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# Thumbed and Sagging Bases on English Medieval Jugs: A Potter's View

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*SUMMARY*

*This paper describes the different types of base produced during the medieval period and presents the results of an experimental kiln firing. It is suggested that basal thumbing had a functional and economic role in addition to a decorative aspect, and that it aided kiln managment by separating vessels stacked for firing, thus reducing kiln losses caused by glaze fusing.*

## INTRODUCTION

The bases of medieval jugs have characteristics unlikely to be seen on modern vessels: they are often thumbed, recessed or sagged, and it is not immediately obvious why this should be so. This paper is written from a potter's perspective, but it is hoped that these observations will throw some light on the interpretative problems faced by archaeologists studying pottery from excavations, and stimulate further debate on matters such as manufacture and kiln management. No attempt has been made to consider problems such as typology or chronology; the techniques described below are general solutions to potting problems in the pre-industrial period, and this discussion focusses on how and why the different base forms were made. The methods of construction described are based on the Corpora of medieval wares from London produced by archaeologists specialising in pottery research, examination of medieval wares, particularly those in the collections of the British Museum (BM) and the Museum of London (MOL), and results obtained by experimental production of replica jugs. References to published examples illustrate vessels examined in the course of this study. Since it is not usual to show a view underneath the base, they do not in every case portray features mentioned in the text. Unless otherwise stated the clay used was dug from the ground at Bawsey, near King's Lynn, Norfolk; it is a fairly plastic high silica clay containing some iron.

## BASE MANUFACTURE

*Flat bases* present few problems. They are found on jugs of all sizes and often on smaller pieces (such as drinking jugs) where the standard of finish is sacrificed to rapid production. Such smaller vessels may have a deliberately *depressed base* showing traces of the pressure of the thumb. This practice is found on some Surrey whitewares (Pearce and Vince 1988, Fig. 82, No. 189; Hobson 1903, BM B140). A modest concavity can also result from shrinkage across the diameter of the base. When the bottom of a pot is thrown, pressure with the knuckle or fingers must be applied to the interior of the base to prevent subsequent cracking; this pressure aligns the clay platelets horizontally and causes a greater degree of shrinkage in drying and firing through the thickness of the bottom than across its diameter. The resulting depression is usually visible in most flat-bottomed pots with the aid of a ruler placed across the diameter of the bottom.

Alternatively, jugs may be given a footrim. A *solid footrim* creating a recessed base occurs for the most part on splayed or collared base balusters. After trimming the collared basal area with the pot upside-down, the excess clay at the base angle is drawn vertically up above the rim of the base, most easily by an even movement using a rib around the circumference, or by a pinching movement with the thumb and forefinger. The clay is then folded inwards with a rib or finger and pressed firmly against the bottom, forming a rough-edged footrim; this can be trimmed with a rib, leaving a bevelled edge when carefully done, or can merely be smoothed with a finger. Tool and finger traces of

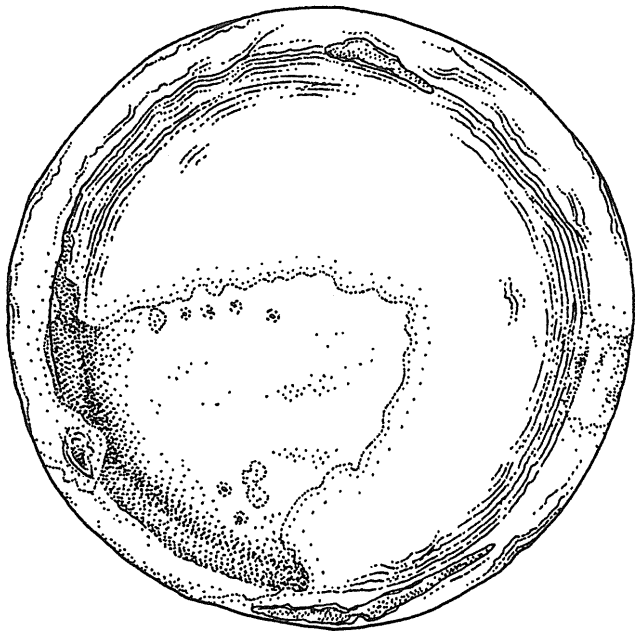


*Fig. 1. Solid footrim of a Kingston-type ware baluster jug showing glaze pooling in a recessed base with stacking scars on the raised footrim (MOL acc. A2001; Pearce and Vince 1988, Fig.52, No.10) (94 mm diam.).*

this movement around the inner circumference of the footrim are not uncommon and occasionally finger impressions, sometimes partly cut away, occur around the side of the base; this has been noted on London-type ware (Pearce *et al.* 1985, Fig.37, No.126: Hobson 1903, BM B7; BM B42).

Most folded and bevelled footrims have an uneven width indicative of hand-finishing, but others have a mechanical aspect (BM B114). Some of the latter may have been produced while the pot was inverted on a moving wheel, either by trimming the folded clay or by cutting away the bottom itself. The evidence is slight, the footrim being perfectly circular, although off-centre, but the technique is a plausible way of achieving the precision obviously displayed; it is common on London-type ware copies of Rouen jugs (Pearce *et al.* 1985, Fig.25, No.53; Hobson 1903, BM 1915 12-8 192).

The *thumbed footrim* is by far the most common and most varied in its particular construction. Broadly speaking, it consists of a band of thumbing around the circumference of the base producing a raised rim along the edge. Thumbed footrims should be made in the hand-hard stage of drying, or somewhat before, when the clay is still plastic enough to be responsive without cracking. Among the great variety of thumbed footrims, two clearly identifiable and quite simple methods of producing them occur throughout the medieval period. Firstly, the rim can be formed by placing the thumb against the outside of the pot, slightly below the edge, and pushing the clay up to make a single *tine*, repeating this until the footrim is completed, as seen on some Mill Green jugs (Pearce *et al.* 1982, Fig.3, No.3; Fig.11, No.27).

In the second method, the edge of the base is gripped between the thumb (placed on the bottom) and the forefinger (extended on the side), and the clay is pulled up in a pinching movement to form a rim segment; on some pots the position of the thumb and forefinger is reversed. This process is continued, as before, around the circumference of the base, with the segments often joined together to form a continuous rim (for a variation of this technique see Pollock and Waterman 1963, 88; Hurst 1962-3). This '*pinched footrim*' is easily recognisable in as much as the repeated pressing of the thumb and forefinger against the bottom will leave an irregular trough-like depression and occasionally an obvious thumb imprint, as seen on some Kingston-type ware baluster jugs (Pearce and Vince 1988, Fig.11; Fig.52, No.9; Fig.55, No.25; Fig.61, No.60). Impressions from the thumb and fingers are often visible on the interior of a pot around the basal edge. The Laverstock jugs found *in situ* in kiln 6 are instructive examples of this technique (*e.g.* Salisbury and South Wiltshire Museum, 6003 R136), as are basal fragments from Clarendon Palace in the British Museum. After thumbing, these have been hand-trimmed or turned upright on a counter-clockwise wheel, leaving abraded thumbing on the circumference (see Musty, Algar and Ewence 1969, Figs.17, 18).

A variation common on hand-built Ham Green jugs is produced by drawing up a thin and continuous rim from the clay around the circumference of the inverted base, or in some cases applying the rim by hand, and punctuating it with pinched depressions forming individual tines (*e.g.* Bristol City Museum, Q 184X; G2633). The styles of basal thumbing can range from a series of neatly overlapping, contiguous or evenly spaced impressions, to footrims where the work is hasty and crude. On countless pots, many with sagging bases, thumbing occurs without any apparent attempt to produce an entire footrim. The result can be several groups of *thumbed segments*, often irregularly spaced around the edge (Pearce *et al.* 1982, Fig.11, No.27), or merely three or four individual projections (Pearce and Vince 1988, Fig.80, No.165; Fig.107, No.417), but occasionally a pot will have only one.

In theory, a footrim should be an obvious benefit to the user of a porous or semi-porous jug by minimising its contact with the surface on which it is placed. In practice, relatively few foot-rimmed jugs possess this virtue (mainly the larger balusters) for the reason that the bottom of the pot often has a sagging base, so that any thumbing provides little additional support.

A jug resting uneasily on a *convex base* would at first sight seem to be unstable on a flat surface, and

more appropriate for use on earth, straw or the coals of a fire. To put this to the test, a large replica sagging-based jug was used for some weeks. When filled with liquid it was surprisingly steady, entirely suitable for use on tables and, when used correctly, superior to the flat-bottomed pitcher it replaced. It was not picked up and poured in the conventional way, but was simply rolled forward on its convex base without removing it from the table. Shallow bowls or other vessels held up to its spout were easily filled by tipping the jug towards them in the manner evident on tripod pitchers, without the need to lift and manipulate a large and heavy jug.

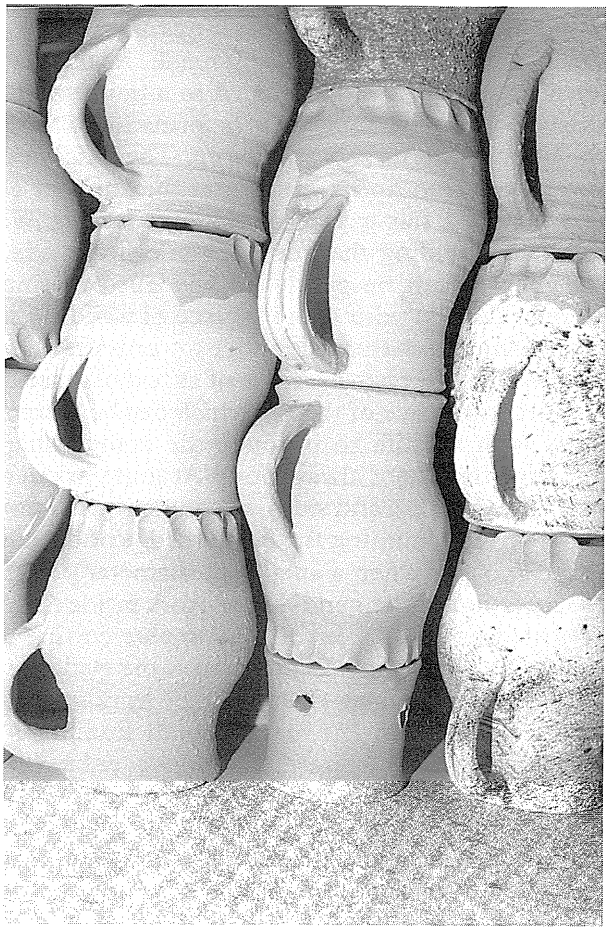
Tests with two further sagging-based replica jugs of large and small London early rounded type showed that, standing on a flat surface when filled, they remain stable due to their low centre of gravity, although they tilt on the sag towards the handle, a disconcerting posture to one accustomed to upright tableware. The larger jug, which had a four litre capacity, was awkward to lift when full and needed two hands; pouring into small vessels from the lifted jug without spillage was difficult, although when poured by rolling it forward (as described above) no spillage occurred. The smaller, two litre, jug could be poured safely in either way. The addition of *thumb stops* [1] to a handle lessens the hazards of pouring from a jug having a centre of gravity some distance from the hand by taking the pressure of the thumb as it presses forward against the rim. Thumb stops occur mainly on tall balusters and conical jugs with flat or marginally sagging bases; they are made by applying pads of clay side-by-side to the top of the handle near the join with the neck, or by simply pushing the thumb well into the handle while it is still soft, leaving two parallel impressions on the upper surface, as seen on London-type and Mill Green ware jugs (Pearce *et al.* 1985, Fig.25, No.52; Hobson 1903, BM B29; Pearce *et al.* 1982, Fig.3, No.3; Hobson 1903, BM 1915 12-8/92).

It is possible that sagging bases contributed to the reduction of thermal shock. This is a problem of reducing the effects of temperature differentials within the clay body, usually by opening up the fabric with additions of grog or coarse filler to produce a loose structure accomodating rapid expansion and contraction. Although convex shapes resist cracking better than flat ones, flat-bottomed pots in a suitable fabric can counter this problem successfully. One may add, somewhat speculatively, that a sagging-based jug is likely to have had a practical advantage when placed in a larger vessel or cauldron of boiling water in the process of cooking. It would seem that sagging-based jugs were multi-functional items, designed to cope with a variety of situations: storage, cooking, carrying and use at the table.

Although no direct evidence is available on the manufacture of sagging bases, one must assume that a simple and reliable technique is more likely than difficult and elaborate procedures giving similar results. The sag itself is easily made. In the hand-hard state a pot will have dried to a point where it can be handled with no risk of deformation, although the bottom will be soft and plastic. The base should not be too thin and a little extra thickness of clay will permit a fair expansion without tearing. With one hand holding the pot and the other inside it, the bottom can be gently pushed out by using a circular motion with a damp piece of wadding or a rag, moving from the inside edge towards the centre. This will usually leave a ridge of excess clay around the circumference of the sag which can be trimmed away with a knife to produce the convex shape, although this is not always done. At some risk to the join between base and sides, a modest sag will result simply from trimming the bottom edge of the base; this can occur when a small rim diameter prevents the insertion of the hand. Hand-work inside the pot or grit drag lines from the perimeter cutting are visible on some surviving pots, as is the evidence of the sag being given an even finish by working it over with a scraper. This is seen on both London-type ware and Surrey whitewares (Pearce *et al.* 1985, Fig.11, No.8; Pearce and Vince 1988, Fig.70, No.102; Fig.77, No.142). The suggestion (Rackham 1972, 12) that sagging bases were produced simply as a consequence of removing pots from the wheel head seems doubtful. The basal clay after throwing is far too wet and soft, and if the suction between the base and the wheel head were sufficient to cause the bottom to sag on lifting the pot it would certainly tear, either on the bottom or on the lower walls. Once given its new shape, the base can be thumbed, if required, in the manner described above.

There is undoubtedly an element of self-conscious decoration in the well-crafted overlapping and inventive thumbwork found on some jugs. Nevertheless, it is unsatisfactory to assume that basal thumbing had a purely decorative function. Thumbing on the bases of jugs began to appear towards the end of the 12th century, and was commonplace until its disappearance in the 16th century. During this period pottery styles underwent profound changes in form, function and surface decoration. It is a striking fact that, in this country, the same cannot be said of basal thumbing: throughout the entire period it remained virtually unchanged.

This is not to overlook the many local and regional variations in the manner of making thumbed bases. The vigorous claw-like work characteristic of some West Sussex ware contrasts sharply with the tidy overlapping often found on Mill Green and Kingston-type wares, or the rough and decisive work of the Grimston potters, to take three examples. The point to be emphasised is that, with few exceptions,



*Pl. 1. Kiln stack. Non-overlapping uniform pots illustrating close packing by a contoured setting using a prop.*

there is an evident lack of consistency between the shape and decoration of the upper surfaces of pots and the treatment given to their bases throughout this time. A highly decorated jug of the mid-13th century will have thumbing which closely resembles that of half a century earlier or later. A skilfully thrown vessel with richly applied surface decoration will typically be furnished with merely utilitarian thumbing which is, moreover, often carelessly executed; this is demonstrated by a jug from Mill Green (Pearce *et al.* 1982, Fig.7, No.15; Pl.1). It is as though the potter considered the base to be an entity divorced from the rest of the pot. If the function of basal thumbing were primarily decorative, it would be reasonable to suppose that substantive changes in form and style would appear in the bases of the pots themselves. That this did not happen in the great majority of cases suggests that the function of thumbing lies elsewhere, and that the relatively unchanging character of thumbed bases is connected with the absence of any real technological change in the manufacture of pots during this period.

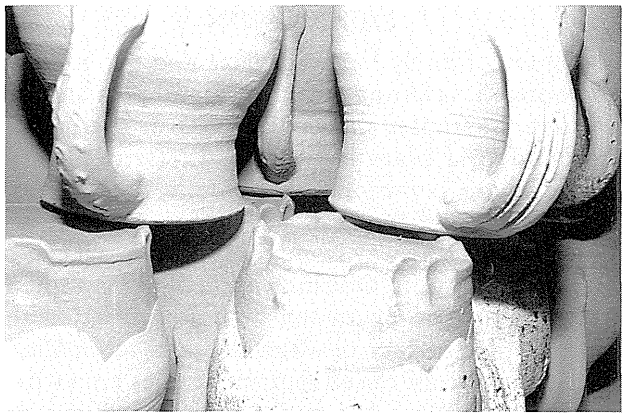
## FIRING

Medieval kilns in particular demonstrate the lack of change noted above. They remained faithful to a basic updraught design[2], with major innovations limited to an increase in the number of firemouths, which had the effect of enlarging the kiln's capacity. Pottery was fired in stacks, with the bottom layer placed directly on the floor or on props, or on a raised floor consisting of firebars or pierced shelving on an arched or pedestal support. That this technically elementary scheme was retained from the early to the late medieval period says a good deal about its practical capabilities, which were considerable, as well as about the conservative nature of medieval technology.

One of the continuing problems in managing kilns of this kind is the arrangement of the pottery stacked inside it. In loading the kiln there is little choice but to fill the void with pots stacked one upon the other to form floors or layers of pottery. For the most part, medieval pottery was fired upside down so as to contain the heat more effectively and prevent glaze drippings, ash or spalled fragments from falling inside and spoiling the ware. In setting such a kiln the pots are closely packed, and in a firing containing glazed ware a potter must take precautions to ensure that the melting glazes do not flow from one pot to another and fuse them together when they are cooled.

The problem of *glaze fusing* is most evident in the case of flat-bottomed pots. When stacked upside down, glaze from the upper pot is likely to flow onto the flat bottom of the lower one and pool thickly round the rim, so that, on cooling, the two will be joined. Since contact is restricted to the diameter of the rim, the pots can often, though by no means always, be separated by a sharp knock leaving a circular glaze scar on the bottom of the lower pot and a rough or chipped rim on the upper one. Despite the obvious hazards, this *modus operandi* seems to have continued in some potteries throughout the medieval period, although losses were probably less serious than one might assume (see Pollock and Waterman 1963, 99; Jope and Hodges 1955, 102). To overcome the disadvantages of this technique, the surface contact of pots in the *kiln stack* must be kept to a minimum, and provision must be made to prevent the pooling of glaze from forming a bond between the pots.

There are a number of ways of doing this. In kiln loads of *repeat ware* [3] in which pots of the same size and shape are stacked directly on top of one another, the addition of a footrim keeps glaze pooling clear of those points where the rims meet. With a thumbed



*Pl. 2. Kiln stack. Overlapping pattern illustrating points of contact between top rim and thumbed footrim.*

footrim, the area of contact is reduced to the points at which the tines of the thumbing touch the rim above them (see Pl. 1).

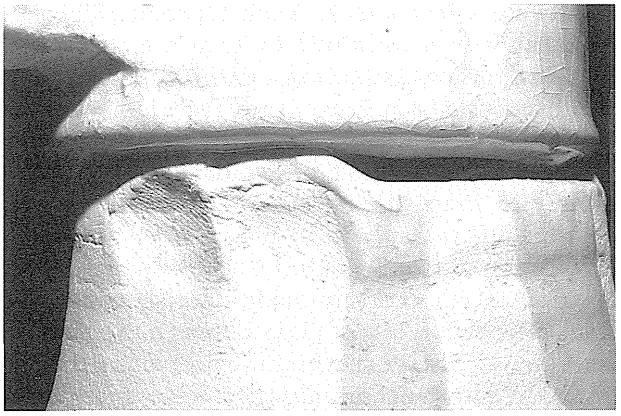
Alternatively, either uniform or mixed loads can be arranged so that pots in an upper layer overlap those beneath, with the rims of the pots on top straddling the upturned bases (Pl. 2). In this stacking arrangement a complete footrim is not essential, although it may be an advantage. Since the rim of an upper pot will touch those below only in three or four places on its circumference, pots with intermittent *grouped basal thumbing*, or with irregular individual projections, will give sufficient support and will distance the vessels placed on them from any glaze running onto the base. Unglazed tiles or sherds used as *distance pieces* [4] may also aid the separation of pots, and can be used to level-up the layer of pots in the stack when the dimensions of the vessels differ. Sherds were used for this purpose in the Downpatrick kiln and at Colstoun (Pollock and Waterman 1963, 99; Brooks 1978-80, 383-8). If the pots have sagging bases, those stacked on top can be supported at individual points on the curve of the sag, which will itself direct the flow of glaze away from the point of contact. A *depressed base* can have a similar result, since indentation has the effect of creating a rim and a space at the centre where melting glaze can collect; this may be seen on a Kingston-type ware biconical jug (Pearce and Vince 1988, Fig.82, No.189) and also on BM B140 (Oxford; Hobson 1903), as well as on a group of Oxford-type ware baluster jugs (Ashmolean Museum, AM1930.225; AM1915.111; AM1971.1185; AM1971.1225; see Bruce-Mitford 1939, 125 and Fig.25G). Examples of intentionally and often roughly indented flat bases quite possibly occur for this reason. Unglazed pots fired together with glazed ones should also be thumbed, unless they are to be placed at the top of the stack. Despite the precautions taken, some glaze is likely to run and cause a few pots to stick together. When this happens with a thumbed footrim the join can be broken apart easily, leaving a glaze scar and perhaps a broken tine, but causing no real damage to the pot itself.

An obvious method of avoiding glaze fusing is simply to keep the glaze away from the top and bottom and to apply it, by brush or by pouring, to parts of a pot from which it is unlikely to spread to the rims. Small, coarsely-made vessels are thus often furnished with a bib of glaze between the base and top rim (not always successfully protecting the pot). This technique occurs across a wide spectrum of mainly utilitarian flat-based jugs. Medieval examples include Kingston-type ware small rounded and biconical jugs and some baluster jugs (Pearce and Vince 1988, Fig.60, No.49; Fig.81, No.178; Fig.82, No.192) and Cheam whiteware rounded and biconical jugs (*ibid*, Fig.122, Nos.554, 547; Hobson 1903, BM B145).

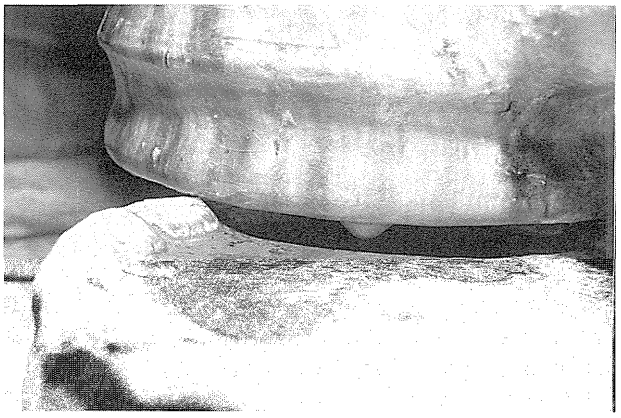
## An experimental firing

To test the effectiveness of footrims in cutting down kiln losses caused by glaze fusing, a single kiln load of fifty-four small uniform pots was prepared. Twenty-seven of these had flat bases and twenty-seven had footrims; of the latter, three were sagged and thumbed, three recessed and the remainder either had continuous or grouped thumbing. The top and footrim diameters were *c.*100 mm. Some pots were made from Bawsey clay and others from Pennard clay, which has a lower silica content. All were glazed by using a lead (galena) flux with a flour binder. The glaze was applied by pouring and the top rims were wiped clear of glaze to ensure an initial contact of unglazed surfaces. The two groups were stacked separately in layers on different halves of the kiln floor; in both cases they were inverted, arranged in an overlapping pattern. The firing was entirely oxidising, with a terminal ambient temperature of 1007° C.

On unloading the kiln, most of the footrimmed pots could be removed individually, and those which were attached by the glaze could be easily snapped apart by hand. The top rims of four pots were lightly chipped from their contact with the raised footrims beneath, rim scars were apparent on the footrims of a further four and on the sagging base of one pot. There were no breakages or losses. In the case of the flat-bottomed pots, only six could be removed individually. A group of seventeen pots had fused together and had to be removed as one piece from the kiln, as did four other pots fastened to each other by the glaze. Once removed, thirteen of these could be separated by a sharp knock with the hand, while four needed a hammer and chisel to get them apart. Most of the fused pots were easier to separate than



*Pl. 3. Inverted thumbed base and heavily glazed rim showing the space between the pots created by thumbing, allowing the glaze to run freely.*



*Pl. 4. Neck of inverted jug supported by a footrim forming a space between the pots where the glaze can spread without joining them together.*

one might suppose, and only four were broken in the process. Five had badly chipped top rims, but might have been usable if dressed with a stone; nine had prominent rim scars on their bases.

Subsequent examination of the above pottery indicated that the most serious damage resulted from glaze collecting on the bottom of the lower supporting pot and vitrifying around the rim of the upper pot. Where glaze flowing from the latter was allowed to run off without pooling around the rim, the pots were joined by no more than a small amount of easily broken glaze; the addition of a footrim facilitated this by creating an area between the pots where the glaze flow could spread freely without joining them together (Pls. 3 and 4). Within the parameters of the test, it would appear that the provision of a footrim contributes substantially to the total of undamaged glazed wares produced in a given firing.

## DISCUSSION

Evidence of badly behaved glaze and the attempts to control it is abundant on medieval pots and kiln wasters. Examples showing circular or overlapping rim and tine scars indicating different stacking patterns are common. The effectiveness of basal projections and footrims in keeping the flow and pooling of glaze away from points of contact can be seen on many pots. One indication of this is a spread of glaze on the upturned bottom, either in the absence of rim scars, or when rim scars are confined to the edge of the raised footrim or tines onto which some of the glaze has run. Such features may be observed on a number of Surrey whiteware jugs in the Museum of London, notably MOL acc A2001 (Fig. 1; Pearce and Vince 1988, Fig.52, No.10; see also Fig.52, No.9; Fig.61, No.60; Fig.70, No.102; MOL 5586 and 5664) and on vessels in the British Museum (Hobson 1903, BM B21; B28; B29; BM 1915 12-8 196; BM 1947 10.4.7). When pots are stacked base-to-base, the tips of thumbing may be broken off in a pool of glaze on the bottom of the supporting vessel, while the pot above remains clear of the glaze (Pearce andVince 1988, Fig.75, No.133, Fig.79, No.154; Hobson 1903, BM B97). Two late 12th- or early 13th-century tripod pitchers from Oxford have pinched thumbing forming, in one case, a complete footrim and in the other three prominent tines. Both vessels have a basal glaze scatter from the rims of pots stacked above them which have been placed directly on the thumbed footrim (Ashmolean Museum, AM1938.1267; AM1938.1252; see Bruce-Mitford 1939, 112, 118 and Fig.22E).

In setting the stack it would seem that the thumbing on pots was not always exploited to the full. In the case of spouted jugs, large spouts were occasionally supported on the basal tines (thus being protected), with the upper rim of the jug placed off-centre on the base and remaining vulnerable to a run of glaze; examples of this may be seen in Castle Museum Norwich (255N) and Bristol City Museum (106/78/DO). Thumbing may only partially prevent damage to a rim (*e.g.* Pearce andVince 1988, Fig.72, No.115). Sometimes the basal thumbing on a pot was ignored altogether and a rim was placed directly on the base, resulting in scarring (*ibid.*, Fig.72, No.114). This is most likely to occur in a mixed or non-uniform kiln load, which is difficult to set, and an arrangement which is best for the composition of the load can disadvantage individual pieces, particularly in large loads where problems of heat distribution and stability of the stack must have priority.

The aim of this paper is to draw attention to the place of thumbed and sagging jug bases in English medieval ceramic technology. The firing test described above indicates that thumbed and foot-rimmed bases can reduce kiln losses caused by glaze fusing, and this is consistent with the evidence visible

on the medieval glazed jugs cited earlier. There would seem to be a specific connection between the operation of medieval kilns and the occurrence of basal thumbing as a factor contributing to their efficient management. As technical advances in kiln construction and practice become apparent in the post-medieval period, thumbing on the bases of jugs virtually ceases. Accordingly, basal thumbing can be viewed as a successful solution within a long-lived but increasingly obsolete technology, and thus had a functional and economic role in addition to a decorative aspect.

**Footnotes**

1. Thumb stops are commonly described in the archaeological literature as 'ears'; their purpose is primarily functional but they can also be decorative elements (see Cardew 1977, 115).

2. There has been some debate about the interpretation of kiln forms (Musty 1974, 44; Swan 1984, 117). In 1969, Musty (1969, 85) wrote that the Laverstock kilns 'are of the opposed double-flue type without internal structure...These have hitherto been called "horizontal" or, incorrectly, "through-draught," and some have been misconstrued as fired at one end at a time, the other flue and stokepit serving as a chimney, whereas *both* flues were the sites of fireplaces'. Bryant (1973, 149) noted that 'Experiments on the medieval forms of these [Romano-British] kilns at Barton in 1971 showed that true horizontal firing is impossible..Two-flued kilns are updraught kilns whose form allows a greater size of oven'. In 1977, the same author reinforced this with the statement 'Details of the substructure of Romano-British and medieval pottery kilns are well known from excavations, and it can be stated with confidence that they were all either intermittent updraught kilns (with one, two, or - in late medieval and post-medieval periods - up to six flues) or clamp kilns' (Bryant 1977, 106).

3. The potter's term for bulk production of the same form.

4. A number of terms are used in the literature: spacers, distance pieces, separators and stacking sherds.

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*Résumé*

Ce papier décrit les différents types de base fabriqués durant l'époque médiévale et présente les résultats de cuisson d'un four expérimental. Il est suggéré que la façonnage des bases avec le pouce avait un rôle à la fois fonctionnel et économique en plus d'un aspect décoratif. Aussi il est suggéré que cette technique contribuait au meilleur rendement des fours en séparant les poteries empilées lors de la cuisson, réduisant ainsi les pertes causées par la fusion du vernis.

*Zusammenfassung*

Diese Studie beschreibt die verschiedenen Arten von Böden, wie sie im Mittelalter für Krüge verwendet wurden, und berichtet über die Ergebnisse eines Brennversuchs. Der Autor vertritt die Auffassung, daß die konkave Ausformung des Bodens mit dem Daumen neben dem dekorativen Effekt eine durchaus funktionale und wirtschaftliche Rolle spielte, die bei der Bestückung des Ofens half, die einzelnen Stücke getrennt zu halten und damit die durch Verschmelzen der Glasuren verursachten Brennverluste zu verringern.