

Guidelines for the Recovery and Processing of Clay Tobacco Pipes from Archaeological Projects

David Higgins

National Pipe Archive, University of Liverpool

Version 1.2 (3 September 2017)



Funded by
Historic England

Contents

1.0 Introduction

2.0 Excavating Pipes

- 2.1 Planning
- 2.2 Spatial Distribution
- 2.3 Finds Recovery

3.0 Post-Excavation Work

- 3.1 Cleaning Pipes
- 3.2 Labelling Pipes

4.0 Dating Pipes

- 4.1 Stems
- 4.2 Stem Bores
- 4.3 Bowl Forms
- 4.4 Bowl Form Typologies

5.0 Identifying a Maker

- 5.1 Heel Stamps
- 5.2 Stem Stamps
- 5.3 Bowl Stamps
- 5.4 Moulded Marks

6.0 Recording and Analysis of Pipes

- 6.1 Counting Pipes
- 6.2 Fabric
- 6.3 Stem Bores
- 6.4 Burnishing
- 6.5 Tip or Mouthpiece Form
- 6.6 Tip or Mouthpiece Finish
- 6.7 Internal Bowl Crosses (or other marks)
- 6.8 Rim Milling
- 6.9 Rim Finish
- 6.10 Bowl Forms
- 6.11 Makers' Marks
- 6.12 Context Summary

7.0 Illustrating Pipes

- 7.1 Line Drawings
- 7.2 Photographs

8.0 Writing a Pipe Report

- 8.1 Introduction
- 8.2 Quantification
- 8.3 Marked Pipes
- 8.4 Decorated Pipes
- 8.5 'Imported' Pipes
- 8.6 Manufacturing Techniques
- 8.7 Kiln Waste
- 8.8 Social Status and Trade Patterns
- 8.9 Discussion

9.0 Curating Pipes

- 9.1 Selection, Retention and Discard
- 9.2 Storing Pipes

10.0 Pipe Glossary

11.0 References

1.0 Introduction

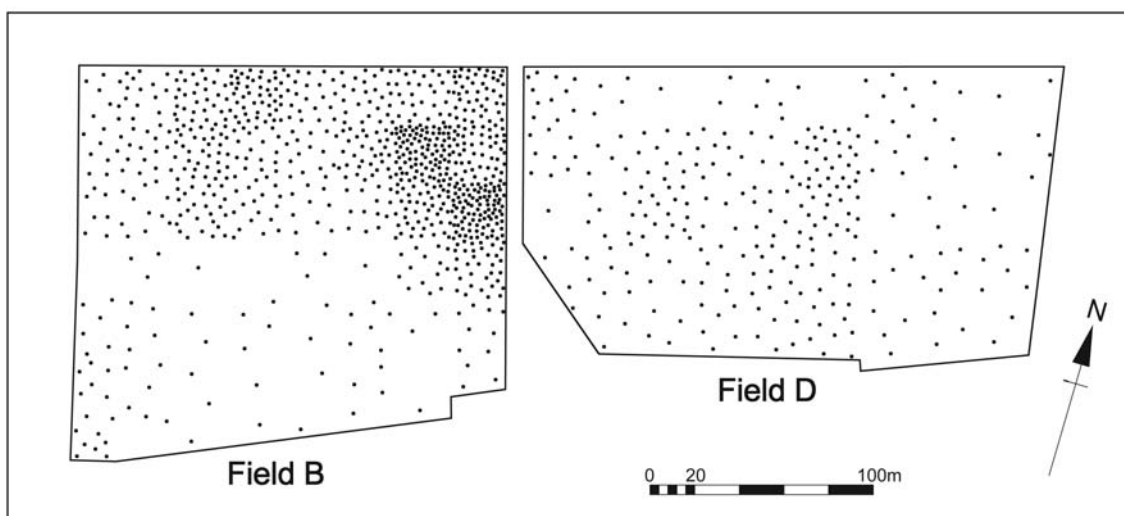
These guidelines are designed to provide a first point of reference for anyone dealing with archaeological projects involving pipes, whether this be planning archaeological fieldwork, collecting, analysing, cataloguing and curating pipes or carrying out specific research projects on them. These guidelines have been written with particular reference to British pipes but the same principles are widely applicable to assemblages from most other parts of the world. Each section is intended to provide an overview of the topic, with general advice and pointers as to where more detailed guidance or resources can be found.

The following pages are designed to enable non-specialists to undertake basic work themselves while at the same time gaining experience within broad guidelines as to 'best practice'. They are also designed to encourage common standards amongst specialists and to enable archaeological curators and managers to assess the scope and quality of any given pipe report. While these guidelines have been prepared to deal specifically with pipes, the same professional standards for dealing with pottery from archaeological projects are also applicable and should be referred to as well (Barclay *et al* 2016). A glossary (see 10.0 below) has been prepared to explain the terms and abbreviations most frequently encountered in specialist literature dealing with pipes.

2.0 Excavating Pipes

2.1 Planning Pipes are ubiquitous on Post-Medieval sites and often encountered during fieldwork or excavation projects but they are often overlooked during the planning stages of such projects. Where excavations are likely to produce pipe assemblages, then they should be considered in the project design and sufficient resources / specialist input allocated to deal with the anticipated work. A clear methodology for the collection of pipes should be established before fieldwork begins, as well as aims and objectives for the subsequent post-excavation work. There should, of course, be flexibility within the system to allow for unforeseen circumstances, such as the unexpected discovery of a kiln dump or a rubbish pit containing a significant pipe assemblage. The site director should liaise with the pipe specialist during the course of a fieldwork project should particular issues arise. Two areas in particular should be considered when initially formulating a project design and/or finds collection strategy:

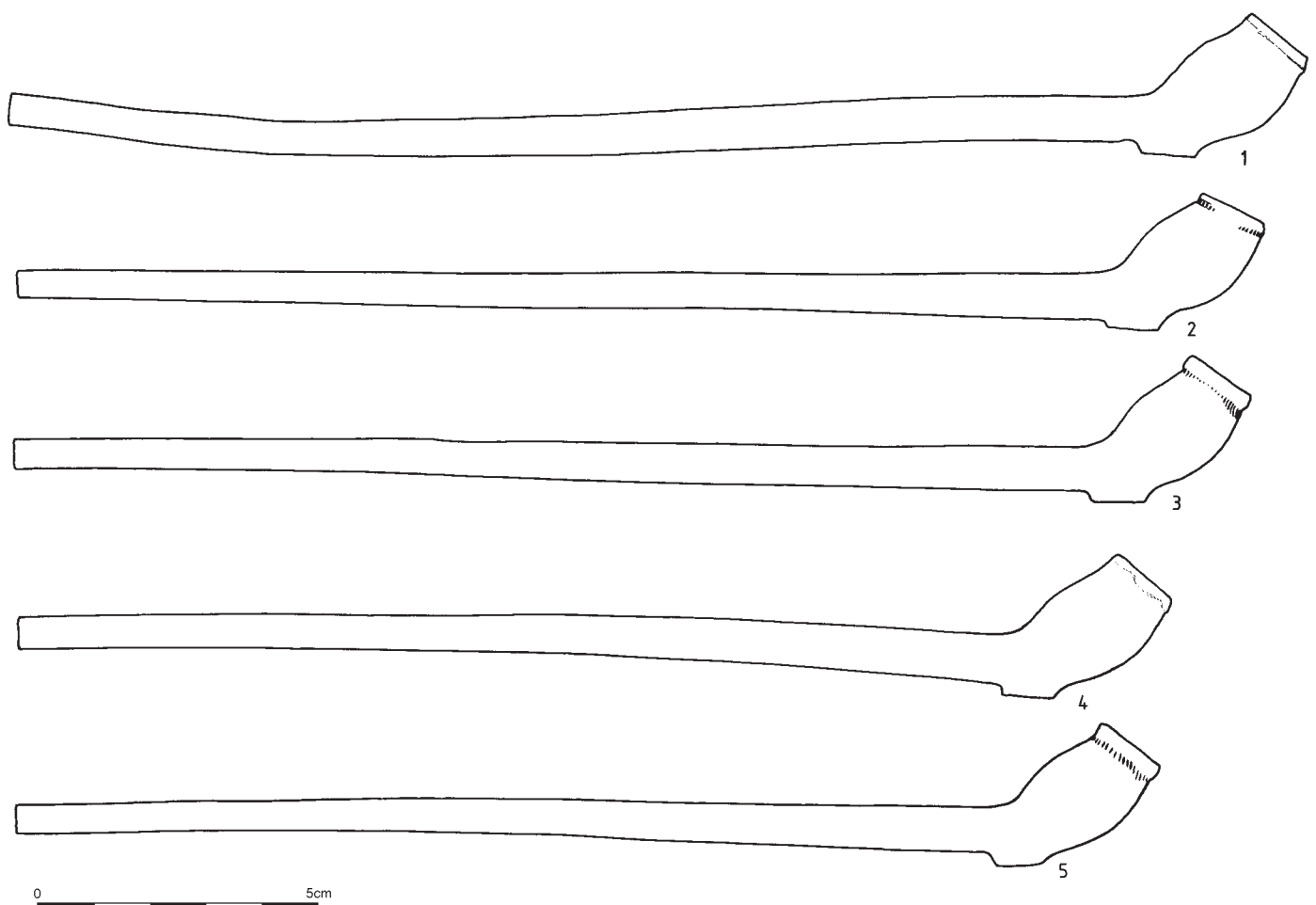
2.2 Spatial Distribution Consideration should be given to the potential of pipes in terms of site interpretation and for any future analysis when planning the recording strategy at the start of a fieldwork or excavation project. The finds recording system should ensure that appropriate distributional data is recorded for the intended post-excavation phase. Stray finds from fieldwalking or landscape surveys should be properly logged by being given a grid reference and site/parish name since they can provide invaluable data for regional studies, while the use of labelled grids for fieldwalking collections or test pits can yield useful results. Several American studies have produced 'contour surveys' of pipe density around settlement sites by systematically recording plough soil samples from test pits on a regular grid, while fieldwalking collections around Wareham in Dorset identified the likely site of a seventeenth-century Civil War siege encampment from the pipe distribution (Higgins 2012a, 183, Fig. 132).



Distribution plot of pipe fragments from a landscape survey at Bestwall, Dorset, showing a marked concentration of mid-seventeenth century fragments in Field B on the likely site of a Civil War encampment (after Higgins 2012a, Fig. 132).

The nature of the deposits may also influence the method and precision with which finds are recorded, for example, the three dimensional plotting of finds from a sequence of trampled surfaces around a settlement may shed light on the chronology and use of these surfaces in a way that the three dimensional plotting finds from a single phase dumped fill within a discreet feature would not. On excavations all pipe fragments should be collected and labelled using the established context numbering protocol for the site but with an awareness that the greater the precision of distributional recording (site grids; individual find logging, three-dimensional plotting, etc.), the greater the potential for subsequent distributional analysis.

2.3 Finds Recovery An appropriate method of finds recovery should be employed bearing in mind the end use and potential of the pipes and, if necessary, in consultation with a specialist. Unlike pots, the original form of a pipe cannot be extrapolated from one section; all the pieces have to be recovered to allow reassembly. Stem length was important in determining the style and value of a pipe but is little studied because of the paucity of excavated evidence. This is a key area where good site recovery is essential if the full potential of the material is to be realised in the post-excavation phase. Where discreet deposits containing material that is likely to join are encountered (e.g., pit or well groups), then sieving should be considered so as to recover all the fragments for reassembly. A sieved deposit from an early pipe kiln dump from Rainford, Merseyside, for example, not only allowed a number of complete pipes to be reassembled, but also showed the variation in stem length of products from a single mould (Higgins 1982, Fig 21).



Reassembled pipes from a kiln dump at Rainford, Merseyside (after Higgins 1982, Fig 21).

All fragments of pipe bowl, stem and mouthpiece should be retained during the excavation or fieldwork phase, since their potential cannot be properly assessed until they have been cleaned and dried. Stem marks or decoration can be difficult to spot before they have been washed and yet often provide some of the best information about the dating or origin of the fragments. Even plain stems can be broadly dated and can be valuable for checking the integrity or date range of a deposit. As with all classes of finds, care must be taken that two waterproof labels recording the site and context information are placed in each bag of finds as soon as they are recovered, and that these labels accompany the pipes throughout the subsequent finds processing stages so that site information is not lost.



Late seventeenth-century pipes excavated from The Quay, Exeter. These pipes were not desalinated before being stored, resulting in damage from salt crystallisation. Photo D. A. Higgins.

Most pipe fragments survive well in the ground and are relatively stable upon excavation. Some soil conditions make the pipe surface soft and powdery, so that gentle cleaning is required. Pipes from marine or estuary conditions will have absorbed salts and these need to be removed by soaking the fragments in frequent changes of fresh water for a week or two before allowing them to dry out. If this is not done, the salts will crystallise over time causing the pipe surface to spall and crumble. The same problem can occur from contaminated ground conditions or where the chemical cleaning of pipes has been attempted and the residues not fully removed from the fabric afterwards.

3.0 Post-Excavation Work

Following the recovery of pipes during a fieldwork project or excavation, the next phase is to separate the pipes from other classes of finds and prepare them into a well-ordered and labelled archive ready for assessment and analysis. Each bag of finds should always be accompanied by two waterproof labels marked with indelible ink so that site information is not lost and stored in clearly labelled sealable bags providing information such as the site code, area/trench and context and/or small find numbers. The fragments must always be fully dry before the bags are sealed.

3.1 Cleaning Pipes Most pipe fragments are fairly robust upon excavation and only require the removal of surface dirt with a soft toothbrush in clean water. If the surface has become soft or powdery, cleaning must be done very gently



A bundle of pipe stems being held together so as to enable the ends to be cleaned quickly and efficiently. Photo S. D. White.

and care must be taken not to scrub away the original surface, which may retain traces of burnishing or other finishing techniques. Similar care must be taken with marks or decoration. Soil should be carefully removed from any marks or decoration, so that they can be seen clearly, and the ends of stems should be cleaned so as to make it easy to see the stem bore and assess the fabric. Where large numbers of stems have been recovered, this can be done quickly by bundling them side by side between the thumb and first finger of one hand and then squaring up the ends on a flat surface. The bundle can then be held together tightly and all the ends cleaned at once with a toothbrush. The bundle can then be carefully held together and turned over, and the other ends squared up and cleaned. All the pipe fragments must be fully dry before being sealed in durable bags for storage.

Any unusual pieces of bowl or stem with traces of paint, ink, organic mouthpiece coating, etc., should be cleaned separately (see below) and, if necessary, in consultation with a conservator. Some mouthpieces have glazed tips and French pipes sometimes have enamel decoration, both of which can be gently washed in water. Where pipes have been in a salty environment (e.g., marine or estuary conditions) or ground that may be contaminated with other chemicals (municipal tips, etc.), they should be soaked in frequent changes of fresh water for a week or two before cleaning and drying. This will prevent the salts or other chemicals from crystallising over time within the fabric, causing the pipe to spall and crumble.



An early nineteenth-century pipe excavated from Chiswick House, London, showing iron staining from burial (top) that has been removed using EDTA solution (bottom). Photo D. A. Higgins.

Buried pipes will frequently absorb iron from the ground, causing discolouration of the fabric and, in particularly iron rich environments, surface encrustation, etc. Where this obscures the surface detail of the pipe or where cleaning is required for display purposes, this can be done using an EDTA solution (Mirdamadi 1999). Chemical cleaning is not advised on pipes with enamel decoration or in the very rare instances where other forms of surface decoration (paint, wax, etc.) or marking (writing, ink stamped bowl marks, etc.) occur.

Sometimes late nineteenth or early twentieth century pipes were given a varnished surface or customised with rubber stamped ink marks, neither of which survive well in the ground. Likewise, mouthpieces were sometimes coated with paint, wax or some other form coating. If unusual surface coatings or marks are noted appropriate care should be taken and, if necessary, specialist advice sought. Ink stamped marks tend to be very faint and to disappear as the pipe fragment dries out (but will reappear if the fragment is made damp again). Any such marks should be transcribed and photographed while the pipe is still damp.

3.2 Labelling Pipes It is important that a proper archive is prepared of any pipe fragments recovered. This includes making sure that they are placed in good quality bags that are suitable for long-term storage and that these are properly marked with the site and context information. The individual fragments should ideally all be labelled using waterproof ink, taking care that the markings are not placed on any marked or decorated areas of the pipe.



*Pipes being marked and bagged in the National Pipe Archive, University of Liverpool.
Photo S. D. White.*

For complete or fragmentary bowls, it is often possible to mark the fragments on the inside, where the numbering does not obscure the surface finish or any marks/decoration on the outside of the pipe. This also leaves the bowl fragment clean externally for photography or display, as well as protecting the mark from abrasion in the bag. If a stem is completely covered with decoration, it is often possible to carefully fit the mark onto one of the broken ends. Small find numbers can be added as necessary to identify individual fragments (such as marked or decorated pieces) and to relate the them to any more detailed catalogue or illustrations of the pipes that are prepared. If there is a compelling reason why it is not possible to label all the fragments, then priority should be given to the bowls fragments and any other pieces with marks or decoration on them.

4.0 Dating Pipes

The dating of a pipe fragment relies on assessing a whole range of variables to do with its fabric, manufacturing techniques, bowl form, style, finish, marks and decoration. The skill and experience of the individual undertaking the work will play a large part in determining how accurate and reliable any assessment of dating is, and specialist advice

should certainly be taken when dealing with large assemblages or those where the pipe dating is fundamental to the excavated deposits. But it is certainly possible for a good assessment of date to be made by considering the key characteristics of any given pipe or pipe assemblage, guidelines for which are given below. This can be very useful for 'spot dating' deposits, or providing a basic record where the assemblage does not warrant a specialist report.

4.1 Stems Assessing the stems is often a useful first step, since they tend to be the most numerous class of pipe fragment recovered. They can be used to indicate whether a context group is likely to contain residual material, or whether it represents a coherent and potentially tightly dated group. They can also be used to check any dates provided by associated bowl forms, marks or decoration, which can be especially useful for smaller contexts where only a few such pieces are present. There are always exceptions but, in broad terms, stems can usually be allocated to one of three general date ranges by assessing their form, stem bore, fabric and finish. Note that stem bores are still recorded in 64ths of an inch, so as to allow them to be compared with previous records and for the data to be used with stem bore dating techniques developed in the USA (see 'stem bores' below).

Seventeenth to Early Eighteenth Century Stems Pipes at this period generally had medium length straight stems (never curved) that were quite thick at the bowl junction. As a result, fragments usually show a clear taper along their length and can be quite chunky if the fragment comes from near the bowl. Stem bores were generally large at this period and so normally range from about 9/65" to 7/64", with a few pieces of 6/64". Some pipes were burnished during this period and many areas of the Midlands and northern England exploited local clays, where these were available. A fine sandy fabric was used in the Oxford area and pipes from areas with access to the Coal Measures often employed clays with opaque white gritty inclusions in them. Stems of this period are usually plain and unmarked although occasionally pieces with bands of milled decoration or alternate pinching to create a 'barley twist' effect are found. Stem stamps are only rarely found.



Seventeenth and early eighteenth-century stems showing bands of milling (1) and 'barley twist' decoration (2 and 3). Photo D. A. Higgins.

Late Seventeenth to Late Eighteenth Century Stems Pipes during this period normally had quite long stems but were thinner at the bowl junction than previously. As a result, they are generally rather cylindrical in appearance with less evidence of any stem taper. Stem bores are sometimes as large as 7/64" but more typically in the 6/64" to 5/64" range. Burnishing was still used in some areas, but very rarely in the far south west, the south east and East Anglia. Local clays with inclusions were rarely used after about 1710. Stems were straight until the late eighteenth century when curved varieties were introduced. Milled bands of decoration were still occasionally

used at the start of this period but maker's stamps become more common. Initials or full name marks placed across the top of the stem were most frequently employed in central southern England and the West Midlands, while decorative stem borders were most often employed in the Midlands and north. Long line name and place stamps orientated along the top of the stem were used in the North West region during the late eighteenth century.

Late Eighteenth Century and Later Stems Pipes of this period were all made from fine clays without any obvious inclusions and they typically had stem bores of 5/64" to 4/64". The stems were normally thinner than previously and varied in length, with nipple type mouthpieces being used on some types after about 1850. Long stems were sometimes rather oval in cross section and could be curved. Burnishing was rarely used, although it continued to be a characteristic of pipes from the Shropshire industry and on some high quality pieces from elsewhere. Stamped marks, now typically orientated along the stem, continued to be used in the West Midlands and North West but died out in other areas in favour of moulded marks. Moulded marks or pattern numbers on the sides of the stem were introduced around the middle of the nineteenth century and became the most widespread and common form of marking thereafter.



*Nineteenth-century moulded pattern number on the side of a stem reading 'No128'.
Photo D. A. Higgins.*

4.2 Stem Bores Note that stem bores are still measured using Imperial 64ths of an inch. The most common method is to use the butt ends of a set of Imperial drill bits, although a finely graduated ruler or other measuring devices can also be used. Retaining this unit of measurement ensures that any new data is comparable with previously published material. It also allows the date of larger assemblages to be calculated using the stem bore dating formulae that have been developed in the USA. Stem bore dating is not, however, generally used by European archaeologists since it requires a large sample and a lot of work to produce a single date, which does not provide a very sensitive means of assessing either the duration of occupation on a given site or fluctuations of finds use/deposition within that span. There are also a number of concerns over how reliable any date arrived at actually is. Stem bores can, however, be used for distributional plots or as bar graphs to show changing site use over time. The divisions provided by 64ths of an inch make convenient units to express this sort of data. The fractions of an inch are always given in 64ths, and not rationalised to larger alternative units (e.g., it is always 4/64" and not 1/16").

4.3 Bowl Forms The bowl form is usually the most accurate way of dating a pipe, since the shapes changed rapidly over time. They were also subject to marked regional variation prior to the nineteenth century, so the shape can also be used to identify which part of the country a pipe comes from. For this reason, it is important to look at specific local typologies as well as the more general national ones. Early pipes dating from before the English Civil War of the 1640s tend to follow London fashions but the disruption of the war appears to have allowed regional forms to develop. These regional fashions continued until the mid-nineteenth century when improved transport networks allowed pipes to be traded over much larger areas, diluting local fashions. There was also a move towards larger manufactories producing a wide range of different shaped pipes which do not follow the earlier typological progression and are more difficult to place into a simple type series.

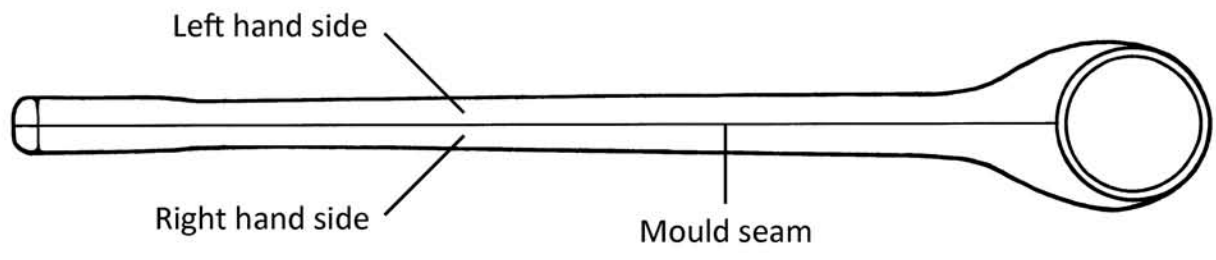
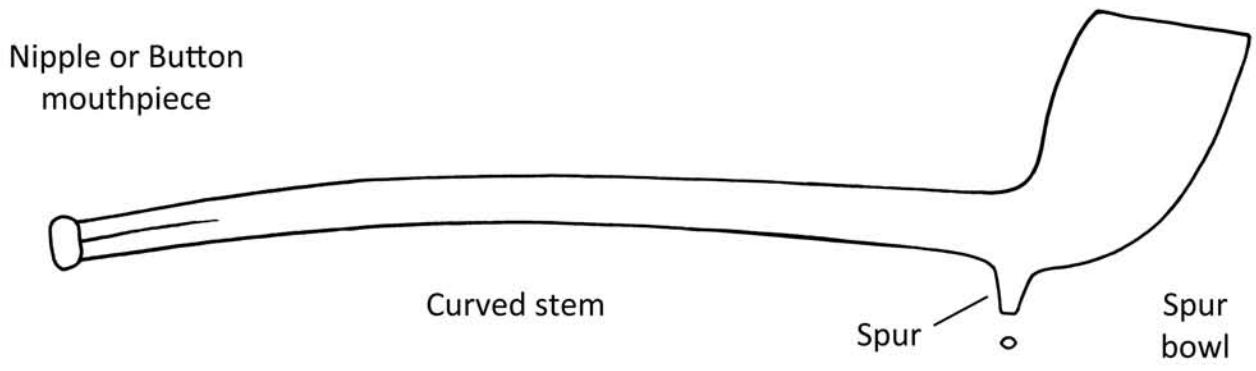
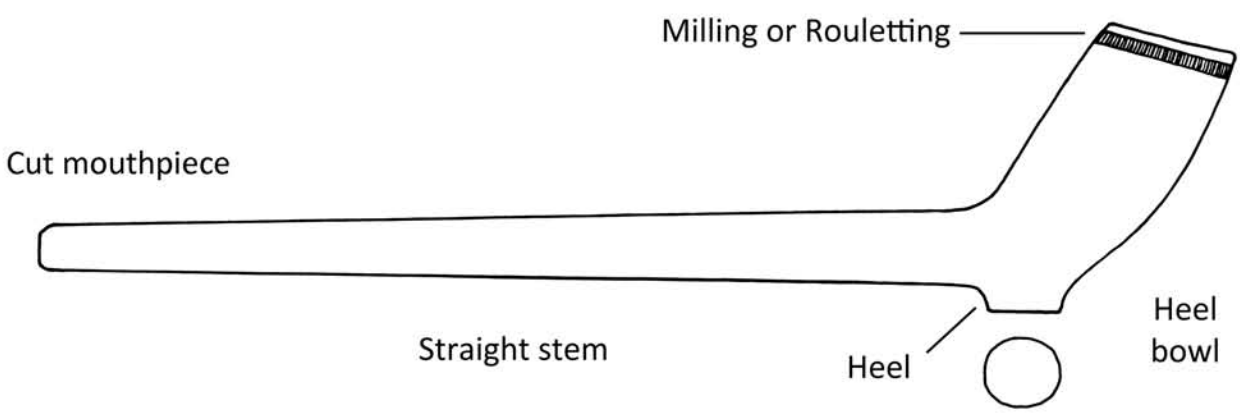
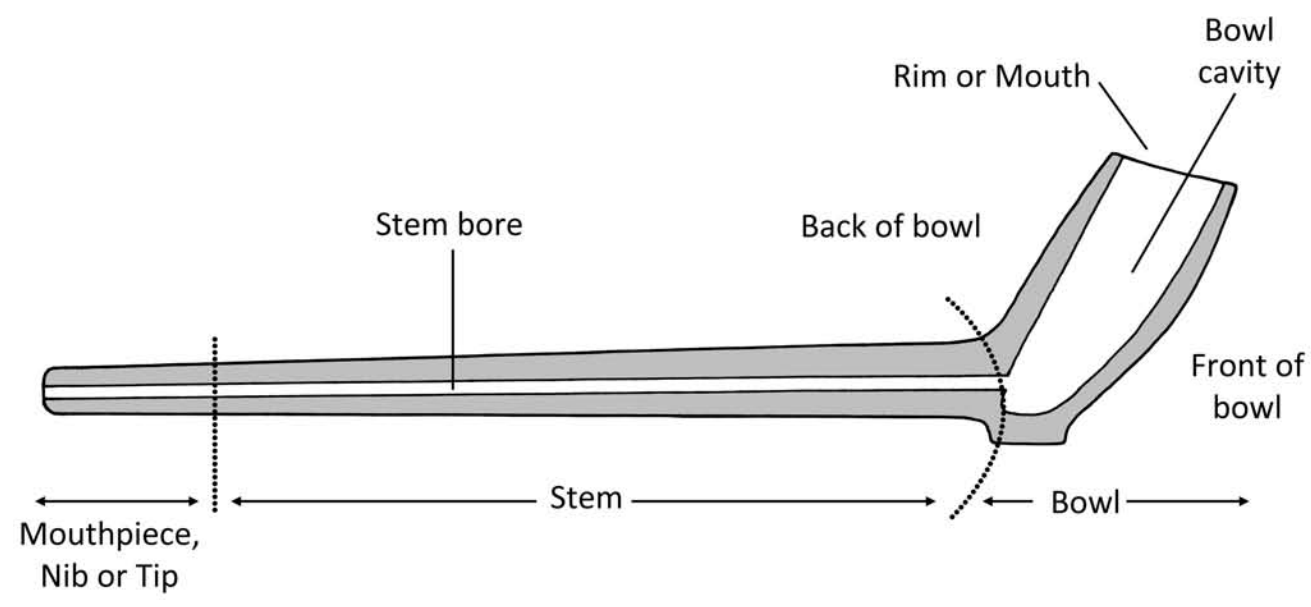


Diagram showing the most commonly used terminology for different parts of the pipe.
 Drawn by D. A. Higgins.

In broad terms there were always two different styles of pipe in contemporary use; those with heels and those with spurs. A heel is the term used for a flat-based projection underneath the bowl of a pipe, which typically has near vertical sides, or ones that flare out towards its base. A heel is usually broader than it is deep, as opposed to a spur, which is the opposite. A spur is the term used for a projection underneath the bowl that is usually longer than it is broad. It typically tapers to a pointed or rounded base, although later varieties sometimes have the end trimmed off. Pipes without a heel or spur were produced for the export trade from the mid-seventeenth century onwards but only came into general use in Britain from the mid-nineteenth century onwards.

Heel forms were the earliest style to be introduced in the late sixteenth century and remained the dominant form in most areas for at least the next century. Spur forms first appear in the very early seventeenth century and soon became an alternative style used in lesser numbers in most areas of the country. During the seventeenth century both types generally had rather squat barrel-shaped forms and they almost always have a band of milling at the rim. The London bowl form typology shows this progression well (Atkinson & Oswald 1969, 178). Seventeenth century bowls tend to tip forward slightly and had quite thick walls. Burnishing was used for better qualities of pipes and almost without exception pipes had bottered rims (i.e., rims smoothed and shaped by twisting a specially shaped former onto the rim during manufacture). The bowl forms stayed quite similar but increased in size during the course of the century as tobacco became cheaper and more readily available and the quantity consumed at any one time increased. This is why the size of the bowl for is very important during this period and it is essential to compare the forms with a life size typology.

Between about 1680 and 1720 there was a 'transitional' period when bowl forms tended to become more elongated and forward leaning before adopting a more upright style, with the rims generally almost parallel to the stem (e.g., see Atkinson & Oswald's 1969 London Typology, bowl types 19-22). The bowl walls became correspondingly thinner and the use of rim milling stopped around 1700 in the south, but lingered on until around 1730 in the midlands and north; its use appears to have been associated with specific bowl styles and it was phased out as new styles emerged. Regional variations are particularly strong during this period and some areas switched preference between heel and spur pipes (or *vice versa*) during this period.

For much of the eighteenth century pipe bowls were generally upright and with fairly cylindrical bowl forms (e.g., Atkinson & Oswald 1969, bowl type 25). Regional variation continues to be quite marked with burnishing persisting in some regions but not others. Rim milling dies out almost completely after about 1730, as does the practice of rim bottering. Bowl forms become quite large with thin walls and relatively tall bowls.

From the late eighteenth century onwards bowls are generally rather less tall and moulded decoration on the bowl sides or seams becomes very common (see 'decoration'). Regional variation becomes less marked and similar forms were used for long-stemmed pipes across the country. These long pipes continued in use right through into the twentieth century, but in decreasing numbers as a plethora of new shapes and styles came into fashion from around 1850. The new decorative styles of short-stemmed pipe are hard to categorise into meaningful typologies but should be easily distinguishable from the earlier forms (e.g., the Edward Pollock trade catalogue of c1906 from Manchester; <https://drive.google.com/file/d/0B8h1zmqg0OuxUWZjdWx3b3g0eVk/view>).

Bowl forms can be dated by reference to national and local typologies, links to which can be found below. It is important to print these out at life size (check the bar scale when printed) before comparing pipes with them, since size can be crucial, especially for seventeenth century forms. The 1969 London typology is still one of the most useful because of the clean, accurately drawn forms and the widespread influence of London styles. It can be used for many areas of the country, in conjunction with more local typologies, where these exist. The general and regional typologies produced by Oswald suffer from the poor quality of the form drawings, although the underlying dating is still sound. Regional typologies are useful if they exist for the study area, but can be variable in terms of the quality of the bowl form drawings and accuracy of the dates attributed to them.

4.4 Bowl Form Typologies The following national and regional bowl form typologies are available on the National Pipe Archive website. It is important to display or print these at life size when comparing pipe bowls with them, since size is often an important factor in determining the date. The typologies start with Oswald's simplified general typology (national) but have then been broadly grouped by region, moving across Britain from the north east to the south west.

- Simplified General Typology (Oswald 1975)
- Scottish Regional Styles (Oswald 1975)
- Tyneside (Edwards 1988)
- North East England and Yorkshire (Oswald 1975)
- Hull (Watkins 1979)
- York (Lawrence 1979)

- North West England; Chester (Rutter & Davey 1980)
- North West England; Merseyside (Higgins 2008)
- West Midlands; Broseley (Atkinson 1975)
- West Midlands; Broseley (Higgins 1987)
- Midlands and Northern Home Counties (Oswald 1975)
- London (Atkinson and Oswald 1969)
- Central Southern England (Oswald 1975)
- Bristol (Oswald 1975)
- Gloucester (Peacey 1979)
- Reading (Higgins 2013)
- West Country (Oswald 1975)

5.0 Identifying a Maker

Many clay pipes have a maker's mark on them and these can not only provide an accurate date for the manufacture of the pipe but also an origin for it. Before the establishment of the railways in the mid-nineteenth century most pipes were produced in small family run workshops and generally only traded around 15-20 miles from their place of manufacture. So, for most pipes, the first port of call are local county lists of pipemakers, many of which can be accessed online through the NPA's 'find by location' page (<http://www.pipearchive.co.uk/find.html>). Further lists and details of individual pipemakers are scattered through the pipe literature for each county and a list of the full holdings available by visiting the NPA itself can be found at <http://pipearchive.co.uk/pdfs/Archive/NPA%20bibliography%20Apr%202017.pdf>.

The majority of makers' marks simply comprise a set of initials and so, for ease of reference, most lists of pipemakers are arranged by initials rather than full name. They are sorted by surname initial first, then Christian name initial and finally by date (oldest first) where the same set of initials occurs. It is also usual to substitute the initial letter 'J' for an 'I' in sets of initials (and in arranging the lists), since this is the form they usually took on old pipe marks. It is important to be aware of this order if you have a full name mark or are trying to look up details of a known maker, since their full name may not appear in a list in the normally expected place.

The date of the pipe will often narrow the search period (see bowl form typologies) as can the style of the mark. When looking at a mark it is important to distinguish between stamped marks, which were impressed into the clay after the pipe had been taken from the mould, and moulded marks, which were created by the mould itself. Stamped marks tend to be sharper and more clearly defined than moulded marks, although they may also be poorly or partially impressed, or double struck so that they can be hard to read. A moulded mark is one that is an integral part of the mould from which the pipe is made, so that it automatically appears each time a pipe is made from the mould. Moulded marks tend to be slightly less crisp than stamped marks and may have 'flow' marks in the clay around them, where the clay moved across the mark during the moulding process. They may also exhibit blank or missing elements where the design in the mould has become temporarily clogged with hard clay.



A late nineteenth-century stamped bowl mark (left) compared with a moulded bowl mark of a similar date (right). Note how the stamped lettering is much more crisp. Photo D. A. Higgins.

The different styles of mark produced using these two methods each have their own chronological and distributional ranges, which can be crucial in narrowing down the origin and likely date of a particular pipe. Similarly, the use of incuse or relief lettering can also be diagnostic of time or place. An incuse mark is one where the principal lettering or design is sunk down into the surface of a pipe, whereas a relief mark is one where the principal lettering or design is raised up from the surface of a pipe. The most commonly encountered types of mark are as follows: -

5.1 Heel Stamps Marks on the base of the heel were primarily used between about 1580 and 1730. The earliest marks were often symbols rather than initials. The use of symbols continued after initial or name marks became more common and examples can be found right through to the twentieth century. Before about 1640 pipes were sometimes traded considerable distances from large centres such as London but, after this date, most production and use was relatively local within Britain (although export pipes were traded much more widely overseas). Not all makers marked their pipes and there was a lot of regional variation. In London and the south-east only around 10% of pipes were marked while in East Anglia hardly any were marked at all. In contrast, the majority of pipes in the north and west of the country were marked. There were also different styles of mark in the different regions, which can also be used to identify where a pipe was made (see Oswald 1975). Most heel stamps are found locally to where they were made but it is important to remember that some pipes were traded and so the style of bowl and mark must also be taken into consideration when looking for a maker.



*A range of heel stamp types. Nos. 1 to 4 are incuse marks; Nos. 5 to 8 are relief marks (not to uniform scale).
Photos D. A. Higgins.*

5.2 Stem Stamps Late sixteenth and early seventeenth century pipes occasionally have patterns of decorative stamps applied to the stem. During the seventeenth century initial marks or symbols were also occasionally applied to the stem, usually a short way behind the bowl and orientated to face the smoker. This style of marking becomes much more common from around 1680-1780 in most areas, the main exceptions being East Anglia and the south-east. In some areas roll-stamped stem borders were also used during this period, especially in the Midlands and north of the country, with notable production centres in Chester and Nottingham. Stem stamps are rare in most areas from the 1780s onwards, with the exception of the west midlands and north west. In the west midlands, especially in and around Broseley, full name stem stamps across the stem with relief lettering has been common during the eighteenth century and, from about 1780, they were turned to read along the stem. During the 1840s the lettering on these Broseley area styles of mark changed from relief to incuse, and incuse stamped marks continued in use until the last Broseley factory closed in about 1960. In the north west the Liverpool makers started using long single line stamps with relief lettering from around the 1760s and these continued in use until around the 1840s. They were placed along the top of the stem.

5.3 Bowl Stamps In most areas marks were only occasionally stamped on bowls during the seventeenth century, the notable exception being the Rainford area of Lancashire (now Merseyside), where distinctive crescent shaped marks were widely used from about 1640 onwards, particularly on spur bowls (Higgins 2008). For much of the eighteenth century bowl stamping was very rare anywhere, although a few large marks were used in the London area. During



A range of stem stamp types. Nos. 1 to 4 are incuse marks; Nos. 5 and 6 are relief marks (not to uniform scale).
Photos D. A. Higgins.

the later eighteenth century London makers used this style more frequently, usually using large oval or circular stamps containing the maker's name and, especially in later examples, address. This style remained popular throughout the nineteenth century in the south east, with other areas adopting bowl stamping from the second half of the nineteenth century onwards, particularly for advertising marks or slogans. Rubber stamped ink marks were also used for a similar purpose from the late nineteenth century onwards.



Different methods of bowl marking. 1. Eighteenth-century relief bowl stamp; 2. Nineteenth-century incuse bowl stamp, which has been double struck; 3. Nineteenth-century rubber-stamped ink mark. Photos D. A. Higgins.

5.4 Moulded Marks Moulded marks were extremely rare in England and Wales for much of the seventeenth century, although they did come into use in Scotland from around the middle of the century when the maker's initials started to be placed on either side of the heel or spur, one initial on each side. These are usually arranged with the Christian name initial on the left hand side of the heel (when the pipe is held as if being smoked) and the surname initial on the right. Occasionally the mould maker got them mixed up but the convention is to always transcribe them in this order and then to note in any accompanying text if it is suspected that they should be read the other way round.

Moulded initials on the side of the heel or spur started to be used in the London area from around the 1670s and, by 1700, had become very common. This style then persisted in the south east as the most frequent style of marking until the twentieth century, but it was not always very common in other parts of the country, the north-east of England being a notable exception. The earlier marks always used lettering with serifs but sans-serif script was often used from the middle of the nineteenth century onwards. The initial 'J' was almost always depicted as an 'I' until the mid-nineteenth century, after which the 'J' was sometimes used.



Mid-eighteenth century pipes from London with the makers' initials moulded on the sides of the spur or heel - in these examples the surname initials S and T respectively. Photo D. A. Higgins.

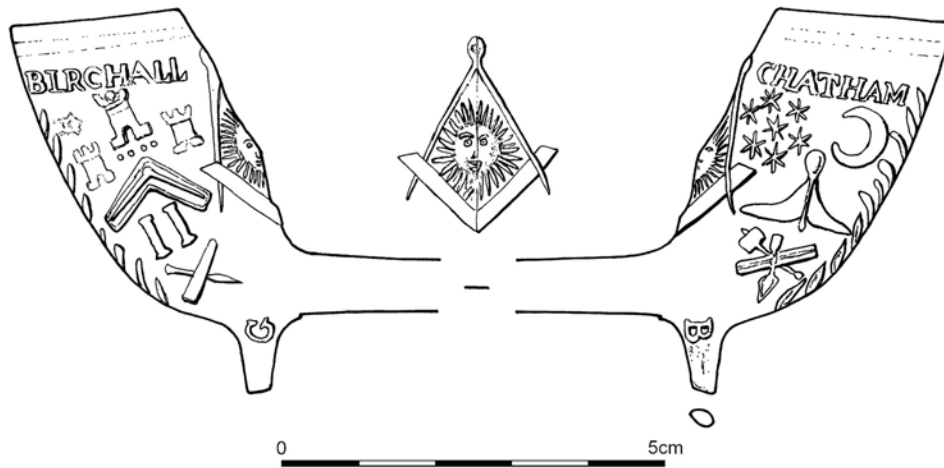
Another distinctive type of moulded mark was the cartouche, which comprised a raised border, usually circular and sometimes decorated, within which the makers' initials, name or symbol were placed. This was placed on the side of the bowl and usually only occurs on one side. This style emerged during the late seventeenth century and continued in use until the late eighteenth century but its use was confined to the south-west of England and, in particular, to the Bristol area. Large quantities of pipes exported from Bristol to the Caribbean and North America have this sort of mark on them.



Early eighteenth-century Bristol style relief-moulded cartouche mark containing the maker's initials. This mark occurs on one side of the bowl only. Photo D. A. Higgins.

Moulded rim marks usually comprise the maker's name and place of work arranged as a band of relief lettering running around the bowl just below the rim. This usually occurs in conjunction with other moulded bowl decoration. Marks of this style generally range from the late eighteenth century through to the mid-nineteenth century in date and are primarily found in the midlands and eastern England, with occasional examples having been produced in London and the south east. Very occasionally lettering was placed along the front mould seam, or elsewhere on the bowl, but examples are rare and scattered.

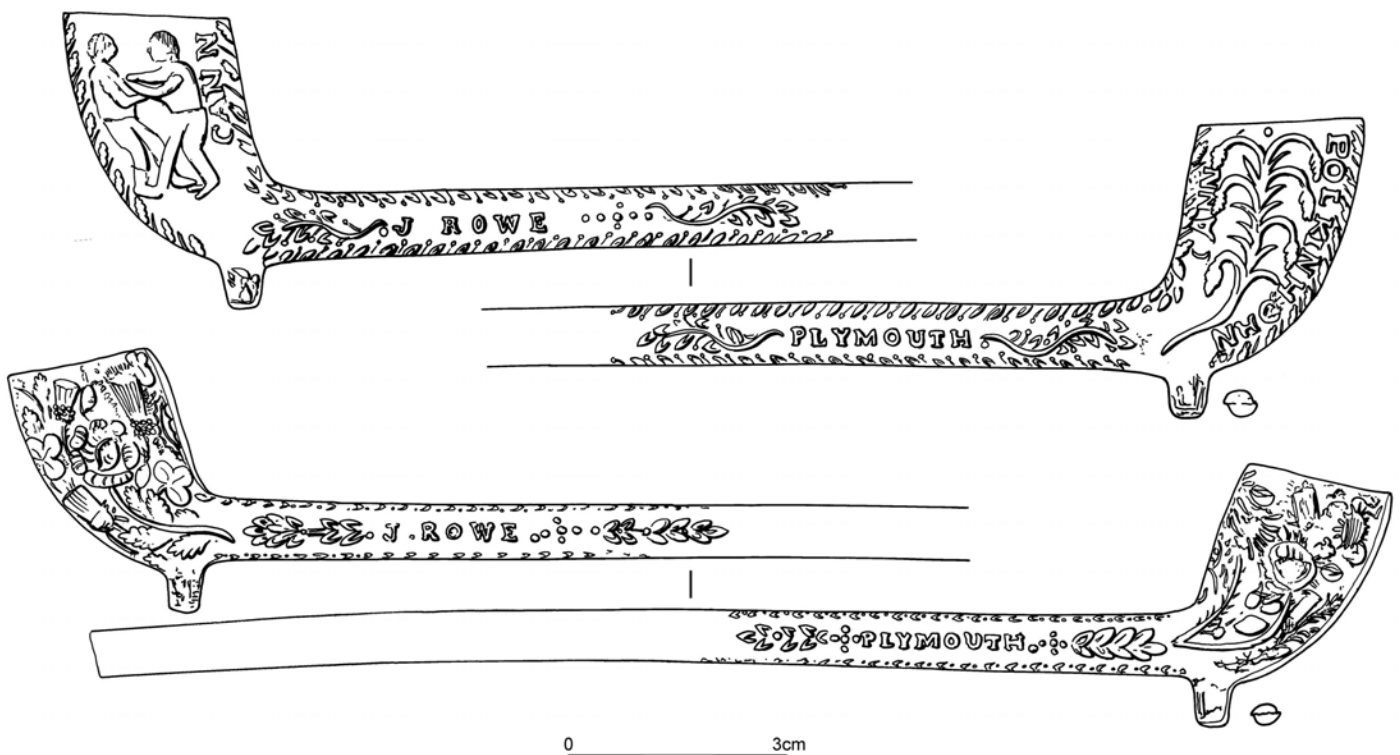
Moulded stem marks were used across most parts of the country and can be quite diverse in character, making them hard to categorise. At the same time, they usually comprise the maker's name and workplace, sometimes with the address as well, which makes them relatively easy to identify. Occasionally they just comprise slogans or pattern names, such as 'DUBLIN' or 'BURNS CUTTY' (both of which are pattern names and not related to specific places or individuals). Normally the maker's name appears on the left hand side of the stem and the place of work on the right. The earliest examples were probably produced in London and the home counties during the early nineteenth century. These are generally relief moulded marks, sometimes accompanied by surrounding decoration and occasionally with the full address as well. After the middle of the century there was generally not any accompanying decoration and many of the marks changed to incuse lettering, often within a relief moulded beaded border. This style with a border



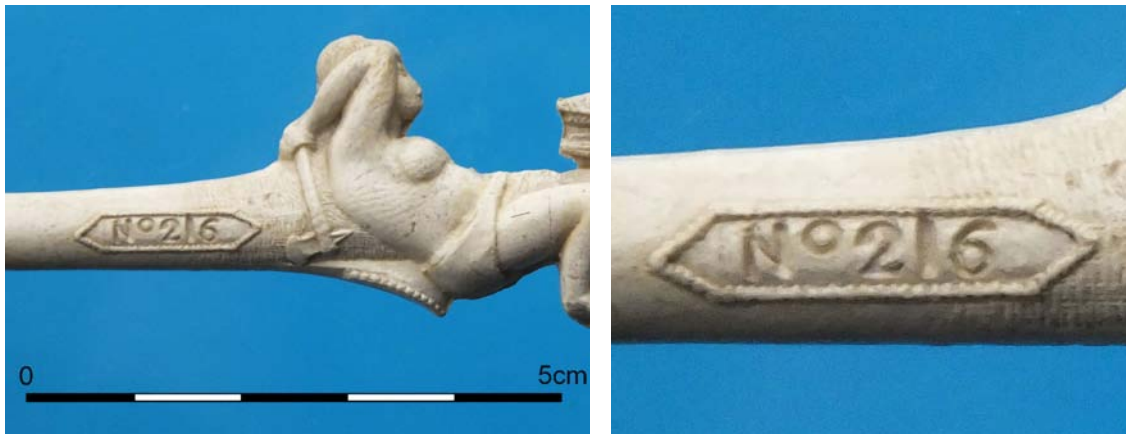
Relief moulded rim mark reading BIRCHALL / CHATHAM, from the Tower of London Moat, c1800-1840. The maker's initials GB, representing a previously unrecorded maker, are moulded on to the sides of the spur (after Higgins 2004, Fig. 18). Drawing D. A. Higgins.

was much more widespread, being found in most parts of Britain. It was particularly popular on pipes produced in the north east and Scotland and continued to be used well into the twentieth century.

Another type of moulded stem mark comprises a number, which was usually placed on the left hand side of the stem a short way back from the bowl junction. These numbers are usually incuse and without any border, but they occasionally occur as relief numbers and/or with a border. These are pattern numbers, used by the larger firms, which identify a specific pattern from their trade catalogue. They tend to date from around 1870 or later and are mainly found in northern England and Scotland, although firms in other parts of the country used them occasionally too. These numbers can be used to identify the maker if it can be matched up with a surviving trade catalogue. Copies of many surviving trade catalogues can be found on the PKN website (<https://www.tabakspijp.nl/archief/archief-catalogi-fabrikanten/>).



Pipes of c1820-30 with relief moulded decoration including the name of the maker, J ROWE, and the place of manufacture, PLYMOUTH (after Higgins 2003, Fig. 19). Drawings D. A. Higgins.



Nineteenth-century pipe produced by Thomas Holland of Manchester with 'No 216' on the right hand side of the stem to identify the pattern number. Photo D. A. Higgins.

6.0 Recording and Analysis of Pipes

When pipe fragments have been collected, whether as part of a private collection or as part of an archaeological project, it is important to record where they have been found. Bags should be properly labelled with the find spot or site information and the individual fragments labelled using waterproof ink (see 'excavating pipes' for further guidance on labelling). Once the individual fragments have been labelled, the nature and detail of the subsequent recording and analysis will depend on the intrinsic significance of the finds and the aims and objectives of the post-excavation analysis. For some sites, a detailed catalogue itemising every fragment may be required, while for others a summary describing the key elements within each context will suffice. It is also possible that a combination of recording levels will be required, for example, a broad context summary for the site as a whole but with selected classes of pipe (e.g., marked or decorated) or specific contexts (e.g., pit groups or kiln dumps) being subjected to more detailed recording and analysis. Even if a full catalogue of all fragments from a site is prepared, then a context summary is usually prepared as well (see 'context summary').

Whatever the scope and purpose of the recording it is important that common standards are adopted for the terminology employed and the data collected so as to provide an unambiguous record of what has been found and to allow easy comparison with other assemblages. It is also important to ensure that a well ordered archive is produced that explains exactly what work has been done, what methodologies or codes have been used in compiling the report and ensuring that the supporting notes and documentation carry through to become part of the project archive, deposited with a suitable body for long-term curation.

Recording guidelines for pipes from archaeological assemblages have been developed and can be used as the basis for any recording project (Higgins & Davey 2004). It is also possible to download a *pro forma* Excel table that can easily be edited so as to tailor it for a particular site or assemblage from the Society for Clay Pipe Research website (http://scpr.co/Recording_form.html). A glossary of pipe related terms is also available (see 'Pipe Glossary' below), as well as some further explanation and general guidance, which is given in the following sections.

6.1 Counting Pipes The most basic record of what has been collected comprises a count of the fragments present. This is most usefully divided into bowl, stem and mouthpiece fragments since this gives an indication of the range of material present as well how reliable any dating derived from it may be (bowl fragments being generally much more accurately datable than any other part). Since the bowl merges into the stem, a judgement has to be made as to how to count any fragment that spans this bowl/stem junction. To do this, any fragment that includes any part of the base of the heel or spur, or any part of the interior of the bowl cavity, is included in the count of bowl fragments, regardless of how much stem is still attached to it. This is because if either of these areas survive, then it is likely that a reasonable assessment of the bowl's form and date can be made. If a stem is just opening into a bowl, but does not actually include any of the bowl interior or any of the base of the heel or spur, then it is simply counted as a stem fragment. A fragment is counted as a mouthpiece where it has any part of the mouthpiece surviving, regardless of how much stem is attached to it. It is important to note that most mouthpieces were simply formed by a knife cut to the end of the stem. This means that both ends of any stem fragments must be checked for a cut rather than a fractured end. For larger assemblages, the easiest way to do this is to bundle the stems together between thumb and forefinger, square

them on a flat surface and then check for cut ends. The bundle can then be carefully held together, flipped over and squared again, and the other ends checked. When giving any quantification for the pipes recovered it is important to note any collection or sampling policy that might have affected the numbers recovered, e.g., only one transect every 10m was field-walked, or only 50% of a ditch fill was excavated. Similarly, sieved deposits that will have resulted in a higher fragment recovery rate should be noted.

Having counted the fragments in any group, a useful shorthand way of expressing the figures for any summary description is to list the numbers of bowl, stem and mouthpiece fragments present (in that order), followed by the total. Thus "Context 001 (9/59/1 = 69) . . ." indicates that Context 001 contains 9 bowl, 59 stem and 1 mouthpiece making a total of 69 fragments in total.



Pipe fragments sorted into bowls (left), stems (centre) and mouthpieces (right). Photo D. A. Higgins.

Another way of quantifying the pipes is to arrive at a minimum number represented in any given group, as is often done for pottery. Pipe bowls are frequently broken into fragments, making them tricky to convert into 'whole pipe equivalents', and the rims are of very small diameter (and often chipped), so that measuring the percentage of surviving rims in the same way as for pots is not really practicable. Likewise, mouthpieces are usually underrepresented in excavations because they were fragile and often reduced to tiny fragments that are not recovered, while mouthpieces formed as simple cut ends can be hard to spot, especially amongst abraded field walking collections. The most useful part to count is therefore the bowl/stem junction, which is generally the most robust part of the pipe and only occurs once in each example. So, if the part of the bowl/stem junction where the heel/spur is or was attached survives (or the equivalent section for a spurless bowl form), then it can be counted as '1' towards a minimum number total. Occasionally this can lead to an anomalous situation where the minimum number count is '0', even though other pipe parts (including 'body sherds' from bowls) are present. This makes the technique most useful for very large assemblages where working out a figure by any other method would be difficult and time consuming. For small groups a 'common sense' approach is often the most useful, where the bowl fragments can simply be sorted into the minimum possible number according to their attributes (form, finish, fabric, stem bore, decoration, etc.). The method used should be clearly stated in any report or site archive and it should be applied consistently to all the groups from that particular site, so as to make the data comparable.

6.2 Fabric The fabric of which a pipe is made can help in characterising it and determining its origin, but it can be very difficult to accurately categorise individual fabric types without scientific analysis because they all appear so similar in the hand. The main distinction to be made is between the fine ball clay (alias pipe clay) obtained from just a limited number of sites in Britain and anything else. Ball clays were used in many places from the earliest days of pipe production but pipes dating from before about the middle of the eighteenth century were also made from local clay sources if these were available. After that date improved transport networks meant that almost all pipes were made of ball clays, regardless of where they were made.



Early eighteenth-century stem fragment with a relief roll-stamped mark reading THOMAS BIRCH from Whitehaven, showing gritty inclusions in the broken end from the use of a local Coal Measures clay. Photo D. A. Higgins.

The ball or pipe clays used for pipe production were obtained from the south or south-west, most notably the Poole Harbour area of Dorset (Wareham Basin) and the Bovey Tracey / Newton Abbot area of Devon (Bovey Basin). The clays from these areas are very fine and without any notable inclusions, even when examined with a hand lens. It is important to note that these are known as 'pipe clays' or 'ball clays', which are white firing sedimentary clays as opposed to the 'china clays' that are used in other branches of ceramic production and come from different deposits. Both ball clay and china clay contain high proportions of the mineral kaolinite, but it is misleading to describe white clay pipes as 'kaolin pipes' since kaolinite by itself is unsuitable for pipe production. This distinction is made because American literature often refers to white pipes as 'kaolin pipes', which perpetuates this misconception.

In broad terms, any pipe with a fine almost inclusion free white fabric can be regarded as being made of ball clay that had been 'imported' to the place of manufacture by the pipemaker. In contrast, 'local' fabrics that have been sourced elsewhere can often be distinguished by a slightly off-white colour and/or the presence of fine inclusions. In particular, white firing clays from the Coal Measures are typically distinguished by small opaque white angular inclusions in the fabric. These clays were not traded far, but were extensively used for early pipe production in areas where these deposits occurred near the surface, most notably in Shropshire, Lancashire and South Yorkshire. A local clay source is also evident in the Thames Valley area, particularly in the Oxford/Reading region, where fine sandy inclusions (rounded quartz grains) are characteristic of the earlier pipe products. Where local fabrics can be identified in an assemblage, the pipes made of these should be identified and a note made of the characteristics that distinguish them from the pipes made of 'imported' (i.e., Devon/Dorset type) clay.

6.3 Stem Bores Stem bores are not normally recorded for all fragments unless a specific question is being addressed, for example, to characterise a closely dated group or type of pipe. It is useful, however, to record the stem bore of marked and decorated bowl fragments, or any illustrated pieces, so as to make the data on them as widely comparable with other examples as possible. Where stem bores are recorded, they should be measured in 64ths of an inch. The use of stem bores for dating deposits is not recommended (see 'Dating Pipes' for more information on this, and how to measure the bore).

6.4 Burnishing Some pipes were finished with a burnished surface, which enhanced both their appearance and value, since it represented an extra finishing process. Burnishing is the compression and smoothing of the clay surface with a hard glossy object, such as polished steel or agate, while the clay is still in a leather hard state. The better the quality of the burnishing, the more the pipe was worth. This means that the presence/absence of burnishing and the quality of it can be used as a guide to the contemporary value of the pipe. It can also be used as a means for assessing the social

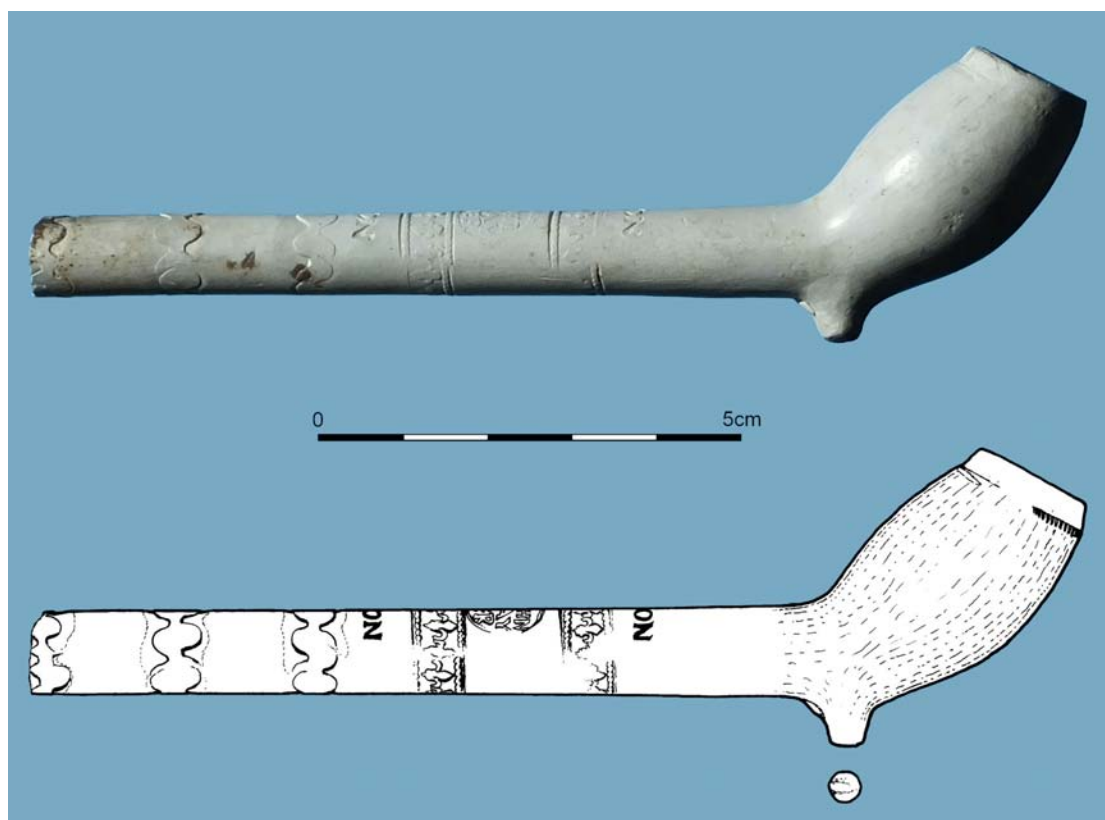
status of a pipe or assemblage and in comparing one such group with another. For this reason, it is useful to not only record the presence/absence of burnishing, but also its quality, which can be expressed as one of four grades:

Fine (F) A fine burnish is when the polishing lines are so closely spaced and even that there are barely any gaps between them and a very uniform glossy surface is created.

Good (G) A good burnish is well applied with close, even strokes and only small, evenly spaced, gaps between the burnish lines.

Average (A) An average burnish will have gaps of roughly equal width to the burnish lines themselves, which may be light and/or rather unevenly applied. The burnish lines will not necessarily extend to the very edge of the area being burnished.

Poor (P) A poor burnish is very scrappy and irregularly applied, with large gaps between the burnish lines and/or uneven strokes/coverage.



Seventeenth-century pipe made by John Tayler of Oxford showing burnishing on the bowl and how it is depicted in a drawing. Illustrations by D. A. Higgins.

Burnishing on the stem is usually less well applied than that on the bowl and so is less reliable as an indicator of quality. Care must be taken with the identification of burnishing, especially where naturally glossy fabrics were being used. Burnished pipes exhibit the slight facets caused by the polishing and, usually, an alternating surface of glossy and matt strips. Burnished areas are indicated by a light broken lines following the burnishing strokes when the pipe is illustrated, with the spacing of the lines mirroring the quality (closeness) of the original burnish.

Where pipe fragments have been abraded or extensively weathered, for example by water rolling or repeated ploughing, or by high temperature burning, it may no longer be possible to tell if they were originally burnished. In old documents the term 'glazed' was used to describe a burnished pipe, and is not to be confused with the modern usage for a glassy surface coating.

6.5 Tip or Mouthpiece Form The form and attributes of any tip or mouthpiece fragments are useful to record, since these can vary by period and/or pipe type. The most frequently encountered types are as follows: -

Cut (C) By far the most common type of mouthpiece was the 'cut' end, which was simply formed by running a trimming knife around the end of the stem to trim off surplus clay. The knife was usually held at a slight angle so that a bevelled end was created and there is usually a slight ridge immediately around the stem bore itself, created as the moulding wire was withdrawn. This type of mouthpiece was used for almost all pipes dating from before c1840 and on many of the types produced after that date.

Rounded (R) The stem terminates with a rounded end, which was formed in the mould. The mould seams can usually be seen extending right up to the stem bore and there is no cut facet. This type of mouthpiece only occurs on late nineteenth century or later pipes.

Diamond Shaped (D) The stem ends with a diamond shaped cross section but without a nipple. This is a rare type of mould formed mouthpiece that only occurs on late nineteenth century or later pipes.

Diamond nipple (DN) A mould formed mouthpiece where the stem takes on a lozenge shape or sharply oval section directly before a nipple end. This type of mouthpiece only occurs from the mid nineteenth century onwards.

Flattened Oval (FO) A mould formed mouthpiece where the stem takes on a flat, oval, section at the tip, without a nipple. This type of mouthpiece only occurs from the mid nineteenth century onwards.

Nipple (N) A mould formed mouthpiece comprising a rounded ridge or 'nipple' at the end of the stem. This form occurs by itself at the end of pipes with round stems from around 1840 onwards, but was often used in conjunction with other shaped ends to the stem. It was almost always used for short-stemmed or 'cutty' pipes.

6.6 Tip or Mouthpiece Finish Fired pipeclay is very porous and will suck moisture into it when dry. This means that a pipe mouthpiece will stick to the smoker's lips if it is not either made damp before use or coated with some sort of a finish to make it impermeable. Some of these finishes, such as milk or wax, are biodegradable and so do not usually leave any visible trace on the pipe, although they may be discernible from residue analysis (a field of study that has yet to be explored).



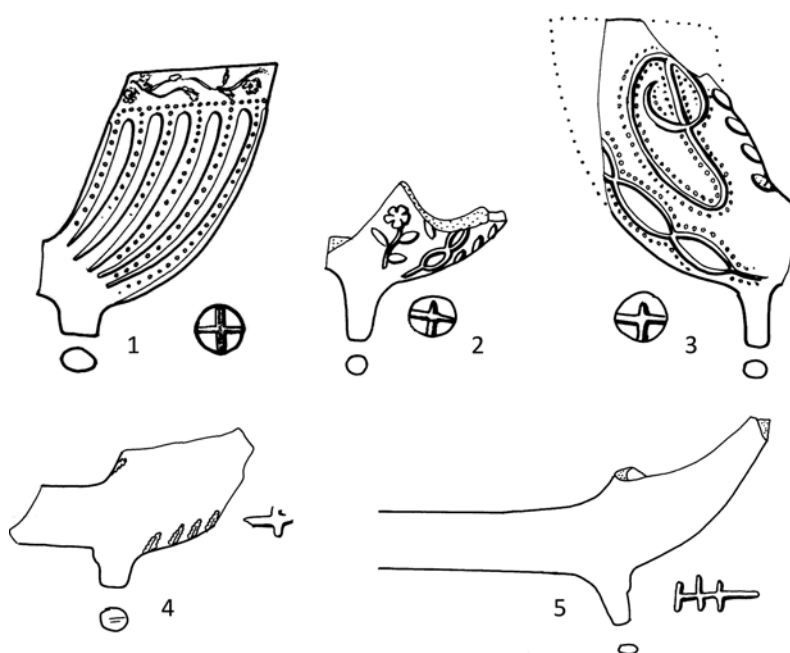
*Nineteenth century mouthpieces showing red paint or wax (top and centre) and glazed (bottom) coatings.
Photo D. A. Higgins.*

Care should be taken when washing mouthpieces, especially from contexts with good preservation, so that any faint traces of organic coatings are not inadvertently lost. Other types of finish, such as glaze, survive well in the ground and are readily identifiable. The evolution of tip finish over time and in different parts of the country has not been much studied and would repay further work. Where tip coatings are present a note of them should be made. Codes can be useful if data is collected in tabular form, the following types being the most commonly encountered: -

- 0 No visible finish.
- BG Brown Glaze.
- GG Green Glaze (often thin and light in colour).

CG	Clear Glaze.
YG	Yellow Glaze (often with a brownish or orangeish tint).
GW	Green Wax.
RW	Red Wax.
*	Other (specify).

6.7 Internal Bowl Crosses (or Other Marks) Relief moulded marks are occasionally found on the base of the bowl interior. These marks were formed by designs cut into the end of the metal stopper that formed the bowl cavity during the moulding process and are not to be confused with scrape marks that may be formed across the base of the bowl interior by the moulding or trimming wires. These marks have not been noted on seventeenth century pipes, which generally had very narrow rather rounded bases to the bowl interior, but occur across Britain from the early eighteenth century onwards. The most common marks found on the internal base of a bowl are simple crosses. When viewed with the stem pointing directly towards the viewer these can either appear as '+' or 'x'. These symbols should be used in any catalogue or report to indicate which type is present. If some other symbol or letter is found it should be described. Occasionally multi-arm stars are found and, very rarely, initials have been observed. The function of these marks is unclear, but they may well have started as a precursor to the practice of 'roughing up' the end of the stopper to help prevent it sticking to the clay during moulding and sucking in the sides of the pipe as it is withdrawn.



Selection of pipes showing internal bowl marks, which are drawn in plan adjacent to the bowl profile (not at a uniform scale). Drawings by S. D. White.

6.8 Rim Milling Rim milling was applied to almost all pipes produced from around 1600 through to the early eighteenth century, with some revival in the nineteenth century, particularly on Irish pipes. This decorative band was hand applied to the pipe during the finishing process using a serrated blade and is not to be confused with moulded milling, which was formed in the mould (and only occurs from the second half of the nineteenth century onwards). The amount of milling and the way in which it was applied are both indicators of the care that was taken in finishing a pipe and so, by extension, its quality. A pipe with a neatly applied band that joins up seamlessly is likely to be of a better quality than one with only a partial band, or one where the milling runs away from the rim at an angle. For this reason, it is normal to not only record the presence/absence of rim milling, but also the amount present. The amount of milling around the rim is estimated to the nearest quarter of a complete circumference and then expressed as a number ranging from 0 for no milling to 4 (four quarters) for a fully milled pipe. Only complete rims should be graded in this way, since the data can then be used to work out the average amount of milling in any given group, which makes it easily comparable with others. The numbers are simply added up and divided by the number of examples, to produce a 'milling index' (such as 3.16, which would denote that, on average, just over three quarters of all pipe rims in a particular group were milled). A note can also be made of incomplete rims where milling can be seen, but which are not complete enough to assess the original extent.



Two seventeenth-century pipes with milled rims. 1. Half milled (M2); 2. Fully milled (M4). Photo S. D. White.

6.9 Rim Finish Once a pipe had been formed in a mould the rim could be finished in a number of different ways, which can, in turn, be used to help determine its date and quality. The most common types of finish, and the codes used to identify them, are as follows: -

Cut (C) – This is the simplest form of finish, where the rim is formed by a single knife cut to remove any surplus clay. This tends to leave quite sharp edges and is characterised by a flat-topped lip to the rim, usually with drag marks visible across it where the clay has been cut. This type of finish was sometimes used on the very earliest pipes (before about 1610) but then became fairly standard on most British pipe types from around 1700-1730 onwards.

Bottered (B) – The term given to a rim that has been compressed, shaped and smoothed by twisting a button-like former against it. This typically leaves a neatly profiled rim with slight facets on either side where the tool has pressed against the clay. This type of rim finish was almost universal during the seventeenth century but fell from use as new eighteenth century forms were introduced. There was a very limited revival on nineteenth century pipes, particularly those from Ireland. In contrast, this technique remained in use on almost all types of pipe produced in northern continental Europe, and so is a good indicator of pieces imported to Britain from contexts dating later than c1730.

Internally Trimmed (I) – Sometimes a knife was run at an angle around the inside of a rim to remove a sliver of clay during the trimming process, leaving an internal bevel with clear striations where the clay had been cut. This was done to even up the thickness of the rim where the stopper had not entered centrally, making it look more elegant, or to create a fine lip to the bowl. This finishing technique is most frequently found on pipes dating from later than c1700.

Wiped (W) – The rim was sometimes wiped with the fingers or a small piece of sponge to remove imperfections and smooth the sharp edges created by cutting off surplus clay. These wipe marks are usually evident as a series of fine striations around the rim, which will have a slightly rounded profile. This technique was used occasionally from around 1700 onwards and, in particular, it was characteristic of pipes produced in the Broseley area of Shropshire from the nineteenth century onwards.

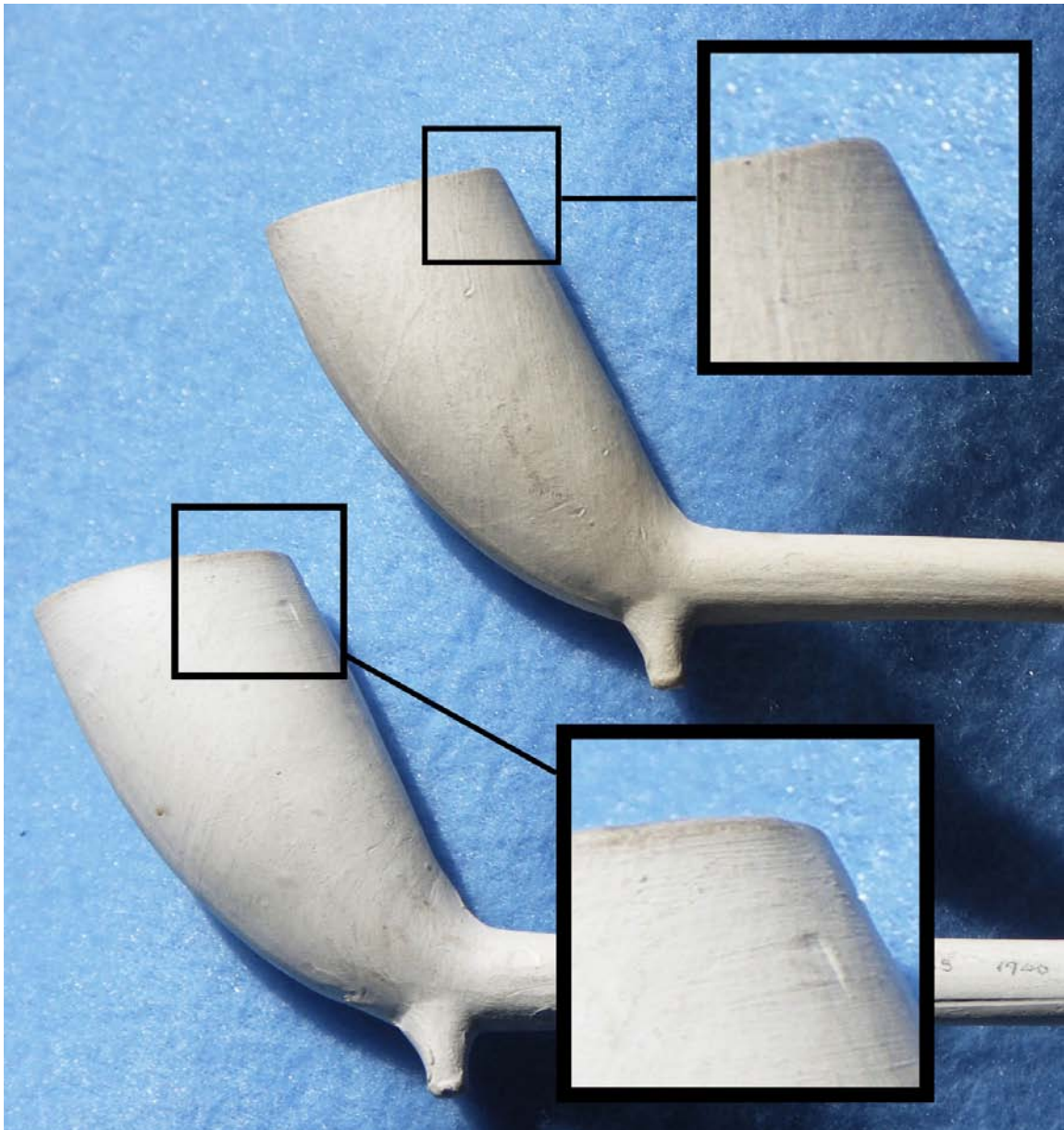
Sometimes these finishing techniques were used together and the codes can be used together to identify this finish in tables or notes. Thus, CW is a rim that has been cut and wiped or IB is a rim that had been internally knife cut and bottered. These last two techniques (internal trimming and bottering) can sometimes be difficult to distinguish where they occur together, since the bottering tool sometimes projected down inside the bowl and scraped the interior as it was rotated on the rim. As a general rule bottering produces a smooth, rounded and slightly polished appearance near the rim as opposed to knife trimming, which extends deeper into the bowl cavity and produces less even marks with a slightly uneven surface and drag lines where the blade has cut into the clay.



Early eighteenth-century bowl from Staveley, Derbyshire, with a cut rim. Photo D. A. Higgins.



Early eighteenth-century bowl from Staveley, Derbyshire, with a cut and internally trimmed rim. Photo D. A. Higgins.



Two nineteenth-century Shropshire bowls with wiped rims. Photo D. A. Higgins.

6.10 Bowl Forms So far as possible, bowl forms should be identified and described with reference to previously published examples, especially when they come from well dated groups or form part of a local typology. Where new forms or decorative motifs are encountered these should be illustrated at life size, so as to provide a reference point for future work. Where good groups occur, for example kiln groups or pit groups, it may be possible to identify the specific moulds in which the pipes were made using 'mould flaw analysis'. This entails recognising tiny flaws in the mould surface, often only clear with a 10x hand lens, that identify the products from a specific mould. Where individual moulds can be identified, they should be described and illustrated so as to define the forms and variability within the given assemblage. See the section on bowl forms in 'dating pipes' for more information on this topic.



Seventeenth-century pipes from Pontefract Castle showing matching mould flaws (circled). Photo S. D. White.

6.11 Makers' Marks When describing the makers' marks found on pipes, it is very important to be clear about three things: where the mark occurs on the pipe; what form (style) the mark takes and how it was created. This is because all three factors are relevant to the date of the pipe and in which part of Britain it is likely to have been produced.

Position - The most frequently positions where pipe marks are found (and the standard abbreviations used to describe them in a database) are as follows: -

H - on the base of the heel.

SP - on the base of the spur.

BB - beneath the bowl where a pipe has neither heel nor spur.

BH - behind the heel (underneath the stem just back from the heel – very rare).

SH - on the sides of the heel.

SS - on the sides of the spur.

BF - on the bowl, facing the smoker.

BL - on the bowl, on the left hand side as smoked.

BR - on the bowl, on the right hand side as smoked.

BA - on the bowl, facing away from the smoker.

BS - on both sides of the bowl.

SX - on the top of the stem, reading across it.

SL - on the top of the stem, reading along it.

SM - multiple individual stamps right around the stem, as a band or pattern.

ST - stem twist, a specific form of roll stamp forming a spiral of shallow grooves around the stem.

RS - roll stamped stem (a continuous band or zone stamped around the stem, which may be plain or decorated but does not include milled decoration).

MSM - moulded stem mark, running along both sides of the stem.

SSS - spiral stem stamp (one-line mark applied on a spiral).

Form - The form of the mark refers to the actual structure or configuration of the mark that makes it visible to the eye. In most cases this is achieved by height differences in the surface of the clay, which can take one of two forms, being either incuse (I) or relief (R). An incuse mark is one where the primary lettering or motif of the mark is sunk down into the surface of the clay, as opposed to a relief mark, where it is raised up. The form of the mark is quite distinct from the way in which it is created (method), and both main types (incuse or relief) can have been either stamped or mould imparted. Much more rarely other forms of mark were used whereby the mark relies on a surface layer of colouring (ink, paint, etc.) to reveal its form, for example, by using ink on a rubber stamp, a transfer print of coloured pigment or a hand written mark using ink or paint. Marks such as these are rare and should be individually described and illustrated.

Method – This refers to the actual production method by which a mark was created, which normally falls into one of two categories, either moulded (M) or stamped (S). A moulded mark is one that is created as part of the actual production process that initially shapes the pipe. The mark itself forms part of the mould, so that every pipe created from it bears the same mark in the same place. This production method was most commonly used for initials on either side of the heel or spur, or the maker's name and address moulded along either side of the stem. Less frequently it was used for lettering on the bowl itself (in various locations) or in a cartouche on one side of the bowl (which was a predominantly Bristol area style of marking).

Moulded lettering usually appears directly from the background or 'field' of the pipe and may be slightly blurred where the clay has been squeezed across the mould surface as the pipe is pressed. This can leave tell-tale striations in the clay around the lettering and, sometimes, pieces of the lettering get stuck in the mould causing small gaps in the characters. In contrast, a mark that has been stamped often has much more crisp looking lettering without any surrounding striations. It also tends to have some sort of a border where the edge of the die containing the design has pushed against the clay. Moulded marks can also be contained within a moulded border, especially where lettering occurs along the stem. It is important to recognise the differences between moulded and stamped marks and to use these terms carefully and specifically when describing pipe marks, especially since both moulded and stamped marks were sometimes used on the same pipe. This is perhaps most frequently encountered when stamped bowl marks were used on pipes with moulded marks already formed on their heels or stems.

Much more rarely other methods were used to create marks, for example by using ink on a rubber stamp, a transfer print or a hand written mark using ink or paint. Marks such as these should be individually described and illustrated.

6.12 Context Summary For some assemblages a context summary is all that is required, and for most site groups one will be compiled, even if a full catalogue of pipe fragments has also been prepared. The purpose of the context summary is to bring together the key information about each context group of pipes from a site and to present it in tabular form so that the data is easily accessible, particularly for the excavator for whom dating evidence provided by the pipes may be crucial. The summary enables an overview of the pipes evidence to be readily viewed for the site itself as well as making this information comparable with other sites. An Excel or similar table is the best way of presenting this data so that it can also be searched and sorted to some extent. There are three principal aims for the context summary: -

- To condense the detailed catalogue data into an easily accessible form.
- To provide a summary of the pipe dating evidence for each context.
- To act as an index for identifying key marked/decorated/illustrated pieces within the publication report or site archive.

In order to do this the recommended categories of information to be displayed (and the abbreviations used for column headings) are as follows: -

Site The site code need not be added to every line so long as it is already evident in the file name/associated documentation and all the material in the table has the same code. A 'site' column and/or 'sub-division' columns should, however, be added as necessary where more than one area or trench is included in the study group.

Cxt (Context) The context number of the group represented on that particular line.

B (Bowl) The number of bowl fragments in the context group.

S (Stem) The number of stem fragments in the context group.

M (Mouthpiece) The number of mouthpiece fragments in the context group.

Tot (Total) The total number of pipe fragments in the context group.

Range The overall date range represented by the pipe fragments in the context group as a whole. This should be from the earliest likely date for the earliest fragment to the latest likely date for the latest fragment. The purpose of this is to indicate the maximum possible range that the pipe group could fall within. It also gives an indication

of the degree of residual or intrusive material in a context by showing how wide a date range is represented. The range should be given in whole years (1700-1800 rather than "C18th") and using two dates in a consistent format, so that the context groups can be sorted by date range if necessary.

Latest This column gives the likely deposition date for the context group, based on the specialists assessment of all the pipe evidence. This is the 'best guess' as to the date of the deposit and is usually based on the latest datable fragments present. Occasionally the latest piece may be disregarded if it seems intrusive, e.g., a single late stem in a large group that is otherwise wholly of an earlier date. Similarly, earlier residual fragments can be disregarded where later pieces are present. Additional weight may also be given to more closely datable pieces so as to narrow the 'spread' created by less accurately datable plain stem fragments. As with the 'range' the date bracket should be given in full and in a standard format so that it is sortable. Where the suggested deposition date is not what might be expected, the reason for it should be given under 'comments'.

Marks The pipe marks present in the context group should be listed and 'x 2', 'x 3', etc., added where duplicate examples occur. As this is just a summary, the exact form of lengthy marks need not be entered, and symbol marks can be simply described (DH x 1; star x 3, etc.). Similarly it is not necessary to differentiate types of mark here (moulded, stamped, etc.), but all marks should be included, even where the reading is uncertain (e.g., "?? x 2"), since this is essentially an index to the marked fragments from the site.

Dec (Decoration) A brief description of the primary decorative motif for each fragment and count for duplicates is given. As with the marks column, this need not be detailed, it is primarily an index to show where these pieces occur within the assemblage as a whole.

Figs This column indicates any illustrated pieces from the context.

Comments This column is used for free text which can expand upon or explain the summary data given in the preceding columns. In particular, it can be used to highlight any strengths or weaknesses within a group and make more qualitative assessments, e.g., that the material is very fresh or abraded, or that the dating evidence is strong or weak. It can also be used to provide specific data, such as a maker's working life to support a suggested deposition date.

7.0 Illustrating Pipes

Pipe illustrations usually form an integral part of any of report or study and are perhaps the most easily assessable and frequently used part of any publication. Given their importance, thought should be taken in selecting the material to illustrate and with regard to which views or details will be required. Previously published drawings provide a valuable first reference point for any new study and should be consulted when selecting new material to illustrate. Previously unpublished bowl forms, marks and decoration should all be illustrated, as should fragments that show technical details or highlight specific characteristics of the study group. Illustrations should always be prepared for publication at life size and accompanied by a catalogue giving details of the example depicted and its context and/or reference number, so that the actual object can easily be located again.

7.1 Line Drawings Pipes have traditionally been illustrated using line drawings and this is still the preferred method amongst finds specialists because of the clarity of form and detail this technique offers. The normal convention is to depict the bowl in side profile, facing to the right of the page (unless there is a good reason for showing the other side) and with the stem aligned horizontally. Both sides are only illustrated where there is a different decorative scheme on either side of the bowl. The plan of the heel or spur is projected below and should show whether the mould line survives or has been trimmed off. Any internal bowl markings are shown in plan as a separate detail, which is usually placed in front of the bowl and on the same orientation as the pipe itself. Where moulded marks occur on the sides of the heel or stem, those on the other (hidden) side are also shown as separate details. Likewise, any marks on the back of the bowl or top of the stem which will be foreshortened in the profile drawing are also shown as separate details. Moulded marks are normally just shown at life size, but stamped marks are usually also shown as a twice life size detail.

When illustrating stamped marks, it can be very helpful to make an impression of the mark using modelling clay, particularly where the mark contains a lot of detail or is on a curved surface, such as a roll-stamped stem. A sheet of modelling clay (such as 'plasticine') needs to be rolled out and then talcum powder gently rubbed into the surface, to prevent adhesion to the pipe. The relevant part of the pipe can then be gently impressed into the modelling clay

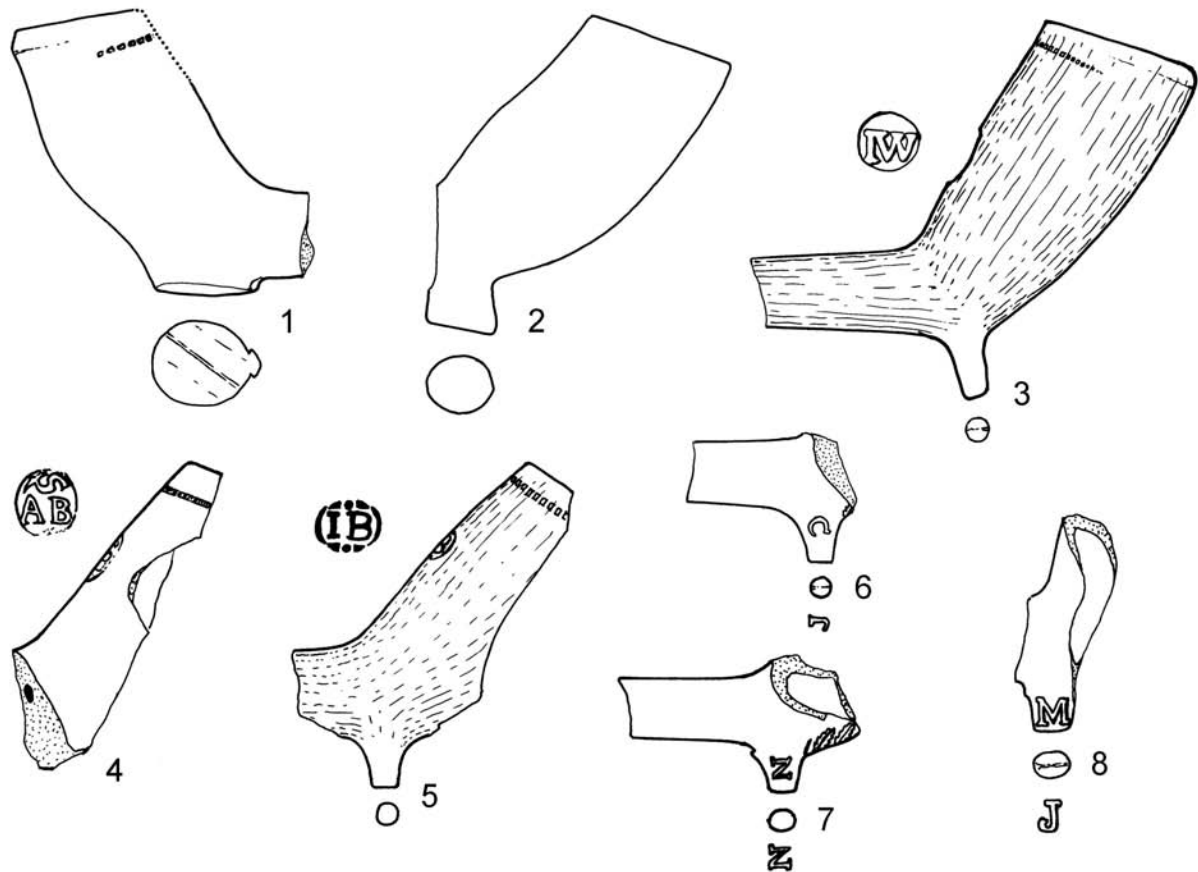
to create an accurate impression of the mark. If a pale (but not white) colour is used ('stone' works well) this can be placed on a normal scanner and the resulting image flipped (to create a 'positive') and enlarged as required to provide the basis for a detailed drawing (usually larger than twice life size, so it can be reduced for final publication). Photographs can be used in a similar way as impressions for most marks, but are not suitable for others, for example, the roll-stamped stems, where the mark occurs in a band all the way around the stem and an impression is by far the best option.



Early eighteenth century stem fragment with a relief roll-stamp reading THOMAS BIRCH from Whitehaven, with the complete form of the mark revealed by a scanned image from a plasticine impression. Photo D. A. Higgins.

As with all archaeological drawings, the convention is that the light is falling from the top left of the illustration. This means that highlights and shadow can be shown on any marks or decoration to make them look more three dimensional and to show how they have been formed on the pipe. For makers' marks, the convention is that incuse lettering or detail is shown in solid black and relief lettering or detail is outlined, with thicker lines used to indicate shadow. Stipple is not used to depict the curved surface of the pipe, which is taken as read, since it often interferes with any other marks or decoration that is being depicted. Small chips or cracks are also usually omitted for the same reason. Stippling can be used, however, to indicate flaked or broken areas where the original surface is missing, or to highlight unusual fabrics or finishes, such as red clay having been used for the body or a glazed area having been applied to the tip of a pipe.

Pipe drawings should always be prepared for reproduction at life size, since this enables direct comparison with other examples. Furthermore, the exact size of a bowl is often an important factor in determining its date, especially for examples dating from before c1730. Finally, details of the profile shape and any marks or decoration are difficult to see if a pipe bowl is reduced. The drawings themselves are often prepared in an enlarged form, which makes it easier to draw the fine detail, and then reduced for final publication. Pencil drawings can be prepared at life size from the pipes themselves and then enlarged to the required scale (usually 1.5 to 2 times) to prepare the finished artwork. A bar scale should always be included with the original pencil drawing and then copied as part of that image at each stage of the process right through to publication so that the size of the drawing can be checked at any point. The final publication drawings typically have a line weight of 0.25mm for the profile of the pipe and a line weight of 0.18mm for broken edges and any detail shown within the outline. These lines will need to be proportionately thicker where drawings are prepared at a larger scale. The final digital images should be prepared at 1200dpi and always have a bar scale in the final drawing. This is especially important in this digital age, where images can easily be unintentionally resized when they are being manipulated or copied.



A range of pipe illustrations showing the different conventions: 1 & 2 show bowl forms with heel plans, one of which shows trimming marks; 3 shows a bowl with burnished areas indicated with broken lines and a relief stamp with the lettering shown in outline; 4 depicts a bowl fragment the broken edge of which is stippled, it also has a relief stamp shown in outline; 5 shows a bowl with burnished areas indicated with broken lines and an incuse stamp shown in solid black; 6-8 depict bowl fragments with relief moulded initials, two of which show untrimmed mould seams on the base. Drawings by D. A. Higgins.

7.2 Photographs Photographs provide a quick and easy way of recording pipes and these can be very useful for record shots or as a visual index for archive collections. Many photographs, however, are poorly executed and could easily be improved with a little forethought. It is also important to remember the limitations of photographs over line drawings when choosing a medium for publication.

When photographing a pipe, good lighting is essential together with a clean untextured background of contrasting colour. A strong, low angle light is often required to highlight surface detail, marks or decoration and this should preferably fall from the top left, unless a different orientation is required to highlight a specific detail. If necessary, a number of shots can be taken with different light angles to pick up detail. It is important not to have the camera too close to the pipe, which distorts the profile of the object. The camera should be placed as far away from the pipe as possible (so as to minimise this distortion), preferably on a stand, and with the subject filling the frame. There should also be a scale alongside the pipe and the pipe should be orientated square on to the camera, unless a specific detail is being photographed. A small piece of modelling clay is useful to place under a pipe being photographed. The pipe can be supported against or bedded into this so as to hold it in place and at the desired angle to the camera. It can also be very useful to support a glass sheet around 20cm above the background and to place the pipes and scale on this to be photographed. Any low angle light used to illuminate the pipe should then cast a shadow outside of the frame so that the subject can be photographed with a crisp, shadow free background.

The side profile of a pipe bowl should always be photographed, since this is the outline that is required to compare with typologies for dating purposes. As with line drawings, the preferred orientation is with the bowl facing to the right, so as to show the surname initial of any moulded mark and make the illustration directly comparable with as many others as possible. Other views can then be taken as necessary to show any other marks, decoration, etc. In general, it is

best to try and keep additional views square on (e.g., directly above, below or facing the seams of the bowl) unless the subject dictates otherwise. Details of marks are also useful.

The camera should always be set to take a high resolution image so that the photograph can be enlarged to see detail if required and so that it is of a suitable quality to use for publication purposes. As a rule of thumb, images with a file size of around 5MB or more will produce good quality results and these should preferably be stored as in an archivally stable file format, such as .tif (.jpg images are unstable and loose quality over time with use). Thought should also be given to making sure photos are properly labelled so that they can be archived properly and securely backed up in a system that allows for their long-term preservation. Ideally each image should be renamed with details of the subject, or placed in a clearly labelled folder (and preferably both). A useful tip is to write details of the subject (site name and code; context or accession number; photographer; date) on a piece of paper and to photograph this alongside each pipe first, followed by more detailed photos of the object itself. This ensures that the subject is clearly identified in a batch of photos, even if the individual images have not been subsequently relabelled.

The drawback with photographs, particularly for publication, is that it is often difficult to pick up all the detail on a pipe from any one lighting position, especially for elaborately marked or decorate pieces. This is because it is hard to get well defined contrast, since the detail essentially comprises 'white on white' on a curved / cylindrical surface, which is hard to photograph. It may also be necessary to photograph a single pipe bowl from a number of different angles to show all the details that can be included in a single drawing, e.g., maker's marks on the bowl or stem; heel plan; internal bowl marks and moulded maker's marks on the sides of the heel.



A seventeenth-century heel stamp from Yorkshire showing how different lighting angles reveal different details of the same stamped mark. Photos by S. D. White.

8.0 Writing a Pipe Report

The scope and detail of any pipe report will depend on a number of factors and, in particular, the end purpose for which it is intended. Where small numbers of pipes are present and/or their significance for the particular project is not great, then it may be possible for a non-specialist to carry out the work using these guidelines. Where larger or more important assemblages of pipes are recovered, then a specialist should be employed. This is particularly the case where kiln waste or large numbers of marked or decorated pipes are present, or where the final report is intended for publication. Further advice on the significance of pipe assemblages can be obtained by contacting the National Pipe Archive (NCTPA@talktalk.net), the Society for Clay Pipe Research (scpr@talktalk.net) or the Académie Internationale de la Pipe (admin@pipeacademy.org).

At its most basic level, a pipe report may be an interim spot dating of the context groups from a site, or an archive catalogue, simply listing and dating the pipes recovered. At the other extreme, a full publication report may contain detailed lists of the pipes and/or context groups as well as illustrations of key pieces and a discussion placing the finds within their local and/or national context. Any report will also be shaped by the nature and range of the pipe assemblage that is to be reported on and the significance of the pipes in relation to the excavation itself. The following guidelines therefore provide broad pointers as to the sorts of information that may be relevant to any given report. They outline the main subject areas that should be considered for inclusion and the range of elements that should be included within each subject area. The key thing is to structure any report clearly and, where the following topics are addressed, to make sure that information is presented in such a way as to make the data easily accessible within the report (e.g., by the use of sub-headings) as well as being comparable with data from other assemblages (e.g., by providing clear figures for the occurrence of particular attributes and/or by the use of tables to present information). The use of a good recording system for systematically collecting details of the individual fragments (e.g., Higgins and Davey 2004) and/or preparing a context summary is an important prelude to writing any report, since this allows data about the various attributes of any particular assemblage to be easily seen, sorted and extracted.

The other important factor is making sure that the project director supplies the specialist with all the necessary supporting site information for the work to be carried out properly. This includes making sure that the specialist is fully aware of the aims and objectives of the work (project design) as well as provided with all the necessary information required to interpret the finds in relation to the archaeology of the site. This includes background historical information; structural details of the site itself (plans, context descriptions, site matrix, phasing); the results of any other finds assessments that have been completed and any absolute dates that have been established for specific features (dated structures, radiocarbon analysis, dendrochronology, etc.). There should be an ongoing dialogue between the project director and the pipe specialist from the inception of the project through to completion, and allowances made for the specialist to visit the site/attend project meetings as required for major projects.

8.1 Introduction Any report should start with an introductory statement giving background details of how the report came about, who prepared it and what material is covered in it. This allows the report to 'stand-alone' in a site archive or as grey literature, while still being easily adapted for inclusion as part of a larger site report. For this reason, it is helpful to try and keep any very general background details that would normally appear at the start of a project monograph in a separate first paragraph that can easily be removed if necessary, while any introductory information directly relevant to the pipes themselves can be contained in the following paragraph(s).

The key information that should present includes the authors name (and that of any illustrators); the date the report was compiled; where the study material comes from (including site name, site code and, if known, grid reference); when the pipes were recovered; the name of the individual or organisation who recovered the pipes and, if possible, the final location at which the pipes are intended to be deposited/stored. The introduction should also detail any specific methodologies that were applied to collecting the material (e.g., sieving of specific deposits, 2D/3D recording of finds, etc.), as well as reference to any typologies that have been used for dating and a concordance of any codes/abbreviations used.

8.2 Quantification There are some basic statements as to the overall pipe assemblage that it is useful to include, so as to enable direct comparison of one assemblage with another. These include the total number of fragments recovered and a breakdown of this figure into the total numbers of bowl, stem and mouthpiece present. It is also useful to note the total number of context groups from which the material was recovered, so that an overall feel for the size and composition of the assemblage can be given. There is, for example, a marked difference between one context that has produced an assemblage of 100 fragments of pipe and 100 contexts that have only produced one fragment each.

8.3 Marked Pipes Another element of any assemblage that it is useful to quantify are the numbers and range of marked pieces present. Any makers' marks should be clearly and accurately described, together with a note of the number of examples of each type recovered. So far as possible the marks should be dated and identified to maker and references supplied as to other known examples of each type. Where a mark has not been previously published, it should be illustrated. It is often useful to provide a table tabulating the marks and details about them, together with a cross reference to any illustrations. This makes it easy to see what material has been recovered from any given site and to access information about the marks. Small numbers of marks are sometimes discussed together in the same section (but care must be taken to distinguish between stamped and moulded marks). Where larger numbers of marks are present, it is usually best to list and describe the marks in two sections, one for stamped marks and one for moulded.

8.4 Decorated Pipes Decorated pipe fragments should also be clearly listed and described. The range and nature of

decoration on pipes can be quite variable and so a pragmatic approach has to be taken to describing any particular assemblage. In general terms, it is helpful to present any decorated pieces in broadly chronological order and to group those pieces decorated in the same way together (e.g., stamped decoration; moulded decoration, etc.). Parallels should be quoted for previously published examples, particularly if the same mould appears to have been used, and consideration given to illustrating previously unrecorded designs. Rim milling is usually considered under 'manufacturing' as a finishing technique, rather as a type of decoration. Milled bands applied elsewhere on the bowl or stem should, however, be mentioned in any discussion of decorative elements.

8.5 'Imported' Pipes While the majority of pipes in any British assemblage are likely to have been made locally, there are often some pieces that have either been traded within the region or brought in from further afield. These pieces can shed light on day to day trading activities within the region or highlight particular connections with a more distant source as a result of special commissions / trading arrangements, or because of their unusual design or quality. Any such pieces should be clearly identified and discussed within the report.

8.6 Manufacturing Techniques Any evidence for the way in which the pipes have been produced and finished should be considered. As well as the more obvious features, such as milled rims or burnished surfaces, this section can also include characteristics ranging from the clay type used to evidence for wear or alteration of the moulds themselves. Particular attention should be paid to any features that appear to be characteristic of any particular production centre or individual. The sorts of evidence that might be relevant to include or discuss in this section include: -

- Fabric type(s).
- Mould types (where these can be distinguished).
- Rim finish (bottered, wiped, cut, internally trimmed, etc.).
- Rim milling, including the amount used and any changes by date or form.
- Internal bowl marks (form, frequency and relationship to mould types).
- Burnishing, including an assessment of quality.
- Other surface finish (varnishing, enamelling, etc.)
- Stem bore size and variation.
- Stem curvature (or lack of it).
- Stem length.
- Mouthpiece types and finish.
- Heel trimming (presence/absence, and the date of any change).
- Nature and type of any maker's marks (by form and date).
- Evidence for manufacturing idiosyncrasies (by individual maker and/or workshop).

8.7 Kiln Waste Quite apart from the structural evidence in the form of the kiln itself (or associated buildings), the artefactual evidence arising from pipe manufacture can be divided into two broad types; the kiln furniture and supplements used in the kiln and the waste pipes themselves. Waste pipes themselves may not look that different from a domestic assemblage in that, in most cases, very few will show obvious signs of being wasters (overfired, warped, deformed slag encrusted or cracked); most of them are simply ones that got broken during the manufacturing process. The best clue to a group of waste pipes is simply that there is often a repetition of pipes from the same mould and a very low percentage of them will show signs of having been smoked. When a pipe has been smoked there is often a greyish discolouration of the fabric inside the bowl, particularly towards the rim. This discolouration is very persistent and little changed by either burial or chemical cleaning with EDTA to remove iron staining (Mirdamadi 1999). In contrast to the pipes themselves, the associated kiln waste is often very distinctive, most often comprising the following types of material: -

- Thin sheets of fired white clay, with just one side showing smear marks.
- Hand formed rolls or strips of fired white clay.
- Stems with slaggy encrustation on them.
- Amorphous pieces of fired white clay, sometimes vegetable tempered.
- Fired white clay with pipe stems embedded in it.

The various types of kiln waste have been described in detail by Peacey (1996) and his study should be consulted if material of this type is found or suspected (available online at http://intarch.ac.uk/journal/issue1/peacey_index.html). Where a significant quantity of kiln waste or any structural evidence is found, then a specialist should certainly be consulted. The relatively large quantities of waste generated, however, led to a disposal problem and kiln waste is quite often found dumped away from a kiln site, where it was used as hard-core in building works, for filling potholes

in roads, etc. As a result, isolated pieces or small groups of kiln waste may turn up on excavations quite unrelated to a production site. Where such pieces occur they can be identified and described by reference to Peacey's work and highlighted in the excavation report.

8.8 Social Status and Trade Patterns In any report it is important to look beyond archaeological artefacts themselves by trying to interpret the society that created them and the role that excavated objects played within that society. Where the evidence allows, a section should be included to present a broader discussion and interpretation of artefactual evidence. Social status is one of the avenues that can be explored through pipes, since different styles and qualities would have been used by different sections of society or on different social occasions. The measurable characteristics they exhibit in terms of bowl form, production quality, makers' marks, stem length and finishing techniques allow them to be compared and assessed. At one end of the social spectrum, pipes from prisons have been found with signs of long and extensive reuse in a broken condition, while fine quality long-stemmed pipes can occur as large fragments from high status rubbish deposits.

The precision with which pipes can be sourced and identified also makes them an ideal artefact type through which to study trade and marketing patterns. Furthermore, site groups often contain a chronological range so that changing patterns can be observed over time. The very local nature of most pipe production enables the catchment areas for local towns to be assessed, while the presence of pieces from further afield can reveal longer distance trading connections. Pipes can also act as markers for longer distance trade routes, when significant numbers of examples from a single source are found to occupy a particular pattern within the broader landscape.

8.9 Discussion A concluding discussion is useful for any report, especially if it has covered a number of areas/topics. This should bring together a summary of the analysis and findings and provides an opportunity for a broader and more general discussion of the evidence and results. It should set the pipes within their local, regional and/or national context as appropriate, highlighting any advances to knowledge that have been made.

9.0 Curating Pipes

When an archaeological project is finished part of the end product should be a stable, ordered and accessible archive of the pipe evidence that can be transferred to an appropriate body for long-term storage with access for future researchers. The pipes themselves should all be clean, dry, labelled and in museum approved packaging (bags/boxes with acid free padding, if required). They should be stored in a logical order so that they can be easily accessed (e.g., with bags arranged in context number order) and cross-referred to any documentary archive. Digital files should be securely backed up and properly curated in an appropriate digital repository, with print-outs prepared on acid free paper as part of the site archive. Any codes or abbreviations used during preparation of the archive should either be expanded to their full form or a concordance of terms prepared. The author(s) of any archive notes, report or illustrations should be clearly identified and the integrity of the pipe archive maintained (including other specialist elements, such as clay analysis or thin-sections). All objects, papers, photographs and digital files should be properly listed and indexed so that the archive can easily be identified and accessed by future curators/researchers.

9.1 Selection, Retention and Discard All pipe fragments should be collected during fieldwork or excavation projects, since they cannot be properly assessed until they have been cleaned and dried. Particular care (e.g., sieving) should be taken to collect all fragments from contexts where there is a high potential for reassembly.

While often numerous, pipe fragments are generally small in size and can be stored compactly (and with no particular conservation implications) so that they only comprise a small element of most archaeological assemblages. They often have a high potential for future research and so the presumption is usually in favour of retaining all fragments recovered as part of an archaeological archive. As with pottery, the presumption should be that every pipe fragment has the potential to inform future research and a strong case has to be made for not selecting items for the archive (Barclay *et al* 2016, 2.6).

Where selective retention or discard is being considered a number of factors must be taken into account, for example: -

- The potential for future research, education and display.
- The need to retain evidence of previous communities in a locality.
- Whether subsequent acquisitions, research or future fieldwork might lead to a reassessment of the significance of the material.

- Whether the material provides evidence for a now defunct local industry.
- Whether or not similar samples could be recovered from the same area in the future.
- Whether the material forms part of a broader pattern of production, consumption and use within the region.

The selective retention of material going into an archive should only be undertaken following discussions between the excavator/collector of the material and the receiving curator, and in consultation with a suitably qualified and experienced specialist. The Society of Museum Archaeologists recommends the following pipe material for retention (1993, 4.1.7): -

“All complete pipes, bowls, decorated or stamped pieces; all fragments (bowls, stems, decorated, stamped and plain) from good context groups as identified by pipe specialists, especially where scarcity of bowls or marked pieces places greater emphasis on analysis of stems for dating (it should be noted than an otherwise poor, disturbed or contaminated context may still yield a coherent pipe group, worthy of total retention, and so it is especially important for clay pipes that selection is not determined entirely by the general nature of the context). Otherwise retain representative sample of stem types/dimensions. Pieces sampled for tobacco residues. In areas where the use and manufacture of clay pipes is scarce or little understood, total retention of all pipe fragments is advised.”

Where any discard prior to deposition, or from existing collections is being considered, then this should only be undertaken in accordance with a written discard policy, approved by the curating institution, and in consultation with a pipe specialist. Any material to be discarded must be properly recorded in accordance with the policy and a record securely stored as part of the site archive.

9.2 Storing Pipes Pipes are generally easy to curate since they are normally stable and do not require special storage conditions. As with any other class of finds, they should have some sort of identification number written on each piece, which can be tied to an accessions register or site archive. They should be clean and dry and stored in labelled bags within archivally sound boxes, which also need to be clearly labelled so that they can easily be linked with the accessions register / site archive. It is also useful to print and store a copy of any catalogue or specialist report with the finds themselves, so that it is on hand to consult when the archive is accessed.

The main problem that can sometimes occur is when the fabric of the pipe itself is contaminated with salts or other chemicals, which can crystallise out over time, causing the fabric to spall or crumble apart. This can be a particular problem with finds recovered from marine or estuary environments. Soaking in regular changes of clean water for a period will usually remove any residual chemicals if deterioration in storage is noted.

Where particularly thin-walled bowls are present, or pipes with long surviving stems, then they need to be adequately protected/padded for storage and, in particular, if they are to be transported. Long stems are easily snapped if subjected to sideways pressure and so they should be protected by a separate box within a larger one if necessary. Likewise, even ordinary fragments can get damaged if too great a bulk is stored together and so particularly large assemblage may need sub-dividing with suitable padding where many hundreds of fragments are found together.

Where pipes have been partially or completely reassembled for illustration or display they will be particularly vulnerable and will need extra padding and/or specially shaped housings making for them. A small sliver of wood placed in the stem bore is recommended when stem fragments are mended, since this supports and strengthens the join. A short section of cocktail stick is ideal, whittled down slightly to fit if necessary (it should always slide in and be stuck in place, not forced into position). Any glue used should be approved for archive use and reversible (soluble) if necessary.

10.0 PIPE GLOSSARY

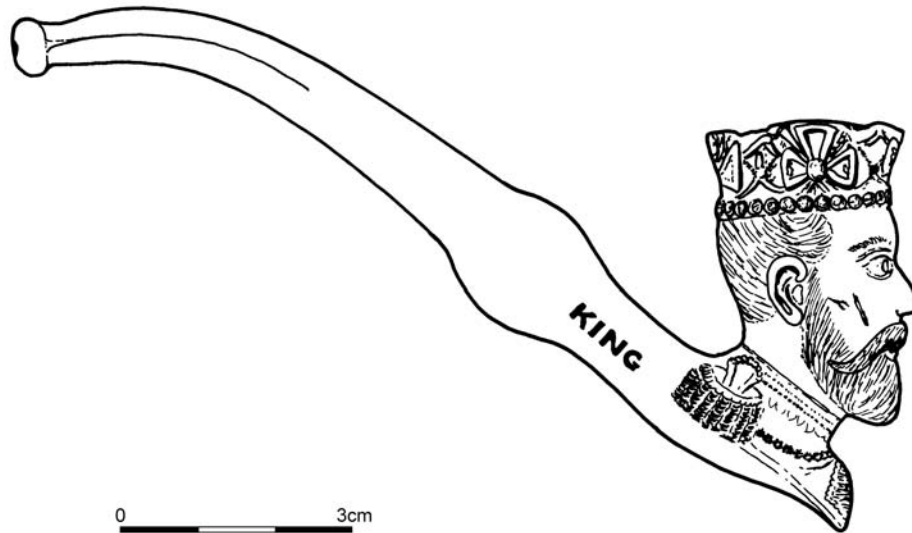
This glossary contains words and terms that are used in describing pipes and related objects/processes as well as common abbreviations used in pipe reports. It is important that these terms are clearly defined and consistently used by pipe researchers so as to enable a concise and unambiguous literature to develop.

Alderman The historic name given to a pipe with a long stem, some of which were certainly curved (*cf* the ‘Masonic Alderman’ illustrated by Church of London on their pattern sheet of c1877). The name was probably used interchangeably with ‘Churchwarden’.

Amberite An artificial material used for making detachable pipe stems/mouthpieces, in imitation of amber.

Back (of a pipe bowl) That part of a pipe bowl closest to an individual when the pipe is held facing away from them (as if being smoked).

Bent stem A pipe with a stem that has been sharply curved after having been removed from a mould. This term was usually applied to short-stemmed pipes dating from after c1850 where the stem has been bent into a sharply curved stem, sometimes with an 'S' shape.



A complete pipe, produced for the coronation of George V in 1911, with a bent stem. Drawing by D. A. Higgins.

Bottered The term used to describe the rim of a pipe bowl that has been compressed, smoothed and shaped by twisting a bottering tool (q.v.) against it. This gave the rim a neater and more refined appearance. The technique was not used on the very earliest pipes but was standard practice for almost all British pipes from the early seventeenth century until the early decades of the eighteenth century, with very occasional revival of the technique during the second half of the nineteenth century. In northern continental Europe, especially in and around the Low Countries, the technique was almost universally employed from the early seventeenth century right through to the twentieth.

Bottering Tool A turned object made of some hard material such as wood or bone that was used to compress and shape the rim of a pipe after it had been trimmed. This was usually disc shaped like a draughts piece, with a groove to form the rim. Sometimes the central area was raised to fit inside the bowl cavity as the tool was pressed down on the bowl mouth and rotated to smooth and shape the rim, leaving a neat circular opening. Different sized tools were required for rims of differing thicknesses or diameters.

Bowl The part of a pipe enclosing the chamber within which the tobacco (or any other substance) to be smoked is placed.

Bowl Stamp A stamped impression made on the body of the pipe itself (as opposed to underneath the heel or on a stem socket) or the tool used to make such a mark. Marks on the bowl itself were almost always placed facing the smoker.

Burnishing The compacting and smoothing of the clay surface by stroking it with a smooth hard tool (usually of polished steel or agate) while in a leather hard state. This results in a glossy line on the surface of the pipe and repeated strokes were used to create a shiny surface, the additional work required enhancing both the appearance and value of the pipe. Archaeologists grade the quality of burnishing into four categories:

Fine (F) A fine burnish is when the polishing lines are so closely spaced and even that there are barely any gaps between them and a very uniform glossy surface is created.

Good (G) A good burnish is well applied with close, even strokes and only small, evenly spaced, gaps between the burnish lines.

Average (A) An average burnish will have gaps of roughly equal width to the burnish lines and may be light and/or rather unevenly applied. The burnish lines will not necessarily extend to the very edge of the area being burnished.

Poor (P) A poor burnish is very scrappy and irregularly applied, with large gaps between the burnish lines and/or uneven strokes/coverage.

Button The expanded end of a moulding wire, formed by repeatedly striking the end of the wire while held securely in a vice so as to burr it over. This button formed a slightly larger hole than the diameter of the wire when inserted into clay, thus allowing the wire to be easily inserted and withdrawn to form the stem bore when moulding a pipe. Alternatively, the term was also used for the raised 'nipple' end forming the mouthpiece on certain styles of pipe, especially short-stemmed cutty pipes.

Cadger A pipe of abnormally large proportions. See 'Show Pipe' for more details.

Calcined The term used from the later nineteenth century onwards for a varnish applied to the surface of a clay pipe to make it look like meerschaum. This was typically a light syrup colour when applied but could be darkened by heating. The term was often used interchangeably with 'cream wash' or 'meerschaum wash' although calcined pipes typically appear to have been darkened all over, while meerschaum wash pipes were typically left with a pale colour all over, or selectively darkened in some areas only, particularly around the bowl rim. See also *cream wash*; *meerschaum wash*.

Carbon Pipe A black pipe produced by excluding oxygen during firing so as to produce a reducing atmosphere. This was typically done by sealing ordinary pipes in a sagger filled with sawdust, which burnt up all the available oxygen, thus creating the reducing atmosphere required.

Churchwarden The name given to a type of pipe with a long stem, some of which were certainly curved. The name was probably used interchangeably with 'Alderman'. During the nineteenth century churchwarden pipes typically has stems of 16" or more in length but, from the mid-twentieth century, the term was increasingly applied to shorter lengths right down to about 9".

Cream Wash A pale varnish used from the later nineteenth century onwards as a coating for the surface of a pipe. Pipes were typically sold with either a single coat (Common Wash) or double coat (Best Wash). The single coat was usually applied directly to the pipe but for better qualities the pipe could be scoured (sanded) first to provide a smooth surface that the varnish would adhere to well. Occasionally three coats were applied. See also *calcined*; *meerschaum wash*.

Cut Mouthpiece A mouthpiece that has been formed by cutting surplus clay from the end of the stem during the trimming process (once the pipe had been removed from the mould and dried a little). A knife was run around the stem against the trimming wire that was inside to support the pipe and ensure that the bore was clear. The knife was usually angled slightly so as to produce a bevelled mouthpiece and there is often a slightly raised ridge around the bore opening itself, formed as the trimming wire was subsequently withdrawn. This was the standard method for forming the mouthpiece and was used on all pipes, apart from some mid-nineteenth to twentieth century types which had either a rounded or nipple type mouthpiece formed directly in the mould.

Cut Rim A pipe bowl where the rim has been formed by a single knife cut during the moulding process to remove surplus clay. This leaves a flat surface with sharply defined edges and, usually, parallel striations across the rim caused by impurities in the clay or irregularities in the blade being used. This technique first appears in Britain in the late seventeenth century and remained the standard technique for creating rims thereafter. A slot was incorporated into the mould to allow the clay that had been extruded up during the moulding process to be trimmed off after the stopper had been withdrawn and before the pipe was removed from the mould. This speeded up production and meant that the rims no longer had to be bottered to finish them. Cut rims do not appear to have been employed in France and the Low Countries, where there was no slot in the mould and the rims had to be hand trimmed and bottered after the pipe had been removed from the mould.

Cutty A short pipe, usually with a stem of around 3" to 5" in length (7.5cm to 12.5cm). This style of pipe became

popular from about 1850 and was the dominant form during the later nineteenth and twentieth centuries. It typically had a stocky stem and a nipple mouthpiece. The term may well have been Scottish in origin.

Die The actual object used to impress a mark into the surface of a pipe during its manufacture. This usually carries the maker's initials and/or some type of decoration. More specifically this term is used to describe the working face and its design used to create the impression as opposed to the 'stamp' (*q.v.*), which is a more general term for the whole object. A 'die type' is a specific version of a design, created by an individual die. If the die itself is altered to change the impression that it creates, then it is regarded as a different 'die type', even if the bulk of the object that created it remains the same.

Dottle A small piece of clay forced into the bowl cavity on the end of the moulding wire when making a pipe. The same term is used by smokers for any remnant of tobacco left in the base of the bowl after smoking.

Ebonite Another name for Vulcanite, *q.v.*

Fabric The clay body from which a pipe is made.

Ferrule A strengthening/coupling ring, typically of metal, used on mounted pipe bowls at the junction of the bowl and stem.



A mounted 'Brasenose' pipe with a white metal ferrule connecting the bowl to a black vulcanite mouthpiece. This design was first registered in 1904. Photograph by D. A. Higgins.

Fillet The term used by pipemakers for the very top edge (rim) of a pipe bowl, formed as a single knife cut when excess clay was trimmed from the top of the mould during manufacture.

Finishing Wire (or Trimming Wire) A wire rod that was re-inserted into the leather hard pipe stem to support it during the trimming process and to allow the very weak clay to be handled without breaking. Unlike the *moulding wire*, this had a rounded end so that it followed the stem bore that had already been created without forming a second hole. It also cleared any *dottle* that had reattached itself to the inside of the bowl when the moulding wire was being withdrawn, thus ensuring a free airway for the finished pipe.

Front (of a pipe bowl) That part of a pipe bowl furthest from an individual when the pipe is held facing away from them (as if being smoked).

Glazed/Glazing In old documents the term 'glazed' was used to describe a burnished pipe (*q.v.*), and is not to be confused with the modern usage for an applied glassy coating.

Gross The standard unit for counting/selling pipes, a gross being 12 dozen pipes (144). In some instances, however, the count could be higher, for example, moulders in a factory were normally expected to produce 16 dozen pipes (192) to the gross to allow for breakages during drying, trimming and firing.

Hair Curler An object used to bind hair around while making it curl. Archaeologically the term usually refers to short dumbbell shaped objects made of white pipe clay but historical references show that other objects/materials, such as broken sections of pipe stem or boxwood, were also used. These objects were particularly associated with the manufacture and maintenance of wigs, which were in vogue from the restoration in 1660 through to about 1800, hence the popular name of 'wig curlers' for these objects. Contemporary sources, however, refer to these objects as 'hair pipes', the term most likely being derived from the early examples, which were often hollow. Some pipemakers made these objects as a side line, but many were produced by a small number of specialist manufacturers who marketed their products widely throughout Britain and the colonies with their initials being stamped on each end.

Hair Pipe The historic term found in old documents referring to the clay curlers used to shape hair for wigs (see 'Hair Curler' for more details).



A selection of pipe clay hair curlers or 'hair pipes' ranging from about 1660-1800 in date (Tatman Collection in the National Pipe Archive). Photo S. D. White.

Heel A projection underneath the bowl of a pipe with a flat base. This usually has near vertical sides, or ones that flare out towards its base. A heel is usually broader than it is deep, as opposed to a spur (*q.v.*) which is the opposite.

Heel Stamp A stamped impression made on the base of a heel or the tool used to make such a mark.

Incuse A letter or design sunk into the surface of a pipe.



A range of heel bowl forms dating from between the seventeenth and nineteenth centuries. Photo D. A. Higgins.

Internal Bowl Cross (or other mark) Relief moulded marks are occasionally found on the base of the bowl interior. These marks were formed by designs cut into the end of the metal stopper that formed the bowl cavity during the moulding process and are not to be confused with scrape marks that may be formed across the base of the bowl interior by the moulding or trimming wires. These marks have not been noted on seventeenth century pipes, which generally had very narrow rather rounded bases to the bowl interior, but occur across Britain from the early eighteenth century onwards. The most common marks found on the internal base of a bowl are simple crosses. When viewed with the stem pointing directly towards the viewer these can either appear as '+' or 'x'. These symbols should be used in any catalogue or report to indicate which type is present. If some other symbol or letter is found it should be described. Occasionally multi-arm stars are found and, very rarely, initials have been observed. The function of these marks is unclear, but it may be connected with the practice of 'roughing up' the end of the stopper to help prevent it sticking to the clay during moulding and sucking in the sides of the pipe as it is withdrawn.

Internally Trimmed/Cut A reference to the fact that a sliver of clay has been trimmed or cut away from the internal edge of the bowl rim during the finishing process. The cut is made at a steep angle so as to create an internal bevel and thin (but not totally remove) the flat top of the rim. This feature is usually only found on bowls with cut rims and mostly on pipes dating from the eighteenth or early nineteenth centuries, although it is also found on better quality pipes of a later date. This trimming appears to have been done either to make the rim thickness look more even where the stopper had entered off-centre or to thin the whole top of the rim down to make the bowl look more delicate and refined.

Leather Hard Clay that still retains some moisture within it, so that it is stiff and can be handled without deforming but it still capable of being cut, joined with slip and otherwise worked to some extent. It generally has the consistency of a piece of leather of similar thickness, hence the name.

Left hand side (of a pipe) All that part of the pipe to the left hand side of the central mould line when it is held facing away from the viewer (as if being smoked).

LHS Abbreviation for 'left hand side' (q.v.).

Meerschaum A naturally occurring mineral, being hydrous magnesium silicate ($H_4Mg_2Si_3O_{10}$), which occurs in white, claylike masses in a limited number of locations around the world. Historically the main source was Turkey. Small numbers of pipes made of this material circulated in the eastern Mediterranean from the seventeenth century onwards, but it was only from the mid-eighteenth century that it was extensively exploited for pipe making, with fine quality workshops establishing themselves in central Europe, particularly around Vienna, during the nineteenth century. Paris was also a notable centre. Meerschaum pipes were individually hand carved, making them much more expensive than contemporary clays. They appear to have first been introduced into Britain around 1800.

Meerschaum Wash (Meerschaum Finish) The term used from the later nineteenth century onwards for a varnish applied to the surface of a clay pipe to make it look like meerschaum. This was typically a light syrup colour when applied but could be darkened by heating. The term was often used interchangeably with 'calcined' although calcined pipes typically appear to have been darkened all over, while meerschaum wash pipes were typically left with a pale colour all over, or selectively darkened in some areas only, particularly around the bowl rim. See also *cream wash*; *calcined*.



*Pipe depicting George V with meerschaum wash and label reading 'SUPERIOR COLOURING PIPE'.
Photo D. A. Higgins.*

Milling A narrow band of small rectangular indentations used for decoration on a pipe, typically impressed using the serrated back of a knife blade. A band of milling was applied around the rim of most British pipes during the seventeenth century with a revival of the practice on some pipes from the mid-nineteenth century onwards (although most later examples have *moulded milling*). Milled patterns were also applied to some pipe stems. Pipes from France and the Low Countries tend to have milled rims at all periods.



An early seventeenth century Dutch pipe with a band of milling around the bowl rim and milled and stamped decoration on the stem. Photo D. A. Higgins.

Mould The former within which clay was pressed to make a pipe. These almost always comprised two halves, split vertically on the long axis, which shaped the exterior of the pipe. A third part, the stopper (*q.v.*), was forced into the open top of the mould to compress the clay into shape and form the bowl cavity. One very early example of a wooden mould had been found (Higgins 2012b) but all other known examples are of metal. Examples from the second quarter of the nineteenth century onwards survive, almost all of which are made of cast iron. Earlier examples may have been made of brass and one or two later examples made of this metal are known, but these are much rarer.



Cast-iron pipe mould comprising two halves to produce the bowl shape (top and middle) and a third part, the stopper (bottom), to form the bowl cavity (Pollock Collection in the National Pipe Archive). Photo D. A. Higgins.

Mould Flaw A surface defect in the mould itself that creates a mark on the pipes made from it. These flaws most frequently occur in areas of the mould that were hard to finish smoothly, such as around the base or sides of a heel or spur. These marks can be used to identify products made in the same mould and are particularly useful where the bowl is otherwise plain and unmarked.

Mould Flaw Analysis The process of sorting pipe bowls into groups according to the moulds from which they were made, by using mould flaws to identify the individual moulds.

Mould Line The term used for an unintentional relief moulded line, usually around the rim of a pipe, that is caused by a join in the mould. Sometimes this is the result of a broken mould that had been repaired but, more usually, it results from a new plate having been added to the top of the mould where the bowl rim had become dished from repeated trimming.

Mould Seam The line or mark left where two parts of the mould used to form a pipe have met. This seam was usually scraped or smoothed during the trimming process to remove it, or lessen its impact. Untrimmed seams are normally only found on very poor quality pipes, or those that have moulded decoration such as leaves to disguise the join.

Moulded Mark A maker's mark that forms an integral part of the mould from which the pipe is made, so that it automatically appears each time a pipe is made from the mould. Moulded marks tend to be slightly less crisp than stamped marks (*q.v.*) and may have 'flow' marks in the clay around them, where the clay moved across the mark during the moulding process. They may also exhibit blank or missing elements where the design in the mould has become temporarily clogged with hard clay.

Moulded Milling A narrow band of small rectangular indentations used for decoration on a pipe, typically around the bowl rim, and specifically created using a mould - moulded milling was created by the pattern having been formed as part of the mould as opposed to normal milling, which was hand impressed after the pipe had been moulded. Moulded milling tends to have a slightly blurred upper edge and, often, striations extending across the clay surface from the corners of each element where the clay had been forced to 'flow' across the design during moulding. This type of milling was only used from the earlier part of the nineteenth century onwards.



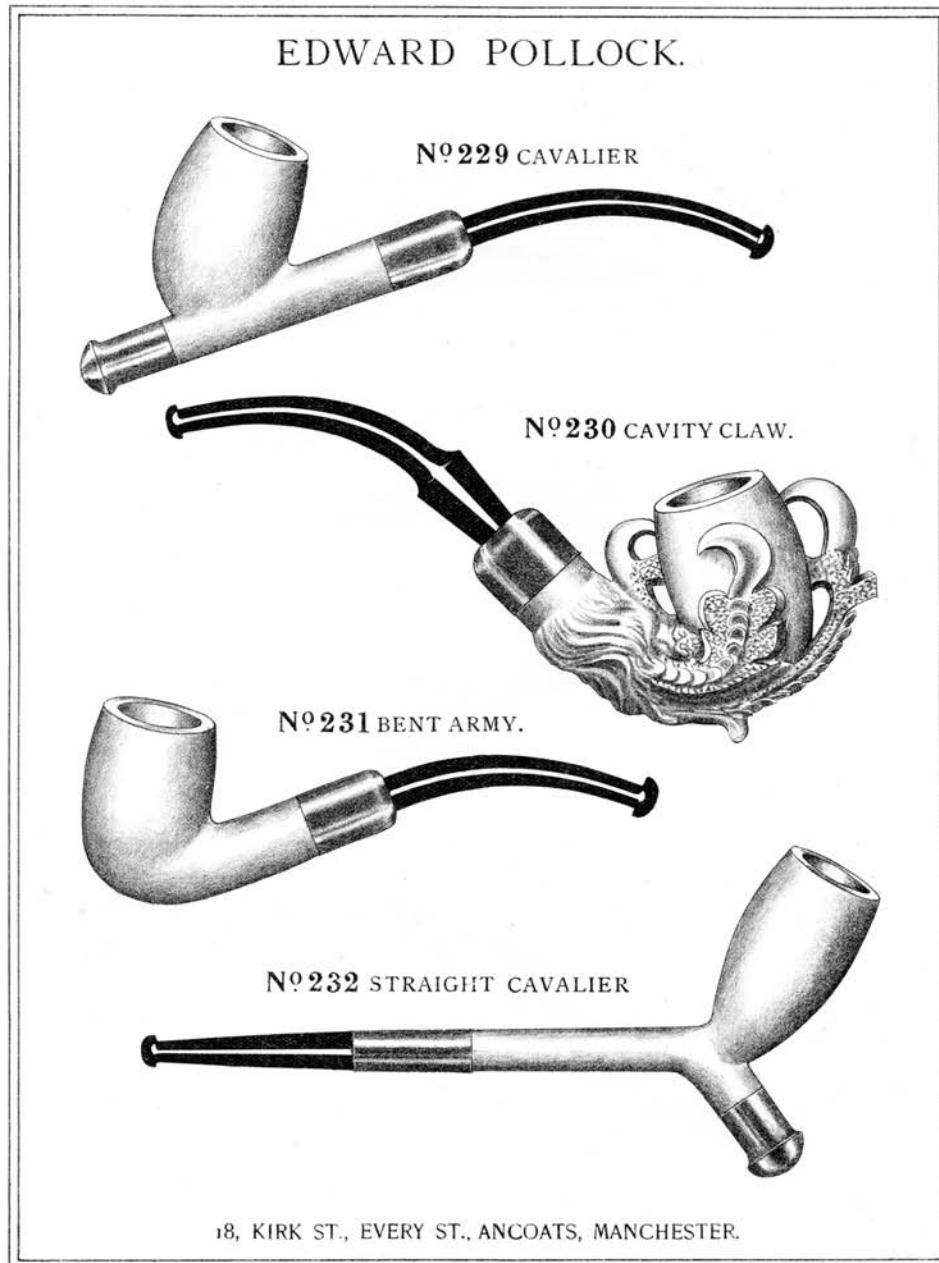
A hand impressed band of milling around the rim of a mid-seventeenth century bowl (top) compared with a band of moulded milling around the rim of a football pipe of c1900 (bottom). Photo D. A. Higgins.

Moulding Wire A wire rod used to form the stem bore of a pipe during the moulding process. This type of wire has its end hammered to form a splayed out 'button' at the end. This is essential when the wire is inserted into the clay since the button forms a slightly larger hole, allowing the wire to pass freely in and out of the clay. Without this button the wire drags against the clay, making it hard to insert, and it can suck the hole closed again as it is removed, since air cannot flow freely around it. See also 'trimming wire'.

Mounted Pipe A pipe where the separate mouthpiece, usually of vulcanite, was inserted into a metal mount or ferrule. This was normally fitted over a specially shaped rounded projection from the bowl but sometimes ordinary one piece clays had their stems broken short to take a mounted mouthpiece. The hole to take the mouthpiece in a mounted pipe was normally smaller than that in a socketed bowl (*q.v.*) and the stem typically butted against the clay rather than being inserted into it.

Mouth (of the bowl) The term used to describe the opening at the top of a pipe bowl.

Mouthpiece The end of a pipe stem that was placed in the smoker's mouth and through which the smoke was drawn when the pipe was in use. Most British pipes were made from a single piece of clay and most of the mouthpieces were simply formed by trimming the end of the stem with a slightly angled knife blade so that a smooth, bevelled end was



Mounted pipes from a trade catalogue produced by Edward Pollock of Manchester in c.1906. Note that the mouthpiece is fitted into a metal ferrule in this type of pipe.

created. After about 1850 some ends, especially for the shorter cutty pipes, were finished with a raised rounded ridge or 'nipple', which was formed in the mould.

Muffle (muffle kiln) A muffle was a larger ceramic chamber built within a pipe kiln within which the pipes were stacked for firing (hence 'muffle kiln'). The muffle was completely sealed once loaded so as to exclude smoke and gasses from combustion of the fuel, which could discolour the pipes. The muffle was typically constructed like wattle and daub, with previously fired waste stems being used to make a vertical framework against which fresh clay was plastered to form the walls. The muffle was frequently coated internally between firings with a thin layer of clay to seal any cracks.

Nib An alternative (but less frequently used and now generally obsolete) name for the mouthpiece of a pipe (*q.v.*).

Nipple (mouthpiece) A type of mouthpiece where the stem terminates with a raised rounded ridge. This could be held by the smoker's teeth to help prevent the pipe slipping out, particularly when used with a short-stemmed pipe that could be smoked without having to be held at the same time.

Relief A letter or design standing out from the surface of a pipe.

RHS Abbreviation for 'right hand side' (*q.v.*).

Right hand side (of a pipe) All that part of a pipe to the right hand side of the vertical central mould line when it is held facing away from the viewer (as if being smoked).

Roll The clay blank prepared ready for moulding a pipe, comprising a thickened end for the bowl merging into a long cylinder for the stem. The rolls for each mould type had to be prepared so as to have the right thickness and length of clay to form the stem, with sufficient bulk left at the end to form the bowl. The rolls were grouped in bundles and allowed to partially dry before being moulded.

Roll-stamp A maker's mark or decorative border that runs right around the stem of a pipe or a tool used to make such a mark.

'Roughing-up' The practice of forming rough marks on the end of the stopper that was used to form the bowl cavity during the moulding process. The function of these was to help break the suction formed between the stopper and the bowl sides during moulding. If the clay was too soft and/or the sides walls too thin, they could be sucked if the stopper did not release cleanly, deforming the finished bowl. A coarse file was often used to strike the end of the stopper, causing irregular dents and ridges that would help break the seal and allow air to flow in around the stopper as it was withdrawn. These types of mark are most frequently found in eighteenth century or later bowls.

Rouletting An alternative name for milling (*q.v.*).

Rubber Stamp A decorative design or lettering cut in reverse in rubber so as to make a stamp that could be used to apply an ink mark to the surface of a pipe. Marks of this type were occasionally employed from the late nineteenth century onwards, most frequently as a large oval mark on the bowl facing the smoker.

Sagger (or saggar) A large ceramic container made of refractory or fire-clay within which pipes could be placed to protect them during firing. Early seventeenth century pipe saggars are known from Devon but almost all pipes elsewhere were fired in muffle kilns until the later nineteenth century, when saggars were more widely introduced following a shift to shorter patterns of pipe. Long-stemmed pipes could be fired within ring saggars, which had a circular hole cut out of the base, leaving a narrow projecting ledge, about an inch wide. The bowls of long pipes were balanced on this with the stems forming a cone in the centre. The tip of this cone could then project through the base of the next ring sagger that was placed on top of it.

Sanded (surface) The best quality pipes were sometimes sanded with a fine grade paper after firing to remove flaws / mould seams. A sanded surface was also used to provide a key for the application of a meerschaum wash or similar varnished finish. The varnish rarely survives burial but the fine surface scratches in the clay can show where one previously existed. Pipes with a sanded (or scoured) surface were produced from around 1860 onwards.



A late nineteenth or early twentieth century socketed pipe produced by Crop of London. Most of the 'meerschaum wash' varnish has worn off the bowl revealing fine surface scratches where it was sanded in preparation for varnishing. Photo D. A. Higgins.

Sans-Serif A typeface that does not employ small cross strokes (serifs) at the ends of the lines used to make up each character in some lettering styles, for example, Arial.

Scoured An alternative term for sanded (*q.v.*).

Serif A small cross stroke used to embellish the ends of the lines used to make up each character in some lettering styles, for example, Times New Roman.

Shooter A cheaply made low quality pipe specifically made for shooting galleries, or a broken waste pipe with at least two inches of stem that could be used for the same purpose.

Show Pipe A pipe of giant proportions with a very large bowl, too big for normal smoking. These were produced in very small numbers during the seventeenth and eighteenth century, presumably as novelties or display pieces, but became more common from the mid-nineteenth century onwards when a number of firms made them commercially. By this date they were known as 'show pipes' and they were sometimes customised with ink stamps as tourist souvenirs or hand written inscriptions as gifts. They were also commonly known as 'cadgers', the joke being that you would ask a friend for a pipe of tobacco and then produce a giant one to be filled.



Giant pipes dating from the late nineteenth or early twentieth century, which were known as 'show pipes' or 'cadgers'. Two of these examples have original painted decoration from the manufacturer on them. Photo D. A. Higgins.

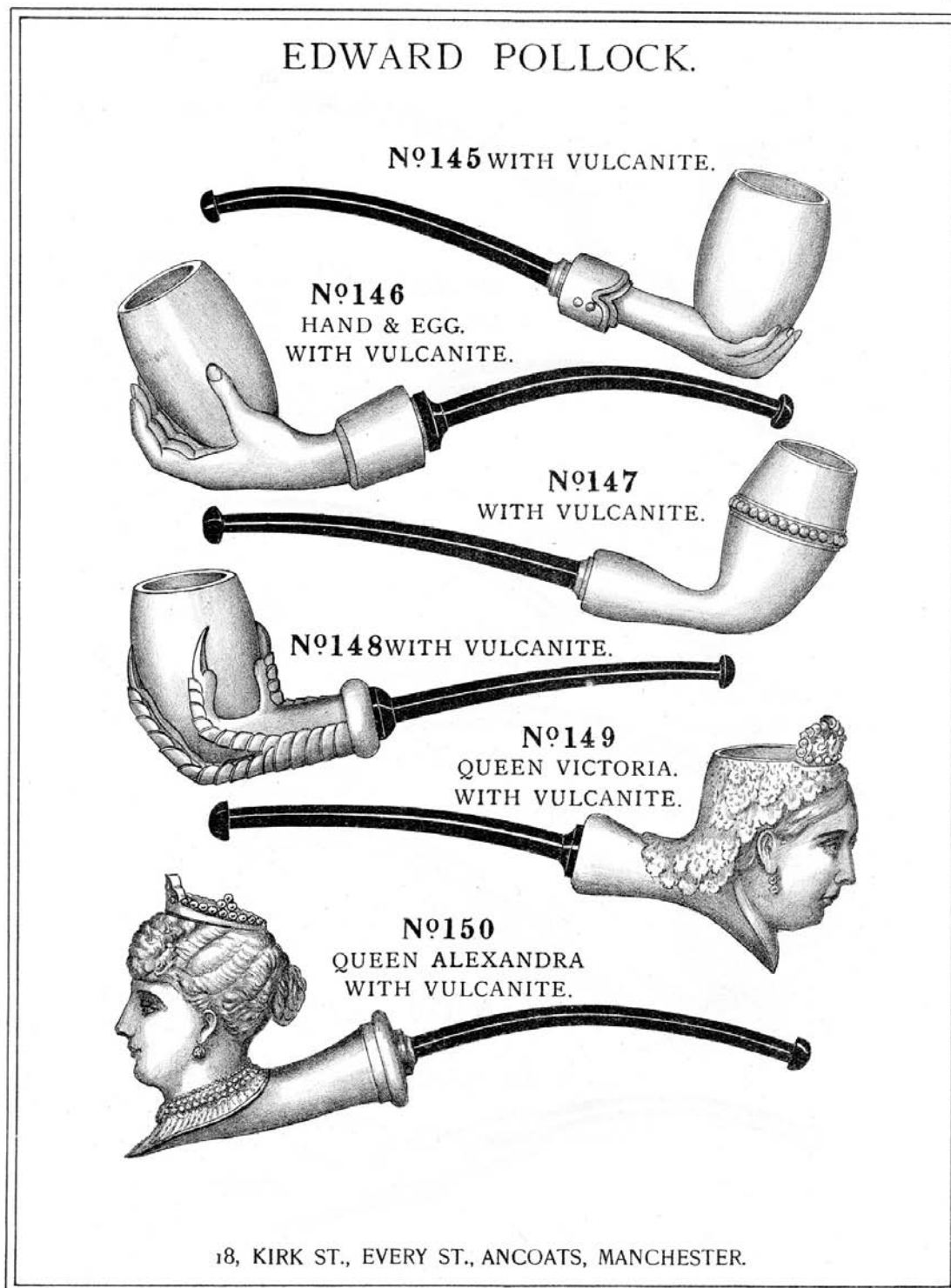
Slip Clay mixed with sufficient water so as to make it into a liquid that can be poured or used as a glue to join two pieces of leather hard clay.

Small Find Number An unique reference number allocated to an individual object or small sub-group of objects so as to allow that specific item to be identified from within a larger collection.

Smoke-Room Pipe A nineteenth century and later style of pipe, typically with a fairly long stem, the name presumably deriving from their common use in the smoking rooms of public houses.

Socket A specially created cavity into which a separate stem section could be inserted. This usually takes the form of a short flared opening connecting with the lower part of the pipe bowl.

Socketed Bowl A socketed bowl is one where the stem end is entirely contained and held within a socket, as opposed to being partially or wholly secured by a mount (see 'mounted pipe'). A cork insert was used to hold the stem in place. This also provided a good seal as well as some cushioning to help prevent the stem socket from being fractured by the force of inserting the stem.



Socketed pipes from a trade catalogue produced by Edward Pollock of Manchester in c1906. Note that the mouthpiece is held by cork mount that is fitted directly into a clay socket in this type of pipe (no metal ferrule).

Spot Date A rapid assessment of the date of an individual object or context group based on the immediately available evidence/resources. This should only ever be regarded as a preliminary assessment to enable current thinking to develop and is subject to change when all the evidence is available and/or a more detailed study has taken place.

Spur A projection underneath the bowl of a pipe that usually tapers to a pointed or rounded base. A spur is usually longer than it is broad, as opposed to a heel (*q.v.*) which is the opposite



A range of spur bowl forms dating from between the seventeenth and nineteenth centuries. Photo D. A. Higgins.

Stamp Either the implement used to impress a mark into the surface of a pipe during its manufacture or a term used to describe the impression created. This usually comprises the maker's initials and/or some type of decoration. This term is often used more generally to include the whole tool (which can be a composite object made of different materials) as opposed to the term 'die' (*q.v.*), which is used more specifically to refer to the actual worked surface forming the impression.

Stamped Mark A maker's mark or decoration that has been added after the pipe has been moulded by impressing a die into clay before it has fully dried. Stamped marks tend to be sharper and more clearly defined than moulded marks (*q.v.*) although they may also be poorly or partially impressed, or double struck so that they are hard to read.

Stem The tube connecting the bowl to the mouthpiece through which smoke is drawn by the smoker.

Stem Bore The hole inside the stem of a pipe through which the smoke is drawn. The diameter of this hole is still measured and published in 64ths of an inch for two reasons. First, it makes any measurements compatible and comparable with the pre-existing pipe literature, which has always used this unit of measurement. Second, it enables any data collected to be used with the American based formulae for dating pipe stems by bore size, which also relies on this unit of measurement.

Stem Stamp A stamped impression made on the stem of a pipe or a tool used to make such a mark.

Stopper 1: The term used for the specially shaped tool that was forced into the top of a pipe mould during the manufacturing process to form the bowl cavity. 2: A small object with a flat circular end that was used by a smoker to arrange and compress tobacco within a pipe bowl when smoking.

Straw A pipe with a thin stem that typically tapered to a fine tip without a nipple end. These varied in length and bowl design but the thin stem was fragile and more difficult to manufacture than other types of pipe and so these were always regarded as a more refined product. They also tended to be slightly more expensive because they took more time to manufacture and were more prone to breakage.

Tip An alternative name for the mouthpiece of a pipe (*q.v.*).

Trimming Knife A knife used to finish pipes once they had been formed in the mould. At its most basic, this could have been an everyday knife used without any modification to slice off extruded clay at the top of the mould or scrape surplus clay from the seams. Many examples, however, are likely to have been modified with additional features such as different sized notches for trimming the stem or bowl seams or a serrated back that could be used to apply lines of milling to the pipe.

Trimming Wire An alternative name for a finishing wire (*q.v.*).

Vulcanite An artificial substance created by mixing rubber and sulphur and then heating the mixture to about 115 degrees Celsius (also known as ebonite). The production method was patented in both Britain and America in 1843 and objects made of it exhibited at the Great Exhibition of 1851. Vulcanite can be easily moulded and polished and so was widely employed in making stems and mouthpiece fittings for pipes – as well as for a few all vulcanite pipes. Initially black, the substance tends to fade to a dark khaki brown over time, especially when exposed to sunlight.

Wig Curler An alternative name for a hair curler (*q.v.*). This term appears to be of modern derivation and has not been found in contemporary seventeenth or eighteenth century documents.

Wiped A finishing technique whereby part of the pipe, usually the rim, has been wiped with something to smooth the clay and round off any sharp edges. The resulting wipe marks are usually evident on the finished pipe. This method is rarely found in the seventeenth century but was occasionally used from the eighteenth century onwards across Britain. It is particularly characteristic of pipes made in the Broseley area from the mid-nineteenth century onwards, where the technique was almost universally employed.

11.0 References

Atkinson, D. R., 1975, *Clay Tobacco Pipes of Broseley, Shropshire*, privately published (printed by Hart Talbot, Saffron Walden), 92pp.

Atkinson D. & Oswald A., 1969, 'London Clay Tobacco Pipes', *Journal of the British Archaeological Association*, Third Series, **XXXII**, 171-227.

Barclay A., Knight, D., Booth, P., Evans, J., Brown, D. H., and Wood, I., 2016, *A Standard for Pottery Studies in Archaeology*, Medieval Pottery Research Group, 39pp (available digitally at http://romanpotterystudy.org/new/wp-content/uploads/2016/06/Standard_for_Pottery_Studies_in_Archaeology.pdf)

Edwards, L., 1988, 'Seventeenth and Eighteenth Century Tyneside Tobacco Pipe Makers and Tobacconists', published as P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe*, **XI**, British Archaeological Reports, Oxford, British Series 192, 164pp.

Higgins, D. A., 1982, 'Reconstruction and Interpretation of the Pipes' in P. J. Davey and others 'Excavations on the Site of a 17th Century Clay Pipe Kiln in Rainford, Merseyside' in P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe*, **VII**, British Archaeological Reports, Oxford, British Series 100, 197-209 (91-306).

Higgins, D. A., 1987, *The Interpretation and Regional Study of Clay Tobacco Pipes: A Case Study of the Broseley District*, doctoral thesis submitted to the University of Liverpool, 628pp.

Higgins, D. A., 2003, 'Tobacco Pipes from Excavations at Dung Quay, Plymouth' in P. Stead 'Excavation of the Medieval and Later Waterfront at Dung Quay, Plymouth', *Proceedings of the Devon Archaeological Society*, **61**, 63-95 (21-133).

Higgins, D. A., 2004, 'Appendix 2: The Clay Tobacco Pipes', in G. Keevill, *The Tower of London Moat*, Archaeological Excavations 1995-9, Historic Royal Palaces Monograph No. 1, Oxford Archaeology / Historic Royal Palaces, 241-70 (315pp).

Higgins, D. A., 2008, 'Merseyside Clay Tobacco Pipes, c1600-1750', *Journal of the Merseyside Archaeological Society*, **12**, 125-60.

Higgins, D. A., 2012a, 'Clay Tobacco Pipes', in L. Ladle, *Excavations at Bestwall Quarry, Wareham 1992-2005, Volume 2: The Iron Age and Later Landscape*, Dorset Natural History and Archaeological Society Monograph Series, No 20, 180-196.

Higgins, D. A., 2012b, 'The Earliest Known Clay Tobacco Pipe Mould', *Post-Medieval Archaeology*, **46/2**, 361-366.

Higgins, D. A., 2013, 'The Clay Tobacco Pipe Industry in Reading', in Ben M. Ford, Daniel Poore, Ruth Shaffrey and David R. P. Wilkinson, *Under the Oracle: Excavations at The Oracle Shopping Centre Site 1996-8: The Medieval and Post-Medieval Urban Development of the Kennet Floodplain in Reading*, Thames Valley Landscapes Monograph No 36, Oxford, 221-235 (313pp), plus accompanying CD-Rom Chapter 9, 'Clay Tobacco Pipes' 531-563, Figs 9.24-9.29 and Table 9.14.

Higgins, D. A. & Davey, P. J., 2004, 'Appendix 4: Draft Guidelines for using the Clay Tobacco Pipe Record Sheets' in S. D. White, *The Dynamics of Regionalisation and Trade: Yorkshire Clay Tobacco Pipes c1600-1800*, British Archaeological Reports, Oxford, British Series 374, 487-90 (567pp).

Lawrence, S., 1979. 'York Pipes and Their Makers' in P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe, I*, British Archaeological Reports, British Series 63, 67-84.

Mirdamadi, J., 1999, 'Method used for the removal of iron staining from the pipes', in D. A. Higgins 'The Clay Tobacco Pipes' in A Connor and R Buckley *Roman and Medieval Occupation in Causeway Lane, Leicester*, Leicester Archaeology Monographs No 5, University of Leicester Archaeological Services/Leicester City Museum Service, 233-234 (215-34).

Oswald, A., 1975, *Clay Pipes for the Archaeologist*, British Archaeological Reports, British Series 14, Oxford, 207pp.

Peacey, A., 1979, *Clay Tobacco Pipes in Gloucestershire*, Committee for Rescue Archaeology in Avon, Gloucestershire and Somerset, Occasional Paper No 4, 79pp.

Peacey, A, 1996, *The Development of the Clay Tobacco Pipe Kiln in the British Isles*, published as P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe, XIV*, British Archaeological Reports, British Series 246, Oxford, 295pp.

Rutter, J. A. and Davey, P. J., 1980, 'Clay Pipes from Chester', in P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe, III*, British Archaeological Reports, British Series 78, Oxford, 41-272.

Society of Museum Archaeologists, 1993, *Selection, Retention and Dispersal of Archaeological Collections*, 48pp.

Watkins, G., 1979, 'Hull Pipes - a Typology', in P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe, I*, British Archaeological Reports, British Series 63, Oxford, 85-121.