

## THE CIDER INDUSTRY AND THE GLASS BOTTLE

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*'... a great number of persons are now driving great trades with bottle-sider and it hath been the occasion of erecting five or six Glass Houses in them parts.'* Thus wrote Andrew Yarranton in 1677 of the west Midlands, in his commentary on the nation's trading potential (1).

The main product of the glasshouses at Newnham-on-Severn and Gloucester in the latter half of the 17th century was the bottle, to meet this demand from cider and perry producers (2). It is interesting to consider whether the development of the stronger glass bottle suitable for fermented drinks in 17th century was to a great extent driven by the needs of the cider and perry industry.

Glass bottles have been used from at least Roman times, but it was not until the 1630's that the robust bottle, with which we are familiar today, appeared. Until then liquids were generally stored and transported in barrels and any references to bottles most probably referred to those of stoneware or leather. Glass bottles were made either from the expensive, decorative but fragile, Venetian glass, suitable for use as a decanter to serve rather than to store wine and other drinks, or from the cheaper (but equally fragile) thin 'waldglas' (forest glass) produced in many parts of northern Europe, including latterly England. Forest glass bottles were generally smaller than a wine or beer bottle and used by apothecaries and similar trades.

What catalysed the developments that transformed a late medieval industry of little significance into one which by 1670, under the name of 'the English method', had revolutionised the entire European wine trade?

### **The Development of Glass in the 16th and 17th Centuries**

The late 16th century saw the introduction by continental craftsmen (3) of improved glassmaking techniques. Although initially confined to the south-east, shortage of fuel and other reasons led to glasshouses being established in other parts of Britain. In Gloucestershire the glasshouse at Woodchester was in production by 1590 (4) and that at Newent (in a hamlet still appropriately called Glasshouse) soon afterwards (5). A third at St Weonards in Herefordshire (6) also dates from that time. Little is known about the craftsmen who worked the Woodchester and St Weonards furnaces, nor the reasons (apart from plentiful fuel) that led to the choice of these sites. Rather more is known of the families at Newent (7).

Glassworkers were a very close-knit community and jealously protected their skills, passing them only to family members (8). When Queen Elizabeth's ministers first encouraged continental glassblowers to come to England, protection from competition was given provided that they used English workers who would then learn their skills. This the glassblowers largely failed to do, keeping the knowledge within their community. An exception may have been Henry Bridgman, who was described as 'glassmaker' in the registers of St. Olave's church in the City of London when his son Henry was baptised on 23 March 1594 (9). The London Crutched Friars glasshouse was then operating under Giacomo Verzelini (10). Bridgman was to leave London and next appears at Newent in 1598 when his daughter was baptised.

Other (French) glassworkers also made the move to Newent – Abram Tysack, Jasper Pylme, Anthony Voyden and Abraham Liscourt, working in a glasshouse on land rented from Sir John Winter. John Brayne, a local landowner, in his will of 1599 left property to his cousin Bridget

Bridgman of the Glasshouse, so the Bridgmans must have had family connections in there (11), which may explain the move. Bridget is believed to have married Paul Tyzack (12), who worked at Bishops Wood glasshouse in Staffordshire until he moved in 1604 (13) when the local timber was exhausted. In 1612 he reappears in Kingswinford (Stourbridge) parish registers when John, son of Paul and Bridget Tysacke was baptised (14). During the intervening period he is presumed to have worked at Newent with his kinsman (15) Liscourt and with Bridgman.

In 1608 a coal mine had been sunk at Bouldon (16), a short distance from the glasshouse. As one of the main consumers of fuel in the neighbourhood, it is likely the glassworkers would have tried using coal and the first, probably unsuccessful, experiments in fuelling furnaces with coal may have taken place. In an appeal resisting the grant of a patent (*see below*) for the production of glass using coal, Abraham Liscourt claimed that he and Paul Tysack had made glass with coal. Liscourt lost his appeal, although Lord Dudley asserted that Tysack, following his move to Kingswinford, had made glass with coal two years before the patent (17).

Concern was growing about the destruction of woodland in order to supply fuel for furnaces. On 23 May 1615 a Royal Proclamation prohibited the use of wood as a fuel for glass furnaces and granted a patent for the production of glass using coal. This spelt the end of forest glasshouses like Woodchester, St Weonards and Newent. Sir Robert Mansell acquired the patent and looked to suppress the existing wood-fired furnaces and either licence or set up furnaces near the coal deposits. One of these was at Kimmeridge, Dorset and another in west Wales, near Milford Haven.

In 1613 Rowland Ferrice had established such a glasshouse at Newnham on Severn (18), close to Forest of Dean coal – suggesting that the Newent glassworkers may have moved there. This would have been encouraged by Winter, their landlord at Newent, who was also the owner of coal mines in the Forest of Dean. It is unlikely that Mansell was involved in its establishment, but the Forest of Dean Eyre of 1634 records that Robert Mansell was by then in receipt of the issues and profits derived from it. By tradition Mansell's connection with Newnham started in 1616 (19) which would make this one of his earlier ventures into the trade.

The key to the successful use of coal in a glass furnace was an underground wind tunnel or flue which created a draught in the centre of the furnace. Even with this, the sulphur that was given off when most coal was burnt produced a near black glass – immaterial for bottles, but unacceptable for most other purposes. Melting pots were covered to prevent this and a chimney built to improve the draught and remove the fumes more speedily. There have been no detailed archaeological investigations at either Newent or Newnham, so whether either is likely to have used coal successfully must for the time remain conjecture, but if the process at Newent had been a success, it would have been mentioned in the patent appeal. Mansell could already have been familiar with the use of a wind tunnel when he became involved in the Newnham glasshouse, so it is more likely that success was achieved here under Mansell's control. Mansell eventually settled in Newcastle on Tyne, with Liscourt in his employ, while Tysack moved to Stourport, establishing the glass industry there.

### **The Development of Glass Bottles in the 17<sup>th</sup> Century**

Wherever the experiments achieved success, the temperatures achieved using coal produced a stronger glass and a bottle soon appeared, made from this thick dark product. At a patent enquiry conducted by the Attorney-General (20) it was accepted that these bottles were the

result of a totally new process and that the inventor was Sir Kenelm Digby in or about 1632. These bottles could withstand the pressure of fermentation, so could be used for alcoholic drinks such as cider, perry or beer. Digby conducted his early experiments in London, but is believed to have developed the process at the glasshouse in Newnham (21). There was a close connection between Digby and Winter, the owner of the land on which the glasshouse was built, if not of the glasshouse itself (22), but the Civil War intervened and the Newnham glasshouse was destroyed along with many of Winter's other furnaces. Glassmaking in the Forest of Dean did not resume until the 1650's, when the Newnham glasshouse was rebuilt (23), so when glassmakers were asked to advise the iron masters of Dean on the use of coal in furnaces, it was to Edward Dagney, an Italian living in Bristol that they turned. The Dagney family do not appear to have remained long in Bristol and moved first to Stourbridge and then on to Tyneside. The Bristol glass industry developed somewhat later (John Lowden was the first glassmaker to appear as a freeman in 1673 (24)), although by the end of the century it had the largest concentration of glasshouses producing bottles outside London (25). Meanwhile by 1671 the Newnham glasshouse was producing bottles again and in about 1682 Thomas Baskerville refers to a Gloucester glasshouse '*where they make a great store of glass bottles*' (26).

### **The Use of Bottles in the Cider Industry**

From being the local drink of cider making districts, by 17th century cider and perry were becoming widely appreciated. This was partly on account of the Civil War, when militiamen and their commanders encountered it for the first time. After the war shipment of cider to London and elsewhere, grew rapidly. Sir Paule Neile recounts the story of one producer, who on finding he had more cider for London than barrels, sent the surplus in bottles (27). The vessel was delayed for some months and on arrival the bottled cider had markedly improved. The idea then developed that cider and perry increased in strength in the bottle. (28) Andrew Yarranton records that he bottled quantities of Herefordshire cider, which he sent via Gloucester, to the Thames at Lechlade and so to London, adding that many others were also bottling cider and that five or six Glass Houses had been established to meet this demand (1). Two Newnham on Severn glasshouses were producing bottles and these were soon followed by Gloucester with three. These were probably the ones referred to by Yarranton. Carriers taking cider to Lechlade and the Thames would have returned to Herefordshire with bottles from Gloucester or Newnham. It may be relevant that Viscount Scudamore (a prominent Hereford producer) owned substantial estates close to the Gloucester glasshouses (29).

By the end of the century 39 English glasshouses are recorded producing bottles (30), of these 13 were in the cider producing west of England. The others were 9 in London, 5 in Stourbridge (itself a cider producing area), 4 in Newcastle, 2 each in Nottinghamshire and Yorkshire and 1 in each of Glamorgan, Norfolk, Shropshire and Suffolk. In May 1695 a tax of a shilling (5p) a dozen was introduced on bottles, This had an immediate impact on production as is revealed by claims (recorded in the House of Commons journals on behalf of glassmakers in Gloucester and Newnham) that since the duty was imposed no glass hath been made in Gloucestershire. Mr Baldwyn, who had interests in three glasshouses, stated (21 May 1698) '*that his customers among whom he chiefly dealt, for cider do now put the same into casks instead of bottles*' (31). Although the tax was soon repealed (1699), it had impacted seriously on bottle production in both centres.

By 1715 production had ceased in Newnham and in Gloucester by 1741. Meanwhile the industry prospered in Bristol, which had become one of the most successful trading centres in the land. Ships sailed to all parts of Europe and North America carrying 'English glass bottles' (32). Within the first quarter of the 18th century a further five glasshouses had been built and

Bristol was established as the region's centre of glassmaking, albeit still using sand brought down river from Newnham (33).

Cider lasts much longer if bottled and can be said to improve due to a gentle secondary fermentation which often occurs, giving rise to a mildly sparkling product. This was appreciated by producers who then sought to provoke the sparkle by adding a small quantity of sugar when bottling (34). The significance of this was noted by a founder member of the Royal Society, Dr. Christopher Merrett from Winchcombe in Gloucestershire, author/translator of *The Art of Glass 1662*. The principles of secondary fermentation, now commonly referred to as the champagne process, were thus discovered and recorded - only made possible by the new tougher glass ('verre anglais') and the bottling process, justifiably referred to in France as being 'in the English fashion'.

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