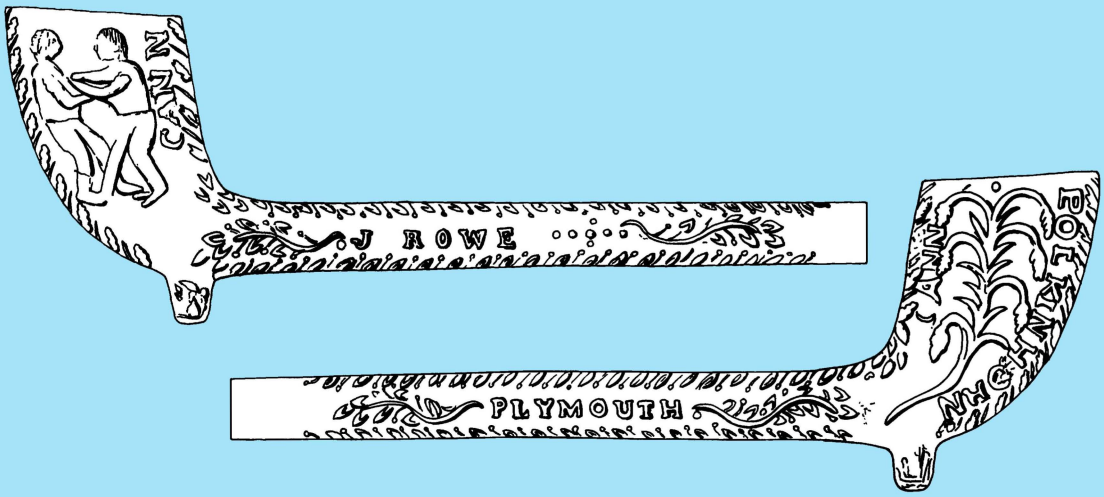
Clay Tobacco Pipes From Excavations at Dung Quay, Plymouth



D. A. Higgins

2003

Proc. Devon Archaeol. Soc. **61**, 2003, 21–133

EXCAVATION OF THE MEDIEVAL AND LATER WATERFRONT AT DUNG QUAY, PLYMOUTH

By PETER STEAD[1]

With contributions by

John Allan [2], Wendy Carruthers[3], Diana Friendship-Taylor, M. Godwin, David Higgins, L. Higbee[4], G. Langman[5], Allan Peacey, Roger T. Taylor and Heather M. Tinsley

In 2001 Exeter Archaeology excavated the site of two 19th-century warehouses at Vauxhall Street on the west side of Sutton Harbour. They overlay deeply stratified deposits which represented three major phases of reclamation, the first the construction of a stone-built waterfront wall of probable 14th-century date. The second phase of reclamation, dating from c. *1425–75, is interpreted as a sloping 'hard'. This was buried by a third phase of reclamation dating from c. 1645, when large warehouse buildings were built on the site. Amongst the artefacts recovered were important groups of regional and imported ceramics and a large assemblage of waterlogged medieval leather. The remains of an early 19th-century tobacco pipe kiln represent a particularly rare discovery.*

INTRODUCTION (Fig. 1)

Sutton Harbour, formerly called Sutton Pool, is a natural sea inlet which served as the main commercial port of Plymouth until the development of Millbay Dock in the 1840s. It was also Plymouth's principal naval harbour during the medieval period, serving as the central point of embarkation during the Hundred Years War, and it remained so until the construction of Plymouth Dock (later to become Devonport) in the 1690s (Pye *et al.* 1993). The continuous redevelopment of its waterfront over recent years has allowed a number of archaeological investigations to take place, and these have contributed to a clearer understanding of the historical development of the harbour.

In 2001 Plymouth City Council granted planning consent for the demolition of two warehouses at 130 and 132 Vauxhall Street (Pl. 1), on the western side of the harbour, and the redevelopment of the site as a multi-storey apartment block (SX 48285440). The archaeological potential of this site had been demonstrated by evaluation and assessment carried out in connection with a previous development proposal (Stead and Rance 1995), which had established that the site lay wholly on land reclaimed from the former foreshore, a process that began in the late 14th or early 15th century. Consequently Plymouth City Council attached a condition to the planning permission stipulating the recording of the two warehouses and, following their demolition, the excavation of the site. This work was commissioned and funded by the developers, South Devon Land plc, and undertaken by Exeter Archaeology between April and June 2001.

[1,4,5]Exeter Archaeology (EA)
[2]Exeter City Museums
[3]Northamptonshire Archaeology
[6]University of Bristol

Temper: *c.* 15%

Quartz: clear angular grains, some sub-angular abraded grains generally less than 0.3mm. Some rounded matt-surfaced and polished grains, various colours clear to brown.

Mica: muscovite flakes common generally less than 0.25mm.

Mica: biotite, sparse flakes less than 0.2mm.

Rock fragments: a few angular, elongated grains of clear quartz with aligned flakes of biotite up to 1.2mm. Schist fragments. Muscovite schist fragment 1.2mm.

Comment: A metamorphic-derived temper with a possible beach sand component. Probably Breton.

APPENDIX 2: TOBACCO PIPES FROM EXCAVATIONS AT DUNG QUAY, PLYMOUTH

By D.A. Higgins

INTRODUCTION AND METHODOLOGY

A total of 1,178 fragments of pipe was recovered from the excavations, comprising 689 bowl, 451 stem and 38 mouthpiece fragments. They have been examined individually and details logged onto two Excel worksheets. All the contexts containing pre-19th-century material have been logged in detail onto one worksheet, whilst a more summary catalogue has been prepared for the 19th-century deposits. The layout of the worksheets has been based on the draft clay tobacco pipe recording system developed at the University of Liverpool (Higgins and Davey 1994). The worksheet allows the data to be sorted in a variety of ways, for example by type, attribute or date. A context summary for the earlier deposits has also been prepared on a third Excel worksheet. Digital copies of the worksheets and draft recording system have been deposited in the site archive.

The bowl form dating has been broadly based on the London typology established by Atkinson and Oswald (1969) but with the dates modified to take account of regional styles from well-dated local groups, notably those from Plymouth (Oswald 1969; Higgins 1992) and Exeter (Oswald *et al.* 1984). An assessment of the likely date for the stem fragments has also been provided. The stem dates should, however, be used with caution since they are much less reliable than those determined from bowl fragments. The pipe fragments were recorded and dated before being compared with the context information from the site; this practice prevents preconceptions being made about the date or nature of the pipe evidence during initial recording.

Where more than one bowl or other diagnostic fragment occurred in a single context, an additional letter was added to the fragment in pencil to identify it. Where such a fragment is referred to in the text without illustration, these letters are given in round brackets, thus (A).

The pipes recovered from the excavations fall into two distinct groups. A series of deposits produced earlier material, almost all of the late 17th or early 18th century. There is then a gap in the pipe sequence before a series of 19th-century material, dominated by finds from a pipe kiln operated by J. Rowe in the 1820s. The report starts with a general introduction to pipe-making in Plymouth, after which these two distinct elements will be dealt with separately.

PIPE-MAKING IN PLYMOUTH

Although Oswald published lists of Plymouth pipe-makers in 1969 and 1975, these focussed primarily on the 19th-century makers and did not represent an exhaustive study

of the documentary sources. Some further work has been carried out as part of this project (see Addendum, pp 91–4), but the list of local makers is probably still far from complete. Excavated finds from the Plymouth area have shown a marked concentration of late Tudor pipes with distinctive eglantine marks (Oswald 1969; Higgins 1992; 1998; forthcoming). These marks strongly suggest that some of the earliest English pipes were manufactured in or near Plymouth at the end of the 16th century. The forms exhibited by finds of the 17th century suggest a continuing and thriving local industry. Despite this artefactual evidence, there are no known documentary references to makers from the area until 1712, after which there are only isolated references until the 19th century.

For most of the 19th century only one or two makers, occasionally three, are documented in the trade directories of the Plymouth area. At face value this would suggest a low level of pipe-making activity. The situation is completely changed, however, when the Census Returns are examined. The details have been fully extracted only for 1851, but in that year no fewer than 31 pipe-makers are listed. It is almost certain that many of these were just employees in small manufactories, such as that operated by William Spence, who was noted as a 'master pipe-maker employing 2 men and 5 women'. Even so, there is clearly a mis-match between the impression created by the trade directories and the Census figures. This mis-match is even more marked when individual names are examined. For example, William Spence, despite being described as a master pipe-maker employing seven others in the Census, does not appear in any of the trade directories examined. On the other hand neither Elizabeth Hoar nor James Hodgetts, both of whom are listed as pipe-makers in directories of the 1840s and 1850s, appears as such in the Census Returns. A wide range of different sources evidently needs to be examined to give a more realistic picture of the pipe-making industry in Plymouth.

When Elizabeth Hoar and James Hodgetts are added to the 31 pipe-makers listed in the Census it is clear that at least 33 people were involved in the trade at that time. This figure compares well with the numbers of 19th-century pipe-makers identified at other coastal towns such as Chester, which peaked with 31 documented makers during the 1820s (Rutter and Davey 1980, 49); Hull, which peaked with 33 documented makers during the 1850s (Watkins 1979, 104), or Exeter, where 33 pipe-makers are listed in the 1851 Census. Most of the 31 Plymouth pipe-makers identified in the Census were living in Stonehouse (17), with smaller numbers in Stoke Damerel (9) and Plymouth (5). Certain areas, such as Morely Lane, Brownlow Street, George Street and Pembroke Street, seem to have housed particular concentrations of pipe-makers, and this is where the principal manufactories are likely to have been situated. Other potentially significant addresses are Pipe Lane in Stoke Damerel, where the Spencer and Wakeham families were living, and Rowe Court in East Stonehouse, where the Jeffery and Jenkins families were living. Although Rowe was a relatively common local surname, the fact that a J. Rowe had been a pipe-maker in the 1820s and that two pipe-making families were living in a Rowe Court in 1851 may well be more than a coincidence. This large community of Plymouth pipe-makers would have been capable of producing many millions of pipes annually and supplying both the local and export markets. Given Plymouth's importance as a port, it is likely that products will have been traded overseas, adding an international significance to the identification and dating of its products.

THE 17TH- AND EARLY 18TH-CENTURY PIPES

The excavations produced 72 stratified contexts and a series of unstratified finds of earlier pipes: a total of 105 bowl, 220 stem and 13 mouthpiece fragments. Most were recovered as small context groups containing ten fragments or fewer. There were, however, a few larger or more interesting groups which are described first, followed by a general discussion of all the earlier pipes from the site. In the following descriptions, the context number is

followed by the numbers of bowl, stem and mouthpiece fragments, and the total number of fragments present. Thus (2/15/1=18) shows that 2 bowl, 15 stem and 1 mouthpiece were recovered, a total of 18 fragments.

PRODUCTION WASTE OF *c.* 1660–90 FROM CONTEXT 1112

(30/21/3=54) This context, a levelling layer, produced a good group of bowls, all of *c.* 1660–90. These are probably a contemporary group of the 1670s or early 1680s (see also context 1111 below). Many of the bowls are unsmoked or overfired, suggesting that they are production waste. This is supported by the fact that three overfired stems encrusted with clay were also present, almost certainly stems reused in a pipe kiln muffle and typically found in kiln waste assemblages.

In general, the quality of these pipes is very poor. Folds or cracks are often visible in the clay surface and the finishing is heavy-handed, resulting in marks on the finished surface. A wide range of forms is represented, from squat forms with extremely large heels to export-style pipes with just the barest hint of a heel. These export pipes are important since they are rarely encountered in this country, despite being made in huge quantities for overseas trade, especially to North America. As with the other forms, the export-style pipes are crudely finished.

The mould types (Fig. 15)

There are 29 different bowls in this context, with at least seven different moulds represented amongst various bowl types (Nos 2–10). The heavy-handed finishing and poor moulding make it hard to see the flaws that would identify individual moulds with certainty, as does the mix of normal and overfired examples of some mould types. The overfired pipes have shrunk considerably, making the forms look slightly different from the correctly-fired examples. The seven groups all contain apparently identical forms and represent the minimum number of moulds represented in this context. Examples from the same mould exhibit various rim finishes and several rim-finishing tools are represented. These include a distinctive 'spiky' milling tool, various ordinary milling tools and at least one tool that made a plain groove at the rim. Stem bores vary from 6/64" to 8/64" and the overall impression is of a workshop where a range of practices and finishes was tolerated provided that the pipes were made cheaply and quickly. The mould types are described below:

Type 1 (Nos 2–3) Four examples with a squat, fairly straight-sided bowl and a particularly large heel, probably from a single mould. One (No. 2) has been very highly fired, almost to stoneware, and has probably shrunk slightly from its normal size. This makes it hard to compare with the other three, only one of which is complete (No. 3). The overfired example is unmilled while the other complete example has been fully milled. None of these examples shows any sign of having been smoked.

Type 2 (No. 4) One example of 'biconical' form, with a particularly small heel. It is unsmoked and has been overfired to a near-stoneware fabric, strongly suggesting that it is a waster.

Type 3 (Nos 5–6) Four examples from the same mould with surface flaws, all apparently unsmoked. Three have been overfired to a near-stoneware fabric and discoloured to a mottled buff/grey colour (eg. No. 5). All three have a distinctive 'spiky' milling, probably made using the same tool as the milled example of mould type 1 (cf. Nos 3 and 5) and one of the examples of mould type 6. The fourth example is different, both because it has not been overfired and because it does not have any rim milling (No. 6). This suggests that the

first three examples all came from a failed batch where the firing went wrong, and that the finish of the pipes was not always the same. The absence of rim milling on the fourth example makes the finished bowl look quite different and could reflect a number of factors. The application of milling was an extra finishing process and may indicate a better-quality pipe: certainly the best-quality pipes would have been expected to have had a complete, neatly applied band of milling at the rim. Alternatively, it may simply have been that different batches of pipes were of variable finish, depending on which individual moulder was making the pipes, or even the whim of the maker on that particular day. Finally, it may represent a chronological progression whereby milling was dropped as a finishing technique to speed up production.

Type 4 (No. 7) Three examples show very similar form and finish, and are likely to be from the same mould, but they cannot be positively linked by mould flaws. One is overfired and another has a defect where an impurity had become incorporated in the clay. Both the surviving rims have a distinctive finish without milling.

Type 5 (No. 8) One example of with a large, barrel-shaped bowl. This example is not overfired but there is a hole in the side where the clay has been moulded very thinly, which could have resulted in the pipe being discarded during manufacture. It does not show any sign of having been smoked.

Type 6 (No. 9) Fourteen bowls have been attributed to this mould type; nine of them complete or nearly-complete; eleven share mould flaws that prove they were produced in the same mould. The other three examples (N, T and Y) are fragmentary so they cannot be positively matched. Only one of the bowls shows any sign of having been smoked and one of the heel fragments is badly overfired. As with mould type 3, the rim finish on these bowls is very variable, ranging from unmilled to fully milled. In addition, there are examples with varying amounts of a plain groove, rather than milling, around the rim. One of the milled examples has the same type of 'spiky' milling as examples made from mould types 1 and 3.

Type 7 (No. 10) This is the most interesting type since it is an export-style bowl, not intended for use in this country. There are two examples from the same mould, which has a residual heel. In the illustrated example this has not even been trimmed, making it clear that it was an insignificant feature.

Related finds from context 1111
(7/3/1=11) The bowls from this context are very similar to those from 1112 (above). They may well derive from the same kiln waste, although the evidence is not so good. The bowls are rather discoloured from burning and iron-staining, and only one shows signs of having been smoked. One (No. 12) is very similar to mould type 3 in 1112, but its heel appears to be rather shorter and broader and so from a different mould type. Another (No. 13) is very like the mould type 4 from 1112 but appears to have a larger heel. Fragment (C) is also from a similar type of bowl but its heel is missing. Examples (D) and (E) are certainly from the same mould as type 5 in 1112 and (F) may well be too, although its heel is missing. Only No. 14 is certainly a different mould type, being an example of the characteristic late 17th- to early 18th-century heel type that is so typical of Devon. The smooth lines and distinctive form of this example make it stand out from the rest of the group and it was probably not made on the site.

OTHER LATE 17TH- AND EARLY 18TH-CENTURY PIPES

Context 588 (6/9/0=15) Although the pipe group contains some earlier 17th-century bowl fragments, these must be residual since the latest pieces are clearly transitional forms that range from *c.* 1680–1720 in date (Nos 16 and 21). This group also contains a stem which is of similar date, decorated with two roll-stamped borders (No. 32).

Context 1046 (2/15/1=18) The pipes from this group are all very fragmentary and abraded, as if well trampled. This accords with the context description: the make-up layer for a cobble surface (839). Two small bowl fragments appear to be of typical local forms of *c.* 1690–1740. The interesting point about this group is that it includes two decorated stems (Nos 33–4), almost certainly from the same pipe, each with a pinched section where the stem has been squeezed to give a barley-twist effect, and part of a decorative stem border. Neither of these techniques was particularly common but they form a small but regular element of the pipe assemblages from Devon. Decorated stems of this type are usually associated with bowls of *c.* 1680–1730 in this area, corresponding to the suggested date for these stems indicated by the associated bowls.

Context 1058 (13/31/0=44) This context also formed part of the make-up for cobbled surface 839; it produced one of the largest groups of earlier pipes from the site. These were also rather fragmented, suggesting that they had been well trampled. Once again, the deposition date seems likely to fall in the period *c.* 1690–1730 (Nos 24, 27 and 28). One of the fragments has a pattern of relief-moulded decoration on each side of the heel, a distinctive characteristic of the local pipe industry (No. 27).

Context 1192 (7/20/1=28) This group includes bowl forms which could range in date from *c.* 1690–1760 but were probably deposited as a single group around 1700–30. They include examples of local transitional heel forms (No. 22), the more upright 18th-century London style (No. 31) and two or three spur bowls of early 18th-century type (No. 29). The form of the last type is based on central southern styles, but they were almost certainly produced locally; they represent the first spur form to be widely used in Plymouth and have much thinner stems and narrower bores than the local transitional heel types. Although the bowl forms show that these pipes are likely to be contemporary, the stems in isolation would suggest widely differing dates, providing a cautionary note that neither the form nor bore of stems alone is as reliable as bowl fragments for dating.

DISCUSSION OF THE EARLIER PIPES

Although a few early to mid-17th-century pipes were recovered from the excavations, most are broken fragments, often clearly residual in the contexts from which they were recovered. There were only half-a-dozen bowls dating before *c.* 1660, the earliest closely datable piece being a fragment of *c.* 1620–50 from context 1045. Bowls of *c.* 1640–60 were recovered from contexts 588, 908 (No. 1) and 949 and there was a fragment of *c.* 1650–70 from 574. These early pieces are too few in number to draw any meaningful conclusions, although it is worth noting that two of only three burnished stems recovered came from 908, with one of the 1640–60 bowls in a mid-17th-century group, suggesting that burnishing was occasionally used until the middle of the century but very rarely thereafter. This pattern would fit with the evidence from Launceston Castle, where about 10% of the early 17th-century pipes were burnished, rising to a peak of around 13% in the 1630s before the technique faded out completely during the third quarter of the century (Higgins forthcoming).

The remaining bowls almost all date from between *c.* 1660 and *c.* 1740 and provide a

good indication of the forms produced and used in Plymouth during this period. In general the pipes are characterised by their distinctly mediocre quality. There are often folds or cracks in the surface of the clay resulting from poor preparation and moulding, while rough handling during the finishing process has often left trimming-marks, nicks and dents on the surfaces of the pipes. Likewise the rim finish is very variable, although almost all rims were bottered (i.e. finished with a button-like tool to give a shaped profile) throughout this period. Some pipes were fully milled while others were not, even when they were produced in the same mould (cf. context 1112 above). Furthermore, about one third of the pipes had a plain groove rather than a milled band applied around the rim. In at least one instance, the plain band seems to change to a milled one, suggesting that both types of mark were made with the same tool, only part of which was milled. When a groove or milling was applied, it often went all around the rim rather than being partially applied. Excluding one isolated 18th-century bowl form of *c.* 1700–60 (No. 31), there were 31 pipes ranging between 1660 and 1740 with complete rims. The groove or milling was estimated to the nearest quarter and the following table prepared (0 = no rim finish; M1 = one quarter milled; G4 = groove around all four quarters, etc):

0	M1	M2	M3	M4	G1	G2	G3	G4	TOT
5	1	1	4	11	1	0	2	6	31

Table 4. Popularity and extent of grooves and milling on pipe bowls at Dung Quay, *c.* 1660–1740.

This table clearly shows that most of the rims throughout this period had some sort of finish (26 out of 31 examples, or 84%), and that milled rims were about twice as common as those with a plain groove. Where a groove or milling was applied, the average amount (3.47 for milled, 3.44 for grooved) and the proportions represented in each category are almost identical. It would seem that although milling was more common, the plain groove was applied in just the same way and that it was regarded as an equal alternative rather than a different type of finish. This use of a plain groove is a distinctive characteristic of the local industry, being extremely rare in most other parts of the country.

Pipes with a plain groove at the rim were, however, also characteristic of the assemblage from Launceston Castle, where some 30–40% of the pipes had a plain groove at the rim during the 1660s and 1670s (Higgins forthcoming). The difference at Launceston is that this type of rim finish faded out rapidly by the end of the century and milled rims also became less well finished during the last few decades before fading out altogether during the early 18th century. Although the overall trend is similar, the exact nature and timing of these changes differs between the two assemblages. This shows that the two sites were supplied with pipes from separate sources, although the two sets of pipes were manufactured and finished in a common tradition and their bowl forms are almost identical. It seems likely that Launceston had its own manufacturers and that, at this period, Plymouth pipes were not being traded inland to Launceston in any great numbers.

Some of the bowl forms represented at Plymouth are also rather different from those found at nearby towns, such as Launceston and Exeter. The kiln waste from context 1112 provides a good sample of Plymouth styles of *c.* 1670–90. These include a London-style bowl, but with an unusually large heel (Nos 2–3), which does not seem to occur in these neighbouring towns, and a series of bowls with a sharply biconical form (Nos 4–7). These are also absent from surrounding areas, although similar forms were a characteristic of mid-17th-century pipes in Norfolk and Suffolk and they are somewhat similar to Dutch pipes of the period. The export-style pipes (No. 10) are also particularly notable and suggest that there was an export trade in pipes from the town.

From around 1680 another distinctive local style of pipe emerges, but one that achieved a much greater regional spread. These forms (Nos 17–24) are characterised by a rather forward-leaning bowl that tends to have quite a straight profile facing the smoker but a very curved one on the other side, often with a distinctive bulge near the bowl rim. The heels tend to be slightly flared and are often cut at an angle dipping away from the stem. These forms dominate the Plymouth assemblage from *c.* 1680–1740 and, as noted above, they are generally milled or have a groove at the rim throughout this period.

In contrast to the above forms, all of which are heel types, spur bowls appear to have been extremely rare at Plymouth. None is represented amongst the earlier finds and it is only from *c.* 1690 that spur forms occur. Even then they are very scarce, with only five recognisable examples among the 105 early bowl fragments recovered (eg. Nos 29–30). These spur forms are part of a national trend towards this style at the turn of the 18th century but their particular form appears to be inspired by forms from central southern England and the West Country.

A final feature of note is the use of markedly oval stems during the late 17th and early 18th centuries. This feature is not always present but, when it is, it is often particularly pronounced towards the bowl end of the stem, for example No. 10. The mid-sections of stem seem mainly to be more circular in section, but occasionally the mouthpiece is also markedly oval, as can be seen in No. 36. This particular example is also very deep, so the mouthpiece must have been quite an awkward shape to fit between the lips.

Marked pipes are barely represented amongst this assemblage, only two or three examples being recovered. This stands in marked contrast with the first half of the 17th century, when it is estimated that 10% of the pipes found at Plymouth were marked (Oswald 1969, 126). This group includes a crude star mark (No. 25), the very edge of a moulded cartouche mark (No. 26) and a stem stamp comprising four fleur-de-lys in a lozenge (No. 35). The star mark is on a chunky heel that is hard to date without the associated bowl, but which probably dates from *c.* 1660–1700. The mark is crudely executed and was almost certainly made using the same die as an example from Berry Pomeroy Castle (Higgins 1998, No. 72.17). The Berry Pomeroy example is on an identical-looking heel but is poorly impressed on one side so that it appears to have seven arms. Comparison of the two marks, however, makes it clear that it would have had six arms when properly impressed. The Berry Pomeroy example was initially dated to *c.* 1650–80 but comparison of other chunky heel forms now suggests that it is most likely to be a little later, as dated above. The occurrence of these two identical examples in south Devon suggests that these pipes were made in the area, most likely at Plymouth.

The fleur-de-lys stamp is of a Dutch type and may represent an import from there, although the stem on which it occurs is very plain and simply finished (Dutch stems often being well made and burnished), so it could just be a local copy. If it is Dutch, it is the only example from this site, in stark contrast with the earlier 17th-century finds from Plymouth, some 40% of which were Dutch (Oswald 1969, 126). The cartouche mark is on a well-made pipe with a good white fabric and may be an import from Bristol. Since two of the three stamped pipes are imports to Plymouth, it appears that local makers were not generally marking their products during this period. A final fragment deserves comment, and one that is perhaps more specifically associated with Plymouth: a heel fragment from context 1058 with a line and dots moulded on each side (No. 27). It comes from the most common local style of bowl at this period and a variety of these moulded heel patterns has previously been recorded from Plymouth (Oswald 1969, No. 54.21). Although moulded heel marks are also known from Exeter (Oswald *et al.* 1984, Nos 80–3), they are rather different in character, suggesting that variations on a common theme were being produced at these two centres.

THE 19TH-CENTURY PIPES

The excavations produced a total of 838 fragments of 19th-century or later pipes, comprising 584 bowl, 229 stem and 25 mouthpiece fragments. They were recovered from just 16 contexts, 13 of which contained material associated with a pipe kiln on the site. This is only the second 19th-century kiln to have been excavated in Devon and it has produced an interesting group of pipes of national importance. The miscellaneous unrelated 19th-century pipes will be described in the catalogue.

THE 19TH-CENTURY KILN GROUP

The discovery of the pipe kiln and associated waste provides an opportunity to examine the products of a single pipe workshop in detail and to set it in its local and regional context. The kiln was clearly operated by J. Rowe, since many of the stems amongst the kiln waste are marked J. ROWE/PLYMOUTH. The general style of the pipes suggests a date in the first half of the century, while more accurate dating can be determined from the makers' names and decoration on the pipes. The kiln deposits include two pipes marked J. Pearce, Plymouth, a maker who has only been located in the trade directories for 1823 and 1824. A date for the kiln in the 1820s is supported by the depictions of Cann and Polkinhorn, county wrestling champions whose most famous meeting was probably that at Morice Town, Plymouth, in 1826 (see below). These closely identifiable pieces strongly suggest that the whole kiln group can be securely dated to the 1820s.

A first point to note is the relationship between the documentary and archaeological records. There has often been a misconception that the post-medieval and modern periods are well documented and so archaeology has little to add. This well-established but previously unknown production site was clearly used over a number of years and made a wide range of products. The archaeological evidence strongly suggests that this site was operating during the 1820s, yet a search of the local trade directories for 1814, 1823, 1830, 1836 and 1847 has failed to find any reference to it, or to the maker J. Rowe. Similarly, although a few of the pipe types made here were previously known, they could not be attributed to a known manufacturer and most types recovered were previously unrecorded. This illustrates the fact that the documentary record does not always provide a complete or reliable picture, even for the 19th century, and that excavated evidence is essential if the range and attribution of artefact types is to be explored.

The 13 contexts containing waste pipes from the kiln, plus three unstratified pieces, gave a total of 833 fragments for study, comprising 579 bowl, 229 stem and 25 mouthpiece fragments. The bias towards bowls, many of them complete, is notable since the excavators tried to recover the entire kiln waste deposit for study. The absence of many of the stems and mouthpieces suggests that they had been selectively removed from amongst the discarded pipes. A possible explanation of this is that waste pipe stems were used in the construction of the kiln muffle, the chamber in which the pipes were fired (see Peacey, below, pp 95–7). This chamber probably had to be repaired or replaced fairly frequently and so Rowe may well have retained any long stem fragments for this purpose. This is an interesting characteristic of this kiln deposit and one that should be looked for amongst other kiln assemblages.

The removal of these stems, however, has limited the way in which this material can be studied in two respects. First, it has not been possible to reconstruct any complete pipes or to estimate accurately their original length. Secondly, many of the pipes clearly had decorated stems but there were insufficient fragments present in the discarded material to reconstruct several of these designs. Despite these limitations, this substantial sample of kiln waste offers the potential for detailed analysis.

The first job was to establish how many different moulds were represented amongst the

waste. This proved to be quite a complex job, since many of the moulds had clearly been altered during their period of use, giving a number of sub-types. Mould identification is relatively easy with distinctive decorated pipes but, for plain bowls, it depends on locating small mould flaws to identify the individual types. These comprise small nicks, scratches or surface imperfections that can be used to characterise an individual mould. Careful comparison of the 833 fragments associated with the kiln debris showed that at least 20 different moulds were represented, most of which were probably in use in the workshop. In total, some 608 bowl and stem fragments could be attributed to the 20 individual mould types. Each type is described below, while their distribution between the different contexts is given in Table 5. Each mould type associated with the kiln has been allocated a number (K1–K20), with letters used to identify sub-types of each mould (K6a, K6b, etc). Each entry ends with a note of the example(s) used for the illustration.

Descriptions of the mould types

K1 (No. 40) Plain bowl form with a distinctive profile and easily identified by clear mould flaws on each side of the bowl near the rim and on the right side of the heel. The maker's name 'J. ROWE/PLYMOUTH' occurs on the stem within a decorative scheme, but it is extremely faint and often hard to see. The mould may have been very worn at the time these pipes were produced or an unsuccessful attempt may have been made to change the mould to one with a plain stem. The stem for this illustration used has a particularly curved profile, perhaps as a result of warping in the kiln, and the others generally seem to have been rather straighter. Composite drawing of examples from context 1257.

K2 (No. 41) This is the most doubtful mould type and it may just be a poorly-formed example of type K1. This example, however, seems rather shorter than K1 and appears to have a slightly smaller, more compact spur.

K3 (No. 42) Plain bowl and stem, the bowl characterised by a number of clear mould flaws: a fairly strong vertical line on the right of the heel, a couple of quite sharply-defined irregular dots on the body of the bowl, two small but clear marks on the left side of the heel, and a distinct mark above on the body of the bowl.

K4 (No. 43) Plain bowl, badly overfired to a near-stoneware, discoloured and slightly encrusted. Although this was recovered from 1309, a culvert fill, it clearly derives from the kiln assemblage. The bowl form is very similar to K5, but is a little shorter.

K5 (No. 44) Plain bowl, the profile distorted by being pushed back and the side facing the smoker squashed flat. The angle and appearance are likely to have been more like K4. The heel has a rather uneven surface with mould flaws and the stem is decorated with a foliage spray, similar to that on K9. The stem decoration seems rather poor on the right hand side but sharper on the left. The two sides are similar except that the left-hand side reaches the bowl with an arching spray of foliage rather than a dipping one, as on the right. Context 1255.

K6 (Nos 45–6) This is one of the most complex groups since the mould appears to have been altered several times and used in at least four different forms (a–d). Mould variations a and b are the same apart from the heel and variations c and d are the same apart from the stem. For this reason only two variations have been illustrated, which between them cover the four variables as set out below:

> K6a (No. 45) The design is quite neatly but lightly cut and comprises a pair of lions supporting the Plymouth Arms with leaves on the seam facing away from

the smoker. The bowl seams line up fairly well but the heel is very badly aligned so there is a marked step between the two halves. The maker's name appears on the stem, flanked by a small leaf or arrow motif. Context 1255.

K6b In the second form the bowl decoration remains as in No. 45 but the heel has been recut to disguise the misalignment of the two halves (as shown in No. 46). The new heel is much larger and more chunky and has clear mould flaws on both sides.

K6c In the third form the entire bowl decoration appears to have been recut, making it much bolder (as shown in No. 46). This work, however, has been done very crudely and the lions are much less accomplished. This would probably be regarded as a distinct mould type were it not for the stem marking and just the hint of the original lion's lower jaw on the right side of the bowl. The stem decoration remains in No. 45.

K6d In the final form the stem appears to have been filed to remove the name and decoration (No. 46), but otherwise the heel remains as in types b and c and the bowl decoration as in type c. The amount of the swags visible has diminished slightly, owing to wear from trimming across the top of the mould. The removal of the maker's name has also made the stem a little thicker than in type c. It is not possible to differentiate types c and d unless a reasonable amount of stem is present to show whether the name is present. The plain stem has been drawn from an example in 1250, with the bowl detail completed from examples in 1250 and 1256.

K7 (No. 47) A single example of a bowl with lions supporting the Plymouth Arms, with leaves and berries on the seam facing away from the smoker. This is similar to K6 but much more competently and boldly executed. Context 1257.

K8 (Nos 50–2) This unusual bowl depicts the famous 'Devon wrestling' match between Cann and Polkinhorn, respectively champions of Devon and Cornwall. Their most famous encounter seems to have been that held at Morice Town, Plymouth, in 1826 (see below) and it is possible that this mould was commissioned specially to commemorate that event. In any case, it must have been a popular design, since the mould appears to have been reworked at least twice.

K8a The first version of this mould is probably the one with a plain, rounded spur and the maker's name flanked by simple leaves (No. 50, drawn from fragments from 1250 and 1307). The lettering and detail on the decoration are quite crisp (the bowl decoration is shown in No. 52).

K8b In second version the stem and heel have been re-worked (No. 51). The maker's name has been recut and is now flanked by much bolder leaves and berries, with a foliage spray at each end (No. 52). Four small leaves have also been added to each side of the spur, the lower pair of which tend to be rather faint and are not always clearly moulded.

K8c In the final alteration to this mould, the stem and bowl decoration stay the same but the spur has been recut to a squarer form, leaving clear mould flaws (No. 52).

K9 (No. 53) This mould is represented by a single stem from 1264; it could possibly have come from the same mould as one of the bowls for which no stem survives. The decoration and name are boldly but very neatly executed in a similar style to that on Type K8 above.

K10 (Nos 54–5) This distinctive rose, thistle and shamrock design was one of the most common on the kiln site. Three distinct versions of the mould can be identified (a–c):

K10a The earliest version of this mould is very 'busy', but with good-quality, neatly-engraved decoration (No. 54, from examples in 1283 and 1309). The maker's name on the stem is flanked with foliage and dots (complete scheme shown in No. 55) and there are four leaves and three dots on each side of the heel. There is a surprising difference in the level at which the rim is cut on these examples; some bowls have about 1mm less of the pattern showing than others. Likewise there is a marked difference in the size of these examples, some bowls being much smaller than others, presumably as a result of shrinkage during the drying or firing process. Examples range from 20.5–22.5mm across the axis of the rim in line with the stem, a difference of 10%.

K10b In the second version of this mould the spur remains the same, but the bowl decoration is completely reworked in a very clumsy manner (No. 55). A second stem is added, linking the rose and thistle, and all the leaves and flowers are crudely remodelled.

K10c In the final version (No. 55), the heel is recut to a rather squarer profile, leaving clear mould flaws on each side. The bowl remains the same as b and the stem as it has throughout.

K11 (No. 56) This mould type is very distinctive because of the boldly-punched triangles that make up the border of the Plymouth Arms, applied in rather uneven lines, and giving a rough and fairly crude appearance to the whole bowl. The stem decoration is also quite distinctive, in particular the 'W' of Rowe, which has been double-struck in the mould. Composite drawing from fragments in 1250, 1256, 1257 and 1283.

K12 (Nos 57–8) A mould type depicting the Plymouth Arms on each side of the bowl with leaf decoration starting on the stem and two leaves on each side of the heel (No. 58; illustrated example from context 1259). There are stems with similar decoration (eg. No. 57, from context 1257) that are almost certainly from the same mould but the decorative elements on the stem are so similar that it is not possible to determine whether there is an overlap between these pieces. The shield is quite elegantly designed and the overall execution is fairly simple but neat, giving a more accomplished appearance than K11.

K13 (No. 59) Chunky bowl with quite an oval rim and ten flutes on each side but none on the mould seams. There is a band of leaves, berries and a flower above the flutes on each side of the bowl. The same V-shaped stamp used to create much of the decoration in this band has also been used extensively to decorate the stem and heel of this mould. Composite drawing of fragments from 1250 and 1257.

K14 (No. 60) This mould is very similar to type K13. In particular, the underlying form and curves of the bowl are so similar as to suggest that there is a link between the two. Perhaps they were cast from a common pattern, or one is a reworked version of the other. If the latter is the case, the reworking of the decoration must have been so extensive as to obliterate all trace of the earlier version. This example is much more crudely executed

than K13 and has only 9 flutes on the left side of the bowl but 10 on the right. The flutes have scratchy, uneven profiles, and the decoration above them is lumpy and poorly formed. The whole mould surface and heel are covered with surface scratches and this is a much poorer-quality design than the previous example. If one has been recut from the other, then this is probably the earlier version, with the fatter flutes on K13 indicating where the irregularities had been removed. It would seem hard, however, to recut 9 flutes as 10 and so it may be that the workshop simply operated with two similar moulds to produce a popular style of pipe in bulk.

K15 (No. 61) A large and rather simply decorated mould type with fluted decoration. The flutes are quite widely spaced and oddly arranged at the mould seams, where one or two thin flutes occur on each side of the seam. These tend to merge with the seam, making it hard to tell whether there were actually one or two in the mould. The thin flutes facing away from the smoker are undulating, as if a series of small dots has been joined up. There are five larger flutes between those flanking the seams on each side of the bowl. Composite drawing of fragments from 1257 and 1258.

K16 (No. 62) The flutes on this bowl are rather thin and pointed in section, one with a distinctive forked tail. The leaves and dots above the flutes often appear to be poorly moulded. Composite drawing of fragments from 1250 and 1258.

K17 (No. 63) This bowl appears to have 16 flutes on the left and 15 on the right. The two farthest from the smoker disappear into the mould seam, so the one on the left is almost invisible. The flutes are narrow and neatly cut, like those on the Pearce pipe below (K18).

K18 (No. 64) The two examples from which this composite drawing was made were both recovered from 1257, the main waste deposit from the ash pit. Both examples are overfired and the more complete has a distorted rim. Neither shows any sign of having been smoked and their presence here is odd, since both are clearly marked with the name of James Pearce, who is recorded working at George Street, Stonehouse, in the directories of 1823 and 1824. Later makers are known to have borrowed moulds or supplied pipes to one another when they were short of stock, so perhaps Pearce and Rowe helped one another in this way. On one of these examples the initials on the heel appear to read JP rather than IP. This, however, seems to be due to the initial being damaged when soft rather than the mould having been altered.

K19 (No. 65) One very overfired and encrusted example. The bowl has seven flutes on each side and leaf decoration on the seams. The heel is missing, but traces of initials survive. Examples from Launceston Castle were almost certainly made in the same mould (Higgins forthcoming, No. 89). What is particularly unusual about the Launceston example is that there are two makers' marks on the pipe. The stem is marked 'HOAR/ DEVONPORT' (there were several Hoars making pipes in Plymouth during the late 18th to early 19th century) while the heel is marked GR, probably for one of the George Randalls of Truro, who are recorded working from at least 1803–41 (Douch 1970, 151). This dual marking is very unusual and suggests that the mould changed hands at some point. The occurrence of an overfired example from this kiln site raises the possibility that Rowe also used this mould. Alternatively, this could also have been a smoked example brought onto the site and discarded into the kiln. Either way, its presence in these deposits is intriguing and clearly shows that this design was being produced during the 1820s.

K20 (No. 66) A single bowl decorated with Masonic emblems, the principal motifs being a shield with three castles on the left of the bowl and a square and compasses, surrounding a

Mould	No.	Mark	1250	1252	1255	1256	1257	1258	1259	1264	1283	1306	1307	1308	1309	+	Tot 1	Tot 2
			Fill of servce trench 1251		Kiln deposit sequence							Layer near kiln	Fill of culvert 1188			U/S		
K1	40	JR	1		1	3	38	1			11	1					56	56
K2	41	–					1										1	1
K3	42	0	4	1	2		2			2			1				12	12
K$	43	–			1												1	1
K4	44	–			1												1	1
K6a	45	JR			1												1	
K6a/b		JR					1			1							2	
K6b		JR	1				1			1	1						4	
K6b-d		JR			1												1	18
K6c		JR	1														1	
K6c/d		JR	3			2	1	1			1						8	
K6d	46	JR	1														1	
K7	47	–					1										1	1
K8		JR	1			3	19				1		1				25	
K8a	50	JR					1		1				1				3	
K8b	51	JR	6			1	4							2	2	1	16	204
K8b/c		JR	3			2	13										18	
K8c	52	JR			2	3	126	1			10						142	
K9	53	JR								1							1	1
K10		JR	2			6	12				1						21	
K10a	54	JR	4			4	3				2				2		15	
K10b		JR		1								1					2	232
K10b/c		JR					45									1	46	
K10c	55	JR	1		4	5	129				7				1	1	148	
K11	56	JR	9			1	5			3	2			1			21	21
K12	57-8	0			1		1		1				1				4	4
K13	59	JR	3	2	4	7	8										24	24

Table 5. Numbers of bowl and stem fragments from each context containing kiln debris that could be identified to mould type. The relevant illustration number for each mould type is also given, together with a note of any maker's mark present on that particular mould type (JR = J. Rowe, JP = J. Pearce, GR = GR on heel, O = no mark, - = bowls without associated stem form). Tot 1 gives the total by each mould and sub-type, Tot 2 gives the same totals but with sub-types amalgamated.

Mould	No.	Mark	1250	1252	1255	1256	1257	1258	1259	1264	1283	1306	1307	1308	1309	+	Tot 1	Tot 2
			Fill of servce trench 1251		Kiln deposit sequence							Layer near kiln	Fill of culvert 1188			U/S		
K14	60	–				1									1		2	2
K15	61	–	1		2		1	2		2							8	8
K16	62	JR	4		1		11	1									17	17
K17	63	–			1												1	1
K18	64	JP					2										2	2
K19	65	GR			1												1	1
K20	66	–							1								1	1
Total			45	4	23	38	425	6	3	10	36	2	4	3	6	3	608	608

Table 5 (cont'd).

sunburst or all-seeing eye, on the right. The design is quite lightly cut on the right side and the mould surface is slightly 'streaky' and uneven. The rim is markedly oval and the mould seams do not align very well. Context 1259, the clay base to the stoke pit.

Discussion of the mould types

The 20 mould types identified from the kiln debris provide a useful sample of the styles produced by Rowe, particularly since his products were barely known from previous excavations. They offer the first opportunity to examine the range of pipes being produced by the Plymouth makers at this period and provide important parallels with which to compare the evolution and dissemination of styles at a national level.

Despite the size of the excavated sample, it seems unlikely that this represents the full range of products made by Rowe. Several of the forms are only represented by single examples and there are two or three pieces that appeared to be from different moulds but which were too small and battered to provide reliable identifications. That said, these are likely to represent the majority of the moulds used by Rowe. His production range can be divided into a number of different types.

There are four or five moulds with plain bowls (Nos 40–4), at least two of which had decorated stems. The various plain bowl forms represented may well have been related to pipes of different lengths, providing a variety of styles for Rowe's customers. Four mould types depict the Plymouth Arms, two with the arms facing the smoker with lion supporters (Nos 46–7) and two with the arms on either side of the bowl (Nos 56–8). Armorial pipes were one of the first types of mould-decorated pipe to become popular in England, with examples being produced in London from the early 18th century onwards. City, company and other arms also became popular, particularly during the late 18th and early 19th century. Other pipes bearing the Plymouth Arms are known from the town (for example, Oswald 1969, No. 54.19) so these pipes can be seen both as part of a national fashion and in terms of a local style.

One of the most unusual and interesting designs produced by Rowe is the pipe depicting two wrestlers, named on the bowl as Cann and Polkinhorn (No. 52). They were the respective county champions for Devon and Cornwall, who met using the 'Devon wresting

style'. The following summary of this style, together with details of Cann and Polkinhorn's lives, are taken from Porter's paper on the subject (Porter 1989).

The Devon style of wrestling was well established by the end of the 18th century and enjoyed particular popularity during the first three decades of the 19th. During the 1830s and 40s the sport went into a decline. There was an attempt to revive it during the 1860s and 70s but this failed. The main distinguishing feature of the Devon style was the use of a hard shoe with which the opponents could kick each other anywhere below the knee. This technique was not approved of in Cornwall, where wrestling was also popular, and led to bad feeling between the two counties. The Devon style was, however, popular amongst rich patrons, who put up prize money for matches. These generally took place during the summer months and were sufficiently numerous for families of 'professional wrestlers' to emerge. Some matches were even staged in London. The Cann family was one such group of 'professional' wrestlers in Devon, the most prominent of whom appears to have been Abraham, the 'champion of all England'.

Abraham Cann was born in about 1795 and appears to have been at his peak during the 1820s. During this decade he seems to have been the undisputed county champion. In 1824 Cann took first prize at a match witnessed at Okehampton; in 1825 he was paid to stand down during one tournament so as to give the others a chance and in 1827 an opponent refused to fight against him. The most popular events during this period were inter-county competitions and, in particular, matches between Cann and Polkinhorn, the Cornish champion. At Tamar Green, Morice Town in 1826 some 6,000–7,000 watched them fight, while around 3,500–4,000 attended a match between the two men the following year at Tavistock. Porter does not note Cann particularly during the 1830s although he presumably continued to fight, since he broke his collarbone during a match in 1841, when he would have been about 46. Cann died in 1864, by which time the Devon style of wrestling was all but dead.

Although Cann's wrestling career probably lasted 20 years or more, and he was a 'local hero' for about 40 years, it was during the 1820s that he appears to have been most famous. He fought Polkinhorn at least twice during this period, in 1826 and 1827, at matches that were attended by thousands. The commemorative pipes produced by Rowe were almost certainly produced during this period and were probably made to 'cash in' on one of these two notable matches. This not only makes them the earliest sporting pipes known from this country but also the best dating evidence for the operation of the kiln on this site, where they were the second most common design recovered.

The most common design represented amongst the kiln waste was decorated with a rose surrounded by thistles and shamrock leaves (Nos 54–5), the emblems of England, Scotland and Ireland. These emblems were commonly used on 19th-century pipes and again show how Rowe was using nationally popular themes in the range of pipes that he offered. The same is true of the Masonic design found on the site (No. 66). This depicts a chain surrounding a shield with three castles on the left side of the bowl and a sunburst within a square and compasses contained by a wreath on the right. Masonic designs were very popular from the later 18th century onwards, especially in the south of England, and they were produced in many different styles. This example, however, is almost identical in both bowl form and the arrangement of the motifs to a pipe produced by Joseph Anderson of Rochester in Kent, who is recorded working from 1828–59 (Higgins 2002, No. 49.4).

The final and most common pipe represented from the site is the fluted bowl, of which seven different designs were present (Nos 59–65). Fluted bowls were introduced towards the end of the 18th century and became one of the earliest widely-produced forms of mould-decorated pipe. Most have broad flutes, typical of the earlier designs, although it is significant that examples with narrow flutes were also clearly in production by the 1820s (Nos 63–4). The bowls exhibit a variety of different forms and the decoration sometimes includes leaf-decorated seams and/or a band of decoration above the flutes. What is

particularly interesting is that two of these fluted types have makers' marks other than Rowe on them. No. 64, represented by two examples, is clearly marked J. Pearce, Stonehouse, while No. 65, represented by a single example, has been identified from parallels at Launceston Castle as a type with the surname Hoar of Devonport on the stem but the initials GR on the heel. All three examples have been badly overfired, suggesting that they have been in the kiln. They could, of course, have been stray pieces, brought onto the site by workers and then discarded into the firemouth of the kiln. Alternatively, the moulds may have been acquired by Rowe second-hand and used without changing the names, or they may have been made for another maker who was having difficulty meeting his orders. Documentary and oral evidence from later pipe-makers has shown that there was often a surprising degree of co-operation between manufacturers who, on the face of it, would be seen as rivals. In Manchester, for example, pipe-makers lent moulds or stock to one another and there are several examples of pipe-makers who actually produced pipes for other firms, even to the extent of putting the other firm's mark or label on the pipes.

Taking out these two uncertain forms, there are still 18 types that could have been made by Rowe. Eight of these patterns actually have his name on the stem and so these were certainly produced in his workshop, while eight have insufficient stem remaining to see whether they were marked. The remaining two patterns (Nos 42 and 57/58) do not seem to have had marked stems but both are represented by multiple examples. Any given maker did not necessarily mark all of his products and so there is no good reason to think that these pipes were produced by anyone other than Rowe.

In broad terms there seems no reason to doubt that the majority of these mould types were owned and used by Rowe in his workshop. The about three-quarters of the patterns that he produced were highly decorated, fluted bowls being the most common mould type represented. Patriotic and local themes, such as the national emblems, Plymouth Arms and Devon wrestling, made up an equal number to the fluted designs, with plain bowls making up the remaining quarter. There are no other good contemporary groups of 19th-century pipes from Devon with which to compare this material although stray finds and the odd published examples make it clear that similar designs such as the rose and thistle, fluted bowls and armorial patterns were being produced by other local makers, such as Hoar.

One interesting area that this group sheds light on is the production and repair of moulds. There is clearly a stylistic similarity between many of the Rowe pipes, particularly in terms of the decoration accompanying the stem lettering. The stem seams are generally decorated with lines of leaves or arrow-like motifs, while there is invariably a spray of foliage at each end of the lettering. Similar arrangements can be seen on the Pearce pipe (No. 64) and on pipes produced by Hoar of Devonport (Higgins forthcoming, Nos 89 and 91). This strongly suggests that the same hand was responsible for decorating all these moulds and that the mould manufacturer was based in Plymouth. In this sense, it may well have been the abilities of a single mould manufacturer rather than the pipe-makers themselves that dictated the range and style of pipes produced in the town. This is shown by the distinctive use of leaf decoration on the sides of the heel or spur, a very unusual feature, but one that occurs regularly amongst this group. The Rowe pipes Nos 51, 54, 58 and 59 all have leaves on the spur, as does the Pearce pipe, No. 64. This use of spur decoration is extremely rare elsewhere and shows the development of a local style, probably as a result of the idiosyncrasy of a particular mouldmaker.

In terms of the repair of the moulds, it is significant how many of the Rowe moulds occur in three or four different forms. Although moulds are known to have been repaired or altered, this is by far the best group recovered anywhere in the country showing these changes. It suggests that the moulds were regularly refurbished, with repairs ranging from just reworking the heel or spur through changing the stem marking to completely recutting

of the entire bowl decoration. These changes were not always for the better, the recut versions of the Plymouth arms (Nos 45 and 46) and the rose, thistle and shamrock (Nos 54 and 55) being much poorer than the original. This might indicate that a less skilled mouldmaker had taken over servicing the pipe-makers, or that it was not possible to recut a design effectively once the original casting had been made.

Very little is known about the process by which moulds were decorated, and the extent to which the design was cast, or worked in the metal afterwards. One possibility is that existing moulds were sent to the foundry to be used as patterns and then the decoration on the resulting castings was re-worked to sharpen it up. The author has had Victorian moulds copied and the resulting castings are much less crisp than the originals, as with the various versions of the rose-and-thistle pipe produced by Rowe. This might suggest that Rowe sometimes had new castings made and that the differences in detail are a result of attempts to remove blemishes or clean up the copies. This scenario, however, does not account for all of the variations observed amongst Rowe's moulds and the evidence from this site is certainly that extensive reworking of existing moulds was possible and that this could be quite well executed if done properly. A good example is provided by the stem decoration on the 'Devon wrestlers' bowl, which was completely replaced with an elaborate and competent design (cf. Nos 50 and 52). Much of the decoration seems to have been punched into the mould using little dies in the form of leaves, etc, to stamp the repetitive motifs. In fact a small range of stamps appears to have been used imaginatively to create a number of different effects. The same leaf stamp, for example, seems to have been used six times in a circle to make a flower, in a pair to make leaves, and on one point to make the arrow-like motif on the stem and heel of No. 59.

The final evidence provided by the kiln group relates to the overall form and finish of the pipes. In broad terms their quality is not particularly high. The decoration is quite bold and simply executed and the trimming and finishing is of mediocre quality. This is not unusual, since early 19th-century pipes nationally tend to be less well designed and finished than those of other periods. The spurs of three rose, thistle and shamrock pipes from 1257 were repaired during manufacture by the application of a little piece of hand-modelled clay. Spurs are particularly prone to becoming detached during the moulding process and these repairs show that Rowe or his workers were not above a quick repair to save an otherwise serviceable pipe.

Although no complete pipes could be reassembled, the surviving fragments make it clear that they would all have had long stems. The overlapping decorated stems produced surviving lengths of 182mm for the wrestlers and 155mm for the rose, thistle and shamrock pipes but the taper on these examples suggests that these are still less than half-complete. Their estimated stem lengths, based on the taper of the longest surviving stems and mouthpieces, would have been in the order of 18"–19" (about 46–9cm). Several of the longer stems are gently curved (eg. Nos 52–7), and it is likely that all Rowe's designs were laid on specially-made racks to give a curved finish. All the mouthpieces had simple cut ends, and a number were coated with a glazed finish, showing that there must have been a tipping muffle on the site. The glaze is quite thin, and generally pale lemon yellow, sometimes ranging through to a caramel brown in colour. Four examples were recovered where the full extent of the tip glazing was present (Nos 67–70); between 55 and 90mm of the tip was coated. There were also six pieces of mouthpiece or stem from 1259 with a matt red coating. One of these was from near the bowl, the broken bowl end was also coated. In other centres wax or paint was sometimes used to coat mouthpieces, but the material used here could be red lead, which was used to create the glazed tips when heated in a tipping muffle. Chemical analysis would be required to determine the substance present.

The final pieces of note are two sharply-curved stems and one squashed and glazed piece. The sharply-curved stems are from coiled pipes, whose stems were looped or coiled

after being moulded (Nos 48–9). Coiled pipes were in vogue during the first half of the 19th century and fragments are occasionally found in groups of this date. Elaborate coiled earthenware pipes with a decorative glazed finish were produced by potters at this period but it is not yet clear which way the influence was going in the production of these novelty pipes. The squashed stem is particularly unusual and the only example of this date that the author has seen (No. 71). It is a fairly thick stem from near the bowl of a pipe that has been alternately squashed or pinched and then covered entirely with the pale lemon/brown glaze found on the mouthpieces. This appears to be part of a barley-twist stem, like that seen on the 17th-century fragments (Nos 33–4). Although this technique was fairly widespread during the 17th and early 18th centuries, it has not previously been noted on such a late pipe.

SUMMARY AND CONCLUSIONS

This site has produced one of the largest pipe assemblages recovered from Plymouth for many years. Despite the evidence for mid-17th-century reclamation of the area, pipes of this period were very poorly represented. The later 17th- to early 18th-century pipes, however, provided a good sample of local products, including a small but important kiln group, showing the locally produced Plymouth styles of the 1670s and 1680s. In general, the pipes of this period were of average to poor quality and unmarked. The use of burnishing had been discontinued and the rim finish was often a plain groove rather than being milled. The most common form was a sharply biconical bowl, which appears to be characteristic of Plymouth, but other forms were also being produced, including export styles. The later 17th- and early 18th-century finds primarily consisted of a distinctive West Country form that was used over large areas of the South West. The finishing techniques, however, show that subtle differences can be identified, distinguishing production in Plymouth from that of neighbouring centres, such as Launceston.

The later finds are dominated by the kiln assemblage from Rowe's workshop. This is one of the best assemblages of its date from Britain and shows the range of products being offered by this maker. Rowe does not seem to have been a particularly prominent maker and cannot even be traced in the documentary sources. He was one of a number of manufacturers working in Plymouth during the 1820s and operated for long enough for some of his moulds to be altered or repaired up to four times. He appears to have had at least 20 moulds in his workshop and presumably employed a number of journeymen to help with production. Each moulder would have been expected to produce several hundred pipes in a day and so, although this seems a large sample, it represents only a very small of fraction of the pipes produced on the site.

Rowe's pipes all had long curved stems and glazed tips. The designs are highly decorative and can be paralleled among designs produced along the south coast, from London and Kent to Devon. Although following national trends, the individual designs reflect local themes, and the production and repair of moulds appear to have been carried out in Plymouth. The importance of this group lies not only in what it reveals about early 19th-century pipe production in Britain but also in illustrating the contribution that archaeology can make to our understanding of the post-medieval period. Rowe was not previously recorded as a pipe-maker and still cannot be located in the documentary record, despite his kiln site having been found and dated. The evidence from his workshop waste not only sheds light on a little-studied period of the industry nationally but will also allow future groups of this period from the South-West to be placed in a much clearer context.

CATALOGUE (Figs 15–21)

All drawings of the pipes are at a scale of 1:1, with details of the stamped marks at 2:1. Where more than one bowl or other diagnostic fragment occurred within the same context an additional identifying letter has been added, eg. (A), to identify the individual fragment. All contexts are PDQ 01, unless otherwise specified.

Pipes from the reclamation deposit of *c.* 1645

1. Bowl, *c.* 1640–60, with a very thick and chunky stem and a stem bore of 7/64". Generally poor finish but probably fully milled originally. Context 908.

1a. Not drawn: fragment of *c.* 1620–50. Context 1045.

Group of kiln waste from context 1112, *c.* 1660–80

2. Bowl, *c.* 1660–80, stem bore 7/64". Rim bottered and unmilled, mould type 1.
3. Bowl, *c.* 1660–80, stem bore 7/64". Rim bottered and fully milled, mould type 1.
4. Bowl, *c.* 1660–80, stem bore 6/64". Rim bottered and has a plain groove all around, mould type 2.
5. Bowl, *c.* 1660–80, stem bore 8/64". Rim bottered and fully milled, mould type 3.
6. Bowl, *c.* 1660–90, stem bore 7/64". Rim bottered and unmilled, mould type 3.
7. Bowl, *c.* 1660–90, stem bore 7/64". Rim bottered and has a plain groove around the surviving portion, mould type 4.
8. Bowl, *c.* 1660–90, stem bore 8/64". Rim bottered and half milled, mould type 5.
9. Bowl, *c.* 1670–90, stem bore 7/64". Rim bottered and has a plain groove around three-quarters of its circumference, mould type 6.
10. Export-style bowl, *c.* 1670–90, with a token heel and stem bore 7/64", mould type 7.

Material probably related to kiln waste in context 1112

11. Bowl, *c.* 1660–90, stem bore 8/64". Rim bottered and fully milled. Context 1113.
12. Bowl, *c.* 1660–90, stem bore 8/64". Rim bottered and has a plain groove all around possibly mould type 3. Context 1111.
13. Bowl, *c.* 1660–90, stem bore 7/64". Rim bottered and three-quarters milled, a variant of mould type 4. Context 1111.
14. Bowl, *c.* 1670–90, stem bore 8/64". Rim bottered and fully milled. Context 1111.

Other late 17th- and early 18th-century pipes

15. Bowl, *c.* 1660–90, stem bore 6/64". Rim is internally trimmed and bottered and has a plain groove all around. Unusual form with a rather Dutch feel to it, but probably of local manufacture. Context 574.
16. Bowl, *c.* 1680–1710, stem bore 8/64". Rim bottered and has a plain groove around three-quarters of it. Context 588.
17. Bowl, *c.* 1680–1720. Rim bottered and fully milled. Typical local form with neatly finished rim. Stem slightly squashed so stem bore distorted and unmeasureable. Context 717.
18. Bowl, *c.* 1680–1720, stem bore 7/64". Rim bottered and three-quarters milled. Context 1178.
19. Bowl, *c.* 1680–1720, stem bore 7/64". Rim bottered and fully milled. Context 1110.
20. Bowl, *c.* 1680–1720, stem bore 7/64". Rim bottered and three-quarters milled. Context 1008.

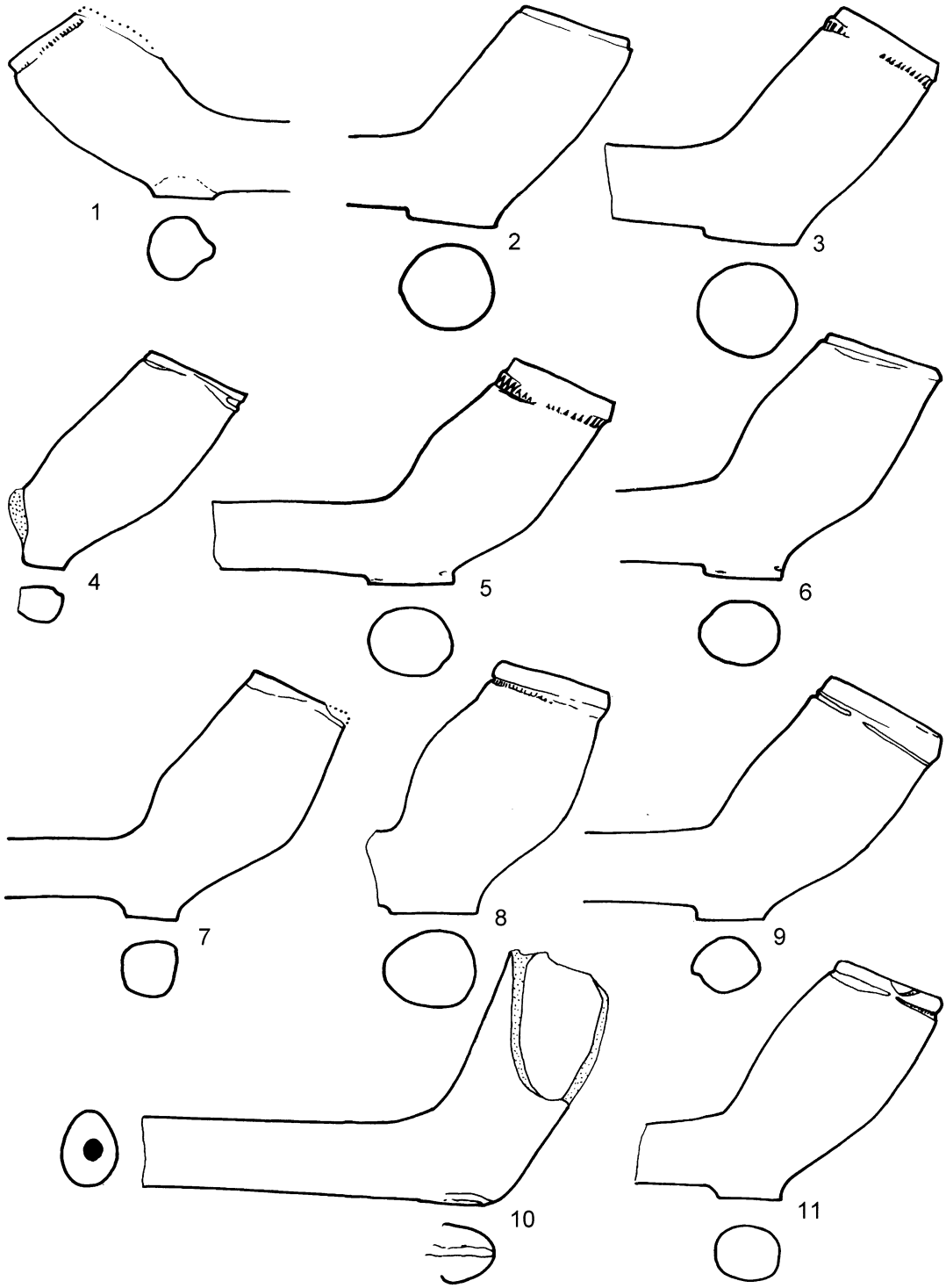


Fig. 15. Dung Quay clay pipes: bowl from reclamation deposit (1); kiln waste of *c.* 1660–80 (2–10); related bowl (11). Scale 1:1.

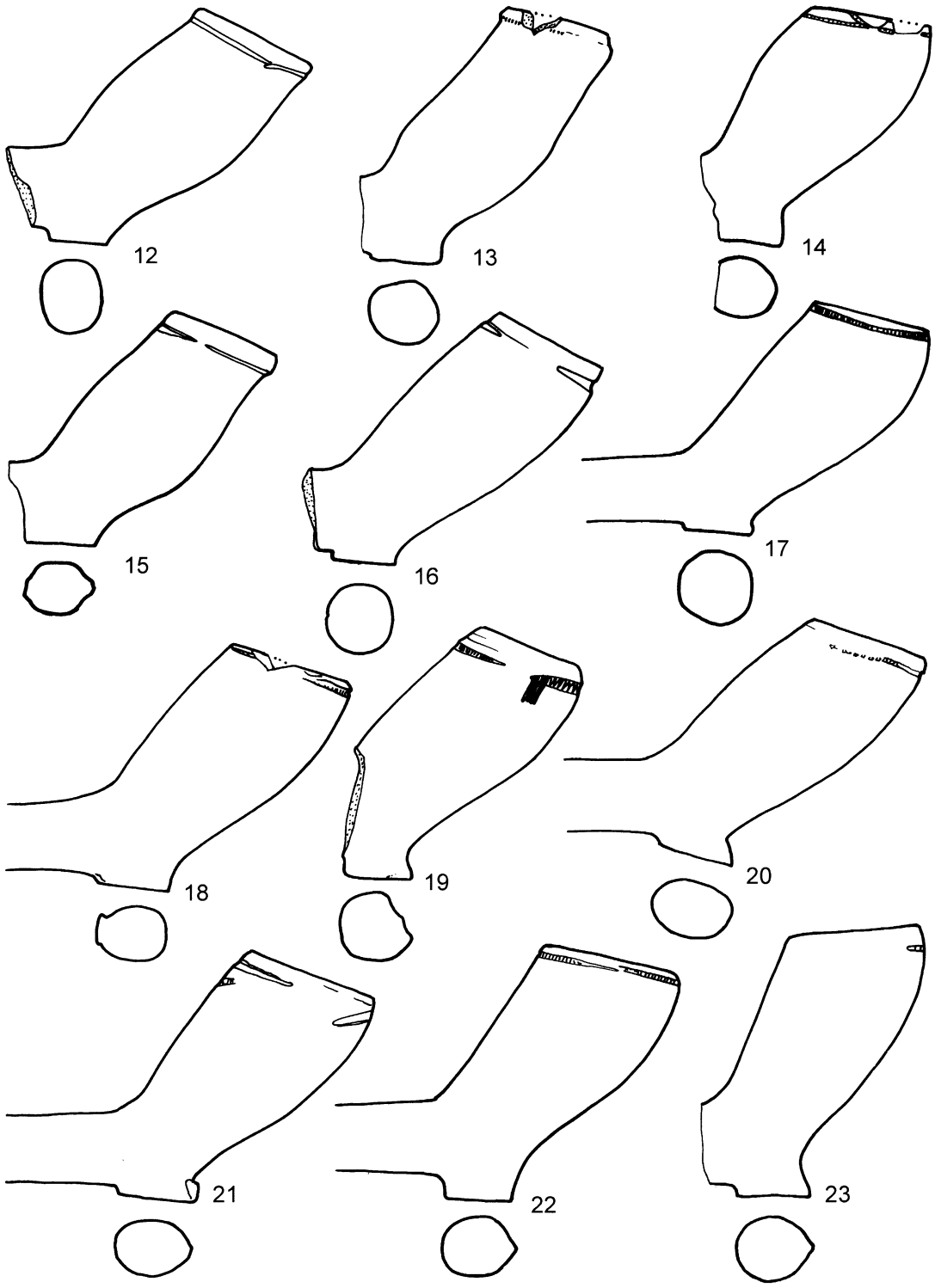


Fig. 16. Dung Quay: late 17th- and early 18th-century clay pipes. Scale 1:1.

20. Bowl, *c.* 1690–1720, stem bore 6/64". Rim internally trimmed and bottered. Odd rim finish with a plain groove around three-quarters of it but also two very small and poorly placed sections of milling, making up only about one-quarter of the rim between them. Context 588.
21. Bowl, *c.* 1690–1730, stem bore 7/64". Rim internally trimmed, possibly bottered and fully milled. Unusual rim finish – internally trimmed but rather a sharp, square rim as if just cut. However, it has a slightly rounded profile and may have been lightly bottered. Likewise, the rim is milled on one side but this same line turns into a plain groove on the other. Context 1192.
22. Bowl, *c.* 1690–1730, stem bore 7/64". Rim bottered and one-quarter milled. Unstratified.
23. Bowl, *c.* 1690–1730, stem bore 7/64". Rim bottered and milled. Joining fragments, freshly broken. Context 1058.
24. Bowl, *c.* 1660–1700, stem bore 8/64". Large, chunky heel, deeply stamped with a crude star mark with six arms. Another example of this mark has been recovered from Berry Pomeroy Castle (Higgins 1998, Fig. 72.17). Context 944.
25. Joining heel fragment and stem, *c.* 1690–1730, stem bore 7/64".
This pipe is made from a good, hard-fired white fabric and it is of much better form and finish than the majority of other pipes from this site. The very edge of a relief-moulded cartouche mark survives on the right-hand side of the bowl. Likely to be an import from Bristol. Context 922.
26. Heel fragment, *c.* 1690–1730, stem bore unmeasureable, from a local transitional-style pipe with a relief-moulded line and dots on each side of the heel. Context 1058.
27. Bowl and two joining stems, *c.* 1690–1730, stem bore 8/64". Rim bottered and has a plain groove all around. Context 1058.
28. Spur bowl, *c.* 1700–40 with 53mm of stem surviving and a stem bore of 5/64". Rim is cut and unmilled. Much thinner stem and smaller bore than associated heel forms A and B from the same context. Context 1192; another in context 1310.
29. Spur bowl, *c.* 1690–1730, stem bore 6/64". Rim is cut and possibly wiped and was almost certainly unmilled. Context 1178.
30. Bowl, *c.* 1700–60, stem bore 4/64". Rim is cut and unmilled. London style bowl form but with an unusually shaped and angled heel. Context 1192.
31. Stem fragment, *c.* 1660–1720, stem bore 7/64". The stem is of fairly basic manufacture with two decorative borders. Although dated to *c.* 1660–1720, this piece is most likely to date from the late 17th century. Context 588.
33–4. Two almost-identical stem fragments, not joining but almost certainly from the same pipe, *c.* 1690–1740, stem bore 6/64". Both are pinched to give a barley-sugar twist effect, flanked by a decorative stamped border. Context 1046.
35. Stem fragment, *c.* 1640–1700 with stem bore of 8/64". Thick, roughly made piece that would have been considered local were it not for the lozenge-shaped stem stamp containing four fleur-de-lys, which is almost certainly Dutch. Context 1247.
36. Mouthpiece, *c.* 1660–1730, stem bore 7/64". It is roughly finished and has an extraordinarily deep, oval section, particularly at its tip. Context 1209.

Nineteenth-century pipes (Figs 17–21)

37–39. Three bowl fragments from contexts 836 and 837, the fills of a cellar (context 838). The first two pieces (Nos 37 and 38) are of general 19th-century types. No. 38 is a fluted bowl of *c.* 1810–50 whose bands of decoration above the flutes are so crude

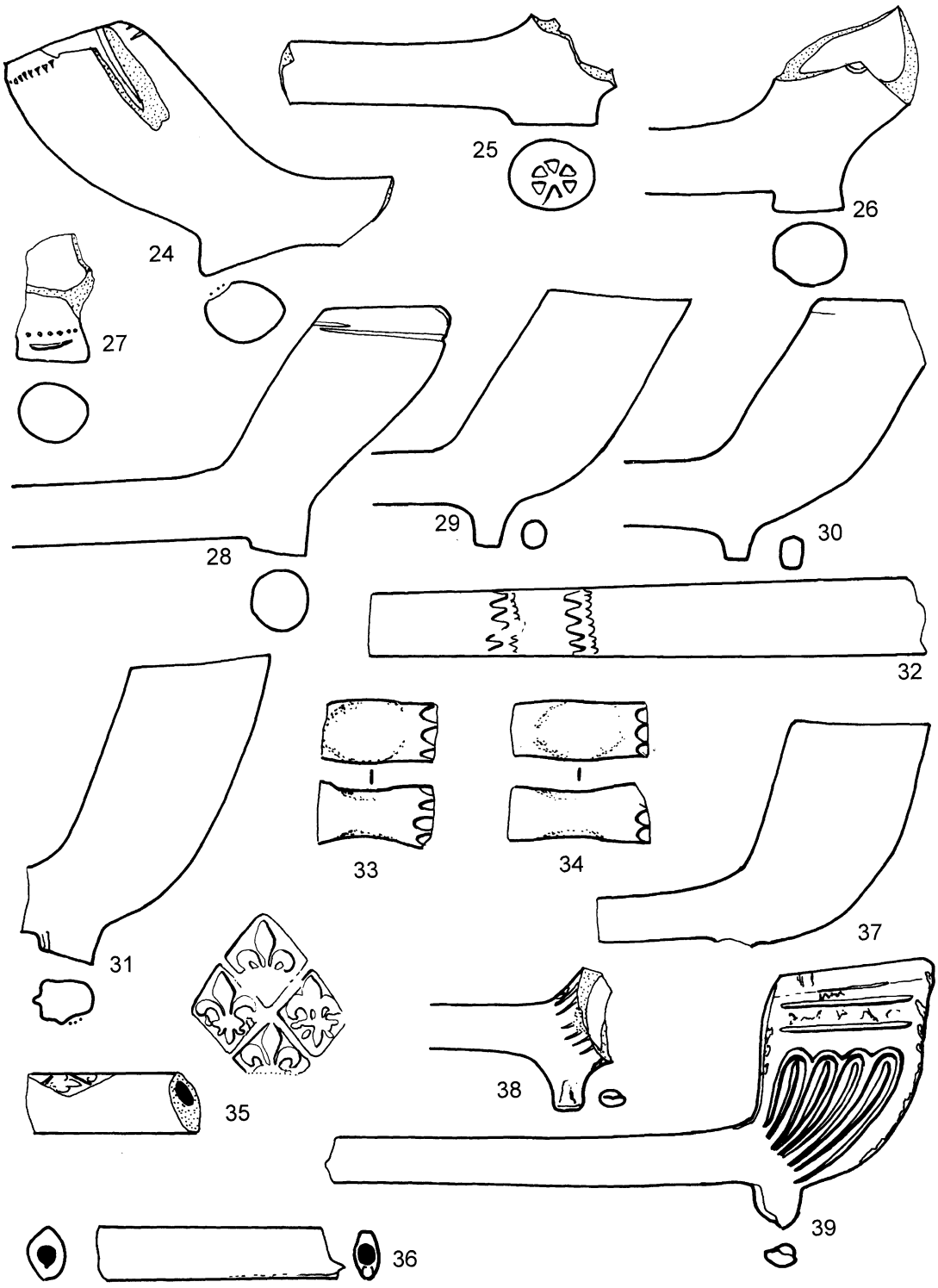


Fig. 17. Dung Quay: clay pipes. Scale 1:1.

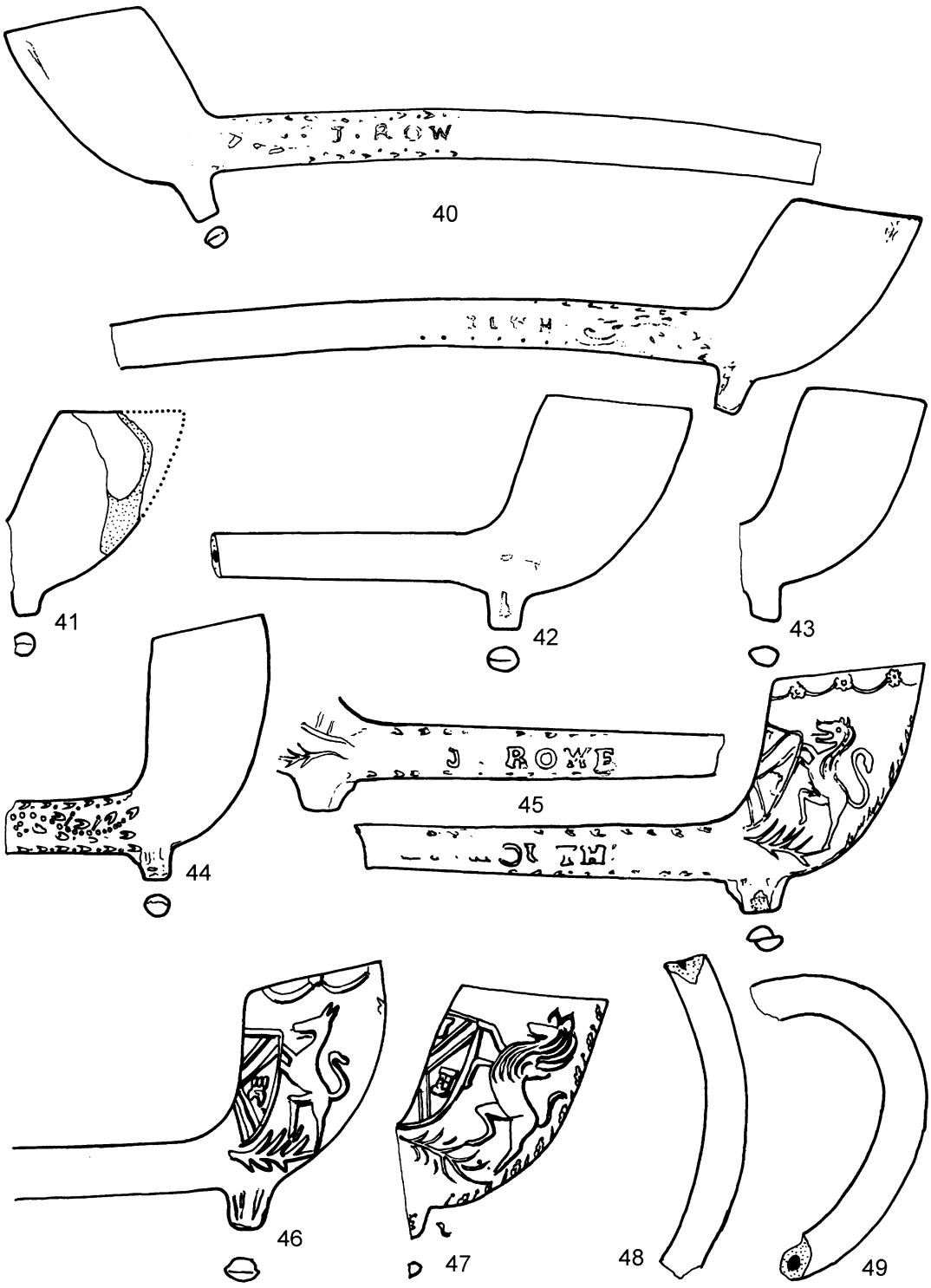


Fig. 18. Dung Quay: clay pipes from J. Rowe's kiln, *c.* 1820–30. Scale 1:1.

and poorly formed that their intended design is unclear. No. 39 is much more neatly executed but very fragmentary. The spur has clear mould flaws of streaks and dots. It is hard to date such a fragment, but it probably dates from *c.* 1820–50; it probably provides the best date for the group as a whole.

40–71. Pipes, *c.* 1820–30, recovered from contexts containing debris from the pipe kiln operated by J. Rowe. A detailed description and discussion of these pieces is provided in the text above.

72. Bowl fragment, *c.* 1780–1820, with the initials ID moulded on the spur. The initial I is unusual in that it has been moulded upright on the spur, the base of which has been trimmed. The bowl has part of the Prince of Wales feathers, a popular design in southern England during the late 18th and 19th centuries. Two examples from the same mould have been found at Launceston Castle, one of which bears a Masonic stem stamp (Higgins forthcoming). An identical stamp has previously been found at Plymouth, so this distinctive design was almost certainly made in the town by an as yet unidentified maker.

73. Bowl fragment, *c.* 1800–30, with a star on each side of the heel. This pipe would have had a ship on the left-hand side of the bowl and Britannia on the right, with leaf decorated seams. A complete bowl drawing has been prepared from two examples made in the same mould found at Launceston Castle (Higgins forthcoming). This example shows that the stem was decorated with leaves and dots, although the design is very blurred in this example. A similar, perhaps identical, pipe has been recorded from Woolster Street in Plymouth (Preston 1986, No. 14) so this is almost certainly a local product, if not from the J. Rowe kiln itself. Stem bore 4/64". Context 1250.

74. Bowl fragment, *c.* 1810–50, from a long-stemmed pipe with the bowl decorated as a man's head, most likely a Turk's head. Bowls of this type were widely produced in southern England during the first half of the 19th century, generally with quite stylised and crudely executed decoration depicting a bearded head wearing a turban. Spur missing, stem bore 5/64". Context 1252.

75. Bowl, *c.* 1860–1930, the rim of which is cut. This is a very unusual pipe, modelled in the form of a Turk's or Arab's head with headdress and 'flaps' on each side of the face. The pipe had a socket for a detachable stem in another material and is made of a very pale terracotta-type clay. The whole exterior has been painted with a glossy orange/red paint. The pipe was made in a two-piece mould and the modelling and finish are quite good. Almost certainly a Mediterranean product, probably from the south of France or Italy. This is an unusual and interesting import to Plymouth. Context 644.

76. Bowl, *c.* 1810–50, with a relief-moulded dot on each side of the spur and quite crudely executed swags and flutes on either side of the bowl. Fluted bowls were popular during the 19th century, but they are less often found with swags above. Other examples with swags but from different moulds are known from Plymouth (Oswald 1979, Nos. 49.41 and 49.45), so this may well have been a common local type. This example has an unusually small stem bore of 3/64". Unstratified.

77. Plain bowl, *c.* 1820–80, stem bore 4/64". Context 1252.

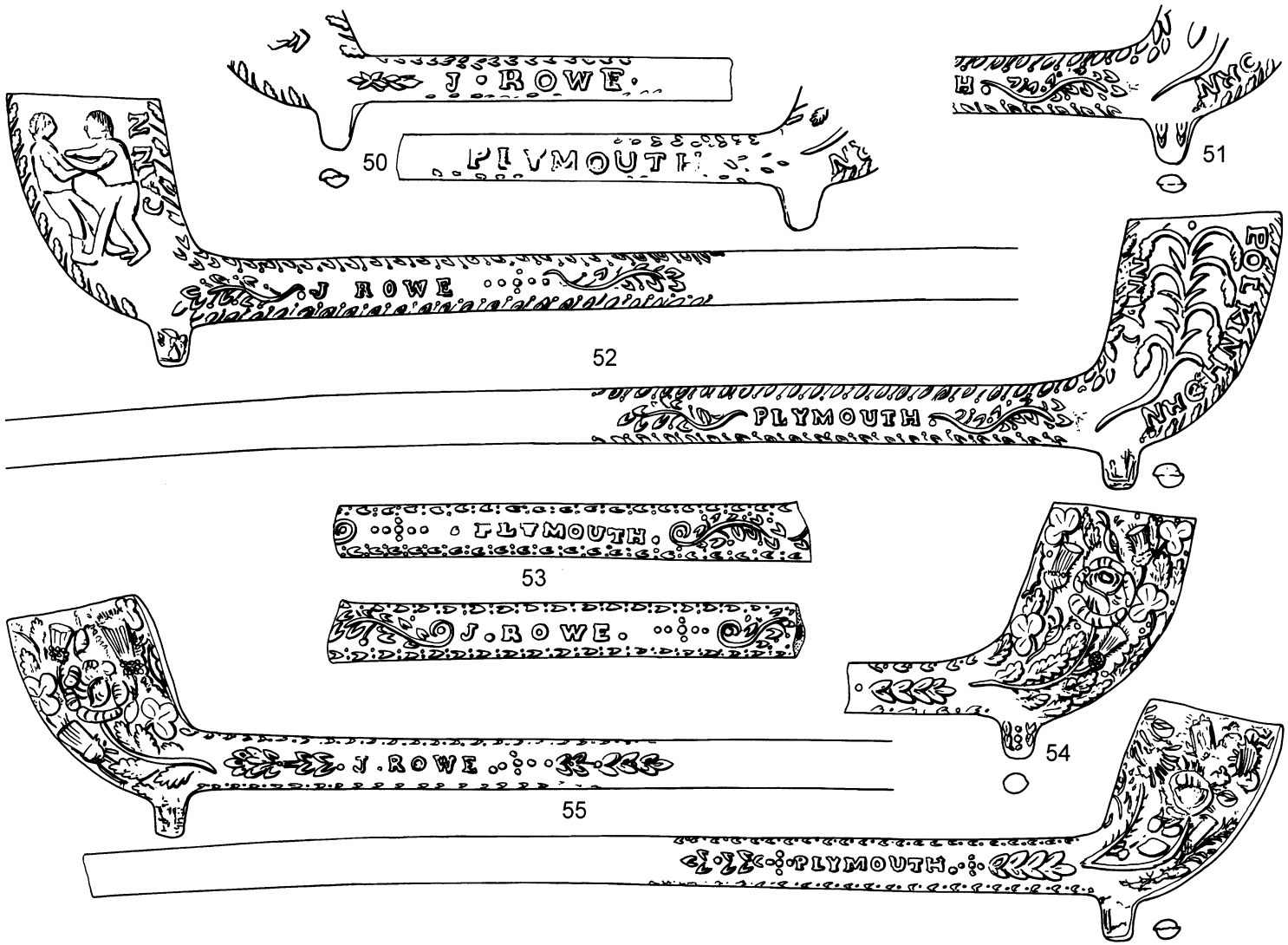


Fig. 19. Dung Quay: clay pipes from J. Rowe's kiln, *c.* 1820–30. Scale 1:1.

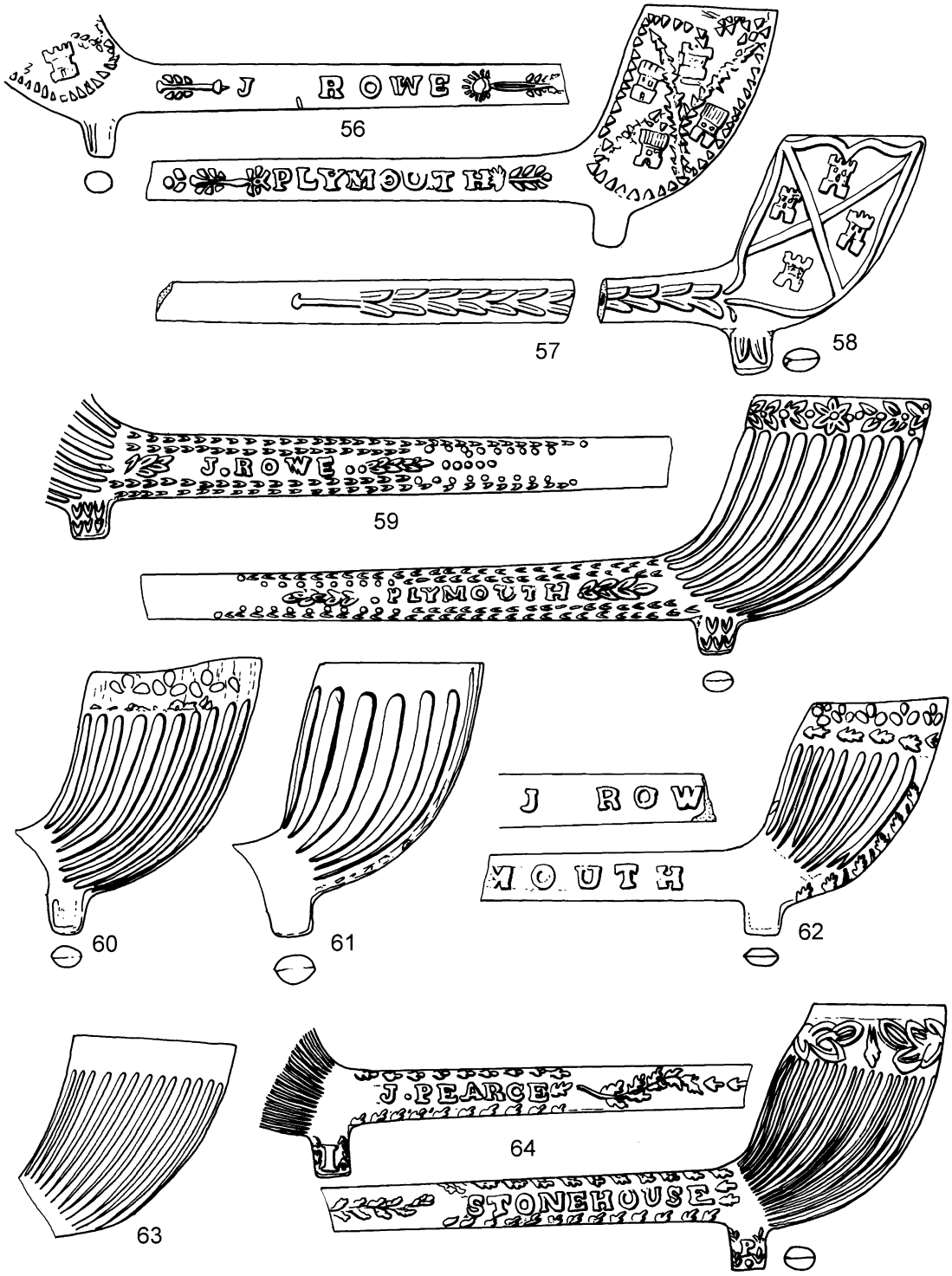


Fig. 20. Dung Quay: clay pipes from J. Rowe's kiln, *c.* 1820–30. Scale 1:1.

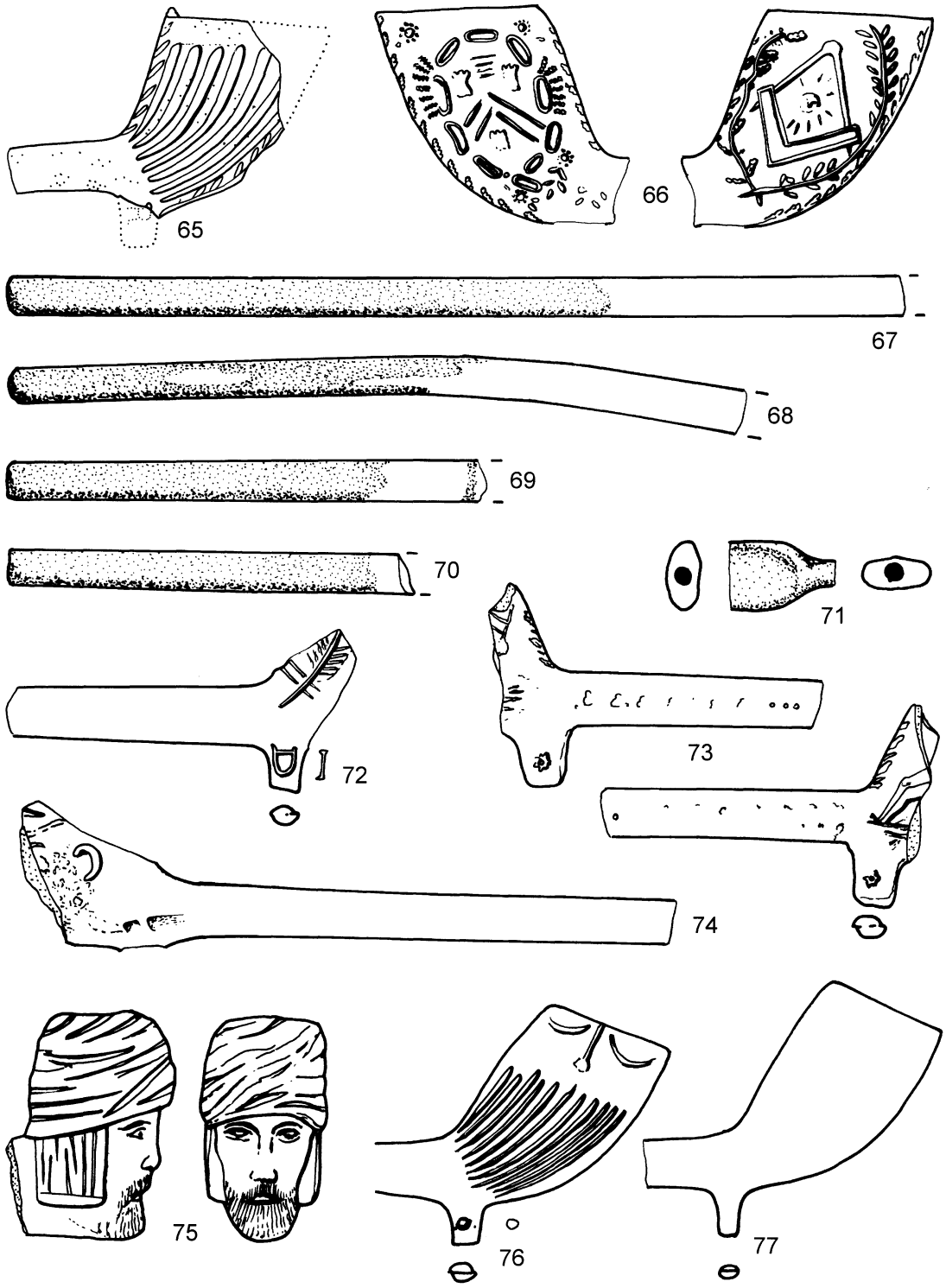


Fig. 21. Dung Quay: clay pipes from J. Rowe's kiln (65–71) and other pipes. Scale 1:1.

ADDENDUM: PLYMOUTH PIPE-MAKERS

This Addendum presents a revised list of Plymouth pipe-makers, replacing those of Oswald (1969, 1975). It includes pipe-makers from the five main historic districts of Plymouth – Morice Town, Stoke Damerel, Devonport, Stonehouse and Plymouth. The boundaries between these various areas were sometimes poorly defined, so what is probably the same address may appear under different headings. Oswald's list of 1969 drew principally on trade directories and included some road names and house numbers. His list of 1975 included more names, but omitted all street and house details. All relevant details from these two sources have been extracted as a starting point for this new listing.

In compiling this list, trade directories for 1814, 1823, 1830, 1836, and 1847 have been searched, but not all such sources have been checked systematically for the names and property details they contain. In addition, details of all pipe-makers listed on a CD-Rom of the 1851 Census Returns have been extracted and the principal makers' names have been checked against an internet version of the 1881 Census. Information that has not been checked is referenced to the 1969 or 1975 list from which it has been taken; all other entries are referenced to the source material from which they have been extracted. Unless otherwise stated, all references are to individuals described as pipe-maker (PM) or tobacco pipe maker (TPM). The Hoar family seems also to have traded as tobacconists and grocers, and so a few additional references to them in these trades have been included. Many other sources remain to be searched, but it is hoped that this list will provide a good starting point for future work. The following list gives the pipemakers initials, name, the date or dates for each reference and finally the information and source relating to them. The list is arranged by initial, then by date and only finally by name since it is usually only the first two categories of information that can be determined from a marked pipe. Regrettably, limitations of space preclude presentation of all the family details of makers recorded in the census; a full listing is deposited with the site archive.

Table 6. Pipemakers in Plymouth.

FA	Fanny Allen	1851	See William Allen below.
IA	James Allen	1851	See William Allen below.
IA	Jessey Tree Allen	1851	See William Allen below.
IA	John Ashweek	1851	PM, Morley Place, Plymouth. Age 16, b. Plymouth, living with family at home including father, William, a tailor (Census).
TA	T. Allyn	1717	Apprenticed to J. Ball of Cornwood for £5 (Oswald 1969 140; *idem* 1975, 166).
WA	William Allen	1851	Rowe Court, East Stonehouse, cf. Jane Jeffery below. Head of family, four of whom were listed as TPMs: William, 44, b. St Peter's, Bristol; wife Fanny, 35, b. Exeter; son James, 16, b. St Peter's, Bristol; daughter Jessey Tree, 14, b. Exeter; the youngest daughter b. Bristol. Two other children (Census).
IB	Joseph Ball (1)	1717	See T. Allyn above.
IB	Joseph Ball (2)	1739–50	'The younger' in an indenture of 1739; 'deceased' 1750 (Oswald 1969, 140).

IC	J. Carey	1782	In discussing the history of the porcelain works in Plymouth, Jewitt follows the owners of the site through the Rate Books. At the end of their life as a porcelain works he records that 'in the following year [1782] the premises are stated to have been occupied by a pipe-maker named J. Carey' (Jewitt 1883, 212).
IC	Jane Chambers	1851	PM, 6 Brownlow Place, East Stonehouse. Age 25, b. East Stonehouse. Husband, John, 31, b. Topsham, a Royal Marine. One daughter (Census).
IC	Jane Codner	1851	PM, 2 Morley Lane, Plymouth. Age 27, b. Plymouth. Husband, Thomas Codner, a sawyer. One son (Census).
WC	William Callard	1851	TPM, 5 Brownlow Street, East Stonehouse, cf. Ann Waickham. Age 33, b. Morice Town. Wife, Mary, 28, b. Plymouth. Two daughters (Census).
		1857–66	10 Brownlow Street, Stonehouse (Billing's & Kelly's Directories; Oswald 1969, 140).
HD	Henry Dowty	1851	PM, lodging at 7 Hobart Cottage, East Stonehouse. Age 27, b. St Johns, Worcester, unmarried (Census).
BE	Ben Evans	*c.* 1700	Pipe mark (Oswald 1975, 166).
ME	Matthew Easterbrook	1851	PM Journeyman, 7 George Street Back, Stoke Damerel. Age 41, b. Stonehouse. Wife, Caroline, 41, b. Devonport (no occupation given). One son and two married visitors (Census).
IF	John Furse	1712	Richard Stone, son of Elizabeth of Plymouth, apprenticed to John Furse of Plymouth, PM (Dorset Record Office, Corscombe Parish: PE/COR/ OV 5/1/4).
LG	Levi Griffiths	1784	Plymouth Dock (Taparell's Directory; Oswald 1969, 140).
MG	Mary Gee	1851	TPM, 7 Pembroke Street, Stoke Damerel. Age 31, b. Devonport. Husband, William, 34. Three children (Census).
MG	Mary Gray	1851	PM, 15 Canterbury Street, Stoke Damerel. Age 60, b. Devonport, widow. Living with married daughter (18, Dressmaker) and lodger (20, Vestmaker) (Census).
AH	Ann Neal Hoar	1823	Tobacconist and PM, Pembroke Street, Plymouth-Dock (*The Tourist's Companion*, 206).
		1824	100 Pembroke Street, Dock, referred to as a manufacturer (Pigot & Co. Directory; Oswald 1969, 140).
AH	Alice Hodgith	1851	TPM, Lane Court, East Stonehouse. Age 56, b. St Kevern, Cornwall, widow living with granddaughter, age 8 (Census).
EH	Elizabeth Hoare	1847	Listed as a tobacco manufacturer at 36 Ker Street, Devonport (*Williams's Commercial Directory*, 37).
		1850	Directory, Devonport (Oswald 1975, 166).
EH	E. Hoar	1856–57	94 Pembroke Street (Billing's & Kelly's Directories; Oswald 1969, 140).

		1862	Listed in *Elvins Directory* as a tobacconist (Oswald 1969, 140).
IH	John Hoar (I & II)	1784	Plymouth Dock, tobacconist (Taparell's Directory; Oswald 1969, 140).
		1812	Pembroke Street, tobacconist (*The Picture of Plymouth*; Oswald 1969, 140).
		1814	'Hoar, J., Grocer and PM, Pembroke Street, Plymouth-Dock' (*The Plymouth, Plymouth-Dock and Stonehouse General Directory*, 57).
		1814	'Hoar, John, Junr, Tobacconist, King Street, Plymouth-Dock' (*ibid.*, 57).
		1830	Tobacconist and PM, 98 Pembroke Street (Brindley's Directory; Oswald 1969, 140).
		1847	Tobacconist, 94 Pembroke Street, Devonport (*Williams's Commercial Directory*, 37).
		1847	Tobacconist, 45 King Street, Devonport (*ibid.*, 37).
IH	James Hodgetts	1847	16 George Street, Stonehouse (*ibid.*, 242).
		1850–1912	Stonehouse (White's Directory), 11 Market Street (Billing's & Kelly's Directories; Oswald 1969, 140).
		1881	PM, 13 Market Street, East Stonehouse. Age 64, b. Devonport. Wife, Elizabeth, 64 (Census).
IH	Joseph Hayman	1851	TPM, 8 Bath Street, Plymouth. Age 54, b. Portsmouth. Wife, Elizabeth, 55, b. Devonport (no occupation given) (Census).
TH	Thomas Hughes	1847	Brownlow Street, Stonehouse (*Williams's Commercial Directory*, 242).
AI	Ann Jenkins	1851	See entry for John Jenkins below.
EI	Elizabeth Jeffery	1851	PM, Fore Street, East Stonehouse. Age 39, b. Stoke Damerel, unmarried and living alone (Census).
II	Jane Jeffery	1851	TPM, Rowe Court, East Stonehouse, cf. Allen family above. Age 31, b. Morice Town, widow, head of household. Two children and visitor, a labourer (Census).
II	John Jenkins	1851	Head of family, George Street, East Stonehouse, three of whom were described as TPM: John, 48, b. Devonport; wife Ann, 37, b. Exeter; daughter, Mary Jane, 17, b. Exeter. Six other children (Census).
MI	Mary Jane Jenkins	1851	See entry for John Jenkins above.
RI	Robert Jordan	1866	Directory, previously at Exeter 1848–57 (Oswald 1975, 166).
WK	William H. Kingdon	1851	TPM, 10 Sutton Road, Plymouth. Age 35, b. Devonport, head of family. Wife, Ann, 44, b. Sool (*sic*), Cornwall (no occupation given). Three children, also a widow, age 92. (Census).
GL	George Lawrence	1851	PM, 3 Pembroke Lane, Stoke Damerel. Age 19, b. London. Living with Whinmouth family, none a TPM (Census).
MM	Mary McCoy	1851	TPM, 3 Pembroke Street, Stoke Damerel. Age 30, b. Plymouth. Husband, William, 32, (waterman), from Ireland. Four children (Census).
AN	Mrs A. Newman	1893	27 Brownlow Street (Kelly's Directory; Oswald 1969,

			142). Presumably the Alice Newman in the 1881 Census (see entry for John Newman below).
IN	John Newman	1873–83	J. Newman, 10 Brownlow Street, Stonehouse (Kelly's Directories; Oswald 1969, 142).
		1881	TPM, 27 Brownlow Street, East Stonehouse. Age 63, b. Tiverton, head of household. Wife, Alice, 61, b. Plymouth, later recorded as PM (see above).
WO	W. Oates	*c.* 1860–1910	Incuse stem mark in Plymouth Museum reading 'W. OATES / PLYMOUTH'.
IP	James Pearce	1823	George Street, Stonehouse (*The Tourist's Companion*, 132).
		1824	85 George Street, Stonehouse (Pigot & Co Directory; Oswald 1969, 142).
IP	John Penron	1851	TPM 1 Pipe Lane, Stoke Damerel cf. William Spencer. Age 31, b. Truro, Cornwall. Wife, 33, fish seller from Portsmouth. Five children (Census).
IR	J. Rowe		*c.* 1820s Kiln and pipes marked 'J. ROWE/ PLYMOUTH'. See report above.
WS	William Spence	1851	Master PM, 16 Morley Lane, Plymouth, employing 2 men and 5 women. Age 25, b. Combe Martin. Wife, Lavinia, 24, b. Devonport, (no occupation given) (Census).
		1881	General dealer, 9 Summerland Street, Plymouth St Andrew. Age 55, b. Combe Martin. Wife, Susan, 52, b. Penzance. Two children (Census).
WS	William Spencer	1851	TPM, 2 Pipe Lane, Stoke Damerel, cf. John Penron. Age 54, b. Devonport. Wife Ann, 53, also from Devonport (no occupation given). One son (Census).
RS	Richard Stone	1712	Richard Stone, son of Elizabeth of Plymouth, apprenticed to John Furse of Plymouth, PM (Dorset Record Office, Corscombe Parish: PE/COR/OV 5/1/4).
AW	Ann Waickham	1851	TPM, 5 Brownlow Street, East Stonehouse, cf. William Callard. Age 53, b. North Roborough, widow, living with granddaughter (Census).
AW	Andrew Wakeham (I)	1851	TPM, 23 Monument Street, Stoke Damerel. Age 58, b. Kingsbridge. Married but wife not listed. Living with unmarried son Andrew, 20, b. Stonehouse, also a TPM (Census).
AW	Andrew Wakeham (II)	1851	See Andrew Wakeham (I) above.
BW	Betsy Wakeham	1851	'Pauper Pipe Maker', East Stonehouse Workhouse. Age 58, b. at sea, married (Census).
EW	Mrs E. Weeks	1902	27 Brownlow Street, Stonehouse (Kelly's Directory; Oswald 1969, 142).
IW	John Weaver	1851	TPM, 6 Market Lane, East Stonehouse. Age 20, b. East Stonehouse, unmarried, living with his family. Father, John, 50, labourer, b. Tinchenell, Somerset; mother, Sarah, from Modbury (no occupation given). Two sisters (Census).
MW	Mary Whitelock	1851	PM, 9 Market Lane, East Stonehouse. Age 48, b. East Stonehouse, widow. Living with three of her children, and her daughter-in-law and her two children (Census).

ACKNOWLEDGEMENTS

The author is particularly grateful to John Allan of Exeter City Museums for identifying Cann and Polkinhorn, and for drawing attention to Dr Porter's paper on Devon wrestling; to Tony Collings of Exeter Archaeology for his help in extracting details of Devon pipe-makers from the 1851 Census, and to Dr Susie White for her help with drawing, inking and setting the pipe illustrations for this paper.

APPENDIX 3: THE CLAY TOBACCO PIPE KILN AT DUNG QUAY

By Allan Peacey

Clay tobacco pipe kiln and associated material

The remains of an early 19th-century tobacco pipe kiln (1284) survived within the footprint of No. 132 Vauxhall Street. The assemblage includes elements of structure, furniture and waste from a kiln of the developed muffle type (Peacey 1996, 33). Although small, this assemblage contains clearly diagnostic material from which a clear picture of the kiln type can be drawn. It is valuable in adding to the growing corpus of 19th-century kiln material which underlines the consistency of practice throughout the British Isles that had evolved by the dawn of the 19th century. In plan this kiln is entirely consistent with the previously-published series (Peacey 1996, 96–111), consisting of a narrow ash pit penetrating the kiln sub-structure from, and at the same level as, a rectangular stoking pit. The material comes from contexts 1255–9 and 1283, which form a continuous stratigraphic sequence within the stoking area of the kiln.

Contemporary descriptions (*ibid.,* 142–8) elucidate those parts that, although rarely surviving *in situ,* are often represented in the material assemblage. Above the ash pit and separated from it by firebars were the firebox and muffle supports. Above this was the muffle, surrounded by flues passing upwards to the chimney. The muffle is the only part of the structure made from materials specific to the trade of pipe-making, all other parts being constructed from standard building materials. The muffle was constructed from coarse pipe clay, often grogged, tempered with organic filler, and at this period invariably reinforced with pre-fired pipe stems. The muffle, a cylindrical vessel, was constructed *in situ* within the cylindrical interior of the kiln. Projecting from the outside of the muffle, constructed from the same material and all of a piece with it, was a series of radial vanes or buttresses dividing the space between muffle and outer brickwork into a series of vertical flues (Fig. 22.1).

The Dung Quay assemblage includes materials from all these elements. Brick fragments recovered including both common red bricks and firebricks, which would have been used in the construction of the firebox and superstructure. Seven muffle fragments recovered include parts of the internal projecting peripheral shelves (Fig. 22.1) which, in conjunction with items of kiln furniture, provided a means of both supporting and separating the pipes throughout the duration of the firing (Peacey 1996, 170).

Four pieces of kiln furniture were recovered: a complete type 4 prop (Fig. 22.2); the base of a second prop of either type 4 or 5; a fragment of bat or tile 30mm thick with embedded pipe stems; and a fragment from a vessel, possibly a saggar (Fig. 22.3). Kiln furniture was prefabricated and reusable. It was used in conjunction with supplements which were discarded after each firing: unfired clay wadding used between objects to bed them securely together and avoid movement and possible collapse of the charge. For additional information on the variety and function of furniture supplements see *ibid.,* 64–81 and 170.

Furniture supplements recovered from this site include two fragments of thin sheet material made by spreading white clay slip onto a sheet of paper. When this dried to a soft leather-hard state it was draped over layers of pipes, taking up the exact form of the stack

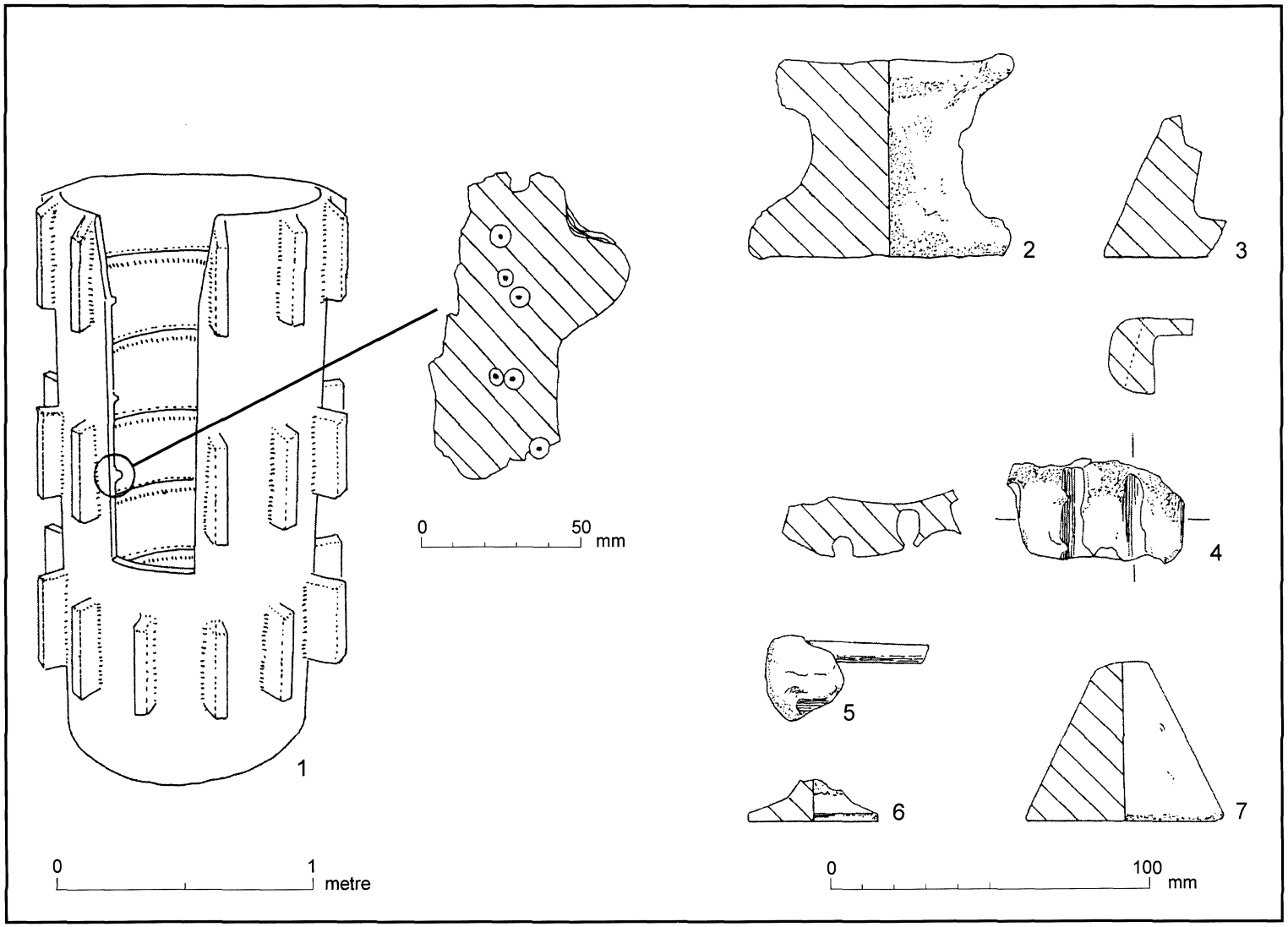


Fig. 22. Dung Quay: Pipe kiln waste. 1. Section through muffle wall fragment showing relationship to a developed muffle. 2. Type 4 prop. 3. Base edge fragment from a vessel, probably a saggar. 4. Applied strip. 5. Two-stem rack end. 6. Base of pipe clay object. 7. Conical object. Scale 1:2.

so that in the early stages of the firing it dried to form a firm grip, keeping everything in place as the firing progressed. Ultimately the thin sheet, which became irreversibly altered in the course of the firing, was broken up and discarded as the unpacking of the kiln took place. Also recovered was a single applied strip fragment bearing the impressions of pipe stems on one face and the cast of a prop or bun edge on the other and a two-stem rack end (Fig. 22, 4–5). The purpose of this last object is not yet known. That racks did fulfil some important and recognised purpose is beyond dispute. Examples have been recovered from Aylesbury, Belfast, Boston, Dublin, Gloucester, Ipswich, Limerick, Lincoln, Newark, Rainford, St Albans and Warwick.

Context 1306 represents a spread of levelling material in the vicinity of the kiln but without any demonstrable stratigraphic link to it. Part of a hand-made pipe clay object was recovered from this context. It is of a form similar to a wine glass base with a break similar in size and shape to that of a wine glass stem (Fig. 22.6). It is hand-formed with a knife-trimmed edge. The material suggests a link to the kiln and it is well known that pipemakers occasionally produced one-off hand-made objects to suit various needs. The material in association is all of 19th-century date. It is therefore likely that this object was a product of the pipe kiln discussed above.

Context 837 is the fill of a 19th-century cellar not associated with the kiln. A conical object in a light-coloured clay, but not pipe clay, was recovered from this context (Fig. 22.7). It has a base diameter of 65mm and a height of 50mm. It was formed by filling a conical mould and scraping off surplus clay from the base, leaving distinctive drag marks. In the past similar objects have been catalogued as kiln supports; however their wide distribution away from pottery- or brick-making sites argues against this. This writer has records of well over twenty similar objects (some hemispherical) in red clay from a number of sites in Gloucestershire and has noted an example in a similar light-coloured clay in the museum at St Ives, Cornwall. Although their exact purpose is not known they are clearly intended to sit on the scraped base and would serve equally in groups of three or more to support hot cooking pots on a table or other objects away from a damp floor. Details of similar objects would be welcomed.

APPENDIX 4: THE DUNG QUAY LEATHER

By Diana E. Friendship-Taylor

The assemblage of medieval leather from Dung Quay is one of two major finds of this sort recovered from excavations in Plymouth in recent years, the other being that from Plymouth Parade (1997). These are much the finest assemblages ever recovered from the town. Such collections are rare in a regional context: the only comparable collection from excavations of medieval sites in Devon and Cornwall is that from the Guildhall excavations in Exeter in the 1970s (Friendship-Taylor 1984).

With one exception, all the assemblage was recovered in a 1.7m deep stanchion pit, excavated into the medieval foreshore deposits (p. 33). This was dug by hand to a depth of 1.4m, the maximum depth at which hand-excavation could safely proceed; thus the uppermost foreshore deposits (1162, 1163 and part-1164) were excavated stratigraphically. The remaining 0.3m to bedrock was removed by machine as grab samples. Once bottomed, the pit was made sufficiently safe to allow rapid cleaning and recording of a section. Further leather fragments were recovered at this stage, which could be securely allocated to specific contexts (part of 1164, 1165, 1166). The machine-recovered fragments came from the lower deposits, listed below as 1164–6. The pit measured merely *c.* 1.5 x 1.5m in plan, so the deposit encountered was very rich in leather, but contained very little pottery.

The material consists almost entirely of shoes, discarded after wear, many cut up for

CONCLUSION

Overall foraminifera preservation was poor in these samples. However, where identified the low-oxygen/high nutrient species *Elphidium oceanensis* is relatively abundant. To the writer's knowledge this species has not been noted from modern samples from the open estuary but it does occur abundantly in Christchurch Harbour, Dorset, where the inlet is more constricted. This species also occurs in restricted port basins and shallow lagoons full of rotting vegetation elsewhere in Europe, and from the microfaunal evidence it appears the quay lived up to its name.

BIBLIOGRAPHY

Unpublished sources

DCO Duchy of Cornwall Office

N2 Surveyor General's Report Book, 1754–60 16 Dec 1755 p. 142–8 Surveyor's Report & Constat[ive] re Sutton Pool & letter from Treasury dated 7 Nov

Plans/741 1786 A Plan of Sutton Poole with the adjacent Keys and Buildings by Wm Simpson

DCO No. 149 Water of Tamar Undated (*c.* 1810–12) plan of Sutton Pool

R3 Draft leases 1877 Plan of Sutton Pool, Plymouth

DRO Devon Record Office

DP 97 1831 Plan of Sutton Pool near Plymouth by James M. Rendel

Exeter Archaeology Archives

c. 1540 Harbour chart (original in British Library, Cott. MS Aug. I i 35-36, 38-39)

PCM Plymouth City Museum

Plymouth Improvement (plan), Sheet No. 4, *c.* mid 19th century

PRO Public Record Office

E. 134 1663 (15 Chas II Mich 36 8/23) Depositions to the Court of the Exchequer, Borough of Plymouth & port etc. called Sutton Pool, Limits, perambulation, encroachments etc.

MR 902 (2) 1725 A Plan of the Town, Citadel and Harbour of Plymouth

PWDRO Plymouth and West Devon Record Office

W467 1757 Plan of Sutton Pool by Edward Bayntun

WCSL Westcountry Studies Library

Maps

1778 (published 1780) A Plan of the Town and Citadel of Plymouth, surveyed by Richard Cowl (PM B/PLY/1780/COW) (original in British Library, BL K. Top 11 83; Stuart 1991, No. 161)

OS Ordnance Survey

1:500 map (Plymouth) Sheet 70, surveyed and engraved 1856

1:1250 Plan SX4854SW, 1975 (revised by Plymouth City Planning Dept, Sept 1990)

Printed sources

Allan, J.P. 1983 'The importation of pottery to southern England, *c.* 1200–1500' in Davey, P. & Hodges, R. (eds) *Ceramics and Trade: the Production and Distribution of Later Medieval Pottery in North-West Europe*, 193–207 (Sheffield).

——1984 *Medieval and Post-Medieval Finds from Exeter, 1971–1980*, Exeter Archaeol. Rep. **3** (Exeter).
——1986 'Pottery: Discussion' in Gaskell Brown (ed.) 1986, 14–23.
——1994 'Imported Pottery in South-West England, *c.* 1350–1550', *Medieval Ceramics* **18**, 45–50.
——1995 'Iberian pottery imported into South-West England, *c.* 1250–1600' in Gerrard *et al.* (eds) 1995, 299–314.
——1999a 'South Netherlands Maiolica in south-west England' in Gaimster, D. (ed.) *Maiolica in the North: the Archaeology of Tin-glazed Earthenware in North-West Europe* c. *1500-1600*, Brit. Mus. Occ. Paper **122**, 157–66.
—— 1999b 'Producers, Distributors and Redistributors: the Role of the South-Western Ports in the Seventeenth-Century Ceramics Trades' in Egan, G. & Michael, R. (eds) *Old and New Worlds: Historical/Post-Medieval Archaeology Papers from the Societies' Joint Conferences at Williamsburg and London 1997*, 278–88.
——2000 'Stonehouse Quay: Pottery and Trade, 1500–1800' in Gardiner, J. (ed.) *Resurgam ! Archaeology at Stonehouse, Mount Batten and Mount Wise Regeneration Areas, Plymouth*, Plymouth Archaeol. Occ. Paper **5**, 78–84.
—— 2003 'Patterns of Artefact Consumption and Household Usage in the Ports of South-West England, *ca* 1600–1700', *Archéologiques, Collection Hors-Série 1, Mer et Monde: Questions d'archéologie maritime*, 134–49 (Quebec).
——& Barber, J. 1992 'A seventeenth-century pottery group from Kitto Institute, Plymouth' in Gaimster, D. & Redknap, M. (eds) *Everyday and Exotic Pottery from Europe. Studies in Honour of John G. Hurst*, 202–4 (Oxford).
——& Langman, G. 1998–9 'The Pottery' in Stead, P. 'Investigations at Nos 4–6 Pydar Street, Truro', *Cornish Archaeol.* **37–8**, 178–89.
Andrew, R. 1984 *A Practical Pollen Guide to the British Flora*, Technical Guide 1. Quaternary Res. Ass. (Cambridge).
Atkinson, D.R. & Oswald, A. 1969 'London clay tobacco pipes', *J. Brit. Archaeol. Ass.* **32**, 171–227.
Barber, J. 1967 'Recent archaeological discoveries at the Barbican, Plymouth', *J. Plymouth Branch, Devon Cornwall Soc. Architect.* **31**, 8–10.
——& Gaskell Brown, C. 1981 'Plymouth' in Milne, G. & Hobley, B. (eds) *Waterfront archaeology in Britain and Northern Europe,* Counc. Brit. Archaeol. Res. Rep. **41**, 144.
——1986 'Buildings and quays' in Gaskell Brown (ed.) 1986, 10–12.
Behre, K.-E. (ed.) 1986 *Anthropogenic indicators in pollen diagrams* (Rotterdam).
Bennett, K. D. 1994 *Annotated catalogue of pollen and pteridophyte spores of the British Isles*, Dept Plant Sciences, University of Cambridge.
Broady, P. 1979 'The Pottery' in Fairclough, G.J., *Plymouth Excavations: St Andrews Street 1976*, Plymouth Mus. Archaeol. Ser., **2**, 47–113.
Brown, D.H. 2002 *Pottery in Medieval Southampton,* c. *1066-1500*, Southampton Archaeol. Monograph **8**, Counc. Brit. Archaeol. Res. Rep. **133** (York).
Coleman-Smith, R. & Pearson, T. 1988 *Excavations in the Donyatt Potteries* (Chichester).
Carruthers, W.J. 1997 'Plant Remains' in Hawkes, J.W. & Fasham, P.J. *Excavations on Reading waterfront sites 1979-88*, Wessex Archaeol. Rep. **5**, 62–4, 78–94.
Culpepper, N. 1826 *Culpepper's Complete Herbal*, Facsimile edition 1979, Gareth Powell Ltd (London).
Daniells, M.J. 2001 *Brief for a recording project: 130–132 Vauxhall Street, Sutton Harbour, Plymouth* (Plymouth City Counc.).
Donn, B. 1965 *A Map of the County of Devon 1765* (Devon Cornwall Rec. Soc. and University of Exeter reprint).
Douch, L.H. 1970 'The tobacco trade and the manufacture of clay-pipes in Cornwall', *J. Roy. Institution Cornwall,* new ser. **6.2**, 139–53.
Exeter Archaeology 2001 *Project design for an archaeological excavation at 130–2 Vauxhall St, Sutton Wharf, Plymouth.*

Fairclough, G.J. 1979 *Plymouth Excavations: St Andrews Street 1976*, Plymouth Mus. Archaeol. Ser. **2**.

Freeman, J.P. 2000 *Rattenbury's Great House, Shepherd's Wharf, Sutton Road, Plymouth. Archaeological excavation, 2000*. Summary report, Exeter Archaeol. Rep. **00.63**.

Gaskell Brown, C. (ed.) 1979 *Plymouth Excavations: Castle Street: the Pottery,* Plymouth Mus. Archaeol. Ser., **1**.

——(ed.) 1986 *Plymouth Excavations: The Medieval Waterfront, Woolster Street: the Finds; Castle Street: the Finds*, Plymouth Mus. Archaeol. Ser., **3.**

Gerrard, C.M., Gutiérrez, A. & Vince, A.G. (eds) 1995 *Spanish Medieval Ceramics in Spain and the British Isles*, Brit. Archaeol. Rep. Int. Ser., **610**.

Goubitz, O., van Driel-Murray, C. & Groenman-van Waateringe, W. 2001 *Stepping through Time*, Stichting Promotie Archeologie Pub. (Zwolle, Netherlands).

Greig, J. 1981 'The Investigation of a Medieval Barrel-latrine from Worcester', *J. Archaeol. Sci.* **8**, 265–82.

——1982 'The interpretation of pollen spectra from urban archaeological deposits' in Hall, A.R. & Kenward, H.K (eds) *Environmental Archaeology in the Urban Context*, Counc. Brit. Archaeol. Res. Rep. **43**, 47–65.

Grew, F. & de Neergaard, M. 2001 *Shoes and Pattens* (Museum of London).

Hawkes, J. 1995 'The Mount Batten Development and Archaeology Project 1993–4' in Ray, K. (ed.) *Archaeological Investigations and Research in Plymouth, Vol. 1 1992–3*, Plymouth Archaeol. Occ. Pub. **2**, 19–25.

——& Cotton, J.C. 2000 'Investigations at Mount Batten', in Gardiner, J. (ed.) *Resurgam! Archaeology at Stonehouse, Mount Batten, and Mount Wise Regeneration Areas, Plymouth*, Plymouth Archaeol. Occ. Pub. **5**, 123–210.

Higgins, D.A. 1992 'The clay tobacco pipes' in Allan & Barber 1992, 241–5.

——1996 'Clay tobacco pipes' in Brown, S.W., 'Berry Pomeroy Castle', *Proc. Devon Archaeol. Soc.* **54**, 239–47.

——2002 'Appendix II: Clay Tobacco Pipes from Clarence Tower' in Pattison, P., *Fort Clarence, Rochester, Kent,* English Heritage Survey Rep. Archaeol. Investigation Ser. **40/2002**, 62–70.

——forthcoming, 'Clay Tobacco Pipes from Excavations at Launceston Castle, Cornwall', English Heritage.

——& Davey, P.J. 1994 'Draft guidelines for using the clay tobacco pipe record sheets', unpublished draft (copy deposited in the site archive).

Horsey, I.P. 1992 *Excavations in Poole 1973–1983*, Dorset Natur. Hist. Archaeol. Soc. Mono. **10**.

Hoskins, W.G. 1972 *Devon* (Newton Abbot).

Hurst, J.G. 1974 'Sixteenth- and Seventeenth-century Imported Pottery from the Saintonge' in Evison, V.I., Hodges, H. & Hurst, J.G. (eds) *Medieval Pottery from Excavations: Studies Presented to Gerald Clough Dunning*, 221–55 (London).

——1977 'Spanish pottery imported into medieval Britain', *Medieval Archaeol.* **21**, 68–105.

——1991 'Italian Pottery Imported into Britain and Ireland' in Wilson, T. (ed.) *Italian Renaissance Pottery: Papers Written in Association with a Colloquium at the British Museum,* 21–31 (London).

——, Neal, D.S. & van Beuningen, H.J.E. 1986 *Pottery Produced and Traded in North-West Europe, 1350–1650,* Rotterdam Papers **6** (Rotterdam).

Jewitt, L. 1883 *The Ceramic Art of Great Britain*, (2nd edn, reprinted Poole, 1985).

Jones, A. 1982 'Human parasite remains: prospects for a quantitative approach' in Hall, A.R. & Kenward, H.K. (eds) *Environmental Archaeology in the Urban Context*, Counc. Brit. Archaeol. Res. Rep. **43**, 66–70.

Jones, J. & Watson, N. 1987 'The Early Medieval waterfront at Redcliffe, Bristol: a study of environment and economy' in Balaam, N.D., Levitan, B. & Straker, V., *Studies in Palaeoenvironment & Economy in South West England,* Brit. Archaeol. Rep. **181**, 135–62.

Kenward, H.K., Hall, A.R. & Jones, A.K.G. 1980 'A tested set of techniques for the extraction of

plant and animal macrofossils from waterlogged archaeological deposits', *Science & Archaeology* **22**, 3–15.
Koff, T. 2001 'Pollen influx into Tauber traps in Estonia in 1997–8', *Review of Palaeobotany and Palynology* **117**, **1/3**, 53–62 (Amsterdam).
Kruger, A. 1992 *The Pocket Guide to Herbs* (London).
Mander, C.H.W. 1931 *A Descriptive and Historical Account of the Guild of Cordwainers of the City of London* (London).
Moore, P.D., Webb, J.A. & Collinson, M.E. 1991 *Pollen Analysis* (Oxford).
Murphy, P. 1983 'Plant Macrofossils' in Ayers, B. & Murphy, P. *A Waterfront Excavation at Whitefriars Street Car Park, Norwich, 1979*, E. Anglian Archaeol. **17**, 40–51.
Nenk, B.S., Margeson, S. & Hurley, M. 1992 'Medieval Britain and Ireland in 1991', *Medieval Archaeol.* **36**, 217–18.
Nicholson, R. & Hall, A. 1989 'The Plant Remains' in O'Brien, C., Bown, L., Dixon, S. & Nicholson, R. *The Origins of Newcastle Quayside*, Soc. Ant. Newcastle Mono. **3**, 112–20.
Oswald, A. 1969 'Marked Clay Pipes from Plymouth, Devon', *Post-Medieval Archaeol.* **3**, 122–42.
——1975 *Clay Pipes for the Archaeologist*, Brit. Archaeol. Rep., Brit. Ser. **14**.
——1979 'The Clay Pipes' in Fairclough 1979, 114–19.
——, Allan, J.P. & Hunt, S. 1984 'The clay pipes' in Allan 1984, 279–93.
Peacey, A.A.1996 'The Development of the Clay Tobacco Pipe Kiln in the British Isles in Davey, P. (ed.) *The Archaeology of the Clay Tobacco Pipe XIV*, Brit. Archaeol. Rep., Brit. Ser. **246**, (Oxford).
Pearce, J.E. 1992 *Post-Medieval Pottery in London, 1500-1700. Volume I : Border Wares* (London).
Porter, J.H. 1989 'The Decline of the Devonshire Wrestling Style', *Rep. Trans. Devonshire Ass.* **121**, 195–208.
Preston, A. 1986 'Clay Pipes' in Gaskell Brown, C. 1986, 59–63 plus fiche.
Pye, A.R. 1998 'The post-medieval development of Sutton Harbour' in Ray, K., Noble, S. & Sharif, S. (eds) *Archaeological investigations & research in Plymouth Vol. 2: 1994–95*, Plymouth Archaeol. Occ. Pub. **4**, 51–65.
——, Westcott, K. & Knight, M. 1993 *NRA Plymouth Barbican Tidal Defence Scheme: historical and archaeological survey*, Exeter Archaeol. Rep. **93.57**.
Ray, K. 1995 'Sutton-super-Plymouth: a medieval port' in Ray, K. (ed.) *Archaeological investigations and research in Plymouth, Vol. 1: 1992–1993*, Plymouth Archaeol. Occ. Pub. **2**, 59–81.
Readers Digest 1981 *Field Guide to the Wild Flowers of Britain*,(London).
Rutter, J.A. & Davey P.J. 'Clay Pipes from Chester' in Davey, P. (ed.), *The Archaeology of the Clay Tobacco Pipe*, III, Brit. Archaeol. Rep., Brit. Ser. **78**, 41–272.
Stace, C. 1991 *New Flora of the British Isles* (Cambridge).
Stead, P.M. 2000 *Archaeological investigations at 'Discovery Wharf', Bretonside, Sutton Harbour, Plymouth*, Exeter Archaeol. Rep. **00.87**.
——2001 '130–132 Vauxhall Street, Sutton Harbour, Plymouth', *Archaeological excavation and watching brief, 2001 Summary Report,* Exeter Archaeol. Rep. **01.60**.
——& Rance, C. 1995 *Archaeological assessment and field evaluation of 130 Vauxhall Street, Sutton Wharf, Plymouth*, EMAFU Rep. **95.01**.
Stockmarr, J. 1971 'Tablets with spores used in absolute pollen analysis', *Pollen et Spores* **13**, 615.
Stuart, E. 1991 *Lost landscapes of Plymouth: maps, charts and plans to 1800* (Stroud).
Taylor, R.T. & Allan, J.P. 1998–9 'Addendum: A note on the petrology of Cornish potteries' in Allan & Langman 1998–9, 186–9.
Tinsley, H.M. 1999 *Pollen analysis of 14th–16th century foreshore deposits from beneath the Parade, Plymouth, Site Code PP7*, Unpub. Rep. for Exeter Archaeology.
——2000a *Pollen analysis of samples from Redcliffe Backs*, Unpub. Rep. for BARAS.
——2000b *Pollen analysis of 14th–16th-century foreshore deposits from beneath the Parade, Plymouth,* Site Code PP7. Amended Interpretation, Unpub. Rep. for Exeter Archaeology.

Vince, A.G. 1985 'The Saxon and Medieval Pottery of London: a Review', *Medieval Archaeol.* **29**, 25–93.

Vuorela, I. 1973 'Relative pollen rain around cultivated fields', *Acta Bot. Fenn.* **102,** 27.

Watkins, G. 1979 'Hull Pipes – A Typology' in Davey, P. (ed.), *The Archaeology of the Clay Tobacco Pipe*, I, Brit. Archaeol. Rep., Brit. Ser. **63**, 85–121.

Watts, M.A. 1993 *Archaeological recording at Basket Ope and Southside Street, Plymouth 1993*, EMAFU Rep. **93.89**.

——1994 *Archaeological field evaluation of the PFS Warehouse site, Hawkers Avenue, North Quay, Plymouth*, EMAFU Rep. **94.87**.

——1995 *Archaeological recording at 153 Vauxhall Street, Plymouth, 1994*, EMAFU Rep. **95.02**.

——1996 *Archaeological evaluation at Vauxhall Street car park, corner of Vauxhall Street and Bretonside, Plymouth,* Exeter Archaeol. Rep. **96.20**.

Williams, B. 1995 'Survey of Spanish Tiles Imported into England: an Interim Note' in Gerrard *et al.* (eds) 1995, 335–7.

Wiltshire, P.E.J., Edwards, K. J. & Bond, S. 1994 'Microbially derived metallic sulphide spherules, pollen and the waterlogging of archaeological sites', *American Ass. Stratigraphic Palynologists Contributions Ser.* **29**, 207–21.

Worth, R.N. 1890 *History of Plymouth* (Plymouth).

ACKNOWLEDGEMENTS

This report was commissioned by the site developers, South Devon Land plc, who funded the initial project. The archaeological works were initiated and subsequently monitored by M. Daniells (PCC Principal Archaeologist), and the excavations were undertaken by Exeter Archaeology (EA) under the supervision and management of P. Stead. C. Henderson took a close personal interest in the site and provided valuable advice about its interpretation. We are grateful to D. Barton (MD South Devon Land plc), I. Brown, M. Goss and B. Till (Midas Construction), R. Hodge and S. Pring (Form Design), and I. Paterson (Paul Carpenter Associates) and the staff of Steven C. Ashcroft (demolition contractor). Thanks are due to the following extra-mural contributors to this report: J. Allan (pottery), W. Carruthers (plant remains), D. Friendship-Taylor (leather), M. Godwin (foraminifera), D. Higgins (tobacco pipes), L. Higbee (animal bone), N. Nayling (medieval timbers), A. Peacey (tobacco kiln material), R. Taylor (petrology), and H. Tinsley (pollen). The leather was conserved by C. Robinson of Exeter Museums Conservation Service under the direction of A. Hopper-Bishop. The initial building recording was undertaken by N. Goodwin, and the finds processed by G. Langman. The illustrations were prepared by T. Ives and J. Reed (leather and pottery). The historical background is derived from summaries of documents concerning Sutton Harbour (Pool) in the Public Record Office and elsewhere made by EA (then EMAFU) in the early 1990s, principally by A. Pye. We are also grateful to A. Morgan at Plymouth and West Devon Record Office for her assistance with the cartographic searches. The text was edited for publication by S. Turton of Exeter Archaeology and J. Allan of Exeter City Museums, aided by P. Boyce.

The site archive, including the finds, will be deposited at Plymouth City Museums and Art Gallery.

This paper is published with financial assistance from South Devon Land plc.