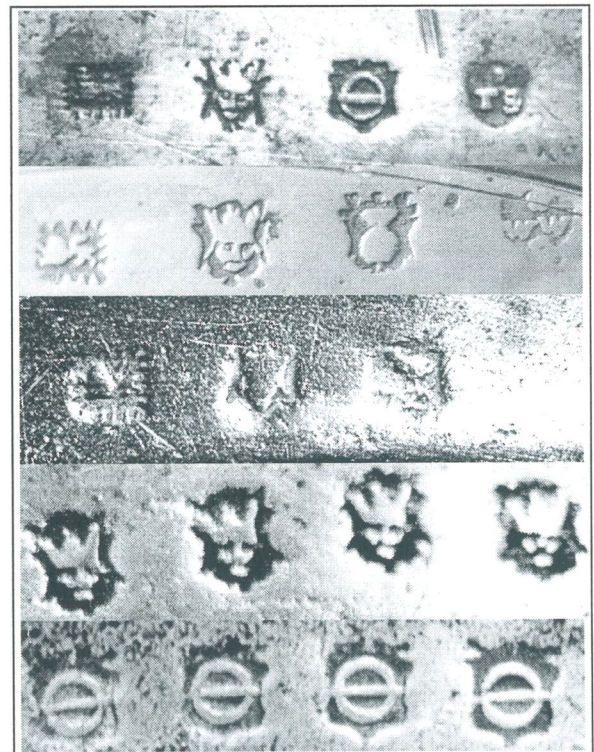
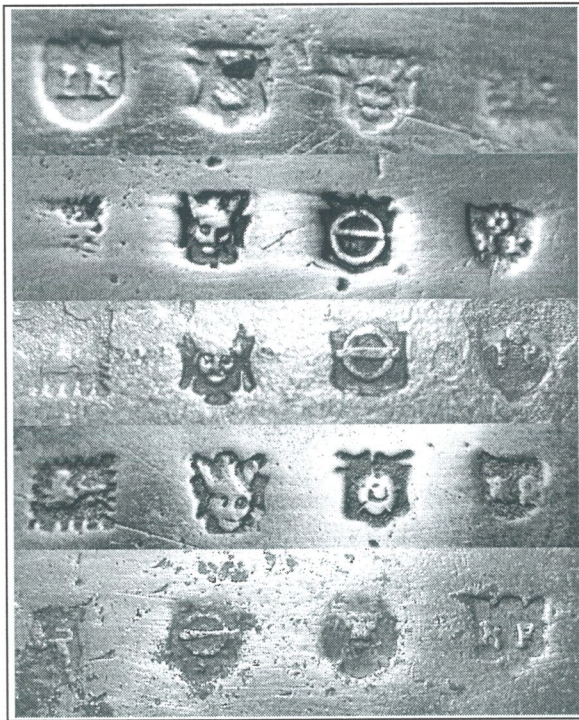


March 03

A punch engraver of the 17th century; his iron and steel, master dies and master punches.

December 1999, Jan Gadd

Many London pewterers working during the c. 1665 – 1690 period used several punches for their pseudo hallmarks that appear to be identical. Some thoughts about how this could be the case inspired this article.



Hallmarks of eight London and two Reading pewterers. Left column from top John Kenton, Nicholas Kelk, John Paine (MPM 5839), Richard Smith and Richard Fletcher, right column, Thos. Shakle, Will White, John Stile and Henry Frewin Sr and Jr of Reading.

The case hardening of wrought iron is a very old technique indeed. Pig iron was inexpensive and the technique of transforming pig iron into wrought iron made the material cheaper. Hammering and other forms of compressing the wrought iron to form iron rod of various sizes suitable for punches made it harder and the heating and re-heating to soften the iron during the manufacturing process was not only known to the engravers; a furnace/kiln was a necessary working tool for him. (The differences between old and new “tool steels” and the hardening process will be discussed at the end of the article.)

For hundreds of years engravers across Europe had manufactured individual wrought iron punches for goldsmiths, silversmiths and many other crafts. This category of engraver was related to the medal and seal engravers. Another category engraved letters of various kind and size for the printing industry, for the printers to punch into a softer mould-metal (copper) from which the type was cast. It is possible and even probable that two different types of engravers with different special skills supplied punches to the London pewterers during the period discussed here; one was the

manufacturer of the larger registered touch and another group supplied the smaller punches for the hallmarks.

The engraver worked with his hardened engraver's tools into the soft wrought iron to produce in the case of the pewterers' "touches" a negative and mirror image. He finally hardened the punch to give it a longer life. This one-off manufacturing procedure for each punch was very expensive indeed which is the reason a Master's large and elaborate touch was often modified and re-used by a successor. The life of such a punch was limited, however, and new ones had to be made from time to time. Normal wear could be rectified by the engraver, however, by first annealing (softening with heat) and then sharpening existing letters and other content with the engravers' tools and finally re-hardening. Modifications of inherited touches too were made in this fashion, of course. This manufacturing method is called "cold forming by stock removal" by engineers; slow but necessary for the manufacture of the larger punches but not for the manufacture of the much smaller pseudo-hallmarks as can be seen below.

The pewterers were possibly more important customers of the engravers than the silversmiths for the simple reason that all silver marks with the exception of the Master's own touch were struck at the Goldsmiths' Hall.

Three out of the four hallmarks a London pewterer would normally use from c. 1665 were non-distinct and rarely related directly to any one pewterer; he simply chose the symbols and devices he liked. His choice was made easier as two of the four hallmarks invariably emulated the London silversmiths' Sterling lion passant and the leopard's head of London. (Both symbols also used in the provinces, but somewhat later.)

A close study of many hallmarks struck by London pewterers during the 1665 –1690 period has revealed close similarities impossible to repeat by individual cold forming (copying) of the "same" hallmark over an extended period. It would appear that one engraver in particular not only found an inexpensive way of repeating hallmarks "identically", he also found his way into the hearts and wallets of a large number of London sadware pewterers of this period. A possible method that could have been used by this particular engraver is discussed in sections A - C below.

A. Some general comments

Only one method of "mass producing" sharp-image "steel" hallmark punches was available to the 17th century engraver and that was by heat forming.

Below is an attempt to hypothesize a possible manufacturing method used by this and other later engravers, based on the evidence found in many "identical/similar" London Masters' hallmarks during the c. last third of the 17th century, some of them illustrated in Fig. 1. Before suggesting how this manufacture might have been carried out, it is necessary to study carefully these photographic and also actual hallmark images as struck on the pewter objects. This is all we have left from the pewterers' workshops, after all – no early punches have survived. (Hallmarks illustrated by Cotterell in Old

Pewter are drawn and never show good enough border detail to allow any conclusions. Photographic images, however, do.)

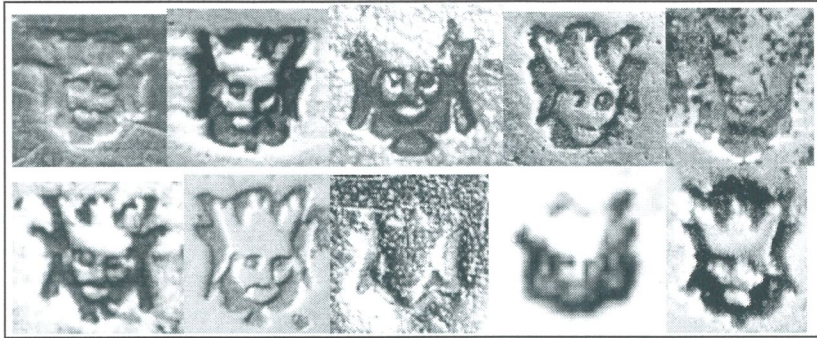


Fig. 2. The crowned leopard's head hallmarks illustrated here are all culled from the 17th century London pewterers' set of four hallmarks illustrated in fig. 1. A comparison strongly suggests that they all used the same engraver. Top row from left John Kenton, Nicholas Kelk, John Paine, Richard Smith, Richard Fletcher. Bottom row from left Thomas Shakle, William White, John Stile, William Hall and Henry Frewin (of Reading).

All hallmarks and punches have two general features; outline (border) and content:

1. The outline was often shield shaped, sometimes plain and sometimes with a variety of scrolls added to sides and corners. The same identical outline (border) can be found on different pewterers' hallmarks, also on marks *with different content*. One particular outline alternatively holds a buckle, a rose and a pineapple (John Kenton's). This strongly suggests that our engraver had an efficient method of pre-forming the different outlines on a quantity of hallmark punches prior to adding the content. He would keep such half fabricated blanks in stock awaiting the next order.
2. The content was usually simple. Apart from the leopard's head and the Sterling lion, the buckle (a symbol used by the goldsmiths¹) was common and a single rose frequent. There are clear signs that the hallmarks made individually for the pewterer containing his initials were also produced on pre-formed blanks using very simple heat forming means. (See below.)

B. Primary dies and punches for the engraver's own use, for the manufacture of hallmark punches.

1. In order to produce the outline (or border) of the pewterers' hallmark punches, the engraver had to manufacture first of all a range of different female *dies*. They were manufactured using pieces of soft wrought iron, first drilled at right angles to the surface and then filed/engraved to match the different *outlines/borders* of each future punch (see figs. 4 and 5). The thickness of the die could have been some 8-10 mm and a chamfer at the top would facilitate entry of red-heated punch rod. These female dies were then case hardened.

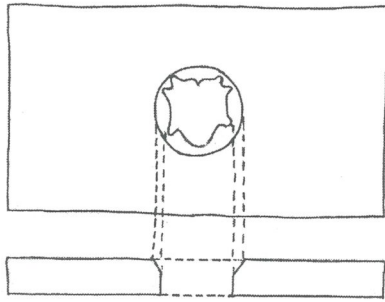


Fig. 3. Left drawing shows two sections of a female die showing the border/outline of the crowned leopard's head hallmark; one of the most common of the c. 1665 – 1690 period supplied by the London engraver chiefly discussed in the article.



Fig. 4. The leopard's head shown again above with another two frequently used hallmark outlines; the "stamp border", often used for the lion passant and the border/outline often used by this engraver for the pewterers' initials. The spikes on the "stamp border" were possibly individually struck into the side of the hot blank – see endnote 2 and discussion below in connection with the later marks by John Barlow and Edward Leapidge, Figs. 9 and 10.

2. For his limited "mass production" of hallmark touches, the engraver would have to make a quantity (range) of images too.

The *pewterers'* finished punches show the *mirror image* of the device or lettering and *depressions* on the punch show as *raised sections* when struck. There was no reason for the engraver to manufacture each small punch in such a complicated way, especially as many identical punches were required for his many customers.

He engraved instead by hand a range of punches showing the *positive (protruding)* and also *correct images/letters* (rather than mirror images/letters), exactly as they were later to be seen on the pewter, using short lengths of wrought iron rod (exactly as the letter punches supplied to the printers). This range of positive images (also letters) were then case-hardened and constituted the basic tooling-kit for the range of images the engraver was able to produce and re-produce and perhaps also to sell "off the shelf". How they were used is explained below.

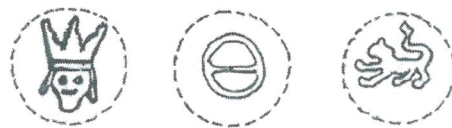


Fig. 5. Some images on the engraver's master punches with positive (protruding) devices.

C. Punches manufactured for the use of the pewterers/silversmiths to strike individual hallmarks.

The tools the engraver would have to manufacture for his own use in order to achieve a limited form or "mass production" of hallmarking punches for the pewterers has been explained above. Below is an attempt at reconstructing the way these 'manufacturing' tools might have been used.

The dies. The end of wrought iron rods or blanks of round and slightly over-size section (the pewterer's future punches) were red-heated and hammered through the die thus heat forming one (of several available) *outlines* of the small punch as illustrated above (Figs. 4 and 5). The blank was then quickly tapped free from the die from underneath and left to cool. Speed was essential here as the heat generated from the red-hot blank would otherwise quickly anneal (soften) the die. The length of the

outline pattern on the blank is the same as the thickness of the die, some 8 – 10 mm as suggested above minus, of course, the thickness of the chamfer (see fig. 3). It is entirely possible that a thinner section, some 6 – 8 mm was stable enough? This process could be repeated several times with careful cooling-off with a wet rag of the die in between uses. The blanks were then filed/smoothed across the surface, ready to receive the content or image. A ridge of burr would appear above the level of the shaped punch outline which was filed off. (Much the same as when a square wooden peg is hammered into a round hole.) A good supply of water would serve the dual purpose of allowing release of the outline-formed hallmarking punch and also to cool the die in order to retain the hardness of the “steel” surface.

The engraver’s positive image master punches. Some blanks with the desired outline were selected from stock and *re-heated*. From his range of master punches described under B above the engraver would then select a punch with a device to match the outline of the blank. This master image was punched into the red-hot blank, producing the *negative* image (depression) required for the head to appear positive (protrude) when later struck on pewter. This manufacturing procedure would somewhat distort the outline of the punch and some finishing would be required with a file. The punches were then case hardened and ready for the pewterer’s use. It is clear from John Shorey’s hallmark (somewhat later - the next generation of engravers production – see fig. 7. below) that his engraver finished the area surrounding the head with an engraver’s chisel prior to hardening.

Individual hallmarks with black letters, single and double initials, often with miniature devices added such as stars, crowns, fleur de lys etc. were also easy to produce for the engravers in a similar fashion as they probably had a very good range of letters and devices held in stock for the printers and other customers. Fig. 7 shows William White’s No. 4 hallmark with his initials and also two very small unidentified devices (flowers?) above and below the initials. The engraver would have to strike the W twice and also the minute device twice onto the red-hot surface of the shield outline blank. It is quite clear from the photo that there simply was not enough space across the shield to accommodate the two W’s properly lined up side by side. The W to the right was therefore struck at a slightly higher level.



Fig. 6. William White’s (OP 5073) initialled hallmark showing the right hand letter at a higher level for space-inside-the-outline reason.

It would appear that the pewterers often favoured a shield shape for this individual initialled hallmark. It is also evident that the engraver discussed here did not always *offer the pewterer a choice of outline* for his choice of image. Buckles, pineapples, leopard’s heads etc. were all supplied by this engraver on punches with the same outline, the lion passant on a punch with a different outline and individual, initialled HM touches often on shield shaped punches as mentioned above. This enabled the engraver to keep his prices down to his London customers.

It is impossible to guess how many images any one image-punch (master punch) would be able to strike onto the end of a red-heated blank before it became worn out. It is, however, important to remember that every time the engraver had to renew any one of his “popular” image master punches, such as the crowned leopard’s head or the

Sterling lion, *some variations to the image would occur*. Some slight differences of a different kind have been noted on various pewterers' versions of the "same" buckle. The horizontal bar across the circle sometimes occurs just above the centre and sometimes just below. The explanation is that the master punch showed these slight irregularities. The engraver when striking the master buckle punch onto the pre-formed asymmetrical rod/blank sometimes used it with the shorter semicircle uppermost and sometimes the other way.

The Pewterers's larger touches could be repaired and the images and lettering sharpened as explained above. The smaller hallmarking punches too could be improved when they started to show wear. Instead of sharpening the images with engravers' tools after annealing as he did on the larger touches, the engraver would simply anneal the punch in his furnace, file a new flat on the end of the punch (thus removing the original image), re-strike the image and re-harden. As the length of the outline on each punch was at least 4-6 mm, such re-striking could be done some 3 – 4 times, depending on the depth of the original image.

The engraver would either (logically) have forged this rod material himself in forging dies of various sizes from commercially available wrought iron bar or have bought it in to his own specification. The section was probably over-size rectangular to fit the dies above.

Other engravers

Not all London 1665–1690 pewterers used the services of the engraver discussed here but surprisingly many did! Many hallmarks during this period were obviously made in the traditional way; also the odd hallmark in a set of four where three can be judged to be "mass-produced". The customer base in London was massive then compared to provincial cities' so it is logical to think that the provincial pewterers' hallmark punches were cold formed like their touches were – and by the same engraver.

There are many examples of mirror turned "N"s in touches and labels. It is not conceivable that a skilled engraver would make such a mistake – no customer would pay good money for it. It is more than likely that the pewterer himself or some "back-street boy" tried his hand here at the engravers' craft.

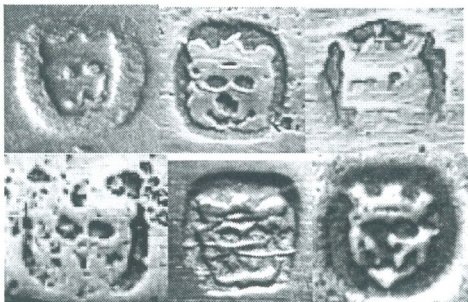


Fig 7. The next generation – the crowned leopard's head with a "castle rampart" crown, hollow eyes and nose and with a silly grin seems to be the "mass production" successor (c. 1690 – 1710) of the "sinister" leopard punch supplied to Nicolas Kelk and his contemporaries by the earlier engraver. Examples here (all with much simplified punch outline – probably "stock-rod") are from top left by John Shorey, John Jackson and "I.S." (on a triple reeded dish with Sir John Fryer's touch and crowned rose mark) and below from left HM from a trifold spoon (also with a harp HM), Alexander Cleeve (Nicholas Kelk's journeyman and successor) and John Calcott, apprenticed to John Shorey, free in December 1699. (Colonel Shorey was a London Merchant pewterer who never got his hands dirty. His "apprentices", such as Calcott, working as his journeymen, manufactured his pewter and struck their hallmarks on their produce. They seem to have been allowed their own set of hallmarks and Calcott's is shown below.)



Fig. 8. Hallmarks by John Calcott, c. 1699, illustrating the leopard's head used by many of his contemporary pewterers.

The new hardmetal pewter of London was more difficult to strike than the older alloy. The “stamp”-outlines illustrated below have sharp points or arrows pointing inwards. They started to appear frequently during the c. 1680 - 1690 period and the sharp points were possibly put there by the engraver² so that the punch would bite into the harder pewter with ease and to avoid double-striking. John Barlow's and Edward Leapidge's hallmarks are typical in this respect (see figs. 2 and 3). They were made by the next generation of London engravers and noticeable here are the identical and much less elaborate outlines of each set of hallmark punches. Some Bristol and Bewdley (and London) engravers favoured “ears” in the corners of the outline for the same non-slip reason.



Fig. 9. John Barlow's hallmarks.

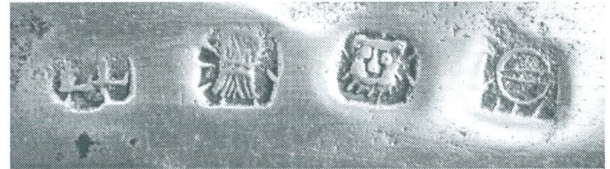


Fig. 10. Edward Leapidge's hallmarks

From c. 1690-1700 an upright rectangular HM outline with cut corners becomes very common indeed. This seems to suggest that a pre-formed rod material became readily available to the engravers from this date. This made the die-forming process of the outline obsolete and the punches cheaper for pewterers willing to accept this rather plain style of hallmark - see London but also Seymore of Cork etc.



Fig. 11. Hallmark No. 2 from a set of four used by George Seymore of Cork

Modern tool steels versus case hardened wrought iron

Modern tool steel alloys commonly contain some 0.5 - 0.6% of carbon in the case of knife and rasp steels and up to 1.3% carbon in the case of file steel. The manufacture is carried out in the soft state – as soft as possible in order to increase the life of production tools. The file is a cutting tool and goes through many stages of preparation before the cutting teeth are *struck* onto the surface. Some of these stages are the forming of the blank, forging of the tang (the steel handle), grinding and then draw-filing of the surface. All these operations will gradually, mechanically harden the surface and heating is essential to soften and “even-out” the steel prior to striking the teeth. The end product was until some twenty years ago hardened by means of heating in a 815 C lead bath (!) and then quickly cooled (quenched) in a temperature controlled liquid. The result is that the steel becomes “all hard”, i.e. *hard to the core*. The higher carbon content will give a harder but also more brittle steel after hardening. Some 95% of all files are today induction heated, however.

The only “steel” and method available to the tool industry of the last quarter of the 17th century and later was the wrought iron which had a very low carbon content; not high enough for the iron to harden after heating and quenching. After manufacturing, the tool to be hardened was packed together with charcoal and heated over a prolonged period. The carbon penetrated and hardened after quenching a thin layer of the *surface* of the tool which became known as “the steel case”. This ancient method of hardening is therefore called case hardening. It is of little interest to ask a modern pewterer about the longevity of his punches and touches as they are made from a very different material compared to the old punches made from case hardened wrought iron.

Conclusion

The image we see of ourselves in a mirror is not the image other people see. It becomes a second nature for tool, die and mould makers and also of engravers to think in three-dimensional mirror images which is very difficult indeed for a lay man. (The classical bronze sculptors and founders had the same problems to overcome.) As the above article is aimed at readers with a wide variety of backgrounds, some passages and sequences above have been emphasized and repeated unnecessarily in the eyes of some and possibly not often and clearly enough in the eyes of others.

This article has argued that some hallmarks illustrated here and used by the London pewterers during the 1665-1690 period were produced using a different and faster heat-forming method. *Some* of these hallmarks illustrated seem to be particular to individual pewterers, however, and may well have been individually made for them using the cold forming method.

Further discoveries of marks identical in part to the illustrated ones would therefore suggest London manufacture, c. 1665-1690. Not illustrated here, but with hallmark punches probably supplied by the same engraver and of the same period are Christopher Raper (OP 3839/J 95), Daniel Ingole (OP 2538), Lawrence Dyer (OP 1480), Samuel Jackson OP 2564 and 5741) and the unidentified pewterer “I.G.”.

¹ The shape of the buckle changed in time with fashion – see Samuel Cocks’ rectangular version, Cotterell OP 1004.

² All spikes point to the centre of the mark which suggests that they were struck with a sharp, short length chisel from the side into the red hot finished punch, prior to hardening.