Quantification: Towards a Standard Practice

Richard Pollard

Abstract
The paper reviews methods of quantification that have been advocated in Roman and Medieval pottery studies in Britain. It highlights the confusion that has arisen over terminology, and the advice that has been given by specialists to those engaged in processing and publication of pottery. The results of a survey of current practice in Romano-British studies are presented and analysed. Standardisation of methods employed in quantification is called for, and some suggestions made as to the techniques and measures that should be used.

Introduction
This paper arose out of the author's concern that, eight years since the publication of the Department of the Environment 'Guidelines' (Young (ed) 1980), the measures of quantity to be used in Roman pottery analysis had still not been agreed. A questionnaire was circulated at the Study Group's annual conference in 1987 and 1988 which, amongst other issues, asked respondents to indicate the quantification techniques that they used. The response has been poor: to date (May 1988) only 19 forms, representing some 30% of participants, have been returned. Nevertheless, the author believes it worthwhile to review the issue, and present the results of the survey.

The literature on pottery quantification methodology has expanded considerably over the last 20 years. The methods propounded may be listed under seven headings:

i. number of sherds
ii. weight of sherds
iii. adjusted sherd weight, producing a result equivalent to a standardised sherd area (Blake and Davey 1983, 24, method (f); Hulthen 1974; Millett 1979, method (b))
iv. displacement volume of sherds (Blake and Davey 1983, 24, method (e))
v. capacity of vessel type; used for amphorae by Sealey (1985, 113-123) in conjunction with method (vi.a) below
vi. number of vessels represented; both minimum (a) and maximum (b) estimates have been discussed
vii. vessel equivalents

The author's reading on this subject has not been exhaustive, and other methods may have been overlooked. Those listed are the ones which have found favour in recent reports on Roman and Medieval pottery from British sites, or have been discussed by British specialists. Two methods require comment at this stage, as some confusion is apparent in the literature.

Number of vessels represented
Orton (1975, 31), defines the 'maximum' estimate as 'the number of distinct fragments remaining after all possible joining of sherds has been made'. In the absence of explicit description of their methods, it must be assumed that the handful of specialists using 'maximum' estimates have followed this approach (eg Clamp 1985, Woodland 1981).

The 'minimum' estimate presents problems of interpretation. Orton has avoided the term in his definitive methodological studies (1975; 1980, 161-7), but does refer to 'estimates [other than 'maximum number of vessels'] ... reduced to allow for sherds which appear to belong to the same vessel but do not actually join' (1975, 31). This is very close to the description of the 'minimum number' estimation technique described by Moorhouse (1986, 118), Millett (1979, 77-8, method e.ii), Vince (1977, 63) and Young (ed 1980, 6). Unfortunately Millett also describes vessel equivalents under the heading 'minimum number of vessels' (ibid, e.i). Moorhouse originally referred to his technique as 'the maximum number of vessels' (1974, 35), but in the definitive report on Sandal Castle he applies the 'minimum' term to the same sets of statistics (1983, 96). Woodland (1981) tabulates both minimum and maximum figures.

Reports sometimes fail to specify whether they are citing minimum or maximum figures; for example, Orton himself simply refers to a 'number of vessels' method (1977, 29), although it may be that the archive enlarges on this, whilst Marsh and Tyers (1978) omit altogether to explain their statistical tables (the text of their report does refer to, eg, 'three examples' of a form type). Samian specialists frequently use the unqualified phrase 'number of vessels represented' (eg Dannell 1977, 53; 1985, 61). Finally, Blake and Davey (1983,
24, section 4.2.1) use the term ‘minimum’ in a universal sense:

'It is recommended that the pottery should be examined exhaustively until the minimum number of vessels represented can be obtained with some degree of accuracy. The ultimate choice of a measure of quantity for pottery will depend on the nature of the site and of the pottery'.

They then list six measures, including 'number of vessels represented', citing the Sandal Castle report; confused perhaps by Moorhouse's change of mind over which measure he is using, they fail to say whether they mean minimum, maximum or both.

**Vessel equivalents**

This measure is defined as 'the total formed by counting each sherd as the appropriate fraction of a vessel' (Orton 1975, 31), either in terms of weight or surface area. Practical problems of estimation have led to the measurement of rims and bases, sherds of which, with round, more-or-less flat-bottomed pots at least, lend themselves more easily to the estimation of fractional presence (eg Orton 1980, 164-7). Fulford, and after him Millett, would use the formula:

'Rim length of the rim sherds of a particular type + by the Mean rim diameter of that type the result being corrected upwards to the next integer' (Fulford 1973, 23-4; Millett 1979, 77, method e.i)

Orton uses the term rim-equivalent (or re) for the estimation of the 'percentage that the sherd is of the complete rim' (Orton 1980, 166), and cites the following formula:

'Estimated vessel equivalent (eve) = (rim equivalent + base equivalent) + 2' (ibid).

Most specialists using vessel equivalents would seem to employ simple re statistics (eg Green 1981, 39; Pollard 1988; Young (ed) 1980, 6) rather than either of the above formulae. Unfortunately Orton's use of the term eves has been corrupted, and the term seems to be used in general where his 're' would be more correct. The present author's questionnaire perpetuated this error, regrettable. The measuring of bases may have greater currency amongst students of medieval pottery (Blake and Davey 1983, 24, method (d); Vince 1977, 63) than those of Roman pottery.

**The questionnaire**

The options presented in the questionnaire are listed in Table 1, alongside those described in a selection of reviews of methods. Table 2 presents the results by institution, with a selection of publications to 'fill out' the survey. This list simply reflects the books on the author's shelves at the time of writing; the reader will doubtless be able to compile her/his own. Recent reports which omit references to quantification are not listed.

Table 2 reveals a considerable lack of standardisation in the selection of methods of quantification. Counting the Chester and HBMC responses as one each, method (i) finds most favour (19), followed closely by (ii) and (vi) (17 each). Various, often unspecified, 'numbers of vessels' methods (vi) appear in 12 entries. Most of the respondents employ at least three methods, in contrast with published reports, which tend to contain only one or two measures. This divergence may reflect firstly the time elapsed between the three stages of excavation, post-excavation and publication (the author might use more methods now), or secondly, the cost of publication (several methods may have been used, producing similar results, only one being selected for release), or thirdly, the special problems presented by the assemblage being published (size, on-site discard strategy, nature of site etc).

The third explanation reflects the advice in the Department of the Environment's 'Guidelines'; that for medieval pottery is quoted above, whilst the Roman counterpart considers the nature of the site to be the sole criterion by which the choice of methods should be judged (Young (ed) 1980, 5). Orton holds that both the site and the pottery - more specifically 'the uses to which the numerical summaries of the pottery will be put' - should be considered (1980, 167). Millett takes a pragmatic stance for the benefit of the excavator: 'His aim must ... be to use a system which is not too time-consuming, and which is generally accepted as a measure so that comparison with other sites is possible' (1979, 77).

**A standard practice?**

Nine years have elapsed since the publication of Millett's paper, but it is debatable whether any 'system'...
has been 'generally accepted'. Sherd counts are used by some 61 percent of respondents and publications, weights and res just under 55 percent, and 'numbers of vessels represented' by some 42 percent. Each has its champion. Moorhouse argues vehemently for the last, in its 'minimum' guise (1986, 118), in the face of Orton's criticisms of the method from a theoretical standpoint (1975; 1980, 162-4) and Millett's pragmatic objections (1979). Orton holds out for vessel equivalents as the primary method, but considers that if the reporter is 'in doubt, use more than one method (even if only one is eventually published)' (1980, 167). Millett believes that 'the two measures which are of most importance are minimum numbers of vessels [he would appear to mean his method e.ii, or (vi.a) in the present paper] and sherd weight' (1979, 78), with the latter being 'the most useful for intersite comparison'. Methods (ii) and (vi) here are deemed to be generally most appropriate by the authors of the medieval 'Guidelines' (Blake and Davey 1983, 24, section 4.2.2), but the latter also acknowledge the value of 'raw sherd counts' and of methods (iii) and (iv) as alternatives to (ii). 'Numbers of vessels represented' is considered satisfactory for completely excavated sites, though not more so than 'vessel equivalents' (ibid, 4.2.4); in this they follow Orton's opinion (1980, 162), which appears to have been revised during the late 1970s following his scathing criticism of the former method:

'from an analytical point of view [it] seems to have little to recommend it ... if measure (iii) [measure (vi) in the present paper] is used comparisons can never be made, even though the same method is used for both sides' (1975, 31).

The simplicity of counting sherds recommends itself to many, and museum curators will be familiar with auditors' spot-checks, which are based upon sherd counts. Weights and counts in combination enable the relative fragmentation of the material, from average sherd weights (by fabric, or context eg), to be recorded, a useful tool for assessing residuality. Rim equivalents in particular can generate useful information on incidence of vessel forms where the latter can be recognised from rim sherds.

It may be that the reader is not convinced of the need to standardise; after all, the Roman pottery 'Guidelines' do not demand it, and Orton's theoretical considerations might be dismissed as just that - pure theory. The aim of this paper is not to dictate, but to expose the diversity of recent practice in the field of quantification and to acquaint the reader with the views of others who have been prepared to commit themselves to print. Having said that, it is only fair to present the author's own opinion for scrutiny. Leicestershire Archaeological Unit staff are in the fortunate position of being able to examine 'specialist' pottery such as samian and mortaria before they are dispatched to the specialists, and of having to analyse both fieldwalked and excavated assemblages, the latter from both deeply stratified and shallow sites. Weighing has been found to be the quickest method (cf Millett 1979, 78), and the most foolproof, at least if an accuracy of 10 grams is acceptable. A more delicate machine can always be used for the smallest, and most delicate, sherds; as a means of rapidly assessing quantity, it has no peers, for if the weight of the empty container is known, it need not even be emptied out. The desire to measure sherd size in bulk leads to counting sherds once weighed, as Millett and others have observed, and the museum user tends to want to know how many pieces of each 'type' they have brought in for identification, if not how many vessels are represented. Leicestershire Roman pottery handled by the Museums Service since 1983 has been subjected invariably to sherd counts; the excavated material is weighed also, in both cases by fabric and context. Assemblages of particular interest are measured by rim equivalents also, with the useful by-products of rim diameter and vessel rim-type incidence recorded (Pollard forthcoming). Visual inspection of graphs suggests that these three methods produce results that do not diverge widely from one another unless there is a high incidence of extremely robust (eg amphorae) or delicate wares. However, note is taken of the cautionary words of Orton (1975, 31):

'Results from different contexts or from different sites, using different measures, cannot be compared with one another. Comparisons may in general be made if the same measure has been used on both sites.'

It is heartening to note that excavated, processed Leicestershire assemblages will be comparable by at least one method with those processed by all nine responding institutions and all four freelance specialists. Publications of others are less encouraging, but even here 10 out of the 17 listed allow some comparison of data. The integration of samian weight/sherd count/vessel equivalents statistics into the body of the report is a trend to be encouraged (Fulford 1984, 122), even if the samian reports of specialists continue to express quantity in terms of numbers of vessels represented. The search for joins should be part of every pottery reporter's work, but it does not seem necessary to take this to the extremes that Moorhouse does (1974, 1983, 1986) whereby 'numbers of vessels represented' becomes the primary measure of quantity employed; chronological seriation by sherd count has been used in at least one instance (Crummy and Terry 1979), and intra-site distributions have been generated by this
author using distinctive vessels such as mortaria, samian, and pots with unusual decoration, picked out during basic processing.

Conclusions

Quantification is an essential element in pottery processing and publication. Diverse opinions have been expressed as to the most suitable methods, and several methods have achieved wide currency in Roman pottery studies. Two methods at least should be employed when any detailed study is envisaged; one method may be sufficient for bulk recording of unstratified material. Current practice favours fabric-by-context as the unit of measurement; data is converted to portions of assemblage by context for purposes of comparisons between assemblages at inter- or intra-site level. Standardisation of methods used is a desirable objective; sherd weight is the measure that finds greatest acceptance in a compromise between theoretical and practical considerations, but other measures may have advantages over weights in particular situations. All of the pottery from a site should be subjected to at least one common method of quantification, and preferably two or more.

Footnote

1 Other questions covered methods of fabric analysis, sampling techniques, and whether sub-divisions by fabric inclusions, colour and texture were attempted for grey wares, white wares, or late Iron Age ('Belgic') wares.

Bibliography

Bird, J 1986 'Samian wares', in Dyson A (ed) 1986, 139-185
Clay, P N and Mellor, J E 1985 Excavations in Bath Lane, Leicester (Leicestershire Museums, Art Galleries and Records Service)
Crouch, K R and Shanks, S A 1984 Processing the Roman Pottery from the Excavations in Staines, Surrey, Surrey County Council

---

Table 2: Measures of Quantification used for Roman Pottery

<table>
<thead>
<tr>
<th>Measures (Nos in text)</th>
<th>i</th>
<th>ii</th>
<th>via</th>
<th>vib</th>
<th>vii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxford Arch Unit</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colchester Arch Trust</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Canterbury Arch Trust</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chester City Council</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Warwickshire County Council</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Norfolk Arch</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leicestershire Arch Unit</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>HBMC/Central Excav Unit</td>
<td></td>
<td>x</td>
<td>(5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guernsey Maritime Trust</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freelance (E Anglia, South England)</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freelance (E Midlands)</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freelance (South and West England)</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freelance (South-east Midlands)</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
(i) [x] = report does not specify whether min or max estimate calculated
(ii) the 'other' option in the questionnaire produced one response, from the E Anglia freelance respondent: 'sherd size'

---
Richard Pollard

Crummy, P, and Terry, R, 1979 'Seriation Problems in Urban Archaeology' in Millett, M (ed), 1979, 49-60
Leech, R, 1986 'The Excavation of a Romano-Celtic Temple and a Later Cemetery on Lamyat Beacon, Somerset'. Britannia 17, 259-328
Millett, M 1979 'How much Pottery?', in Millett, M (ed) 1979, 77-80
Millett, M, (ed) 1979 Pottery and the Archaeologist, Institute of Archaeol, University of London, occasional publication No. 4
Moorhouse, S A, 1974 The Medieval Pottery from Sandal Castle, Yorkshire: a discussion of the methods used to present the material. Unpublished BA dissertation, Department of Archaeol, University College Cardiff
Moorhouse, S A, 1986 'Non-dating uses of medieval pottery', Medieval Ceramics 10, 85-123
Orton, C R, 1980 Mathematics in Archaeology (Collins, London)
Pollard, R I, 1988 The Roman Pottery of Kent Kent Archaeol Soc Monograph ser No. 4
Rahtz, P A, Hayfield C, and Bateman, J, 1985 Two Roman Villas at Wharram Le Street York University Archaeol Publications 2
Richardson, E, 1986 'Pottery', in Dyson, A (ed), 1986, 96-138
Sealey, R P, 1985 Amphorae from the 1970 Excavations at Colchester Sheepen, Brit Archaeol Rep (British Ser) 142 (Oxford)
Smith, L D, and Green D F, 1977 'Determination of vessel morphology from sherd weight', Computer Applications in Archaeol (1977), 77-89
Solheim, W G, 1960 'The use of sherd weights and counts in the handling of archaeological data', Current Anthropology 1, 325-9
Vince, A G, 1977 'Some Aspects of Pottery Quantification' Medieval Ceramics 1, 63-74
Wilson, M G, 1984 'The Other Pottery', in Frere, S S, 1984 Verulamium Excavations Vol. III, Oxford University Comm Archaeol Monograph 1, 200-76