The Mesolithic landscape in the Wandle Valley

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In January 2006 Linc Property Holdings Ltd commissioned Museum of London Archaeology (MOLA) to undertake an archaeological evaluation at Ravensbury Park in the Wandle Valley. The site is situated between Morden Road to the north and the River Wandle to the south (site code RPK05; Fig. 1). Four evaluation trenches were placed across the site in order to investigate the possibility of an Anglo-Saxon cemetery which a previous excavation had identified a few metres to the north-east.[1]

Although the evaluation failed to identify a continuation of the cemetery, a sequence of alluvial deposits were recorded which were found to date from the early part of the Holocene (i.e. the last 10,000 years). A geoarchaeological examination of one of the trench sequences (Trench 3), with complimentary palynological and palaeobotanical work, has enabled a detailed picture to emerge of the evolving Wandle Valley floodplain and the landscape changes taking place during the early to mid-Holocene period (the Mesolithic to Early Neolithic).

Natural topography and fluvial history

British Geological Survey mapping[2] shows that the site lies on the interface of Pleistocene terrace gravels to the north and the alluvial floodplain to the south. The higher gravel forms part of the Taplow Terrace and dates from the latter part of the Wolstonian/Saalian cold stage (*c.* 280,000 to 128,000 years ago).[3]

The present floodplain was probably carved out during the interface of the last cold stage (the Devensian) and the present interglacial (the Holocene). After the Last Glacial Maximum, the climate began to warm rapidly, resulting in the melting of the tundral, periglacial landscape (*c.* 18,000 to 15,000 years ago). The increased levels of water discharge into the fluvial system resulted in the degradation of the floodplain surface, and an episode of down-cutting carving out a new floodplain. As the glacial floodwaters subsided, coarse-grained sediments were deposited across the valley floor, forming an unstable braided river environment.

With the amelioration of the climate during the early part of the Holocene, the braid-plain began to stabilise, as peak discharges dropped and pioneering vegetation began to colonise and consolidate channel bars and bank-side areas. As a result, former channels of the braided river became abandoned and in-filled with organic clays and peat deposits. This process is thought to have eventually resulted in the formation of single-thread meandering channels within lowland rivers. By the mid-Holocene the impact of farming and associated woodland clearance increased the sediment supply to rivers. During peak flow discharges the floodwaters would carry this sediment onto the floodplain, eventually raising and levelling its surface.

Holocene alluvial sequences representing such environments have been previously recorded just over 1.3 km north of the Ravensbury park site (Fig. 1). An excavation at Streatham House[5] revealed a peat deposit overlying the floodplain gravels, which was radiocarbon-dated to 9423 ± 72 BP.[6] Geoarchaeological boreholes on an adjacent site at Windsor Avenue[7] also revealed a similar sequence and chronology of deposits. Here the floodplain gravels were overlain by a peat deposit radiocarbon-dated to 9250 ± 50 BP.[8] Both these sites were within the central part of the floodplain, and demonstrated that the Wandle Valley had the potential to contain undisturbed organic alluvial sequences stretching back as far as the Pre-Boreal pollen zone of the early Holocene. However, such deposit sequences have not been analysed beyond the assessment level. This article aims to readdress that balance with an investigation of the early Holocene sequence recorded at Ravensbury Park, and by attempting to place the site within a wider framework of the early Holocene floodplain development of the Wandle Valley.

The site sequence

The sequences recorded in the four evaluation trenches were found to indicate two depositional environments. Trench 1 and the northern part of Trench 4 were positioned over a higher area of the Taplow Terrace gravels (Fig 2). The depositional sequence in these trenches consisted predominately of colluvial deposits and dry soil horizons.

Across this area the basal deposits consisted of mid-orangey-brown, iron-stained, poorly-sorted coarse sandy gravels, with some calcareous inclusions, the surface of which occurred at *c.* 16.8 m OD. These deposits are characteristic of the Pleistocene terrace formations, and were deposited in unstable cold-climate braided river environments.

Above the terrace gravels a 1 m thick unit of dark brown humic silty clay developed. It had the appearance of a gradually accreting topsoil, although its thickness suggests it may be partially derived from eroded topsoil material washing down-slope.

In contrast to this area of higher ground, Trenches

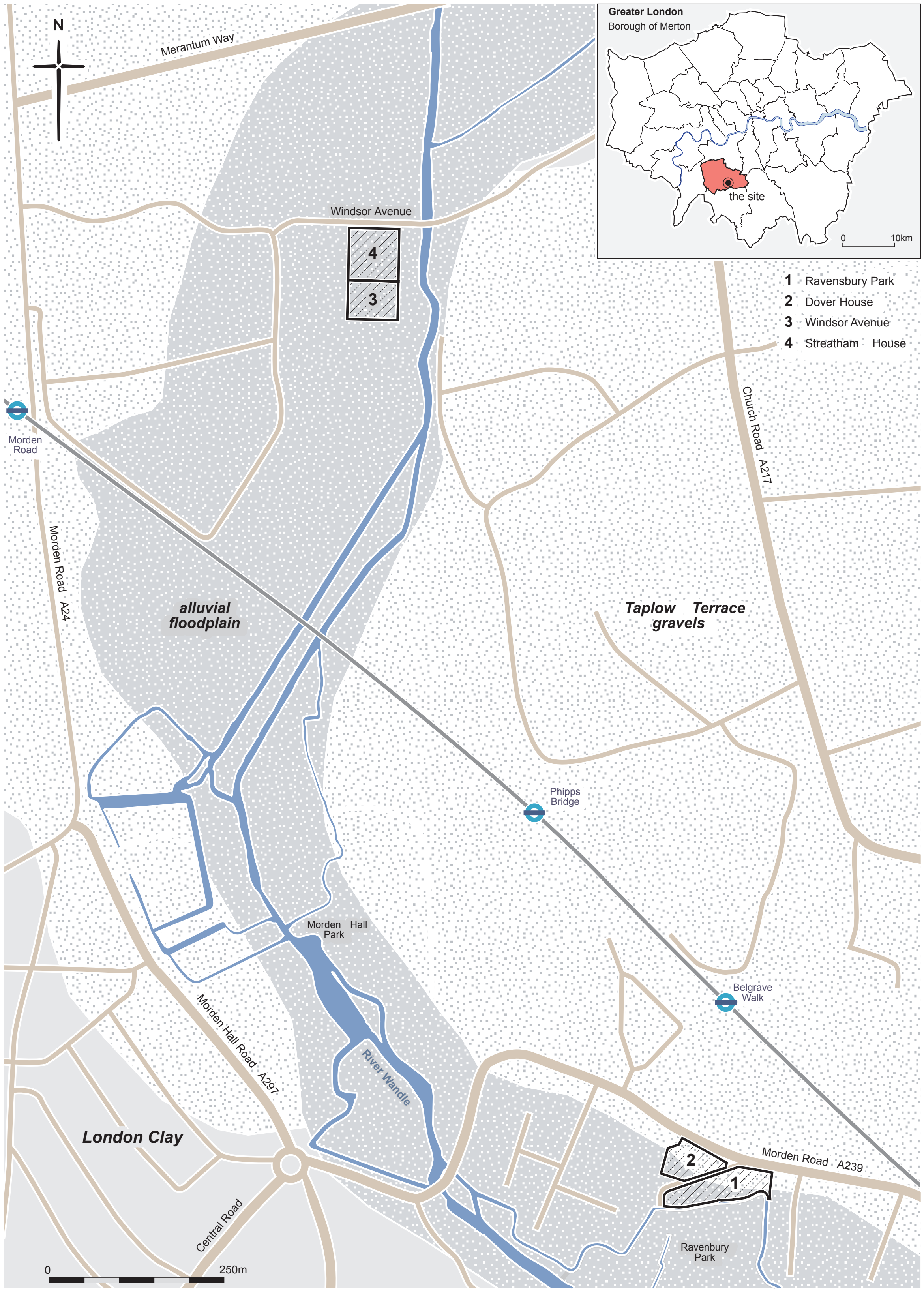

Fig. 1: location of the sites mentioned in the text in relation to British Geological Survey mapped geology

2, 3 and the southern end of Trench 4 were positioned within the alluvial floodplain and were found to consist of a sequence of peats, clays, tufaceous deposits and soliflucted deposits. The marked change in these two zones was most apparent in Trench 4 (Fig. 3).

In this trench, the Pleistocene gravel surface was found to drop suddenly from *c.* 16.8 m OD to *c.* 15.9 m. Filling this hollow, a 0.5 m thick unit of weathered and abraded nodular chalk fragments had accumulated. This lower unit is probably derived from soliflucted material washing down slope, collecting at the terrace base. Such solifluction events are likely to have occurred towards the end of the Devensian Late Glacial period when the climate was beginning to warm rapidly.

The deposits above these soliflucted deposits suggest that the terrace edge was gradually being encroached upon by alluvial deposits. A black anaerobic organic clay points to the onset of standing water conditions, and the development of a sedge fen or reed swamp environment. The overlying deposit consisted of a mid-brown silty clay which contained frequent calcareous inclusions. This deposit marks a change to drier conditions, with the formation of drier soil horizons. The calcareous inclusions are likely to be the result of spring waters, rich in calcium carbonate, episodically flowing across the surface and evaporating, leaving calcareous clasts around root stems. Thick deposits of this 'tufa' were identified to the north-east of the site at Dover House.[9]

Trench 3, which lay further to the south within the floodplain, displayed the most interesting sequence across the site (Fig. 3). The floodplain gravels, which occurred at *c.* 15.8 m OD, were overlain by a dark reddish-brown humified organic clay which measured up to 0.2 m thick. The deposit is similar to the Pre-Boreal deposits (*c.* 9,900 BP) recorded at Windsor Avenue and Streatham House. A radiocarbon date from the top of this deposit gave an age of 9260 ± 50 BP,[10] attesting to the contemporaneous dates of these deposits along the Wandle Valley.

Environmental samples taken from this deposit contained frequent waterlogged sedge (*Carex*), and occasional seeds of pondweed, gypsy-wort (*Lycopus europaeus*), birch (*Betula*), rose (*Rose*) and possibly willow (*Salix*). These plants indicate a marshy wetland environment, with ephemeral pools of standing water developing on the surface. The presence of birch seeds and willowtree buds suggests some sparse tree cover in the locality.

At Ravensbury Park the deposit appears to be less peaty than those observed in the more central parts of the floodplain at Windsor Avenue and Streatham House, and a degree of decomposition of the organic component of the deposit appears to have taken place, leading to a more humified character. This is most likely due to the higher elevation of the deposit at the edge of the floodplain. The analysis of the plant remains also suggests this, with the assemblage consisting only of more robust, lignified seeds.

This Pre-Boreal peat horizon was sealed by a sequence of deposits comparable to the deposits sealing the lower soliflucted material in Trench 4. However, a fine sandy clay silt suggests a short episode of fluvial activity, possibly associated with a spring line occurring at the terrace base. The base of the black homogenous clay in this trench was radiocarbon-dated to 8800 ± 40 BP.[11]

Reconstructing the Early Holocene environment

A detailed examination of the pollen assemblage from the deposits in Trench 3 revealed four distinct pollen

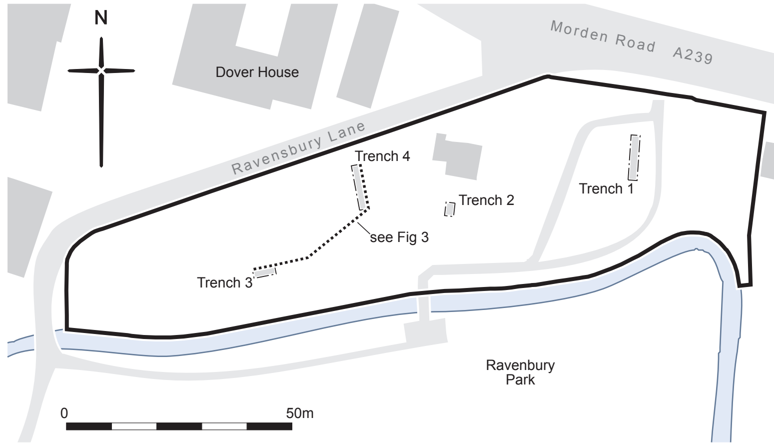

Fig. 2: trench and transect location at Ravensbury Park

zones (RPK 1–4, Figs. 3 and 4), attributable to the early to mid-Holocene. The lower part of the sequence demonstrated the highly dynamic changes in vegetation during the Pre-Boreal to Boreal periods, which equates with the early Mesolithic. During this time the principal woodland types were migrating into the region from their glacial refugia. These changes were in response to temperature amelioration at the close of the Devensian cold stage at 10,000 BP, with progressive arrival and expansion to dominance of first the pioneer colonisers (birch and hazel) followed by more competitive, but more slowly migrating, woodland taxa (pine, followed by oak and elm).

Initially (RPK 1), birch (*Betula*) dominates as a pioneer coloniser of what was an open, arctic tundra before 10,000 BP. Here, this expansion took place in the Pre-Boreal from *c.* 9,900 BP, and resulted in widespread dominant birch woodland. However, a number of herbaceous communities also remained as vestiges of the preceding open-habitat Arctic tundra environment; of specific interest are the occurrences of Jacob's ladder (*Polemonium caeruleum*) and gentian (*Gentiana*). These and mugwort (*Artemisia*) and meadowsweet (*Filipendula*) are typical of the rich open herbaceous vegetation of the Younger Dryas period (Loch Lomond re-advance). They indicate tall herb, short turf and disturbed ground habitats. These herb taxa are light-loving, and were later shaded out by incoming/expanding woodland. The on-site vegetation of this early Holocene period was grass-sedge fen.

During the Pre-Boreal, in addition to the dominant birch, pine pollen is also present in relatively small numbers. It is attributed to pine which was progressively migrating into the region, but was not necessarily growing locally. However, by the top of zone RPK1, values start to increase sharply, suggesting its arrival nearby. By zone RPK2, this is clearly the case, with its pollen attaining high percentage values. This marks the Boreal period which saw the establishment of pine woodland, which ousted the preceding birch from *c.* 9,700–9,500 BP. This phase also saw the competitive ousting of the light-loving

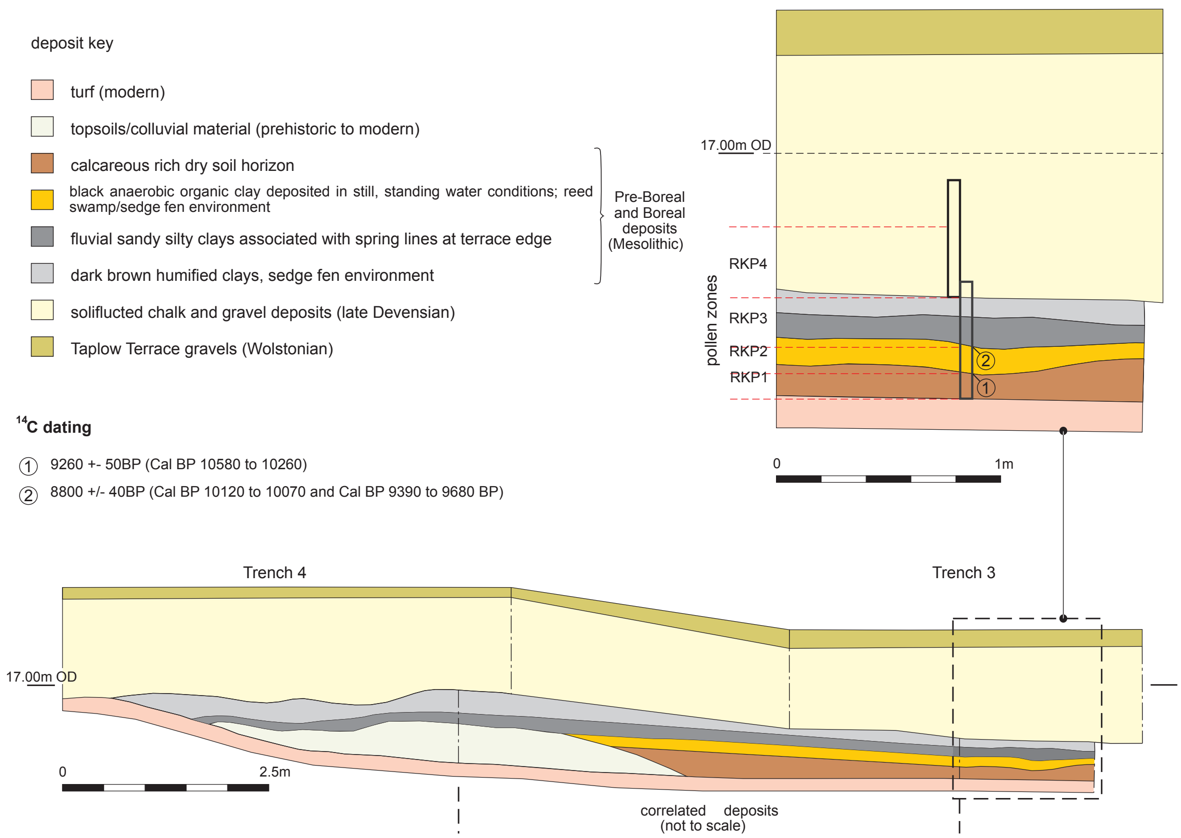

Fig. 3: section across Trenches 4 and 3, with location of pollen sampling column and radiocarbon dates

herb taxa noted in the preceding zone. The on-site vegetation remained grass-sedge fen, but with some evidence of local willow.

Oak (*Quercus*), elm (*Ulmus*) and hazel (*Corylus avellana*) are the next tree taxa to arrive, but appear here only in small numbers with the exception of hazel. Pine remained important, and the previously dominant birch became scarce as these more competitive woodland taxa took over. During zone RPK3, pine and hazel formed the often quoted, and diagnostic, Boreal pine-hazel forest.[12] It is not clear whether oak, elm and lime had established small stands during this period, or whether their pollen was derived from extra-regional sources. Other sites in London and from southern England as a whole clearly show their expansion to dominance at the expense of pine during the middle and later Boreal period.

The boundary between RPK 3 and 4 shows a significant drop in pollen preservation, which corresponds to a stratigraphical change to a more minerogenic topsoil/colluvial layer. Overall, the tree and shrub pollen declines dramatically, with only the more robust types such as dandelion surviving at high levels. However, the presence of cereal pollen in the deposit does suggest a Neolithic or later date.

The evolution of the Wandle floodplain

During the Late Glacial period of the last cold stage (the Younger Dryas/Loch Lomond re-advance, *c.* 13,000 to 11,000 BP) the Wandle floodplain probably consisted of a series of shallow braided channels. High discharge rates during the seasonal melting would have reworked the gravel bed of these channels, eroding and building up new channel bars within the river system. The coarse sediment of these channels was likely to be derived from colluvial/soliflucted material eroding off earlier terrace deposits further up-slope.

At this time the site would have remained as high and dry ground. The characteristics of the gravel suggest it is part of the Taplow Gravel formation rather than the gravel unit of the floodplain. Observations at Windsor Avenue demonstrated that the underlying central floodplain gravels consisted of a finer greenish-grey sandy gravel characteristic of the final phase of gravel deposition occurring at the Late Glacial/early Holocene interface. During seasonal melts, 'rafts' of sludgy semi-frozen soliflucted material slid down slope, collecting at the base of this terrace.

The landscape at this time would have consisted of open sparsely-vegetated arctic tundra. As the climate warmed rapidly at the beginning of the Holocene, pioneering birch began to colonise this open landscape (the Pre-Boreal). The unstable braided channels begun to stabilise as discharge rates dropped, and marshy sedge fen environments began to develop in marginal channel areas. Evidence from Windsor Avenue suggested that the braided river may have begun to adopt an anatomising form, with the sedge fen deposits becoming dissected by a network of ephemeral channels. The sedge fen environments began to encroach onto the higher ground at the Ravensbury site, as represented by the organic deposits developing in Trench 4.

Gradually the birch forest was replaced by pine, with oak, elm and hazel beginning to appear in small numbers (the Boreal). This woodland would have covered the higher ground of the upper terrace, while the floodplain remained as an open sedge fen. However, the pollen evidence and plant macro remains did suggest that willow was beginning to take hold on the lower-lying floodplain areas.

The deposit sequence across the site suggests that during this period the wetland margins encroached further onto the higher ground of the Taplow terrace. An episode of increased fluvial activity appears to have occurred along the floodplain edge, as indicated by the fine sandy clay silts which overlie the Pre-Boreal and early Boreal organic deposits. This episode of flowing water was succeeded by a period of standing water which resulted in the formation of the black homogenous clay.

These upper deposits are somewhat of an anomaly. Deposits similar to the homogenous black clay have been identified in the upper Colne Valley[13] and the upper Lea Valley.[14] Soil micromorphological, pollen work and mollusc evidence from these types of deposits has shown that they occur due to rising water levels, with subsequent increased waterlogging of river valley margins. Radiocarbon-dating of these sediments have produced fairly consistent dates of *c.* 7,000 BP, which corresponds with the increased levels of precipitation occurring during the Climatic Optimum in the Atlantic pollen phase.[15] However, on the Ravensbury Park site the black organic clay produced an earlier radiocarbon date, placing its formation in the late Boreal period. This suggests some form of localised impeded drainage on the floodplain edge, rather than a landscape-wide increase in water levels. These deposits may be associated with spring lines, which excavations at Dover House suggested may be running off the higher ground towards the north-west.

By the end of the Boreal period the flood-plain edge began to evolve into a more terrestrial environment ,with dry humic topsoils developing above the sedge fen and standing water deposits. Colluvial material eroding off topsoil deposits further up the gravel terrace increased the thickness of these deposits substantially.

The investigations at Windsor Avenue suggest that across the lower-lying central part of the floodplain, widespread sedge fen began to develop across relict

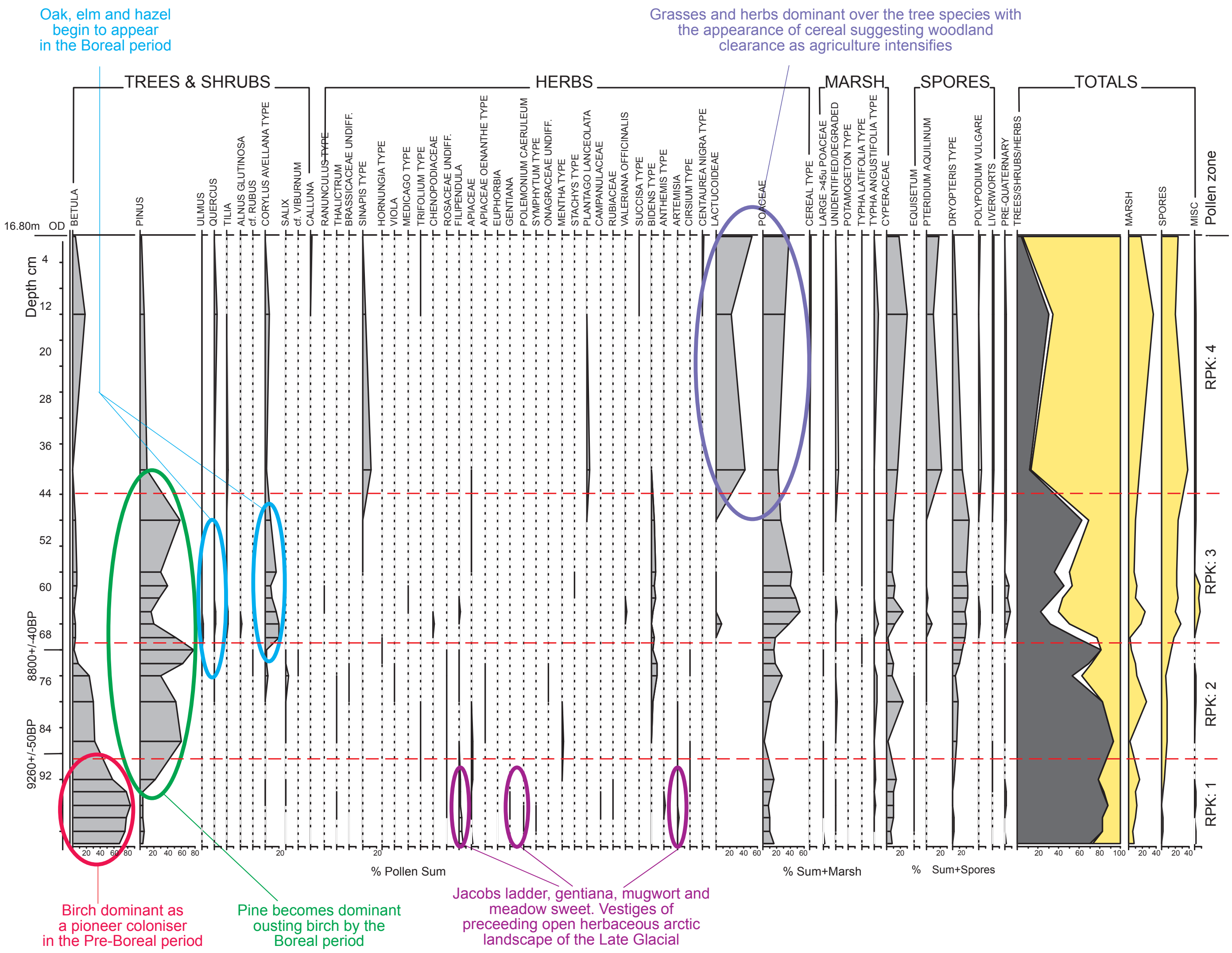

Fig. 4: pollen diagram, illustrating pollen zones RPK1–4 and main points of interest

anatomising channels. The stabilising effect of vegetation on hill slopes and bank-side areas reduced sediment supply to the river system, causing some channels to become dominant through increased rates of incision, while more ephemeral channels became redundant. By the Neolithic period the channels of the Wandle are likely to have adopted a single-thread meandering form.

Although these upper organic clays were undated on Windsor Avenue, the pollen assemblage does point to a Neolithic date. The assemblage showed a decline in tree pollen, although higher percentages of oak, elm and hazel characteristic of the Atlantic pollen phase were present. The increase in grasses and decline in tree pollen may indicate the clearance of upland woodland as agricultural activity intensified.

Above these deposits, minerogenic alluvium was deposited through over-bank flooding, and shows a marked increase in sedimentation rates. This increase in sedimentation, which has been recorded in many lowland rivers,[16] is attributed to an increase in agricultural activity from the Bronze Age into the historic periods. With the clearance of woodland, sediment supply through hill-wash increased, with this sediment being deposited across the floodplain during flood events. These minerogenic deposits represent terrestrial grassland environments, seasonally inundated by flood waters, which gradually raised the floodplain surface protecting it from more frequent episodes of flood inundation. Excavations at Merton Bus Garage[17] suggested that these minerogenic deposits may have continued to accrue across the floodplain into the 17th century.

Conclusions

The excavations at Streatham House, Windsor Avenue and Ravensbury Park have shown that the Wandle Valley contains a well-preserved palaeoenvironmental record stretching across the entire Holocene. Although localised differences exist across the sites, the deposits appear to be widespread, occurring over a 1 km long stretch in the Merton area. Although these sites were not associated with archaeological material, the environmental record can place the prehistoric occupation of the Wandle Valley into a wider landscape context, and provide a valuable insight into how the landscape and floodplain have evolved due to environmental, climatic and anthropogenic factors.

Of particular importance is the presence of the Boreal organic deposits. In other tributaries of the Thames, these deposits have often been associated with *in-situ* early Mesolithic sites. Excavations in the Colne and Lea valleys[18] have found well-preserved Late Upper Palaeolithic/early Mesolithic occupation sites located on the surface of former Late Pleistocene braided river channel bars, sealed by Boreal age peats, or later Atlantic age sedge fen clays. These sites were well preserved, because they were located well within or near the edge of the floodplain and were therefore rapidly buried beneath peat and alluvial deposits of an early Holocene age.

These horizons of potential Mesolithic activity are difficult to identify, and require a sound knowledge of alluvial geoarchaeology combined with an awareness of similar deposit sequences with associated archaeology in other tributaries of the Thames. What is clear from the investigations at these three sites is the high potential of the Wandle Valley to contain not only a good palaeoenvironmental record but also the possibility of well-preserved early Mesolithic sites. Future archaeological work should focus on identifying such sites, which at present are poorly represented not only in the Wandle Valley but in the London area as a whole.

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