

NEW EVIDENCE OF EARLY 18TH CENTURY WIREDRAWING AT WORTLEY

It is unusual that a small disc of lead from the early 18th Century which was recently found in the West Country could be traced back to its origin at Wortley near Barnsley in the West Riding of Yorkshire.

In the spring of 2010 the Wortley Top Forge web site www.topforge.co.uk received an Email from the person who had found the disc, whilst using a metal detector, asking if we were interested ? A small sum of money allowed us to take possession of it.

THE END OF A LONG JOURNEY.

The tally was found in a field at Stanton Wick, Somerset a village approximately 7 miles south of Bristol close by the A37, this road is of great age and traverses between Bristol - Shepton Mallet and Yeovil, servicing an area in which the famous West of England cloths were produced in the 18th Century. This same road continues onward to Exeter and Cornwall. The A37 also crosses the A368 close to Stanton Wick connecting Weston Super Mare and Bath

Where was the wire going, what was its final destination and use? We will probably never know, but wire of the size 18 gauge indicated by the lead tally could well have been used in the manufacture of cloth, which ever English gauge system we use, 18 gauge would be between 0.045 and 0.055 thousandths of an inch in diameter, about the size of a sewing needle. Wire of this diameter was used in the manufacture of woollen cloth. Could it have been destined to be used for screens for the tin or copper mines of Cornwall? Or Bye Mills within a mile downstream, on the River Chew from Stanton Drew, a former iron and copper battery mill in use from 1600 - 1860. A water wheel drove a series of drop stamps for crushing iron/copper ores, to small sizes before separating the small fines with a wire mesh screen. Was the Wortley wire going to be used here? There is evidence that copper smelting was done as well as glass making (Bristol glass) taking place in the area but there seems to be little or no use of wire in the glass industries, so perhaps it is safe to rule out glass working as a destination at this period. Was the site of the tally find, an overnight or resting place to feed and water the pack animals and their masters ? Could the tally have become detached or torn off during the removal of the wire from the animals when allowing them to rest for the night, or was it removed mischievously or maliciously?

PREPARING WIRE FOR A LONG JOURNEY.

At this period, goods of this sort would have been carried by pack animals or possibly carrier's wagon. Wire in long lengths has always been made into coils and has to be

kept under control and manageable otherwise it, 'tangles' and can become useless. Control is maintained by drawing the wire in coils approximately 2-3 feet (600-900mm) in diameter; typically such a coil would weigh up to half a hundred weight (50-60 lbs) or so. A coil could consist of hundreds of rings of wire and to keep the wire in a manageable state, whilst being transported, a series thin wire ties were placed at intervals around the circumference of each bundle. It is to one of these ties that the tally would have been fastened, the tie wire being threaded through a hole in the tab of the tally, (which is now broken off). After being secured to the tie, the tally would have been tucked in between the coils of wire in an attempt to prevent it being torn off in transit. What we shall never know is, was it removed by accident or design? An interesting effect of the tally being, 'tucked in' and the forces exerted upon it during transportation is that the form of the wire has been impressed into the soft lead on either side of the tally, leaving evidence of:

1. The orientation of the tally within the bundle.
2. Because of the similarity of the width of the grooves, they leave a fair witness of the diameter of the wire. The deeper grooves appear to indicate a diameter the size of 18 on the Birmingham Wire gauge 0.049" (about the diameter of a medium sized sewing needle).

DATING THE TALLY.

The date of the tally can be shown to be between 1723 and 1739 say 1731 +/- 8years. The importance of the tally is that it is an early 18th century artefact that has been found, originating from the old wire mill at Wortley, that gives an insight into what was made and its method of distribution even if we are unsure of its final destination and end use. What is interesting is the distance that the wire was sent, why was this? Was Wortley at this time, one of only a few places in the country, where iron and steel wire was made? Reginald C. Andrews' book the, 'Story of Wortley Ironworks' tells us of a London warehouse where wire was also sent. The West of England connection appears to illustrate a wider distribution network than was previously thought - unless it was sent on, via the London warehouse.

DESCRIBING THE TALLY.

It was a lead tally, 1 3/8 inches / 35 mm in diameter, which we believe had been tied to a bundle of wire for identification purposes, the obverse giving the makers name - Matthew Wilson & Co, the reverse, the address - Wortley Wyre Mills. It had been cast in a pair of dies, designed and made specifically for that purpose. In the raised centre on the reverse of the tally, which had been left plain, a figure 18 was struck and on the obverse a letter B. It is almost certain the 18 refers to the size (diameter) of the wire expressed as a gauge number. The purpose of the letter B is much less certain, for Birmingham Wire gauge?.

SIZING THE WIRE.

The figure 18, almost certainly the size or gauge (diameter) of the wire expressed as gauge number is the earliest reference to a wire gauge number known to the author that has been recorded. Thomas Hughes in his, 'On the Wire Gauge' of 1878 quotes prices for hand drawn steel wire in 1871, No18 gauge being 58/- shillings for a bundle weighing 63lbs. Hughes also affirms that after a long search he failed to discover a wire gauge made before 1842, however he does quote that in 1738 wire drawers at the Old Wire Mill in Greenfield, North Wales were paid a piecework rate of three shillings and nine pence a hundredweight for drawing iron wire of No 18 gauge, in spite of the fact that the drawing of wire in the UK goes back to much earlier times. Kenworthy, the Stocksbridge historian says that, there was a date stone on a lintel of the old wire mill at Thurgoland, dated 1624; this was the same mill that Matthew Wilson owned as a partner from 1723 until his death in 1839.

MAKING THE TALLY.

Whilst the tally with its connection to Matthew Wilson of Wortley and wire is interesting it is not the only avenue of interest that can be discussed. The tally was used for identification so it had to be relatively.

1. Almost indestructible and resistant to corrosion. (out in all weathers).
2. Will stand rough handling.
3. Not easily lost.

The method of tally making seems to cover the former criteria.

The lead tallies would have been made on the premises of the wire mill by being cast between two dies, probably held in a pair of tongs whilst molten lead was poured into them when, 'set' they were released to cool. The equipment to do this was simple, scrap lead, a fire to heat a lead pot, a ladle, a pair of tongs to hold the dies, which may have been made in Sheffield by a mark maker, a specialist who had the craft skills to design and make such dies. Other centres of mark making at that time would have been Birmingham and London, (evidence shows that Wilson had a London warehouse for his wire). Note the knurling on one side around the raised centre. The 5/32" (4mm) seriphed characters are evenly spaced, each word is separated by a star, executed in a professional manner. Each individual character is of a 'half round' section to ensure that when the tally was cast, it would release itself from the dies, an important point which makes one realise the degree of sophistication being applied to detail at this period. The dies would be quite an expensive but essential piece of equipment. Surely the tally is evidence that mark making design and manufacture in Sheffield of the early 18th Century, was one of the industries allied to the cutlery and tool making trades at that time and that they were quite sophisticated.

THE TALLY:

Suggested shape, full size.

Diameter 1 3/8" (35mm)

Ave. thickness at centre 0.16" (5mm)

Ave. thickness at edge 0.103" (2.5mm)

Lead was chosen because:

1. Its low initial cost and availability..
2. Workability, its low melting point for casting.
3. Easily marked (with punch) wire gauge size.
4. Easily attached to wire bundle.

The major cost in the making of tallies were the dies in which the tally would be cast. Close examination reveals that on the edge of the tally is a small, 'step' where the two dies (which form the mould into which molten lead would have been poured) prove the tally was cast in two dies. The design of the dies seems to be well thought out, a thick raised centre on which to strike a mark to denote the size of the wire etc., is enclosed within a thinner rim on which the seriphed characters are formed intaglio to mark the words, with stars separating the words, producing a very clear image, which has obviously stood the test of time. The edge of the raised centre is knurled, to produce an inner border to the name.

We must speculate about where the dies were made, London, Birmingham or more likely Sheffield, all these places would have had diesinkers or mark makers at that time capable of producing such work. The most likely material for the dies would have been brass, because of the ease of working, it is unlikely that steel would have been used because of its uneven grain structure which would cause the die to crack or to make a defective blank tally, cast iron would have been difficult to work (cast steel had yet to be invented). Almost certainly the circular form of the die would be cast brass which could

have been hand turned on a lathe in the same manner that a wood turner would today. The characters would then be set out and engraved, being finished with a round engraving tool to ensure the tally, 'releases' from the die after casting. The, 'Co' is the best preserved example of the engraving, as most of the other characters have been worn or distorted. The dies would have been held in a pair of tongs to keep them in alignment whilst the molten lead was being cast.

The lead used to make the tally, could have been scrap material or off-cuts, perhaps from a plumbers, all water pipes such as there were and many gutters and roofs, were made of lead. The lead was put into a cast iron lead pot, hung over a fire to melt. A lead ladle would then be used to transfer the molten lead into the mould, it would set within a few seconds and was then dropped into a bucket of water to quench and not to cause any damage to the soft lead tally as it fell.

The figure mark struck on the raised boss is '18'; the size of the wire, note that the figure 1 is upside down. Whilst the figures could be reversed to read 81, there is no wire gauge of that size, so we may be certain that the figures are intended to read 18. Both the 18 and B characters have a white mineral deposit within the recesses, it is likely that this is lime. In the process of wire drawing lime was used, it was also used to inhibit rust and the tally could have been coated by it after being dipped in a trough attached to the bundle containing a solution of lime and water, the wire would then have been dried off in front of a fire. Whilst the coating was not perfect at least it helped to keep the wire in a mostly 'bright' condition. All other iron and steel work of the period was produced, 'in the black' state i.e the metal had an iron oxide coating, therefore not, 'bright'. Any bright goods of the time e.g. cutlery, tools, domestic ironware etc., would have been ground bright. The action of drawing made the iron or steel, bright has it passed through the, 'wortle' (draw plate), which was the requirement of the customer if it was to be used in the production of textiles (carding) and required a smooth surface finish so as not to cause damage to the woollen threads..

A comparison with the width of the indentations in the tally where it has rubbed against the wire, provide a fair indication of the wire diameter, which is expressed as a gauge size. One of the oldest wire gauge systems in existence was the Birmingham Wire Gauge. A steel plate was cut with a series of notches of varying widths, each notch being given a number. Using the Hawley Collection of Tools and Cutlery at the Kelham Island Museum and their extensive range of wire gauges, shows 18 BWG to be of a similar diameter. Now of course wire is sized and read by a modern micrometer, to at least a thousandth of an inch, but in the 18th Century the wire gauge was as near as could be got to a precision instrument, which is why it is confidently claimed that the wire size is, '18' gauge.

Whatever the final destination and use may have been, let us hope that the wire did not go astray even without its tally and that Matthew Wilson and his workers got paid for their efforts.

This small lost and now retrieved lead tally gives us an insight into how Wortley iron, steel and wire industries of the early 18th Century went about their business, their industry and transport of articles that were crucial to other manufacturing industries of this country, hundreds of miles away.