

PHARMACEUTICAL HISTORY AND ITS SOURCES IN THE WELLCOME COLLECTIONS

V. COMMINATION AND ENGLISH BELL-METAL MORTARS c. 1300–1850

by

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THE APPARENTLY simple operation of grinding drugs has many facets not generally appreciated. Part I of this paper draws attention to some of these, and Part II deals with the widely collected English bell-metal mortars.

PART I

Though the mortar is now recognized as a special symbol of pharmacy, for much of its long history it is impossible, as Langland's fourteenth-century allusion indicates, to separate its culinary and medical usage:

As her sauce was . . . unsavourily grounde
In a mortar, post mortem of many bitter payne.¹

Certainly, culinary use was widespread, and the bulk of mortars manufactured must have been intended for kitchen use. Nevertheless, large numbers were undoubtedly used in pharmacy alone, where their obvious importance in pharmaceutical practice, and the opportunities that many of them afforded (by their size and decoration) for demonstrating the owner's wealth, contributed to their role as a pharmaceutical symbol.²

This use as a symbol was all the more appropriate in that the grinding of drugs was often much more than merely reducing hard compact drugs to manageable powders. For instance, according to Renodaeus in 1657, drugs were triturated for three chief reasons: 'First that they may be exactly mixed with others. Secondly,

¹ William Langland, *Piers Plowman*, Book XIII, p. 44. Early English pictorial evidence of the mortar in culinary and pharmaceutical usage is scarce, but for an interesting example showing a mortar similar to Wellcome mortar number 1, see the fourteenth-century English medical text, Sloane MS. 6 f 175 v.

² The importance attached to the mortar by the apothecary himself is suggested in some early wills and inventories. For instance, the mortar heads the list of possessions in the will of Constantine Del Damme, apothecary of York, proved 1398 (*Testamenta Eboracensia*, vol. 1, Surtees Society, p. 245), and four mortars form by far the most valuable part of the equipment of Thomas Brydon, apothecary of Cambridge: four brazen mortars were valued at £2 6s. 0d., out of his shop furniture worth £6 15s. 0d. (W. Palmer, 'Cambridge doctors in olden times', *Proc. Camb. Antiq. Soc.*, 1910–11, 15, 224).

It needs to be added that in England (unlike Scotland) the mortar did not achieve the same popularity as a symbol as it did on the Continent. However by the middle of the seventeenth century its use has become reasonably common appearing on apothecaries' trade tokens as well as being employed in shop signs.

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that they may acquire a new faculty. Thirdly, that their malignity may be corrected'.³ He also made clear the subtlety of the grinding procedure:

Those [drugs] that consist of a meane substance, as many odoriferous simples, must be bruised moderately, lest their more subtil and odoriferous parts should exhale, and be dissipated, yet they must be beaten very small, when they go to the confection of any electuary, and when we would have them to search and penetrate to the remotest parts, then must they be beaten very fine, when we would have them stay long in the body, then they must be coarser, provided they be not imbued with any maligne quality; some must be beaten very fine and small, that they may sooner performe their operation, and manifest their power.⁴

The resulting particle size following trituration assumed greater theoretical importance for many seventeenth-century supporters of corpuscular theories of matter. They felt that the mode of action of drugs could be explained in terms of the physical characteristics of particles. Such a theory was promoted by, for instance, Thomas Willis in his *Pharmaceutice Rationalis* (1679–81) when he described drugs as acting on the various parts of the body (e.g., the stomach, blood and brain) according to whether the particles of the drugs were volatile or sharp, smooth or rough, viscous or gelatinous.⁵ Particle volume, too, played an important role as Willis indicated when he attributed the rapid effect of small quantities of certain emetics to the smallness of the particles.⁶

Such views were accepted and developed by Willis's contemporaries and successors, some theories embracing Newtonian views on forces acting between particles.⁷ However, one keen supporter of Newton, John Quincy, still emphasized particle shape when relating, in 1718, particle theory to pharmaceutical practice:

Trituration has a great share in some instances, in raising or depressing the efficacy of what comes under its management. For in grinding, all those bodies whose efficacy consists much in the peculiar shape and points of their component parts, the more and finer they are broke, the less will they operate, thus may Calomel be render'd much gentler, and made capable of being given in much larger quantities, only by long rubbing in a glass mortar.⁸

It would be wrong, however, to imagine that such written emphasis on triturating conscientiously was common, for the practice of grinding was looked upon as *secundum artem* and, in consequence, was rarely discussed. Also, it was appreciated that the chemical processes often involved in the preparation of a medicament were far more significant in accounting for the ultimate particle size.⁹ Furthermore, as the eighteenth century continued, the strictly mechanical views on particle shapes and sizes became less and less popular.

³ R. Tomlinson, *Renodaeus his Dispensatory*, London, 1657, p. 60.

⁴ *Ibid.*, p. 61. Renodaeus also considered that differences in particle size could make a considerable alteration in a drug's action: finely powdered, for example, as a diuretic, or grossly powdered as a purgative (p. 133).

⁵ T. Willis, *Pharmaceutice Rationalis*, London, 1679–1681, pp. 47–48.

⁶ *Ibid.*, pp. 26, 33.

⁷ This subject is complex, owing to minor differences between theories. These have received no extended study, but for useful information, especially on Mead's use of Newton's 'Great Principle of Action in the Universe', see W. Coleman, 'Mechanical philosophy and hypothetical physiology', *Texas Quart.*, 1967, 10, 259–69.

⁸ *Pharmacopoeia Officinalis & Extemporanea: or, a Compleat English Dispensatory*, London, 1718, p. 12.

⁹ M. Charas, *The Royal Pharmacopoeia*, London, 1678, p. 12.

CHOICE OF MORTAR

One particular problem for the apothecary or chemist and druggist¹⁰ was the choice of mortar. Formularies often refer to different mortars for different operations, though reasons are seldom given, such knowledge being another aspect of *secundum artem* of the practitioner. Moyse Charas (1656), who gave explicit instructions in the pharmaceutical techniques of his period, indicated that in many preparations involving trituration, the great brass mortar (i.e., bell-metal mortar) was to be used for the main mixing process in formulations involving anything from a few ounces of pill mass to the mixing of many pounds of ingredients.¹¹ This seems to suggest that large mortars were commonly used for reducing particle sizes, while small mortars were generally used for bruising drugs or for other gentle treatment.

Thus the nature of the drug and the preparation to be made were usually more significant than the amount of drug to be ground when choosing the mortar size. However, bell-metal mortars were the specific mortars of choice for some drugs, irrespective of quantity, since they could be heated in the fire (e.g., to aid the grinding of tragacanth, gum arabic, and talc, to dry saffron and tobacco, or to melt gum resins).¹²

The complexity of choosing the correct grinding procedure is illustrated in the following comments by R. Recorde:

Of mortars [apothecaries] ought to have divers sorts for all precious stones (that enter into electuaries) and corall, ought not to be beaten in a brazen mortar, but pearls and corall ought to be beaten in a mortar of white marble; precious stones must be made or grinded into powder upon a stone called in Latine *Lapis porphyrus* which is a kind of red marble. Also purgations or electuaries, pills or powders mingled with any sirups ought not to be dissolved in brazen morters, but in morters of glasse, of stone, or of some fine wood; yea, and if they were of silver for great men of high degree, it were best. Also some ointments ought to be made in morters of lead.¹³

Not surprisingly, a range of mortars could be used in a single preparation, for instance for making Hungary powder a porphyry slab, a large brass mortar, a heated brass mortar, and a great bronze mortar, were all recommended.¹⁴

The idea that the mortar itself could contribute beneficially, at least those made of lead and copper, to a preparation is perhaps more evident in other sixteenth- to seventeenth-century writings than in the above quotation from Recorde. For instance, Renoedaeus noted: 'And seeing that matter is multifarious and requires various preparations, not only from the industry of the apothecary, but the adjunctment of the instruments, wherein it acquires not only a convenient form and a due magnitude but a fit matter, from which the medicament may mutate something.'¹⁵

COPPER CONTAMINATION AND THE DECLINE OF THE BELL-METAL MORTAR

Emphasis on the particular choice of a mortar also involved the question of con-

¹⁰ In Britain the chemist and druggist as a practitioner of pharmacy came into more and more prominence during the eighteenth century, when the majority of apothecaries were involved in general medical practice.

¹¹ Cf. M. Charas, *The Royal Pharmacopoeia*, London, 1678, and the preparation of Pil. Ruffi, p. 187, and Theriaca Andromachi, pp. 131–33.

¹² *Ibid.*, p. 13.

¹³ R. Recorde, *The Urinal of Physick*, London, 1651, pp. 160–61.

¹⁴ Charas, *op. cit.* (fn. 11), p. 121.

¹⁵ Tomlinson, *op. cit.* (fn. 3), pp. 481–82.

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tamination, or the introduction of undesirable properties. A number of seventeenth-century and earlier writers refer to this problem, emphasizing that the use of copper, bell-metal and brass utensils required caution. The main reason for the prejudice was the ease with which certain preparations absorbed the unpleasant taste and smell of the rapidly formed verdigris. This was certainly appreciated by William Bullein, who, in 1562, commanded apothecaries to ‘avoid stynking brass’ when making decoctions.¹⁶

Such concern became more conspicuous over the next hundred years. In 1662 Nicholas Lefevre gave the specific direction that: ‘There must ever be a care . . . to choose the cleanliest matter for the fabrick of vessels, which must also be pressed and compacted, that the subtillest portions of matter may not transpire, and that the substance of the vessels may not communicate any foreign quality to the matter whether single or compounded, upon which the chymist doth operate.’¹⁷

This was elaborated by Lemery¹⁸ and Glaser¹⁹ in 1677, who recommended earthenware or glass vessels in preference to those of metal. Where copper vessels were unavoidable, they advised that their interiors be tinned, ‘because . . . tin is not so soluble as copper, and besides, hath no such malignous quality’.

The eighteenth-century chemistry textbooks continued to refer to the problem. Both Boerhaave,²⁰ and Macquer²¹ discussed the poisonous quality of verdigris, and the drawbacks of easily corroded metallic vessels. Macquer also pointed out that in using a mortar and pestle, small portions were mechanically struck off and mixed with the contents, and that, since copper is harmful to health, no copper (including bell-metal) mortars and pestles ought to be used.²²

Notwithstanding such influential views, the earlier London pharmacopoeias ignored the advice, and presumably the majority of apothecaries (and cooks) used their bell-metal mortars until warnings appeared not only in the strictly medical and scientific literature, but also in the form of more public warnings. Initially alarm was raised by cases of culinary poisoning. In 1751, the *Gentleman's Magazine* published two Parisian accounts of the dangers of copper in water cisterns, culinary, brewing and pharmaceutical utensils.²³ Further reports on copper poisoning, at home and abroad, soon followed.²⁴ Notable was the anonymous tract appearing in 1755, *Serious Reflections on the Manifold Dangers attending the Use of Copper Vessels*, strongly deprecating the use of any copper or brass utensils in the kitchen. This tract painted a gruesome picture of the pernicious nature of copper and brass verdigris, citing several cases of violent

¹⁶ *Bulwarke of Defense*, London, 1562, under ‘Apothecaries Rules’. For a useful seventeenth-century discussion, cf. N. Biggs, *Mataeotechnia Medicinae Praxeus*, London, 1651, p. 102.

¹⁷ *A Compendious Body of Chemistry*, London, 1662, p. 86.

¹⁸ N. Lemery, *A Course of Chymistry*, London, 1677, p. 11.

¹⁹ C. Glaser, *The Compleat Chymist, a New Treatise of Chymistry*, London, 1677, p. 20.

²⁰ H. Boerhaave, *A New Method of Chemistry*, translated with notes and appendices by Peter Shaw, London, 1741, 2nd ed., vol. 1, pp. 92 and 580.

²¹ *A Dictionary of Chemistry*, London, 1771, p. 133. Macquer stated: ‘copper, or copper converted into brass or in any other form, but particularly when penetrated by any salts and reduced into verdigris, produces always, when taken internally, the most troublesome consequences, and becomes a poison. For this reason, it is dangerous to use copper utensils and vessels for the purposes of cookery’.

²² *Ibid.*, p. 212.

²³ *Gentleman's Magazine*, 1751, 21, 197.

²⁴ E.g., *ibid.*, 23, 50, 539, 24, 277. These include remarks by James Lind on the prohibition of copper cooking vessels in the Swedish Navy.

deaths due to contaminated food.

During the next twenty-five years or so, more poisoning cases were reported, and simple tests for copper contamination were devised and experiments carried out, amidst a growing concern with the adulteration of food.²⁵ Nevertheless, this appears to have had little effect, either on cooks or apothecaries,²⁶ until the 1780s when Joseph Robertson summarized the earlier reports in a popular form, *An Essay on Culinary Poisons* (1781), and William Blizard published his *Experiments and Observations on the Danger of Copper and Bell-Metal in Pharmaceutical and Chemical Preparations* (1786). Blizard had first published six years previously, 'Experiments and observations on the use of bell-metal mortars in the shops of apothecaries',²⁷ but finding that shops and laboratories still abounded with these mortars, he embarked on a more extensive campaign against their use. He showed, for instance, that grinding coral in such mortars—a reasonably common practice—led to copper being present in the resulting powder (his evidence for this was the blue colour formed on adding ammonia to an aqueous solution of the powder).²⁸ He commented that the cupreous impregnation would have a more dangerous effect on a person already sick.

There were some rapid rewards for his work. Blizard himself reported that one apothecary instantly ordered iron mortars to replace those of bell-metal, and that the London Hospital governors had ordered iron mortars to be purchased for their laboratory and dispensary, and their bell-metal ones to be sold.²⁹ More important, the paper affected other influential authors. In Thomas Healde's translation of the 1788 *London Pharmacopoeia* the categorical statement appeared that 'we deem mortars made of brass or copper improper for preparing medicines',³⁰ to which was added an explanatory footnote referring the reader to 'Mr. Blizard's essay on bell-metal mortars and pewter vessels'.

Robertson's 1781 essay on culinary poisons, in which he considered copper and bell-metal, was similarly influential, though on a more domestic level, and both Blizard's and Robertson's works were copied, reproduced and referred to for the next fifty years in medical writings by, for example, Thomas Percival,³¹ in cookery books

²⁵ Cases were reported in, for example, *Medical Observations and Inquiries*, 1762, 2, 146. Many of the pamphlets and treatises dealing with adulteration or poisoning mentioned the dangers of verdigris contamination, including Sir George Baker in *Med. Trans.*, 1772 (2nd ed.), 2, 265. Tests for copper contamination were devised by Henry Jackson, *An Essay on Bread*, London, 1758, pp. 48, 53, and William Falconer, M.D., *Observations & Experiments on the Poison of Copper*, London, 1774.

²⁶ One of the most popular cookery books of the eighteenth century, of which 20 editions were published between 1747 and 1791, was Mrs. Hannah Glasse's *The Art of Cookery made Plain and Easy*, which continued to direct copper and bell-metal skillets to be used in preparing green pickles. This was a common practice to enhance their colour with the bright green of verdigris. William Falconer (op. cit., fn. 25) advocated caution rather than abolition.

²⁷ *Medical Commentaries*, 1780, 7, 313.

²⁸ W. Blizard, *Some Experiments and Observations on the Danger of Copper and Bell Metal in Pharmaceutical and Chemical Preparations*, London, 1786, p. 10.

²⁹ *Ibid.*, p. 17.

³⁰ *The New Pharmacopoeia of the Royal College of Physicians of London, translated into English by Thomas Healde*, London, 1788 (3rd ed.), p. 3. It would be interesting to know if the prompt appearance of this statement was due to the fact that George Baker, who was publishing his findings on Devonshire colic and other types of poisoning during 1767–1785 was concerned with the production of the 1788 edition of the *Pharmacopoeia*.

³¹ T. Percival, *Essays, Medical Philosophical and Experimental*, London, 1789 (4th ed.), vol. II, p. 221. Note also A. Fothergill, *Cautions to the Heads of Families*, Bath, 1790, p. 65 ff, and J. Johnstone *An Essay on Mineral Poisons*, Evesham, 1795, p. 99.

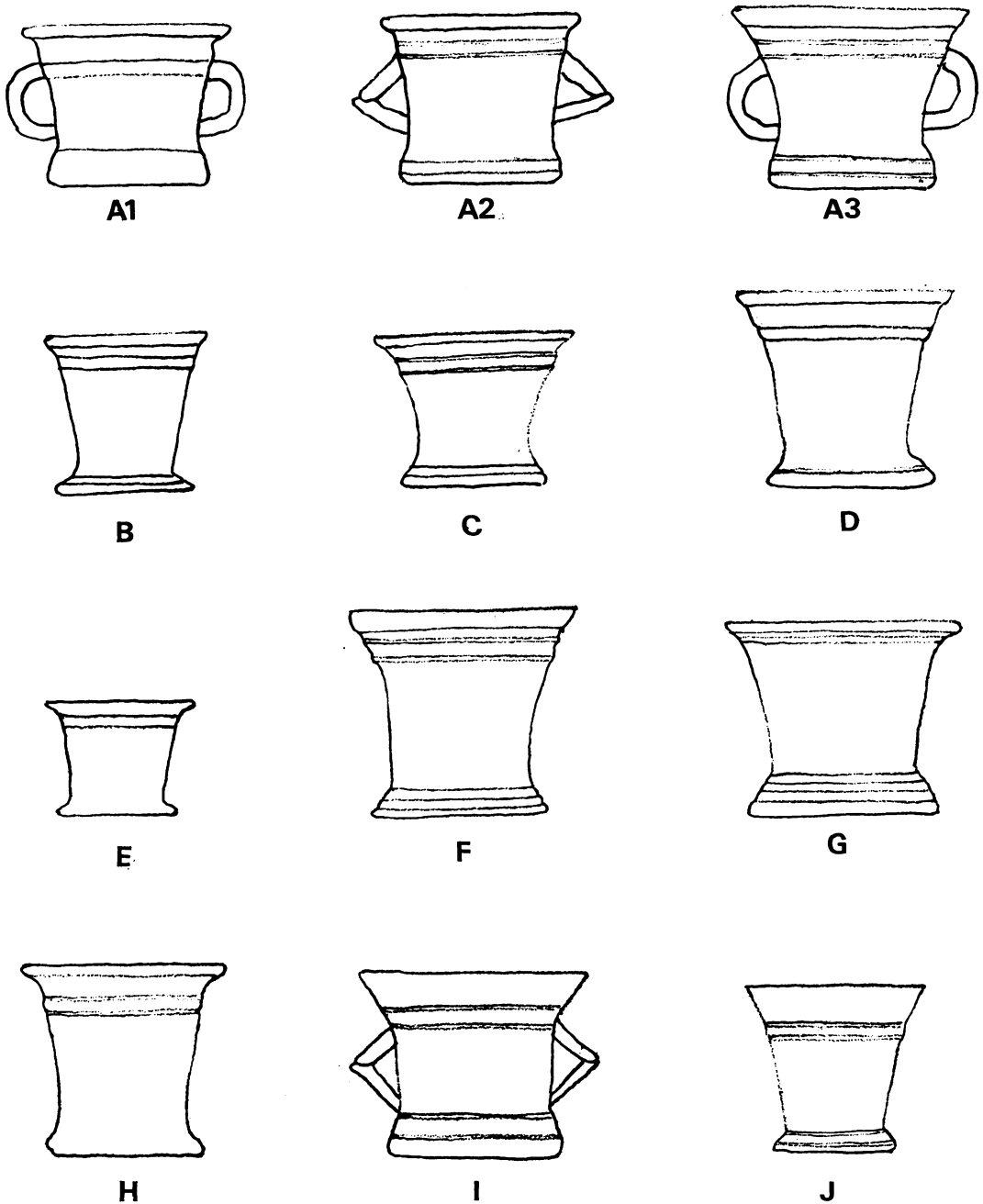


Figure 1 'London' and related mortar shapes

The shapes are drawn from selected mortars in the Wellcome Collection, which show the best preserved characteristics of each group.

For easy reference, mortars outside the series which follow the general shapes of a London group, though differing in details of neck and base rings and ribbands, have been described in the catalogue as: A-, B-style etc.

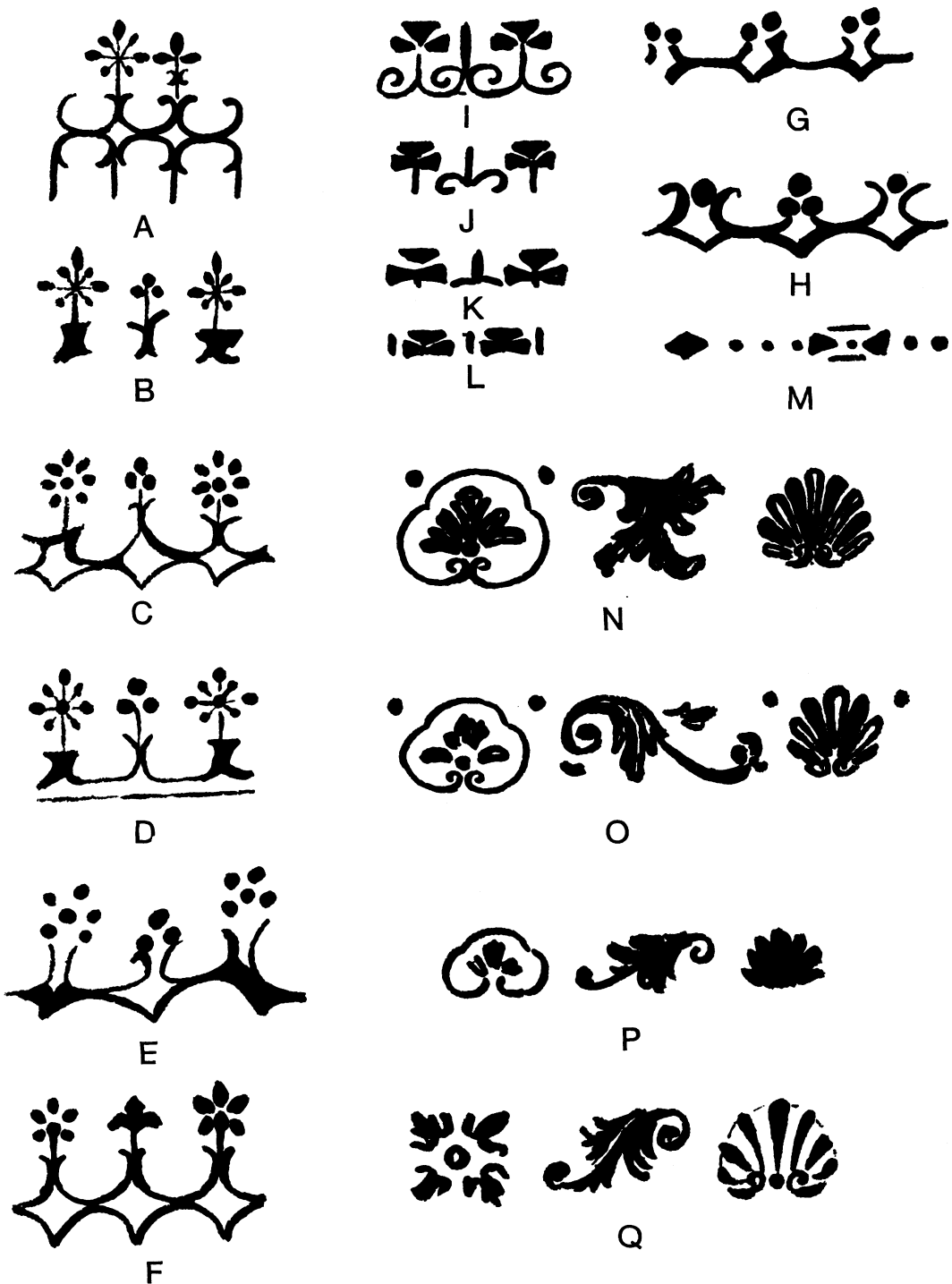


Figure 2
Seventeenth- and eighteenth-century mortar decorations.



A



B



C



D



E



F

Figure 3



A



B



C



D



E



F

Figure 4



A



B



C



D



E



F

Figure 5



A



B



C



D



E



F

Figure 6



A



B



C



D



E



F

Figure 7



A



B



C



D



E



F

Figure 8

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like John Farley's *London Art of Cookery*,³² and in treatises on food adulteration, such as *Culinary Poisons* by Frederick Accum.³³

WEDGWOOD MORTARS AND DRUG GRINDERS

Apart from the warnings over copper poisoning, the rapid growth of commercial drug grinding from around the mid-eighteenth century was another factor, which probably reduced the use of bell-metal mortars. In 1758 Robert Dossie wrote:

But since the late attempts, made by particular persons, to gain advantages by the preparation of the medicines of great consumption, at very low rates, by more expedite means, a method has been practised of performing this operation [grinding], with much less labour and consequently greater profit, than by the usual way.

This has been done by the introduction of the horsemill and roller; which have been applied to this purpose, in the same manner, as it was before by the sugar refiners, and manufacturers of snuff; and at the same time that the machine grinds the material, it also works the sieves for searching the powder.³⁴

Unfortunately, little information is available about drug grinders until the nineteenth century when there was considerable criticism of their nefarious practice of adulterating powders.³⁵ The situation became so bad that many chemists and druggists of the nineteenth century undoubtedly preferred to grind their own drugs, and elaborate, mechanically aided pestles for large mortars were probably not uncommon, a reason for some bell-metal mortars—at least large ones—remaining in use.³⁶

Another reason for the decline in the use of the bell-metal mortar was that from the 1780s an alternative mortar was available. This was the hard ceramic—'composition'—mortar introduced by Josiah Wedgwood. So far as is known this was not prompted by Blizard's attack on copper poisoning, but by Wedgwood's desire to help Joseph Priestley. He wrote: 'The Dr. [Priestley] seems at a loss for a mortar, not metal, for pounding in. Make him a deep one or two'.³⁷

Wedgwood first exhibited his mortar at Apothecaries' Hall in London in 1779, and it was copied quickly by other Staffordshire potters.³⁸ A range of sizes was soon available and while Redwood in 1845 indicated that Wedgwood (or marble) mortars could only be used for trituration (metal ones being necessary for the up and down motion of contusion), there is no doubt that the use of bell-metal had waned, a movement also furthered by the growing reliance of chemists and druggists on manufactured products.³⁹

³² J. Farley, *The London Art of Cookery and Housekeepers' Complete Assistant*, London, 1783, pp. 224 and 416.

³³ F. Accum, *A Treatise on Adulterations of Food, and Culinary Poisons*, London, 1820, p. 352.

³⁴ *The Elaboratory Laid Open*, London, 1758, p. 34.

³⁵ For general information on the problems of adulteration see E. Steib, *Drug Adulteration: Detection and Control in Nineteenth-century Britain*, Madison, 1966.

³⁶ Cf., for instance, F. Mohr and T. Redwood, *Practical Pharmacy*, London, 1848, p. 236.

³⁷ Quoted in R. E. Schofield, *The Lunar Society of Birmingham*, Oxford, 1963, p. 160.

³⁸ B. Hillier, *Master Potters of the Industrial Revolution*, London, 1965, p. 59, quotes a 1785 advertisement of Turner and Abbot stating that they manufacture 'Mortars and Pestles of so hard a composition, that the strongest acids cannot penetrate and intermix with them, consequently far preferable for the Chemist, Apothecary, or Kitchen'.

³⁹ The last recorded dated bell-metal mortar is inscribed John Lovett, Druggest Gloucester J. R. Fec't 1818. See A. Lothian, 'Some English bell founders and their mortars', *Chem. & Drugg.*, 1958, 169, 705–11.

PART II

The above account has indicated the importance of the bell-metal mortar over many centuries, an importance emphasized by the large number that survive. Many of these reflect the owner's wealth and his standing as a practitioner, though this applies less to English mortars than to many from say France and Italy. Little is, in fact, known about the production of English mortars, such as what proportion were custom made, and whether they were (as some wills and inventories suggest²) items of prize possession. The following account of mortars provides some basic information for further studies. A catalogue of the large representative collection of Wellcome Institute mortars is included as this has provided the basis for the particular classification of mortars that has been used.

INTRODUCTION: PROBLEMS OF IDENTIFICATION

The attribution of European bell-metal mortars to particular countries is not generally difficult, as they usually conform to a national or regional type. English bell-metal mortars are no exception, and can be identified by their characteristically simple shape and decoration, though, as will be seen, problems arise in attempting more precise attribution to period and maker.

Large numbers of English decorated bell-metal mortars were cast by bellfounders, who supplemented the uncertain trade of bellfounding with the manufacture of ewers, pots and pans, mortars and guns.⁴⁰ Originally calling themselves 'ollarius' or 'potters'⁴¹ such founders employed, for producing many of their wares, the same metal, techniques and decorations as used in founding bells. By comparing the decorations on the wares with those of the bells it is sometimes possible to identify the founder and date of manufacture.⁴²

During the thirteenth and fourteenth centuries, many bell-founders were at work in towns throughout England using distinctive lettering and ornamental stamps, adding the date and their name to important pieces. The great medieval foundries of London, Bristol, Gloucester, Worcester and York were flourishing by the fourteenth century, and, by the fifteenth, Wokingham (later transferred to Reading) and the Midland foundries of Nottingham and Leicester were well established and rivalled those of the ecclesiastic centres in reputation and influence.⁴³

The Reformation in England, and the Dissolution of the monasteries in 1536, had a severe effect on the bellfounding industry, the demand for bells nearly ceased, and many medieval foundries disappeared. However, the craft of bell and mortar founding revived during the 1560s and flourished for the next 200 years, some of the sixteenth-century foundries continuing successfully into the 1800s.⁴⁴

The custom of placing the founder's name on the bell, which had lapsed in the fifteenth century was revived from the 1560s onwards,⁴⁵ but in a few instances only was this applied to mortars. While bells may provide clues for identifying mortars, this major source of

⁴⁰ Evidence of this appears on many early foundry marks for example, John Copgrove of York c. 1325, used a foundry shield showing a bell, pestle and mortar, and a tripod pot (H. T. Ellacombe, *Bells of the Church*, Exeter, 1872, p. 434). Henry Jordan (1442–1470), William Dawes (1385–1408) and his associates William Wodeward and John Bird, included a laver pot (J. C. L. Stahlschmidt, *Surrey Bells and London Bellfounders*, London, 1885, pp. 59, 87). 'H.S.' of Bury St. Edmunds c. 1450, displayed a cannon on his foundry stamp (H. B. Walters, *The Church Bells of England*, Oxford, 1912, p. 306).

Documentary evidence is also occasionally helpful. King's College, Cambridge, accounts for the year 1500 record payments to Thomas Chyrche 'Potter' for supplying culinary vessels to the kitchens, when he also recast the bells (J. J. Raven, *The Church Bells of Cambridgeshire*, Cambridge Antiquarian Society Publications, 1882, p. 36).

⁴¹ Not until late in the fourteenth century were the founders commonly described as 'Braziers' or 'Bellyetters' (Stahlschmidt, *op. cit.* fn. 40, p. 2).

⁴² But for a cautionary note, see below.

⁴³ Walters, *op. cit.* fn. 40, pp. 194–207.

⁴⁴ *Ibid.*, p. 215. One foundry, the well-known Whitechapel foundry, established in 1570, still flourishes.

⁴⁵ *Ibid.*, p. 315.

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information has unfortunately been subjected to constant depredations. After the Dissolution, bells provided a source of revenue both for the King's Exchequer and for the pockets of mercenary parishioners, and, furthermore, the seventeenth-century enthusiasm for change ringing destroyed many ancient bells for more harmonious peals.⁴⁶

Another difficulty in attributing a provenance to many mortars is that much information on stamps used by founders has still to be collected. In addition, what information there is sometimes needs careful interpretation. Founders sometimes combined to cast a bell beyond the resources of the individual, or a founder, having learnt his craft under one master, would work with several more before setting up on his own account.⁴⁷ Furthermore foundry stamps were not only handed down within a foundry, but also moved from one end of the country to the other; there is a fascinating instance of an early set of Royal portrait stamps, originally used c. 1350–1400 in Norfolk, moving to Bedfordshire, Worcestershire and Nottingham, and being last used in Hertford in 1806.⁴⁸ Of special relevance are the movements of stamps of the mid-sixteenth to seventeenth centuries, a peak period in mortar making, when there were many links between the different foundries.⁴⁹

Apart from the use of identical stamps, certain styles of decorative motif were popular. Many founders used a number of similar patterns, complicating the question of identification further by frequently varying their own in very small details, as is particularly noticeable in the grape and vine borders and the arabesque patterns of the seventeenth century.⁵⁰ This, and the other difficulties already mentioned, make it clear that it is not always possible to ascribe a mortar to one particular founder or foundry with certainty. It is unlikely, too, that chemical analysis of mortars will offer any help.⁵¹

⁴⁶ *Ibid.*, pp. 350–57.

⁴⁷ A good example of founders combining to cast a large bell is in connection with 'Great Tom' of Lincoln. (T. North, *The Church Bells of Lincolnshire*, Leicester, 1882, p. 523).

An instance of an itinerant founder is Nathaniel Bolter, a seventeenth-century itinerant founder, worked with Robert Atton of Buckingham (*fl.* 1605–*d.* 1628) (A. H. Cocks, *Church Bells of Buckinghamshire*, London, 1897, p. 206), next with Humphrey Keene in Oxfordshire in 1629 (F. Sharpe, *Church Bells of Oxfordshire*, Oxfordshire Record Society, 1953, 4, 463) and later with William Purdue and others in Wiltshire, c. 1654–1664 (H. B. Walters, *Church Bells of Wiltshire*, Wiltshire Archaeological Society, 1927–1929, pp. 282, 299).

⁴⁸ Walters, *op. cit.* fn. 40, p. 289.

⁴⁹ For instance, in the seventeenth century, the sixteenth-century stamps of the Brasyers of Norwich were used concurrently by the Watts and Newcombe families of Leicester, the Clibury's of Wellington (H. T. Tilley and H. B. Walters, *Church Bells of Warwickshire*, Birmingham, 1910, pp. 31, 49) and by Robert Mot in Whitechapel. Later, in the eighteenth century, they were in the hands of Thomas Gardner of Subdury (*fl.* 1709–1760) (C. Deedes, and H. B. Walters, *Church Bells of Essex*, Aberdeen, 1909, p. 111).

The two Thomas Hancoxes of Walsall (founding first 1622–31 and second 1631–40) used stamps from Godwin Baker of Worcester (*fl.* 1615–1623), John Green I of Worcester (*fl.* 1592–1600), Henry Farmer of Gloucester (*fl.* 1602–1622) and James Keene of Woodstock (*fl.* 1612–1654) (Tilley and Walters, *op. cit.* fn. 49, p. 53) and from the Newcombes of Leicester.

Other examples of stamp movement are the use of the Nottingham foundry stamps of Augustine Bowler of Hull (*fl.* 1626–48) and the Hedderleys of Bawtry and Derby in the eighteenth century (North, *op. cit.* fn. 47, p. 130). The elaborate capital of John Wallis (*fl.* 1578–1624) moved from Salisbury to Reading, where they were used by Samuel Knight (*fl.* 1681–1709) (Walters, *op. cit.* fn. 47, p. 295).

⁵⁰ In the seventeenth century, almost identical arabesque patterns were used by John Finch of Hereford (*fl.* 1632–1663) and John Martin of Worcester (*fl.* 1644–*d.* 1697) (F. Sharpe, *Church Bells of Herefordshire*, Brackley, 1966, p. 75). Very similar patterns were used by the Watts and Newcombes of Leicester, the Bagleys of Chacombe, Richard Sanders of Bromsgrove, Richard Oldfield (*fl.* 1606–1640) and the Rudhalls of Gloucester. Variations on the grape and vine theme were used by the Bagleys, Newcombes, Hancoxes, the Keenes of Woodstock, Oldfields of Nottingham, Purdues and Rudhalls of Gloucestershire, John Martin and William Cockey of Frome. (These lists are not exhaustive.) Most of the patterns require very careful examination to distinguish between them.

⁵¹ Analyses that have been undertaken indicate a considerable range in copper to tin ratios, being roughly between 5:1 and 8:1 (cf. also Walters, *op. cit.* fn. 40, p. 33). For references to the variety of wares sometimes used in casting a bell see *Notes and Queries*, 1874, 3 (Ser. V), 77, and Raven, *op. cit.* fn. 40, p. 93. Lead is commonly found in English mortars, sometimes in the order of 10 per cent.

All English mortars, made from copper alloys, were, until the nineteenth century commonly described as brass, regardless of their composition.

A. MEDIEVAL MORTARS

The study of the early development of the English bell-metal mortar is hampered by a lack of examples until the late sixteenth century. Only three early mortars, which are undoubtedly English, are recorded, one dated, the others dateable from their stamps. The earliest, most famous of all, was cast in 1308, by Brother William de Towthorpe, for the Infirmary of Saint Mary's Abbey in York.⁵² The second mortar was cast around 1420 by Robert Norton of Exeter, and is identified as Norton's work by the initial cross and lettering.⁵³ The third bears the name and rebus of Robert Chamber, who was Abbot of Holme Cultram in Cumberland (1507–1519).⁵⁴ These three mortars, occurring at 100-year intervals and geographically widely spaced (York, Exeter and Cumberland), have a basic simplicity of shape which is not reflected in four undated, uninscribed, early mortars believed to be English (though a Continental origin remains a possibility), and assigned to the same period—the fourteenth and fifteenth centuries. For instance, the best known of the four—the grotesque mortar from Dunstable Priory⁵⁵ with its heavy encrustation of gargoyle-like heads, thick pilasters and deep concave sides—compares oddly with the plain beaker-shape of William de Towthorpe's 1308 mortar with its elegant, quatrefoil pattern waist band. Two of the four mortars are described below (nos. 1 and 2) while the fourth (which is similar to no. 1) is referred to in fn. 57.

1. Drum-shaped with well-defined waist. Decorated with four pilasters or ribs, a narrow ring around both the waist and the neck, and a stepped base. Two large, squared handles and two smaller semi-circular ones. The latter span the upper half of waist only and each one is threaded by a small cast ring.

In 1904, Davison described the recovery of this mortar from the subsoil near the site of Barnwell Priory in Cambridgeshire. However, the inventory of the Priory contents compiled at the Dissolution makes no mention of a mortar, unlike many similar lists, where the mortar appears amongst the kitchen equipment.⁵⁶

The mortar is similar to one in the Fitzwilliam Museum, Cambridge.⁵⁷ 14.7 × 19 cm.

2. Drum-shaped mortar similar to number 1, but the four pilasters are merely ribbon-like appliqué. Single rings demarcate the upper and lower limits of the waist. Two handles with stylized rope decoration, bearing some resemblance to the surviving handles on the Dunstable Priory mortar (see above). 13.2 × 19.6 cm.

B. EARLY UNDATED, UNDECORATED MORTARS, OR UNDATED AND DECORATED WITH RINGS ONLY

Many of these mortars are probably from the period 1500–1650 (see group B₁) though an earlier date cannot be ruled out. Evidence from the dating is circumstantial, being based on design and appearance, and is open to revision. Mortars post c. 1650 (cf. group B₂) generally have a more regular outline i.e., with clear-cut moulding and little of the squat dumpiness and poor finishing characterizing many in group B₁. The rough character of many in the latter group possibly suggests their manufacture by itinerant founders, while their 'individuality' is often highlighted by 'merchant's marks'.⁵⁸ Walters, who has made many detailed studies on bells, has made a pertinent point that in the time of Queen Elizabeth 'the itinerant

⁵² Its history is well known. See A. G. Hemming, 'Dated English bell-metal mortars', *Connoisseur*, 1929, 83, 158–66. It is inscribed on the rim: MORTARIV·SCI·IOHIS·EWANGEL·DE·INFIRMARIA·BE·MARIE·EBOR and on the base FR·WILLS·DE·TOVTHORPE·ME·FECIT·A.D.: M.CCC.VIII.

⁵³ It is inscribed about the rim: OAI. RAM. ATDM. AS. +(a reversed and contracted form of SANCTA MARIA ORA PRO NOBIS). See H. B. Walters, *Proc. Soc. Antiq. Lond.*, 1912–13, 25 (ser. 2), 51. Present whereabouts unknown.

⁵⁴ *Victoria County History of Cumberland*, p. 173. Now in the Carlisle Museum.

⁵⁵ Hemming, *op. cit.* fn. 52, pp. 158–66. Also in L. G. Matthews, *History of Pharmacy in Britain*, Edinburgh and London, 1962, plate V.

⁵⁶ Cf. D. Davison, 'Bell-metal mortars', *Connoisseur*, 1906, 15, 229–34; *Archaeologia*, 1871, 43, 226–28.

⁵⁷ Cf. E. S. Peck, 'Bell-metal mortars', *Chem. & Drugg.*, 1952, 157, 891.

⁵⁸ F. A. Girling, *English Merchants' Marks*, Oxford, 1964, p. 9. This is not to say that master founders did not use marks. See, for instance, the mark of Richard Brasyer, Bell Founder of Norfolk in E. M. Elmhirst, 'Merchant's marks', *Harlerian Soc. Pub.*, 1959, 180, 6, or of Master Warden Daniel of the Founder's Company, London, 1586, (Guildhall Records MS. 6830, vol. 2, no. 426).

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element [was] most marked in the history of bellfounding. The regular trade had not yet recovered from the storm and stress of the Reformation crisis, the demand for new bells had become intermittent, and several of the great mediaeval foundries had died, or were dying. It was therefore the opportunity of the jobbing worker, and many seem to have seized their chance'.⁵⁹

It is possible that it was this type of man, more the 'travelling tinker' than a mastercraftsman, with little in the way of elaborate gear, who was responsible for many of these mortars. Six of the mortars bear 'merchant's marks' (others with merchant's marks are dated mortars numbers 36 and 42 in section C), which appear to have been drawn freehand very lightly on to the clay mould of the mortar before casting. Moulded initials on mortars (see p. 277) are commonly those of the person for whom the mortar was made, or less frequently those of the founder, but as none of the merchant's marks has yet been identified, it cannot be definitely said whether they were the marks of a master founder, his assistant, or of an itinerant working alone. The marks are not reproduced, but fall into two groups, letters or patterns. Mortars 6, 10, and 13 each bear a capital W, and number 36 a capital M. Mortars 3, 20, 24 and 42 bear geometric patterns of triangles and straight lines.

GROUP B₁

a. Without handles

3. Decorated with two moulded rings, one limiting the top and the other the bottom of the waist which bears the initials E 2 [i.e. reverse S] on one side, and a merchant's mark on the other. The rounded foot has given a distinct bell-shape to this mortar, while the base is convex and cracked indicating prolonged and heavy usage. 20.5 × 27 cm.
4. Mortar with markedly concave sides. Single rings outline the top and bottom of the waist on which are the initials R C, on one side, and A W on the other. The initials have not been identified. 12 × 16.5 cm.
5. Mortar with badly damaged rim, single moulded rings limiting waist on which is an indecipherable merchant's mark. 15.5 × 18.5 cm.
6. Mortar with two moulded rings outlining waist on which is a merchant's mark. As with number 3, a rounded foot gives a distinct bell-shape to this mortar. 11.6 × 14 cm.
7. A large mortar with single moulded rings limiting waist, moulded decorative rings towards the base, and a well-defined band around neck. This well-moulded mortar may be of a later date than other mortars in this group, though it does not have a straight pedestal foot as is typical of many eighteenth-century mortars. Also, it is similar to mortar number 35 (dated 1599). 26 × 31 cm.

b. With two semicircular handles, unless otherwise stated.

8. Mortar with smooth concave sides. No ring decoration. An unusual mortar in having one rounded handle only. An interesting suggestion by C. A. Peal (*Libra*, 1965, 4, 4), that one-handed mortars may be measures has not received much attention. The possibility of such mortars being drinking vessels has also been raised (*ibid.*, p. 12). However, this mortar has the rounded (rather than square) interior base, characteristic of mortars. 14 × 16.5 cm.
9. Mortar with smooth concave sides somewhat elongated by straight waist. No ring decoration. 13.4 × 14.5 cm.
10. Mortar with neck upturned, and heavily moulded base. Merchant's mark on waist. 11.4 × 14.7 cm. (Fig. 3a).
11. Mortar with smooth concave sides and with moulded ring one third up from base. Two handles situated towards neck, which is upturned slightly. 14.5 × 16 cm.
12. Mortar of similar shape to number 11, though neck more flared, and with the semicircular handles placed more centrally. 10.5 × 13 cm.
13. Mortar with broad waist limited by single moulded rings. Merchant's mark. 12.3 × 13.6 cm.
- 14–15. Mortars of similar shape to 13, though squatter and with more flare to neck. 12.7 × 15 cm. and 12.2 × 16 cm.
16. Similar mortar to numbers 14 and 15, but with more flare to base. 10.2 × 13.5 cm.
17. Mortar of similar shape to number 13, but with upturned neck, more prominent moulding, and with rope-like decoration on handles. 13.5 × 16.5 cm.
18. Mortar similar to numbers 13–17, but with additional moulded ring towards the base. Upper waist ring also near to mouth. 15.5 × 18 cm.

⁵⁹ Walters, *op. cit.* fn. 40, p. 179.

19. Mortar with similar banding to that on number 18, though with different spacing, the lower bands being closer together, leaving a tall undecorated foot. Possibly a much later mortar as suggested by the greater weight and feel. 10.4 × 12.5 cm.

c. Mortars with two squared handles, unless otherwise stated.

20. Mortar with waist outlined by two faint moulded rings. Merchant's mark on waist. 11.5 × 14.3 cm.

21. Mortar similar to 20, but with sharper casting and less well defined foot. No merchant's mark. 13 × 15.5 cm.

22. Mortar similar to numbers 20 and 21, but taller and with neck upturned. 15 × 15.5 cm.

23. Mortar with two semicircular handles, in addition to two square handles, which are placed alternately. The semicircular handles are threaded with a cast ring. 11.8 × 14.7 cm.

24. Mortar with four handles, two semicircular alternating with two squared ones. The latter, bear rope-like decoration. The slightly concave flaring of the mouth is suggestive of Continental mortars, though the mortar is generally similar to others in the group. It bears a merchant's mark. 12.4 × 16.7 cm.

GROUP B₂. POSSIBLY POST 1650

a. With semicircular handles

25. Mortar with two handles and double ring moulding limiting both the upper and lower limits of the waist. 14 × 18 cm.

26. Mortar similar to number 25, but with narrow triple ring moulding marking upper limit of waist, and a double ring the lower limit. Also decorated strap handles. 13 × 17.2 cm.

27. Mortar with four handles, a banded neck and three broad decorated rings towards base. Similar in appearance to mortar number 44 dated 1656. 18 × 21 cm.

b. With triangular handles

28. Mortar of shape A₂, a shape found in the London group of mortars (see table 1). 13.3 × 17 cm.

c. Without handles

29–30. Two mortars each with well-defined, flat out-turned foot and smooth flared rim. Faint ring decoration on number 29. 14.8 × 18 cm. and 12 × 15 cm.

31. Mortar with prominent stepped foot and neck decorated with moulded rings. 16.6 × 20 cm.

32. Heavily cast mortar, with pedestal base (for fixing into wooden stand). Moulded ringed foot and neck bands. 15.2 × 18.5 cm.

32A. A group of bell-metal and brass mortars of styles B and C (see Fig. 1). The incised or moulded ring decoration is slight. Probably eighteenth to nineteenth century. Size range 8.2 × 10.5 to 10.8 × 14 cm.

32B. A group of mortars similar to 32A, but with more ring decoration suggesting a Continental rather than British origin. Size range: 7.3 × 9.5 to 15.5 × 17.5.

32C. A group of light brass mortars of uncertain origin, but probably Continental. Probably all nineteenth century. Size range: 7.2 × 10.6 to 11 × 14 cm.

C. DATED MORTARS

(excluding mortars dealt with under factories or designs, see pp. 278ff)

Introduction

The first of this group (dated 1585), with its narrow moulded rings delineating the waist and its two small semicircular handles, follows the traditional simple English pattern of the three dated medieval mortars (see p. 274). The fleur-de-lys stamp, the shape of the mortar and the date, indicates its production at the Bury St. Edmunds bell-foundry of Stephen Tonne II.⁶⁰ Other known Tonne mortars—all of which have a distinctive shape—date from

⁶⁰ *Bury St. Edmunds Bell-Foundry*. Stephen Tonne II (*fl.* 1559–*d.* 1595) assisted by Thomas Draper (*fl.* 1574–*d.* 1595) and William Land (*fl.* 1572–1587), and succeeded by Thomas Andrew (*fl.* 1598) and Thomas Cheese (*fl.* 1603–1633).

Tonne's foundry marks included the fleur-de-lys found on mortar no. 33, and the Bury St. Edmunds crown pierced by two arrows in saltire.

Draper used a modified version of the Bury crown and arrow stamp, and a new fleur-de-lys when he set up on his own account at Thetford in Norfolk.

The William Land, who made the British Museum mortar bearing his name and the date 1612, was a Houndsditch founder (*fl.* 1612–1637), but presumed to be the Bury St. Edmunds Land's son from his later association with Draper's son, John. (Deedes and Walters, *op. cit.* fn. 49, pp. 78–81).

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1570,⁶¹ 1574,⁶² 1593.⁶³

The Stephen Tonne mortar, and later, dated mortars (especially numbers 33–36, 38, 40–41 and 45–46) illustrate one or more of the general characteristics of the period 1585–1650 (some of these appear on the undated mortars in section B):

- a. Name inscribed in English.
- b. A group of 3 initials. These are generally believed to be the initials of a husband and wife (Christian names and surname) indicating a domestic rather than pharmaceutical use of a mortar. Such mortars may be analogous to the Dutch marriage mortars (cf. also number 38). The trio of initials can also represent the name of the founder, or an owner, and a place name. One Tonne mortar is stamped S_E^T , for Stephen Tonne of Edmundsbury (See Hemming, fn. 61, p. 393). The stamp r^W_S was the foundry mark of John Scott of Wigan (fl. 1646–1664) (F. H. Cheetham, 'Church bells of Lancashire', *Trans. Lanc. & Cheshire Antiq. Soc.*, 1915–21, p. 9).
- c. A typical bell-like flaring mouth and base.
- d. A thick and heavy construction.
- e. Thick, moulded decorative rings.
- f. A tendency for handles, when present, to be simple semicircular lugs, occasionally slightly elaborated in twisted rope form.

Furthermore, many of the mortars show the individuality of a founder, which can rarely be seen in the undecorated mortars already considered.

33. Dated and inscribed on waist: 1585 I_E^P . Single moulded rings delimit the waist, which bears a fleur-de-lys motif different from those on mortars 37 and 41. Two semicircular handles (1 broken). The initials might refer to an unidentified I P of Edmundsbury, rather than the initials of the first names and surname of a man and his wife. The mortar was made by Stephen Tonne II of Bury St. Edmunds (see above). 12.5 × 15 cm. (Fig. 3B).

34. Dated and inscribed around base: 1591 RS MS. Decorated with four moulded, vertical, rope-like ribs. Also, three narrow moulded rings separating waist and foot. Four handles, two square, alternating with two semicircular. Thickened rim. 14.3 × 18.7 cm. (Fig. 3C).

35. Dated and inscribed beneath neck: 1599 and THOMAS \diamond BAKER \diamond . Decorated with double moulded rings marking the upper and lower limits of the waist. Two semicircular handles. Upturned neck. 18.5 × 24 cm. (Fig. 3D).

36. Dated and inscribed on waist: 1607 T L. Decorated with one narrow, moulded band marking the upper limit of waist, and with two bands the lower limit. Small pedestal foot. A merchant's mark is present. 13.6 × 17 cm.

37. Dated and inscribed around neck: 1614 FRANCIS COTTRELL. Decorated with fleur-de-lys motif separating the name and date. Two semicircular handles on waist which is limited above and below by single moulded rings. The fleur-de-lys motif and lettering on the mortar suggest that Henry Farmer of Gloucester was the founder (cf. no. 41). (H. B. Walters, 'Church bells of Worcestershire', *Trans. Worcs. Archaeol. Soc.*, 1925–30, p. 51, Fig. 45). The mortar is illustrated in the *Connoisseur* (op. cit. fn. 56). 13.2 × 17 cm.

38. Dated and inscribed around base: 1617: HEVRY:MAYO.C REBCCA:HIS:WIF: Decorated with three thin, moulded rings, one below neck, one on waist and one on base. Two squarish handles. It is of interest, though perhaps without significance, that the handles resemble those appearing on some Neale mortars (*Connoisseur*. 1929, 83, 116) and that some Neale mortars have similar inscriptions, e.g. Richard Haynes: Anne his Wife. 12.3 × 16 cm. (Fig. 3E).

39. Dated 1622 on waist and OVLV:PRAISE:AND:GLORY:BE:TO:GOD:FOR:EVER around neck. Floral 'daisy' band around waist and also linking the inscription. Rope motif around foot. 10 × 12.3 cm.

Mortars were founded by both Andrew and Cheese. Andrew continued with Tonne's style and stamps (as in the British Museum specimen dated 1598) but Cheese modified the stamps and used new mortar shapes. A. G. Hemming, 'Mortars by English church bell founders', *Connoisseur*, 1934, 93, 393.

⁶¹ *Ibid.*, pp. 392–95.

⁶² See Hemming, op. cit. fn. 60, pp. 158–66.

⁶³ British Museum Collection.

40. Dated and inscribed 1629 H_A^C in large bold lettering and numbering around waist. Squat, bucket-shaped mortar with squarish handles (one broken). Single narrow, moulded rings outline waist. Narrow rim around neck. 15 × 19.5 cm.

41. Dated and inscribed around the neck: 1630 E^{WM}. Inscription and date separated by fleur-de-lys and by diamond stamps (repeated twice). Moulded narrow rings outline shoulder, waist and base. A narrow grape and vine decoration is applied to rim. The grape and vine band was used by James Keene of Woodstock between 1626–1633, and afterwards by Thomas Hancox in Walsall (Tilley and Walters, fn. 49, p. 54). The fleur-de-lys (identical with that on mortar no. 37) was acquired with other stamps from Henry Farmer of Gloucester by James Keene, and was used on at least one of his bells in 1624. (Cocks, fn. 47, p. 162 pl. XXVI, and Sharpe, fn. 47, pp. 17, 21, 123). 10.4 × 14 cm.

42. Dated 1631, and inscribed around neck and on waist: W^{WA}. Decorated with bands of three narrow moulded rings delineating the waist. Two rounded lugs and two merchant's marks on waist. 15 × 18.7 cm.

43. Dated and inscribed on waist: 1636 A^{FM}. A squat mortar with markedly flared mouth and heavy foot. Decorated with two single narrow moulded rings delineating waist. 11 × 16.3 cm.

44. Crudely dated and inscribed on waist: 1652 I^{LA}. A small undecorated, roughly made mortar. Cf. mortars numbers 29–30. 9.5 × 11.5 cm.

45. Dated 1656 on waist. Two semicircular handles on upper waist. Decorated with three moulded rings outlining bottom of waist. Heavily moulded foot and banded neck.

The distinctive shape of this mortar bears a very close resemblance to an undated mortar (no. 18) in the Ludlow Museum. The Ludlow mortar is smaller, but is decorated with the seed and flower border and part of the arabesque pattern both of which were used by John Martin of Worcester (*fl.* 1644–*d.* 1697). No. 45 might, therefore, come from the same foundry. 23.8 × 27 cm.

46. Dated and inscribed on waist: 1656 RICHARD IAMES. Decorated with narrow moulded ring the waist inscription, a wide band of plant-like motifs below, under which are three narrow moulded rings, the first delineating the lower limit of the waist. Additional motifs of fleur-de-lys and above diamonds separate the date and name. This mortar was possibly made by Roger and William Purdue of Bristol and Salisbury. See William Purdue's decorative motif on 3rd bell, Avebury, St. James, Wilts., cast in 1650, and also 5th bell, Great Bedwyn, Wilts., cast 1656, recorded in Walters, 'Church bells of Wiltshire', fn. 47, p. 19. 19.2 × 22 cm.

47. Dated 1664 on waist. B-style in shape (cf. Fig. 1). A motif of grape and vine running border on the waist separates two rose and crown motifs. For a further note on this mortar see under Mask mortars, p. 285. 9.7 × 11.1 cm.

48. Dated 1682 on neck and inscribed with the letters C R surmounted by a crown (repeated twice) on waist. Decorated on neck with two fleur-de-lys separating C, the date, and acanthus leaf motif. Two decorated square handles. C was a symbol in use for representing powder, but, while this is appropriate for a mortar, it cannot be certain that this was the original intention. 14 × 15.5 cm.

49. Dated 1691 and inscribed F S [?], the letters and date form a single stamp on the waist. (Also scratched on surface Jean Thomin and the date 1739.) The shape is similar to F (Fig. 1). 9.5 × 12.2 cm.

50. Dated and inscribed on waist: March ye 6 1715. Decorated with bands of three moulded rings outlining the inscribed waist. This mortar was made by Ralph Ashton of Wigan (*fl.* 1698–1720). Ralph Ashton originally used type from an earlier Wigan founder, John Scott (*fl.* 1646), until the beginning of the eighteenth century, when he and his successor Luke Ashton (*fl.* 1724–1750) used the highly characteristic lower case type and heart-shaped stops found on this mortar (F. H. Cheetham 'Church bells of Lancashire', *Trans. Lanc. Cheshire Antiq. Soc.*, 1915–21, p. 9). (Cf. Ralph Ashton's mortar of 1706 illustrated by Hemming, fn. 62, p. 166, and mortars by Luke Ashton in Hemming (fn. 61, p. 395), and Lothian (fn. 66).) 12 × 15.5 cm.

51. Dated 1734 and inscribed JOSIAH TIPPETT around waist. Decorated with five moulded rings on the shoulder, eighteen stamps of two small concentric rings above waist and twenty-seven small ring stamps below the waist which is delineated by narrow moulded rings. (Fig. 4A).

A large mortar from the same foundry is now at the Whitechapel Bellfoundry. It is dated 1736, inscribed IAMES MORGAN and decorated with the same concentric rings. 24.5 × 29.8 cm. (Fig. 4A).

D. 'WHITECHAPEL' MORTARS

Mortars by the first four master founders at the famous London foundry of Whitechapel are known. They are inscribed:

1. Robertus Mot me fecit 1590.⁶⁴

⁶⁴ See Hemming, *op. cit.* fn. 60, pp. 392–95.

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2. Josephus Carter me fecit for Thomas Sadler 1609.⁶⁵
3. William Carter made me for George Beere, T B 1615.⁶⁶
4. (a) Thomas Bartlet made me 1624.⁶⁷
(b) Thomas Bartlet made me for Gedeon Delaune 1625.⁶⁷

The 1615 mortar (no. 3) made by William Carter also bears Thomas Bartlet's mark, and is the earliest dated example of the Whitechapel septfoil and trifoil pattern (pattern A, Fig. 2).⁶⁸ These stamps feature again on the Gideon Delaune mortar of 1625 (no. 4b above), though slightly modified by the addition of a second row of fleur-de-lys to the waist and to the inscription band. While the latter mortar is the last recorded signed example from Whitechapel it is not unlikely that later mortars with similar designs originated from the foundry. Three in the Wellcome collection have waist pattern C (Fig. 2) which is closely related to the earlier septfoil and trifoil pattern, but is less crisp, and more informal. Pattern C appears commonly on large mortars, occasionally accompanied by a rim decoration based on the trifoil and fleur-de-lys, usually mutilated as in J, K, and L, but appearing in full as the waist decoration I on Wellcome no. 65 which is dated 1669.

In 1684, a new variation F, was in use, for it appeared on a mortar dated and inscribed ROGER WARDE·APOTHECARY·IN·YORK·1684.⁶⁹ This is a bold simplification of the previous patterns, the trifoil becoming a fleur-de-lys, and the septfoil, a cinquefoil. This design continued at least until 1705,⁷⁰ though it did not displace pattern C immediately, the latter being in use in 1685.⁷¹ Other modifications of the patterns are not uncommon some appearing below (e.g. E, G, I).

It can, of course, be argued that the similarity of designs is insufficient evidence for attributing the mortars in this section to Whitechapel. The major designs C and F have not yet been found on any Whitechapel bells, neither are the mortars signed, but equally the decorative details do not appear on any other founders' work examined so far, with the exception found on a bell cast by Thomas Gardner of Sudbury, 1711–1759 (pattern D).⁷² Whitechapel did use a fleur-de-lys and cross (similar to I) on bells by Master Founder Richard Phelps in the early 1700s,⁷³ but confirmation of the attribution awaits further investigation. All the mortars are of similar shape (cf. Fig. 4B, C and D), the later ones have two moulded rings rather than three around the foot. The consistent shape has been used in placing numbers 66 and 67 under the Whitechapel foundry.

i. With waist decoration C

52. Dated 1653 and inscribed PHILLIP LOCKTON IN ABINGTON GROECR, around shoulder. Illustrated in the *Connoisseur*, 1906, 15, 229–34. 26 × 31.5 cm. (Fig. 4B).

53. Decoration J around shoulder. Illustrated in *Connoisseur* 1906, 15, 229–34 (Fig. 2). 27 × 35 cm.

54. Decoration K (? defaced) around shoulder. 26.5 × 34 cm.

ii. With waist decoration E

55. Decoration M around shoulder. 22.6 × 29 cm.

iii. With waist decoration F

56. Dated 1698 and inscribed CHARLS PETER around shoulder. This possibly belonged to Charles Peter, once surgeon to James II's Horseguards and surgeon to the Household of William III. He kept a bathing house in St. Martin's Lane, Long Acre in London, from where he sold his Cordial Tincture and Pills 'which have cured Thousands of ye Collick, Stone, Gravel, Scurvie and Dropsy etc.' He published one pamphlet advertising his Cordial Tincture, in 1686, and some pamphlets on

⁶⁵ Ibid.

⁶⁶ See Lothian, op. cit. fn. 39, p. 709.

⁶⁷ Ibid.

⁶⁸ The signed pattern A is linked with later, unsigned patterns C and I by B, which appears together with rim pattern J on a mortar in the collection of the Pharmaceutical Society of Great Britain.

⁶⁹ In a private collection.

⁷⁰ Mortar inscribed 'Richard Raper Apothecary at the Bell and Lyon in Cheapside, London, 1705', see Lothian, op. cit. fn. 39, p. 709.

⁷¹ 'W.B.' mortar dated 1685, London Museum.

⁷² Deeds and Walters, op. cit. fn. 49, p. 125, pl. XXXII.

⁷³ Cocks, op. cit. fn. 47, p. 99, pl. XXI.

venereal disease between 1678–1695. His trade card, dated 1705, bearing a portrait, is illustrated by Ambrose Heal, in *London Tradesmen's Cards of the Eighteenth Century*, London, 1925, pl. 88. 26.8 × 34 cm. (Fig. 4C).

57–59. Three mortars with no shoulder decoration. 25.8 × 33.7, 21.7 × 28.5 and 26 × 24 cm.

iv. With waist decoration G

60–63. Decoration M around each shoulder. 8.7 × 11, 9.3 × 11.5, 9 × 11.3 and 10.5 × 13 cm.

v. With waist decoration H

64. Decoration M around shoulder. 26 × 34 cm.

vi. With waist decoration I

65. Dated 1669 on the waist. Decoration K around shoulder. 15 × 19.5 cm. (Fig. 4D).

vii. Miscellaneous mortars

66. Dated 1688. In shape, and the characteristics of the numerals, this mortar is possibly Whitechapel. Unfortunately an inscription around the neck has been removed. 18.5 × 24.6 cm.

67. Waist decoration of scroll work and a wreath design on shoulder. Although the shape of this mortar is similar to other mortars in this section, the scroll and leaf design has not been linked—even tentatively—to Whitechapel. No mortar later than 1705 (fn. 70) has been attributed to Whitechapel, and it is uncertain what decoration (if any, cf. 32A) might have been used on their mortars after this date. The general similarity of this mortar with no. 175, which has been placed under the Beardmore and Reynolds foundry must be emphasized, for the attribution of eighteenth-century mortars to these two large foundries is unquestionably open to revision. 9.2 × 11.2 cm.

E1. 'LONDON' SERIES

There is a large number of mortars in the Wellcome collection which may point to the existence of a large unidentified foundry flourishing in the second half of the 17th century. The mortars cover a large number of shapes and stamps (many of the latter hitherto believed to indicate a Continental origin) but the distribution of stamps on various shapes (see Table 1) highlights many close relationships which together suggest a common provenance. However, it must be remembered that the close relations could just be the result of interchange of stamps and moulds amongst a number of small foundries sited in a particular locality, such as at Lothburie and Aldersgate.

The grouping is based on a careful study of selected mortars, which have crisp designs and well-moulded shapes. Other mortars with minor variations have been included in the catalogue groups (though not listed in Table 1), for it is not unlikely that the small variations are due merely to over use of a mould or unsuccessful casting.

The mortars are assumed to be of London manufacture on the evidence of number 73, which bears the coat-of-arms of the City of London, and on the large numbers of this type of mortar in existence in the Wellcome collection and elsewhere. Many of these might have been cast in response to an increased demand after the Great Fire of London, when many mortars must have been lost.⁷⁴

Unfortunately out of the ten mortar shapes included in the group and twenty decorative stamps (other examples could be added, but these do not feature in the Wellcome collection) there are only four strong pieces of evidence on which the series can be dated: the Commonwealth stamp, two mortars dated 1671 and 1667, and the Charles II portrait stamps. The Commonwealth stamp covers the period 1649–1660. This stamp occurs on four shapes, A, B, E and H. The two dated mortars are of shape G (no. 67A dated 1671, and a British Museum mortar no. 6 53 27 dated 1667) and have identically formed date cartouches and

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numerals. They are connected with the bulk of the mortars by the flighted fleur-de-lys which appears both on the British Museum mortar and on Wellcome no. 88, shape A3.

The two Charles II portrait stamps can be dated between 1660–1685, though unlike the Commonwealth stamp, it is possible that these fine portrait stamps of such a popular monarch

⁷⁴ *London Gazette*, 3–10 September 1666, p. iii, lists 13,200 houses destroyed in the Fire of London.

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TABLE 1

CORRELATION OF MORTAR SHAPES (FIGURE 1) AND STAMPS IN THE LONDON SERIES

The individual mortars listed in the table represent the best preserved shape and stamp characteristic of each group found within the Wellcome collection of this series. Examples from other collections showing different combinations of the same stamps and shapes have been omitted.

	A1	A2	A3	B	C	D	E	F	G	H
I DATED MORTAR									67A	
II COMMONWEALTH	68			69			72			70
III CITY OF LONDON	73									
IV BIRD & KEY	75			77	80					
V UNICORN	82							83		
VI EAGLE	84							85		
VIIA FLEUR-DE-LYS	86		87							
VII B FLEUR-DE-LYS			88	88A						
VIII FLOWER			95							
IX (I) ROSE & CROWN				96	97	100	101			
X STAG'S HEAD		106	107		108					
XI DRAGON'S HEAD				113	114	115				
XII WINGED DRAGON					118					
XIII ADAM & EVE					119					
XIV RIBBON					120					
XV DOUBLE CROWN							121			
XVI CROWNED HEAD							122			
XVII WYVERN										122A
XVIII CHARLES II									123	

may have continued in use after his death. The portraits are found on no. 137 shape G, and on a mortar of shape C, no. 242.30, in Lincoln City and County Museum.

Two more stamps may provide further evidence for dating the group. The first is the rose and crown found on shapes B, C, D and E. The rose and crown was a popular Tudor device frequently used by the Elizabethan bellfoundries of Nottingham, Leicester, Reading and Whitechapel, but the shape of the mortars makes it doubtful that they are Elizabethan.⁷⁵ Taking into consideration that the earliest date (as yet) for the whole group could be 1649 it seems more likely that the rose and crown of these mortars was introduced at the Restoration. (Cf. also mortar no. 47, dated 1664, with two rose and crown motifs.) The second stamp of interest no. 121, a double crown motif, might refer to the double reign of William and Mary (1689–1694) but the exact significance has not yet been established.

⁷⁵ One mortar in the Ludlow Museum, similar to shape J, is decorated with portraits of Elizabeth I. As the shape of the mortar is seventeenth-century, this is probably another instance of founders using out-of-date stamps (cf. portrait stamps of Edward III and Phillipa in use 1350–1806 fn. 53). This may, of course apply also to the Charles II stamps.

The following arrangement is arbitrary following the relationships indicated in Table 1. Also listed under a particular motif are any mortars bearing that motif, but of shapes not noted in the chart.

I DATED MORTAR

Shape G

67A. Dated 1671. The waist has five separate decorative stamps: (1) the date 1671 bordered with dots and two lines, (2) scroll between two rows of dots, (3) a flower, (4) a thistle, fleur-de-lys and rose, each crowned, and (5) a flower, a repeat of (3). 12.4 × 15.4 cm. (Fig. 3F).

II COMMONWEALTH CREST (c. 1649–1660)

Shape A₁

68. Decorated with four stamps. 11.5 × 16.3 cm.

Shape B

69. Decorated with four stamps. 10.6 × 12.1 cm.

Shape H

70. Decorated with four stamps. A mortar shape similar to shape D (cf. Fig. I). 11.9 × 14.4 cm.

Shape E

71 and 72. Decorated with two stamps. 8.9 × 11 and 9 × 10.9 cm.

III CITY OF LONDON SHIELD

Shape A₁

73. Decorated with six shields. 11.5 × 14.3 cm. (Fig. 4E).

IV BIRD AND KEY MOTIF

Shape A₁

74–75. Two mortars decorated with four examples of the motif. 11 × 14.5 and 11.9 × 14.7 cm. (Fig. 4F).

Shape B

76–79. Four mortars each decorated with four motifs. Mortar 76 has two semicircular handles, a common feature with mortars of shapes A₁ and 3, but not of B. The base is also flatter and more out-turned than the majority of B-shape mortars. 10.2 × 13, 10.5 × 12.4, 10.2 × 12.5 and 10.5 × 12 cm.

Shape C

80–81. Two mortars each decorated with two motifs. 9 × 12.8 and 9.4 × 12.5 cm.

V UNICORN MOTIF

Circular enwreathed motif (4 cm. in diameter) of unicorn. Each mortar has four stamps.

Shape A₁

82. 11.5 × 14.5 cm.

Shape F

83. 11.5 × 14 cm. (Fig. 6C).

VI EAGLE MOTIF

Double-headed eagle in circular motif 4 cm. in diameter. Each mortar has four stamps.

Shape A₁

84. 12 × 14.5 cm. (Fig. 5A).

Shape F

85. 11.2 × 13.7 cm.

VII FLEUR-DE-LYS MOTIF

A. Fleur-de-lys with ring at base of motif.

Shape A₁

86. Mortar with four motifs. 11.5 × 14.7 cm.

Shape A₃

87. With four motifs. 12.5 × 17.5 cm. (Fig. 5B).

B. Fleur-de-lys with flighted stalk.

Shape A₃

88. Decorated with six motifs. The British Museum mortar (no 53 27) dated 1667 has an identical fleur-de-lys stamp. 12.5 × 17.3 cm. (Fig. 5C).

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Shape B

88A. Decorated with four motifs. 10.5 × 12.3 cm.

C. Other fleur-de-lys motifs

89–90. Two mortars of shape J. Waist of no. 89 decorated with four fleur-de-lys motifs, and no. 90 with two large embossed motifs running from the base to near the top. 9.5 × 11.6 and 9.5 × 11.5 cm.

91–92. Two mortars with flat out-turned bases, but, unlike shape E, with fine moulding around the shoulder. Each decorated with two fleur-de-lys motifs. 10.5 × 13.2 and 11.2 × 14 cm.

93. Mortar of E shape decorated with four fleur-de-lys motifs. 9 × 11.8 cm.

94. Mortar with heavy, moulded rings around shoulder. Bears three fleur-de-lys motifs. 5 × 6.7 cm.

VIII FLOWERING PLANT MOTIF

Shape A₃

95. The motif appears four times. 13.5 × 17.3 cm. (Fig. 5D).

IX ROSE AND CROWN MORTARS

Large numbers of mortars are decorated with the rose and crown, though many different moulds were used for the motif. Six examples of the motif are in the Wellcome collections. Mortars 97–101 have an identical motif. The rest, including nos. 47, 96, 102–104, all having different ones. All the Wellcome mortars except 98 and 104 have four examples of the motif. For a note about dating see p. 281.

Shape B

96. 10.3 × 12 cm. (Fig. 5E).

Shape C

97–98. Number 98 has five examples of the motif. 9.5 × 12.5 and 9 × 12.3 cm.

Shape D

99–100. 10.7 × 13.6 and 11 × 13.6 cm. (Fig. 5F).

Shape E

101. 8.2 × 11 cm.

Shape J

102. 11 × 13.7 cm.

103. Mortar similar to 102 but with different mould for rose and crown. 10.4 × 12.8 cm.

104. Mortar with sides curving in to the out-turned base. Two examples of motif. 9.1 × 12 cm.

X STAG'S HEAD MOTIF

Stag's head in oval frame. 4.5 × 3.5 cm.

Shape A₂

105–6. Number 105 has two crests and number 106 four. 11 × 14.7 and 11 × 15 cm. (Fig. 6A).

Shape A₃

107. A large version of A₃, but with four semicircular handles. 14.2 × 18.5 cm.

Shape C

108–10. Number 108 has four motifs and numbers 109–10 two only. 9.5 × 12.5, 9.5 × 13 and 9.4 × 12.5 cm.

111–12. Two mortars slightly less flaring than numbers 108–10, and having more resemblance to shape A₃ but without handles. 11.2 × 14.7 and 10.4 × 13.3 cm.

XI DRAGON'S HEAD WITH COLLARED NECK

Shape B

113. Decorated with four motifs. 10.5 × 12.2 cm. (Fig. 6B).

Shape C

114. With three motifs. 8.5 × 12.4 cm.

Shape D

115. With four motifs. 10.8 × 13.5 cm.

Other shapes

116. Mortar with two semicircular handles and four motifs. Despite the presence of semicircular handles and the heavy appearance of the mortar, the shape is substantially different from shape A, being upright and with some similarity to B. 12.5 × 15.5 cm.

117. Mortar somewhat similar to shape C, but with unusually thick rim. 10 × 11.9 cm.

XII WINGED DRAGON MOTIF

Circular framed motif 4 cm. in diameter.

Shape C

118. Decorated with two stamps. 9 × 12.3 cm. (Fig. 6D).

XIII ADAM AND EVE MOTIF

Enwreathed circular motif 6 cm. diameter depicting Adam and Eve in the Garden of Paradise.

Shape C

119. Decorated with four motifs. 9.5 × 12.8 cm.

120. Decorated with three motifs. 9.7 × 13 cm. (Fig. 6E).

XIV MISCELLANEOUS RIBBON DESIGNS

Shape A

120A. Heart-shaped design. 9.1 × 12 cm.

120B. Diamond-shaped knot design. 9.5 × 13 cm.

XV DOUBLE CROWN MOTIF

Design of two crowns within oval wreath. 4 cm. diameter.

Shape E

121. Mortar with slight ring moulding to shoulder, otherwise E. Badly worn motif, repeated twice. A mortar in a private collection has the same motif along with the dragon's head design (no. X, p. 43), providing further evidence for the common origin of the mortars. 8.8 × 11 cm. (Fig. 6F).

XVI CROWNED HEAD WITHIN OVAL STAMP 3.5 × 3 cm.

Shape E

122. Badly worn motif, repeated three times.⁷⁶ 8.4 × 10.8 cm.

XVII WYVERN MOTIF

Shape H

122A. The waist completely covered by four large wyvern stamps, the wyverns standing at right angles to the rim and base. 12 × 14.4 cm.

XVIII CROWNED HEAD OF CHARLES II

Shape G

123. Few mortars of this shape have been recorded, but others are Wellcome mortar no. 67A dated 1671 and a mortar in the British Museum (6 53 27). 12 × 15.5 cm. (Fig. 7E).

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A₁-style in shape

Two mortars similar in execution to A₁-shape mortars, but with different banding to neck and base.

124. Decorated with two examples of the motif, only slightly different from that on number 123. 12 × 15 cm.

125. Mortar with different ring moulding to 124. Decorated with two examples of the motif also different in detail to the ones on number 123. 14.8 × 18.8 cm.

E-style in shape

Both numbers 126 and 127 have two badly worn motifs, which makes it impossible to correlate them with those on numbers 123–25.

126. 8 × 10.5 cm. (Fig. 7F).

127. 8.8 × 12 cm.

E₂ MORTARS CONTEMPORARY WITH THE ABOVE 'LONDON' GROUP

These do not fit into the grouping based on Table 1, which, it will be remembered, was compiled from careful comparisons of selected, well-moulded mortars. While the following mortars have a number of similarities in shape and motifs to the 'London' group, their exclusion may just indicate that no evidence has come to light to link them directly with the other mortars. In some cases it may also indicate that the criteria for mould shapes for the 'London' group were drawn too narrowly.

⁷⁶ The stamp bears more resemblance to a portrait of Charles I than the heavily wigged Charles II, but the motif is too worn to be properly identified. A better example may help the dating of the 'London' group see p. 280.

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XIX ROYAL COAT OF ARMS WITH THE INITIALS CR

128. Large mortar with pedestal foot. The upright style resembles shape B, but there is a well-moulded ringed base. Decorated with three circular stamps, 5.5 cm. diameter. 17.5 × 20 cm. (Fig. 7A).

129–30. Medium sized mortars resembling shape B. Each decorated with two stamps. 11.4 × 14 and 11.4 × 13 cm.

131–32. Two mortars identical in moulding to 129 and 130, but smaller. 10.6 × 14.4 and 10.5 × 12.1 cm.

133. B-style mortar smaller than 129–32. 9.3 × 12.6 cm.

XX CROWNED FLORAL MOTIF

134. Mortar with two stamps of circular floral motif composed of miniature fleur-de-lys surmounted by crown. After style B. 11.5 × 14.4 cm.

XXI MASK MORTARS

A group of mortars each bearing one of a variety of mask motifs.

B-style

Two mortars resembling Wellcome mortar 47 dated 1664. The date cartouche on the latter is identical with that on a G-style mortar dated 1665 in the Fitzwilliam Museum, a mortar identical in shape to mask mortars nos. 137–39. Thus, it is possible that numbers 135–39 were produced by one founder.

135. Decorated with six rose medallions each surmounted alternately by fleur-de-lys, rose spray and mask. 9.6 × 11 cm.

136. Waist decoration with design of an acorn—two roses—mask—two roses, repeated once. 9.8 × 11.5 cm. (Fig. 7B).

G-style mortars (see note under B-style)

137. Decorated with four inverted drop-shape motifs, each of masklike head. 11.2 × 14.5 cm.

138. Decorated with four inverted drop-shape motifs with sun masks alternating with four decorative shields (unidentified but probably not representative). 10.8 × 14.5 cm.

139. Elaborately decorated mortar with two crucifixion scenes, four circular stamps surmounted by the fleur-de-lys and rose spray (as found on mortar 135) and two inverted drop-shaped motifs featuring masks as on mortar 138. 11 × 15 cm. (Fig. 7C).

Shape J

Mortars of shape J and I (nos. 140–141A, 89, 90, 102 and 103) belong to the same group, distinguished by their deep, straight-sided rim set at a slight angle to the body of the mortar.

140–141. Each mortar has four stamps on waist, featuring mask in rococo frame. 11 × 13.8 and 10.2 × 12.5 cm. (Fig. 7D).

Shape I

141A. Decorated with ten mummy-like figures applied vertically to waist. 11 × 12.6 cm.

THE BEARDMORE FOUNDRY

Although many founders must have produced for a purely local market,⁷⁷ there were a few foundries with much wider reputation. Of these, Whitechapel, and the possible 'London' foundry of the seventeenth century have been considered, whilst a third was the Beardmore foundry, which flourished in the eighteenth century. The latter appeared in the London Directories of 1766 as 'Joshua Beardmore, founder, Barbican' and remained there, with changes in style owing to various partnerships, until 1787. In 1788, Beardmore disappears from the records, leaving the firm as Reynolds & Wilkins, founders.

There are two recorded dated mortars from this foundry. The first is inscribed 'BEARDMORE & CO. FECIT 1768',⁷⁸ and the second, in the Wellcome collection, is inscribed 'BEARDMORE & REYNOLDS-LONDON-FECIT-1781' (number 142). Both mortars feature a version of the shell, florette and leaf decorations which appear on twenty-four Wellcome mortars. There are three sizes of these designs (Fig. 2N, O, P.), which, with minor variations of detail, appear in different combinations of waist and rim decoration on three sizes of mortars. Another six mortars repeat the leaf motif, but vary the style of the shell and florette stamps a little.

The mortars are elegant, though, being clearly mass produced, lack the individuality of

⁷⁷ For example John Palmer of Canterbury (*fl.* 1638–1649) who operated in a very limited area (Walters, *op. cit.* fn. 40, p. 220). His mortar, inscribed JOHN PALMER MADE ME FOR MARGARET – BALDOCKE 1638 is illustrated by Hemming, *op. cit.* fn. 52, p. 165.

⁷⁸ In the collections of the Pharmaceutical Society of Great Britain.

many earlier mortars. It is interesting that the Beardmore & Reynolds mortar of 1781, the last dated English bell-metal mortar in the Wellcome collection, should be cast about the time of the introduction of Wedgwood's revolutionary composition mortar (see p. 271).

BEARDMORE MORTARS

142. Large mortar inscribed below the rim: BEARDMORE & REYNOLDS. LONDON. FECIT. 1781. Decorated with waist decoration N. 25×33.5 cm. (Fig. 8A).

143–149. A group of large mortars decorated around waist with pattern N and around rim with P.

All are from similar moulds, which feature three rings above base. The majority of other mortars in the Beardmore section have two rings only. All *c.* 31.7×40 cm.

150–51. Two medium-sized mortars. Each has pattern O as waist decoration, the neck a small version of P. 13.7×18 and 13.9×18 cm.

152–61. A group of medium-sized mortars. Each has pattern P as waist decoration, and a small version of P around neck. *c.* $11\text{--}13 \times 15\text{--}19$ cm.

162–63. Two virtually identical mortars, with pattern P around waist. No neck decoration. 11.2×13.4 and 10.9×13.4 cm. (Fig. 8B).

164. Mortar, similar to numbers 162 and 163, but with cleaner moulding and less brass-like in colour. 11.5×15 cm.

165. Mortar similar to numbers 162–64, but from a distinctly different mould, characterized by more flaring of neck and more rings at foot. 11.1×13.6 cm.

166. Mortar inscribed around waist: R:BARTHOLOMEW and decorated with small section of pattern P. No neck decoration. 11.7×13.5 cm.

167–172. Six mortars with waist pattern Q. No neck decoration. The similarity in design and in overall execution with Beardmore mortars already considered, suggest that these may also originate from the foundry. *c.* $11\text{--}13 \times 13\text{--}18$ cm.

The following mortars, while having similar moulding and execution to the above mortars have totally different waist decorations, and it is impossible at present to say whether they are Beardmore products or not.

173. Mortar with similar design to N, but with daisy-like floral motif. 18×21.7 cm.

174. Mortar with waist band of diamonds and dots between rope design borders. 11.2×15.2 cm.

175. Mortar with waist band of scroll ornament, repeated on shoulder. 18×23.2 cm.

THE NEALE FOUNDRY

Between 1627 and 1641, Henry Neale was casting bells at Somerford Keynes in Wiltshire,⁷⁹ and making mortars decorated with hearts, bells, and other motifs, on which he inscribed his name and the date.⁸⁰ In 1635, he founded bells at Burford in Oxfordshire, where his successor, Edward Neale, began founding on his own account in 1641. Edward Neale ended his bell-founding career in 1685 and died in 1695.

The territory of the Neale foundry was bounded by the activities of James and Richard Keene of Woodstock, on the east, and on the west by the Purdues of Gloucester, both foundries having extensive and flourishing practices.⁸¹ It is just possible that this competition was responsible for Neale's exploitation of the market for mortars, for, although the Keene and Purdue foundries probably cast an occasional mortar,⁸² nothing remains comparable with the surviving number of mortars made by Edward Neale. The Wellcome collection contains six, all of which are highly characteristic of Edward Neale's work, being crisply cast, and bearing the same decorations, numerals and trade marks found on his bells.

To what extent the aesthetic appeal of these elegant mortars contributed to their survival, and whether the quantity of Edward Neale's mortars still in existence indicates a much larger production is difficult to determine.

176. Dated on waist 1647, and bearing the following inscriptions and decorations: (a) Edward Neale's foundry shield, between the initials E N, which have a heart beneath each initial (b) two hearts separated by a diamond stamp (c) T^ME engraved on the lower waist. The foot is decorated

⁷⁹ Walters, *op. cit.* fn. 47, p. 281.

⁸⁰ See, for example, Hemming, *op. cit.* fn. 60, p. 394.

⁸¹ Walters, *op. cit.* fn. 40, p. 232. Note also the distribution of surviving bells from these founders in e.g. Sharpe, *op. cit.* fn. 47, and Walters, *op. cit.* fn. 47.

⁸² See mortars numbered 41 and 46.

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with three groups of stamps, separated by single diamonds: (a) six linked hearts (b) five crowns (c) eight linked rings. 10.5 x 13.5 cm. (Fig. 8C).

177. Dated on waist 1669, and bearing the following inscriptions and decorations: ostrich plume style fleur-de-lys, the initials w^H_E , and a second ostrich plume stamp. 10.7 x 14.2 cm.

178. Dated on waist 1662, and bearing the following inscriptions and decorations: a floral sprig, the founder's initials E N separated by a bell, and a second floral sprig. 10.8 x 13.5 cm.

179. Dated on waist 1665, and bearing the following inscriptions and decorations: a crowned head of Charles II (repeated twice), and the founder's initials E N. 9.5 x 11.8 cm.

180. Dated on waist 1666, and bearing the following inscription and decorations: Charles II stamp (identical with the head on no. 179) (repeated twice) and the initials I^T_M . 10.3 x 13.5 cm.

181. Undated. Waist encircled by the founder's initials E N and 3 stamps depicting an armoured figure on horseback. 10.5 x 13.5 cm. (Fig. 8D).

MISCELLANEOUS MORTARS

182. Mortar similar in shape to shape B, decorated with rectangular stamps bearing a rococo motif and two shields similar to that on the 'mask' mortar no. 138. The moulding is badly worn and indistinct and hence the possibility that this mortar is linked with the 'mask' mortars of B and G-style shape cannot be confirmed (see p. 285). 9 x 11.5 cm.

183. Mortar of unusual design, so that a Continental origin cannot be ruled out. The mortar has four vertical ribs dividing waist into four panels. Panel (1) has T and separated by crown above a stylized daisy, a mask on either side of the stem. (2) has T and separated by daisy above a heart and flower stamp, two masks in lower corners. (3) has a crown above a daisy and two masks below, and (4) has heart in flower stamp above a star-shaped flower, and two masks in lower corners. 11 x 14 cm. (Fig. 8E).

184. Anvil-shaped mortar with two rounded lug handles, decorated with four lions rampant. 11.5 x 14.8 cm. (Fig. 8F).

185. Squat mortar with 'London' type ribbon bands above and below waist. Two small round handles, and four lions passant on the waist. 10 x 12.6 cm.

186. Mortar with deeply indented rim, which is half masked by a badly cast and illegible inscription. The waist is decorated with four Tudor badges of the portcullis and chains surmounted by a crown. (This does not necessarily indicate a sixteenth-century origin, as the badge was used by at least one seventeenth-century founder, Samuel Smith of York (*f.* 1662–1709).)