Comment to Dr Jenny Bulstrode's paper 'Black metallurgists and the making of the industrial revolution', History and Technology (2023). A review of the technology used during the operation of Reeders Pen at Morant Bay Jamaica 1772 to 1783.

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ABSTRACT: In her paper, Dr Bulstrode's disclaims the traditional view that the rolling of iron was discovered by Henry Cort. Rather she attributes this to the enslaved working in a Jamaican foundry based on their experiences of crushing sugar cane. Whilst there is no evidence of rolling here, there are documentary exchanges between the Jamaican and British Governments which show evidence for the introduction of the making of malleable iron based on English practices developing at much the same time as the establishment of the Jamaican foundry at Reeders Pen.
As a result of a feared invasion in the 1780s the foundry was demolished and its reestablishment ignored. It is the resulting correspondence for recompense from the British Government that forms the bulk of discussion. When compared with the developing iron technology at the time there is common ground for assuming that this was exported to Jamaica by 1783.

A recent paper by Dr Jenny Bulstrode entitled *Black metallurgists and the making of the industrial revolution* has received over 40,000 on-line views (Bulstrode 2023). In this her main issue states that the process of the rolling of iron should be attributed to 'Black metallurgists' working in a forge and foundry established at Morant Bay in Jamaica (Reeders Pen) in 1772. According to Bulstrode, this process was based on their experience of crushing sugarcane through rollers (Fig. 1).

In Bulstrode's view, this denies the traditionally held view regarding Henry Cort's (1740–1800) patent of 1783 (Cort 1783). Until then, one would presume that 'drawing out' through hammering was the final process in the making of wrought or 'bar' iron. Bulstrode's speculation has received much on-line comment requiring little further discussion here (Howes 2023; Jelf 2025).

Nevertheless it should be stated that there is a hint of a process that predeceased Cort by some 50 years (Payne 1728) which involved passing bar iron 'between two large mettall rowlers which have proper notches or furrows upon their surface'. Although not taken up it questions Bulstrode's claim for the originality of the rolling of iron being derived from such as that shown in Figure 1.

Although evidence for rolling at Reeders Pen is doubtful, there is much that Bulstrode missed that points towards the evolution of Cort's better-known process of making malleable iron by the use of raw coal (Cort 1784). This paper therefore concentrates on this aspect as practised at Reeders Pen.

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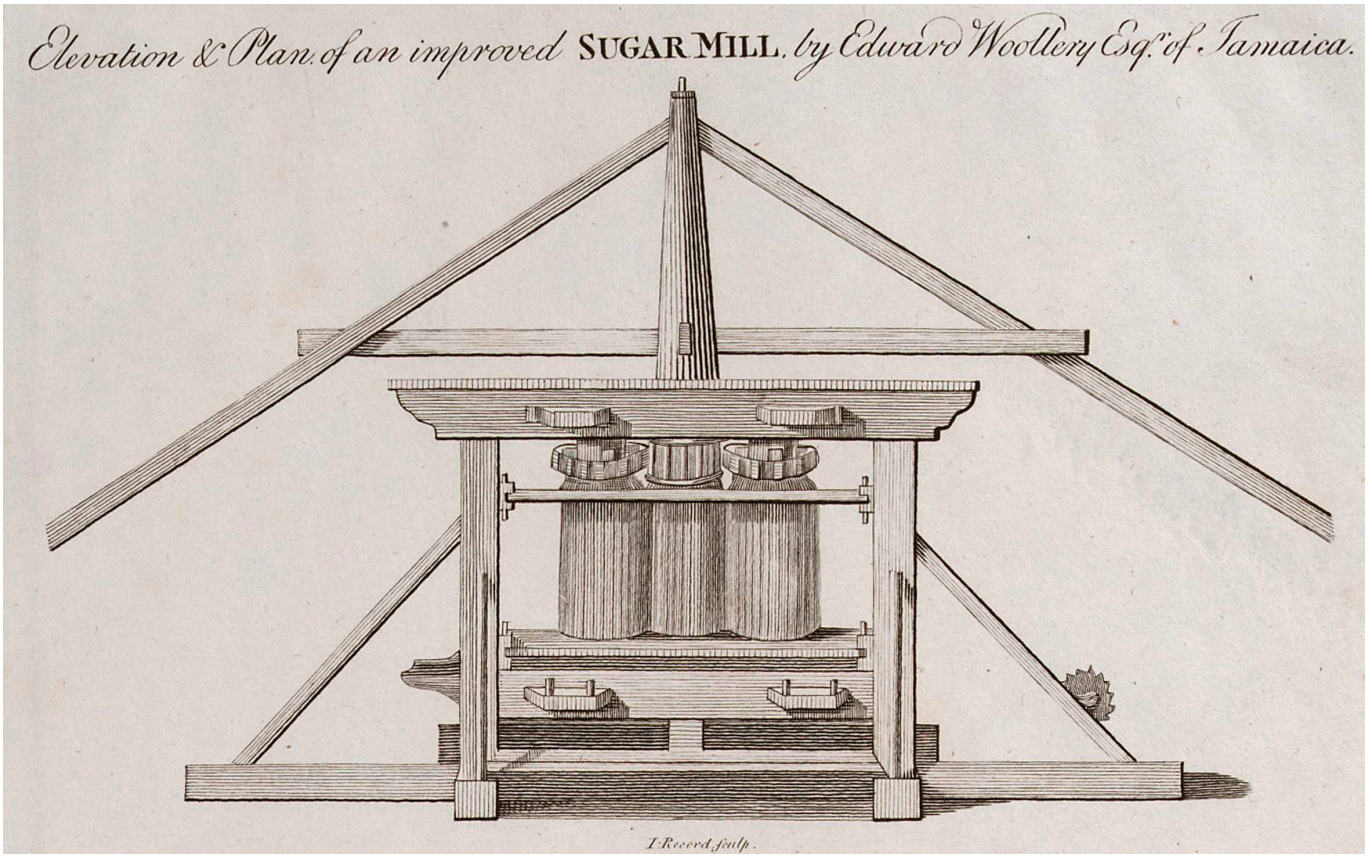

Figure 1: Elevation and Plan of an Improved Sugar Mill with vertical rollers (Edwards 1801).

Such a process was long sought after and when ultimately perfected was, in combination with Cort's rolling patent, to revolutionise the British iron industry. Although rolling did not take place at Reeders Pen, there is much that can be teased from the correspondence between the Secretary of the Jamaican Assembly (Stephen Fuller) and the British Government that shows mutual technological influences between Jamaica and England ultimately leading to the making of malleable iron by the use of coal (Devon Archives: 1160 M/C/J).

The evidence for this unravels as the result of an impending invasion from a combined French and Spanish force in 1782. If this invasion had been successful the foundry would have provided a source for munitions in the hands of an enemy. As a result it was ordered by the Governor of Jamaica that the plant be dismantled thus leaving only the following on the site which was ultimately put up for sale (The Daily Advertiser 1791).

> . 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.

Following the dismantling, John Reeder (the proprietor) was financially crippled and unable to continue with the prime purpose of supplying the planters

> ... with every Utensil they want on the shortest notice, whereas on the contrary, they are obliged to wait seven Months, at least, and then take whatever is sent whither it is executed to their directions or not nor will he be under the expensive necessity of keeping by him a double set of Utensils while there is a Manufactory in the Country (Devon Archives: 1160 M/C/J/16).

It was then, that following a bout of sickness, Reeder returned to find his forge and foundry in the limited state described above. That is 'levelled with the ground [with his] reverberatory furnaces [(Fig. 2)] demolished' leaving only a pile of refractory bricks (National Archives: CO 137/87, f. 254; Devon Archives: 1160 M/C/J/16). As a result of his pique Reeder therefore sought recompense for the actions carried out on behalf of Britain by the dismantlement: a protracted correspondence followed between the Secretary to the Jamaica Assembly (Stephen Fuller) and the British Government on behalf of Reeder. This was related to the initial costs incurred by Reeder and the potential losses due to the impending invasion. In queries put forward by the British Government, these

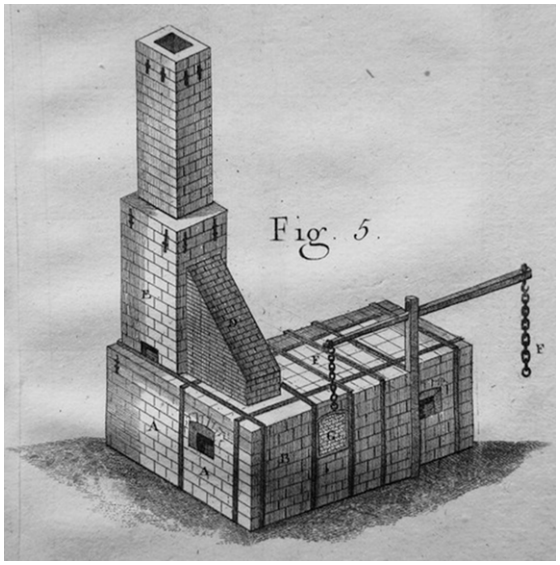

Figure 2: Air furnace or reverberatory furnace (Jars 1774, plate 6).

were stated as 'Want of iron', 'Want of coals', 'The difference of Labour' (Devon Archives: 1160 M/C/J/20). The 'want of iron,' related to its supply, was twofold: scrap and pig, which is explained by the following:

> In answer to which more than three thousand Tons [scrap] 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 in England from the abundance of wood being near to the Ore, which is very rich.

With regard to the 'want of coals' this was better explained as a matter of the type of fuel used in the above – mineral (coal) and wood (charcoal) –:

> Coals may be imported from Wales & Newcastle at a lower price than they are sold at in London. The advantage the Manufacturer has there which he has not in England are the low price of wood and Charcoal with Loam [flux in a blast furnace] on the spot (Devon Archives: 1160 M/C/J/20).

From these – type of iron and choice of fuel – one can deduce that both malleable iron and pig iron were being produced with the former supplied (in part) from scrap and the latter coming from off-site 'plantations'. Here the 'low price of wood and Charcoal with Loam on the spot' was made possible by large areas given over to woodland which could be worked to produce 'plantation iron' by self-sustaining communities under ironmasters.

The *very rich* 'Ore' was obtainable from such as '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. [and] erect mills and furnaces near and upon the rivulet' (Journal of the House of Assembly of Jamaica 1776).

There was thus recoverable scrap iron (probably malleable iron) which was possibly reworked in reverberatory furnaces at Reeders Pen in a similar manner to that described by Hayman (2004a, 56ff.). An alternative, or indeed a likely addition, was that of pig iron which was simply melted to make the castings known to have been an important product of the foundry. Hence, 'a large crane strongly bound with iron' would have been available for moving such as cannon, howitzers, mortars and cannonades (Devon Archives: 1160 M/C/J/2).

Much of the above function of the reverberatory furnaces is tied to the third point: 'The difference of labour'. This is significant with regard to the exchange of intellectual property which lies at the heart of Jenny Bulstrode's thesis related to the rolling of iron. However in this case it concerns malleable iron itself. At first sight, the following might suggest indigenous skills inherited from a Jamaican past.

> This is obviated by my being possessed of Negroes sufficient, many of which are perfect in every branch of the Iron Manufactory so far as relates to casting and turning Mill Cases, Cannon, Iron Boilers & & and in wrought Iron Anchors, Mill Gudgeons, Axels & & (Devon Archives: 1160 M/C/J/20).

However, it is reasonably evident that these skills originated in England and were transferred to the so-called 'Negroes' (Bulstrodes's Black metallurgists) as recounted by Reeder's daughter.

> On this my father went to England and procured artificers such as were necessary under whom his Negroes worked to become, in course of time, sufficiently acquainted with the business to dismiss all the White men but two & a perfect Foundry was established, where not only sugar utensils were made; but Cannon manufactured (Devon Archives: 1160 M/C/J/30).

Furthermore , the need for English expertise in constructing and maintaining reverberatory furnaces is evident in the following: 'that his [Reeder's] Machinery for making barr Iron since [the dismantlement] and will remain so *until proper people are procured from England to put it in order*' (Devon Archives: 1160 M/C/J/1).

Such a statement suggests that malleable iron was worked at Reeders Pen prior to 1782 in reverberatory furnaces based on an English pattern, possibly from Shropshire. Here in Shropshire, there was considerable effort made to find a means of making malleable iron using coal as a fuel. However in Jamaica, where woodland was abundant, it appears as a paradox to import coal from Wales & Newcastle as stated above. Nevertheless, it seems possible that the substitution of charcoal for coal might have been due to the higher calorific value of coal.

An advantage of the reverberatory furnace was the separation of fuel (in this case coal with all its impurities) from iron thus avoiding contamination. Apart from making castings from plantation iron brought to the foundry, alternatively malleable scrap could be revived. It also raises the possibility of blending with charcoal-rich plantation iron or even the process developed by the Cranage brothers with regard to 'barr' iron soon to be discussed.

It is thus suggested that the supply of coal was an important factor in the workings of Reeders Pen. It had the advantage of being shipped to Morant Bay from 'Wales & Newcastle at a lower price' as stated above. Furthermore, although plantation iron was made on remote sites, it used local ores and charcoal which did not travel well. There were thus good reasons for transporting the 'composite' of charcoal and iron ore as pig iron to be 'processed' at Reeders Pen.

As far as the chronology is concerned: the lease from the Belvidere planation west of the River Morant dates from 1772 but progress only really got into a full swing around 1776 at which time there were the intentions to work ore and 'erect mills and furnaces'. This was presumably followed by Reeder's recruitment of expertise from England. Previous to this there had been a growing need to find alternatives to charcoal in the making of malleable iron (see Hayman 2004b). Ultimately, it was Henry Cort who achieved this but there were such partial successes as those claimed by the Cranage brothers in 1766.

> The pig or cast iron is put into a reverberatory or air furnace, built of a proper construction, and, without the aid of anything more than common raw pit coal, is converted into good malleable iron, and, being taken red hot from the reverberatory furnace to the forge hammer, is drawn into bars of various shapes and sizes, according to the will of the workmen (Cranage 1766).

In spite of the doubt that the Cranage process was ever successful, it seems possible that something like it might well have been imported to Reeder's foundry and applied successfully –such was the process known as 'buzziing' in which scrap was a feature. Although the above is not proven, it does reopen the debate on the Cranage brother's influence on Cort's puddling patent.

The sequel to Reeders Pen is suggested by the intended sale of the site in 1791 but the debate for recompense rumbled on with a promise of a position for John Reeder. However, Reeder's daughter, Eliza Crosse, was still seeking satisfaction well into the next century.

Whilst we can extract a reasonable amount with regard to the production of malleable iron at Reeders Pen the matter of rolling is silent. This in itself suggests that the only 'evidence' relies on the fanciful ideas hypothesised by Bulstrode around grooved rolls used in breaking sugarcane and operated by the enslaved inspired by their related traditions (Fig. 1) .

Although not influential with regard to Cort's puddling process, what happened at Reeders Pen appears as an offshoot of what was going on in Shropshire at the time. Although short-lived, John Reeder's recruitment of artisans versed in Shropshire practice shows his dedication to the use of reverberatory furnaces and rejection of the traditional forge containing fineries and chaferies. At Reeders Pen, coal as fuel appears as important with charcoal relegated to the outback where it was plentiful.

Apart from the history of metallurgy there lies an interdisciplinary potential in which the division of processes – charcoal furnaces and outlying forge– can be studied alongside eighteenth-century business organisation and the transferal of skills and labour as practised between continents.

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The National Archives CO 137/87 FOL. 254

English Patents

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Thomas and George Cranage. A.D. 1766, No. 854.
Henry Cort. Manufacture of Iron, A.D. 1784, No. 1420.
Henry Cort, Preparing, Welding and Working Iron, A.D. 1783. English Patent No. 1351.

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Corrigendum to the comment by J. v. Laun, Historical Metallurgy 55(2), pp. 81–85.

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Preliminary note: All references to Devon Archives 1160 can be followed in full in Jelf, O. (2025). The origin of Henry Cort's iron-rolling process: assessing the evidence. *Historical Metallurgy 55*, 70–80. doi:10.54841/hm.674

In the above paper I discussed the exchanges between the Jamaica Assembly (Stephen Fuller) and the British Government regarding John Reeder's claim for compensation. This followed the dismantlement of Reeders Pen as a precaution against impending invasion.

In order to consider this the British Government asked for details around three points - 'Want of iron', 'Want of coals' and 'The difference of Labour' (Devon Archives M/C/J/20, see p. 83). Further examination of my paper makes it clear that there is greater depth to be drawn from the sources, such are those that can be perceived as 'fact' or alternatively those that might be perceived as 'desirable' and therefore open to the compensation sought if followed up. Such is the case with the 'Want of iron' – 'In answer to which more than three thousand Tons [scrap] in Jamaica useless to its Owners' is a statement of fact whereas 'Pig Iron may be obtained from the Ore on easier terms than it can in England from the abundance of wood being near to the Ore, which is very rich' implies the long redundant use of charcoal as fuel rather than coke as introduced by Abraham Darby in 1709. This then contains a certain naivety; possibly a hangover derived from bloomery practice and known to have been practised by indigenous Jamaicans.

Likewise, in the case of 'Want of coals' it is stated that they 'may be imported from Wales & Newcastle at a lower price than they are sold at in London'. This is followed by a backup statement concerning the 'low price of wood and Charcoal with Loam on the spot' which, because of the availability of loam, may refer to casting.

Much of the above is drawn together by the importation of skilled artificers (possibly from Shropshire) who trained-up a local workforce in what must be the use of the often-mentioned reverberatory furnaces (Devon Archives1160 M/C/J/30). Furthermore the mention of 'machinery for making barr Iron' and 'proper people' for its repair from England does suggest something approaching the Cranage brothers process (Devon Archives: 1160 M/C/J/1) (see p. 84).

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