

# **An Investigation of Hand Tools Used for English Cut-and-Rubbed and Gauged Brickwork**

Gerard Lynch, David Watt and Belinda Colston

## **INTRODUCTION**

Historically the term 'cut and rubbed' was initially used in England from the early 15<sup>th</sup> century to describe the post-fired working of standard bricks to produce architectural mouldings for enrichments prior to laying; mainly within nominal sized mortar joints.

The term 'gauged brickwork', or gauged work, appears in England during the 17<sup>th</sup> century (Gunther, 1928) and defined a new class of brickwork that was a refining in quality and accuracy, of the earlier 'cut and rubbed' work. Although this older name remained in use, as well, it was then understood to refer to gauged brickwork. In essence, gauged brickwork describes brickwork where a superior finish in the details of an important brickwork elevation is required, such as moulded reveals, arches, string courses and other forms of ornamentation. The term may appear paradoxical, as all brickwork may be considered gauged (measured), but it traditionally serves to distinguish a special branch of bricklaying work to very accurate measurements, which raised artisans of the craft to the status of the best masons.

## **DEFINITION OF A RUBBING BRICK**

A 'rubbing brick', or 'rubber', can be defined as a masonry unit, made from a brickearth, or topmost clay, that possesses a high natural silica content. It is low-fired, or baked, to a point just below vitrification (900°C) so that the resultant burnt brick possesses no fireskin normal to other fired bricks. The rubbing brick has the same uniform characteristics of soft body and close texture throughout allowing it to be easily cut, carved, filed and rubbed, (abraded), to present smooth accurate finishes and sharp arrises (edges), without detriment. In England, for centuries, this has made the 'rubber' prized for use on all forms of enrichments where precision and fineness of joint were essential prior to the mass production of mechanised quality- controlled and regular shaped bricks.

### **The Characteristics and Properties of Rubbing Bricks**

The widespread and quality reserves of high-silica, alumina and calcium bearing brickearths and top clays in England, particularly in the south, provided the necessary raw material for the type of bricks that could be capable of being cut, carved and abraded, without detriment for gauged brickwork. Slow and low-temperature firing that averaged between 800<sup>o</sup>c and 950<sup>o</sup>c provided bricks

‘soft’ enough for working to size and shape. It also, however, beneficially rendered the integral silicas and aluminates re-active when, in combination with the integral calcite within the brick, in similar manner to that of a hydraulic pozzolan. This created an all-important protective case - hardening that was initiated once the porous rubber was dampened immediately prior to the setting phase of construction, (Lynch, 2004, p. 286).

## **MEDIEVAL TUDOR CUT AND RUBBED WORK**

From the fourteenth century, the practice of post-fired cutting and rubbing of bricks to gain precise shapes for providing the detail to popular Gothic-styled buildings gathered so much momentum, that, from the early fifteenth century, the prestigious master bricklayers capable of executing this work were in international demand. Small wonder that, in England from this time, a ‘Ducher or Flemying’ was frequently requested to cut and build the richly-decorated chimney stacks for which the Tudor period is now so famous (Ryan, 1996, p. 57). Put simply, Flemish bricklayers were treating bricks, capable of being worked ‘post-fired’, as building stones.

### **Hewen Bricks and Brickhewers**

Numerous accounts show how the better bricklayers were also employed as masons. Christopher Dickenson was, for example, the master mason at Windsor Castle and Nonsuch Palace, yet is recorded in the Nonsuch accounts as a Master Bricklayer (Moore, 1991, pp. 232–33). The use of ‘de tegulis operatis vocatis hewentile’ or ‘worked bricks called hewentile’ (Simpson, 1960, p. 26 and 65) became established as the most popular way of producing enrichments on brick buildings such as simple cut and rubbed moulded window details (e.g. label courses), trefoil-corbelling, machicolations, and decorative chimney stacks. This highly-skilled area of cutting, rubbing, and shaping bricks was executed by craftsmen referred to as ‘hewers’ (Salzman, 1967, p. 145).

That the majority of fifteenth- and sixteenth-century mouldings were of ‘roubed [rubbed] bryck’ is readily apparent (Salzman, 1967, p.574), whilst ‘both from building-accounts and from the bricks themselves, the worked parts often revealing a core quite different from the fired face’ (Moore, 1991, p. 227). He emphasised that the majority of mouldings from these centuries were not cast from the ‘green’ clay, but ‘cut and roubed’ to shape (Moore, 1994). The words ‘...the worked parts often revealing a core quite different from the fired face’ simply indicate that one can visually determine that the face of the brick has been removed in the process of working, exposing to varying depths, textures and inclusions in its inner body. The photograph (Figure 1) of a ‘Finely finished’ crocket at Wallington Hall (Norfolk) (c.1525), which Moore shows in his book, serves to illustrate that point precisely.

It also supports his emphasis that these selected bricks were indeed capable of being cut and rubbed to a fine degree of accuracy, without detriment, and that those who executed this class of work were commonly called brekmasons (Moore, 1991, p. 233; citing Simpson, 1960, p. 60).

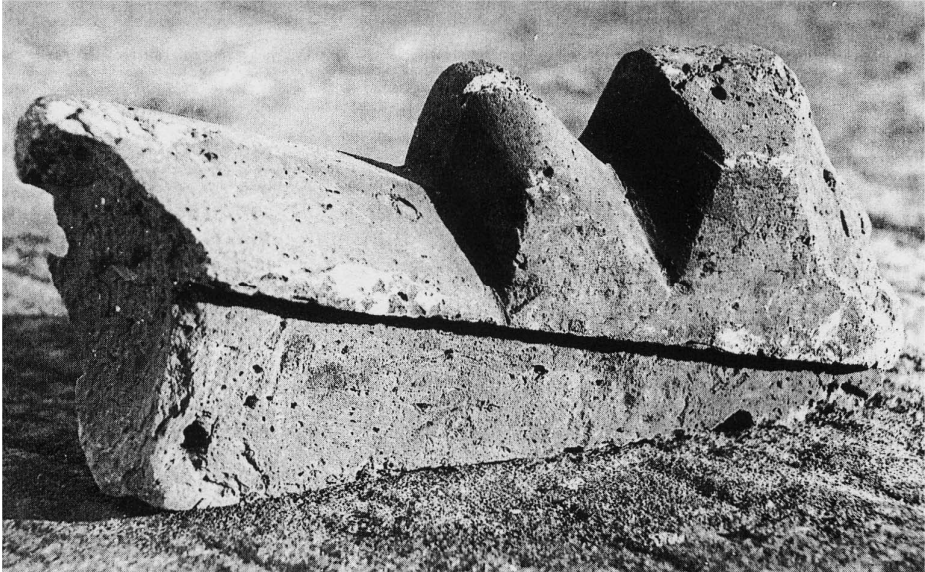


Figure 1 A finely finished 'crocket' at Wallington Hall (Norfolk) (c.1525)

### **Post-fired Cutting or Green Moulded**

All the time and expense for 'cutting and rubbing' bricks may seem strange to many observers today. Why not make a mould to the desired shape and cast the shape before firing when so many repeats would be needed? There are several answers to this:

- The slight warping and twisting of the varying brickearth/clays in firing would be a problem for enrichments, especially where precision was vital (not so much though for those bricks hidden by stucco).
- The lack of skill of brickmakers in making sophisticated timber mould boxes to cast the clay in and mould the special shape before firing.
- The problem of moulding complex shapes that possess deep undercutting made their removal from the timber mould box, fixed with removable 'negatives', virtually impossible.
- The prolific use of 'clamps' to fire bricks, where the close-stacking arrangement of standard bricks and lack of firing control did not suit the production of 'specials', which, like roofing tiles, generally needed to be kiln-fired.
- The inherent quality of some brickearth/clays, when low-fired, to be easily cut to shape and abraded to a precise profile and smooth finish.
- The employment of masons and the continuing development of some of the highly-skilled brickmasons/bricklayers as 'hewers' able to expertly 'cut and rub' bricks quickly and accurately to the desired shape.

Studying contemporary documentary evidence frequently records the tools used, as indicated by Moore (1991, p. 227):

Tools for this must have been among the dozens of axes, chisels and 'other' or 'small' tools frequently sharpened by the Smith. In 1533-4 a brick-axe at 8*d.* and three stone hammers at 6*d.* each were bought for the bricklayers at Windsor Castle. At Stonor Park there is corbelling with chamfers and simple mouldings on the chapel tower, cut with the aid of four hand-saws provided in 1416-17.

The range of tools would have included, hand-saws, drags, and chisels as well as abrasives like hand stones, rasps, files and rifflers. The most significant hand tool was the brick axe.

### **Brick Axe**

The brick axe was clearly a very popular cutting tool amongst medieval and Tudor hewers and remained in use, with some changes in style and skill in its use, until well into the nineteenth century. The brick axe of this period, forged from a length of iron, resembles a double-bladed bolster with two wide blades at opposing ends with average dimensions of 5 ins (127 mm) in blade width. It is typically 12 ins (306 mm) in overall axe length, a round central grip of 4.5 ins (115 mm) and weighs about 3 lbs (1.36 kg) (Figure 2) It is most likely, however, that brick axes would have been made to suit individual craftsmen. The brick axe appears to have come into England with the craftsmen from the Low-Countries where it was termed a 'bikijzer' (brick iron/ blade) (Janse, 1998, p. 41). The brick axe was used for roughing-out or chopping away waste brick and/or working a surface flat. Also, where necessary, it might be used for finishing, or dressing, the brick surface and in this respect the tool resembles a form of chisel as much an axe.



Figure 2 Selection of iron brick axes to the Moxon specification (Richard Filmer)

The significance of the brick axe to the skilled Tudor city bricklayer is evident in a study of the design of the coat of arms of the Worshipful Company of Tylers and Bricklayers, granted their Royal Charter by Queen Elizabeth I on the 3<sup>rd</sup> August 1568. The extended arm above the armorial shield shows a hand clasping a brick axe, as opposed to the brick trowel one might expect to see. Company rules excluded 'aliens', emphasising that, by then, the best native craftsmen (and not just the Flemish) were very capable of working bricks post-fired. English craftsmen must always have had the opportunity, even in the earliest times, to learn from Flemish 'hewers'. This fact is clearly shown in a letter of c.1440 concerning the preparation and cutting of an ornate chimney at Havering-atte-Bower (Essex), as reproduced by Ryan (1996, p. 57):

Ye well ordeyne me a Mason that ys a ducher or flemynge that canne make a dowbell chemeney of ye brykke ... and yf ye may no flemynge have then I wold have an engelesche man and he were a yonger man for a yonger man ys sharpest of wittes and of cunnynge [skill],.

Study of a number of cut and rubbed ashlar and moulded enrichments on several English medieval and Tudor brick buildings, has revealed a common 'finishing' axing technique being used by the hewers to varying standards of workmanship. This would sometimes make an allowance for the viewing distance (i.e. if the feature was high up, it might be roughly axed, yet would appear neat and to profile to the viewer at ground level). For example, bricks axed for quoins and splayed reveals, yet not rubbed smooth, reveal the hewers always dress the faces of the brick diagonally; generally from top left to bottom right in a series of parallel strokes. These angles vary, however, presumably due to individual craftsmanship, from 45° and 60° (approximately) in a manner similar to what masons term 'boasted ashlar' work. This practice was also repeated for simple mouldings, such as 'cants' used for reveals or voussoirs in arches, where clearly the diagonal axing marks provide evidence of the brick being dressed first before being cut to the wedge-shape of the arch voussoir; a two-or-even three-stage cutting process.

With more ornate mouldings, possessing concave or convex curves, the techniques were modified. If practical to use the brick axe, then it was worked so as to cut parallel to the run of the moulding, as in the Bridewell chimney brick, where the axe strokes follow the length of the roll mouldings. Where access with the axe was possible, though not to chop with it, it was then used in a 'paring' manner similar to a carpenter's use of a wood chisel to gouge out the desired profile.

The aesthetic choice as to whether to leave axe or drag strokes visible on the brick face or rub smooth (more easy with low-fired historic bricks than their modern counterparts) is (as it was in the past) down to time, finance, the final viewing position and level of craftsmanship.

The brick axe in use is a well-balanced and comfortable tool with good control and very effective in executing tasks for which it was designed. The double-blade undoubtedly serves several purposes.

Firstly, it gives balance either side of the handgrip. Secondly, forging two blades saves metal for a given weight of material. Thirdly, it gives weight above the lower cutting-edge and behind the blow being delivered. The final advantage is the benefit of an extra blade, sharp and ready for immediate use as the other blade dulls, requiring the attention of the blacksmith only half as often.

This latter point is of importance, as even though the bricks selected for cut and rubbed work were relatively soft, they still caused the edge of the brick axe to dull rapidly. This accounts for the large number of brick axes being used by the hewers and frequently sharpened by the blacksmiths. Contemporary accounts for Kirby Muxloe Castle (Leicestershire), reveal sharpening every two or three weeks in the winter of 1482, (Hamilton-Thompson, 1920, pp.293-94):

Monday 18 November...

Smyth, ...For sharpynge 10 dosen axes with Chesell and other  
Tooles, at 2d [a dosen]...20d

Monday 9 Dec[ember]

Smyth, ...for sharping 12 dosen axes with Chesells and other  
Tooles, at 2d...2s 0d.

## **POST-RESTORATION AND STUART GAUGED WORK (1603 -1714)**

During the seventeenth century, once more with influence from the Netherlands (and in particular the south-west of the present-day province of Holland), came the highly-refined skill of what quickly became termed 'gauged', or 'gaged', work in England, as the ultimate development of the earlier cut and rubbed work (Bolton and Hendry, 1927, p. 45).

### **Gauged Brickwork**

Classical architecture demanded broad, plain, and smooth-faced facades to emphasise its detailing and ornamentation, which precisely-prepared and laid stonework traditionally provided. If bricks were to be used, however, they could not be warped or laid with thick mortar joints. The solution was to cut and rub the bricks to fine tolerances, and set them by 'dip-laying' on a thin greystone (hydraulic) lime putty:silver sand joint averaging 1–2 mm in width, but often less. Such work was referred to as 'gauged work'.

Moxon sums up the contemporary view of the bricklayer in his seminal work, *Mechanick Exercises: OR, The doctrine of Handy-Works Applied to the ART of Bricklayers Work* (1703, p. 237) who says:

Whether the *White Mafon*, which is the *Hewer of Stone*, or the *Red Mafon*, which is the Hewer of Brick, be the moft ancient, I know not: but in Holy Writ, we read of making of

Bricks before we read of Digging or Hewing of Stones; therefore we may suppose the *Red Mafon* (or Bricklayer) to be the most Ancient.

In his, 'Tools used in Brick Work'; Moxon lists 23 tools, each with a succinct explanation of their use together with an engraved plate depicting them (Figure 3).

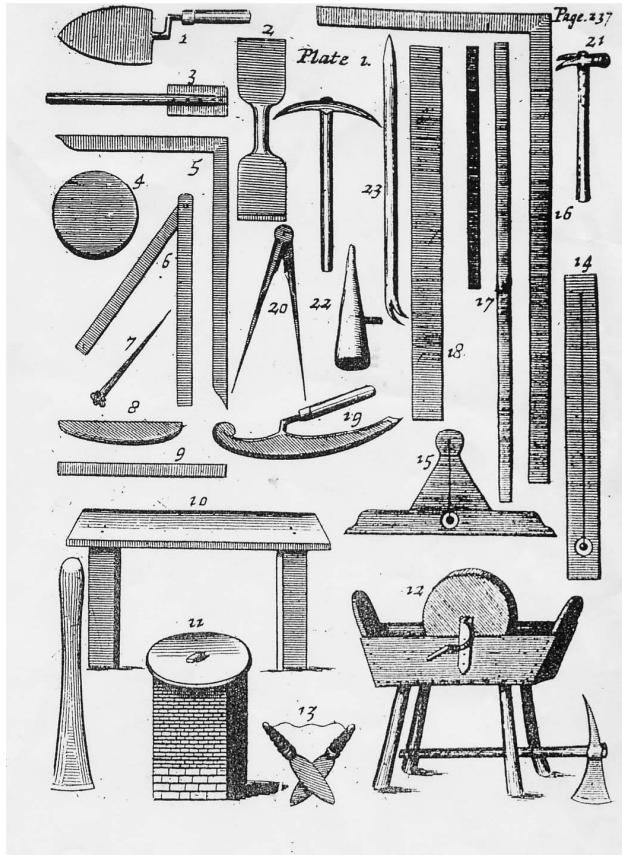


Figure 3 Moxon's plate 1 depicting tools used by the seventeenth-century bricklayer

These tools would have been part of the hewer's equipment, kept in the cutting shed where all the setting out and cutting of architectural enrichments took place. Such a place was supplied by Hugh May at Whitehall Palace in 1668:

A shed was built in the Pebble Court for the working of the cut, rubbed and gauged brick. The mouldings were 'hewn' in brick... and two square niches....

(Colvin, 1976, p. 272)

We can determine how much gauged work was being emphasised as a necessary craft skill for the seventeenth-century craftsman bricklayer by extracting the full meaning behind Moxon's descriptions of the tools and how they were to be used (Moxon, 1703, pp. 245-48):

*A Brick Ax, with which they cut Bricks to what fhape they pleafe, as fome for Arches both ftreight and Circular, others for the mouldings of Architecture, as Archytrave Friez and Cornice.*

The brick axe was, as detailed earlier, the chief cutting or hewing tool. Moxon reveals it was not only for cutting arch voussoirs, but also shaping mouldings for enrichments.

*A Saw made of Tinn, to faw the Bricks which they cut.*

This tin saw would have been used in three ways. First, to cut a deep (5 mm) line into the bricks around the templet to give the brick axe a good start and preventing spalled arrises when cutting. Second, to cut straight sections. Third, to cut a series of parallel slots above the scribed lines for axing and abrading to profile.

*A Rub-ftone, which is round, and is about fourteen Inches Diameter, and fometimes more of lefs at pleafure, on which they rub the Bricks which they cut into feveral fhapes, and also others which they cut not, being call'd Rubbed Returns, and Rubbed Headers and Stretchers.*

Also called a 'rubbing stone', usually of York stone and round on plan although it could be square. It has traditionally been round, as of the rubbing action, used when squaring brick faces is always a circular motion across the stone surface. It is likely that the first rubbing stones were from old grinding-wheels.

*A fmall Trannel of Iron, or a large Nail ground'd to a fharp point, with which they mark the Brick, either from a Square or Bevel, or a Mould made of thin Wainfcot, or Paft-board to direct them in the cutting thereof.*

A large flat clout nail, ground to a sharp point is now termed a 'scribe'. This is used to score or 'scribe' the outline of any templet prior to 'tinning', if necessary, with the grub-saw and then rubbing or cutting to shape

The small 'Trannel' is possibly also to be used as a bench-mounted trammel with a sharp point, set to the desired radius, to help make the cutting marks for curved work. Trammels would, where necessary, be fitted with a metal-edged reverse (or negative) templet to serve as a running mould. This facilitates scribing mouldings and checking end 'drafts' as they are worked, but also for turning



along the length of the axed brick profile to test/abrade the final few millimetres from it to finish. A variation of a plasterer's 'horse-mould', it was vital for the degree of accuracy gauged work with 1mm joints demands. The technique also accords with Moxon's remarks in the first part of point 8 below.

Some use a *Float Stone*, with which they rub the moulding of the Brick, after they have cut it with the *Ax*, pretty near to the Pattern described on the Brick, by the *Tranel* from the Wainscot, or Pafboard Mould, that fo they may make the Brick exactly to anfwer to the Pattern or Mould. Others ufe no Stone at all, but cut the Brick exactly to the Pattern with their Brick-Ax, leaving the Ax froaks to be feen on the Brick, which, if they be freight and parallel one to another, look very prettily, and is the trueft way of Working; but then they muft take care, to Ax the Brick off, with an Ax that is exactly freight on the edge, that the moulding in the Brick be neither round nor hollow, from fide to fide of a Header, or from end to end of a Stretcher.

The 'Float Stone' is a small hand-held stone used for rubbing down completed, surface-dried, gauged work to finish the surface. The distinct shape of the engraved 'Float stone' in Moxon's plate is flat on one face and, on the opposing side, shaped to fit certain curved mouldings, and/or for the then relatively standard sized niches.

Moxon stresses traditional hewing practice was '...leaving the ax froaks to be feen on the Brick, which, if they be freight and parallel one to another, look very prettily, and is the trueft way of Working...'. This only appeared neat if the axing marks were straight and parallel one to the other. Moxon's remark that it is, 'the trueft way of Working' is not meant to be disparaging about the 'new' fashion for smooth rubbed surfaces, only to emphasise the pre-eminence of the older 'axing' technique.

Moxon concludes this point with sound advice to prospective 'hewers', irrespective of whether the cut moulding is to be rubbed smooth or not. The brick axe must be 'exactly freight on the edge' or the resultant moulding will cut either concave or convex across the width of the brick face.

*A Grinding-ftone*, to fharpnen their Axes, Hammers, Trowels &c. upon.

The grinding-stone was essential in the cutting-shed to maintain sharp axes, chisels, saws and other cutting tools used in 'hewing'. A blacksmith only re-worked an edge once it began to lose its temper or hardness due to this constant re-sharpening.

There can be little doubt, however, though Moxon makes no mention of it, that the grinding-stone would have been used, where appropriate, to abrade shape on a rubber held against the spinning stone at the desired angle of contact. Such a practice has been seen to be employed by Flemish

craftsmen in Arthur Vanderdorpe's workshop in Bruges, when preparing gauged brickwork for an ornate 'topstuck' to a seventeenth-century building in the town of Veurne.

### **THE GEORGIAN PERIOD (1714 -1830)**

The brickwork of this period was at first a consolidation of the fine work of the post-Restoration period. This was especially true of gauged work in the early part of the eighteenth century, which continued to be employed to great artistic effect through the personal input of artisan architects and master bricklayers. Later, as the century progressed, its use became increasingly tame and style-bound, as the period settled into a rigid architect-led, or pattern-book copied, conformity, revealing the all-important loss of craft input. Importantly, with this change, bricklaying began being viewed no longer as an 'art', but rather as a 'craft' where craftsmen were losing intellectual and creative input in the design and creation of his work.

At the beginning of the period, Moxon's descriptions of the art of the bricklayer remained true for the Georgian cutting shed and site. One needs to go to the end of this period and read another's observations, therefore, to fully assess how things had continued to develop in the cutting shed and gauged work.

Nicholson (1823, 384-89), in describing the tools and their use, emphasises how gauged work was now being reserved mainly for arches; hence his emphasis on preparing voussoirs rather than mouldings. Several of the tools Nicholson lists (except the brick axe, as it underwent a significant change) are omitted here as they have already been given and their use described.

The *Hammer* used by bricklayers (fig 7) is adapted either for driving, or dividing bricks...the axe part, more nearly resembles an adze, but is not so broad in proportion to its length.

This is what we now term a 'brick hammer', though the drawing in Nicholson's plate is incorrect. The axe blade should, be turned through 90° so that it 'resembles an adze' as he describes, – in his drawing it does not (Figure 4).

The development and popularity of this particular cutting-tool was undoubtedly instrumental in the decline of the use of the Moxon-styled short brick axe.

'The *Chopping-block* is made of any chance piece of wood that can be obtained, of about six or eight inches square, when for two men to work thereon; and lengthened in proportion for four or more. It is generally supported, about two feet three inches from the ground, upon two or more fourteen-inch brick piers. It is better to have several blocks when they can be obtained, in preference to allowing many hands to be employed at one; because the vibrations communicated by one workman are liable to inconvenience another.

The Chopping-block is used for reducing bricks to any required form by means of the axe.'

The term 'Chopping-block' denotes its use – to facilitate the cutting, or chopping, of a brick to shape. It was not placed on the bench or 'banker' as Nicholson terms it, but was frequently positioned so as to isolate the resultant vibrations created from precise work being undertaken at the bench.

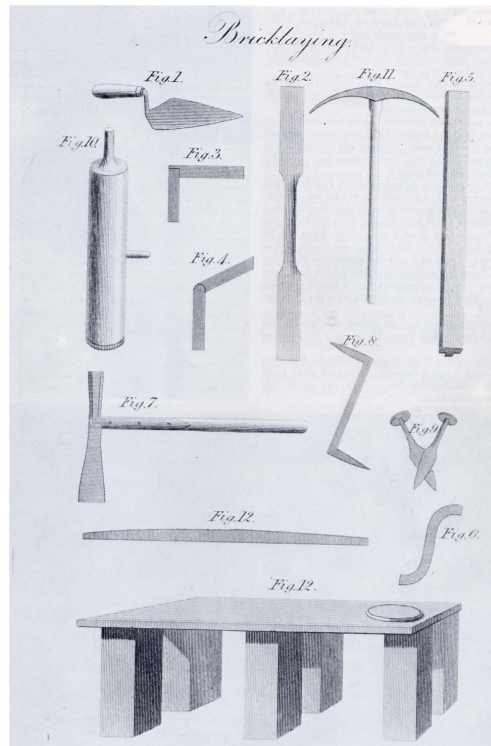


Figure 4 Tools and equipment used by an early nineteenth-century bricklayer, from Peter Nicholson's 'New and Improved Practical Builder and Workman's Companion'

The early brick axe examined earlier is clearly not that shown in Nicholson's fig 2. The stated use of it, for 'cutting off the soffits to brick to the saw cuttings, and the sides to the lines drawn by the scribe', is revealing. This brick axe is considerably bigger and heavier. It had narrow 3 inch (76 mm) blades, 25.5 inches (645 mm) in total length, with a similar sized grip to that shown by Moxon, but it weighed about 6.25 lbs (2.83 kg).

These sizes and weight are taken from Lloyd (1925, p. 289) where he reproduces a photograph of the two different types of brick axes placed side-by-side with their respective details recorded

beneath. This later axe being large and heavy, was not intended for fine shaping, its size negates such use. It was designed to cut as large a waste portion of brick as possible, something which was important because of the large amounts of 'axing' (or cutting) of brick arches in the cutting shed.

Lloyd (1925, pp. 72-30) quotes the larger brick axe in use from *The Dictionary of Architecture*:

...The lines having been first marked on the brick by a species of small saw, the axe is then taken by the middle and held in a perpendicular position, its edge is then applied to the brick where marked, and both being raised together, it is struck smartly on a block of wood, by which the brick is cut into shapes. The rough edges of the brick are then rubbed on a piece of grit stone.

This definition reveals the changed use of the tool. Clearly its long chisel-type blade design and heavier weight was intended to 'cleave' bricks in a manner akin to a chopper splitting timber. This brick axe is incapable of trimming and dressing rubbing bricks as its predecessor.

#### THE VICTORIAN AND EDWARDIAN PERIOD (1837-1914)



Figure 5 The Operative Society of Bricklayers membership certificate by A.J. Waudby, 1863.  
(The People's History Museum, Manchester).

The Victorian and Edwardian periods witnessed great developments and changes in brickmaking, tools, and craft techniques for executing gauged work. The return to favour of fair-faced brickwork after the 1840s, particularly with the emergence of the Arts and Crafts Movement in the 1860s, saw brickwork standards rise again after years of decline. With this movement, and the so-called William and Mary and Queen Anne styles, hand crafting practices enjoyed a revival that in brickwork, led to gauged work rapidly re-establishing itself as the highest form of brickwork for producing architectural dressings on principal facades.

The brick axe still remained the main cutting tool and study of the membership certificate of the Operative Society of Bricklayers for 1863 and the emblem of 1869 by A.J. Waudby (Figures 5 and 6), one sees the large brick axe detailed earlier represented several times

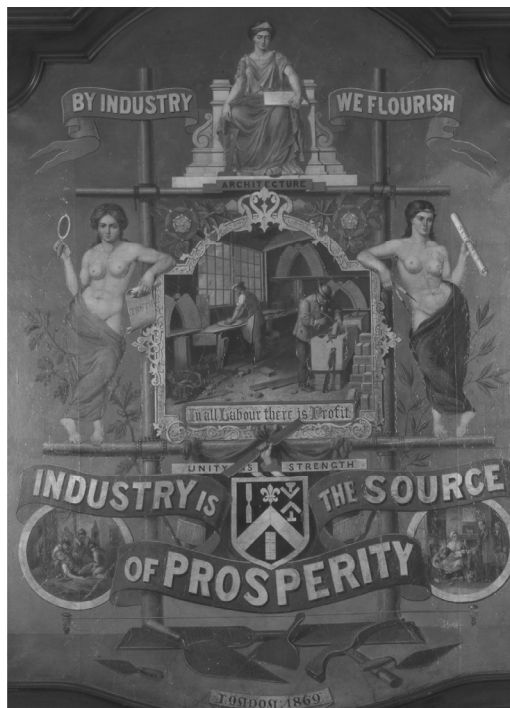


Figure 6 The Operative Society of Bricklayers Emblem, by A.J. Waudby 1869  
(The People's History Museum, Manchester)

In the 1863 certificate it can be seen on the coat of arms held above the shield and amongst a collection of the bricklayer's tools at the bottom. It is to be seen in the depiction of the cutting-shed, incorrectly spelt Guage [gauged] Work, where it leans against the chopping block where the cutter works a brick. In the later 1869 depiction of the cutting shed (Figures 7 and 8) two craftsmen are shown at work cutting Gothic arches, one at the rubbing stone and the other at the chopping block.

In all of these pictures one can truly assess the size of the large brick axe in contrast, not only to the other tools, but also to the craftsmen.



Figure 7 Large brick axe lies against the chopping block in A.J. Waudby's 1863 depiction of a cutting shed, (The People's History Museum, Manchester)

The Waudby depictions of a cutting-shed are of singular interest as they provide a rare glimpse into this normally secretive workplace. Also one can see the then common arrangement of cutting at a chopping block, away from the banker upon which rests the rubbing stone and bedding slate.

The chopping blocks depicted are sturdy - not unlike a butcher's block - unable to move or vibrate. In design it could also be an arrangement of two wooden blocks, screwed to a base and fixed to support a brick in an angular position. Alternatively, it could be a solid timber block cut to an angle of between 45-60° to the vertical, to create a 90° seating to the incline. Both allowed the brick to rest securely whilst being worked.

The scotch (Figure 9) became popular from the mid-nineteenth century and consisted of three distinct parts: stock, blade and wedge. Often old files were re-worked into blades because of the suitability of the steel. A hardwood wedge secured these. The origin of the term 'Scotch' is obscure, although it is known to be of late medieval origin and means, 'to make an incision, cut, score or gash'.



Figure 8 Depiction of a cutting shed, where two cutters are preparing gauged arches, the large brick axe again lays against the chopping block, by A. J. Waudby 1869, (The People's History Museum, Manchester)



Figure 9 Bricklayer's Scotch

### The Wire Bow Saw

During the last quarter of the nineteenth century, the introduction of the bow saw revolutionised the preparation of gauged brickwork in the cutting shed (Figure 10). Utilising a steel wire blade, looped and twisted so its entire surface area became plaited and thus serrated, providing a 360 cutting edge, for cutting rubbers within profiled cutting boxes, it increased both the accuracy and speed of the operation. Hammond (1889, p. 21) states;

It is the practice now to do everything possible in a good red brick cutting with the bow-saw.

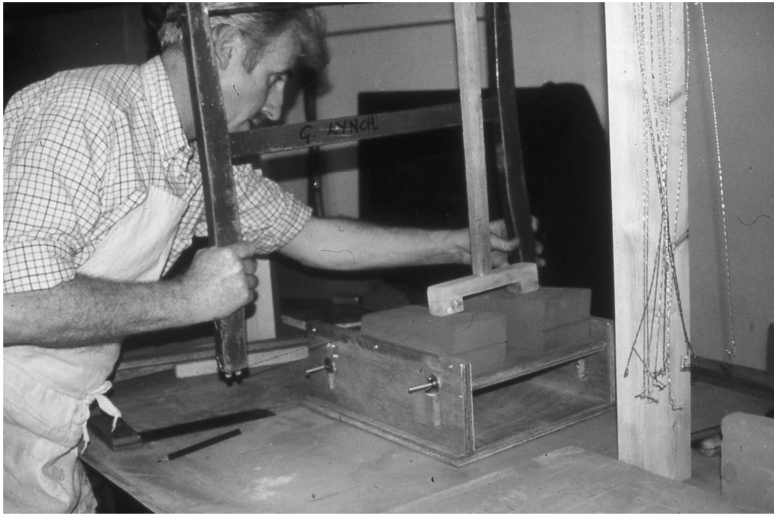


Figure 10 Gerard Lynch using the wire bow saw

He also discusses the dramatic effect of the bow saw within the cutting shed:

There is nothing connected with cutting that has caused a greater revolution during the last few years than the bow-saw. Whether for boxing mouldings of any description, reducing bricks for ashlar or arches, cutting scrolls, and every kind of work, the bow-saw is the most convenient invention.

A 'cross piece' generally termed the 'bridge', spreads the pressure of the vertical strut clamping the rubbers within the box, wedged between it and an overhead beam above the bench. The bow-saw technique made cutting easier, increasing accuracy and facilitated precise finishing. It also largely removed the need for reverse templates to check and finish; except for internal curved mouldings and stopped returns that cannot be cut in a box, but only by the older techniques of hand-cutting and abrading.



## **1918 - TO THE PRESENT (2006)**

The period from 1918 to the present (2006) has witnessed the move away from enriched mass-masonry laid in lime-based mortars to calculated, thin-walled, structural envelopes, set in cement mortars to meet the required speed of erection.

This rapid, changing, and cost-driven environment, has manifested itself in an ever increasing site acceptance of general poor standards of work, and where traditional 'crafting' skills became increasingly supplanted by standardised national 'fixing' practices. Gauged brickwork, as the highest expression of the finest skill and knowledge of traditional bricklayers, was fast heading for extinction.

Through the publication of *Gauged Brickwork: A Technical Handbook* in 1990, the writer strove to return to national prominence this neglected branch of the craft. In his lectures, master-classes and published work, he emphasised the pressing need to revive its skills and knowledge for apprentices, and established craftsmen denied the opportunity to learn. As Head of Trowel Trades at Bedford College of Higher Education between 1987-92, the author pioneered a broadening of the curriculum for apprentice bricklayers. Gauged brickwork clearly stimulated the more able apprentices providing an opportunity to learn the deeper applications of geometry and setting out, as well as traditional materials, and the various traditional tools for shaping, cutting and rubbing, to construct gauged enrichments.

Unfortunately this period coincided with demise of traditional time-served apprenticeships bound to a qualified bricklayers within a company, for government backed advent of short, competence-based, modular training schemes. Despite the writer's work to promote historic craft practices to advance bespoke cutting and preparation, including reviving the long-defunct use of the brick axe, this has resulted in a wholesale loss of the traditional knowledge of materials, tools and skills being taught. This has lead to some brickmakers producing a harder rubbing bricks that respond favourably to mechanised cutting and shaping in order to supply pre-cut enrichments for on-site assembly only; the very antithesis of true gauged work as the consummate expression of the bricklayers art.

This has resulted in a severe shortage of highly skilled and knowledgeable craftsmen who can confidently undertake cut and rubbed, and gauged work. Such a change impacts on the quality of work vital for the successful repair, conservation, and restoration of historic brick properties, and for its positive inclusion on new buildings erected for the discerning client.

## **CONCLUSIONS**

Through the skilled use of brick axes, handsaws, scotches, files, rasps, chisels, and hand-held rubbing stones, templets and trammels, and the wire bladed bow saw and profiled cutting boxes,

craftsmen bricklayers crafted work of great accuracy and beauty. We have much to learn and re-learn about the tools, equipment, materials, and craft techniques of the hewers, or cutters, and setters who produced cut and rubbed and gauged work in the different historic periods. It is important to have a broad experience and understanding of the influences of historical materials, tools and techniques that created the aesthetics of the post-fired brickwork of the differing historical periods. This would serve to ensure that the best of these influences could be employed judiciously in restoration and conservation and where appropriate on new work.

## REFERENCES

Bolton, A.T. And Hendry, H.D. (Eds.) 1927, *The Wren Society Volume IV*, Oxford, Oxford University Press.

Colvin, H. M. (Ed.) 1976, *The History of the King's Works, Volume V, 1660-1782*, London, Her Majesty's Stationery Office

Gunther, R.T. (Ed.) 1928, *The Architecture of Sir Roger Pratt*, Oxford Oxford University Press. Reissued 1972 by Benjamin Bloom Incorporated, New York.

Hamilton-Thompson, A, 1920, *The Building Accounts of Kirby Muxloe Castle, 1480-1484*, Volume XI, Parts 3-6, Leicester, The Leicestershire Archaeological Society Transactions, Leicester Archaeological Society.

Hammond, A 1889, *The Art of Practical Brickcutting and Setting*, London, Crosby, Lockwood and Son.

Janse, H. 1998, *Van Aaks Tot Zwei, Historische handgereedschappen in de Nederlands en Vlaamse bouwwereld*, Rijksdienst voor de Monumentenzorg, Zeist sdu Uitgevers, 's-Gravehage.

Lloyd, N. 1925, *A History of English Brickwork*, London, H. Greville Montgomery.

Lynch, G. 2004. English Gauged Brickwork: Historical Development and Future Practices, unpublished PhD thesis, Leicester, De Montfort University.

Moore, N. J. 1991, 'Brick' In: BLAIR, J. and RAMSAY, R. (Eds.), *English Medieval Industries: Craftsmen, Techniques, Products - Bricks*, London, 1991, The Hambleton Press.

Moxon, J. 1703, *Mechanick Exercises, Or The Doctrine of Handy-Works, Applied to the ART of Bricklayers Work*, London.

Nicholason, P. 1823, *The New and Improved Practical Builder and Workman's Companion*, London.

Ryan P. 1996, *Brick in Essex from the Roman Conquest to the Reformation* Chelmsford, Essex, P Ryan.

Salzman, L.F. 1967, *Building in England down to 1540: a Documentary History*, 2<sup>nd</sup> Edition, Oxford. At the Clarendon Press London.

Simpson, W.D. (Ed.) 1960, *The Building Accounts of Tattershall Castle 1434-1472*, Lincolnshire, Records Society (transcript), 65 (translation).

