.[202] They had a rolling mill[203]; and they had grooved rollers.[204] And by applying their 'perfect' metallurgy to this combination of technology, they had been transforming scrap metal and crude pig iron into valuable bar iron before Cort even entered the iron business.[205] In his second, 1784 patent Cort claimed priority and the exclusive right to 'make, use, exercise and vend my said Invention' not only within England, Wales and England's northern border, but 'also in all the Colonies and Plantations abroad'.[206] The patent was a colonial monopoly. The culture of remanufacture in Jamaica was not only the source of the idea and application he took but the assurance that the monopoly would be lucrative.[207]

In 1784, as Cort's second English patent was enrolled, politician and vocal supporter of enslavement, John Baker Holroyd, declared 'our knowledge of the Iron trade seems hitherto to have been in its infancy'. In direct reference to the loss of the American war and newly founded United States of America, he described the so-called 'Cort process' as being 'more advantageous to Britain than Thirteen Colonies'.[208] Through Cort's patent, former colonies were to become markets for British manufactures and America's revolution to inaugurate a new paradigm for British extraction.[209] Cort made the Holroyd quotation the first testimonial of his promotional campaign material.[210]

In late August 1789, Cort's financial partner Adam Jellicoe died suddenly, and the partnership was discovered to have been founded on £39,676 of embezzled Navy funds.[211] The Navy Board immediately set about seizing the property and goods of the

banker-cum-ironmaster, including his patents.[212] By 26 September, Cort had filed for bankruptcy. Friends helped him pay debts and secure a small pension, and in their efforts launched the myth of the heroic inventor.[213] Two years after Cort died in May 1800, his children acquired land in Berbice under the name 'Kort & Company'.[214] From at least 1803, Cort's son William was established as an enslaver there, with William's older brother Henry and the younger Frederick joining him by 1805.[215]

Conclusion

EuroAmerican accounts have often described the combination of processes for which Cort took credit as one of the most important innovations in the making of the modern world. But the theft of this combination from Black metallurgists in Jamaica who developed it was not the central concern of this paper. The principal ambition of this paper has been to engage with the practices and purposes of some of those Black metallurgists on their own terms.

The first section introduced some of the most significant ironworking societies in world history[216]: regions corresponding with the Gold Coast and the Bights of Benin and Biafra. European traders brought huge quantities of Baltic bar iron to meet changing regional trade-good preferences.[217] But rather than displace domestic production, this massive influx of European iron prompted a massive expansion in the production of superior quality iron from the highlands of the Northern Volta Region of Ghana and Togo, to Igboland and Western Cameroon. Meanwhile smithing lineages proliferated and travelled, remanufacturing European iron into new forms and to take on new properties. In the concepts and practices of these regions and the ideas they exchanged, iron had often embodied both principles of the sacred and of the profane. Against the onslaught of Europe's human trade, working iron was a means of expression to forge fighting alliances, heal sickness and express grief.

Black Jamaicans articulated these living histories with their experiences in the diaspora, and in doing so made new forms of meaning. The second section introduced some of the conditions of those articulations. The intensive industries; military bases; and maritime networks of British enslaver colonialism in Jamaica relied on the skill of Black metallurgists to remanufacture European ballast and scrap. Yet the same skill that maintained this system also empowered its overthrow, as Maroons transformed chains and shackles into weapons of resistance, forcing the British to treaty in 1739–40.

After the peace treaties, sugar production on the island was massively expanded and with it the demand for iron. The third section introduced some of the 76 Black metallurgists who ran a foundry named after the white enslaver, John Reeder, and whose perfect skill transformed scrap metal and crude ore into best bar iron and spectacular profits. This section described how individuals such as Devonshire; Mingo; Mingo's son; Friday; Captain Jack; Matt; George; Jemmy; Jackson; Will; Bob; Guy; Kofi; and Kwasi drew on their living histories and diaspora experiences to forge new expressions of identity. It introduced the significance of bundling iron blades, an approach that was often used to forge fighting alliances between West and Central African societies; how sugar cane in Jamaica was bundled like this iron; and iron in Jamaica was bundled and rolled like this sugar cane. In 2019, Lydia Gibson described how Accompong Town Leeward Maroons today grow sugar cane around sacred sites where spiritual and human

worlds meet.[218] Two hundred and forty years before, iron and sugar also shared this conceptual space to embody principles of both the sacred and the profane.

The fourth section showed how preparations carried out by Kwasi to defeat a freedom fighter known as Three-Finger Jack were expressions of this power. One of the 76 Black metallurgists of John Reeder's foundry, Kwasi was a Windward Maroon from Nanny Town, a community whose living histories spoke to Akan heritages, while Jack was the leader of 58 fugitives from enslavement who the British identified as from the Kongo region of Central Africa. In the material expressions of power and agency that led to Jack's death at Kwasi's hand, performing iron played a crucial role. Much important work has been done on the famous colonial pantomime that Jack's story became and how this pantomime was reclaimed in subsequent decades, not least by Black actor and playwright Ira Aldridge in 1830, and by Jamaica's Little Theatre Movement in the 1980s.[219] Here, Kwasi's baptism and the vital living histories Bilby has documented make it possible to inform interpretation of the significance of the events leading up to Jack's death on Kwasi's terms[220]; events that made the name of the foundry, 'John Reeder', the talk of the island.

When bad weather separated the Jamaica convoy and took ship's master John Cort off course to Portsmouth where his cousin Henry Cort ran a failing ironworks, he brought the talk of the island with him. Historians have often sought to understand Henry Cort in a lineage of British ironmasters. Section five places him in his proper context: the financial networks of British enslaver capitalism. In doing so it becomes possible to understand the significance of the destruction of John Reeder's foundry. Too great a threat to British colonial rule and to its industrial monopoly, the foundry was razed to the ground; the Black metallurgists' innovative combination of processes patented in Britain under Cort's name.

Kwasi received a government pension from the British and became Captain of the Charles Town Maroons. He lived well into his eighties, respected and renowned, and when he died in Hannah's Town in 1816, it was reported in newspapers across Jamaica, England and Scotland.[221] This international celebrity was not just for Kwasi but also because of Jack. Moseley, the white physician who saw the Maroons' return, had included the events as part of his 1799 *Treatise on Sugar*. Within a year of the treatise's publication, a pantomime debuted in London; and Philadelphia the following year. With abolition of the trade the popular hypocrisy of the day, British theatres made Jack into a Robin Hood, led astray by malign forces. Threatened by the Haitian revolution, American theatres made him a caricature villain. Each presented the enslaver as enlightened benefactor; and Kwasi as an enslaved Christian granted freedom.[222] Performances became like Cort's patents, false mirrors for imperial eyes to picture themselves as they built their institutional lies.

The Cunu Cunu Pass is a steep ravine-punctured trail through Windward Maroon territory, and along it is a spot called 'Three Finger Woman Tumble', named for the fugitive who escaped down the precipice with her baby on her back while her baby's father died fighting a party of Windward Maroons. According to Windward Maroon oral history, the baby's father was Three-Finger Jack, but the story of a Maroon woman and her baby who escaped a party of British soldiers in the same way and place has been joined with that of Jack to form living history like a bundle of oaths that speaks with iron what cannot otherwise be put into words. A plaque on the road between Kingston and St. Thomas memorializes

Jack, and how he died fighting to preserve his freedom and the freedom of others, but the site, Three Finger Woman Tumble, marks how she and his baby lived.[223] Black metallurgists in eighteenth century Jamaica transformed iron for their own purposes, and Windward Maroon histories record the significance in their own ways.

Notes

1. Münzer, [1494–5], *Doctor Hieronymus Münzer's Itinerary*, 92–3.
2. For enslaver prestige culture, see Münzer, [1494–5], *Doctor Hieronymus Münzer's Itinerary*, 93; and Saunders, *Black Slaves and Freedmen in Portugal, 1441–1555*, 176–7.
3. Bigelow, *Mining Language*; Carney and Rosomoff, *In the Shadow of Slavery*; Carney, *Black Rice*; d'Avignon, *A Ritual Geology*; Ford, *The role of the trypanosomiases in African ecology*, 333–5; Gómez, *The experiential Caribbean;* Hill, "Making Scientific Sense of Traditional Medicine"; Kananoja, "Infected by the Devil, Cured by Calundu"; Kananoja, *Healing Knowledge in Atlantic Africa*; La Fleur, *Fusion Foodways of Africa's Gold Coast in the Atlantic Era*; Logan, *The Scarcity Slot*; Murphy, "Translating the vernacular"; Osseo-Asare, *Bitter roots*; Osseo-Asare, "Bioprospecting and Resistance"; Parrish, "Diasporic African Sources of Enlightenment Knowledge"; Roberts, *To Heal and to Harm*; Sluyter, *Black ranching frontiers*; Sweet, *Domingos Álvares*.
4. Edgerton, "From innovation to use"; and c.f. discussion of shipbreaking in Alang, Gujarat, India, Edgerton, *The Shock of the Old*, 208.
5. For the mid-nineteenth century construction of Cort as heroic inventor, see MacLeod, "Concepts of invention"; MacLeod, *Heroes of Invention*, 249–279. For industrial and economic histories that have identified Henry Cort as one of the top ten 'macroinventors' of the industrial revolution, see Allen, *The British Industrial Revolution in Global Perspective*, 243. Mokyr, *The enlightened economy.*
6. *Voyages*, https://www.slavevoyages.org/assessment/estimates; Burnard, *Planters, Merchants, and Slaves*, 170–3; Eltis, "The Volume and Structure of the Transatlantic Slave Trade," Table IV.
7. For the development of iron smelting and smithing in first millennium AD coastal Ghana, see DeCorse, "Coastal Ghana in the First and Second Millennia AD"; and Chouin *Forests of power and memory*, 719–43; For the displacement of iron working societies, long distance exports, and iron industrial complexes as refuge and place for the exchange of ideas in first and second millennium Southern Ghana, see Pole, "The Hammers of the Mawu"; For the increase in iron production from the fourteenth century in Bassar, Togo, see Barros, "Bassar"; For the early origins of iron production in Igboland and the specialisation of industrial production complexes, growth of centres and itineracy of smiths (who were also often linguists) from c.500 AD, see Njoku, *A history of iron technology in Igboland*; For the early development of iron smelting centres in Cameroon, see Clist, "West-Central African Diversity from the Stone Age to the Iron Age," 77–9; For iron and agricultural developments (Asiatic complex of cultigens) linked to population growth, and for the internal (i.e. African) long-distance trade 'as old as iron production in the Grassfields', see Warnier, *Cameroon Grassfields Civilization*, 20, 44,
8. Brown, *Tacky's Revolt*, 85–128.
9. C.f. Saraiva, "Black Science"; Shilliam, "Race and Revolution at Bwa Kayiman"; Soto Laveaga and Gómez, "Thinking with the World."
10. Münzer, [1494–5], *Doctor Hieronymus Münzer's Itinerary*, 251.
11. For the poor quality of European copper manillas, see Ulsheimer, [1603–4], f.34b in Jones, *German Sources for West African History*, 27.
12. For the account of the cast copper in the Benin palace, see Dapper, [1668], *Naukeurige Beschrijvinge Der Afrikaensche Gewesten*, 495–6.

13. Green, "Africa and the Price Revolution," 6, 19; Green, *A Fistful of Shells;* Ogundiran, "Of small things remembered"; Vogt, "Portuguese gold trade," 94; Neaher, "Igbo metalsmiths among the Southern Edo," 46.
14. Drewal, "Iron's Empowering Presence," 97, fig. 3.18.
15. Altar-ring, Edo State, Benin City, circa sixteenth-nineteenth century, British Museum, Museum No. Af1897,1011.5. For iron cores as a notable feature of Benin ritual altar rings see, Vogel, "Rapacious Birds and Severed Heads," 333.
16. Barnes has described these mutually constituted principles in African and African diaspora ironworking as the "sacred iron complex" most often expressed as the ideas that iron is sacred; ironworkers are exceptional members of society who are either feared or revered; and iron workplaces are sanctuaries for the dispossessed. Barnes, *Africa's Ogun*, 4.
17. For classic work based on a survey of twentieth century ethnographies and material culture, see Herbert, "Iron, Gender, and Power"; For examples of iron as a material of power in the Banda region of west-central Ghana, 1300–1900 AD, see Stahl, "Efficacious Objects and Techniques of the Subject," 197–236.
18. Insoll, "Meyer Fortes and material culture"; Pole, "The Hammers of the Mawu."
19. "They are usually content with a hard fight . . . [war] comes to an end in two or three days" in Müller, [1662–9], 138 in Jones, *German Sources for West African History*, 198.
20. "Wy het haar zelfs in overvloed verkoopen . . . want zoo wy het al niet en deeden, zoo zoudenze het dog genoeg konnen krijgen van de Engelse, Deenen, en Brandenburgers" in Bosman, [1704], *Nauwkeurige beschryving van de Guinese Goud-, Tand- en Slave-kust* 1, 176; see also enslavers hopeful conflict will bring captives in William Snelgrave, Onboard the *Henry*, Annamaboo, 13 December 1721, Bank of England, (20A67/4/1/2), fol. 70, 1, 6; enslavers promised captives as an outcome of conflict in Thomas Hill, Whydah, 17 May 1731, Bank of England, (20A67/4/1/1), fol. 38, 6; enslaver complaining of shortage of captives due to 'Dahaughmmy [sic]' defeat in Hill, Barbados, 24 Jan 1732, Bank of England, (20A67/4/1/1), fol. 41.
21. Hill, Annamaboo, 7 March 1731, describes war leaving only about "8,000 [people], who are all fled to the other side of the River Volta . . . " Bank of England, (20A67/4/1/1), fol. 40; c.f. the movement of people described in Pole, "The Hammers of Mawu," 67–75.
22. Njoku, *A history of iron technology in Igboland*; Njoku, "Magic, religion and iron technology in precolonial north-western Igboland."
23. Oriji, "Slave trade, warfare and Aro expansion in the Igbo hinterland."
24. For strategies of resistance, see Oriji, "Igboland, Slavery, and the Drums of War and Heroism"; for the connection between smithing and medicine in this region, see Njoku, *A history of iron technology in Igboland*, 101–2; also c.f. blacksmithing as preparatory foundation to the work of ritual and healing in late nineteenth century Akan society, Konadu, *Our Own Way in This Part of the World*, 96; for the resistance of captives, see Hill, Whydah, 27 May 1731, Bank of England, (20A67/4/1/1), fol. 43, 1; and Snelgrave, Barbados, 6 April 1722, Bank of England, (20A67/4/1/2), fol. 68. For a connection between iron bars and medicine in coastal Ghana, see Chouin, *Forests of Power and Memory* 446.
25. Oriji, "Igboland, Slavery, and the Drums of War and Heroism," 124–5.
26. "Costoro hanno un'antica predizione, la quale minaccia la morte ad uno di quei Rè per mano di un'Europeo" in Cavazzi da Montecuccoli, [1687], *Istorica descrizione de tre regni*, 578.
27. Up to the mid-seventeenth century the Gold Coast imported rather than exported people, with European enslavers trafficking an estimated one hundred thousand people into the Gold Coast from other parts of Africa. Kea, *Settlements*, 105–6. Nor did this practice stop with the onset of the transatlantic human trade on the Gold Coast. For example, in October 1710 the British enslaver John Gordon described buying 115 people for 3,000 iron bars at the head of the River Gambia with the intention of selling them in exchange for goods on the Gold Coast, John Gordon, Galena, October 1710, Bank of England, (20A67/4/1/1), fol. 31. For an example of ritual responses to pre-Atlantic enslavement, see the manacle votives in

the British Museum (2007,2014.8; 2007,2014.9) and others described in Stahl, "Archaeological Insights into Aesthetic Communities of Practice in the Western Volta Basin."

28. "Everything is reduced to these two sorts of goods [cowries and iron]"; "We adjusted with them the reduction of our merchandize into bars of iron, as the standard coin, viz . . . " Barbot [1699] in Hair, Jones, Law, *Barbot on Guinea*, 637; 689
29. Jobson, [1623], *The Golden Trade*, 120–1.
30. C.f. how blacksmiths among the Mande in the 1970s fulfilled the role of mediators and intermediaries in conflicts and negotiations, McNaughton, *The Mande Blacksmiths*, 64–5. In her classic survey of twentieth-century cosmologies of ironworking in Sub-Saharan Africa, Herbert also describes "the ambivalence of the smith's role: he makes instruments of both production and destruction and, especially in West Africa, serves as mediator. Indeed, the smithy is often a place of asylum." Herbert, *Iron, Gender, and Power*, 107.
31. Vansina, "Linguistic Evidence for the Introduction of Ironworking into Bantu-Speaking Africa," 329.
32. Njoku, *A History of Iron Technology in Igboland*, 259.
33. van Dantzig, "The Akanists," 205.
34. C.f. Stahl's argument that ritual and aesthetic iron working practice in the Western Volta Basin should be understood in a context of shifting interregional exchange, rather than in terms of specific ethnic/linguistic groups, Stahl, "Archaeological insights into Aesthetic Communities of Practice in the Western Volta Basin."
35. "£359 3s 6d to Mr Thomas Westerne for Iron" shipped January 1657, (fol. 56), in British Library (IOR/B/26); "Iron for 1220 barrs – £406 5s 5d" shipped, July 1658, (fol. 67); "Iron 2000 barrs . . . £656 07s 10d" shipped, Oct 1658, (fol. 76); "Iron 1660 barrs . . . £346 17s 10d" (smaller bars) shipped, Feb 1659, (fol. 84); "3000 barrs of Swedish iron . . . £826 15s 4d" shipped, August 1659, (fol. 113); "Iron 1500 barrs . . . £415 5s 10d" shipped, November 1659, (fol.128); "Iron 2000 barrs. £564 10s" shipped, December 1659, (fol. 133); "Iron 2012 barrs . . . £657 6s 10d" shipped, April 1660, (fol. 156); "Iron 3000 barrs . . . £846 11s 9d" shipped, Sept 1660, (fol. 163); "Iron 660 barrs . . . £208 1s 8d" shipped, Nov 1660, (fol.175), British Library, (IOR/E/3/85); "Iron 12,095 Barrs . . . £3676 17s 2d" shipped, September 1661, (fol.31); "13488 Barrs Iron . . . £3889 9s 8d . . . 1197 barrs Iron . . . £322 7s 6d" (the two sets of bars represent two different sizes) shipped, Nov 1661, (fol.31); "Iron 1495 Barrs . . . £405 2s" shipped, July 1662, (fol. 75), British Library, (IOR/E/3/86).
36. Chouin, *Forests of Power and Memory*, 489; 718–9; 728.
37. For descriptions of status swords, see Bosman, [1704], *Nauwkeurige beschryving van de Guinese Goud-, Tand- en Slave-kust*, eerste deel, 176–7; Müller, [1662–9], 129–32, in Jones, *German Sources for West African History*, 194–5; *de Gémozac*, [1671], "Visit to the 'Governor' of Akitekyi," in Chouin, *Colbert et la Guinée*, 126. See also Chouin *Forests of power and memory*, for the suggestion the sword was made locally, see 728; and for relevant discussion of material culture in changing practices and systems of thought, see 650–1; For the role of smiths in making and fastening shackles and chains, see Hemmersam, [1639–45], 55 in Jones, *German Sources for West African History*, 113.
38. National Archives, (T/70/22), fol. 37–8.
39. Barbot, [1711–2], *A Description of the Coasts of North and South Guinea*, 273–4.
40. "3000 barrs of Swedish iron . . . £826 15s 4d" shipped, August 1659, British Library, (IOR/E/3/85), fol. 113.
41. To give two examples of many: "the people begin to aske for iron barrs and I have a great many but they doe not like them, for they must be all marked and noe flau's in them," Richard Thelwall, Annamaboe, 17 July 1683 in Law, *The English in West Africa* 1, 137; "I want [iron bars] which are good and marked, for none else vends here. I have a great many here which are not so qualified" Ralph Hassell, Anamaboe, 27 June 1687 in Law, *The English in West Africa* 2, 209.
42. Thomas Wilkieson, Amsterdam, 19 October 1723, National Archives, (T/70/25).
43. William Hagan, Amsterdam, 7 January 1724, National Archives, (T/70/25).
44. Hagan, Amsterdam, 18 April 1724, National Archives, (T/70/25).

45. "Their iron is much harder than ours," Rømer, [1760], *A Reliable Account of the Coast of Guinea*: 24. "Dese Sabels sijn seer swaar/hegt, en stark, . . . " Bosman, [1704], *Nauwkeurige beschryving van de Guinese Goud-, Tand- en Slave-kust* 1, 176.
46. For seminal studies showing the increase to massive industrial scale iron production in response to the Atlantic trade, see Warnier & Fowler, "A Nineteenth-century Ruhr in Central Africa"; Fowler, *Babungo*; Barros, "Bassar"; For the increase in trends described earlier (e.g. proliferation of smiths, long-distance travel, expansion of old sites and seeding of new), see Njoku, *A History of Iron Technology in Igboland;* For expansion of domestic production on the seventeenth century Gold Coast, see Chouin, *Forests of Power and Memory*, 650–1; 721–735. For studies that describe increase in production and long-distance exports together with immigration of metallurgists seeking work or escaping conflicts and raids, see Barros, "The Effect of the Slave Trade on the Bassar Ironworking Society, Togo" and Pole, "The Hammers of Mawu."
47. Equiano, [1789], *The interesting narrative* 1, 51.
48. Dapper, [1668], *Naukeurige Beschrijvinge Der Afrikaensche Gewesten*, 495–6.
49. *de Gémozac*, [1671], "Visit to the 'Governor' of Akitekyi," in Chouin, *Colbert et la Guinée*, 126; and Chouin, *Forests of power and memory*, 650–1; 728.
50. The highly variable trade recorded in the diaries of British forts on the Gold Coast show that iron bars continued to be traded from forts alongside other manufactured goods, primarily for gold, and that the small but frequent presence of iron bars in exchanges were complemented by sudden spikes where large volumes were traded in short periods. For example, Fort Succondee [sic] traded 543 iron bars for gold in the two-month period 1 July to 31 August 1730 alone, (fol. 35). No iron bars were traded from Succondee [sic] during the same period the following year, (fol. 51), but significant quantities of iron bars had been traded from Commenda (fol. 78) in previous months and were subsequently traded from Tantumquerry (fol. 108) later in the year, National Archives, (T/70/1466). The demand for gold among both European and African traders was particularly intense in the period of early Asante state-building. As such, forts using iron to purchase gold in this period is another indicator of iron's continuing value and significance. For the demand for gold in the Royal Africa Company, see "they bought their gold too dear," Hippisley, [1764], *Essays*, vii and for European perceptions of gold in Asante state-building, see Bosman, [1704], *Nauwkeurige beschryving van de Guinese Goud-, Tand- en Slave-kust* 1, 12; 179; In addition, note that Britain's competitors, such as the Danish, continued to ship iron to the Gold Coast in significant quantities, '*Jern*, 1,000', June 1733, Rigsarkivet, (V-G K), (G)-(G), fol.179.
51. Metal cloth was another symbol of power on the Gold Coast. According to Asante oral history, in the time of Osei Tutu, (prior to the Denkyira war and defeat at Feyiase in 1701), there was one very powerful chief who had an iron tunic (*Dadie batakari*). The iron-clad chief was described as supporting the Takyinanhene. Agyeman-Duah, *Ashanti stool histories*, 4. Other examples of iron in Asante ritual objects include ritual staffs such as "afenatene," a staff forged from three swords, (Museum No. Af1978,22.830) and an iron ritual calendar (Af1952,24.6.a-c), both in the British Museum.
52. For the tension of placing *Mpɔnpɔnsɔn* over *Bosomuru*, see McCaskie, "Telling the tale of Osei Bonsu."
53. Otumfuo, *History of the Ashanti*, 218.
54. Ampene, *Engaging Modernity;* McCaskie, "Unspeakable Words, Unmasterable Feelings."
55. Ross, "The iconography of Asante sword ornaments," 16.
56. Müller, [1662–9], 86–7, in Jones, *German Sources for West African History*, 175–6. For the difference between a state oath that derives power from recalling past events of unspeakable pain, and a minor oath that is drunk rather than sworn, see Quamie-Kyiamah, "The Customary Oath in the Gold Coast," 141.
57. Letter from Director-General Willem Butler and Council, Elmina, 27 March, 1719, Nationaal Archief, (104), (D.2.1), (1.), (1.05.01.02), fol. 265.
58. Sir Challoner Ogle, 1733 May, Kingston at Port Royal, National Archives, (ADM 106/848/42).

59. 20 April 1731, National Archives, (ADM 106/834/72); Captain Andrew Durnford to Duke of Richmond, "legislative decisions on the payment of [Black] artificers and labourers," 1 June 1791, National Archives, (CO 37/43/7), fol.31–4; Henry Hamilton to Henry Dundas, Reports on the Island's internal security, 20 January 1792, NA (CO 37/43/26), fol.253; Edward Mathew to Lord Sydney, "for the assistance of 150 Black artisans for the Repairs and additions to their fortifications," 13 September 1784, National Archives, (CO 101/25/47), fol. 227; Lord Sydney to Edward Mathew, 5 October 1784, National Archives, (CO 101/25/47), fol. 207–8; Archibald Dow and Daniel Scarville, Antigua, "Account of Artificers who were discharged for what reason," May 1786, National Archives, (ADM 106/1286), fol. 23.
60. For the significance of the name Kojo, see Brown, *Tacky's Revolt*, 90–2.
61. For the treaties, see Bilby, "Swearing by the Past."
62. John Lewis to James Knight, 20 December 1743, Miscellaneous Papers and original Letters relating to the affairs of Jamaica, British Library, (Add MS 12431), fol. 99–100.
63. "*Mfena* (swords, plural)," Ampene, *Engaging Modernity;* Bilby, *True Born Maroons*, 17.
64. Sivapragasam, *After the Treaties*, 19–45.
65. Ibid, 70–85.
66. Daniels, "The Origin of the Sugarcane Roller Mill," 495.
67. Dubois and Garrigus, *Slave Revolution in the Caribbean*, 4–5, 9; Sheridan, "Changing sugar technology," 68.
68. Delle and Fellows, "Repurposed Metal Objects," 1000; 1019.
69. c.f. Bigelow, *Mining Language*, 111–2.
70. Kippax, [1751], *The Theory and Practice of Commerce*, 315–6.
71. Stammers, "Iron knees in wooden vessels," 115.
72. Solar and Rönnbäck, "Copper sheathing and the British slave trade," 825.
73. Gille, "Naval Artillery," 406; for discussion of iron guns as trade goods and currency in West Africa in this period and through abolition see, Satia, *Empire of* Guns, 188–90.
74. Britain, [1779], *An Act for the more effectually preventing the pernicious practices of smuggling*.
75. Sutherland, [1764], *An Attempt to Ascertain*, 289.
76. Nicholson, [1825], *The Operative Mechanic*, viii; 338.
77. Anderson, [1764], *An Historical and Chronological Deduction*, 283.
78. Alexander Spotswood to the Council of Trade and Plantations, 4 March 1728, National Archives, (CO 323/8) fol. 85; Oast, *Institutional Slavery*, 208.
79. "Journal, January 1719, Journal Book V," in Ledward, [1718–22], *Journals of the Board of Trade and Plantations*, 16–32.
80. Sir Challoner Ogle, 1733 May, Kingston at Port Royal, National Archives (ADM 106/848/42).
81. Admiral William Parry to the Commissioners of the Navy, 26 June 1768, National Archives (ADM 106/1170), fol. 206.
82. Richard Taylor, estate of John Gardiner, "Notice," *Kingston Journal*, November 29, 1760.
83. George Cameron, Dean's Valley estate, Westmoreland, formerly of St Elizabeth's, "Notice," *Royal Gazette of Jamaica*, July 1, 1780.
84. John Stewart, Savanna-la-Mar, "Notice," *Savanna-la-Mar Gazette*, July 15, 1788.
85. William Tait, Annotto Bay, St George's, "Notice," *Royal Gazette of Jamaica*, July 29, 1826.
86. For pre-1800s examples see, Richard Taylor, estate of John Gardiner, "Notice," *Kingston Journal*, November 29, 1760; John Graat, "Notice," Parish St James, *Cornwall Chronicle*, May 30, 1776; John Grant, "Notice," Hanover, *Jamaica Mercury*, September 20, 1779; Henry Farquharson, Montego Bay, "Notice," *Jamaica Mercury*, September 20, 1779; Anon., Portland, "Notice," *Jamaica Mercury*, March 11, 1780; Peter Parr in Jamaica, *Journals of the House of the Assembly of Jamaica*, November 30, 1781; Alex Farquharson, Montego Bay, "Notice," *Cornwall Chronicle*, November 7, 1789; George Cameron, Dean's Valley estate, Westmoreland, formerly of St Elizabeth's, "Notice," *Royal Gazette of Jamaica*, July 1, 1780; John Crawford, Harbour St. near Orange St, Kingston, "Notice," *Royal Gazette of Jamaica*, August 24, 1781; John Stewart, Savanna-la-Mar, "Notice," *Savanna-la-Mar Gazette*, July 15, 1788; Simon

Finchett, Peter Flood, Montego Bay, "Notice," *Cornwall Chronicle*, July 2, 1791; Thomas Cockburn, Alley, Vere, "Notice," *Royal Gazette of Jamaica*, Saturdays January 12 – March 30, 1793; Smith & Logan, Alley, Vere, "Notice," *Royal Gazette of Jamaica*, Saturdays January 12 – March 30, 1793; Thomas Wilkie, Montego Bay, "Notice," *Cornwall Chronicle*, November 3, 1793).

87. Mitchill, [1797], "Affinities of Septic Fluids in other Bodies," 13.
88. John Graat, Parish St James, "Notice," *Cornwall Chronicle*, May 30, 1776.
89. Anon., Portland, "Notice," *Jamaica Mercury*, March 11, 1780.
90. Smith and Logan, Alley, Vere, "Notice," *Royal Gazette of Jamaica*, Saturdays January 12 – March 30, 1793.
91. Archibald Campbell to George Germain, "military works being undertaken on forts and fortifications of Jamaica," September 26, 1781, National Archives, (CO 137/81/13), fol. 96–99.
92. Sheridan, "Changing Sugar Technology," 68–9; Singerman, "The Limits of Chemical Control in the Caribbean Sugar Factory," 42–7.
93. Edgerton, "From Innovation to Use"; and c.f. Edgerton, *The Shock of the Old*, 208.
94. Goucher excavated John Reeder's Foundry between 1989 and 1993. Elements of the report appear in many publications by Goucher, but for the first and fullest report see Goucher, "African Metallurgy in the Atlantic World," 204–12.
95. Copy memorandum of Eliza L. Crosse concerning Reeder's appeal, c. 1850, Devon Heritage Centre (1160 M/C/J/30).
96. "TO BE SOLD," Morant Bay, *The Daily Advertiser*, May 28, 1791.
97. Stephen Fuller, agent for Jamaica, to the Chancellor of the Exchequer, June 17, 1788, National Archives (CO 137/87), fol. 43; Copy: Fuller to Chancellor, 1788, Devon Heritage Centre (1160 M/C/J/7).
98. Indenture, April 29, 1772, between Edmund Duany and John Reeder, Jamaica Records Office, 91. I am indebted to Ashley Jones for a scan of this document.
99. Report on consequences of dismantling the foundry, to Pitt, May 1789, Devon Heritage Centre (1160 M/C/J/16).
100. Copy memorandum of Eliza L. Crosse concerning Reeder's appeal, c. 1850, Devon Heritage Centre (1160 M/C/J/30).
101. "Being asked what quantity of iron manufactures were now made in the plantations, [Mr Carey] said there were none, but for their own private use, except some few pots and backs exported to the Sugar Islands." "Journal, June 1735, Volume 44," in Ledward, [1718–22], *Journals of the Board of Trade*, 17–33.
102. "The bed of this ore begins about four hundred yards below the hot spring of Bath, and extends along the western bank of the rivulet, on both sides of the road, for nearly three quarters of a mile." To extract this ore, Reeder determined to "erect mills and furnaces near and upon the rivulet," Petition of John Reeder, December 4, 1776; and Mr Lewis for the Committee, December 29, 1776, in Jamaica, *Journals of the House of the Assembly of Jamaica*, 6, November 18, 1766 – December 21, 1776, 670–1.
103. Britain, [1779], *An Act for the more effectually preventing the pernicious practices of smuggling*.
104. "TO BE SOLD," Morant Bay, *The Daily Advertiser*, May 28, 1791.
105. Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1); Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2); Petition of John Reeder, December 7, 1785, in Jamaica, *Journals of the House of the Assembly of Jamaica*, 8, October 19, 1784– March 5, 1791), 132.
106. Stephen Fuller to Lord Sidney, June 7, 1788, National Archives (CO 137/87), fol. 248.
107. *Measuring Worth*, www.measuringworth.com/ukcompare/, (accessed February 18, 2023).
108. Stephen Fuller to Lord Sidney, June 7, 1788, National Archives (CO 137/87), fol. 248.
109. Answer to objections to Manufactory, c. 1789, Devon Heritage Centre (1160 M/C/J/20).
110. Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1); Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2); Petition of John Reeder, December 7, 1785, in Jamaica, *Journals of the House of the*

Assembly of Jamaica 8, October 19, 1784– March 5, 1791), 132; "TO BE SOLD," Morant Bay, *The Daily Advertiser*, May 28, 1791.

111. Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1).
112. Copy Letters, from Stephen Fuller to John Rolle, 1788, Devon Heritage Centre (1160 M/C/J/7).
113. *Measuring Worth*, www.measuringworth.com/ukcompare/, (accessed February 18, 2023.
114. Stephen Fuller to Lord Sidney, June 7, 1788, National Archives (CO 137/87), fol. 248.
115. Petition to House of Commons by Reeder for compensation, 1788, Devon Heritage Centre (1160 M/C/J/9).
116. 02 Jul 1780, (CoEPRT).
117. 31 Dec 1780, (CoEPRT).
118. 25 Dec 1780, (CoEPRT).
119. Report on consequences of dismantling the foundry, to Pitt, May 24, 1789, Devon Heritage Centre (1160 M/C/J/16); c.f. Brown, *Tacky's Revolt*, 90–2.
120. Roberts, "Precolonial Currencies," 157.
121. Daniels & Daniels, "The Origin of the Sugarcane Roller Mill," 495.
122. Mintz, *Sweetness and Power*, xxii.
123. Brown, *Tacky's Revolt*, 222.
124. July 2, 1780, (CoEPRT).
125. December 31, 1780, (CoEPRT).
126. July 2, 1780, (CoEPRT); December 31, 1780, (CoEPRT); For a summary of the debate of what can be read into the naming of enslaved people in Jamaica, see Williamson, "Africa or old Rome?." For relevant discussion of the ambiguities of colonial archives in the cases of enslaved people and their baptism records, see Chira, *Patchwork Freedoms*, 25–6.
127. December 25, 1780, (CoEPRT).
128. Brown, *Tacky's Revolt*, 85–128.
129. Bilby, "The Treacherous Feast," 1–9; 21–3, and Note 8; Bilby, *True-Born Maroons*, 399–410.
130. The term "science" is the preferred term in Jamaica today. Among other eighteenth century instances in colonial literature, Moseley, [1799], *A Treatise on Sugar*, 170–1, used the term to describe an indigenous Jamaican system of practice and thought that the British called "obeah" or "obi," where spiritual agents were apprehended through material techniques, to practical purposes. This science was the product of distinct ways of knowing – including West African heritages – articulated into a coherent discourse and practice under certain conditions, and often deflecting interference from hegemonic power. Moseley's account was based on his experience working as a physician in Jamaica from 1768, just a few years after obeah was criminalised in Jamaica in 1760. For a recent analysis exploring the possible connection between this criminalisation and the use of the term "science" by practitioners, see Gerbner, "Maroon Science."
131. Ampene, *Engaging Modernity*.
132. McCaskie, "Unspeakable Words, Unmasterable Feelings," 5.
133. Bilby, "Swearing by the Past," 669–70.
134. Brown, *Tacky's Revolt*, 85–128.
135. *Royal Gazette of Jamaica*, Saturday August 5, 1780.
136. *Royal Gazette of Jamaica*, Saturday December 2, 1780); *Saunders's News-Letter*, Friday October 20, 1780). Cork, Ireland, was a stopping point for voyages from Jamaica to Lancaster.
137. Moseley, [1799], *A Treatise on Sugar*, 174.
138. Jamaica, *Journals of the House of Assembly of Jamaica*, December 8, 1780; *Royal Gazette of Jamaica*, Saturday December 23, 1780.
139. Jamaica, *Journals of the House of Assembly of Jamaica*, December 23, 1780.
140. Jamaica, *Journals of the House of Assembly of Jamaica*, January 11, 1781.
141. *Royal Gazette of Jamaica*, Saturday February 3, 1781, 15; *The Scots Magazine*, Monday August 3, 1785, 406.
142. *Royal Gazette of Jamaica*, Saturday August 3, 1816); December 25, 1780, (CoEPRT).
143. Campbell, *The Maroons of Jamaica*, 165–81.

144. Sivapragasam, *After the Treaties*, 54.
145. Moseley, *A Treatise on Sugar*, 176; Jamaica, *Journals of the House of Assembly of Jamaica*, December 18, 1781), 437; December 25, 1780, (CoEPRT).
146. For a similar account of a science-man extracting a nail, see Beckwith, *Black Roadways*, 140; for accounts of active practices of animal magnetism on Saint-Domingue in the 1780s and for discussion of the symbolic power transfer involved in reports which conflated Afro-Caribbean therapies and rituals with mesmerist practice, see Regourd, "Mesmerism in Saint Domingue," 320–24; and for the use of mesmerist practice as a diversion from accusations of obeah, see Gerbner, "Maroon Science," 335. For evidence that animal magnetism was known and discussed at the same moment in Jamaica as a cure of diseases, see "Extract of a letter from a gentleman in Kingston to his friend in Spanish-Town," *South Carolina Gazette*, July 15, 1785, 3.
147. For an early account of *minkisi*, see Dapper, [1668], *Naukeurige Beschrijvinge Der Afrikaensche Gewesten*, 548–9. It is relevant to note that when the distinctive tapered and square-edged iron bars of the West African trade began to be imported into Central Africa (alongside the significant immigration of West African people, see Vansina, *Paths in the Rainforest*, 145), *minkisi* were found pierced with tapered and square-edged iron pegs resembling scale models of these bars. In the late nineteenth century, the West African Toma group developed a distinctive new currency of slender iron rods called *kissi* pennies. *Kissi* pennies were then found piercing a Central African *nkisi* (see Roberts, "Precolonial Currencies, Value, Power, and Prestige," 163) of the *nkondi* form associated with the most powerful moral authority (see, LaGamma, "The Recently Acquired Kongo Mangaaka Power Figure"). These treatments illustrate the importance of engaging with the status of iron currency forms' material embodiment and ritual expressions in different groups and at different times.
148. Moseley, [1799], *A Treatise on Sugar*, 170–80.
149. Njoku, "Unmasking the Masquerade," 149–50; Rashford, "Plants," 64.
150. Letter from Director-General Willem Butler and Council, Elmina, March 27, 1719, Nationaal Archief, (1.05.01.02), fol. 265; Long, *History of Jamaica*, [1774], 424.
151. Njoku, "Unmasking the Masquerade," 149–50; Rashford, "Plants," 64.
152. Long, [1774], *History of Jamaica*, 424.
153. Rashford, "Plants," 62–71.
154. *Royal Gazette of Jamaica*, Saturday February 3, 1781, 79.
155. *Royal Gazette of Jamaica*, Saturday April 28, 1781, 270.
156. *Royal Gazette of Jamaica*, Saturday September 9, 1780, 534.
157. *Royal Gazette of Jamaica*, Saturday September 2, 1780, 639; *The Manchester Mercury*, Tuesday December 4, 1781.
158. *Royal Gazette of Jamaica*, Saturday September 22, 1781, 603.
159. "Extract of a Letter from Sir Thomas Rich, of the Princess Royal, to Mr Stephens, dated Nov. 20 at Spithead," *Dublin Evening Post*, Thursday November 29, 1781.
160. "Cousin" is used here and subsequently in the sense Cort himself used it: to denote a relative who is neither immediate nor completely removed.
161. James Weale, "Prospectus of an intended Work . . . ," Dana Research Centre and Library (MS/0371/3), fol. 198–99.
162. Stephen Fuller to Lord Sidney, June 7, 1788, National Archives (CO 137/87) fol. 248.
163. *Measuring Worth*, www.measuringworth.com/ukcompare/, (accessed February 18, 2023).
164. Cort, [1855], "British Iron Manufacture," 622.
165. Elder, *The Slave Trade*, 173.
166. Will of Jane Cort, Spinster of Lancaster, Lancashire, January 2, 1799, National Archives, (PROB 11/1317/3); "Vessel Name; Ship Abby, Master's Name: John Cort," Lancashire County Council Archives (DDLPC/8/2), fol. 4591, fol. 4670; (DDLPC/8/3), fol. 4886, fol. 5068, fol. 5180, fol. 5372, fol. 5629.

167. "T Bell & Co," October 1757, National Archives (ADM 22/75); "Batty and Cort," 1762, The United Kingdom Hydrographic Office Archive (MP/28/2); See also, Alexander, "Key to the Henry Cort Story?," 348; and Alexander, "Henry Cort," 82–3.
168. For the geography of the sites involved, see Mott, *Henry Cort*, 22–6; For Barbot and the suggestion that Barbot's addition of details on the Gold Coast iron trade came from conversations with English merchants while he was revising the 1688 text from Southampton, see Hair; Jones; Law, *Barbot on Guinea*, xvi-xviii and 562, note 3.
169. James Weale, "Prospectus of an intended Work . . . " Dana Research Centre and Library (MS/0371/3), fol. 198.
170. James Weale, "Prospectus of an intended Work . . . " Dana Research Centre and Library (MS/0371/3), fol. 198–99; Webster, "The Case of Henry Cort," 387–8; *Measuring Worth*, www.measuringworth.com/ukcompare/, (accessed February 18, 2023).
171. Cort, [1855], "British iron manufacture," 622.
172. See James Gillray's cartoon "Political Candour." In response to a bill naming Jellicoe, the caricature politician declares "my whole life, I never did suspect, I never had the least suspicion of any thing dishonorable [sic] in the Right Honble Gent," James Gillray, June 14, 1805, satirical print, The British Museum, no. 1868,0808.7372.
173. For Cort acting as a pay agent as early as 1757, see, "T Bell & Co," October 1757, National Archives (ADM 22/75); For detail of how Henry Cort acted as a banker, see Alexander, "Henry Cort," 82–3.
174. James Weale, "Prospectus of an intended Work . . . " Dana Research Centre and Library (MS/0371/3), fol. 198.
175. Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2).
176. Archibald Campbell, "A Memoir Relative to the Island of Jamaica," 1782, British Library, (Kings MS 214), fol. 14; Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1); Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2).
177. Stephen Fuller to Lord Sidney, National Archives (CO 137/87) fol. 249; see also O'Shaughnessy, *An Empire Divided*, 208–20.
178. Archibald Campbell, "A Memoir Relative to the Island of Jamaica," 1782, British Library, (Kings MS 214), fol. 14; fol. 78; see also Bollettino, Dziennik & Newman, "All Spirited Likely Young Lads."
179. Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1); Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2).
180. Stephen Fuller to Chancellor of the Exchequer, June 17, 1788, National Archives (CO 137/87) fol. 254; Copy: Fuller to Chancellor, 1788, Devon Heritage Centre (1160 M/C/J/7).
181. Chatham Officers ask for clarification of the orders for cordage for Portsmouth and Jamaica, February 12, 1781, National Archives (ADM 106/1267/63); Commodore Alan Gardner to Wm Smith, Naval Storekeeper, Jamaica, to deliver old bell metal, old copper and iron in store . . . May 16, 1788, National Archives (ADM 106/1296/194); William Smith, Storekeeper, Jamaica, list of the casks, old copper, bell metal . . . to be returned to Portsmouth, June 2, 1788, National Archives (ADM 106/1296/197).
182. For Cort acting as a pay agent as early as 1757, see, "T Bell & Co," October 1757, National Archives (ADM 22/75); For detail of how Henry Cort acted as a banker see Alexander, "Henry Cort," 82–3; For Caribbean and South American postings of Cort's clients, see "Batty and Cort," 1762, The United Kingdom Hydrographic Office Archive (MP/28/2).
183. "Remarks on the Bill to secure the Payment of Prize and Bounty-money to Greenwich Hospital." *The London Magazine*, March 1761, 122–125, especially 123.
184. Jamaica, *Journals of the House of Assembly of Jamaica*, July 3, 1781, 377.
185. Cort, Patent No. 1351.
186. Alexander, "Key to the Henry Cort Story?" 349.
187. James Weale, "Prospectus of an intended Work . . ." Dana Research Centre and Library (MS/0371/3), fol. 199.

188. Cort, [1855], "British iron manufacture," 622; For Jellicoe's anxiety at having "Considerably more than Twenty thousand Pounds engaged in the business of [Henry] Cort and my Son," see Adam Jellicoe, November 11, 1782, "Letter ... found in his Iron Chest after his Decease ...," Britain, [1805]. *The Tenth Report of the Commissioners of Naval Enquiry*, Appendix no. 48.
189. Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1); Petition to House of Commons by Reeder for compensation, 1788, Devon Heritage Centre (1160 M/C/J/9).
190. James Watt to Matthew Boulton, December 14, 1782, Birmingham Library, (MS 3782), (12), (78), item 74.
191. Cort, Patent No. 1351.
192. Alexander Raby to Coningsby Cort, June 20, 1812, reproduced in Webster, [1859], "The Case of Henry Cort," 53.
193. Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2).
194. July 2, 1780, (CoEPRT).
195. December 31, 1780, (CoEPRT).
196. December 25, 1780, (CoEPRT).
197. The Scottish patent combines a brief version of the first English 1783 patent (No. 1351) with what would become the second English 1784 patent (No. 1420), demonstrating what is otherwise suggested by the wording: that Cort understood the second English patent as an extension of the first.
198. Cort, Patent No. 1420.
199. Cort, Patent No. 1351.
200. For Cort's description of his process, see Cort, Patent No. 1420; For earlier accounts of treating iron in an air furnace (later called "puddling"), as well as the importance of understanding technological shifts not as individual achievements but broader societal shifts that take place in many places often around the same time, see Hayman, "The Cranage brothers and eighteenth-century forge technology," 113–20.
201. Stephen Fuller, agent for Jamaica, to the Chancellor of the Exchequer, June 17, 1788, National Archives (CO 137/87/43); Copy: Fuller to Chancellor, 1788, Devon Heritage Centre (1160 M/C/J/7).
202. Answer to objections to Manufactory, c. 1789, Devon Heritage Centre (1160 M/C/J/20).
203. Indenture, 29 April 1772, between Edmund Duany and John Reeder, Jamaica Records Office, 91. I am indebted to Ashley Jones for a scan of this document.
204. Copy memorandum of Eliza L. Crosse concerning Reeder's appeal, c. 1850, Devon Heritage Centre (1160 M/C/J/30).
205. Petition by John Reeder to Speaker of Jamaica, 1783, Devon Heritage Centre (1160 M/C/J/1); Petition by John Reeder to Speaker of Jamaica, 1782, Devon Heritage Centre (1160 M/C/J/2); Petition of John Reeder, 7 Dec 1785, in Jamaica, *Journals of the House of Assembly of Jamaica*, 8, (19 Oct 1784–5 Mar 1791), 132; "TO BE SOLD," Morant Bay, *The Daily Advertiser*, May 28, 1791; Answer to objections to Manufactory, c. 1789, Devon Heritage Centre (1160 M/C/J/20).
206. Cort, Patent No. 1420.
207. For the framework to understand patents as a response to technology already in use, see Edgerton, "From innovation to use," 124.
208. Holroyd, [1784], *Observations on the Commerce of the American States*. 19, note.
209. Williams, *Capitalism & Slavery*, 124–5; 154.
210. Cort, [1787], *A Brief Statement of the Facts relative to the New Method of making Bar Iron with Raw Pit Coal and Grooved Rollers*, Appendix, 13.
211. Britain, [1805], *The Tenth Report of the Commissioners of Naval Enquiry*, 159.
212. Alexander, "Adam Jellicoe," 342.
213. MacLeod, "Concepts of invention"; MacLeod, *Heroes of Invention*, 249–79.
214. "Kort & Comp., Aan de Oost-Zeekust, en de Rivier Corantyn," (1802), Nationaal Archief, (4. VEL), (C), (3.4), (1577B1–4), 7.

215. van Batenburg, [1807], *Kort historisch verhaal van den eersten aanleg, lotgevallen en voortgang der particuliere Colonie Berbice*, 198, 236, 266.
216. For an overview of the arguments around the exceptionally early dates of Leija sites in Nsukka, Nigeria, and the possibility of iron-working originating independently in West Africa, see Chiriruke, *Metals in Past Societies*, 26–7. For the impact of West and Central African preference for iron on the development of Europe's financial sector and iron trade, see Evans & Rydén, "Voyage Iron," 54; Evans & Rydén, *Baltic Iron in the Atlantic World*.
217. C.f. Rodney, "Portuguese Attempts at Monopoly on the Upper Guinea Coast"; and Rodney, *A History of the Upper Guinea Coast*.
218. Gibson, "Journal #Mermay: Mami Wata Thursday 7th May 2019," (accessed April 6, 2023).
219. Botkin, *Thieving Three-Fingered Jack*.
220. Bilby, *True Born Maroons*; "Swearing by the Past"; "The Treacherous Feast."
221. *Royal Gazette of Jamaica*, Saturday August 3, 1816; *Englishman*, Sunday October 20, 1816; *The Public Ledger and Daily Advertiser*, Monday October 21, 1816; *Exeter Flying Post*, Thursday October 24, 1816; *National Register*, Monday October 21, 1816; *Star*, Monday October 21, 1816; *Cambridge Chronicle and Journal*, Friday October 25, 1816; *Norfolk Chronicle*, Saturday October 26, 1816; *Sun*, Saturday October 26, 1816; *Champion*, Sunday October 27, 1816; *The News*, Sunday October 27, 1816; *South Eastern Gazette*, Tuesday October 29, 1816); *Hereford Journal*, Wednesday October 30, 1816; *Aberdeen Press and Journal*, Wednesday October 30, 1816; *The Perthshire Courier*, Thursday October 31, 1816; *Stamford Mercury*, Friday November 1, 1816; *Staffordshire Advertiser*, Saturday November 2, 1816; *Caledonian Mercury*, Monday November 4, 1816; *Hull Packet*, Tuesday November 5, 1816; *Manchester Mercury*, Tuesday November 5, 1816; *Commercial Chronicle*, Tuesday October 29, 1816; *Chester Chronicle*, Friday November 15, 1816; *The Scots Magazine*, Sunday December 1, 1816.
222. Gibbs, "Toussaint, Gabriel, and Three Finger'd Jack."
223. Bilby, *True-Born Maroons*, 309–12.

Acknowledgements

I wish to thank the two anonymous reviewers and the editors, Professors Tiago Saraiva and Amy Slaton, as well as Professors Kenneth Bilby, Philip Burnham, David Edgerton, Christopher Evans (McDonald Institute for Archaeological Research), Dániel Margócsy, Simon Schaffer, and Jim Secord for their invaluable comments, support, and encouragement. I am also grateful to Rokia Ballo, Ashley Jones, John Shorter and Drs Nathan Bossoh and Sheray Warmington, for conversations that informed this work.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Jenny Bulstrode http://orcid.org/0000-0002-9251-1355

ARCHIVES

Bank of England

- Humphrey Morice: Trading Accounts and Personal Papers Volume 1-2, (20A67/4/1/1-2).

Birmingham, Library of.
- Matthew Boulton and Family Papers (MS 3782),
  - Correspondence and Papers of Matthew Boulton (12).
    - Matthew Boulton and James Watt 1782-1784, (78).

British Library
- India Office Records (IOR),
  - Court Minutes, 19 October 1657–14 April 1665, (B/26).
  - Letter Book 2, 1657–1661, (E/3/85).
  - Letter Book 3, 1661–1666, (E/3/86).
- Miscellaneous Papers and original Letters relating to the affairs of Jamaica, (Add MS 12431).
- Archibald Campbell, 'A Memoir Relative to the Island of Jamaica', (1782), Kings Manuscripts, (Kings MS 214).

Church of England Parish Register Transcripts
- Christening, Church of England Parish Register Transcripts, 1664–1880, St. Thomas in the East, Jamaica, Registrar General's Department, Spanish Town, (COEPRT).

Dana Research Centre and Library
- James Weale, Volumes entitled: 'Prospectus of an intended Work .... to be entitled, An Historical Account of the Iron and Steel Manufacturers and Trade by James Weale', 1779–1811, (MS/0371).

Devonshire Heritage Centre
- Devon Heritage Centre (DHC), Crosse-Upcott Family (1160 M), Correspondence (C), Correspondence Re: Jamaica (J), 1-30.

Jamaica Records Office
- Indenture dated 29 April 1772, Index to Grantees, B.A. Old Series vol. 6, No. 248.

Lancashire County Council Archives
- DDLPC – Lancaster Port Commission 1744–1981
  - Register of Vessels, 1734–1946, (8).
    - Register of Vessels, 12 May 1767–14 May 1781, (2).
    - Register of Vessels, 21 May 1781–30 June 1789, (3).

Nationaal Archief
- No. 13, Brieven en papieren van de Kust van Guinea, 1718 aug. 8 - 1720 juli 28 (104), Kust van Guinea (D.2.1), Vergadering Van Tienen (1.) Archief van de Tweede West-Indische Compagnie, (1.05.01.02).
- Inventaris van de verzameling buitenlandse kaarten Leupe, 1584-1813 (4.VEL), Landkaarten, plans, enz (C), Zuid-Amerika (3.4), Berbice, Algemeene, Kaart van de Colonie de Berbice, Nommer-en naamlyste (1577B1-4).

National Archives
- Records created or inherited by HM Treasury, Company of Royal Adventurers of England Trading with Africa and successors (T/70),
  - From Africa, (22).
  - To and from merchants at Exeter, Rotterdam, Hamburg etc. (25).
  - Dixcove, Succondee, Commenda, Agga, Tantumquerry, Winnebah, Accra, Quittah, Whydah: Copy-book of diaries, 1730, (1466).
- Records of the colonial office (CO)
  - Original Correspondence (37/43).
  - Colonial Office and Predecessors, despatches (101/25).

- Original correspondence (137/81).
- Original correspondence (137/87).
- Colonial, General (323/8).

- Records of the Admiralty (ADM)
  - Navy Board: Records (106)
    - In-letters, Miscellaneous, U.-Y. (834).
    - In-letters, Miscellaneous, I.-K. (848).
    - Miscellaneous in-letters to the Navy Board from P correspondents, described at item level. (1170).
    - In-letters, Miscellaneous, P. (1267).
    - In-letters, Miscellaneous, A-C. (1286).
    - In-letters, Miscellaneous, F-V. (1296).
  - Navy Board and Admiralty, Accountant General's Department (22),
    - Pay Book of Widows' Pensions (75).
- Records of the prerogative court of Canterbury (PROB)
  - Will of Jane Cort, Spinster of Lancaster, Lancashire, (11/1317/3).

Rigsarkivet

- Vestindisk-Guineisk Kompagni (V-G K), XIV Grevinden af Laurwigen (G) 1733 - XIV Grevinden af Laurwigen (G) 1734.

United Kingdom Hydrographic Office Archive

- Miscellaneous Papers Volume 28, (MP/28).
  - Individual Papers for HMS Temple (2).

NEWSPAPERS

- *Aberdeen Press and Journal.*
- *Caledonian Mercury.*
- *Cambridge Chronicle and Journal.*
- *Champion.*
- *Chester Chronicle.*
- *Commercial Chronicle.*
- *Cornwall Chronicle.*
- *Dublin Evening Post.*
- *Englishman.*
- *Exeter Flying Post.*
- *Hereford Journal.*
- *Hull Packet.*
- *Jamaica Mercury.*
- *Kingston Journal.*
- *Manchester Mercury.*
- *Norfolk Chronicle.*
- *Royal Gazette of Jamaica.*
- *Saunders's News-Letter.*
- *Savanna-la-Mar Gazette.*
- *South Carolina Gazette.*
- *South Eastern Gazette.*
- *Staffordshire Advertiser.*
- *Stamford Mercury.*
- *Star.*
- *Sun.*
- *The Daily Advertiser.*

- *The London Magazine*.
- *The Manchester Mercury*.
- *The News*.
- *The Perthshire Courier*.
- *The Public Ledger and Daily Advertiser*.
- *The Scots Magazine*.

ONLINE SOURCES

- Voyages: The Transatlantic Slave Trade Database https://www.slavevoyages.org/assessment/estimates (accessed: 18 February 2023).
- Measuring Worth, www.measuringworth.com/ukcompare/ (accessed: 18 February 2023).
- Gibson, Lydia, "Journal #Mermay: Mami Wata Thursday 7th May 2019," http://www.whatiswild.com/Journal.html (accessed 6 April 2023).

PATENTS

- Henry Cort, 1783, *Cort's Method of Preparing, Welding and Working Iron*, (1783), Patent No. 1351.
- Henry Cort, *Manufacture of iron*, (1784), Patent No. 1420.

REFERENCES

Agyeman-Duah, J., K. A. Darkwa, and B. C. Obaka. *Ashanti Stool Histories*. 1 vol. Legon: Institute of African Studies, University of Ghana, 1976.

Alexander, E. "Adam Jellicoe: A Flawed Investment." *The Mariner's Mirror* 89, no. 3 (2003): 340–342.

Alexander, E. "Henry Cort, Navy Agent." *The Mariner's Mirror* 89, no. 1 (2003): 82–83. doi:10.1080/00253359.2003.10659276.

Alexander, E. "Key to the Henry Cort Story? An Appraisal of the Weale Document Collection." *Transactions of the Newcomen Society* 75, no. 2 (2005): 341–358. doi:10.1179/tns.2005.016.

Allen, R. C. *The British Industrial Revolution in Global Perspective*. New York: Cambridge University Press, 2009.

Ampene, K., and N. K. Nyantakyi III. *Engaging Modernity: Asante in the Twenty-First Century*. Ann Arbor MI: University of Michigan Publishing, University of Michigan Library, 2016. doi:10.3998/maize.14689915.0001.001.

Anderson, A. *An Historical and Chronological Deduction of the Origin of Commerce from the Earliest Accounts to the Present Time*. II vols. London: Millar, Tonson, Rivington, etc., 1764.

Barbot, J., *A Description of the Coasts of North and South Guinea*, (no publisher given), 1732.

Barnes, S. T. *Africa's Ogun: Old World and News*. Bloomington & Indiapolis: Indiana University Press, 1997.

Barros, P. L. D. "Bassar: A Quantified, Chronologically Controlled, Regional Approach to a Traditional Iron Production Centre in West Africa." *Africa: Journal of the International Africa Institute* 56, no. 2 (1986): 148–174. doi:10.2307/1160630.

Barros, P. L. D. "The Effect of the Slave Trade on the Bassar Ironworking Society, Togo." In *West Africa During the Atlantic Slave Trade, Archaeological Perspectives*, edited by DeCorse, 59–80. London: Bloomsbury, 2016.

Beckwith, M. *Black Roadways: A Study of Jamaican Folk Life*. Chapel Hill: University of North Carolina, 1929.

Bigelow, A. M. *Mining Language: Racial Thinking, Indigenous Knowledge, and Colonial Metallurgy in the Early Modern Iberian World*. Virginia: Omohundro Institute of Early American History Culture, 2021. doi:10.5149/northcarolina/9781469654386.001.0001.

Bilby, K. "Swearing by the Past, Swearing to the Future: Sacred Oaths, Alliances, and Treaties Among the Guianese and Jamaican Maroons." *Ethnohistory* 44, no. 4 (1997): 655–689, Autumn. doi:10.2307/482884.

Bilby, K. M. "The Treacherous Feast: A Jamaican Maroon Historical Myth." *Bijdragen Tot De Taal-, Land- En Volkenkunde / Journal of the Humanities & Social Sciences of Southeast Asia* 140, no. 1 (1984): 1–31. doi:10.1163/22134379-90003425.

Bilby, K., and K. A. Yelvington. *True-Born Maroons*. Gainesville: University Press of Florida, 2008. doi:10.5744/florida/9780813032788.001.0001.

Bollettino, M. A., M. P. Dziennik, and S. P. Newman. "'All Spirited Likely Young lads': Free Men of Colour, the Defence of Jamaica, and Subjecthood During the American War for Independence." *Slavery & Abolition* 41, no. 2 (2020): 187–211. doi:10.1080/0144039X.2020.1714110.

Bosman, W. *Nauwkeurige beschryving van de Guinese Goud-, Tand- en Slave-kust, nevens alle desselfs landen*. Utretcht: Anthony Schouten, 1704.

Botkin, F. R. *Thieving Three-Fingered Jack: Transatlantic Tales of a Jamaican Outlaw, 1780-2015*. London: Rutgers University Press, 2017.

Britain, G. *An Act for the More Effectually Preventing the Pernicious Practices of Smuggling*, (1779, 19 Geo III, c.69). London: Charles Eyre and William Strahan, printers to the King's Most Excellent Majesty, 1779.

Britain, G. *The Tenth Report of the Commissioners of Naval Enquiry*. London: Office of the Treasurer of His Majesty's Navy, 1805.

Brown, V. *Tacky's Revolt: The Story of an Atlantic Slave War*. Cambridge: Harvard University Press, 2020.

Burnard, T. *Planters, Merchants, and Slaves: Plantation Societies in British America, 1650-1830*. Chicago and London: The University of Chicago Press, 2019.

Campbell, M. *The Maroons of Jamaica, 1655-1796: A History of Resistance, Collaboration and Betrayal*. Granby Mass: Bergin & Garvey, 1988.

Carney, J. *Black Rice: The African Origin of Rice Cultivation in the Americas*. Cambridge Massachusetts & London: Harvard University Press, 2001. doi:10.4159/9780674262539.

Carney, J., and R. N. Rosomoff. *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World*. Berkeley: University of California Press, 2011. doi:10.1525/9780520949539.

Chira, A. *Patchwork Freedoms: Law, Slavery, and Race Beyond Cuba's Plantations*. Cambridge: Cambridge University Press, 2022.

Chirikure, S. *Metals in Past Societies: A Global Perspective on Indigenous African Metallurgy*. London: Springer International Publishing, 2015. doi:10.1007/978-3-319-11641-9.

Chouin, G. "Forests of Power and Memory: An Archaeology of Sacred Groves in the Eguafo Polity, Southern Ghana (c. 500-1900 A.D.)." Doctoral thesis, New York, Syracuse University, 2009.

Chouin, G. *Colbert et la Guinée: Le voyage en Guinée de Louis de Hally et Louis Ancelin de Gémozac (1670-1671)*. Saint-Maur-des-Fossés, France: Éditions Sépia, 2011.

Clist, B. "West-Central African Diversity from the Stone Age to the Iron Age." In *Africa, the Cradle of Human Diversity*, edited by Cesar Fortes-Lima, Ezekia Mtetwa, and Carina Schlebusch, 63–110. Leiden; Boston: Brill, 2022.

Cort, H. "A Brief Statement of the Facts Relative to the New Method of Making Bar Iron with Raw Pit Coal and Grooved Rollers." March 1787.

Cort, R. "British Iron Manufacture." *Journal of the Society of Arts* 3, no. 140 (1855): 619–623, July 27.

Cort, R. "The Invention of Rolling Iron." *Mechanic's Magazine* LXIX, no. 1825 (1858): 135–136, July 31.

Crosson, J. B. "Obeah Simplified? Scientism, Magic, and the Problem of Universals." In *Critical Approaches to Science and Religion*, edited by Sheldon, M P., Ragab, A., and Keel, T., 348–374. New York: Columbia University Press, 2023. doi:10.7312/shel20656-021.

da Montecuccoli, G. A. C. *Istorica descrizione de tre regni, Congo, Matamba, Angola*. Bologna: Giacomo Monti, 1687.

Daniels, J., and D. Christian. "The Origin of the Sugarcane Roller Mill." *Technology and Culture* 29, no. 3 (1988): 493–535. doi:10.1353/tech.1988.0091.

Dapper, O. *Naukeurige Beschrijvinge Der Afrikaensche Gewesten*. Amsterdam: Jacob van Meurs, 1668.
d'Avignon, R. *A Ritual Geology: Gold and Subterranean Knowledge in Savanna West Africa*. Durham: Duke University Press, 2022.
DeCorse, C. R. "Coastal Ghana in the First and Second Millenia AD: Change in Settlement Patterns, Subsistence and Technology." *Journal des Africanistes* 75, no. 2 (2005): 43–54. doi:10.4000/africanistes.115.
Delle, J. A., and R. Fellows Kristen. "Repurposed Metal Objects in the Political Economy of Jamaican Slavery." *International Journal of Historical Archaeology* 25, no. 4 (2021): 998–1023. doi:10.1007/s10761-021-00587-7.
Dickinson, H. W. "Henry Cort's Bicentenary." *Transactions of the Newcomen Society* 21, no. 1 (1940): 31–47. doi:10.1179/tns.1940.004.
Drewal, H. J. "Iron's Empowering Presence." In *Striking Iron: The Art of African Blacksmiths*, edited by Roberts et al., 82–99. Los Angeles, California: Fowler Museum at UCLA, 2019.
Dubois, L., and J. D. Garrigus. *Slave Revolution in the Caribbean, 1789-1804, a Brief History with Documents*. Bedford/St Martin's: Macmillan Learning, 2017.
Edgerton, D. "From Innovation to Use: Ten Eclectic Theses on the Historiography of Technology." *History and Technology* 16, no. 2 (1999): 111–136. doi:10.1080/07341519908581961.
Edgerton, D. *The Shock of the Old: Technology and Global History Since 1900*. London: Profile Books, 2006.
Elder, M. *The Slave Trade and the Economic Development of Eighteenth-Century Lancaster*. Edinburgh: Edinburgh University Press, 1992. doi:10.1515/9781474468022.
Eltis, D. "The Volume and Structure of the Transatlantic Slave Trade: A Reassessment." *The William and Mary Quarterly* 58, no. 1 (2001): 17–46, January. doi:10.2307/2674417.
Equiano, O. *The Interesting Narrative of the Life of Olaudah Equiano . . .*. 1 vol. London: printed and sold by the Author, 1789.
Evans, C., and G. Rydén. *Baltic Iron in the Atlantic World: Europe, Africa and the Americas, 1500-1830*. Leiden/Boston: Brill, 2007.
Evans, C., and G. Rydén. "'Voyage Iron': An Atlantic Slave Trade Currency, Its European Origins, and West African Impact." *Past and Present* 239, no. 1 (2018): 41–70, May. doi:10.1093/pastj/gtx055.
Ford, J. *The Role of the Trypanosomiases in African Ecology: A Study of the Tsetse Fly Problem*. Oxford: Oxford University Press, 1971.
Fowler, I. "Babungo: A Study of Iron Production, Trade and Power in a Nineteenth Century Ndop Plain Chiefdom (Cameroons)." Doctoral thesis, University College London, 1990.
Gerbner, K. "Maroon Science: Knowledge, Secrecy, and Crime in Jamaica." In *Critical Approaches to Science and Religion*, edited by M P. Sheldon, A. Ragab, and T. Keel, 325–347. New York: Columbia University Press, 2023. doi:10.7312/shel20656-020.
Gibbs, J. "Toussaint, Gabriel, and Three Finger'd Jack: 'Courageous Chiefs' and the 'Sacred Standard of Liberty' on the Atlantic Stage." *Early American Studies* 13, no. 3 (2015): 626–660, Summer. doi:10.1353/eam.2015.0024.
Gibson, L. "Journal #mermay: Mami Wata Thursday 7th May 2019." Accessed April 6, 2023. http://www.whatiswild.com/Journal.html
Gille, P. "Naval Artillery." In *A History of Technology and Invention: Progress Through the Ages, Volume III the Expansion of Mechanization, 1725-1860*, translated and edited by Daumas, and Hennessy, 406–413. London: John Murray, 1980.
Gómez, P. F. *The Experiential Caribbean: Creating Knowledge and Healing in the Early Modern Atlantic*. Chapel Hill: University of North Carolina Press, 2017.
Goucher, C. "African Metallurgy in the Atlantic World." *The African Archaeological Review* 11, no. 1 (1993): 197–215. doi:10.1007/BF01118148.
Green, T. "Africa and the Price Revolution." *The Journal of African History* 57, no. 1 (2016): 1–24. doi:10.1017/S0021853715000754.
Green, T. *A Fistful of Shells: West Africa from the Rise of the Slave Trade to the Age of Revolutions*. UK: Allen Lane, 2019. doi:10.7208/chicago/9780226644745.001.0001.

Hair, P. E. H., A. Jones, and R. Law. *Barbot on Guinea: The Writings of Jean Barbot on West Africa, 1678-1712*. I-II vols. London: The Hakluyt Society, 1992.
Hayman, R. "The Cranage Brothers and Eighteenth-Century Forge Technology." *Historical Metallurgy* 38, no. 2 (2004): 113–120.
Herbert, E. W. *Iron, Gender, and Power: Rituals of Transformation in African Societies*. Bloomington and Indianapolis: Indiana University Press, 1993.
Hill, R. A. "Making Scientific Sense of Traditional Medicine: Efficacy, Bioprospecting, and the Enduring Hope of Drug Discovery in Ethiopia." *History of Pharmacy and Pharmaceuticals* 63, no. 2 (2022): 270–301. doi:10.3368/hopp.63.2.270.
Hippisley, J. *Essays, I. On the Populousness of Africa. II. On the Trade at the Forts on the Gold Coast. III. On the Necessity of Erecting a Fort at Cape Appolonia*. London: T. Lownds in Fleet Street, 1764.
Holroyd, J. B. *Observations on the Commerce of the American States*. London: J. Debrett, 1784.
Insoll, T. "Meyer Fortes and Material Culture: The Published Image and the Unpublished Resource." *The Journal of the Royal Anthropological Institute* 16, no. 3 (2010): 572–587, September. doi:10.1111/j.1467-9655.2010.01640.x.
Jamaica, A. *Journals of the House of the Assembly of Jamaica*. Jamaica: Printed by the Order of the House of Assembly, 1664-1826.
Jobson, R. *The Golden Trade: Or, a Discovery of the River Gambra, and the Golden Trade of the Aethiopians*. London: printed by Nicholas Okes, and are to be sold by Nicholas Bourne, dwelling at the entrance of the Royall Exchange, 1623.
Jones, A. *German Sources for West African History, 1599-1669*. Wiesbaden: Franz Steiner Verlag GMBH, 1983.
Kananoja, K. "Infected by the Devil, Cured by Calundu: African Healers in Eighteenth Century Minas Gerais, Brazil." *Social History of Medicine* 29, no. 3 (2016): 490–511. doi:10.1093/shm/hkv145.
Kananoja, K. *Healing Knowledge in Atlantic Africa: Medical Encounters, 1500-1800*. Cambridge: Cambridge University Press, 2021.
Kea, R. A. *Settlements, Trade, and Polities in the Seventeenth-Century Gold Coast*. Baltimore: John Hopkins University Press, 1982.
Kippax, J. trans. *The Theory and Practice of Commerce and Maritime Affairs, Written Originally in Spanish by Don Geronymo de Uztariz*. Dublin: George Faulkner in Essex-street, 1751.
Konadu, K. *Our Own Way in This Part of the World: Biography of an African Community, Culture, and Nation*. Duke University Press, 2019.
La Fleur, J. D. *Fusion Foodways of Africa's Gold Coast in the Atlantic Era*. Leiden, Boston: Brill, 2012. doi:10.1163/9789004234093.
LaGamma, A. "The Recently Acquired Kongo Mangaaka Power Figure." *Metropolitan Museum Journal* 43 (2008): 201–210. doi:10.1086/met.43.25699095.
Law, R., ed. *The English in West Africa, 1681-1683: The Local Correspondence of the Royal African Company of England*. 1 vol. London: British Academy, 2015.
Law, R., ed. *The English in West Africa, 1681-1683: The Local Correspondence of the Royal African Company of England*. 2 vols. London: British Academy, 2015.
Ledward, K. H., ed. *Journals of the Board of Trade and Plantations: Volume 4, November 1718 - December 1722*. London: His Majesty's Stationery Office, 1925.
Logan, A. L. *The Scarcity Slot*. University of California Press, 2020.
Long, E. *History of Jamaica, or a General Survey of the Antient [Sic] and Modern State of That Island . . .*. 2 vol. London: T. Lowndes in Fleet Street, 1774.
MacLeod, C. "Concepts of Invention and the Patent Controversy in Victorian Britain." In *Technological Change*, edited by Robert Fox, 137–154. Amsterdam: Harwood, 1996.
MacLeod, C. *Heroes of Invention*, 249–279. Cambridge: Cambridge University Press, 2007.
MacLeod, C. *Inventing the Industrial Revolution: The English Patent System, 1660-1800*. Cambridge: Cambridge University Press, 2009.
McCaskie, T. "Telling the Tale of Osei Bonsu: An Essay on the Making of Asante Oral History." *Africa* 84, no. 3 (2014): 353–370. doi:10.1017/S0001972014000394.

McCaskie, T. "Unspeakable Words, Unmasterable Feelings: Calamity and the Making of History in Asante." *The Journal of African History* 59, no. 1 (2018): 3–20. doi:10.1017/S0021853717000408.

McNaughton, P. R. *The Mande Blacksmiths: Knowledge, Power, and Art in West Africa*. Bloomington: Indiana University Press, 1988.

MeasuringWorth. "Five Ways to Calculate Relative Value of a UK Pound Amount, 1270 to Present." *MeasuringWorth*, 2021. Accessed February 18, 2023. www.measuringworth.com/ukcompare/

Mintz, S. W. *Sweetness and Power: The Place of Sugar in Modern History*. New York: Penguin Books, 1986.

Mitchill, S. L. "Affinities of Septic Fluids to Other Bodies." In*The New-York Magazine or Literary Repository*, edited by Thomas, and James Swords, 9–17. 2 vols. New York: T. and J. Swords, 1797.

Mokyr, J. *The Enlightened Economy: An Economic History of Britain, 1700-1850*. New Haven: Yale University Press, 2009.

Moseley, B. *A Treatise on Sugar*. London: G.G. and J. Robinson, Paternoster Row, 1799.

Mott, R. A., and P. Singer, ed. *Henry Cort: The Great Finer*. London: The Metals Society, 1983.

Münzer, H., in Firth, J., trans. *Doctor Hieronymus Münzer's Itinerary (1494 and 1495); and Discovery of Guinea*. Hampshire: Hobbs the Printers, 2014.

Murphy, K. "Translating the Vernacular: Indigenous and African Knowledge in the Eighteenth-Century British Atlantic." *Atlantic Studies* 8, no. 1 (2011): 29–48. doi:10.1080/14788810.2011.541188.

Neaher, N. C. "Igbo Metalsmiths Among the Southern Edo." *African Arts* 9, no. 4 (1976): 46-9; 91–2, July. doi:10.2307/3335053.

Nicholson, J. *The Operative Mechanic and British Machinist*. London: Knight and Lacey, 1825.

Njoku, O. N. "A History of Iron Technology in Igboland, c.1542-1900." Doctoral thesis, Nova Scotia, Dalhousie University, June 1986.

Njoku, O. N. "Magic, Religion and Iron Technology in Precolonial North-Western Igboland." *Journal of Religion in Africa* 21, no. 3 (1991): 194–215. doi:10.1163/157006691X00023.

Njoku, R. C. "Unmasking the Masquerade: Counterideologies and Contemporary Practices." In *West African Masking Traditions and Diaspora Masquerade Carnivals: History, Memory, and Transnationalism*. Rochester, USA: University of Rochester Press, 2020.

Oast, J. *Institutional Slavery*. Cambridge: Cambridge University Press, 2016.

Ogundiran, A. "Of Small Things Remembered: Beads, Cowries, and Cultural Translations of the Atlantic Experience in Yorubaland." *The International Journal of African Historical Studies* 35, no. 2–3 (2002): 427–457. doi:10.2307/3097620.

Oriji, J. N. "The Slave Trade, Warfare and Aro Expansion in the Igbo Hinterland." *Transafrican Journal of History* 16 (1987): 151–166.

Oriji, J. N. "Igboland, Slavery, and the Drums of War and Heroism." In *Fighting the Slave Trade: West African Strategies*, edited by Diouf and Diouf, S A., 121–131. Ohio: Ohio University Press, 2004. doi:10.2307/j.ctv136c1pz.12.

O'Shaughnessy, A. *An Empire divided: The American Revolution and the British Caribbean*. Philadelphia: University of Pennsylvania Press, 2000.

Osseo-Assare, A. D. A. "Bioprospecting and Resistance: Transforming Poisoned Arrows into Strophantin Pills in Colonial Gold Coast, 1885-1922." *Social History of Medicine* 21, no. 2 (2008): 269–290. doi:10.1093/shm/hkn025.

Osseo-Assare, A. D. A. *Bitter Roots: The Search for Healing Plants in Africa*. Chicago; London: The University of Chicago Press, 2014. doi:10.7208/chicago/9780226086163.001.0001.

Otumfuo, N. O. A. P., II in McCaskie, Tom, ed. *History of Ashanti*. Oxford: Oxford University Press for the British Academy, 2022.

Parrish, S. S. "Diasporic African Sources of Enlightenment Knowledge." In *Science and Empire in the Atlantic World*, 281–310. New York & London: Routledge, 2008.

Pole, L. M. "The Hammers of Mawu: Ironworking Tradition in the Togo Hills, Ghana." *African Archaeological Review* 27, no. 1 (2010): 43–78. doi:10.1007/s10437-010-9069-x.

Quamie-Kyiamah, A. "The Customary Oath in the Gold Coast." *African Affairs* 50, no. 199 (1951): 139–147. doi:10.1093/oxfordjournals.afraf.a093970.
Rashford, J. "Plants, Spirits and the Meaning of 'John' in Jamaica." *Jamaica Journal* 17, no. 2 (1984): 62–71, May.
Regourd, F. "Mesmerism in Saint Domingue: Occult Knowledge and Vodou on the Eve of the Haitian Revolution." In *Science and Empire in the Atlantic World*, edited by James Delbourgo and Nicholas Dew, 311–322. New York: Routledge, 2008. doi:10.4324/9780203933848-17.
Roberts, A. F. "Precolonial Currencies: Value, Power and Prestige." In *Striking Iron: The Art of African Blacksmiths*, edited by A. F. Roberts, T. Joyce, and M. C. Berns, 150–163. Los Angeles, California: Fowler Museum at UCLA, 2019.
Roberts, C. E. "To Heal and to Harm: Medicine, Knowledge, and Power in the Atlantic Slave Trade." Doctoral thesis, Cambridge, MA, Harvard University, 2017.
Rodney, W. "Portuguese Attempts at Monopoly on the Upper Guinea Coast." *African History* 6, no. 3 (1965): 307–322. doi:10.1017/S002185370000582X.
Rodney, W. "A History of the Upper Guinea Coast, 1545-1800." Doctoral thesis, London, University of London, 1966.
Rømer, L. F. *A Reliable Account of the Coast of Guinea (1760)*. Translated and edited by Winsnes. Oxford: Oxford University Press for the British Academy, 2000.
Ross, D. H. "The Iconography of Asante Sword Ornaments." *African Arts* 11, no. 1 (1977): 16-25; 90–91, October. doi:10.2307/3335218.
Saraiva, T. "Black Science: Amílcar Cabral's Agricultural Survey and the Seeds of African Decolonization." *Isis* 113, no. 3 (2022): 597–609, September. doi:10.1086/721072.
Satia, P. *Empire of Guns: The Violent Making of the Industrial Revolution*. Redwood City: Stanford University Press, 2019.
Saunders, A. C. D. C. M. *A Social History of Black Slaves and Freedmen in Portugal, 1441-1555*. Cambridge: Cambridge University Press, 1982.
Sheridan, R. B. "Changing Sugar Technology and the Labour Nexus in the British Caribbean 1750-1900, with Special Reference to Barbados and Jamaica." *New West Indian Guide* 63, no. 1/2 (1989): 59–93. doi:10.1163/13822373-90002033.
Shilliam, R. "Race and Revolution at Bwa Kayiman." *Millenium: Journal of International Studies* 45, no. 3 (2017): 269–292. doi:10.1177/0305829817693692.
Singerman, D. R. "The Limits of Chemical Control in the Caribbean Sugar Factory." *Radical History Review* 2017, no. 127 (2017): 39–61. doi:10.1215/01636545-3690858.
Sivapragasam, M. "After the Treaties: A Social, Economic and Demographic History of Maroon Society in Jamaica, 1739-1842." Doctoral thesis, University of Southampton, 2018.
Sluyter, A. *Black Ranching Frontiers: African Cattle Herders of the Atlantic World*. New Haven: Yale University Press, 2012.
Solar, P., and K. Rönnbäck. "Copper Sheathing and the British Slave Trade." *The Economic History Review* 68, no. 3 (2015): 806–829. doi:10.1111/ehr.12085.
Soto Laveaga, G., and P. F. Gómez, eds. "Thinking with the World: Histories of Science and Technology from the 'Out There', Special Issue." *History and Technology* 34, no. 1 (2018): 5–10.
Stahl, A. B. "Archaeological Insights into Aesthetic Communities of Practice in the Western Volta Basin." *African Arts* 46, no. 3 (2013): 54–67. doi:10.1162/AFAR_a_00088.
Stahl, A. B. "Efficacious Objects and Techniques of the Subject: 'Ornaments' and Their Depositional Contexts in Banda, Ghana." In *Relational Identities and Other-Than-Human Agency in Archaeology*, 197–236. Boulder: University Press of Colorado, 2018. doi:10.5876/9781607327479.c009.
Stammers, M. "Iron Knees in Wooden Vessels – an Attempt at a Typology." *International Journal of Nautical Archaeology* 30, no. 1 (2001): 115–121. doi:10.1111/j.1095-9270.2001.tb01361.x.
Sutherland, A. *An Attempt to Ascertain and Extend the Virtues of Bath and Bristol Waters by Experiments and Cases*. London: Frederick & Leake, 1764.
Sweet, J. H. *Domingos Álvares, African Healing, and the Intellectual History of the Atlantic World*. Chapel Hill: The University of North Carolina Press, 2011.

van Batenburg, A. J. V. I. *Kort historisch verhaal van den eersten aanleg, lotgevallen en voortgang der particuliere Colonie Berbice*. Amsterdam: C. Sepp Jansz, 1807.
van Dantzig, A. "The Akanists: A West Africa Hansa." In *West Africa Economic and Social History*, edited by Henige and McCaskie. Madison: University of Wisconsin-Madison, 1990.
Vansina, J. *Paths in the Rainforests: Toward a History of Political Tradition in Equatorial Africa*. London: James Currey, 1990.
Vansina, J. "Linguistic Evidence for the Introduction of Ironworking into Bantu-Speaking Africa." *History in Africa* 33 (2006): 321–361. doi:10.1353/hia.2006.0022.
Vogel, S. M. "Rapacious Birds and Severed Heads: Early Bronze Rings from Nigeria." *Art Institute of Chicago Museum Studies* 10 (1983): 330–357. doi:10.2307/4104344.
Vogt, J. "Portuguese Gold Trade: An Account Ledger from Elmina, 1529–1531." *Transactions of the Historical Society of Ghana* 14, no. 1 (1973): 93–103.
Voyages: The Transatlantic Slave Trade Database. Accessed February 18, 2023. https://www.slavevoyages.org/assessment/estimates
Warnier, J.-P. "Slave-Trading without Slave Raiding." *Paideuma* 41 (1995): 251–272.
Warnier, J.-P. *Cameroon Grassfields Civilization*. Bamenda: Langaa Research & Publishing CIG, 2012.
Warnier, J.-P., and I. Fowler. "A Nineteenth-Century Ruhr in Central Africa." *Africa: Journal of the International African Institute* 49, no. 4 (1979): 329–351. doi:10.2307/1159222.
Webster, T. "The Case of Henry Cort." *Mechanics' Magazine* II (1859): 387–389.
Williams, E. *Capitalism & Slavery*. Chapel Hill: The University of North Carolina, 1944.
Williamson, M. "Africa or Old Rome? Jamaican Slave Naming Revisited." *Slavery & Abolition* 38, no. 1 (2017): 117–134. doi:10.1080/0144039X.2016.1270071.