

The Glass Industry in Merseyside and its environs, 1500 – 1750

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Introduction

For nearly two thousand years, Merseyside and its surroundings have been closely connected with glass manufacture. Its history ranges from the possible Roman glass factories at Wilderspool, Warrington (May 1897; 1904), to the huge world wide glass making concerns now centred in St Helens. To confine this study purely to Merseyside would be an artificial exercise and the area is extended to take in the Lancashire and Manchester areas where glass making evolved during this period. The nearest medieval glass making site to Merseyside is Kingswood in the middle of Delamere Forest, where it is presumed glass was made for the abbey of Vale Royal from 1284 to at least 1309. Clear, stained and painted window glass have been found at this site (Newstead 1939; Ridgway and Leach 1948; Vose 1977). Prior to 1500 glass was not in very great demand, its main use being for windows in churches and royal palaces, with vessel glass used only by the higher classes of English society. Rachel Tyson found that out of approximately 200 English archaeological sites where medieval glass was found all were exclusively high status, wealthy sites, clearly indicating that glass was a luxury item. No utilitarian vessels such as urinals or bottles have been found on any artisan or peasant sites prior to 1500 (Tyson 1995).

This situation was to change dramatically in the period 1500 to 1750. Merseyside and its environs contributed significantly to this most crucial period in the development of glass making in England. From 1567 Jean Carré, a French merchant, encouraged French glass-makers to emigrate to England. The Huguenot gentlemen glass-makers settled first in Surrey, moving north through Staffordshire, and eventually arriving and working at Bickerstaffe, near Ormskirk in Lancashire. Around 1600 they arrived at Haughton Green, in Denton in south east Manchester, around 1615; at Warrington about 1650; and at Sutton, south of St Helens, from about 1688.

The only late 16th to mid 17th-century excavated production sites in this area are the Bickerstaffe glasshouse, Lancashire dated around 1600, and the Haughton Green, Denton glasshouse in south east Manchester which operated about 1615 to 1653 (fig. 1). The marked improvement of glass quality associated with French immigrant glass-makers from Normandy and Lorraine who came to England from the 1560s can be seen in the excavated products of the Bickerstaffe and Haughton Green glasshouses (fig. 1., Vose, 1972; 1980, 143-49, 180-82; 1994; 1995; 1996). In 1560 most of the glass sold was considered a luxury for the rich, but by 1640 windows were supplied for



Fig. 1. Location map – Bickerstaffe and Haughton Green glasshouses

houses of medium size as well as for wealthy residences, there were standardised bottles for commercial storage, and there were thousands of dozens of drinking glasses for taverns and middle-class buyers in a market which was to continue to expand (Godfrey 1975, 256).

James I's Royal Proclamation in 1615 (PRO State Papers 1615; Hartshorne 1897, 413) led to an abrupt change of fuel for glass furnaces from wood to coal. By the 1640s there were 50 per cent more furnaces in operation than in the wood burning era (Godfrey 1975, 223). This traumatic transition in a conservative industry is exemplified by the Bickerstaffe and Haughton Green glasshouses, both nationally important sites in the history of glass technology, and which both provided for the Merseyside markets. The development of covered glassmaking pots, a vital technological step forwards, is first encountered in crucible evidence occurring at Haughton Green. The new English lead crystal glass and the dark English wine bottle, both developed in the second half of the 17th century, formed the spearhead of the English penetration of continental markets, making England for the first time a net exporter of glass (Charleston 1984, 96). Bottles were made at Thatto Heath, between Prescot and St Helens, from about 1721 (Harris, 1968, 109, 113; Barker, 1977, 10).

John Houghton's list of glasshouses in England and Wales, published in 1696, lists two glasshouses in Lancashire, one described as "near Liverpool",

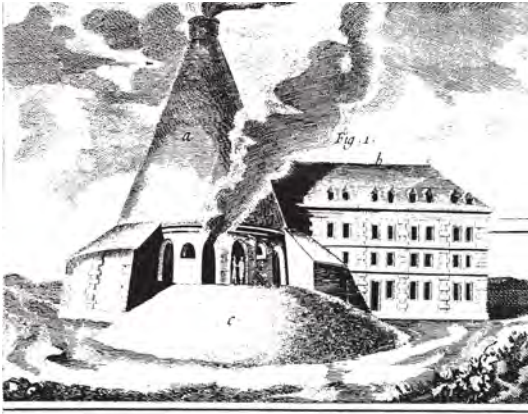


Fig. 2. Exterior view and section of an English-style cone glasshouse showing the large underground flue beneath the central furnace, from Diderot and D'Alembert's Encyclopédie, vol. 10, pl. 3



Fig. 3. Cone glasshouse, Old Swan, Liverpool



Fig. 4. Bickerstaffe glasshouse foundations

producing “Flint, green and ordinary”, and another in Warrington, making window glass (Houghton 1696). The Warrington glasshouse was owned by the French Huguenot family of Leaf from about 1650, who in 1688 also leased property in Sutton, south of St Helens. This included a building already used as a glasshouse, no doubt the one referred to by Houghton as “near Liverpool”, and was probably situated at what is now known as Glasshouse Farm near Eltonhead Hall (Harris 1968, 106-110; Barker 1977, 9-10). The site of a 17th-century glasshouse at Culcheth, Glazebury, Warrington has also been noted (Cheshire SMR). Towards the end of the 17th century, the English made a further important contribution to glass technology with the development of cone glasshouses which led to enormously increased furnace efficiency. Diderot and D’Alembert’s 18th-century illustration of an English glasshouse shows the key features of the cone building, such as the central furnace with its grill of iron bars on which the coal could be laid and raked out, the ashes falling into a pit beneath, and the system of underground flues leading directly into the furnace to assist the coal burning, which with the outer cone building created a much more intense heat than in the old wood-fired furnaces (fig. 2) (Diderot, and D’Alembert, 1751-65). During the first half of the 18th century glass was blown near Ormskirk (Jarvis, 1941-2) and at Prescott and Thatto Heath, the two latter being the forerunners of the St Helens glass industry. The Prescott cone building, the property of Thomas Cobham, can be seen clearly on a



Fig. 5. Bickerstaffe main furnace area with demolition line



Fig. 6. Reconstruction of a wood-fired glasshouse based on the Blunden's Wood, Surrey c. 1330 excavation

print dated 1743 (Barker 1977, 10). A partial cone can still be seen at Pilkington, St Helens (Vose, 1980, 189). Regrettably a complete cone which belonged to the 19th-century Old Swan Glassworks, Liverpool was pulled down in the 1970s (fig. 3; Vose 1980, 189-90).

Production Sites: Bickerstaffe and Haughton Green Glasshouses

The importance of the Bickerstaffe and Haughton Green glasshouses to this area cannot be exaggerated. The Bickerstaffe glasshouse situated near Ormskirk in Lancashire is the only known wood-fired glass making site in the North West at this period. Haughton Green, located approximately 30 miles away from Bickerstaffe south east of Manchester, is the only example of coal-fired glass making site in the North West, and had the monopoly for glass making in this area up to 1642.

There are possible links between the two sites. The Huguenot glass-makers at Bickerstaffe and Haughton Green may have been from the same families. We know that members of the Lorraine families of Du Houx and Pylmey were at Haughton Green, in addition to the English entrepreneur, Francis Bristow, from 1615-53. Lorraine glass makers, aristocrats in their own country, have been described as “fiercely independent in spirit, proud, clannish, hot-headed and secretive” (Godfrey 1975, 7). Both sites share a record of violence: at Bickerstaffe in 1600, there occurred the only murder by a French glass maker known in this country (Vose 1995, 1); and in 1635 members of the Lorraine Pylmey family were ordered to keep the peace at the Quarter Sessions in Manchester (Vose 1994, 63). The glass products from both sites are similar in style, and more importantly, analyses have shown that both sites produced glass with an unusually high soda content (Pardoe 1994, 58; 1995, 16).

The Bickerstaffe wood fired glasshouse

The Bickerstaffe glasshouse was built on Stanley land, within a mile of the so-called “Palace of the North” built



Fig. 7. Green-tinted glass fragments showing moulded and applied decoration from the Bickerstaffe glasshouse excavation



Fig. 8. Conjectural reconstructions of forest glasshouse products in green-tinted glass, mould-blown with trailed and printed decoration, made in 1927 by James Powell & Sons, based on fragments from the Woodchester glasshouse, Gloucestershire

at Lathom by the earls of Derby. The furnace stood on Glass Hey Field, Hall Lane, Bickerstaffe (SD 441036). The 6th Earl William (1594-1642), a keen patron of the arts, was dedicated to restoring the family's prestige and power. Encouraging glass-makers to come to this area would have been viewed as beneficial both for prestige and also for making money. The raw materials for glass making: wood, sand, and fireclay, were readily available, as also was salt from Cheshire. There was easy access to local markets including Liverpool and Ormskirk. References to glaziers and glassmen seem to indicate a brisk trade in glass in the north-west of England immediately prior to the Royal Proclamation of 1615 (Barker 1977, 486, Note 54). The demand for window glass had gone up, and vessel glass was becoming available to those lower down the social scale.

Excavations revealed the foundations of a main furnace, comprising roughly dressed sandstone slabs positioned beneath a central hearth area (fig. 4). They suggest a small furnace built to the traditional English rectangular design with parallel sieges running alongside a central hearth. Any subsidiary furnaces for potarching, fritting, or annealing were probably attached to the main furnace. A demolition line of debris perhaps raked out from the furnace, included sandstone, clay bricks, charcoal from hazel, oak and birch wood from the final firing, and crucible and glass fragments. A circular 'dump' of the same materials lay close by (fig. 5). The glass-makers would have recycled the ashes as potash.

Furnace temperatures were established at around 1100 and 1200 degrees centigrade, consistent with wood-fired furnaces. A reconstruction of an early wood-fired glasshouse based on the excavations at Blunden's Wood, Surrey gives an impression of what these early glasshouses would have looked like (fig. 6; Wood 1965).

The crucibles (glass making pots) where glass was melted in the furnace were of open bucket-shape with straight rims typical of wood-fired furnaces. Base diameters were 0.2-0.46m.

Glass products were green tinted broad (cylinder) flat glass, and vessel glass with moulded and applied furnace decoration typical of products of French Huguenot glass-makers (fig. 7) (Vose 1972; 1995; 1996, 286-336). Conjectural reconstructions of forest glasshouse products in green-tinted glass, mould-blown with trailed and pruned decoration, were made in 1927 by James Powell & Sons (fig. 8). They were based on fragments from the Woodchester glasshouse, Gloucestershire, where typical Lorraine type products were excavated. The Woodchester glasshouse may have belonged to the Du Houx family who also established the Haughton Green glasshouse (Vose 1996, 209).

The only documentary background to the Bickerstaffe glasshouse is an entry in the Ormskirk Parish Register which records on 10 December 1600: "A stranger slayne by one of the glassemen beinge A ffrenchman then working at Bycerstaff and buried" (fig. 9). The reference seems to suggest that the glass-makers might have already moved on, perhaps to avoid further trouble (see Vose 1995 for full report).

The Haughton Green Coal-Fired Glasshouse

Despite south west Lancashire having high grade coal and vast quantities of suitable sand for glass making, the first coal-fired furnace serving North West markets was established at Haughton Green, Denton in the valley of the River Tame near Manchester, on land owned by the Hyde family (fig. 10). The Haughton Green site (SJ/942946) lies 10.75km from the centre of Manchester, 3.25km from Denton and less than one kilometre from Hyde Town Hall as the crow flies.

From around 1615 Isaac du Houx, gentleman glass-maker from Lorraine, had a leasing arrangement with Sir Robert Mansell, the glass monopolist, which lasted until 1642. The Haughton Green glasshouse continued to be run independently until about 1653. Reasons for its establishment were probably that good quality surface coal, loose quartz sand and fireclay were readily available locally, that south east Lancashire was relatively highly populated, and that it was close to the markets of Stockport and Manchester in an area more easily accessible to glaziers. Transport charges were very high at this time.

The site was covered by 3 metres of coal shale in parts. The main furnace was 9.6m long and 3.3m at the widest, following the rectangular or oblong furnace pattern of wood-fired furnaces. It was a four pot furnace, with two

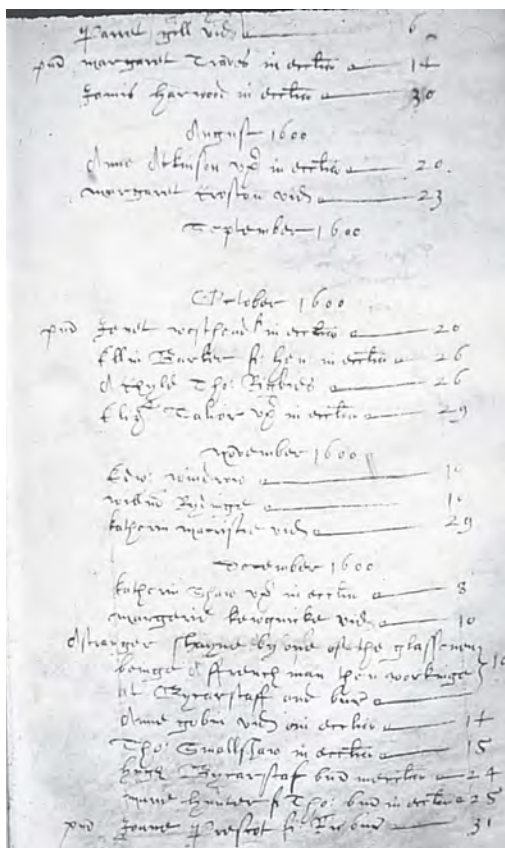


Fig. 9. Ormskirk Parish Register, page for 10 Dec 1600



Fig. 10. The Haughton Green glasshouse site in the valley of the River Tame. The main furnace area is to the left of the excavation, the subsidiary furnaces to the right

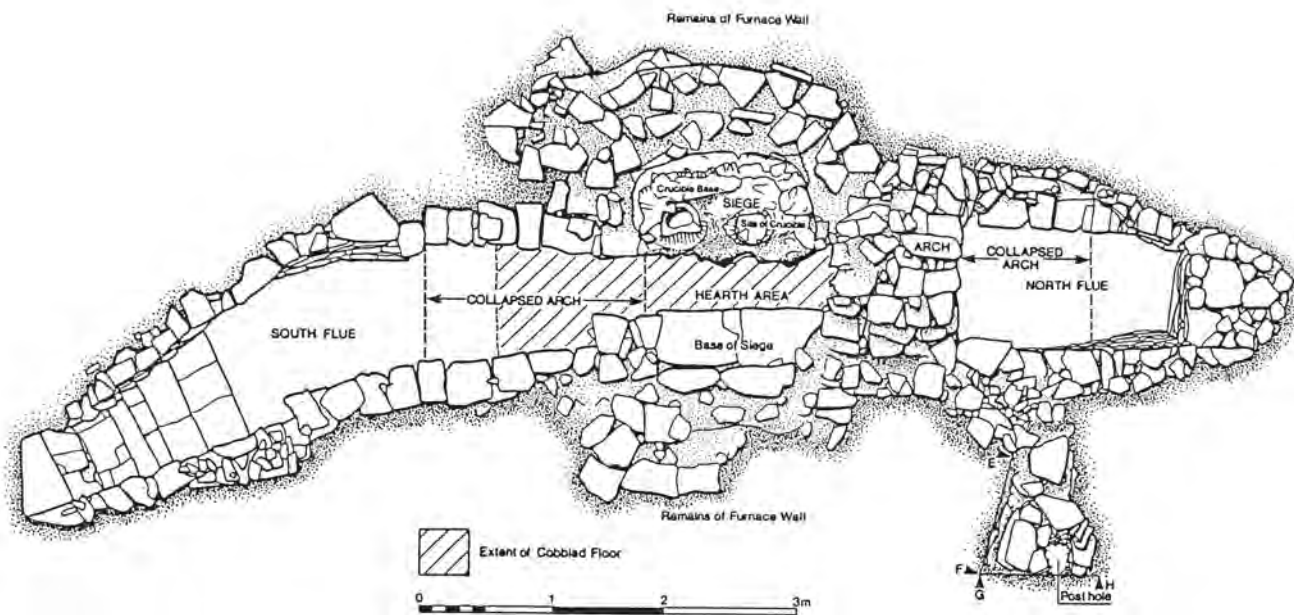


Fig. 11. Haughton Green: main furnace plan with underground flue running under the central sieges or platforms for the crucibles or glass-making pots



Fig. 12. Haughton Green: main furnace



Fig. 13. Haughton Green: south flue steps



Fig. 14. Haughton Green: subsidiary furnaces, possibly used for annealing (cooling) the glass

parallel sieges approximately 1.3m long, 0.6m wide. There was a bank of red clay and stones supporting the central hearth structures, with foundations of two semicircular walls surrounding the rear of each siege (fig. 11).

The most important features were the flue passages, built with regard to prevalent wind, which provided the oxygen for burning the coal. A barrel vault of dressed sandstone topped the north and south air passages. A grill of iron bars would have been placed between the sieges, where the coals were laid and raked, the ashes falling below (fig. 12). Glass typical of this period required a furnace temperature of 1300-50 degrees centigrade for melting (Crossley 1987, 369). Seven stone steps 1.8m deep gave access to the bottom of the south passage, giving the furnace its distinctive 'banana' shape (fig. 13). Part of a Rainford-type clay pipe bowl was found in a sooty deposit on one of the steps which was dated to 1640-60, splendidly corroborating the final 1653 date for glass-makers found in documentary evidence. Three annealing kilns for controlled cooling of the glass lay 6 metres from, and separate to, the main furnace (fig. 14).

Open glass making pots which were the norm in wood fired furnaces continued to be used in coal-fired furnaces where the coal fumes made little difference, as for bottle-making. In addition the first covered pots, an English invention, appeared as a direct result of the use of coal for firing, to protect finer glass mixes such as lead crystal which was developed from the 1670s, from being damaged by sulphur compounds. However, archaeological or documentary evidence for the early development of the closed pot is sparse, the first excavated examples being the early 18th-century pots found at the Bolsterstone glasshouse, Yorkshire (Ashurst 1987, 147-226).

Haughton Green presented a valuable opportunity to see what, if any, development of the glass making pot might have occurred in the first half of the 17th century. The results were a breakthrough in the history of glass technology. The majority of Haughton Green crucibles were of the open bucket shape, with base diameters mainly between 0.30-0.45m. However 15 sherds suggested that lidded pots were used at Haughton Green, with "cut-aways" in the rims to allow access to the melt. These fragments, which fall into no previously known pattern, suggested the possibility of an early form of closed crucible. It is concluded from the evidence that once a lid was placed on the charged pot, it stayed there throughout the life of the crucible. Access to the glass was through the "cutaway" at the rim. The earliest solution to the closing of the crucible perhaps remains undiscovered but the evidence from Haughton Green is sufficient to raise the distinct possibility of a practical method which has so far gone unrecognised (Ashurst D. & F. E. "Closed Crucible" in Vose 1994, 45-8). Analysis of the glass added further evidence that covered pots were probably used. As the very high levels of chloride found suggest the use of rock salt as alkali, the pots must have been covered to reduce volatilisation.

Haughton Green was a major supplier of broad (cylinder) window glass, had a utility service in bottles and chemical ware, and a fairly high standard in forest style vessel glass consisting of green, black and blue glass with furnace decorated beakers, wine glasses, jugs, bowls and plates (fig. 15). Analyses showed a very distinctive, high alumina, low soda glass, very resistant to normal weathering. The consistency of analyses implied the availability of good quality consistent raw materials.

Based on numbers and weight, clear green-tinted



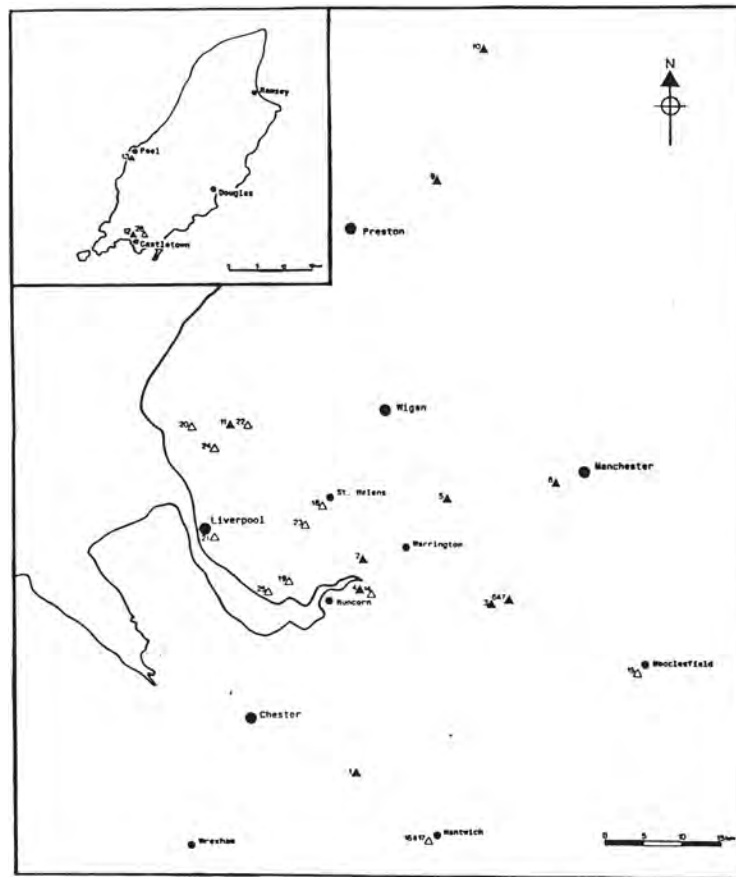
Fig. 15. Haughton Green: green-tinted glass fragments



Fig. 16. Haughton Green: examples of black vessel glass



Fig. 17. Haughton Green: examples of blue vessel glass



▲ A. Haughton Green products occurring:

- | | | |
|------------------------------------|---|--|
| Cheshire | | |
| 1. Beaton Castle | 5. Twiss Green moated platform, near Warrington | |
| 2. Bewsey Old Hall | 6. Tatton Old Hall | |
| 3. Hough Hall, Mere | 7. Tatton Park, deserted village. | |
| 4. Norton Priory, Runcorn | | |
| Greater Manchester | | |
| 8. Ordall Hall, Salford | 9. Lancashire | |
| | 10. Stydd Chapel, near Ribchester | |
| | 11. Easington, near Slaidburn | |
| | Isle of Man | |
| 11. St. Catherine's Chapel, Lydiat | 12. Castle Rushen Stores, Castletown | |
| | 13. Peel Castle | |

▲ B. Haughton Green products absent:

- | | |
|------------------------------------|---|
| Cheshire | |
| 14. Halton Castle | 16. Nantwich, National Westminster Bank |
| 15. Macclesfield, Town Hall | 17. Nantwich, Crown Car Park |
| Merseyside | |
| 18. Barrow Old Hall, St. Helens | 22. Lydiat Hall |
| 19. Wrights Moat, Halewood | 23. Prescott 1980 |
| 20. Lady Green Lane, Ince Blundell | 24. Old Hall Farm, Sefton |
| 21. Liverpool, South Castle Street | 25. Speke Hall |
| Isle of Man | |
| 26. Castle Rushen | |

Fig. 18. North West sites examined for Haughton Green products

glass formed 90% of production, opaque black glass about 7.5 to 10%, and clear blue glass between 1 and 1.78%. The black and blue glasses are products unique to the period, none being identified so far on other British glasshouse sites (figs. 16 and 17). The analyses infer a family of glasses with one base composition and the skill to add trace amounts to give individual colours. The black glass is lustrous and completely opaque when fractured. Its colour is due to adding sulphur and a reducing agent to the glass melt, perhaps by adding a small quantity of coal to the batch. Technically it is very deep amber. The fact that black glass represented nearly 10% of production suggests that it was deliberate and not just a mistake. The blue glass was made by adding cobalt oxide.

The black and blue glass, and to a lesser extent the

quality of the green glass, made it possible to search Merseyside sites and other areas to try and establish the marketing pattern for Haughton Green glass (see Vose 1972; 1980, 143-49, 180-82; and 1994; 1996 for full reports).

Socio-economic survey of marketing and distribution patterns – Haughton Green glass.

There is no documentary evidence concerning the marketing and distribution of Haughton Green products. However because of the distinctiveness of the glass products a socio-economic assessment was attempted from an examination of other excavated sites and contexts of the same period within its likely



A. Haughton Green products occurring:

1. Chester Castle.
2. Crook Street 1973-4. Trench I F128B F124.
3. Crook Street 1973-4. Trench I 178.
4. Lower Bridge St. 1974-6. Trench II 105 F115
5. Hunter Street School 1979-81. Trench II (40).
6. No. 1 Abbey Green 1975-8. Ditch M13.

B. Haughton Green products absent:

7. Crook Street 1973-4, Trench I. F134A and B.
8. St John Street, Site of the New Telephone Exchange, 1938.
9. The Dominican Friary, Greyfriars Court 1976-78.

Fig. 19. Chester sites examined for Haughton Green products

catchment area. The search for Haughton Green products hence centred on excavated sites in Lancashire, Greater Manchester, Merseyside, Cheshire and the Isle of Man, focusing on contexts belonging to the first half of the 17th century but most particularly on Civil War contexts which it was hoped would prove particularly fruitful. Closed 17th-century and Civil War contexts from excavations of this period proved few and far between, but Chester, a highly strategic city during the Civil War, provided the best of these, so a special search of all Chester's excavated post-medieval sites was undertaken. Sites ranged from castles and religious foundations to towns and villages, plus a particularly detailed look at Chester (Vose 1996, Chapter 7, 151-89, Appendices 6 and 7, 336-421). Of 26 sites examined outside Chester on 13 there was no evidence, but 13 did have contexts containing glass comparable to Haughton Green (fig. 18). A separate study of Chester found evidence on six out of nine sites (fig. 19).

Due to the limitations of finding suitable excavated sites in the North West, no definite conclusions can be drawn about the geography and distribution of Haughton

Green products apart from noting their appearance in the different locations. Nevertheless it can be observed that probable or possible Haughton Green products were found on seven out of 11 Cheshire sites, in addition to six out of nine Chester sites, whereas Merseyside had only one site in nine producing an example of the glass. The survey maps (figs. 18 and 19) seem to suggest that of the 19 sites at which Haughton Green products were sold or purchased, most lay either side of a line drawn between Manchester, the Mersey Estuary, and Chester. There is a possibility that they were shipped from these places to the Isle of Man. Only one example was found in the South Lancashire/Merseyside/Liverpool area and that at a religious foundation, providing evidence that the sale of common green glassware did not extend to this largely rural area. Interestingly, fragments were found as far north as Stydd Chapel and Easington north of Clitheroe in mid-Lancashire.

The 18th Century

During the first half of the 18th century, glass was blown near Ormskirk (Jarvis, 1941-42, 144). It was also made at glassworks in Prescot and Thatto Heath, the forerunners of the St Helens glass industry. The Prescot glasshouse which opened in 1719 lay to the west of the town, halfway down the hill, just off the road to Liverpool. Window glass was made, which was described as "the best of that sort in England" when it was sold in London in 1734. It was bought up by Stourbridge competitors by 1751 "in order to shut it up" (Buckley 1929, 232). The bottle works at Thatto Heath, built in the early 1720s, continued in operation well into the 19th century. Both the Prescot and Thatto Heath glasshouses were established by members of the Henzey (Hennezel) family of Lorraine glass-makers, one of the four main glass making families in that part of France (Harris 1968, 111). Coal, sand and clay were readily available, but bottle makers also used rock salt which was easily obtained from the Cheshire salt works. This was the beginning of the coal and salt connection which evolved into the Merseyside chemical industry of which glass making became a part (Barker, 1977, 10-12; Barker 1951). Coal has been mined in Rainford, Bickerstaffe and Skelmersdale within living memory, the coal measures also supplying fireclay used for building furnaces and pots.

The rich St Helens coalfields were one of the chief attractions when the British Cast Plate Glass Company was set up at Ravenhead, St Helens in the 1770's. The foundations for the great Ravenhead Casting Hall were laid in 1773, which was one of the industrial wonders which prominently featured in the itineraries of 18th-century visitors to south west Lancashire (fig. 20) (Barker 1977, 22). The building with its cathedral-like arch work was demolished in the late 1970s (Vose 1980, 154). The communication and transport problems which had held St Helens back for centuries were solved by the building

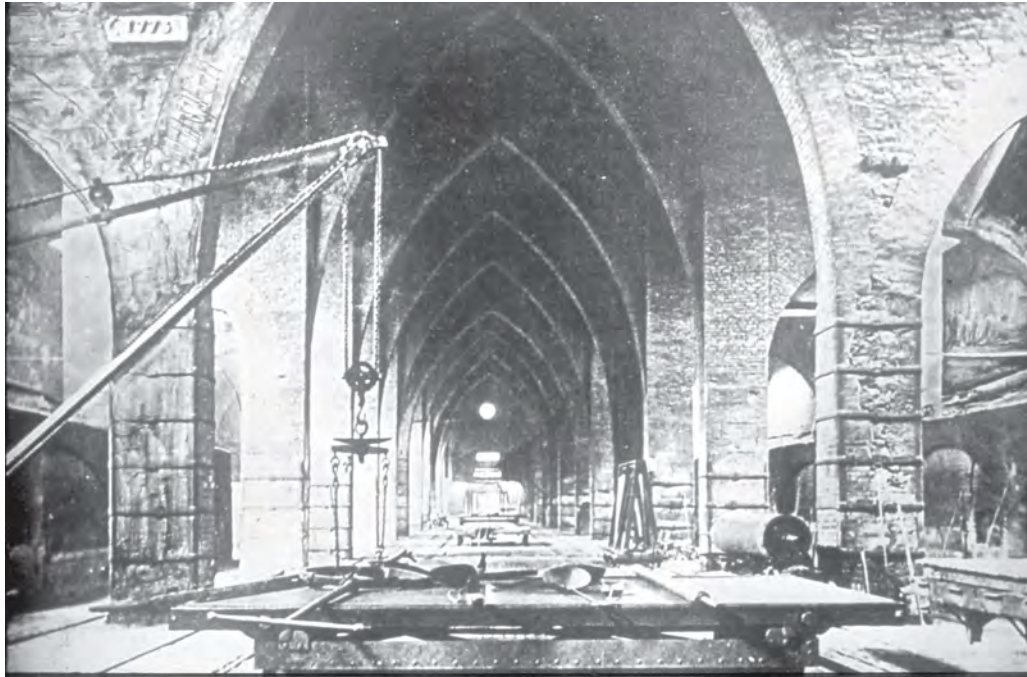


Fig. 20. Photograph of the 18th-century Ravenhead Casting Hall, St Helens, demolished in the 1970s

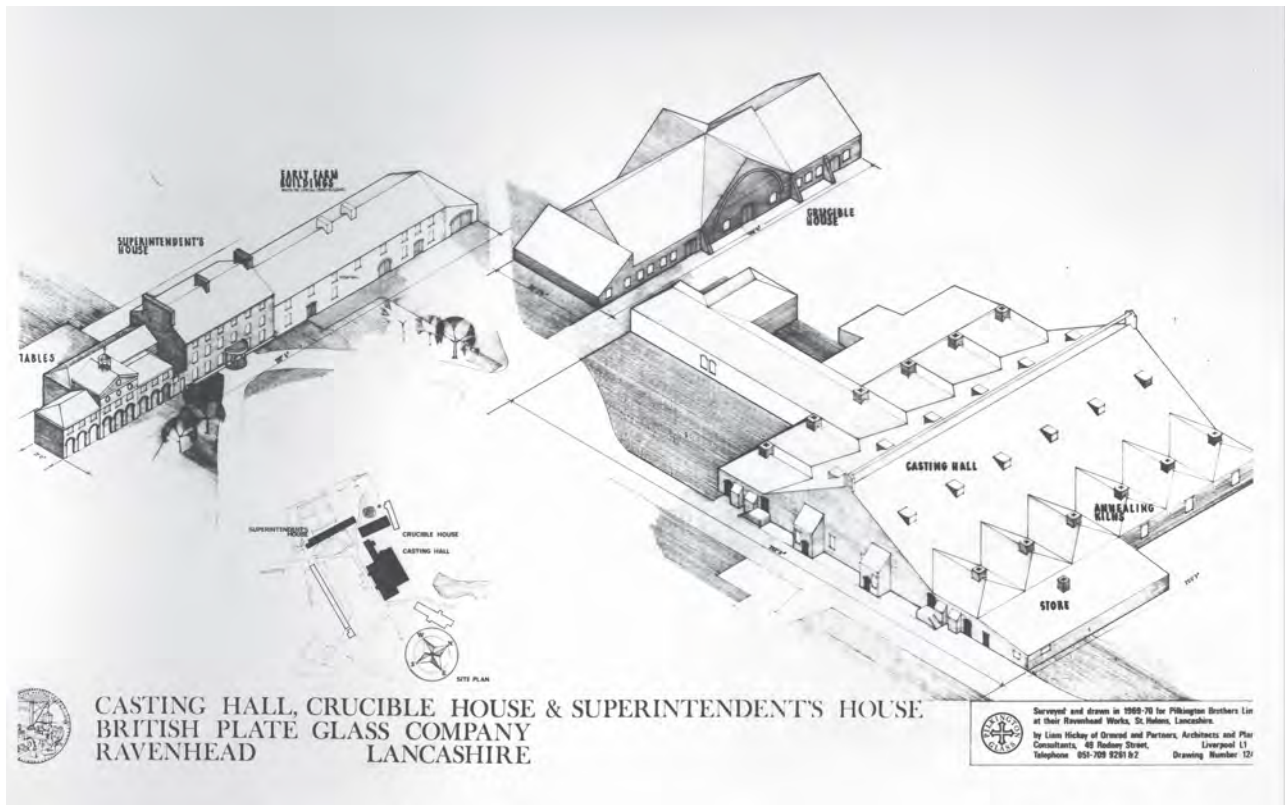


Fig. 21. Architectural drawing of the British Cast Plate Glass Manufacturers' Works at Ravenhead, Merseyside, c. 1790, with the casting hall, crucible house and superintendent's house

of the Sankey Canal which was opened in 1757 and extended to the Ravenhead glassworks 16 years later. This directly led to St Helens becoming one of the major glass making towns in the world. Two other works were started in St Helens: the Eccleston Crown Glassworks founded 1792, and the St Helens Crown Glassworks founded 1826. St Helens was to become the main centre of plate-glass manufacture in the country, with the vast majority of window glass from the 18th century onwards probably coming from the furnaces at St Helens (Barker 1977; 1994). In addition to the glassworks at St Helens, the firm of Peter Seaman & Company was formed in 1758 to make bottles and flint glass in Warrington (Barker 1977, 10).

In the 1960s and early 1970s Pilkington glassmakers of St Helens conducted a survey of industrial glass making remains in the town, including the British Cast Plate Glass Manufacturers' Works at Ravenhead. Architectural drawings were made of the historic buildings which were kept in the company's archives (fig. 21).

St Helens' glass making boom was almost exactly paralleled with the rise of Liverpool as one of the country's major ports. Glass making in 18th-century Liverpool had a long struggle to survive, with Warrington and Prescott better situated for the trade, and with occasional competition from Bristol and Whitehaven. In 1715 Josiah Poole, later bankrupt, founded a glasshouse in Liverpool which was known after 1756 as the "Old Glasshouse" in Hanover Street. A second glasshouse known as "the New Glasshouse" making flint glass, crown glass and bottles, was set up shortly after 1750, near the South Dock. A short-lived glass factory was started before 1758 consisting of two glasshouses in Dale Street making fine flint glass (Buckley 1925, 230-32).

There was a marked increase in glass making activity in the port from about 1750. By the late 18th century 250 tons of glass every year were being shipped abroad from the city, and by the early 19th century one local glass manufacturer was shipping two-thirds of his produce to America from the port (Barker 1977, 8). In the late 18th century the St Helens coal master John Mackay could point to the regular importation of alkali to Liverpool, and the existence of water transport down to the Mersey via the Sankey Canal (opened in 1757 and extended to Ravenhead in 1773), which attracted glass manufacturers to the town (Harris 1968,117).

There is still much to be discovered regarding the archaeology of glass making in the Merseyside area in this period. Suggestions for further research might include: a study of 16th and 17th-century glass imports in the Merseyside area; a continued awareness of 17th century and Civil War contexts where Haughton Green products may be identified (Vose 1996, 151-190, 366-422); a further effort to locate other late 16th or 17th-century Huguenot glass making sites which probably remain to be found in the area; and identifying where glass was blown in Ormskirk in the early 18th century.

Acknowledgments

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