

GLOUCESTER FOLK MUSEUM AND THE MECHANISATION OF THE PIN INDUSTRY

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Introduction

The buildings now occupied by the Gloucester Folk Museum are one of the City's oldest surviving and most important industrial sites and were, from 1743 to 1853, the pin manufactory of Cowcher, Kirby, Beard and Tovey (referred to throughout as Kirby Beard).

The Gloucester pin industry produced pins by hand from the late 16th century until well into the 19th century but Kirby Beard were experimenting with machine production by the 1820's. Why did they introduce pin machines and how is this move to mechanisation reflected in the Westgate Street premises?

Background

Visitors to the Folk Museum come for a variety of reasons but all can enjoy moments of quiet reflection as they contemplate the ancient buildings and artefacts that surround them. It is hard now to imagine the noise, fumes and heat and the chatter of voices that would have confronted them 200 years ago as they entered the pin factory of Kirby, Beard and Co. It is appropriate that buildings that once housed Gloucester's most important manufactory now find a fresh use celebrating the history and industries of the City (figure 1).

The story of pin making in Gloucester is fairly well known and a summary, compiled over the years by successive Folk Museum curators, is included at Appendices 1, 3 & 4. The Gloucester industry was principally a hand industry and utilised both in-workers and out-workers according to economic conditions and demand. An important source of labour was the City's 'poor houses'. It was an agreement between John Tilsley and the Corporation for the employment of paupers that established pin making as a significant industry in Gloucester in the 17th century. Outworkers were sub-contractors working from home, workhouse or, sometimes, prison. Inworkers worked in the factory and enjoyed nominally better pay. All were paid 'piece-work' (by the number made).

The Folk Museum displays include a number of pin machines (figures 9, 10 & 11). These machines, particularly those for making solid headed pins, have always been regarded as significant to Gloucester only in so far as they were used in the Birmingham factories that succeeded the Gloucester hand industry. However, it is now apparent that the situation is less straightforward. Finds of solid headed pins supported by documentary evidence, together with a re-examination of the buildings, now indicate that important development work on powered production took place in Westgate Street.

Kirby Beard and Co

Kirby Beard and Co moved from Gloucester to Birmingham in 1853 and subsequently amalgamated with other pin companies but the name was retained until the middle of the 20th century. They are still well known for the 'Kirbygrip' hair slide. Unfortunately the Birmingham factory and their London offices were destroyed by enemy action during WWII and any documentation that may have existed of their Gloucester origins was lost. Also destroyed was a very early pin machine brought from the Gloucester factory. It is believed that around 30 machines were moved from Gloucester when the firm relocated in 1853 (1).

The lack of company records means that we are dependent on indirect sources such as census returns, trade directories, wills, newspaper accounts etc. to construct a company history. Among the numerous artefacts at the Folk Museum relating to pin making is a faded clipping from the 'Drapers Record', the trade publication for those in the drapery business. The edition is dated 9th November 1907 and describes the history of Kirby Beard as related (presumably) from the memories of those who had taken part in the relocation from Gloucester over half a century before (full text at appendix 2). The article also includes a reproduction of a portrait of William Tovey that (again presumably) hung in the offices in Birmingham at the time (figure 3). This article is a key text from which subsequent histories have been derived and contains fascinating and intriguing references to the mechanisation of the industry.

'...endeavours were made by the firm to substitute steam power and machines for the hand labour which had hitherto been supreme. Messrs. Kirby, Beard & Co. were the first firm to start this radical change. They commenced by setting up a steam engine for wire "drawing" and "pointing". This was followed by machines for making pins with solid heads direct from the wire. This machine was first worked at Gloucester, and it is interesting to note that the firm had manufactured pins at that place since 1743....

The article goes on to say that in 1818 Kirby Beard purchased the rights to an automatic pin machine designed, the year before, by an American, Seth Hunt. They employed another American, Lemuel Wright, to build and develop the Seth Hunt machine, but with limited success. Wright then left but in 1824 patented his own successful machine, which he then licensed to other companies including Daniel Foot Taylor of Lightpill. How much was Wright's success due to his time spent on development in Westgate Street, Gloucester ?

The account quoted above makes it clear that mechanisation happened in stages; there was no sudden leap from hand-crafted pins to solid headed, machine made, production. Stages in the process, such as wire drawing and pointing were mechanised before the introduction of the solid head machines. Social factors too would have played a part. The Cholera epidemics of 1832 and 1847 may have accelerated the move to machines. The poor areas of alleys and yards around Archdeacon Street, The Quay and the Island were where the majority of Kirby Beard workers lived and where most deaths occurred (123 in 1832 and nearly 100 in 1847). Factory acts regulating the hours of women and children would also have reduced the supply of labour.

The most expensive part of the pin manufacturing process was that of the brass wire, and the cost of wire drawing. The many different sizes of pins produced required the wire to be drawn down to many different gauges. For the smallest pins this might need to be done through several stages with an annealing stage if the wire became too brittle. Hand wire drawing requires strength, skill and space and was an early candidate for mechanisation. Pin machines, with their huge output compared to the hand industry, required a correspondingly large supply of wire. This wire would need to be of a consistent quality throughout its length; something that would be difficult to achieve by even the most skilled drawer using only a pair of pliers and his own muscle power. Initially waterpower was used for the purpose, making use of redundant textile mills in the Stroud valleys, but in Gloucester this was not available and the newly invented steam engine was the only option. Somewhere in the Kirby Beard factory complex we would expect an area devoted to wire drawing. So far this area is unidentified but

may have been in demolished buildings shown on the Board of Health map (figure 5) or within the pin factory annexe (figure 6).

The Kirby Beard Partners

The pin-making factory that became Kirby Beard and Co was established around 1743 by William Cowcher (1713-83). Cowcher was an important figure in the City, becoming an Alderman. He has an impressive memorial in the South Aisle of St Nicholas Church opposite his factory that also records the names and dates of several of his children including Richard Cowcher. Richard succeeded his father in the business but died aged only 39 in 1805 (figure 2). William Cowcher built a fine town house next door to his factory that later became the company offices (still standing and now occupied by Nikki's Taverna). Richard Cowcher established the partnership with Robert Kirby, but the Cowchers were both dead long before the first pin machines arrived.

Robert Kirby probably brought vital Capital to the business and looked after the London end of the trade. He was well connected and became a Sheriff of London in 1816. The Gloucester pin makers all maintained London warehouses. These were situated near London Bridge in the City and were where the majority of the production was traded. By 1820 two further partners, George Beard (1810) and William Tovey (1815) had joined. George Beard succeeded the Cowchers as pin maker and William Tovey (figure 3) worked primarily as the regional or country salesman. Tovey, who died in 1823, was a huge man weighing 23 stone. The names of Tovey and Cowcher were later dropped and the firm appeared as Kirby, Beard and Company by the 1840's.

Kirby Beard was the most important pin firm in Gloucester, and lasted the longest. The 1851 Census records George Beard aged 34, son of the first George Beard, as a pin-maker employing 132 hands. In its latter days at Gloucester, the firm's premises included the present numbers. 99, 101, 103 and 105 Westgate Street - the offices being in number 105. Clearly in 1851 this was still a substantial business. Within two years George Beard had moved the business to Birmingham and 30 years later he is living in a substantial house in Solihull, Hillfield Hall, with six servants including a butler (6).

The story of the partners and of the relationships, marital, personal and business, between Gloucester's pin makers in the first half of the 19th century is not yet well researched. In this context the Gutch deposit at Worcester County Records Office has huge potential. The Gutch archive contains information about the smaller Gloucester pin making concern of Hall and English and has many references to Kirby Beard with whom they had familial ties and maintained a price association.

The Westgate Factory On 19th Century Maps

Two 19th century maps record the existence of a pin manufactory in Westgate Street; neither records any other pin 'factories' in the City by this time although a new Gloucester Pin Factory would be established in Horton Road in 1892 (closed in 1939 and now the Irish Club - this made hair grips and hooks and eyes but not pins).

Arthur Causton's survey of 1843 (figure 4) marks the factory exactly within the area now occupied by the Folk Museum. However, the Board of Health map of 1852 (figure 5) has the factory marked further west on the area now occupied by a nightclub (formerly a bonded warehouse of the Cheltenham and Hereford Brewery). This change of apparent location to land immediately behind the company's offices may be incidental but could be significant

given the transition to mechanisation during this period. On the opposite side of Quay Street is a small building attached to a smithy and marked 'Machine Manufactory'. Could this building be linked to the pin factory and might it have been used to manufacture pin machines before the relocation to Birmingham around that time?

The Evidence From The Buildings

Knowing nothing of the Folk Museum's history, its former use is immediately apparent when floorboards are lifted to reveal heaps of handmade brass pins and debris trapped by the plaster ceilings. Further investigation produces 'industrial' looking hearths and chimneys, windows and skylights inserted in the oak frame and small doorways (now blocked) cut through to adjoining premises. The remains of pins trampled into the floorboards by the feet of the workers are a reminder of the human workforce that once filled the building, many of them children (7, 8).

The hand made pin industry did not require purpose built premises. Like many other processes prior to the industrial revolution much of the work was done at home by out workers. However the pin making process had a number of stages that had the potential to be mechanised or that required particular skill and were better carried out in a workshop. As mechanisation advanced premises had to be adapted until a point was reached where only purpose built factories would do.

The top floor of the Folk Museum has clearly been adapted for the pin trade. The Tudor fireplace has been re-built as an annealing forge (figure 8). The attic floor has been removed and a high ceiling with skylights inserted (both now removed). Along both sides two rows of small windows have been inserted to light the workshop. All of these features seem to date from the eighteenth century and offer no clues to mechanisation.

However, the building now known as the 'Pin Factory Annexe' is a much more likely candidate to house early pin machines (figures 6 & 7). The building has been adapted from a two-storey timber frame structure. A brick built second floor has been added that blocks the gable window in the (now derelict) brew house of 89-91 Westgate Street. Three long rows of windows with horizontal sliding ('Yorkshire') sashes in an early 19th century style now completely obscure the ancient origins of this building.

On the South East corner a huge square brick chimney has been inserted. Internally the new second floor is heavily boarded and braced as if intended to take a substantial load. The chimney is interesting, as it appears to serve no fireplaces or openings other than on the ground floor. It could be interpreted as a flue for a steam boiler and such a chimney would have been necessary for early experiments with steam power. The adaptations to this building are extensive and must have been expensive. Was the 'Annexe' altered around 1818 when the Seth Hunt pin machine patent was purchased?

Conclusion

The story of the last phase of the Gloucester pin industry has yet to be written but I hope that I have revealed tantalising glimpses of what that story might be. The simple view that the Gloucester hand industry failed to adapt to mechanisation is not valid because when Kirby Beard moved to Birmingham they moved a quantity of fully functional pin machines from Gloucester.

Acknowledgements

I am indebted to Brian Jowett, probably the last man in England to manage a pin factory. He was group production manager for Newey and Tayler in Birmingham, incorporating Kirby Beard. Mr Jowett's visit to the Folk Museum in 2005 and subsequent detailed observations on past publications and surviving artefacts inspired this article. It is hoped that with his help a further article answering some of the questions set out above will appear in the future.

References

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- 2 Jones, S R H, Hall, English & Co 1813-41 Business History Vol 18 Jan 1976.
- 3 Gloucester Folk Museum documentation and research files.
- 4 Will of William Cowcher Gloucestershire Archives, 1789/97.
- 5 1851 Census for Gloucester.
- 6 1881 Census for Gloucester.
- 7 Cox, N R, *Gloucester Folk Museum a Guide to the Buildings* 1987



Figure 1
The Gloucester Folk Museum, formerly the pin factory of Kirby Beard and Co. Alderman William Cowcher's house and the company offices, now Nickis Taverna, described as 'new built' 1776 (GA gms137)



Figure 2
The Cowcher memorial in the South aisle of St Nicholas Church. William Cowcher died on November 1st 1785 aged 70. He was succeeded as pin maker by his son Richard who died on December 27th 1805 aged 39.

Figure 3



William Tovey, one of the partners, weighed 23 stone and died in 1823.

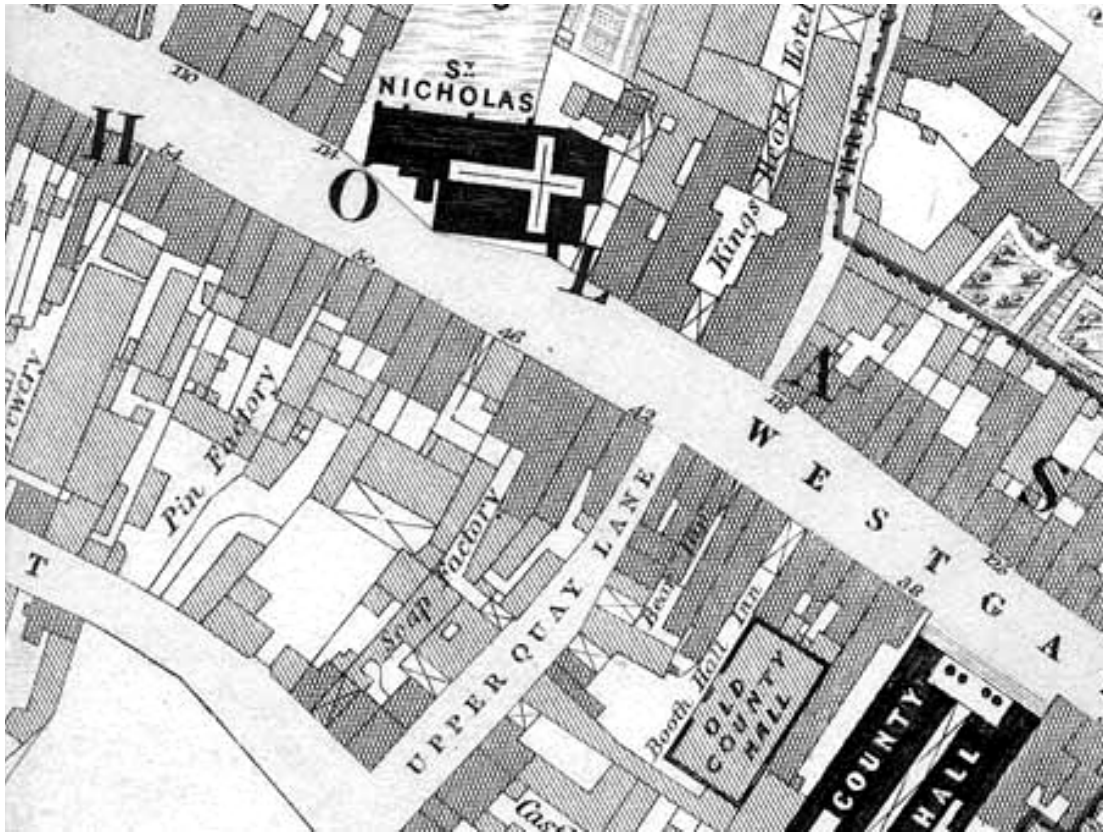


Figure 4
 Causton's Map of 1843 clearly shows the pin factory annexe at the rear of the Folk Museum. It is to the right of the letter 'y' in the word factory.

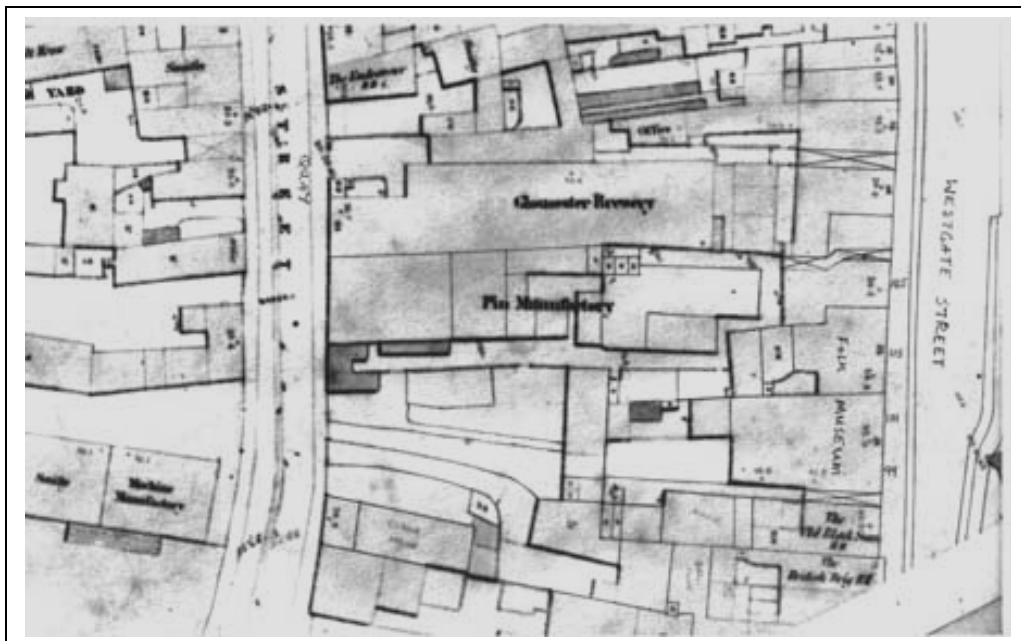


Figure 5
 The Board of Health map of 1852 has the Pin Manufactory marked further West over warehouses now occupied by a nightclub. The Warehouse was built in 1925 and replaced buildings to the rear of William Cowcher's house.



Figure 6
Gloucester Folk museum Pin Factory Annexe.



Figure 7
Folk Museum Pin Factory Annexe rear



Figure 8
Gloucester Folk Museum top floor chimney adapted to pinhead annealing forge.
The machine is a heading ram for attaching separate pinheads.

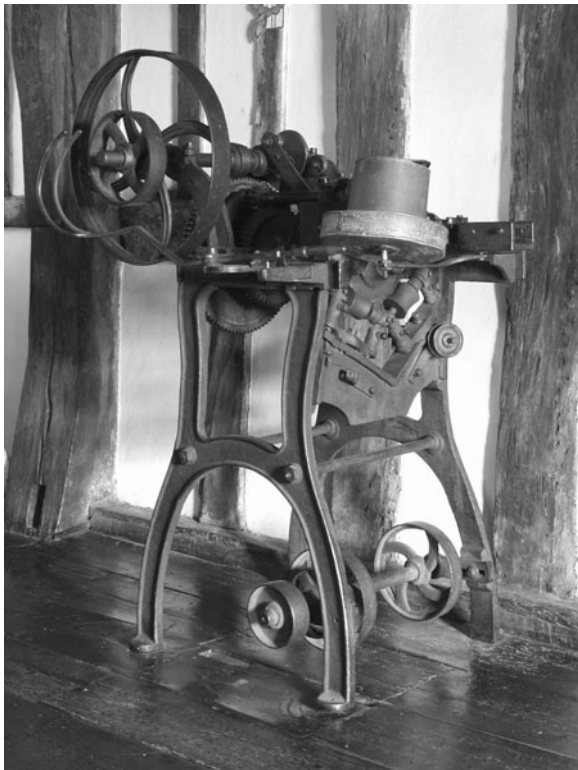


Figure 9
Pin cutting and pointing machine
Gloucester Folk Museum display.

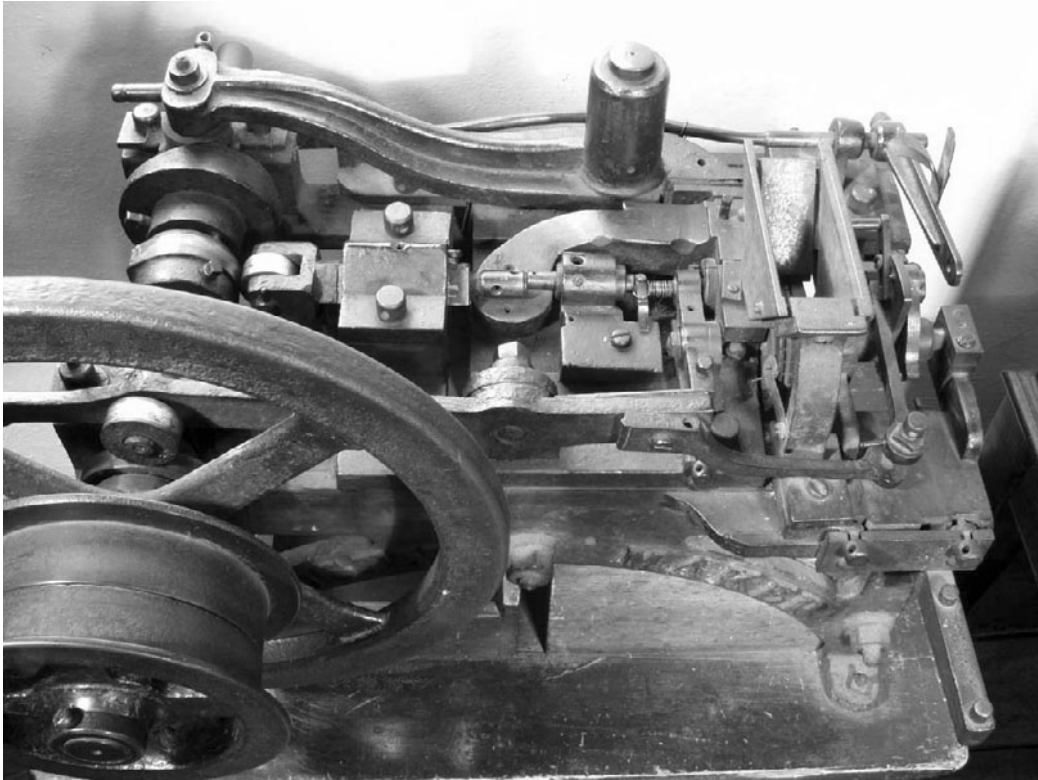


Figure 10
Pin heading machine for solid head pins.
Gloucester Folk Museum display.

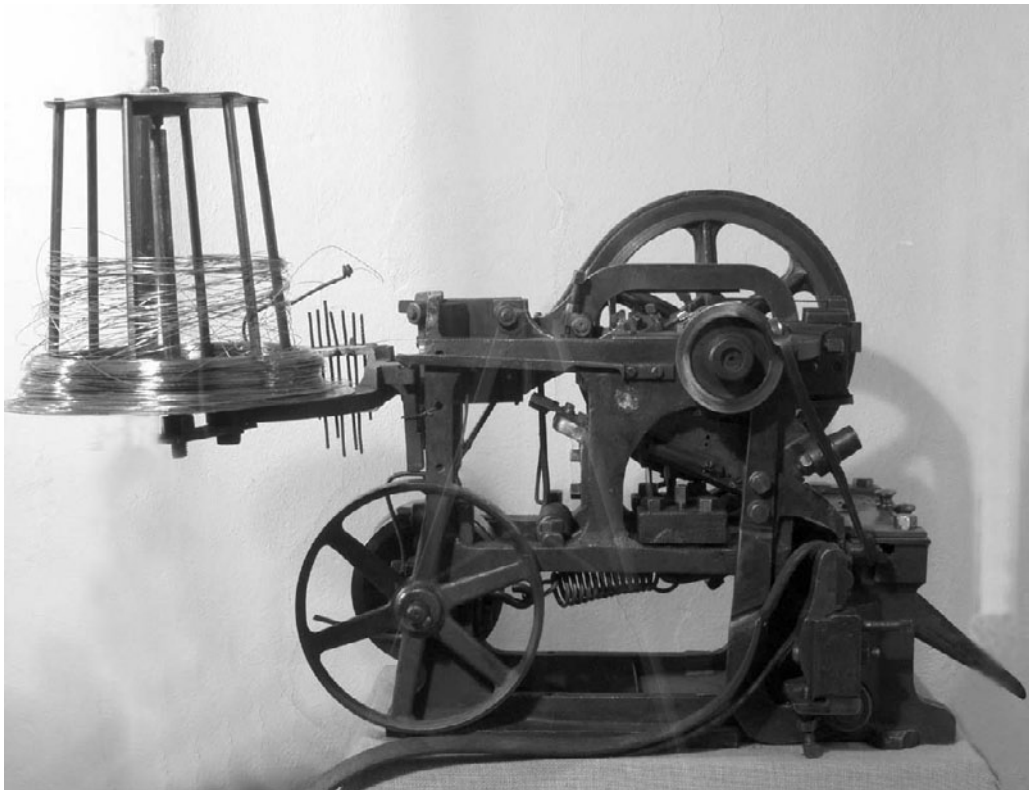


Figure 11
Fully
automatic
pin
machine
c. 1880.

Gloucester Folk Museum display.

Appendix 1

Pin-making by hand in Gloucester (3)

A number of pin-makers and wire drawers were working in Gloucester from the mid-sixteenth century onwards, but it was John Tilsley who gave a great boost to the trade. He set up a small factory near the Southgate in 1626, and this employed more than 80 “boys and wenches” by 1632.

The industry continued to expand during the seventeenth century and should be recognised as the first to produce goods by non-craftsmen in a factory setting. By 1735 pin making was “the chief manufacture of the city”. It was probably the largest pin-making centre in Britain (and probably the World) by 1763, employing 1,200 men, women and children. In 1802, the nine pin factories in Gloucester employed 1,500 workers out of a population of 7,579.

The initial success of the pin-making industry in Gloucester was due to the existence of local brass industries supplying the raw material; a relatively large urban population providing the labour; and good water communications for distributing the finished pins. It was a hand industry not requiring such things as special buildings or waterpower.

But from the beginning of the nineteenth century, Gloucester manufacturers were faced with an almost continuous series of problems. The Napoleonic Wars (ending in 1815) disrupted trade and lost export markets. Thomas Haynes, one of the chief pin-makers in Gloucester, went bankrupt in 1808 and many others suffered. Competition for labour and markets arose as other local pin manufacturing centres such as Bristol, Bath and Birmingham expanded.

There was partial recovery and two decades of relative stability, helped by a price association formed by three Gloucester pin firms in 1827 to control prices in their major London market. But this was broken in the 1830s by competition from Bristol manufacturers, traditionally makers of low-quality pins. The higher end of the market was also attacked in 1833 by the Stroud firm of D.F.Taylor who used machines for making solid-headed pins patented by an American, Lemuel Wright, in 1824.

The price association was abandoned in 1836 following five years of economic depression.

Appendix 2

An Interesting Personage in The History of The Pin Trade

From The Drapers Record November 9th 1907

It was the custom amongst bygone kings and potentates to be followed in their campaigns by historiographies of renown, whose duty consisted in extolling their master’s successes, and in slurring over the defeats. It would certainly have been better for the world if the plodding chronologists of centuries ago had busied themselves more with the commercial history of their time, and less with the endless squabbles of contemporary kings. Had only the traditions of some of our old-established firms been as carefully recorded as have those of our reigning dynasty, how instructive a record would have been transmitted to posterity, and how admirable an example furnished for our guidance in the future.

This want of continuity in the records of long-established firms is due, in part, to the successive introduction of partners, who having no intimate relations with the founders of the concern, are content to restrict their interest in its progress to that part of its history with which they have been personally associated. Occasionally, of course, exceptions are found to this general rule, and of these exceptions, one of the most noteworthy is the firm of Messrs. Kirby, Beard & Co., of London, Paris, Birmingham, and Redditch. This well-known firm of manufacturers was founded as far back as 1743 by Mr. William Cowcher, who directed establishments at London and Gloucester. Since his time the business has been carried on by sons or near relatives until the present day, and for the greater part of this same period it was conducted on the same premises. This date will suffice to show, that if not absolutely the oldest manufacturing firm in the country, Messrs. Kirby, Beard & Co. must be reckoned Nestors of British industry. For nearly a century-and-a-half the firm have been connected with the manufacture of pins and needles, and have succeeded in establishing a well founded reputation for excellent workmanship. One of the first dates with which we have to deal is the year 1816: which was marked by the shrievalty of Mr Robert Kirby, the then senior partner in the firm. The year was an eventful one, being rendered memorable by the celebrated Spa Field riots, a disturbance which afforded Mr Kirby ample opportunity for devoting himself to serving the best interests of the City of London. Notwithstanding these pressing calls upon his time and energy, he by no means neglected the business of which he was the active head, but superintended, in conjunction with his partner, George Beard, the introduction into their method of manufacture of numerous important improvements. Mr Beard, the grandfather of the present proprietors, had previously been an apprentice of the firm, and therefore, from his long connection with it, had its interests as much at heart as his senior partner. The essence of the changes originating with these two gentlemen may be summed up as the introduction of machinery. Up to the time at which we have arrived, a pin was the result of a long series of processes carried out by hand, and amounting in number to twelve or fourteen. Each of these processes was performed by different workmen, who from long and incessant practice attained to an extraordinary degree of skill. In those days the tools and appliances made use of were of the simplest description, and pins and needles owed their production almost entirely to handicraft.

The first step in the great revolution which was shortly to follow was the purchase by the firm in 1818 of some machinery patented by an American named Seth Hunt, for manufacturing pins with solid heads. Although specious in plan and boasting considerable ingenuity, the machinery failed to stand the test of practical work, and the hope of producing pins by its aid had to be abandoned. For some years after this unsuccessful attempt to introduce machinery, the old processes of manufacture were persevered with, and no improvement of great magnitude has to be chronicled. The next important date in the annals of the firm is the year 1833, when Mr G Beard, the father of the present proprietors, who died last year in his 90th year, began his apprenticeship to Mr Robert Kirby. About this time fresh, and on this occasion successful, endeavours were made by the firm to substitute steam power and machines for the hand labour which had hitherto been supreme. Messrs. Kirby, Beard & Co. were the first firm to start this radical change. They commenced by setting up a steam engine for wire “drawing” and “pointing”. This was followed by machines for making pins with solid heads direct from the wire. This machine was first worked at Gloucester, and it is interesting to note that the firm had manufactured pins at that place since 1743.

The machines at the present in use are extremely delicate and wonderfully efficient, producing pins pointed and provided with heads, at the rate of 180 per minute. The pins, however, as they leave the machine are only in the rough state, and have to be subjected to a series of

“finishing” processes before they are ready for the market. In addition to pins, Messrs, Kirby, Beard & Co. manufacture hairpins of all sorts and sizes, while at their establishment at Redditch they produce needles.

Of late years, the production of hairpins has been very much increased, and now the firm is probably one of the largest makers of hairpins in the United Kingdom. Their output at the present time is computed to be about ten tons, or 20,400,000 hairpins per week. The machinery by which the hairpins are produced is as complete and up-to-date as the pin machinery, and is the special invention of the firm.

The firm have depots in London and Paris, and an agency in New York, to aid in the distribution of the goods, as well as agents in various parts of the world.

Appendix 3

The process of making pins by hand (3)

Brass pins were introduced to England in the mid-sixteenth century. Before this, bone, box wood and ivory were used. Iron or steel pins are also known to have been in use in the earlier fifteenth century.

Brass wire was readily available to Gloucester pin-makers after the formation of the Bristol Wire Company in 1702. The wire obtained from the wire drawer was very soft and covered with oxidation. To make this wire sufficiently clean, hard and of the gauge required by the pin-maker, the following stages were necessary.

1. Cleaning the brass wire

The wire was pickled in sulphuric acid, washed, beaten and dried,

2. Wire drawing

Wire was bought in a standard thickness and redrawn by pin-makers to that required for pins of different sizes. The wire was wound on to a reel or barrel, and pulled through a draw plate on to another barrel. This was repeated several times until the wire was the correct gauge and sufficiently hardened and bright.

3. Wire straightening

The coil of wire was placed over a spool and one end of the wire passed round a set of nails in one end of a twenty-foot bench. The wire was straightened by pulling with pincers through the nails and running it over the bench which measured the length. A good drawer could pull 60 feet of wire a minute off the reel.

Everything depended on the alignment and spacing of the nails: the further apart and more obtuse the angle, the thicker the wire and heavier the pin.

4. Cutting into lengths

The lengths of wire were then cut with shears worked by the foot into lengths of rather more than six pins. These short lengths, which were to form the shanks of the pins were passed to the grinders to be pointed.

5. Pointing

Each of these lengths was then pointed at each end by a machine called a mill, consisting of a circular single-cut file and a fine grit-stone, which pointed and polished respectively.

6. Cutting (1)

Lengths sufficient to make two pins were cut off from the ends of the wires pointed previously, and the remaining centre piece of the wire was also pointed.

7. Cutting (2)

The ends were cut off the remaining piece of wire, and this in turn pointed. Thus the six pin shanks were formed from the original six-length piece of wire.

8. Spinning heads

The pin heads were made from brass wire finer and softer than that used for the shank. This wire was coiled into a compact spiral around a wire of the size of the pins.

9. Cutting up heads

Two turns of wire were cut off the end of each coil to form heads. This was done by a sharp chisel fixed in a wooden frame and held down by a spring until the whole coil was cut up.

10. Annealing the heads

The heads were annealed to make them more malleable before they were attached to the shanks. This was done by placing the heads in iron boxes in a furnace at a red heat (c. 600 C.). The boxes were then plunged into cold water.

11. Fitting the heads

A bowl containing the loose heads was taken to the treadle-operated drop-stamping machine or heading ram, one example of which may be seen on display. The pin shanks were inserted into the heads, and the heads shaped and secured by a blow from the ram. Several blows were needed to fix the head firmly. An expert worker would head 1500 pins per hour.

12. Cleaning the pins

The pins were placed in a vat and boiled for half an hour in sour beer, wine lees, or a solution of tartar, and then washed.

13. Tinning

This was to prevent corrosion. The pins and granulated tin were packed in alternate layers in a copper pan. Water and cream of tartar were added and the whole boiled for half an hour.

14. Drying and polishing

The pins were dried and polished first in a barrel and then in a leather bag, both containing bran. The bran was separated by winnowing and the pins collected in bowls.

15. Papering

Pins were stuck into papers that had been crimped. Children often undertook this work.

Nb This 'division of labour' was recognised by Adam Smith in his famous work on economics 'An Inquiry Into The Nature and Causes of the Wealth of Nations' in 1776 and also in France by Perronet in 1762.

Appendix 4

The Mechanisation of Pin-Making (3)

The lengthy and laborious method of making pins by hand changed little from the medieval period until the nineteenth century – except for the setting up of workshops and the introduction of a steel draw-plate with different sized holes through which the wire could be drawn to any gauge, and which standardised the size of pin. Both of these occurred in the 1800s.

Mechanisation in the industry seems to have occurred in two stages. In the early 1800s a number of processes were simply adapted to power operation. Straightening and perhaps drawing wire being carried out by power in some places before 1810. The grinding wheels used to point shanks were sometimes power driven before 1805. Some of these changes were first noted in Birmingham workshops, but in Gloucester they came later or were not adopted at all.

Later in the nineteenth century, new machines were invented which made a number of pin-making processes more automatic, but it was pin heading that proved most difficult to make fully automatic.

The first break through came in 1817 when an American, Seth Hunt, patented a machine, which would produce pins with the “head, shaft and point in one entire piece”. A Gloucester firm, later named ‘Kirby, Beard and Co.’, bought the machine and the patent, and in 1818 started manufacturing the first ‘solid-headed’ pins. But the venture did not succeed and traditional hand manufacture of pins continued for the first quarter of the nineteenth century. It was another American, Lemuel Wright, who effectively changed English pin manufacture. In 1824 he patented a pin machine that would produce forty to fifty solid headed pins per minute. The head was made on the same piece of wire as the shaft, which was forced up and formed the head in one movement.

Wright set up pin making business in Lambeth, and then moved to Stroud. The patent was sold to Daniel Foote Tayler who adapted Wrights machine and sold the first solid headed pin in London in 1833.

Tayler operated for some years from Lightpill Mill, near Stroud, but his company was not a success and went into liquidation. It was purchased by John Williams who removed the machinery to New Hall Works, Birmingham, in 1840 and traded as ‘D.F Tayler and Co. Ltd.’ Williams improved the machines until one girl could look after a number of them. Such developments meant the end of traditional hand pin making in Gloucester.