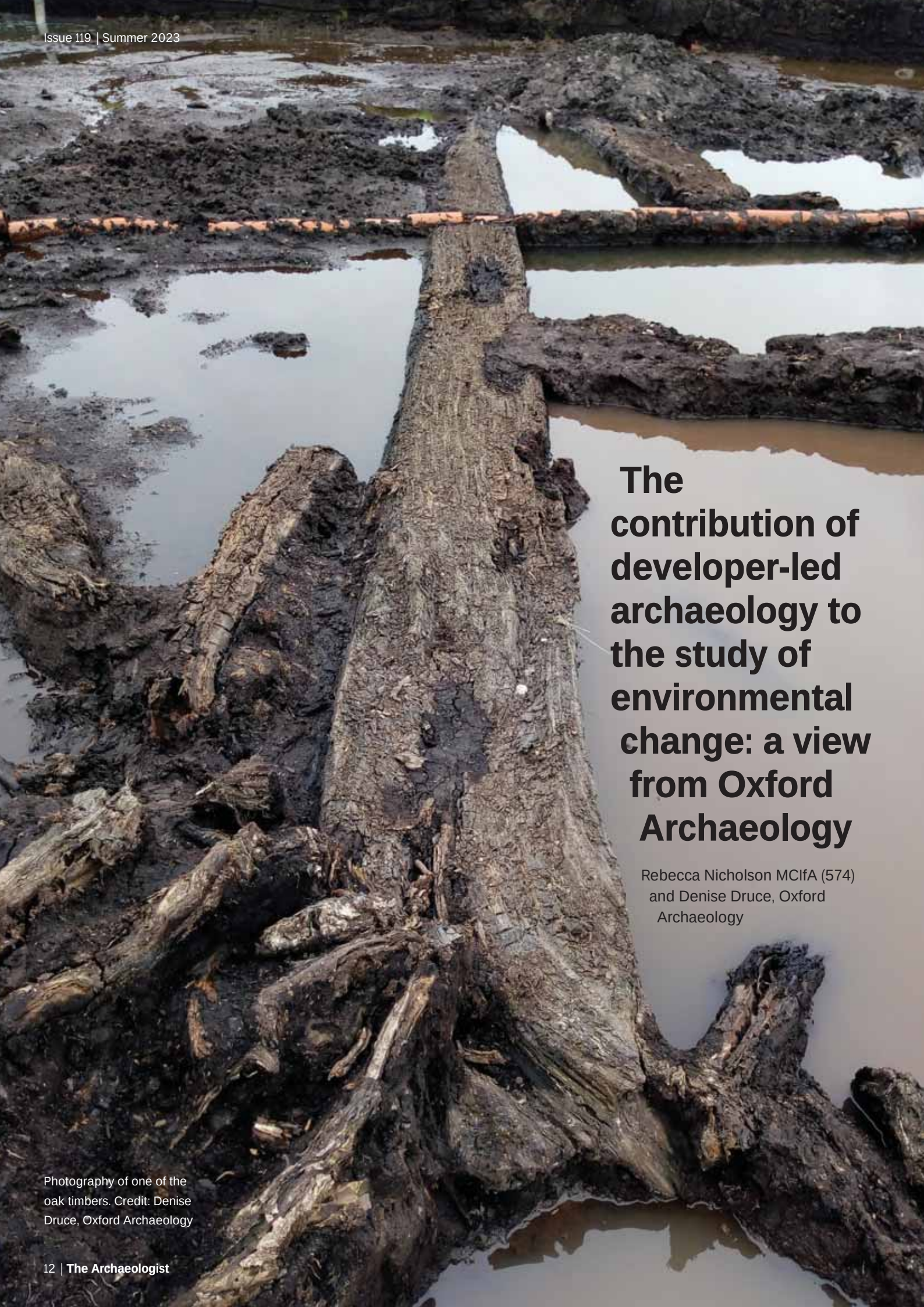

The contribution of developer-led archaeology to the study of environmental change: a view from Oxford Archaeology

Rebecca Nicholson MCIfA (574) and Denise Druce, Oxford Archaeology

Photography of one of the oak timbers. Credit: Denise Druce, Oxford Archaeology

The reconstruction of past landscapes and the role that the environment played in shaping human history at a regional and local scale has been a longstanding feature of archaeological discourse. From its inception, Oxford Archaeology has employed a team of environmental archaeologists to investigate a range of palaeoecological proxies from the remains of plants and animals hidden within the archaeological sediments and from the composition of the soil matrix itself. In recent years our geoarchaeologists, led by Elizabeth Stafford, have increasingly employed deposit models, often including purposive boreholes, to inform our project designs by mapping the extent and distribution of buried deposits, such as peats, across a site or landscape to guide our investigations and to provide continuous sequences for sampling (Champness 2018; Historic England 2020). In conjunction with trial trenching, this has allowed areas of archaeological and palaeoenvironmental potential to be identified, maximising the opportunity to relate human activities to local and wider developments in the landscape and environment over extended time periods.

Aside from the analysis of microfossils such as pollen and diatoms (algae), much of the environmental work that we undertake relies on the recovery of macrofossils (especially bones, seeds and molluscs) and this involves the sieving of large volumes of earth: over the last year in the region of 60,000 litres of soil have been processed using 0.25mm and 0.5mm meshes at our Oxford office alone. With similar procedures followed by most other developer-led archaeological organisations, the quantity of material generated is enormous and now offers considerable potential for both 'big data' analyses and detailed local investigations. This plethora of data is starting to offer us opportunities for research of a kind not typically offered in the developer-funded world, as discussed in the contribution by Anwen Cooper (p6).

Aerial photo of the site. Credit: Debbie Lewis, Oxford Archaeology

Holly leaf (recovered on site). Credit: James Hodgson, Oxford Archaeology

The elm leaf (as it came out of the sample). Credit: Fraser Brown, Oxford Archaeology

Excavations at Windy Harbour, Pouton-le-Fylde

While some of the material we study is relatively robust – charcoal, charred seeds and bone survives in a range of soils and most sites produce at least some items – other organic material is much less common, yet can provide tantalising and tangible insights into lost landscapes. One such example is an elm leaf that featured in the British Museum's recent exhibition 'The World of Stonehenge'. The leaf was recovered from peat near to Poulton-le-Fylde, Lancashire. It was found in association with quantities of charcoal as well as Early Neolithic Carinated Bowl pottery, fragments of Langdale stone axe and Late Mesolithic–Early Neolithic worked flints, recovered from excavations commissioned by Kier Highways on behalf of National Highways in advance of the A585 Windy Harbour to Skippool road improvement scheme. Ongoing analysis of

Sampling the core. Credit: Magdalena Wachnik

pollen, plant macrofossils, insects, diatoms and the sediments themselves, taken from samples both from the excavated trenches and associated boreholes from the earlier phase of deposit modelling, is painting a picture of the changing Mesolithic–Bronze Age landscape at the wetland edge, where it is clear that there was intensive prehistoric occupation. Radiocarbon dating will be pivotal and Bayesian analysis has been enabled by the presence of well-stratified peat deposits in clear association with prehistoric activity. Oak timbers, which have been dated by dendrochronology (by Ian Tyers) provide evidence for an exceptionally long-lived environment, dating from the Neolithic period, where oak trees of significant age were growing and dying for over two millennia. Anatomical irregularities observed in the timbers indicate they were undergoing significant environmental stresses, the most common causes being changing water levels, flooding, sea water ingress, and physical damage due to wind-throw or branches from collapsing neighbouring trees.

Bexhill–Hastings road scheme

Palaeoenvironmental analyses are also forming an important component of another investigation of prehistoric activity at the water's edge, in this case in south-east England, from sites and associated boreholes excavated along the course of the Bexhill–Hastings road scheme, with work funded by East Sussex County Council and Historic England. The landscape consists of ridges of higher land cut by three deeply incised river valleys that extend down into the low-lying area of the main Combe Haven valley, an area of low-lying and poorly drained wetland. Located on the higher ground and at the wetland edge were a very large number of flint scatters dating from the Late Upper Palaeolithic through the entire Mesolithic, when pollen analysis from borehole sequences indicate that the area was mostly covered by mixed dry woodland including hazel, oak, lime and pine, with some birch and elm. Also present were a smaller number of Neolithic and Bronze Age flint scatters, areas of fen peat with waterlogged wood and a number of Bronze Age burnt mounds, in addition to a Roman bloomery site and Anglo-Saxon occupation on higher ground. Post-excavation work is ongoing and includes analysis of a range of palaeoenvironmental proxies, but while a very comprehensive programme of radiocarbon dating and Bayesian analysis, conducted by Peter Marshall at Historic England, is helping to refine chronologies for the nationally significant early prehistoric flint scatters and for the Bronze Age features, the potential of scientific dating to help elucidate environmental change has in this case been limited by fluvial influences. In a regularly flooded landscape, many of the sampled organic sediments failed to produce statistically significant pairs of radiocarbon dates, something which would not have been apparent had only a single item or sediment fraction been dated from each sample.

Nevertheless, the site has yielded some fascinating discoveries: several heads of the human flea Pulex irritans have been identified by David Smith (University of Birmingham) from a pit associated with a Middle Bronze Age burnt mound, a very early find of this blood-sucking parasite. While it is tempting to see this as evidence for the use of the feature for bathing or as a sweat lodge, three fleas are perhaps not conclusive in that regard. Evidence from the pollen and insect remains for the wider landscape indicate that the burnt mounds were located in open or grazed grassland close to a freshwater channel and an area of carr woodland. This damp woodland, predominantly of alder but with fluctuating levels of oak and lime, was represented in a lower-lying area by a thick layer of fen peat dating from the Early Bronze Age. It included an understorey of ferns, rushes and sedges, with nettle, honeysuckle, holly and mistletoe also present and with evidence for water plantain, water starwort, buttercup and mint reflecting a fluctuating water table. Openings, possibly grazed by cattle, may have existed in the earliest Bronze Age woodland. Both pollen and insect evidence indicate that deciduous trees such as oak, beech, lime and pine were located nearby, probably mainly on higher ground. The insect assemblage from this site represents the only prehistoric woodland fauna recovered from this area of East Sussex at the present time, and significantly includes several taxa which are now either regionally extinct or critically endangered.

References

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Rebecca Nicholson

Rebecca is Environmental Manager at Oxford Archaeology and leads a team of archaeobotanical and archaeozoological specialists across the three offices. Following a degree in History and Archaeology at the University of York, she worked as a technician at the Environmental Archaeology Unit at the same university, developing a love of fish remains after mentoring by Andrew 'Bone' Jones, a specialism she still pursues. After an MA in Environmental Archaeology (University of Sheffield), a period working as environmental co-ordinator for the North-East England Archaeological Unit in Newcastle and a spell working abroad, she completed a DPhil on aspects of vertebrate taphonomy and moved to the University of Bradford with a Leverhulme post-doctoral award. There she developed a love of Scottish Archaeology working for the Old Scatness Project before moving south to join Oxford Archaeology in 2004, where she has been ever since, co-ordinating and contributing to the palaeobiological programmes for an exciting and varied range of projects.

Denise Druce

Denise is one of a team of in-house environmental archaeologists who has worked for Oxford Archaeology since 2003. Denise started out in environmental archaeology as a palynologist, but has developed skills in charred plant remains, waterlogged plant remains, and wood and charcoal identification over the years. She is also able to turn her mind to geoarchaeological investigations and interpretation when required. Prior to joining Oxford Archaeology Denise worked as an Environmental Archaeology Assistant for CADW (Welsh Historic Monuments) and for the Palaeoenvironmental Research Centre, Lampeter University (now University of St David's). Denise's academic achievements include obtaining a PhD from Bristol University, which focused on Mesolithic to Romano British environmental change of the Severn Estuary and being awarded a first-class degree in Environment and Archaeology at University of Wales, Lampeter.