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Archaeology and the London Thames: past, present and future

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Throughout London's history the Thames has functioned as the city's main artery, but the archaeology of the river and its floodplain has, until recently, attracted relatively little attention. Now a wealth of new evidence of changes in prehistoric land use, vegetation and sea level is being recovered, some of which is relevant to present-day policies of river management.

The River Thames entered its present course through what is now central London some 450,000 years ago, at the end of the Anglian period of glaciation.[1] In prehistoric and historical times it acted as highway, port and focal point for settlement, and the Roman, Saxon, medieval and modern towns were all founded on its banks. Study of the archaeology of London and of the Thames itself has also been closely linked, ever since the seventeenth century, when, for example, Samuel Pepys noted in his diary the discovery of archaeological remains during the construction of Blackwall Dock.[2]

The Thames floodplain and the prehistory of London

The archaeological record of London is much more complete for the historical period than for the prehistoric periods of occupation. As yet, there is only limited evidence of where prehistoric communities lived, with a few exceptions such as the Heathrow area and parts of northeast London. However, the floodplain is now becoming a focal point for retrieving information about prehistoric London. Its archaeological potential was recognized almost decade ago by the London archaeologist Nick Merriman,[3] who realized that, although material was deeply buried and difficult to find, evidence for a prehistory of central London could, with persistence and some common sense, be recovered. This challenged several prejudices current at the time, particularly that there was no substantial human presence in London before the foundation of the Roman town in AD 47 – an assumption that can no longer be sustained.

Prehistoric archaeological material has survived along the Thames for several reasons:

- silts deposited by floods, and associated deposits of peat and sand, have buried much material in wet conditions
- wet sites tend to preserve material, especially organic remains such as wooden artefacts, better than dry sites
- there has been a great deal of land reclamation along the banks of the river, which has tended to bury and preserve archaeological material
- people were attracted to the resources of the floodplain throughout prehistory.

During the past decade, much has been learned about the prehistoric use of the wetlands that formed along the Thames throughout the Neolithic period and the Bronze Age. The remains of about a dozen wooden trackways have been found that ran from areas of dry gravel terrace into and across the wetlands (Fig. 1).[4] Five sites in Southwark and Westminster have yielded Bronze Age plough marks, with associated drainage or boundary ditches and even a fragment of a plough.[5] All five sites are on soil-capped sand islands that would have been easy to cultivate, were quite fertile and had good access to fresh water. There is also evidence from a Bronze Age site (Hays), farther east in Dagenham, that cattle and sheep may have been pastured on marshland,[6] which suggests that mixed farming was practised on the floodplain.

Other recent discoveries on the floodplain include a Bronze Age ring ditch with associated cremations on the approach road to present-day London Bridge,[7] a Bronze Age pile-built structure thought to be part of a bridge or a jetty on the south bank of the Thames at Vauxhall,[8] and a series of timber platforms in east London. In addition to this evidence from the Bronze Age, new finds of Neolithic age have recently added to what little was known about this period. Developments such as the building of the Channel Tunnel railway and modernization of the main A13 road into London have uncovered large flint scatters and occupation areas under the peat of the east-London floodplain, as well as an early enclosure in Rainham.[9] Material from the Mesolithic hunter–gatherer period is even more meagre, but some traces have been found, such as a camp in Bermondsey, associated with a former (Late Glacial) lake, a huge flint scatter at Erith and many stray finds on the Southwark islands.[10]

No material of Palaeolithic age has been found recently on the floodplain, but the majority of what was previously found came from such deposits. The river terraces contain many redeposited stone axes, and there are also a few *in situ* assemblages of stone tools that were documented in the late nineteenth and early twentieth centuries, such as the Stoke Newington group, recorded by Worthington Smith,[11] and Wansunt Pit, described by Spurrell[12] and Chandler & Leach.[13]

Figure 1 *Remains of a Middle Bronze Age trackway found at Beckton, between West Ham and Barking in northeast London; it was built on peat and consisted of a V-shape wooden cradle filled with bundles of alder brushwood.*

Previously, much information from these antiquarian sources was considered of little use to modern archaeologists, mainly because most of the artefacts they described were no longer in their primary contexts but had been redeposited in or near the Thames. Many of the early archaeologists in London were indeed little more than collectors of artefacts dredged from the river or from its gravel terraces,[14] but because at that time dredging and gravel extraction was not mechanized, many finds were made in the material that was dug out by hand. Such finds, although out of their original contexts and therefore of limited archaeological value, have proved invaluable for studies of artefact types and typologies. Many now grace the British Museum and the Museum of London, notably spectacular collections of prehistoric metalwork that are on a par with similar material from other European rivers.

There was a second group of London antiquarians whose importance tends to be overlooked. They not only collected finds but also recorded sites, sequences and artefacts *in situ*. Their work remains important because they created records of sites that are no longer available for us to study but which are sometimes very useful when we analyze new data from nearby sites. Some of these records could be said to mark the birth of rescue archaeology in London, because many of the notes were made and the sections drawn during excavations for the Thames docks and for tunnels under the river, as well as at quarries. These records also give us an indication of how much archaeological material was simply lying around on the surface of the

Figure 2 *Remains of yew trees of Early Bronze Age date recovered from an excavation along the line of the A13 road at Wennington Marsh on the border of London and Essex (scale bar intervals 10 cm).*

floodplain until it was destroyed relatively recently, for example Spurrell's observations at Crossness, where he reported enough Roman artefacts on the surface to fill "a couple of carts".[15]

The work of recording the archaeology of the floodplain, particularly along the foreshore, and of monitoring its destruction, was carried forward recently by the Thames Archaeological Survey,[16] and the urgent need for such work is dramatized by the rapid rate of erosion occurring on the foreshore. There are parallels with Spurrell's report of Roman remains at Crossness in other early records of Roman finds in Southwark, yet modern surveys close to Crossness, across the river in Purfleet and Rainham, back in the city and west to Chelsea, all show that erosion has reached down to Neolithic levels. This leaves very little archaeological evidence within these floodplain deposits.

Former vegetation of the floodplain

The ecological history of the Thames floodplain is also being investigated. Much of this research has been done through the system by which developers fund archaeological work, but unfortunately the results are seldom published. They usually remain in the archaeological archives and the Greater London sites and monuments record, where they are at least available for study. Sometimes the data collected from a group of excavations are synthesized and published,[17] but this is seldom achieved, partly because of the cost of publication. Fortunately, however, postgraduate students continue to undertake research on the floodplain. Among the ecological themes currently being examined are the nature and development of woodlands.

The changes in woodland cover that have been inferred (mainly from analyses of fossil pollen) do not exactly match the sequence that is to be expected when a lowland freshwater system becomes an estuarine one, as happened with the Thames. There are many postglacial changes that parallel those in comparable areas: the rise of mixed deciduous woodland following the end of the most recent ice age; the subsequent expansion of this woodland until the end of the Mesolithic period, when people began to make clearings; and, in the Neolithic, the so-called elm decline.[18] All these changes occur in the London sequence, but there is a significant and fascinating anomaly: the remains of yew trees (*Taxus baccata*) found at many excavated sites and even outcropping at the surface of a buried forest on the modern foreshore at Erith in southeast London (Figs 2, 3). Where these yews have been dated (by radiocarbon), they fall into the Late Neolithic and Early Bronze Age, a period of wetland expansion in the Thames estuary.[19] Although yew is not unknown in the British prehistoric record, it is extremely rare in lowland river valleys, and indeed the Thames forest appears to have no modern analogue in Britain. Where recorded in detail,[20] the trees seem not to have been environmentally stressed and to have lived for several centuries on a substratum of peat (often several metres thick) overlying clays.

In addition to the former forest exposed at Erith, records from recent excavations show that yew was also present on the north bank of the Thames from the border of Essex west almost to the City Airport.

Figure 3 *Part of the Neolithic to Iron Age buried forest on the southern foreshore of the Thames at Erith on the border of London and Kent; yew-tree trunks on the surface in the foreground; 18 species of trees have so far been recorded from this 1 km-long site.*

Figure 4 *The remains of an oak-timber Roman quay of the third century AD at the Thames Exchange site in the City of London (right foreground: scale bar 50 cm).*

Furthermore, there are references in the antiquarian sources to many yew trees found in peat deposits and on the surface of the floodplain. These records expand the area that the yew forest seems to have covered. Spurrell noted it in Crossness and even counted tree-ring sequences,[21] and Pepys observed a yew tree at the Blackwall Dock: "And an Ewe-tree he showed us (upon which he says the very Ivy was taken up whole about it), which upon cutting with an addes, we found to be rather harder than the living tree usually is".[22] This last statement can be borne out by those of us who have had to take wood samples from the trees and generally have recourse to a chain saw. Pepys' observation extends the area of the forest east to the Isle of Dogs, where yew has not yet been recorded in modern excavations. As yet, there is no explanation of why this remarkable phenomenon occurred, and it continues to be studied.

Evidence of sea-level change

Britain is an important area for the study of global sea-level change, because deep sediments are preserved in estuaries such as that of the Thames, and in areas of tectonic uplift such as western Scotland. Changes of sea level in the Thames have long aroused interest. There are references in the antiquarian sources to areas now under water that were previously dry land, but modern research stems from the model developed by Devoy,[23] which is now being refined with new data derived from archaeological structures.[24]

The calculation of past sea levels is a complex undertaking, but one to which archaeology can make important contributions. For example, Roman and medieval London had a highly developed waterfront and its quays, many of which have been excavated (Fig. 4), have been used to gauge sea-level change accurately. These timber structures have a great advantage over other indicators in that they can be dated by tree rings (dendrochronology),[25] which is capable of providing a date accurate to within six months. This has proved possible at several sites on the London waterfront, including Regis House.[26] A further advantage of such structures is that they tend to be founded on gravel, which is an extremely robust building material that has not compressed under the great weight of the quays. This means that they are unusually stable and therefore provide accurate reference points from which to calculate past river and sea levels. In contrast, much conventional sea-level research uses data from peat and clay deposits, which are highly compressible and allow only calculations with considerable error margins.

Sea-level research that uses archaeological data is largely restricted to the historical period, with the occasional use of prehistoric evidence, but it adds much-needed information on changes over the past 2000 years, which are very poorly resolved in the geological record. The archaeological research has shown that, in London at least, there have been fluctuations over this period, within the general postglacial trend of rising sea level, which clearly affected people living alongside the Thames, particularly as regards navigation.

Modern applications of archaeological research

Although archaeological research has its own objectives, much of the work on the Thames and its floodplain does have a use outside the subject, particularly in association with river management. Current trends in river management and coastal defence are tending away from the "hard engineering" of previous decades, where river banks and coasts were laced with concrete walls. A more environmentally sustainable approach is now being developed ("soft engineering"), which consists of mechanisms, such as vegetated banks and controlled breaches, that can direct floods to areas set aside for wetlands. This is leading to reclamation of saltmarsh, much of which has been lost during the past 50 years. Research in environmental archaeology on archaic wetlands is being used to help identify suitable areas for reclamation and types of vegetation that can be used for this purpose.

A second application arises from the archaeological research on changing sea levels. While speculation continues as to the nature of the links between greenhouse-gas emissions, annual temperature increases and increased storminess, mean sea level is rising globally. Models of the rate and amplitude of this rise are now being developed in order to calculate how much land will potentially be lost and to establish the necessary extent of river and coastal defences. In London, it has been calculated by the Environment Agency that, if the central area were flooded, up to £20 billion of damage could be done. Current defences against this include the Thames Barrier, but this comes to the end of its design life in 2030. Research is now under way to establish exactly what will be needed to replace it, and this work is incorporating archaeological information, using models of sea-level change over the past 10,000 years.

A wide range of archaeological endeavour is focused on the Thames and its floodplain, where students, academics, county, developer-funded and English-Heritage archaeologists, and amateur groups, are all working to enhance our knowledge of London throughout the periods covered by the archaeological record. It is a testament to the quality and importance of these projects that their results have been recognized outside, as well as within, the discipline of archaeology and that evidence derived from them is contributing towards modern river defence and environmental enhancement.

Notes

1. See p. 5 in D. Bridgland, *The Quaternary of the Thames* (London: Chapman & Hall, 1994).
2. See p. 236 in R. C. Latham & W. Matthews (eds), *The diary of Samuel Pepys*, vol. VI (London: G. Bell, 1972).
3. N. Merriman, "Predicting the unexpected: prehistoric sites recently discovered under alluvium in Central London", in *Alluvial archaeology in Britain*, S. Needham & M. Macklin (eds), 261–7 (Oxford: Oxbow, Oxford Monograph 27, 1992).
4. See F. Meddens, "Sites from the Thames Estuary wetlands, England, and their Bronze Age use", *Antiquity* **70**, 325–34,

1996 for an analysis of some of the trackways. Many more have since been discovered and await publication.

5. The plough fragment was found in a recent excavation at Three Oak Lane, Southwark, by Pre-Construct Archaeology, but has yet to be published.
6. See p. 326 in Meddens 1996, *n.* 3 above.
7. See pp. 8–10 in B. Watson, T. Brigham, T. Dyson, *London Bridge: two thousand years of a river crossing* (London: MoLAS (Museum of London Archaeology series) monograph 8, 2001) for a summary discussion of the ring-ditch.
8. A photograph of the remains of the oak piles was published on p. 12 of *Archaeology International 1998/99.*
9. These finds have not yet been published because, at the time of writing (winter 2001/2002), many of the projects were still at the fieldwork stage.
10. E. J Sidell, J. Cotton, L. Rayner, L. Wheeler, *The prehistory and topography of Southwark and Lambeth,* in press (London: MoLAS monograph); M. Bennell, *Under the road: archaeological discoveries at Bronze Age Way, Erith* (London: Bexley Borough Council, 1998).
11. See p. 190 in G. Worthington Smith, *Man the primeval savage* (London: Edward Stanford, 1894).
12. F. C. J. Spurrell, "On the discovery of the place where Palaeolithic implements where made at Crayford", *Quarterly Journal of the Geological Society of London,* **36**, 544–8, 1880.
13. R. H. Chandler & A. L. Leach, "On the Dartford Heath gravel and on a Palaeolithic implement factory", *Proceedings of the Geologists' Association* **23**, 102–111, 1912.
14. J. Cotton, "Ballast heavers and battle axes: the 'golden age'" of Thames finds, in *Mark Dion: archaeology,* A. Coles & M. Dion (eds), 58–71 (North Battleford, Saskatchewan, Canada: Black Dog Press, 1999).
15. See p. 219 in F. J. C. Spurrell, "On the estuary of the Thames and its alluvium", *Proceedings of the Geological Society* **11**, 210–30, 1889.
16. This is a joint initiative between the Museum of London and the Institute of Archaeology, with additional funding from English Heritage and the Environment Agency. See the article by Gustav Milne in *Archaeology International 1998/99*, pp. 11–12.
17. R. G. Scaife, "Holocene vegetation development in London", in E. J. Sidell, K. N. Wilkinson, R. G. Scaife, N. G. Cameron, *The Holocene evolution of the London Thames: archaeological investigations (1991–1998) in advance of the London Underground Limited Jubilee Line extension,* 111–17 (London: MoLAS monograph 5, 2000).
18. J. R. A. Greig, "The deforestation of London", *Review of Palaeobotany and Palynology* **73**, 71–86, 1992.
19. A. J. Long, R. G. Scaife, R. J. Edwards, "Stratigraphic architecture, relative sea level and models of estuary development in southern England: new data from Southampton Water", in K. Pye & J. R. L. Allen (eds), *Coastal and estuary environments: sedimentology, geomorphology and geoarchaeology,* 253–79 (London: Geological Society Special Publication 175, 2000).
20. S. Seel, "The Erith buried forest" in E. J. Sidell & A. J. Long (eds), *The Thames estuary field guide* (International Geological Correlation Programme Project 437: coastal environmental change during sea-level highstands), 33–39, (Durham: University of Durham Environmental Research Centre, Research Publication 4, 2000).
21. See p. 219 in Spurrell 1889, *n.* 15 above.
22. See p. 236 in Latham & Matthews 1972, *n.* 2 above.
23. R. J. N. Devoy, "Flandrian sea-level changes and vegetational history of the lower Thames estuary", *Philosophical Transactions of the Royal Society of London Series B,* **285**, 355–410, 1979.
24. E. J. Sidell, "Archaeology and sea-level change: improved resolution through the combined use of geographical and archaeological methodologies", in A. Millard, (ed.), 185–93, *Proceedings of the 1997 Archaeological Sciences conference, Durham* (Oxford: Archaeopress, British Archaeological Reports International Series 939, 2001).
25. For an explanation of tree-ring dating and a description of some of its archaeological applications, see the article by Martin Bridge in *Archaeology International 2000/2001*, pp. 17–20.
26. T. Brigham, B. Watson, I. Tyers, "Current archaeological work at Regis House in the City of London", *London Archaeologist* **8**, 31–44, 1996.