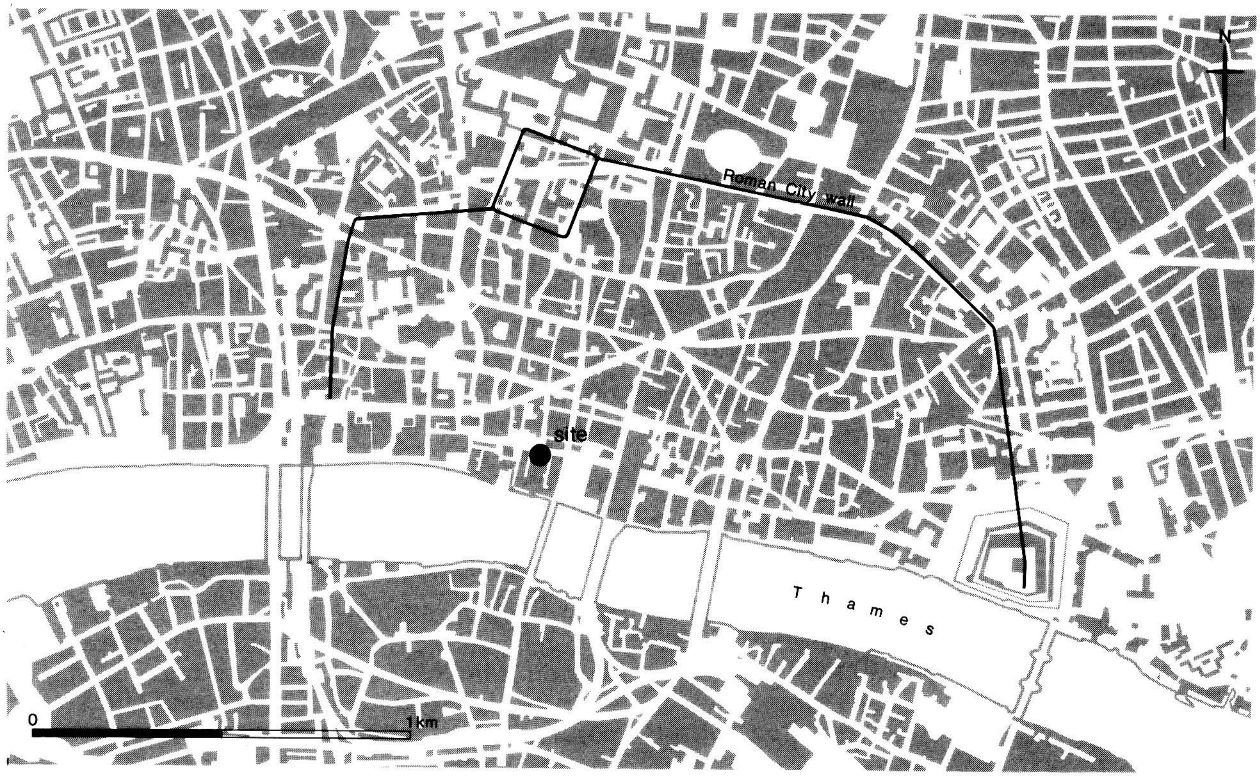

Fig 1: plan of the Bull Wharf site showing its relationship with the Roman city wall, the modern street plan and the River Thames.

Environmental sampling, processing and some preliminary results from Bull Wharf

Tim Holden
Sharon Gerber-Parfitt

Introduction

The Environmental Archaeology Section at the Museum of London is primarily concerned with the recovery and interpretation of geological and biological evidence from archaeological deposits. Since these may have accumulated by natural means or by the activity of man, they can provide information about the past environment, economy, human behaviour and how they have changed through time.

One fundamental objective is to provide data relating to the environmental context within which previous populations operated. In London, factors such as the changing level and tidal patterns of the River Thames, the silting up of its tributaries, the nature of the surrounding countryside and whether it was wooded or being intensively farmed are all of great significance to its development. Such questions are all potentially answerable by analyses of pollen[1], charcoal, diatoms[2], other plant and animal remains[3] and the sediments themselves.

On a more local scale the living environment of the urban inhabitants can also be identified[4]. Insects, animal bones, snails, intestinal parasites, plant

1. C. A. Baker, P. A. Moxey and P. M. Oxford 'Woodland continuity and change in Epping Forest' *Field Studies* 4 (1978) 645-669.
2. R. W. Battarbee 'The use of diatom analysis in archaeology: a review' *Journ Archaeol Sci* 15 (1988) 621-644; G. Milne, R. W. Battarbee, V. Straker and B. Yule 'The London Thames in the mid-first century' *Trans London Middlesex Archaeol Soc* 34 (1983) 19-30.
3. P. D. A. Boyd 'The micropalaeontology and palaeoecology of marine esturine sediments from the Fleet and Thames in London' in Neale and Brasier (eds.) *Microfossils from Recent and Fossil Shelf Seas* (1981) 274-292.

species and sediment types are frequently indicative of marshy areas, waste land, gardens, insanitary living conditions and stable areas. They can therefore be used to identify different land usage within the city and provide an insight into the conditions in which people spent their lives.

Apart from questions related to the environment, the study of many different classes of "environmental" remains can also provide data relating to economic activities, diet and other elements of human behaviour. Animal bone, for example, can be used to identify the breeds of animal being eaten and how they have changed through time. The age and sex ratios of slaughtered animals can be used to suggest whether they were bred primarily for meat production or slaughtered after being used as wool and milk producers or as draught animals. Butchery techniques and the remains of different cuts of meat can be identified. Since different cultural groups frequently butcher their meat in specific ways, certain ethnic communities could be potentially identified from their animal bone waste.

From just these few examples it can be seen that there is much to be gained from the analysis of the geo- and bioarchaeological samples from London. Over the last 3 years the Department of Urban Archaeology excavated over 70 sites in the City of London and many more from Greater London. Many were sampled for environmental data, and progressively more structured sampling policies evolved during this period. These are presented in the *Environmental Procedures Manual*[5]. The implementation of these policies and the subsequent detailed analyses are beginning to prove their worth as a series of major projects are coming to a close. Funding problems and sheer volume of work have, however, resulted in the inevitable backlog of material for analysis. It was therefore something of a luxury to be able to complete all of the initial environmental processing from the Bull Wharf site (UPT90) within weeks of the end of the excavation. This, together with the availability of good "on site" processing facilities, makes it an ideal opportunity to present an account of some of the reasoning behind our sampling strategies, details of our method of operation and some preliminary results.

Bull Wharf was located on what was the bank of the tidal Thames in the City of London (see Fig. 1). The occupation and structural remains of the late Saxon period on the Phase I excavations at this site were better preserved than any so far found on the City waterfronts. The conditions of survival and preservation of organic material was on a par with the nationally important sites of similar period at Coppergate, York and Wood Quay, Dublin. It therefore provided a good opportunity for the recovery of important data relating not only to the changing environmental conditions in and around the City but also to the economy and life-style of previous inhabitants.

Other sites along the riverside such as Vintry House (VRY89), Thames Exchange (TEX88) and Billingsgate (BIG82) have already provided much information regarding this but the presence of three Saxon buildings and associated occupation levels and dumps at Bull Wharf offered the potential to add significantly to our understanding of such communities.

Sampling strategy

As a general rule the Environmental Archaeology Section is interested in analysing organic remains from most well-stratified, well-dated contexts. Deposits which have built up *in situ* and can therefore be most closely related to the processes that produced them are of particular interest and given priority. Examples include burned debris from hearths and ovens, occupation debris on floor surfaces and the contents of vessels such as barrels or pots provided that these contents are associated with their original use. Deposits that have become carbonised as a result of conflagration would also be included in this category as would cesspits even though, in the latter case, other non-faecal waste may have been added to the pit thereby reducing its value for specific dietary reconstruction.

Many deposits in London are in the form of dumped material associated with features such as pits, ditches and levelling deposits. These commonly consist of redeposited material which could have been brought from some distance away. They will therefore produce data of a different calibre to those contexts which built up *in situ*. Their composition does not necessarily represent the product of any site related activity. They may, however, contain assemblages of bone or charred grain for example, which reflect activities such as tanning or crop processing that were being carried out elsewhere.

After initial deposition many sediments, particularly dumps and foreshore deposits, will also have been mixed, reworked and redeposited by agencies

4. D. de Moulins 'Environmental analysis' in C. Maloney (ed.) *The Upper Walbrook in the Roman Reriod: the Archaeology of Roman London, vol. 1.* C.B.A. Research Report 69 (1990) 85-115.

5. J. Murray and J. Rackham *Environmental Archaeology Department of the Museum of London* (1990).

such as water or indiscriminate human activities. This mixing reduces their value for identifying specific human activities because they bear only a very loose relationship to the processes that produced them. Nevertheless, they still provide basic presence/absence data on different species and, provided that the context is well dated, will add to existing knowledge on broader issues such as animal husbandry, butchery techniques, or dietary or economic trends.

On site, when a well-defined context is encountered, decisions have to be made regarding how it accumulated, its composition and what it represents. It is on the basis of these that samples are taken. At this stage it is difficult to identify any of these with certainty and problems relating to contamination, disturbance and mixing may only become apparent as excavation and post-excavation analysis progresses. During this procedure therefore, it is inevitable that more samples than will finally be deemed useful will be taken. Some will be discarded later as more is learnt about the nature of the context.

Previous excavations on the Thames waterfront indicated that large dumps of organic and other waste material held behind a series of revetments were expected to represent a major feature of the land reclamation process. Initially therefore, in accordance with normal procedure, large samples amounting to anything up to 300 litres of this were taken for flotation and wet-sieving (see below). The concentration of highly compacted organic debris, however, made it almost impossible to follow the normal procedure. Much potentially valuable information was being lost or destroyed during the sieving process and this method was deemed inappropriate for these types of samples. It was therefore decided that smaller samples of 10 litres should be taken from different parts of the same dumps. This approach was also applied to areas of organic occupation debris overlying floor surfaces. They were divided up into smaller areas of about 1m square, and 10 litre samples were taken from each area. Some of the larger occupation deposits which were sometimes as thick as 15-20cm were also sampled from a 25cm square column down through the statigraphy. Samples were taken in 3cm spits. In this way it was hoped that later detailed analysis would provide a good picture of both spatial and temporal variation in composition and any changes in use of the buildings would thereby be highlighted.

In addition to large organic deposits smaller contexts such as hearths, drains and small pits were also sampled. Where possible the whole of such samples were taken, otherwise 70 litres would be a common sample size for flotation and wet-sieving.

Relatively few large animal bones were recovered from the dumps and floor surfaces but hand collection was undertaken throughout the excavation providing a reasonable sample for analysis.

Finally, at Bull Wharf it was particularly important to know more regarding some of the thick clay/silt lenses that periodically covered the site and the conditions under which they accumulated. Column samples through these sediments using narrow (monolith) sampling tins were therefore taken for this purpose. Analysis will be undertaken by Geological Service Facility of the Institute of Archaeology using techniques such as particle size analysis, phosphate analysis and magnetic susceptibility. These should make it possible to identify how long it took for the sediments to accumulate, whether the environment changed during this time and if the sequence includes any erosional events. Once this is understood more fully a decision can be made regarding whether a detailed pollen or diatom analysis could be expected to provide additional environmental data.

Recovery methods

Different classes of biological remains preserved on City sites require the application of different recovery techniques. At the crudest level the recovery of larger animal bones by hand during trowelling is normally carried out. This results in significant quantities of animal bone for analysis providing vital information on many domestic animal species. These samples are, however, heavily biased towards larger animal bones at the expense of smaller but equally important plant and animal species. More specific methods of recovery such as wet-sieving or flotation are therefore employed to try and correct this inbalance. There are numerous examples of the effectiveness of such techniques. Wheeler and Jones[6] for example indicated that careful hand collection at Fuller's Hill, Great Yarmouth, produced only two species of relatively large fish. By contrast, 15 different species were recovered when a programme of wet-sieving was applied. A much more representative picture of the local economy was therefore obtained. In the light of examples such as this it is customary for us to process large quantities of sediments for the recovery of small items that would not normally be seen during excavation.

6. A. Wheeler and A. K. G. Jones 'Fish remains' in A. Rodgerson (ed.) 'Excavations on Fuller's Hill, Great Yarmouth' *East Anglian Archaeol Rep* 2 (1976) 208-224.

These are then subjected to one of the following procedures:-

1) Wet-sieving small sub-samples through a stack of sieves, the smallest of which must be 0.25mm, particularly for the recovery of waterlogged plant and insect remains.

2) Wet-sieving through a 1mm mesh and/or flotation of up to 70 litres; wet-sieving for the recovery of small to medium sized animal bone including fish, mollusc shell, mineralised and other plant remains; flotation for charred plant remains.

3) Wet-sieving of up to 230 litres of sediment through a 5mm mesh principally for the collection of unbiased samples of medium-large animal bone and finds.

Ideally it would be desirable to wet-sieve a small sub-sample of each sediment through a 0.25m mesh sieve (i.e. procedure 1 above) followed by a quick scan under a binocular microscope in order to determine the level of organic preservation. In practice, however, this is only undertaken where there is reason to believe that organic preservation is likely to be good. Where this proves to be the case, an assessment of the sample's potential is recorded and a 10 litre sample set aside for detailed microscopic analysis. If it is considered that preservation or the diversity of remains do not warrant detailed analysis then the sample is passed on for wet-sieving and/or flotation.

At Bull Wharf the flotation and wet-sieving facilities were excellent (see Fig. 2), consisting of a cement mixer to aid the disaggregation of stub-

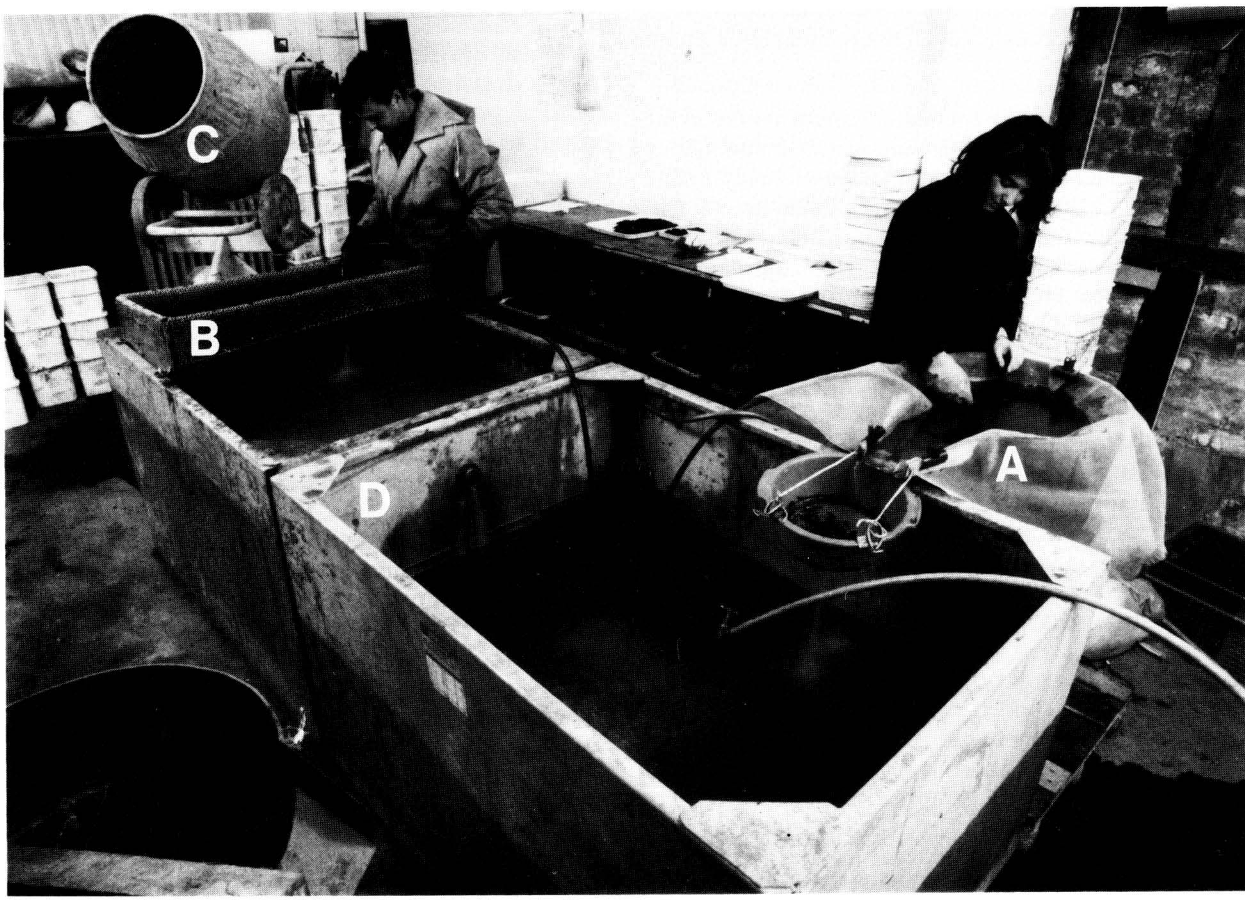

Fig. 2: the processing setup used at Bull Wharf. A the Siraf style flotation tank, B the wet-sieve facility, C the cement mixer used for difficult clay rich samples and D the settling tanks.

born clay rich samples, 1mm and 5mm wet-sieving facilities and a Siraf style flotation tank[7]. These were all arranged around two large settling tanks to prevent silt entering the drainage system.

Flotation

This technique provides an efficient method for the recovery of carbonised and other plant remains. It is carried out using a Siraf tank (see Fig. 2 and cover) which essentially consists of an oil drum that has been adapted to hold a flexible 1mm mesh in position some six to eight inches from the top. The tank has a cut-out section in one of the sides which acts as a weir over which the floating debris will flow once the tank is filled with water[8]. This is then directed by means of a short lip into the 0.25mm sieve in which the debris is collected.

Processing is carried out by filling the tank with water so that there is a constant flow over the weir and into the 0.25mm sieve (cover). Up to 10 litres of sediment is placed in the 1mm mesh and gently disaggregated by hand. Slight agitation and the constant flow of water are usually sufficient to encourage most of the carbonised plant remains to flow over the weir and into the collecting sieve. Once most of the floating debris (the flot) has passed over the weir the water flow is stopped and the water level reduced by opening a tap in the lower part of the tank. The material remaining in the 1mm mesh (the residue) is then wet-sieved to remove any residual fine material (see below). The flot and residue are put into trays and left to dry.

It is estimated that a 10 litre sample can be processed in this way in about 15-20 minutes. This will, however, depend on the nature of the deposits, with clay-rich sediments taking much longer.

Wet-sieving

This involves the washing of sediments through an appropriately sized mesh using a jet of water to remove finer silts and sands. Where the controlled recovery of samples of fish or small mammal bone, mollusc shells, mineralised seeds is required, samples of up to 70 litres will be wet-sieved through a 1mm mesh. The residue is then dried and sorted by hand to recover any biological remains.

If larger volumes of sediment are required in order to provide an unbiased sample of large-medium animal bone or for finds recovery then anything up to an additional 230 litres might be sieved through a 5mm mesh. The residue from this process is not dried but quickly scanned and any shell, bone or finds picked out. The remaining residue is then discarded into the settling tank.

The wet-sieving process is carried out either in the flotation tank itself or in a purpose built wooden frame (see Fig. 3) held over the silt trap. This frame can be fitted with sieves of the appropriate mesh size. The apparatus is designed to hold approximately 10 litres of sediment at any time and it is estimated that this amount can be processed in approximately 10-20 minutes. Only rarely, with compacted or clay rich sediments, is the use of the cement mixer in which the metal blades have been replaced by rubber baffles required. Ten litre samples of sediments which are difficult to disaggregate by other means are put into the revolving drum for periods of 10-40 minutes. The resulting slurry will then be poured into the sieve and processed by wet-sieving as outlined above. Experiments have shown that contrary to what one might expect, little damage to bone or other artifacts is caused by the use of this equipment.

Sorting

Following flotation the dried flots which usually consist of carbonised material are scanned under a

Fig. 3: wet-sieving sediments through a 5mm mesh.

7. D. Williams 'Flotation at Siraf' *Antiquity* 47 (1973) 198-202.
8. K. K. Kenward, A. R. Hall and A. K. G. Jones 'A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits' *Sci Archaeol* 22 (1980) 3-15.

low-powered microscope and an assessment made of both the diversity and abundance of all identifiable debris. This provides a rapid preliminary assessment of the importance and potential of the sample before it is handed over for detailed analysis as part of a post-excavation project. By contrast, the dried residues are sorted by hand and seeds, bone, shell and other identifiable items removed. Depending on the richness of a sample a 10 litre residue can take anything between 10 minutes and 1 day to sort completely. As with the other recovery techniques, an assessment is made of the potential of the remains for answering particular archaeological questions. The different classes of material are then handed on to the appropriate specialists for detailed analysis.

Preliminary comments and results from Bull Wharf

Flotation samples

Some flotation samples produced many charred plant remains. They were from contexts provisionally dated between the 9th to 11th centuries (N.B. few spot dates are yet available) and show a regular low presence of oats, barley, wheat and rye. The presence of weed seeds in some samples might enable a discussion regarding the agricultural field ecology and possibly the crop husbandry regimes used. Sprouted cereal grains in some samples might also be indicative of malting. One hearth sample in particular contained over a litre of cereal grain and other seeds. It was dominated by rye grain but smaller amounts of the other major cereals, wheat, oats, barley and various pulses, together with some of the larger associated weed seeds were also present. The composition of this could indicate whether it was a burnt sample of stored grain or crop processing remains. It may then be possible to speculate on the type of soil that it was grown on, how it was cultivated, how it was stored, as well as adding to the existing data on the Saxon diet.

Some sites in the London area have already produced charred plant remains from the Saxon period. They include Milk Street, National Gallery Extension, Peabody Bldgs and Maiden Lane[9]. The Bull Wharf material should therefore supplement the data from these sites and add to the general picture of the Saxon and early medieval economy.

Waterlogged samples

Several samples were taken from cesspits and drains from the later periods on the site (16th century and later). These produced few waterlogged organic remains but one or two showed excellent preservation of cereal bran, epidermal and other plant tissues. More accurate dating of these samples will give a better picture of their importance.

From the late Saxon/early Medieval periods a large number of samples were taken for waterlogged analysis. Those from the organic dumps and occupation levels were dominated by straw/rush/reed and small wood fragments. These are probably best interpreted, at present, as the remains of human habitation or stable sweepings. A more detailed analysis should enable us to distinguish these on the basis of the plant debris, surviving insect remains and by the presence or absence of human intestinal parasite ova (N.B. certain beetles, for example, are very specific to human habitations, external dumps or animal stalls). Preservation in these samples was such that if food debris or remains of economic activities such as fish processing or cereal milling, were dropped or discarded then these would be expected to be preserved in the straw/rush matrix. The assessments have already highlighted the presence of cereal bran and other plant epidermal tissue together with substantial quantities of fish bone and lesser quantities of insect remains. The seeds of several plant species that were probably growing around the site were also recorded during the assessment. These should add to the available data regarding the local environment. In view of this exceptional preservation and the rarity of well-preserved organic remains from the Saxon period in London these samples will be exhaustively studied with particular emphasis being placed upon waterlogged plant remains, fish bone and beetle fragments.

Much of the well-preserved organic debris had been compressed into numerous thin layers. Preliminary analysis should therefore involve carefully peeling back these layers with a scalpel in the hope that some of the more delicate remains which undoubtedly survive but which are usually broken up during sieving, will be more readily identifiable. This technique, in conjunction with the material from wet-sieve residues, should yield information on classes of debris, especially plant foods, that do not normally survive on archaeological sites.

Wet-sieve residues

Plant remains are generally less common in wet-

9. A. Davis, D. de Moulins, A. Locker, C. de Rouffignac, B. West and J. Rackham 'The environmental evidence' in R. Cowie and R. L. Whytehead (eds.) 'Two Middle Saxon Occupation Sites: Excavations at Jubilee Hall and 21-22 Maiden Lane' *Trans London Middlesex Archaeol Soc* 39 (1989); A. Davis, D. de Moulins, A. Locker, B. West and J. Rackham 'The environmental archaeology' in R. L. Whytehead and R. Cowie (eds.) 'Excavations at the Peabody Site, Chandos Place and the National Gallery' *Trans London Middlesex Archaeol Soc* (in press).

sieve residues unless they are mineralised. In some samples, however, dense "seeds" that were not removed by flotation also remained. These included fruit stones in the cherry/sloe/plum family, hazel nut shell and smaller fruit seeds such as blackberry and elderberry. In some of the post-medieval contexts fig seeds were also common.

Large animal bone was recovered from most of the 94 wet-sieve residues but the diversity of these remains do not appear to be high. Fish bone was also relatively abundant, appearing in all but 27 of the samples. Small mammal and bird bone was less frequent but it should complement the large bone recovered by hand collecting and provide data on the local environment, wild resource utilisation and domestic fowl.

Several assemblages of marine shell, particularly oyster, may also contain enough shells for comment to be made regarding past exploitation of the estuary. Of particular interest would be questions of whether these shellfish were being brought from managed beds or collected from the wild.

Hand-collected animal bone

The organic dumps and occupation surfaces were not generally rich in large animal bone and, as bulk sampling for bone was not extensively carried out (see above), the majority was hand-collected. This resulted in 325 samples many of which were less than 0.5kg, with an obvious bias towards larger bones. Several of the earlier contexts, however, provided larger samples of up to 14kg. At this preliminary stage in the analysis it is clear that sheep, cow and pig were all important resources. There was also frequent evidence of butchery. In addition to these and other domestic species such as dog there were also occasional occurrences of deer bone and antler. These include both red and roe deer remains with some of the antlers having been shed before being worked and others apparently cut from the corpse. As detailed analysis progresses a better picture of game exploitation should accrue. Bones such as the spine of a sturgeon, jaw of a porpoise and a whale vertebra should also add to the picture of wild resource utilisation.

Most of the bone came from the late Saxon and early Medieval contexts. This should therefore provide an excellent opportunity to shed light on the proportions of different animals used, animal husbandry practices and butchery techniques from these periods.

Excavated human remains

Two contexts produced human remains. One was a single disarticulated femur which will be of little interpretive value in isolation. The other consisted of a foreshore burial of a female aged between 28 and 35[10]. It was recovered from between two large pieces of bark which had been packed with reed and moss. There was a hole in the left side of the cranium which had apparently been caused by a blow to the head. A number of samples of environmental interest were taken from this burial including moss samples from the packing material, bark from the upper and lower coverings, fibre samples from the vertebral region and sediment samples from the gut and thoracic regions. It has already been determined that the gut area did not contain recognisable food debris and that the fibres attached to the bone of the vertebral column and pelvis were bast fibres from the inner layer of the bark (not muscle or ligament tissue). Further samples from the gut will be sent for analysis of intestinal parasites. The skeleton is presently being studied in more detail by the Anatomy Department, Guys Hospital.

The unusual circumstances surrounding this burial, i.e. being staked down on what appears to be the Saxon foreshore make it of special interest regarding Saxon burial and ritual practice associated with death. Apart from this a more detailed palaeopathological analysis of the body will also be expected to throw light on other more basic aspects of life such as health, disease and diet. Features such as tooth wear and decay are already being studied.

Other hand-collected samples

A series of small samples of moss luting recovered between adjacent layers of boat planking were also taken for analysis. Identification of the the different species used might help to identify the origin of the boats and could potentially indicate where repairs involving the replacement of luting material had occurred.

Summary

Organic preservation on this site was exceptional. Floor surfaces, dumps and cesspits have been shown to contain many classes of debris that are not generally recovered on dry archaeological sites. These include, food debris, beetle remains and most probably, intestinal parasite eggs. They therefore offer considerable potential for identifying many of the more basic and often overlooked aspects of late Saxon/early Medieval life. The sampling strategy was such that comments regarding spatial distribution and temporal changes in the debris can be highlighted, if they in fact exist.

10. Maclaughin and Scheuer *pers comm.*

Bone samples recovered by hand collection should provide a good picture of utilisation of some of the larger animals on the site. Analysis of the fish and bird bone from the controlled wet-sieve samples can be expected to complement those recovered by other means.

Occasional finds such as the human burial, whale, sturgeon and porpoise bones are unlikely to reflect aspects of everyday life in the late Saxon period. They may, nevertheless, provide an insight into rare but probably important events and possibly highlight aspects of prestige, status and ritual.

Acknowledgments

We would like to recognise the valuable contribution of Josie Murray and James Rackham, who were largely responsible for developing the present site-related working practices used by the Museum of London Environmental Section. We would also like to thank Alan Pipe for numerous bone identifications, Julian Ayre for help and comments and Sue Maclaughlin and Louise Scheuer for their expert opinions relating to the waterfront skeleton. All photographs were produced by Jan Scrivener and the plan by Julie Carr. We would also like to acknowledge the generous financial support of Beaver House Ltd.

Letter

Re Gromaticus' comments on Harvey Sheldon's redundancy in *LA* 6, no. 11. I too regret the loss of such a long-serving archaeologist, but I do not have to remind anyone that he was just one of over two hundred archaeologists recently made redundant in London. As Gromaticus has already pointed out (in *LA* 6, no. 9), the waste in training and expertise (often starting with a university degree, and involving years of experience and many thousands of pounds invested in each individual) is enormous. The devastating effect this has had on those unfortunate people, and on the quality of the archaeological service in London, can hardly be imagined. The question now is whether it is accepted that such an appalling situation should have been avoided, and that it must not be allowed to happen again.

The Museum of London, which deals with the curation, research and presentation of archaeology in Greater London (through the Museum of London Archaeology Service), is also responsible for the maintenance and display of the material in its possession. One wonders if the Museum's involvement in the latter role has inevitably been at the expense of the former; perhaps the two roles would be best carried out by two separate bodies.

There is a similar dichotomy in the work of English Heritage. This organisation's primary duty is the maintenance and presentation of England's historic buildings and monuments, but it is also involved in the curation of, and research into, the country's archaeological remains. English Heritage shares archaeological work with the Royal Commission for Historic Monuments (England). Would it not make more sense if the RCHM(E) had sole responsibility for England's archaeology, with English Heritage then being able to concentrate on the maintenance and presentation of monuments and buildings?

One of the reasons English Heritage gave for removing the museums (the Museum of London and the Passmore Edwards Museum) from the planning process in London was that this constituted a conflict of interest with the museums' archaeological work. Although this potential problem had to be addressed, the solution found by English Heritage can hardly be described as satisfactory. English Heritage turned what was essentially a local government issue on its head by establishing its own planning advice section for London. Not only does this complicate the planning process; by expanding English Heritage's range of responsibilities even further, it makes it increasingly difficult to understand that organisation's role in archaeology.

The recent English Heritage publications *Developing Frameworks* and *Management of Archaeological Projects* suggest that English Heritage would like each archaeological excavation unit to devise their research agenda, and then design appropriate projects for the execution of this work and dissemination of their findings. However, only a fraction of English Heritage's funds are spent on archaeological work, and even that amount is expected to decrease in real terms over the next few years. Archaeological units, particularly the smaller ones, could end up spending time and money they can ill afford, preparing research designs for projects that have little prospect of being funded. Even if extra funds were made available for research projects, under the present regime this extra work would simply be added, piecemeal, onto the existing work programme; extra staff would be needed – until there was the next collapse of developer funding, or the research projects dried up, or both. We would still end up with periodic redundancies of dozens, if not hundreds, of archaeologists in London and elsewhere, while the universities continue to churn out archaeology graduates.

What is needed is a system that takes into account the uncertain nature of archaeological funding. If developer funding is expected to be a major source of revenue for 'rescue' work for the foreseeable future, it follows that other sources of funding should be aimed to complement developer funding, increasing whenever developer funding periodically decreases during the economic cycle. In the two publications referred to above, English Heritage have suggested policies and procedures for research work. What are missing are the flexible, long-term strategies that would enable the research work to be carried out as efficiently as possible. Nowadays, the archaeological profession is expected (quite rightly) to be efficient and business-like. I believe that it should also be operating within a carefully-planned national heritage policy; this shouldn't be too difficult with such a small profession, numbering a couple of thousand at the most, with an annual budget of a few million pounds – that is a small business. Without adequate national management, acknowledging responsibility for the proper use of resources (people and money) at its disposal, the archaeological profession (and archaeology in general) is doomed to blindly limp on, until the next crisis comes along. Ironic really, when you consider that one raison d'etre of archaeology is to avoid repeating past mistakes.

Kurt Hunter-Mann

13 Cleveland Street
Holgate
York YO2 4BS