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The competition within the slave trade during the 18th century forced slave traders to search for an assortment of barter cargo that would attract the preferential attention of the African suppliers of slaves. An enterprising group of Liverpool slave traders that formed William Davenport & Co. rose to the occasion and in three years became the supplier of half of all the glass beads re-exported to Africa from England. An analysis of barter values in Bonny, West Africa, reveals that glass beads were one of the main categories of trade goods of great interest to the African slave traders. The trade beads were primarily the products of Venice where the glass bead sector grew from at least 7% to over 70% in value of total Venetian glass exports from the late 16th to the late 18th century. While the sale of glassware in Venice slumped due to competition from other European producers, the bead industry prospered and manufactured tens of millions of units of conterie *and* perle a lume *beads per year during the second half of the 18th century.*

PART ONE: THE TRADERS

"Many have been the approaches that... our Resident has made to the British Court with the purpose of introducing a direct trade of glass beads... to the British Nation"[1] (Querini 1767:32v). Thus begins a report by Paolo Querini, one of the *Inquisitori alle Arti* appointed to oversee the various guilds of artisans and artists in Venice (Cecchetti 1866:342), sent to the attention of the *Serenissimo Principe* of the Republic of Venice on 26 September 1767, with respect to the activity of the Venetian Resident in London, Count de Vignola. "Vignola... proposes to his Excellency a trade with the Company of Liverpool... of glass beads from Venice, word that in English covers not only what we call in Venice *contarie* but also the manufacture of *suppialume* [*perle a lume*]"[2] (Querini 1767:36r).

Around this same time, Sir James Wright, His Majesty's Minister in Venice, in "a very secret and difficult manner," obtained copies of the reports being sent by Vignola to the *V Savi alla Mercanzia* (The Five Wise Men of Trade) in Venice regarding the glass bead trade to Liverpool (The National Archives: Public Record Office [TNA: PRO] SP 99/73:19r). The Senate of Venice delegated to the Venetian Board of Trade, the *V Savi* or *Cinque Savi*, the care of all matters relating to the trade of the Republic (Da Mosto 1937:196-197). To one of these copies Wright would add: "It seems our African Trade always suffers whenever we are not regularly supply'd with Beads: it is very certain that the indolence of the Venetians together with the number of their feast days prevent them from supplying us with the necessary quantity" (TNA: PRO SP 99/73:19v, 108v). A set of reports concerning the bead trade, among other things, was sent via confidential channels to the Secretary of State of the Southern Department, the Third Viscount Weymouth, and then to Lord Hillsborough, Secretary of State to the Colonies (TNA: PRO SP 99/73:19r).

Why was the trade in Venetian glass beads of such importance that it was reported in detail to the highest levels of authority in both the Republic of Venice and in England during the last half of the 18th century? To provide the answer, this study is divided into two parts since glass beads reflect the desire of England to optimize profits from the African slave trade on the one hand and the strategic need of the Venetian Republic to foster one of its remaining sectors of competitive glass exports on the other.

The Liverpool traders are represented by four individuals whose trading activity is well documented: William Davenport, William Earle, Thomas Earle, and Thomas Hodgson. Together with three other partners, they registered the firm of William Davenport & Co. (hereafter WD&Co.) in Liverpool in 1766, to provide glass beads and similar goods for the African trade. By analyzing the sales of WD&Co. within the context of total bead re-exports to Africa from England, it is possible to show that for a time, WD&Co. was the dominant bead trading house in England. Evidence also identifies WD&Co. as the "Liverpool Company" that attracted the urgent attention of the authorities of the Venetian State and elicited the subsequent covert reports from the English Minister in Venice. Glass beads were a

significant component of the barter goods shipped by the Davenport slave ventures to Africa. An analysis of the trading accounts of these African slave ventures reveals that glass beads were a manufactured trading good quite distinct from the notion of a cheap trinket with a barter value totally out of proportion to its cost for the European trader.

The producer in the second part of this article is represented by Murano and Venice, being pioneers in the technology and production of glass beads in Europe. Their entry into the Liverpool market proved that Venetian glass beads were able to compete against other bead-producing centers in Europe and avoided the fate of other Venetian glass exports of the period such as luxury transparent glass and large mirrors. A combination of technical expertise and experience coupled to mass production placed the Venetian bead industry in such a strong position in international markets that it became the leading glass export category of Venice during the second half of the 18th century (Trivellato 2006:143-183).

Following the period of disruption caused by the American War of Independence, the re-export of beads from England to Africa did not regain its pre-1780 levels and thus the demands of the English market for Venetian beads decreased substantially. The heady days of William Davenport & Co., "Merchants of Liverpool, for carrying on the trade of selling Beads, Arangoes, Cowries, Corrall or any other article, probably for the African Trade," were now over (Earle Papers [EP] D/EARLE/4/2).

Glass Beads and the Slave Trade from Liverpool, 1750-1800

Between 1751 and 1800, approximately one million slaves were traded by ships outfitted in Liverpool (Trans-Atlantic Slave Trade Database [TSTD]). During the early part of this period, there is no evidence of any special interest in glass beads in Davenport's trading activities. The entries for sales in the surviving Waste Book begin in 1747, while the first entry for the sale of glass beads only appears in April of 1761. The amounts throughout are modest and in many cases Davenport is simply earning a commission on beads supplied by a third party such as Robert and Elizabeth Vigne of London, the firm of William and James Manson & Co., or through a "Bead Account" on the Isle of Man. Annual amounts between 1747 and the last entry in June of 1766 went from less than £5 per year through an unremarkable increase during 19 years of business to over £200 a year. On this evidence, it would be very hard to predict that in two years time Davenport would be part of a major international glass-bead business with annual sales around £10,000 that would attract the interest of the *Serenissimo Principe* of the Republic of Venice. The first indication of the new expansion in the trading horizon of Davenport is in one of the last entries of the Waste Book which reads "Bead Account in Company with Will. Earle & Co." and "To Earle & Hodgson for 1/6 part of Beads" (Davenport Waste Book).

Other actors were now playing a decisive role in this new direction of Davenport's trading career. Enter first the Isle of Man. Situated conveniently close to the shipping lanes out of Liverpool, it profited from a duty-free status on goods loaded from its port. It played a major role in the provision of duty-free European cargoes (including glass beads) ordered through retailers such as Vigne & Co. that were loaded onto slave ships bound for the African coast sailing from Liverpool. In 1765, however, the nature of the trade with the Isle of Man changed substantially when the tax-free status came to an end (Morgan 2007:21-22). The opportunity thus presented itself for the entry of a new and more reliable source of glass beads from Europe with a similar fiscal incentive as the Isle of Man had provided until then. As will be seen, the combined efforts of WD&Co. and Count de Vignola provided such an option.

The Earles and the Italian Connection

Of the partners who signed the articles of agreement for WD&Co. on 24 July 1766 (William Davenport, Peter Holme, Thomas Hodgson, Ralph Earle, Thomas Earle, William Earle, and John Copeland), one family name and its inner circle stands out as bringing to the business a longstanding commercial relationship with Italy; i.e., the Earles, together with Thomas Hodgson, their business partner in Leghorn, and John Copeland, a brother-in-law. Thomas Earle and Thomas Hodgson brought to WD&Co. the unique opportunity to import directly from Italy the glass beads manufactured in Venice, using their established channels of trade and freight between Leghorn and Liverpool.

The younger Earle brother William, four years older than William Davenport, had gained very valuable trading and bartering experience as captain of a slave-trading vessel (Pope 2007:198). Part of his trading correspondence has survived and provides valuable insight into the obstacles faced by slave traders putting together cargoes via the Isle of Man. One series of letters begins with an order for a specific set of beads placed on 22 August 1760 with Peter Abraham Luard, his bead supplier in London. One month and much frustration later, the sense of urgency created by the lack of just 250 bunches of beads (called "pipes" in his letters) for his cargo is evident in the following letter [italics added for emphasis]: "I am surpris'd the goods you had already

packed did not come out... if you cannot buy or borrow 150 Bs [bunches] of purple pipe... also 100 dark dove pipe... we must be content to go without them... *but for the want of them for assortment may ruin a voyage*" (EP D/EARLE/2/2). The potentially ruinous consequences for this slave voyage in not loading at the most some 500 kg of beads, representing less than 0.5% of a minimum average cargo weight (100 tons) for a slave venture, is a telling indication of the importance given to beads as barter cargo. The need for beads could even justify a further provisioning at the Isle of Man. On 23 November 1764, William Davenport instructed the captain of the *William* to stop at the Isle of Man to pick up "a parcell of Beads... [and then] make all the Dispatch from thence... [to] the River Gambia." In fact, the *William* was already carrying £232 in beads and the parcel would add another £58 in cargo value so, that for this particular voyage, beads represented 18% of total cargo value (Davenport Accounts).

The Marketing Success of William Davenport & Co.

To better judge the change in the business paradigm that WD&Co. brought about in England for a short time in the marketing of glass beads for re-export to Africa, it is necessary to place it in the context of other sources of glass beads for the slave traders of Liverpool during the second half of the 18th century. The traditional retail channel for beads is exemplified by the Vigne family which carried out business during the whole of the period in question. Thus, on 1 June 1765, Robert Vigne sent a letter to the Treasury requesting a licence to import a "parcel of bugle [tubular glass beads]" that had been caught up in the change of the tax status of the Isle of Man (TNA: PRO T 1/451/143-144). Forty-one years later, on 15 January 1796, the cargo manifest for the vessel *Armonia* that arrived in the Port of London from Venice listed a shipment of "five barrels of *conterie* beads" and "three chests of *perle a lume* beads" for the attention of "Robert Vigne, an English subject"[3] (Cinque Savi Consoli). Retailers such as the Vignes would obtain their beads in Europe and supply them to clients in England. Other similar intermediaries that figure in the supply of glass beads for slave-trading ships sailing from Liverpool were Peter Abraham Luard (EP D/EARLE/2/2), the Mansons (TNA: PRO PROB 11/931 and PROB 11/1176), and the Fonseca brothers (Dumbell MS-10-50 [1-2] and MS-10-51). Beads were not necessarily the only stock of these middlemen supplying the slave trade. As the trade with Venice grew, there is evidence that at least one Venetian bead manufacturer tried to establish direct trade with the slave traders of Liverpool (Inikori 1973:124).

WD&Co. represents a complete break from the approaches outlined above and arguably had no equal in the glass-bead trade in England during this period. First of all, the majority of its partners were active slave traders, thus bringing to the glass-bead business their practical knowledge regarding the best choice of beads for barter in Africa and their prior experience in the outfitting of slave ships. They also set an example for their peers in Liverpool regarding the successful use of beads in the assortment of cargoes bound for Africa, as can be observed from the listing of their major bead clients in the Davenport Bead Book: William James, William Boates, Robert Green, Chris Hasell, Miles Barber, and Samuel Shaw among others, all among the major slave traders of Liverpool (Morgan 2007:14-42). In addition, they were able to use their business connections in Italy to profit from the interest shown by Venice in becoming their supplier of beads. Without having to invest capital in new fixed overheads, they could use their existing export/retail infrastructure and freight arrangements between Italy and Liverpool to quickly incorporate glass beads into their marketing activity. These major advantages would help to quickly set them apart from the traditional bead suppliers plying the slave-trade business.

Where did WD&Co. obtain its beads? Vignola had managed to obtain permission from the English Parliament to warehouse Venetian beads destined for re-export for up to five years without having to pay any duty. He tied this very important concession to the fact that now "the Dutch cannot sell second-hand and contraband [beads] to England" and to the formation of "a rich company of merchants in Liverpool" who, from the start, had been building a direct trade with Venice as a source of glass beads "for a useful trade with Africa" (TNA: PRO SP 99/73:111r).[4] This "Liverpool company" can be identified as the WD&Co., as revealed in Vignola's letters. In one, he invited Mr. Copeland of the "Liverpool Company" to come to London to observe the quality of Venetian beads. He quotes from a letter received from Mr. Hodgson, "Director of the Company," where "the Director avows that the [Venetian beads] are <u>not only well made but superior to</u> [the beads] <u>made in Bohemia</u>"[5] (TNA: PRO SP 99/73:112r).

Vignola then emphasized the need to match prices in order to dominate this market: "it is true that if Venice... finds a way to [offer the same prices as] the products of Bohemia... it will attract in the future all the orders from London, Liverpool and Bristol"[6] (TNA: PRO SP 99/73:113r). Vignola wrapped up his account of a successful trade promotion by informing the *V Savi* that the Liverpool Company will order a substantial quantity of beads, paying 5% more than what they paid for Bohemian beads. The reasons for the premium may lie in a previous letter where Vignola mentioned that the Liverpool Company was requesting 18 months credit on bead purchases (TNA: PRO SP 99/73:45v).

On 28 June 1768, Thomas Hodgson wrote to Vignola to explain the obstacles to shipping from Nuremberg due to local problems with the Rhine princes and the King of Prussia, so this was an opportune time for Venice to provide an alternate supply source. He proposed sending a 120-ton ship to Venice to load a cargo of beads as a first step in establishing a direct trade with Venice (TNA: PRO SP 99/73:101r-102v, 105r-106v). The Vignola papers thus reveal that WD&Co. did not purchase beads directly from Venice to any great extent until 1768, Bohemia apparently being the main supplier, though this does not rule out an indirect supply of Venetian beads prior to this date.

No further archival documentation concerning the supply of Venetian beads to WD&Co. after mid-1768 has been encountered. The level of bead sales between 1768 and 1770 indicates that WD&Co. had not only solved the problems of supply via the Rhine but that it was able to substantially increase the amount of beads being supplied to the English market and at the right price to maintain market growth. While it is not certain whether Venice managed to capture *tutte le commissioni* as predicted by Vignola, there is no reason to doubt that Venice achieved its purpose of establishing a direct supply of beads to the English market via WD&Co.

To measure the market impact of WD&Co., Table 1 compares company sales as registered from mid-1766 to early 1770 (Davenport Bead Book) with the re-export of glass beads from England to Africa during the same period (Johnson 1990:78-80). By 1769, WD&Co. held 48% of the market, a remarkable feat for a new supplier that had only come into existence in mid-1766. The traditional bead traders would probably have held on to at least their historic level at approximately 20% of the market, which corresponds to the £5,000 baseline in re-export sales observed from the 1720s to the 1760s (Figure 1). Even if there had been a single additional trading house along the lines of WD&Co., the remaining market share would have been 30% at most. It seems more probable that the market was divided equally between WD&Co. on the one side and all the other glass bead traders on the other.

Prior to WD&Co., the growth in the English slave trade between 1745 and 1766 did not see a correlated expansion in bead re-export activity. In mathematical terms, the linear coefficient of correlation between the data relating to the slave trade and the total re-export of beads to Africa was 0.02 during the period 1721-1751, 0.47 during 1751-1765, 0.85 during 1766-1783, and -0.11 during 1784-1795. This confirms that the only clear correlation between slave trade activity and the value of bead exports corresponds to the period between the entry of WD&Co. into the market in 1766 and the crash of 1780. WD&Co. fostered a new level of demand by offering a local and ample supply of beads as evidenced by the entries in the Davenport Bead Book, which coincided with the increase in the slave trade from Liverpool. It is further argued that WD&Co. responded quickly to market constraints in supply by profiting from the desire of Venice to become a supplier to the English market.

Table 1. Market Share of WD&Co., 1767-1770.

Period	Sales WD&Co.	Bead Exports to Africa	WD&Co. Market Share of Bead Re-exports to Africa
	£		%
July to December 1766	942	n/a	n/a
1767	5,504	20,747	27
1768	9,022	24,614	37
1769	12,417	25,690	48
January to July 1770	8,710	n/a	n/a
1770 (projection)	< 14,900	19,338	< 58

Note: 1770 would register a sharp decline in exports, so a projection based on mid-year results may overestimate the total annual sales. In 1770, sales in seven months reached the level of the total sales of 1768.

Sources: Davenport Bead Book; Johnson 1990:78-80.

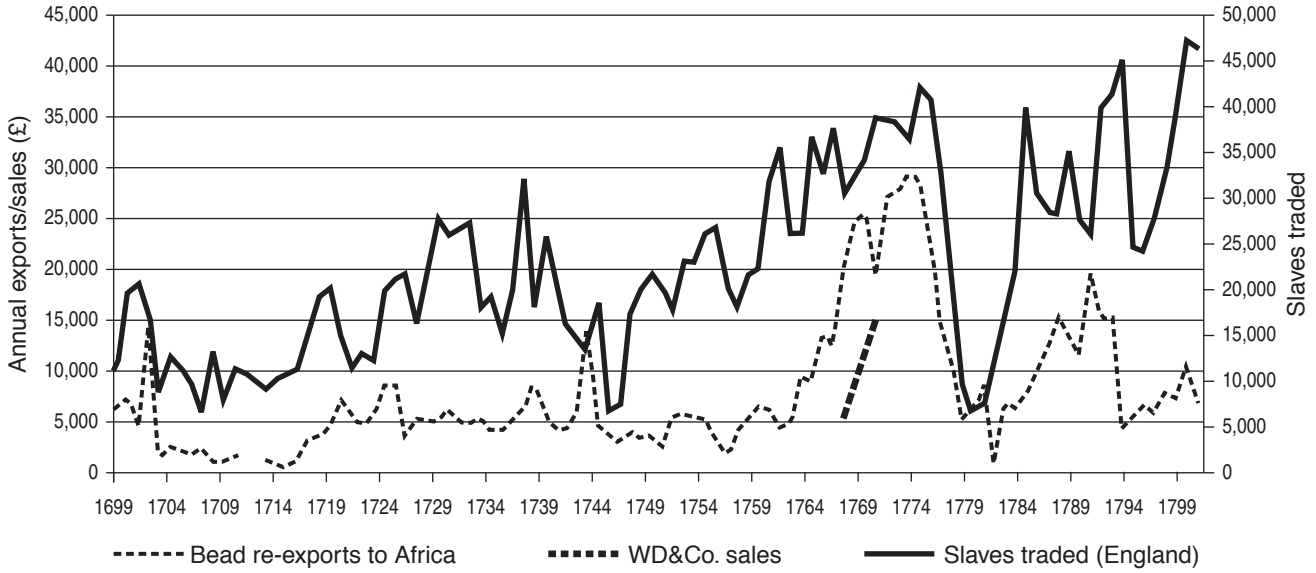

Figure 1. Historic trends of slaves traded on English ships and the concurrent bead re-export market (Davenport Papers, Bead Book; Johnson 1990:78-80; TSTD).

What happened after the crash of 1780 that significantly reduced the size of the bead market in England? After 1773, WD&Co. is no longer identified as the supplier of beads in the Davenport invoice books for the slaving voyages, its place being taken by Copeland & Co. The last annotation in the Bead Book in July of 1770 reads in part: "the new Sales Book... was delivered to John Copland," which may indicate a new distribution of responsibilities among the associates (Davenport Bead Book). No register of dissolution has been found for WD&Co. and the disappearance of Davenport from the company name after 1773 remains an open question. The period after 1780 also corresponds to the passing of the Earle generation that had created the unique bead-trading house. Thomas Earle died in Leghorn in 1781, followed by William Earle in 1788.[7] The bead market in England would never regain the dynamic it possessed following the creation of WD&Co.

The Supply of Beads from Venice

To establish a reliable supply of beads from Venice to Liverpool, Venice had to be able to satisfy the potential demands of the English market at a price that would allow the beads to compete with other trade goods. England imported the majority of the glass beads used in the barter trade with Africa (Johnson 1990:58). Venice was not the only supplier and was competing with Bohemia, if not other sources. One way to establish an order-of-magnitude correlation between the demands of the English market and the export potential of Venetian glass beads is to compare the value of re-exports from England to Africa and the sales of WD&Co. with the total value of Venetian bead exports to Western Europe as registered with the Venetian customs authorities converted to pounds sterling (Trivellato 2000: 230-231).

In order to compare these data in a single graph, an exchange rate of 5 Venetian Ducats to the pound sterling has been utilized even though it corresponds to the rate calculated by Rapp for 1650 (Rapp 1976:136). Additionally, the cost of freight between Venice and the ports in England has been ignored. Both assumptions can be optimized but they are useful approximations to arrive at a general overview of the supply capability of Venetian bead producers in respect to the demands of the English re-export market.

Prior to 1780, the English bead market represented approximately 50% of the value of the bead exports from Venice to Western Europe (Figure 2). The other customers included France, Portugal, Spain, and Holland. Since Vignola actively courted the English market, the suggestion is that Venice was not exporting enough beads to England, or to other destinations, to the limit of its production capacity prior to 1767. After 1780, the English market for beads declined, which may explain the disappearance of WD&Co. As of that date, Venice and Liverpool/England went their separate ways, the former maintaining a variable level of glass bead exports to Western Europe as its lowest range surpassed the needs of the English market.

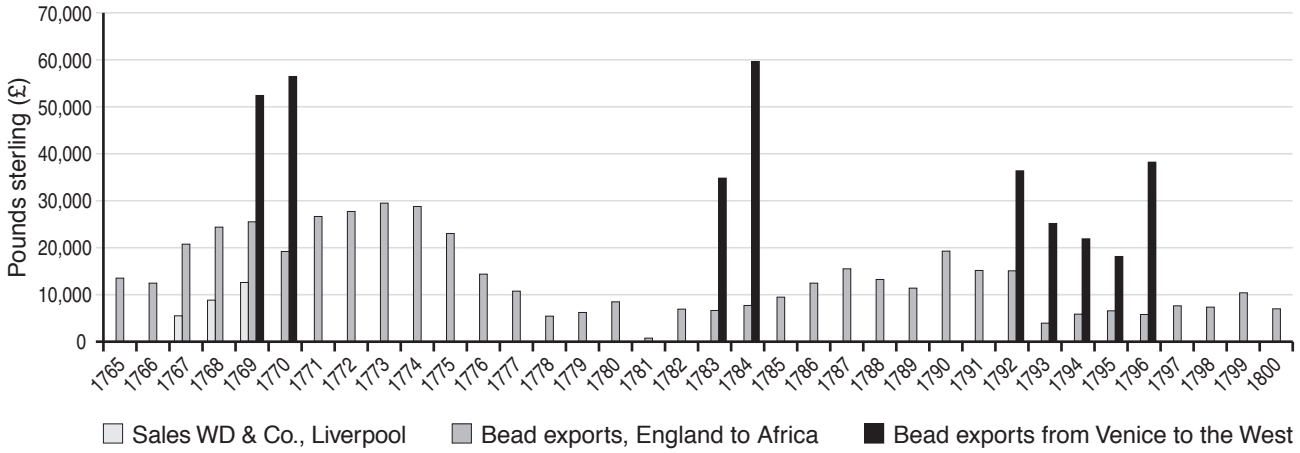

Figure 2. English demand and the Venetian supply of glass beads (the West includes England, Spain, France, and Holland)(Davenport Papers, Bead Book; Johnson 1990:78-80; after Trivellato 2000:230-231).

The WD&Co. Pricing Policy for Glass Beads

The pricing of glass beads in the English market determined if they could generate the required level of profit to become a major category of barter goods for trade with Africa. This is not a condition that can be taken for granted, since the glass recipes for beads were the most expensive of Murano, and the labor required during the manufacturing process was intensive.

Table 2 compares the values for pricing Venetian glass beads during the second half of the 18th century that are relevant to the present discussion. The information is derived from the following sources: a) a letter dated 1782 from Giovanni Cimei, trader of Loreto (Italy), to Girolamo Rossetti, a glassmaker on Murano requesting a shipment of various types of *conterie* at specified prices (Inquisitori di Stato); b) the accounts of the individual slave voyages kept by William Davenport that register the prices by weight of the beads in the cargo (Davenport Accounts); and c) an original in English and an accompanying translation into Venetian Italian of an offering of "Coloured Glass Beads, 6 Boxes, in Time, in 6 Lots, at 2s. per lb." in London in 1782 (Inquisitori di Stato).

The letter from Loreto is a very useful guide to the determination of value in the marketing of beads in Italy. *Conterie* were sold wholesale at 14 *soldi* a *libbre sottili* to a trader in Loreto who then set an obligatory minimum retail price to the public of 24 *soldi* a *libbre sottili*, below which the shopkeepers in Loreto were not allowed to sell.[8] Assuming a similar mark-up was applied further on, this would suggest a FOB cost in Venice of around 8 *soldi* per *libbre sottili* minus distribution costs to Loreto.

In Liverpool the price recorded for the beads loaded as cargo on the Davenport slavers was on the order of 9 pence a pound (equivalent to a *libbre grosso*).[9] This included

Table 2. Prices of Venetian Beads, 18th Century.

Market	Period	Price in *Soldi*	Unit of Weight	Type of Bead
Loreto wholesale	1782	14	*libbre sottili*	*conterie*
Loreto retail		24		
WD&Co. FOB Liverpool (1)	1768 – 1782	15 23	*libbre sottili* *libbre grossi*	*perle a lume* and *conterie*
Other Retail London (2)	1786	39 62	*libbre sottili* *libbre grossi*	not specified

Notes: (1) Based on 9 pence a pound; (2) based on 2 shillings a pound.

Sources: Loreto and London prices from Inquisitori di Stato; WD&Co. price from Davenport Accounts.

freight from Venice, the cost of warehousing in Liverpool, and the profit margin of WD&Co. This price corresponded approximately to 23 *soldi* a *libbre grosso* or 15 *soldi* a *libbre sottili*, based on a currency exchange rate of 5 Venetian ducats to one pound sterling (Rapp 1976 :136). Beads in Liverpool up to the early 1780s were thus sold retail at just over the wholesale prices in Loreto in 1782. This suggests a very aggressive marketing policy of WD&Co. that aimed at market share rather than unit profit. That WD&Co. could adopt this marketing strategy is a reflection of their control of business costs and of their purchasing power.

If the London bead prices of 1782 shown in Table 2 are in any way indicative of how bead prices evolved in England after 1780–with glass beads being offered at 2 shillings per pound instead of the 9 pence offered previously by WD&Co.–the increase in price (nearly 170%) would have significantly lowered the gross mark-up that a slave trader could expect from beads as barter cargo. In order to better understand the economic impact of WD&Co.'s pricing strategy, the following sections will address the economic factors regarding the use of glass beads in the Liverpool slave trade.

Glass Beads in the Trade Cargo of Liverpool Slavers

Why were glass beads of such interest as a barter cargo for the English slave trade? The historiography of the slave trade is ambiguous in attaching any importance to glass beads (Thomas 1997:313-329). In contrast, the empirical evidence leads to the following conclusion: "The main categories of goods in demand were as follows: cloth and beads, iron bars, brass rods and brass bowls, alcohol and tobacco, guns and gunpowder... a considerable number of beads was generally included in the cargo" (Johnson 1976:15-21). Johnson (1990:54-63) published statistics that show that bead re-exports from England to Africa in the 18th century reached a total of £0.8 million, a sum on the order of magnitude of copper and brass (£1.4 million), gunpowder (£1.5 million), and iron and steel (£2.3 million). In Richardson's (1979:303-330) breakdown of the 8 categories of barter goods for the African slave trade based on a detailed analysis of over 90 slave-trading accounts, glass beads figure prominently. His data confirm that textiles were always the principal trading good offered to Africa. Data published by Davies (1960:350-357) and Richardson (1979:312-315) reveal that their share of total cargo value of exports to Africa dropped by some 40% from the time of the Royal Africa Company to the slave trade from Liverpool, as evidenced in Table 3. Beads and other barter cargo increased their importance as exports from Liverpool at the expense of textiles. The export value of glass beads was, on average, greater or equal to that of gunpowder, cowries and spirits, arms and iron, and only brassware and textiles showed a greater presence.

Credit terms were not the same across the range of barter goods according to the Davenport accounts. Spirits and cowries were purchased mostly on cash terms (only about 5% of their total value was sent on credit to Africa). Beads and arms were also for the most part bought on cash terms (only around 12% was sent on credit), while iron and brassware were purchased on a combination of cash and credit. In contrast, textiles and gunpowder were items mostly shipped on credit (Table 4). It is a measure of the market strength of merchandise such as beads when it could command cash terms in the face of competition from other products being offered on credit.

The Profit from Glass Beads in West Africa

As a rule, slaves were bartered for a basket of goods on "the principle of Assortment, according to which the cheap goods were acceptable only if accompanied by more expensive goods" (Johnson 1966:202). A balance was struck between the imposition by the trader of certain kinds of goods and the reticence of the African slave trader to accept them unless compensated with the goods he actually preferred. This bargaining was played out in the face of strong competition between European slave traders: "Dec 1st 1769... anchored in Whydah... where were 5 portuguese & 2 French vessels" (EP D/EARLE/1/4). Whatever could give the slaver an edge in a barter market would result in a faster turn-around time for him and lower the risk of insurrection, attack, and disease as well as increase the overall profits of the venture by decreasing running costs and the timing of the overall cash-flow cycle.

The historiography concerning the profit from beads in Africa includes reports such as "For Europeans, whose aim was to maintain maximum profits with a minimum commitment of manpower and resources, glass beads, exchanged for... African... slaves... yielded enormous margins–1,000 per cent was the return on investment according to a source in 1632" (Dubin 2006:106). In 1723, Savary de Brulons reportedly claimed that one slave could be bought with 2 kg of beads, approximately the weight of one bunch (Trivellato 1998:69-70). Even at the high price of two shillings a pound for beads (around nine shillings a bunch), this would be a four-digit percentage range of gross mark-up for any barter value of a slave over £5. Is there any substance to the notion that glass trade beads were a cheap cargo that was grossly overvalued during barter in Africa?

In order to proceed further on the matter of profit from the barter trade in beads, it is necessary to define how

Table 3. Value Share (%) of Main Slave-trading Cargoes.

	Beads	Iron	Brassware	Textiles	Gunpowder	Arms	Cowries	Spirits	Other	Total
RAC	2.1	7.3	6.3	47.2	2.9	3.4	6.4	(1)	24.4	100
L	7.7	7.7	14.3	27.9	5.4	6.5	7.1	5.2	18.3	100

Notes: RAC is the percentage of cargo values exported by the Royal African Company averaged over the periods 1674-1676, 1680-1685, 1688-1698, and 1701-1704. (1) the data for spirits are included under "Other." L is the percentage of cargo value as reported in available records from Liverpool slavers averaged over the period 1755-1800.

Sources: RAC adapted from Davies 1960:350-357; L from Richardson 1979:312-315.

Table 4. The Role of Cash and Credit, Davenport Ventures, 1761-1783.

	Beads	Iron	Brassware	Textiles	Gunpowder	Arms	Cowries	Spirits	Other	Total
% Disbursement	14	17	4	4	< 1	14	9	17	21	100
% Notes	12	28	48	85	80	11	4	5	48	n/a
% Total Value Cargo	8	10	17	28	5	5	7	6	14	100

Notes: % disbursement is the percentage of cash outlay per category of goods with respect to total cash outlay on goods: this provides an indication of the perceived opportunity cost of each category of goods to the slave trader; % notes is the percentage of credit extended to a particular category of goods with respect to the total expenditure in that category: this provides the debt to equity ratios (financial leverage) for each type of goods; % total value cargo is the percentage breakdown of total value for each category of barter goods over total cost (cash plus credit) of barter goods, used as a crosscheck with published data (L in Table 3 above).

Source: Davenport Accounts, average of 61 slave trading ventures.

this profit was estimated. To begin with, the overall net accounting profit from the Davenport ventures has been proposed by Richardson (1976:62) at around 8%. Since beads represented on average 8% of total cargo value, these two values by themselves contradict any claim to a four-figure net accounting profit from the barter of glass beads.

It can be argued that the high-percentage profits reported in the historiography of glass beads were not calculated from a detailed accounting of total revenues and expenses but represent a trader's rule-of-thumb estimation of the gross mark-up between the prime cost of barter goods (such as glass beads) and the final revenue from the sale of slaves. This gross mark-up does not include the cost of the voyage, economies of scale with regard to ship sizes, the practice of over-invoicing, nor the impact of using credit to potentially aim at a higher profit on every cash amount expended (by financial leverage) on certain goods. It treats all goods as having a similar barter value in Africa, which was not the case. The index, with all its drawbacks, at least identifies a ceiling for the range of profits a slave trader could obtain on his assortment of barter cargo. Figure 3 shows the distribution of mark-up percentages for each of the 51 Davenport slave ventures where there was sufficient data to calculate the index.[10] On average the mark-up was 162% and it can be seen that few of these voyages managed to reach values over 400%.

It can be argued that this conception of a gross mark-up does not reflect the fact that barter goods had a barter value in Africa that was independent of their prime cost in Liverpool. Thus beads may have been sufficiently overvalued in Africa compared to all other bartered goods so as to reach four-figure mark-up values. Goods in Africa were traded according to local systems of valuation at the point of barter; e.g., the ounce and the bar, among others (Johnson 1966:197-214; Law 1991:239-257). Unfortunately most of the slave trade account books researched for this article (around 80) only included the prime cost of the merchandise for barter and the final value of sales of slaves, ivory, or palm oil in pounds sterling. To date, only two account books of Liverpool slaving ventures during the period of interest have been found that include the prime cost, the barter value expressed in bars at the destination in Africa, and the value

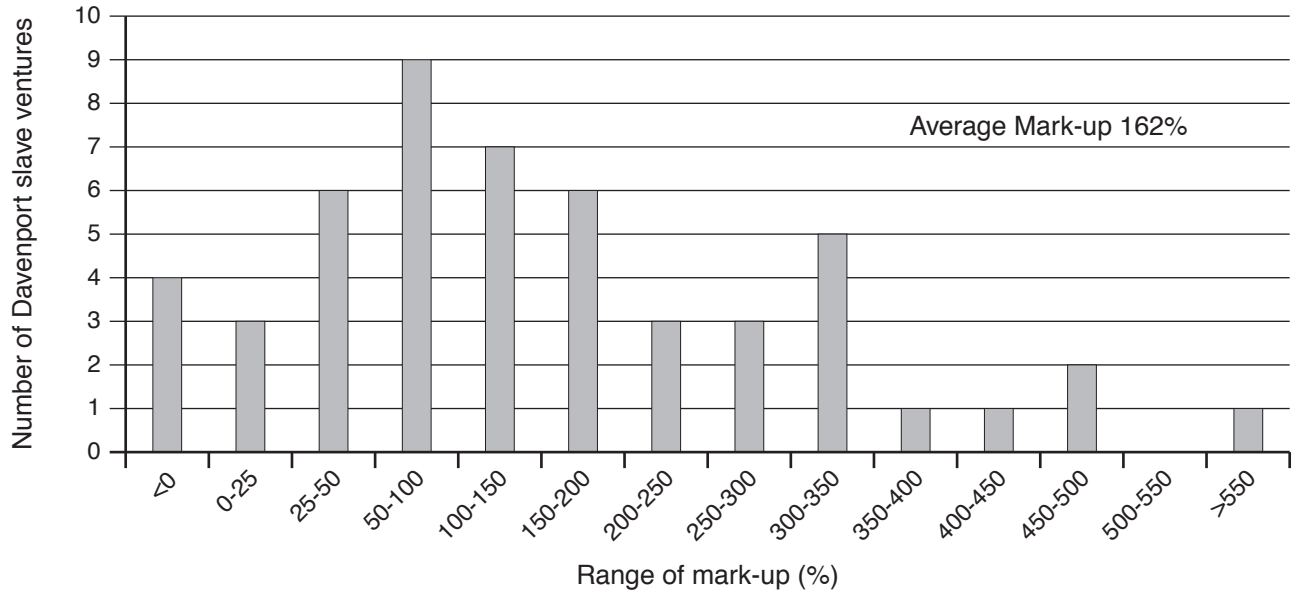

Figure 3. Mark-up on total barter goods of 51 Davenport slave ventures, 1761-1783 (Davenport Papers).

of slaves sold in the New World. These accounts relate to two voyages of the slave ship *Earl of Liverpool* to Bonny, West Africa, in 1797 and 1798 (Dumbell MS-10-50 [1-2]).

Based on these accounts, Figure 4 compares the percentage share of total cargo value based on the prime cost of the main barter cargoes compared to the same share calculated on the basis of the barter value (expressed in bars) in Bonny.[11] Gunpowder is the cargo category that increases the most in relative value on arrival, with beads a strong second. Firearms keep their valuation at destination. Textiles

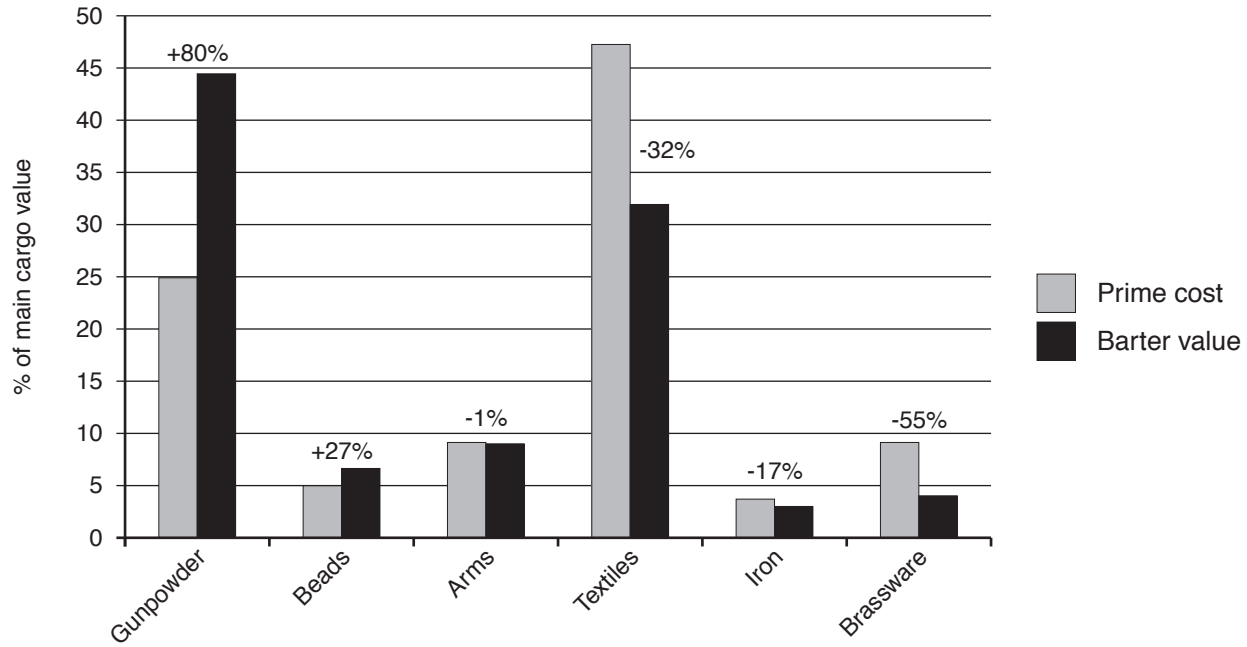

Figure 4. Change in relative values of slave-trading cargoes at Bonny, West Africa; *Earl of Liverpool*, voyages of 1797 and 1798 (Dumbell MS-10-50 [1-2]).

lose one third of their value relative to the other goods. Iron and brassware lose one sixth and one half, respectively, of their relative value at origin.[12] If the comparison is now made as to how many bars at Bonny could be bartered for every pound sterling of prime cost of the different cargo categories (Figure 5), it becomes clear that beads constituted a very attractive component of the export cargo on these two voyages, second only to gunpowder. For a slave trader looking to enhance the barter value of every pound sterling spent in Liverpool, glass beads were certainly one of the best choices according to these data.

For at least these two voyages, it is now possible to determine the order of magnitude of the gross mark-up for glass beads and other individual barter goods based on the actual barter value in Africa. Each category of cargo is assigned its deemed contribution to total revenues for sales of slaves in the New World in proportion to their share of total barter value expressed in bars, as shown in Table 5. This allows a calculation of mark-up based on barter value at Bonny, not on prime cost in Liverpool. In figures rounded off to the nearest ten, Table 5 shows that gunpowder (830%), beads (560%), and arms (420%) achieved the highest gross mark-up, while textiles (250%) and brassware (140%) achieved the lowest. The average mark-up for the two voyages is 420%, thus placing it above the average indicated in Figure 3. Barter trade is location specific and the records from two voyages cannot be taken as representative of the whole bead-trading business in Africa during the 18th century. The figures in Table 5, together with all the other facts regarding net and gross profit levels of the African slave trade, do, however, point out the need for caution when interpreting statements in the historiography that imply unique four-digit profit levels for just glass trade beads.

For the *Earl of Liverpool* ventures, gunpowder generated much greater profits than glass beads and probably only safety concerns imposed a ceiling on the amount taken on board for each voyage. Textiles on credit, rather than beads bought on cash terms, would have surpassed a 2,000% gross margin of leveraged profit for the two voyages. The greatest advantage that can be claimed for beads on the basis of the available data is that–according to Table 5–beads could command a premium on barter of around 30% over the prime cost. Given that the Davenport voyages present an average mark-up of 162% and if Bonny is representative of the barter value of beads throughout West Africa during the second half of the 18th century, then the mark-up on beads would not have exceeded 200% on average for a slave trader such as Davenport and associates.

Would a rise in the prices of beads have influenced the decline in the bead re-export trade after 1780? Based on the available data, the price elasticity of the beads used in the slave trade cannot be calculated. It is, however, possible to state that if prices had increased after 1780 (e.g., from the 9 pence per pound in the Davenport accounts to 2 shillings or more per pound), they would have impacted significantly on a gross profit that was not much greater than that of any other barter good according to the Davenport accounts. In other words, beads were not overvalued goods at barter that could have withstood significant price increases in Europe. Glass beads were a type of item that the Africans could relate to culturally, which is why beads were so useful in making an assortment of goods more appealing at barter.

Figure 5. Average barter value in bars at Bonny per pound sterling of prime cost, *Earl of Liverpool*, voyages of 1797 and 1798 (Dumbell MS-10-50 [1-2]).

Table 5. Estimates of Gross Mark-up of Main Barter Goods, *Earl of Liverpool*, 1797/1798.

	Prime Cost	Barter Value	Value Share Based on Bars	Revenues From Slave Sales Pro-rated to Bar Values	Gross Mark-up Based on Bar Value
	£	Bars	%	£	%
Beads	250	2,299	6.8	1,649	560
Textiles	2,231	10,889	32.1	7,811	250
Brassware	428	1,410	4.2	1,011	140
Arms	432	3,120	9.2	2,238	420
Iron	183	1,103	3.3	791	330
Gunpowder	1,161	15,113	44.5	10,841	830
Total	4,683	33,934	100.0	24,343	

Source: Dumbell MS-10-50 (1-2).

PART TWO: THE BEAD PRODUCERS

If Venice had not been able to consolidate its presence and strength in the bead export market during the previous centuries, it would not have been in a position to benefit from the marketing success of WD&Co. The authorities of the Republic of Venice correctly judged that the inherent strength of the glass-bead industry could offset the weakness shown by the other sectors of the glass industry (e.g., mirrors and luxury transparent glass) and thus merited its full diplomatic support in the effort to penetrate the English market. Even if Bohemia may have taken the lead to supply WD&Co., a joint effort by State officials and the private glass manufacturers of Venice was able to fight back and gain market share from its European competitors, based on quality, price, and credit terms. The focus will now turn to those aspects of the manufacture of beads in Venice that made this possible, when other sectors of the Venetian glass industry had already failed to keep up with European competition.

The Evolution of the Glass Industry of Venice

Venice and its island of Murano have become synonymous with the excellent craftsmanship of the transparent *cristallo* glass vessels that captivated the luxury market of Europe from the 15th century onwards (Verità 1985:17-29). Care must be taken, however, that when Muranese *cristallo* is conscripted into the theories on luxury goods and patterns of consumption of the early modern period, the process does not unwittingly transform its historical production levels into a dominant role to the exclusion of all other Venetian glass manufactures.

The problem lies in that the historiography of Venetian glass is devoid of quantitative production and export data until the end of the 17th century. The historians of the Venetian glass industry have repeatedly drawn attention to this lack of data: "sparsely documented" (Luzzato 1961:55);[13] "on the exports of... window glass and Muranese mirrors... the documentation is very scarce and is reduced to sporadic hints" (Sella 1961:59);[14] and "we have no statistics on glass production to tell whether the entire industry shared in the sixteenth-century expansion" (Rapp 1976:7). It is only for the second half of the 18th century that there is a detailed quantitative database of glass exports from Venice, and Campos (quoted in Caizzi 1965:146) identifies glass beads as the leading export of the Venetian glass industry of that period. More recent research by Trivellato (2000:219-245) has established in greater depth the economic role of the exports of Venetian glass beads with respect to total glass exports in the period from 1769 to 1796.

Overall the nature of the Venetian glass industry is best summed up by Luzzatto even though he was writing about the 15th century: "the industry that manufactures both for general consumption and for the luxury market... is the Venetian glass industry... this utilitarian and commercial production that up to a point can be described as mass production, was not only not abandoned but continued to become the quantitative nerve of the industry of Murano." He then identifies the paradox of the historiography of Venetian glass: "but even if from an economic viewpoint it is still the production of objects of [mass] consumption that

by far predominate, the great fame [of Murano is] its artistic glass" (Luzzatto 1961:198-199).[15]

The lack of quantitative data prior to the 18th century makes it very difficult to judge whether the detailed economic picture of the glass industry provided by Trivellato for the 1750-1800 period represents a historical singularity which has to be explained in terms of a sudden readjustment of the Venetian glass industry to external events or whether it is the outcome of a *longue durée* process that slowly shaped the survival of the fittest sectors of the industry in the face of global opportunities and European competition. To help answer this question, we will examine Venetian glass production and exports starting at the end of the 16th century.

Venetian Glass Exports in the 16th Century

Corti (1971:649-654) has published his transcription of a document that provides the earliest known, extensive, quantitative breakdown of Venice's total annual glass sales according to geographical destination, along with an indication of the represented glassware categories. It is a market intelligence report that Corti assumes to have been written in 1592 by a Tuscan resident in Venice to assist the Granduca Ferdinando I de' Medici revitalize the glass industry in Pisa. Attention should be drawn to some other levels of interpretation of the data reproduced in Table 6 that have until now not received sufficient attention. First of all, it provides the first historical quantitative indication of the role of glass beads within the aggregate of Venetian glass exports. The table shows the breakdown in value of glass exports as follows: at least 22% in mirrors, at least 7% in beads, and a ceiling of 70% that includes all types of glass vessels for liquids (including fine crystal), glass lamps, plus an unknown percentage of common glass for windows.

The Venetian Glass Industry in the 17th Century

The only information for this period is qualitative, so only the main developments will be dealt with. The Muranese glass mirror and luxury glass sectors are reported as suffering from the competition of new technologies. In the words of Trivellato (2006:152-153): "during the last twenty-five years [of this century]... revolutionary inventions and innovations introduced in England, Bohemia and France challenged the supremacy of Venetian glass technology." In marked contrast, "For the Muranese industry of beads the seventeenth century was a century of prosperity... the second half... of notable expansion. It is significant that this qualitative judgement derives from the healthy market for Venetian beads in the East–Alexandria, Cairo, Upper Nile Valley and Abyssinia," though no quantitative data are provided (Sella 1961:66).

Table 6. Breakdown of Glass Exports from Venice, 1592 (in ducats).

Venice city	25,000
Terraferma and Lombardy	15,000
Sicily, Naples, Rome, and Puglia	12,000
Constantinople	10,000
Alexandria, Egypt	5,000
Aleppo, Syria	20,000
Germany	3,000
Lisbon	10,000
Spain and Indies (of which <12,000 ducats as *margherite, smalti, contarie* and *paternostri)*	42,000
Sub-total 1	142,000
To the world as unfinished mirrors Sub-total 2	40,000
Total	182,000
Adapted from Corti (1971:652-653).	

Glass Production and Exports in the 18th Century

Much more quantitative data is available for the 18th century, especially for the period 1750-1800. Trivellato (2000:219-245) provides a very detailed breakdown of the geographical export profile (in weight and value) for the four main glass categories produced during this period: *conterie* (drawn beads), *perle a lume* (lampworked beads), mirrors, and window glass. As Figure 6 illustrates, glass beads now constitute the most prominent Venetian glass export and, in value, comprise about three quarters of the main glass export revenues, with mirrors second and window glass a distant third. The average over eight annual records between 1769 and 1796 is 593,317 ducats for exports of *conterie* and 270,524 ducats for *perle a lume*, derived from an average glass export total of 1,195,912 ducats. In weight, this corresponds to an annual average of 463 tons of *conterie* and 162 tons of *perle a lume* (adapted from Trivellato 2000:230-232). Glass beads had become the dominant sector, in value, of the Venetian glass industry by the second half of the 18th century.

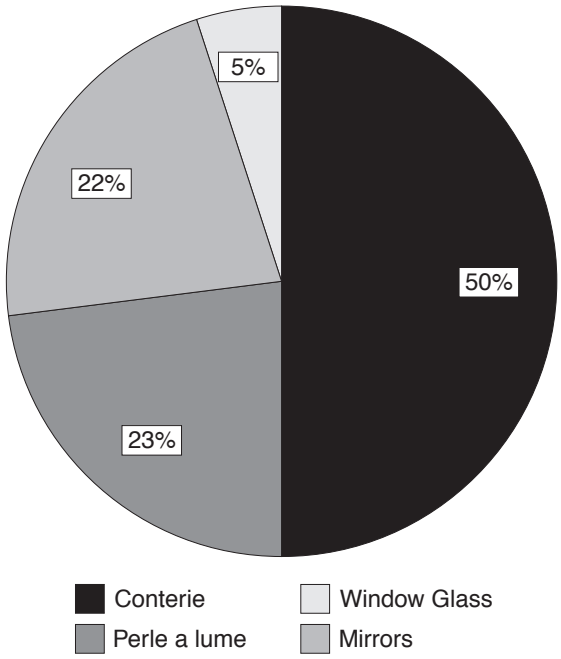

Figure 6. Breakdown of export value share of the four main export categories of Venetian glass, 1769-1796 (after Trivellato 2000: 230-231).

The Survival of the Venetian Bead Industry

What gave the Venetian beadmakers the ability to compete against other European producers when neither *cristallo* nor large glass mirrors had managed to hold out against new entries? One of the reasons lies in the characteristics of Venetian glass canes, many of which were used to make *perle a lume* elsewhere, such as France. In a letter to the *V Savi* dated September 1776, that describes a visit to a bead-production facility in Paris, Giorgio Barbiera states that he was suspicious of the fact that he saw no trace of the manufacture of glass canes there. He also reported that Venetian canes fetched three times their price when sold outside of Venice (Morazzoni and Pasquato 1953:34). The mastery of the technology to make canes remained one of the major obstacles to competition. The cost of purchasing Venetian canes at a premium was always less than the expense of having to develop a parallel manufacturing facility. The challenge was not only the technological aspect of drawing the canes, however. It also involved the glass recipe required for making beads, recipes quite distinct from those for *cristallo*, mirrors, and window glass. How is it possible to deduce this?

In the *Codice Donà dalle Rose* at the library of the Museo Correr in Venice is a document entitled "Folio in which are revealed all the costs and all the products of every one of the glass furnaces of Murano." It sets out in a comparative fashion the different operating costs incurred by the glassworks of Murano depending on the category of glass being produced (*Codice Donà*). It is reported that the context for this information was the proposal by the *maestri* of Murano in 1779 to constitute a single society for the production of glassware as a solution to the problems facing the glass industry at the time (Zecchin 2010:15-26). The correlation of the data in the document provides unique insight into the differences between the glass recipes for beads and those for all the other glass products of Murano. The original compiler of the table failed to include the production by weight of each of the glass categories, so it is necessary to work on the basis of the total value of each production.[16]

The relevant data from the document have been recalculated in ducats and, together with calculations of the relevant internal correlations, are summarized in Table 7. The production of glass canes for beads involved the highest percentage of costs incurred for raw materials (39%) compared to the rest of the Murano glass products. This large share of total raw material cost is not, however, commensurate with the contribution to total revenues from the production of beads (25%). In the absence of production data by weight, there are two possible explanations for this: a) if the recipes involved the same ingredients across all glass products, then glass canes dominated total output in weight but were sold at a very low price per weight compared to all the other glass products or b) the ingredients used for the cane glass recipes were special and thus very expensive compared to the cost of raw materials for all the other glass.

To examine the first option, it is instructive to examine Trivellato's data for the period 1769-1796. As seen in Table 8, the mass output of glass beads was second only to that of window glass. This explains why the share of raw material costs of bead and window glass production were the highest compared to the rest of the glass products. Yet the price per unit weight of window glass was the lowest compared to beads and mirrors, so the first explanation can be ruled out and the evidence points to the very high cost of the recipe ingredients required to make glass canes for beads.

"At this point I draw attention to the fact that lead based glass was well known in Venice and was the base for coloured glass canes and *conterie*" (Toninato 1982:12).[17] Lead oxide was needed to lower the temperature at which glass could be worked at a lamp burning animal fat to make the *perle a lume*. Multiple special pigments of high purity that would not whiten, volatilize, or interact within

Table 7. Economics of Murano Glass Workshops, 1779.

Products	Furnaces	Raw Materials (ducats)	Total Costs (ducats)	Revenues (ducats)	Manpower per Furnace	Contribution to Total Revenues	Cost of Raw Materials to Total Raw Material Costs	Profits (ducats) per Furnace per Unit Cost of Raw Material
Window glass	16	49,575	115,592	157,696	13	33%	27%	0.05
Common glassware	2	22,994	41,235	52,800	37	11%	13%	0.25
Large mirrors	2	8,714	22,776	39,174	15	8%	5%	0.94
Fine crystal	2	23,845	36,307	85,161	18	18%	13%	1.02
Small mirrors	2	6,955	13,918	25,548	14	5%	4%	0.84
Glass canes	4	71,025	95,906	120,032	16	25%	39%	0.08
Total	28	183,107	325,734	480,412				

Source: *Codice Donà*; for the context of original data, *see* Zecchin (2010:15-26).

different layers of overlaid colored glass were also required, plus individual crucibles to hold each color and lead recipe (Moretti 1975:69-70). This explains why recipes required to make the glass canes for beads were more chemically complex and so more expensive than those required for all the other glasses.

What window glass and beads do share (*see* last column of Table 8) is the need for mass production in order for the former to compensate for its very low sale price and for the latter to make up for its very high recipe cost. This underlines yet again the importance of high unit production to maintain a competitive price in the manufacture of glass beads (*see* Appendix A).

Table 8. Average Prices and Production of Murano Export Glass, 1769-1796.

Type of Glass	Soldi/g	Average Production (tons)
Conterie	0.16	626
Perle a lume	0.21	
Mirrors	0.21	156
Window Panes	0.01	791

Adapted from Trivellato (2000:230-231).

CONCLUSIONS

Venice managed to compete for market opportunities such as afforded by England's predominance in the slave trade during the second half of the 18th century, not because of a sudden shift from *cristallo* and luxury mirrors to beads, but because Venice had established its strength and presence in the international bead market through a *longue durée* process of technical and market development. The evidence points to protective barriers built up over two centuries that helped to shield the Venetian bead industry from other European bead-production centers such as Bohemia.

For the glassmakers and authorities of Venice, beads represented not only a major contribution to total Venetian export revenues, they also symbolized the continuous fight for survival of the Venetian glass industry through the centuries. It is possible to estimate from raw data that the order of magnitude of total glass production in Venice grew from around 800 tons in the 16th century to over 2,000 tons in the 18th century. During this time glass bead exports rose tenfold in value, from at least 7% to over 70% of total glass exports.

The contribution of glass beads in maintaining the continuity of the traditions of Murano glass during the critical 18th century, when its *cristallo* and mirrors had

been displaced by other European glass production centers, merits a higher profile in the historiography of Venetian glass. As Luigi Zecchin has so rightly pointed out (quoted in Trivellato 2000:239), the history of glass beads is a story that remains to be written. The trade networks of these beads and the quantitative trail they left within Europe and the rest of the world need to be followed up even further afield in time and space than has been possible here.

The strength and survival of the Venetian glass bead sector in the 18th century instilled in its craftsmen and politicians a sense of collective pride in this global achievement, a sense of having recovered the rightful place of "Venice venerable Mother of the art of glass" (TNA: PRO SP 99/73:113r).[18] This sentiment of the period, which comes across in many of the primary sources that have sustained this study, is sometimes lost in the way historiography has at times belittled the role of glass beads. Part One of this article endeavoured to show that for Liverpool slave traders such as the Earles and Davenport, glass beads were never trivia but a critical factor in the success of their barter trade in Africa, goods chosen with the greatest of care in the absence of which their Africa trade suffered. Their detailed account books also seriously question the idea that African traders were gullible enough to barter slaves for a handful of beads. The few complete accounts point to a barter rate of at least 200 kg of beads for one slave at the end of the 18th century, and a barter value per pound sterling spent in Liverpool second only to gunpowder. The very low price of a single unit of glass beads that was made possible by the scale of production in Venice should not be confused with the actual level of barter value as evidenced in the account books of the Liverpool slave trade.

The European slave trade represents a heinous chapter in the history of all those involved, but it cannot detract by association from the art, beauty, and technical achievements embodied in Venetian glass beads. During the second half of the 18th century, glass beads were part of the global trade patterns established between Europe, Africa, and the New World. Glass beads cannot be eaten, they do not protect against the elements, they were not made to kill or destroy structures, they cannot serve as containers, or be forged into strong tools. In spite of this they were one of the eight main categories of cargo bartered for slaves in Africa by traders from Liverpool. They were not found in nature like cowries, corals, or arangoes but had to be expressly manufactured by a skillful chemical and physical process that was perfected in Venice. Venetian women and men were involved in a production sequence that turned out millions of beads per year by the 18th century, to be traded in their near totality to destinations outside Europe. Venetian glass beads are thus among the most important man-made, mass-produced objects to first target intercontinental markets, based exclusively on aesthetic appeal and not on functionality.

It is thus fitting to close with the proud and hopeful words of Giovanni Malazoti who, together with other Venetian bead manufacturers, wrote in 1754, as the European slave trade started its major period of growth: "May God allow it, that we may be able to supply the orders that derive from a doubling of business... we have no memory of so many orders in other times... from Holland, England, Spain, Portugal, Alexandria and other places in the East... in Bohemia they make *conterie*, but not as good as those of Venice" (Cinque Savi Diversorum).[19]

APPENDIX A. CALCULATION OF THE ANNUAL PRODUCTION OF GLASS BEADS IN VENICE

The account books of the Davenport slave voyages list beads by the bunch and by weight. It is assumed that the beads sold by the bunch correspond to a size equivalent to large *perle a lume* and *rosettas* (G. Moretti 2005:32); the beads sold by weight, the smaller *conterie*. The bunch weights derived from 730 individual cargo registers of 40 slaving voyages during the period 1761-1782 (Davenport Accounts) indicate that, on average, a bunch of 100 beads weighed 4 pounds, so each bead in a bunch would have weighed around 0.04 pounds or 18 grams (Figure 7). According to data provided by Trivellato (2000:230-231) for the period 1769-1796, the average weight of exports per year was 340,628 *libbre grosse*. At 477 g per *libbre grosse*, this corresponds to 162.5 metric tons of *perle a lume*. Assuming that beads sold as bunches in the Davenport accounts correspond to *perle a lume* or their equivalent in size/weight, the weight of Venetian exports of these beads was equivalent to 9 million beads per year (162.5 metric tons is equal to 162,500,000 g which, divided by the weight of an average bead [18 g], equals approximately 9 million beads). The units of *conterie* would be at least one order of magnitude greater since, by weight, their total export quantity was around three times greater and, on average, their size and weight could be substantially smaller than the *perle a lume*.

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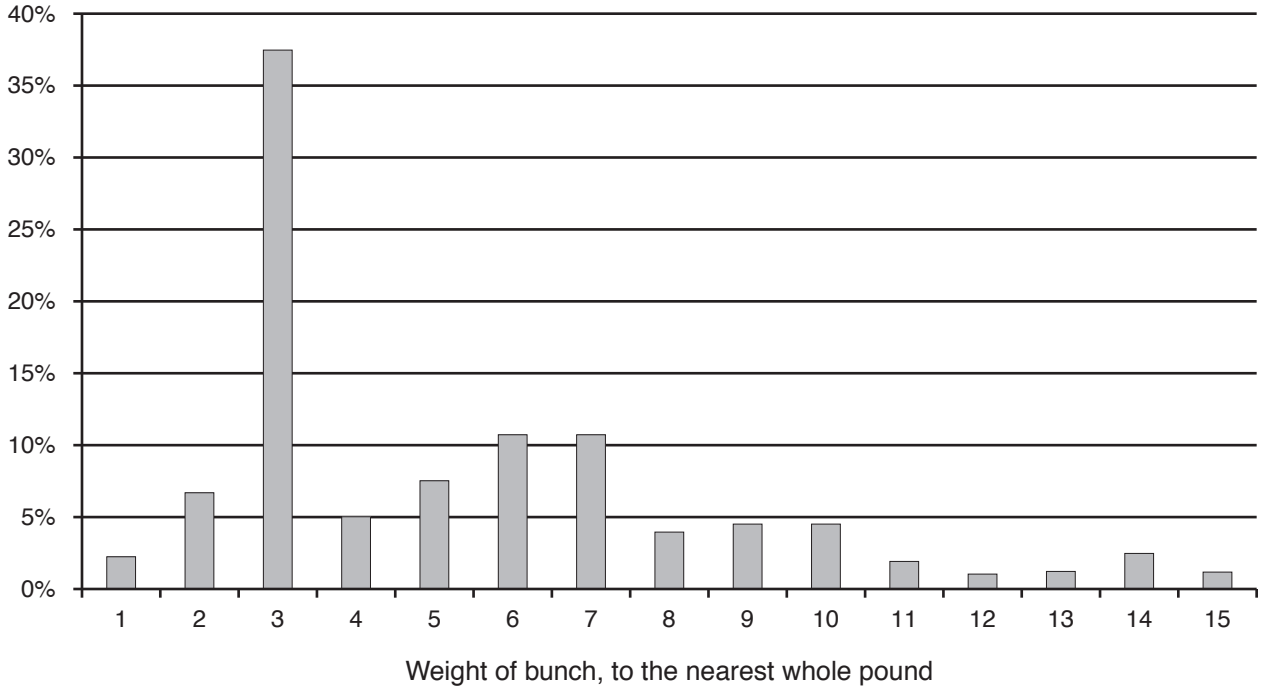

Figure 7. Percentage distribution of weights of bunches of beads (Davenport slave voyage accounts).

assistant, Ms Katie Ankers, were of great help in searching the slave trading records. In Venice, I received generous guidance from Mrs. Clementina Albano, Head of the Document Section at the Stazione Sperimentale del Vetro in Murano, and from Sigg. Gianni and Giuliano Moretti of Ercole Moretti & F.lli, Murano.

ENDNOTES

1. "Molte sonno le commissioni che... questo... Sign. Resid^te^ Vignola alla Corte Brittanica nel proposito d'introdure con quella Nazione un diretto commercio di Contaria... nella Nazione Inglese" (all translations by the author).

2. "Vignola... propone a V. S. un com^o^ [commercio] colla Comp^a^ [Compania] di Liverpool... de Contarie di Venezia, termine per altro che in frase inglese comprende non solo quel, que noi a Venesia chiamiam Contarie ma anche le manif^re^ [maniffature] a Suppialume."

3. "Cinque barili contarie" and "tre casse manuffature a lume" for "Gioberto Vigne, suddeto inglese" for a total of some 7,000 pounds [*grossi*] or over 3 tons of glass beads in total.

4. "Non potendo più gli olandesi venderla di seconda mano é di contrabando a Inghilterra.... si formò una ricca Compagnia di Mercanti a Levurepool... un utile traffico con le Regioni Africane."

5. "Alle arte sono a confessione del Direttore stesso non solo ben fatte ma superiori di lavori Boemi."

6. "È certo che se Venezia... si ingegnera a dare a prezzi... le Manuffature di Boemia... attraerà in avvenire arte stessa tutte le commissioni di Londra, Levurepool e Bristol."

7. A Thomas Hodgson is reported as dying in 1773, and another Thomas Hodgson in 1803, but it is impossible to determine if either corresponds to the partner in WD&Co. William Davenport died in 1797 (Pope 2007:200).

8. The assumption is that the weight refers to *libbre sottili* because the trader is dealing in *conterie*.

9. The voyage accounts in the Davenport Papers span more than 20 years (1761 to 1782) and 9 pence per pound is a price that figures in the majority of the accounts reflecting beads purchased in England with only a few exceptions.

10. Account Books of the voyages of the *Tyrell* (1761), *Plumper* (1762), *Little Brittain*, *Sisters*, *William* (1764), *Henry* (1765), *King of Prussia* (1767), *Neptune*, *Dalrymple*, *William* (1768), *Henry*, *Dobson*, *Fox*, *King of Prussia*, *Hector*, *William*, *Andromache* (1769), *Swift*, *Dobson*, *Fox*, *True Blue* (1770), *Lord Cassiles*, *Hector*, *King of Prussia*, *Dalrymple*, *Andromache*, *Swift*, *May* (1771), *Swift*, *May*, *King of Prussia*, *Dreadnought, Badger* (1772), *Hector*, *Andromache*, *Swift*, *Dalrymple* (1773), *May*, *Lord Cassiles*, *Badger*, *Dreadnought* (1774), *Badger*, *Dalrymple*, *Swift* (1775), *Badger*, *Dreadnought* (1776), *Hawke* (1779, 1780), *Preston* (1781, 1782), and *Quixotte* (1783).

11. Spirits are excluded in this analysis because their prime cost is reported but no bar value is given, for reasons not specified in the source. The data in Figure 4, however, account for 82% of total cargo value, including provisions, so the exclusion of spirits (on average 8% of total cargo prime cost, with the remaining 10% corresponding to sundry goods) is not considered to affect the overall trends observed in the data.

12. Dr. Giorgio Riello (University of Warwick) has suggested that these data may correlate with the fact that textiles, iron, and brassware were manufactured by African industry, while gunpowder, glass beads, and firearms were not.

13. "Scarsamente documentato."

14. "Sulle esportazione di... lastre di vetro e specchi muranesi... la documentazione è scarsissima e si riduce a sporadici accenni."

15. "L'industria che produce per i consume più comuni e l'industria di lusso... è l'arte vetraria veneziana... questa produzione di carattere utilitario e commercial, que fino ad un certo punto si potrebbe qualificare come produzione di massa, non solo non è abbandonata, ma seguita a costituire quantitativamente il nerbo all'industria di Murano... ma se del punto di vista economico prevale ancora di gran lunga la produzione di oggetti di largo consume, la grande fama [di Murano è] il vetro artistico."

16. Weight output by furnace would have varied considerably subject to glass category and, in the absence of unit pricing and product breakdown, there is no key to convert total value of production to weight of output by product.

17. "A questo punto osservare che il vetro al piombo era ben noto a Venezia e constituiva la base degli smalti e delle conterie." A technical discussion concerning the chemistry of these recipes is beyond the scope of this study but is important in the overall analysis of the reasons why Venetian beads were able to maintain a dominant role in the international marketplace.

18. "Venezia anticà Madre de generi vetrari."

19. "Valese Dio, che supplir si potesso le commissioni che in oggi derivano che un duplicato commercio... non se'ha memoria che tanto e cosi abbondevoli commissioni in tempo alcuno... derivano dall'Olanda, dall'Inghilterra, dalla Spagna, dal Portogallo, da Alessandria et altri luoghi del Levante... in Boemia si fabbricano contarie non riuscete al grado che la Venete."

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