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The Archaeologist

Issue 119
Summer 2023

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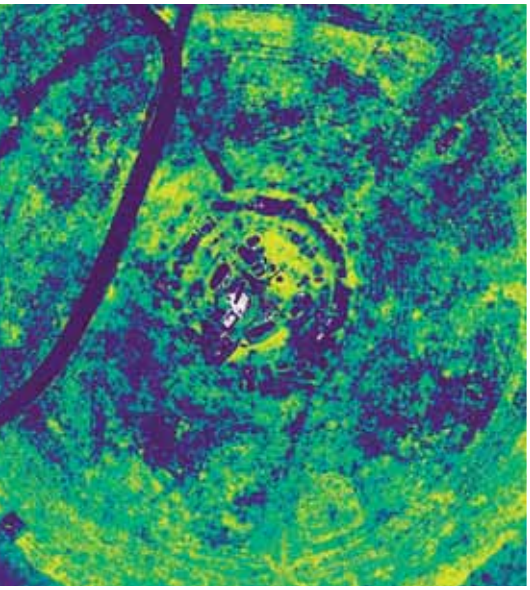

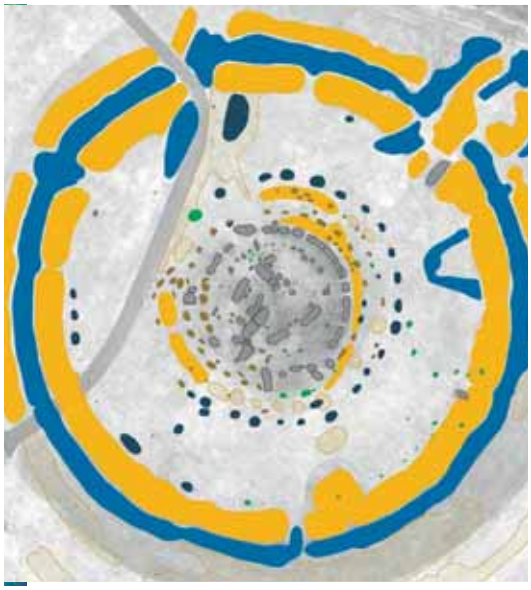

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Themes and deadlines

TA120 will focus on the theme of our 2023 conference, 'sustainable futures'. Articles will highlight where archaeologists believe change should happen to secure the best future for our profession, from skills development, inclusion and ethical practice, through to standards, value and public benefit.. Deadline: 1 August 2023

Contributions to The Archaeologist are encouraged. Please get in touch if you would like to discuss ideas for articles, opinion pieces or interviews.

We now invite submission of 100–150-word abstracts for articles on the theme of forthcoming issues. Abstracts must be accompanied by at least three hi-resolution images (at least 300dpi) in jpeg or tiff format, along with the appropriate photo captions and credits for each image listed within the text document. The editorial team will get in touch regarding selection and final submissions.

We request that authors pay close attention to the guidance on submitting articles, which can be found on the website: www.archaeologists.net/publications/archaeologist

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Design and layout by Sue Cawood
Printed by Fuller Davies
ISSN: 1368-9169

Cover photo: Bracken-covered cairnfield in a project study area of the Cumbria. Credit: Philip Barratt

EDITORIAL

Jen Parker Wooding MCIfA (7885), Senior Professional Standards and Practice Coordinator CIfA

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With climate change at the top of agendas and an enhanced interest in past, present and future environments, the role of the environmental archaeologist has never been more important. This edition of TA showcases the breadth and depth of environmental archaeology and its far-reaching applications.

Innovations in techniques, analytical methods and the use of multidisciplinary approaches has resulted in a huge increase in environmental data, and its potential to contribute to current and future environmental debates and agendas. This has attracted large-scale funding for multi-partner, collaborative research projects, such as the UKRI-funded 'Rewilding' project introduced by Anwen Cooper and Tina Roushannafas. Here they emphasise the central role that archaeology can play when it comes to interdisciplinary nature recovery agendas. Similarly, Philip Barratt and Hannah O'Regan show the value of environmental data in the UKRI-funded Creative Adaptive Solutions for Treescapes Of Rivers (CASTOR) project, again illustrating the increased interest in environmental archaeology, especially outside of the sector. These projects demonstrate the importance of collaboration and research synthesis, but it is important to acknowledge that a lot of the data being generated is increasingly derived from developer-led archaeology, to which most of these articles can attest. Rebecca Nicholson and Denise Druce explain how Oxford Archaeology now has a greater ability to contribute more widely to research that would not ordinarily be associated with developer-funded archaeology. Andrew Margetts, Lucy Allott, Alice Dowsett and Richard James (Archaeology South-East) also emphasise the opportunities of working on large-scale projects to input into wider discussions to support conservation approaches or inform choices about land management.

Looking in detail at the study of specific environmental features and finds excavated at sites, Warren Bailie outlines the information that can be extracted from the study of palaeochannels, whilst Julie Curl details how animal tracks left on drying Roman ceramic tile fragments provides an alternative way of identifying the presence of wild and domestic animals in the absence of surviving faunal remains. These data sets paint a picture of past landscapes, climates, flora, and fauna and can add valuable historical context to an area. A great example of this is outlined by Richard Tipping, Eileen Tisdall, Morvern French and Stefan Sagrott's article. Their project, 'Weathering Extremes', used lidar data alongside environmental and scientific analyses to reconstruct the climatic impact of storm surges on the landscape at Caerlaverock with the newfound evidence supplementing the historical narrative of the medieval castles located there. However, reconstructing past environments and climates also comes with challenges and interpretation of the data is key. Elizabeth Pearson presents the conundrum of cross-referencing paleoenvironmental sequences against existing climate models, exploring the potential issues and inconsistencies involved, whilst discussing how environmental archaeologists can help to address any uncertainties faced.

Collectively these articles emphasise the role archaeologists play in communicating the results of environmental investigations, to inform stakeholders about the past, and to help navigate the environmental challenges of the future. Tabitha Gulliver Lawrence concludes with a think piece exploring an archaeologist's perspective of the natural world and how diverse interests within a team can help encourage lively discussion and knowledge exchange. That's what it all comes down to, whether it's 'big data' or an individual, a continuous cycle of learning and sharing maximises the benefits that archaeologists bring to society, and in this case that environmental archaeologists bring to society.

Environmental archaeology in the wild: making space for the past in the new conservation movement

Philip Barratt and Hannah O'Regan, Department of Classics and Archaeology, University of Nottingham

Bracken-covered cairnfield in a project study area of the Cumbria. Credit: Philip Barratt

As humans seek to mitigate the environmental effects of our actions, intentional and unintentional, nature-based solutions are being looked to for answers. Rewilding has become an increasingly popular option and, though definitions and principles are varied, it tends to follow a future-focused framework. Thus, despite the 're' prefix, it is often future action and not the past that informs intervention; a belief that 'unleashing' natural processes now will inherently bring about desirable results. However, like our current difficulties with human-made environments, the potential for unintended results is ever present.

Humans have been eco-engineering for millennia, and in the UK there is no part of the landscape that has not been affected. From niche construction in the Mesolithic, through to agriculture and urbanisation, people have always intervened to shape the environment. Each of these impacted the environment at different spatial and temporal scales with compounding and overlapping effects, driving constantly shifting baseline conditions in which further new impacts take place. This is still true today, where interventions are too often based on temporary contemporary conditions.

Successful approaches to these problems require a deeper understanding of humans as integral to the environment, as only the most misanthropic conservationist looks forward to a future without people. It is here that the past could and should have a role in these debates and the decisions taken to tackle present and future environmental problems. Environmental archaeology is well placed to contribute, as it encompasses the skills and techniques to access and interpret records of long-term human–environment interactions.

These records can come from deposits preserved over millennia in caves, peat bogs or lakes, enabling, for example, the detailed reconstruction of landscape change from pollen or identifying the presence of plants and animals from sedimentary ancient DNA. Environmental archaeology allows us to examine how

Drone landing after high resolution surface survey in bad weather. Credit: Philip Barratt

environmental interdependencies develop over different temporal scales, observing periods of environmental resilience and crossings of ecological thresholds. It also enables us to engage with and communicate a narrative of a shared past to communities whose involvement and support is vital for successful future solutions.

Unusually, environmental archaeology was incorporated from the start of the multi-disciplinary UKRI-funded Creative Adaptive Solutions for Treescapes of Rivers (CASTOR) project. CASTOR is looking at the modern socio-economic complexities of riparian woodland expansion in the UK. This is an example of contemporary rewilding-related research, leveraging our knowledge of the past. The work of the environmental archaeologists involved in the project is to integrate faunal, vegetation and archaeological records from key study regions in Yorkshire and the Lake District, and use them to infer likely historic and prehistoric processes to better inform modelling and future management.

For example, pollen datasets have been collated, digitised, and new Bayesian chronologies created to improve cross-site correlations. These are being used, in tandem with data collated from HER records, to develop landscape scenarios for hydrological models looking at changing run-off and flooding through time. A targeted programme of coring will refine these models by detailing the transition of wetland environments in the study area. In addition, the rich data provided through all archaeological sources, such as cores, bones and monuments, are being used to develop local landscape scenarios from the Neolithic

Drone survey of stone circle and adjacent peatland (centre) prior to coring for environmental evidence. Credit: Dr Mark Smith, University of Leeds

onwards. These are the foundation for new virtual reality interventions that will allow local communities to experience site-specific human and environmental change through time.

Through this work, we have found that different research partners have varied expectations of archaeological data, and vice-versa. Taphonomic challenges can limit the regions available for study, and regions suitable for modelling may not be archaeologically rich. In these situations, compromise is necessary, a process useful in identifying where to focus resources to meet research priorities. It also challenges assumptions about the extent and quality of existing archaeological and palaeoenvironmental data. For example, when scrutinised, an apparent wealth of 20th-century pollen data may dwindle to a few sites suitable for contemporary analysis. Continued development of these foundational datasets is often neglected by funding programmes, a situation that would benefit from reviewing. However, it is unquestionably an interdisciplinary approach that is required to meet the challenges presented by climate change, and environmental archaeology deserves a seat at the table.

The CASTOR project is led by Dr M Dennis, University of Manchester. Prof H O'Regan, University of Nottingham, is a co-investigator for the environmental archaeology element of the project. https://www.uktreescapes.org/projects/castor/

Ring cairn in archaeological landscape to be used for hydrological modelling. Credit: Philip Barratt

Dr Phil Barratt

Dr Phil Barratt is a Post-Doctoral Research Associate in Environmental Archaeology at the University of Nottingham, working on the UKRI-funded CASTOR project, and is also Affiliate Researcher in Archaeology at the University of Glasgow. He has worked on research and contract projects in the UK and Ireland using environmental proxies and developing radiocarbon and tree-ring chronologies.

Hannah O'Regan

Hannah O'Regan is Professor of Archaeology and Palaeoecology at the University of Nottingham. She is particularly interested in relationships between humans and other animals, and has worked with bones from Palaeolithic to post-medieval sites in the UK and South Africa. She is currently researching the history of bears in Britain, and her role in CASTOR is to advise on zooarchaeology and palaeoecology in upland England.

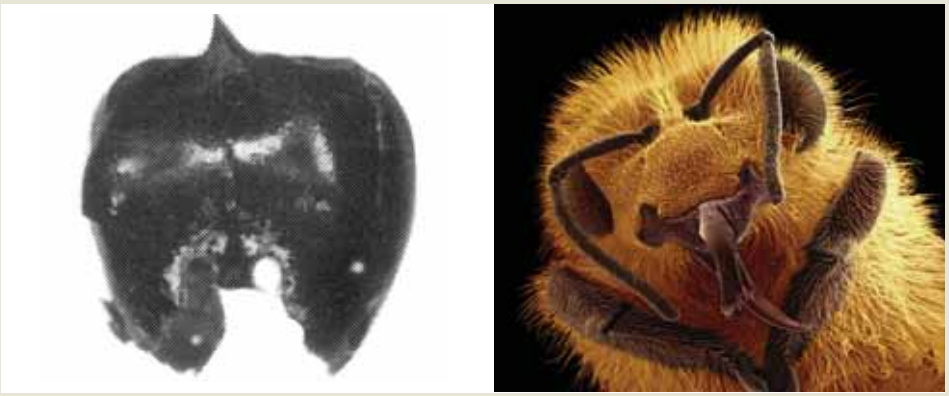
‘REWILDING’ LATER PREHISTORY:

using palaeoenvironmental evidence to reveal the ‘wonder and enchantment’ of past wildlife, and to showcase archaeology’s central role in future nature recovery

Anwen Cooper and Tina Roushannafas, Oxford Archaeology

Discussions about climate change and biodiversity loss, and attempts to limit them, currently abound. David Attenborough’s new Wild Isles series both awakens us to the magical wildlife of the British Isles and warns us of its extreme fragility. Wider media coverage bombards us with statistics about threatened and diminishing species – from honeybees, to capercaillie, to elm trees. At the same time, we hear hopeful stories about new farming methods that help to revitalise biodiversity and boost the sustainability of a much-threatened industry; about the positive actions of species introduced into protected landscapes – wild boar, white stork, beaver, and so on – and about ambitious government plans for national-scale nature recovery. In this context, archaeologists have rightly revisited their working relationships with ecologists and have sought to make archaeology relevant to current debates. A new four-year UKRI-funded research project – ‘Rewilding’ later prehistory: Bronze and Iron Age ecologies from the perspective of the wild – captures this moment by taking positive practical steps to foreground the ‘wonder and enchantment’ of past wildlife, and by asking important questions about how archaeology can play a central role in global interdisciplinary nature recovery agendas.

The ‘Rewilding’ project, led by Oxford Archaeology (OA), brings together an international network of archaeological scientists, digital specialists and rewilding experts. Our use of the term ‘rewilding’ is a deliberate play on words. Contemporary ecological rewilding aims to restore wildlife areas in modern landscapes, to reinstate species – like beavers – that have become locally extinct, to let natural processes – scrubland regeneration and rewetting – take over, and to encourage a wide set of people to reconnect with nature. Archaeological ‘rewilding’ aims instead to reconnect archaeologists with elements of past landscapes that were beyond human control, and to ask what wildlife was in past landscapes, what wildlife meant to people in the past, and why an archaeological perspective on wildlife matters now. Leading the project from Oxford Archaeology gives landscape and environmental archaeology experts at a major fieldwork organisation time and space to explore cutting-edge research themes, to extend their research skills, and to pilot research methods that enhance Oxford Archaeology’s charitable and business aims. We are working with colleagues at CIfA, Historic England, the Association for Environmental Archaeology and the University of Bournemouth to respond to the results of our survey of key training needs and resource requirements for researchers in developer-funded archaeology.



Head of a honey bee from a Middle Bronze Age enclosure ditch at Mingies Ditch, Oxfordshire, alongside a modern example (Credits: Oxford Archaeology; Annie Cavanagh. Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)). Recent declines in bees and beekeepers have led to claims of a global pollination crisis

One key ‘Rewilding’ project aim is to create a novel holistic account of Bronze and Iron Age ecologies – from 2500 BC to AD 43 – in the Thames Valley, the East Anglian Fens, Northumberland, West Sussex and Wales. The Bronze and Iron Ages cover a key tipping point in the transition from wild to farmed landscapes in Britain, when extensive field systems emerged and vast tracts of woodland were cleared. As yet, however, there is no cross-regional synthesis of a full spectrum of plants and animals for this period. Traditional histories of Bronze and Iron Age landscapes focus almost entirely on stories of human ‘progress’ or of environmental loss – intricate accounts have been built of farming revolution, technological achievement, urbanisation, woodland decline and animal extinction. Meanwhile, subtler but still important narratives – of woodland regeneration, phases and regions of heightened human mobility, farming setbacks, and the essential role of wild plants and animals in everyday lives – have been overshadowed.

Since their introduction in 2016, white storks have made the Knepp landscape, West Sussex, their home. Alongside creating nests that also attract sparrow colonies and managing small mammal, earthworm and insect populations, this graffiti in Brighton shows the extent to which white storks offer a charismatic totem for nature recovery, connecting people in towns and villages with the wider landscape. Credit: Knepp Castle Estate

Evidence for prehistoric wildlife can be extremely difficult to reach. This is partly because wild plant and animal remains are often not preserved in archaeological deposits. Information about such remains (and especially those of wild species) can also be hard to recover from assorted data silos across British archaeology. Even so, extraordinarily well-preserved sites like the Late Bronze Age pile-dwelling settlement at Must Farm, Cambridgeshire, offer vivid reminders of just how important wild species were in prehistoric peoples' lives. Elsewhere, deposits of objects like pierced limpet shells, a white-tailed eagle talon, or a pillow of meadowsweet in prehistoric burials, and odd collections of wild animal remains – red and roe deer, pine marten, wild boar and badger fragments in a Bronze Age watering hole – raise important questions about how prehistoric people understood wildlife. Ecological combinations and species that blur the boundaries between 'wild' and 'domesticated' – weeds, horses, and hedgerows – are another key research focus.

The OA team will work closely with environmental archaeologists and the Archaeology Data Service (ADS) to improve access for all to digital information about plant and vertebrate animal remains. We will link up with scientists at the Universities of Oxford and Exeter, and the Centre for Ancient Genomics, Toulouse to create an original toolkit for investigating archaeological wildlife, using high-resolution aDNA and isotope methods to explore themes such as horse 'ferality', the vegetational makeup of 'blank spaces' – landscapes where repeated investigations have produced no archaeological trace – and whether or not it is possible to identify and characterise prehistoric hedgerows archaeologically. Overall, we hope to gain fresh insight into how wildlife and people shaped one another in prehistory, and into just how 'wild' habitats commonly understood as areas of 'wilderness' – for instance woodlands – actually were.

Traditional narratives which focus on farming revolution and environmental loss in prehistory are reinforced via captivating reconstruction drawings like this one. Credit: Oxford Archaeology

Pierced sea eagle talon, mammal rib, boar tooth and clay bead, buried with an Early Iron Age child (c. 2800 BP) at Soham, Cambridgeshire. Credit: CFA Archaeology

Many of our research ideas have been shaped by the interests of rewilding pioneers and project collaborators, Knepp Castle Estate.[1] By working closely with nature recovery experts and volunteer groups, we want to explore the many ways in which archaeology and nature recovery can be mutually beneficial.

[1] https://www.rewildingbritain.org.uk/rewilding-projects/knepp-castle-estate

Cutting-edge methods and underused datasets for our archaeological wildlife toolkit: (a) using contemporary hedging practices to improve identifications of hedges in prehistory; (b) horse tooth samples in preparation for high resolution isotope analysis; (c) existing but currently unused pollen samples awaiting further analysis and dating on the 'Rewilding' project. Credit: Oxford Archaeology

The 'Rewilding' project team with colleagues at Historic England and Knepp Castle Estate. Credit: Tina Roushannafas, Oxford Archaeology

Palaeoenvironmental evidence can inform understandings of current ecological patterns – for instance by determining whether current species declines are part of longer-term cycles or are a direct effect of recent climate change – and can provide fascinating details about the histories of species being considered for reintroduction in nature recovery projects. 'Rewilding' researchers are already learning from Knepp ecologists how animal–plant dynamics in current rewilding landscapes can help us to interpret interspecies relationships in archaeological settings: herbaceous plant combinations previously thought by archaeologists to be related to human activity can in fact be created by rootling pigs. Studying a period in which tending to wildlife was integral to farming practices offers a novel perspective on current relationships between farming and wildlife. Illuminating past understandings of wildlife can help to challenge the idea that 'wildlife' has a fixed definition. We will also be working with artists and ecologists to build creative archaeological wildlife interpretations for visitors to rewilded landscapes, the income from whom, importantly, funds further nature recovery work.

For more information about the 'Rewilding' project and upcoming events, follow us @RewildArch, listen to our Knepp Wildland podcast (https://t.co/f1M91NSFyJ) or visit our website at: https://rewilding.oxfordarchaeology.com/

Tina Roushannafas

Tina is a postdoctoral researcher on the 'Rewilding' later prehistory project. Tina specialises in ancient plant remains (archaeobotany), having completed an environmental archaeology master's in 2016/7 and worked as an archaeobotanical lab technician in 2018/9, both at the University of Oxford. She has several years' experience in developer-funded archaeology, starting out in the field and later working as a project officer specialising in environmental sampling/analysis. While particularly interested in prehistoric and early medieval Britain, she has worked on a range of assemblages, including Neolithic and Bronze Age sites in the Near East. Her research interests include the uses of wild plants, diversification and resilience in crop cultivation and open science practices. Her PhD research utilised geometric morphometrics (statistics-based shape analysis) to explore diversity in archaeobotanical wheat remains.

Anwen Cooper

Anwen is the lead investigator on the 'Rewilding' later prehistory project – a UKRI Future Leader Fellowship. Anwen's main research interests are later prehistoric Britain and Ireland, and interpretative approaches to landscape, material culture, and archaeological practice. She has worked across the sector in British archaeology, as a field surveyor, landscape-scale site director, and development control officer (1996–2006), and as a postdoctoral researcher on high-profile collaborative projects at the Universities of Oxford, Manchester and Reading (2012–2022). Her PhD explored knowledge creation during archaeology's 'professionalisation' during the period 1970–2010, drawing on CIfA archival material. Most recently, she worked with a team at Cambridge Archaeological Unit to bring to publication the spectacular Late Bronze Age pile-dwelling settlement at Must Farm, Cambridgeshire.

Telling the stories of landscape:
a team-based approach to environmental archaeology

Andrew Margetts, Post-excavation Project Manager; Lucy Allott, Senior Archaeobotanist; Alice Dowsett MCIfA (11957), Senior Geoarchaeologist; and Richard James MCIfA (1496), Senior Archaeologist, Archaeology South-East

Our broad specialisms within the field of environmental archaeology ensures Archaeology South-East (UCL Institute of Archaeology) can undertake holistic approaches to communicating the past, allowing us to support the planning of large-scale conservation projects and to inform choices about land management and landscape change. We are fortunate to be imbedded within a coherent set of historic landscapes that articulate with Natural England's National Character Areas (NCAs). Their definition has immense value as they provide a framework for reconstructing the relationships between past societies and the environment in order to understand the evolution of the modern countryside.

Heathland landscapes: Black Down, West Sussex (includes material © Archaeology South-East; Courtesy of Enid Allison; © Natural England under CC BY-NC-ND 2.0 licence)

Environmental archaeology has been at the heart of forming understanding of the evolution of some of the most important historic landscapes in the areas in which we work. From the coastal marshes of Kent and Sussex to the claylands and heaths of East Anglia, archaeology takes us into some of our most ecologically rich and historically interesting cultural landscapes. Alongside archaeological and historic environment work, our geoarchaeological and palaeoenvironmental expertise helps chart these changing environments from the depths of prehistory up to the present day.

Black Down, 240 hectares of wooded heathland in National Trust ownership, straddling the boundary between the South Downs National Park and the Surrey Hills AONB, provides an example of where historic landscape analysis told the story of this beautiful and vulnerable part of the countryside to visitors, but also helped the National Trust manage the site in a sustainable way. By mapping surviving archaeological features and charting the evolution of the landscape, we were able to reconstruct historic land use from the Mesolithic onwards.

A holistic approach ensures integration of geoarchaeological and paleoenvironmental work with historic landscape analysis and archaeological investigations. Our recent work within the nationally important landscape of the Wantsum Channel, Kent, identified deep sedimentary sequences. These were shown to preserve a record of the landscape over the last 13,000 years, helping us understand a location witness to some of the defining moments in our history (such as the opening of the Dover Strait, the Claudian invasion and the landing of St Augustine). Over 500 subsamples were extracted from 21 boreholes in order to study the relative abundance and diversity of a range of environmental proxies. These included pollen, diatoms, foraminifera, ostracoda, insects, plant macrofossils and mollusca. Lithological, particle-size and micromorphological analyses were also performed on the sediments. This palaeoenvironmental and geomorphological strategy was supported by scientific dating subsequently built into Bayesian models, allowing the creation of a detailed chronological framework for the sedimentary sequences.

Knowledge of past landscapes also allows us to plan for future change. Medmerry, on the Manhood Peninsula, West Sussex, comprises the largest managed realignment of open coastline in Europe. It provided an opportunity to examine a landscape subject to dynamic coastal processes that have impacted the local community today as much as influencing how, where and when people lived in the area in the past. The landscape preserved environmental remains, in dry and waterlogged conditions, revealing a complex interplay between freshwater, saline and brackish environments that impacted flora and fauna as well as human settlement. A range of samples were analysed including plant macrofossils, wood, fauna and mollusca as well as pollen, micropalaeontological remains and insects, providing information about vegetation and agricultural and pastoral economies, as well as human exploitation and management of resources.

Environmental archaeology is at its best when employed as part of synthetic multi-disciplinary approaches. At Archaeology South-East, publication of archaeological syntheses that include major environmental components tally with Natural England's NCAs (https://www.ucl.ac.uk/archaeology-south-east/our-research/publications). The understanding of the evolution of these landscapes helps facilitate their conservation and enhancement. Articulation with areas of landscape character has been helpful in forming meaningful study areas. ASE are in the process of completing major new archaeological syntheses of the Sussex coastal plain and the important wetland landscape of Romney Marsh. Over the last decade our work has transformed understanding of the South East's largest environmental and cultural area, the woodland landscape of the Weald.

Here, as elsewhere in Britain, past agriculture has been one of the biggest influences on landscape ecology and biology. By elucidating the history of particular agricultural regimes, and charting their impact through palaeoenvironmental studies, we can evaluate both their benefits and disadvantages in terms of habitat and nature recovery. In the case of the Weald, historic woodland management and pastoral land use had a fundamental impact on the area's landscape character. Wood pasture in particular has been of great importance to the formation of the region and its restoration enhances the historic landscape.

Wood pasture is an incredibly rich habitat, the product of grazing animals within historic land management systems. These environments often owe their origins to the medieval period when herders turned their beasts out on the wooded commons. As well as their ecological importance, these sites have additional cultural and landscape value. At Archaeology South-

From the coastal marshes of Kent and Sussex to the claylands and heaths of East Anglia, archaeology takes us into some of our most ecologically rich and historically interesting cultural landscapes.

Wetland landscapes: The Medmerry realignment scheme (includes material © Archaeology South-East; © Environment Agency; © Natural England under CC BY-NC-ND 2.0 licence

East we are exploring historical and archaeological aspects of the origins, composition and operation of wood-pasture. Our work has involved engagement with conservation bodies such as the Sussex Wildlife Trust, but understanding of historic agricultural regimes also has wider public benefit. The creation, management and restoration of wood pasture is a key element of the government's new Environmental Land Management Scheme (ELMS). Farmers, land managers and practitioners of regenerative agriculture can embrace recognisable elements of historic pastoralism to respond to the agricultural challenges of the future.

By utilising landscape character areas as a framework for our environmental archaeology we are able to help communities by informing decisions about the places they inhabit and care for. By demonstrating how a given landscape has evolved, we can aid choices about land management and landscape change, providing valuable evidence to help inform planning and conservation decisions. Only through partnership can archaeology respond to the challenges of the future, and only through embracing the multidisciplinary elements of 'environmental archaeology' can we as practitioners inform the restoration and enhancement of the historic landscape. By doing this we will provide added benefit in terms of supporting biodiversity and nature recovery and aiding the targeting of agri-environment schemes.

Andrew Margetts

Andy has published widely on the archaeology of South East England, with a particular focus on the Wealden region. His main research interests are medieval pastoralism and agriculture as well as the application of archaeological studies to inform future landscape management.

Lucy Allott

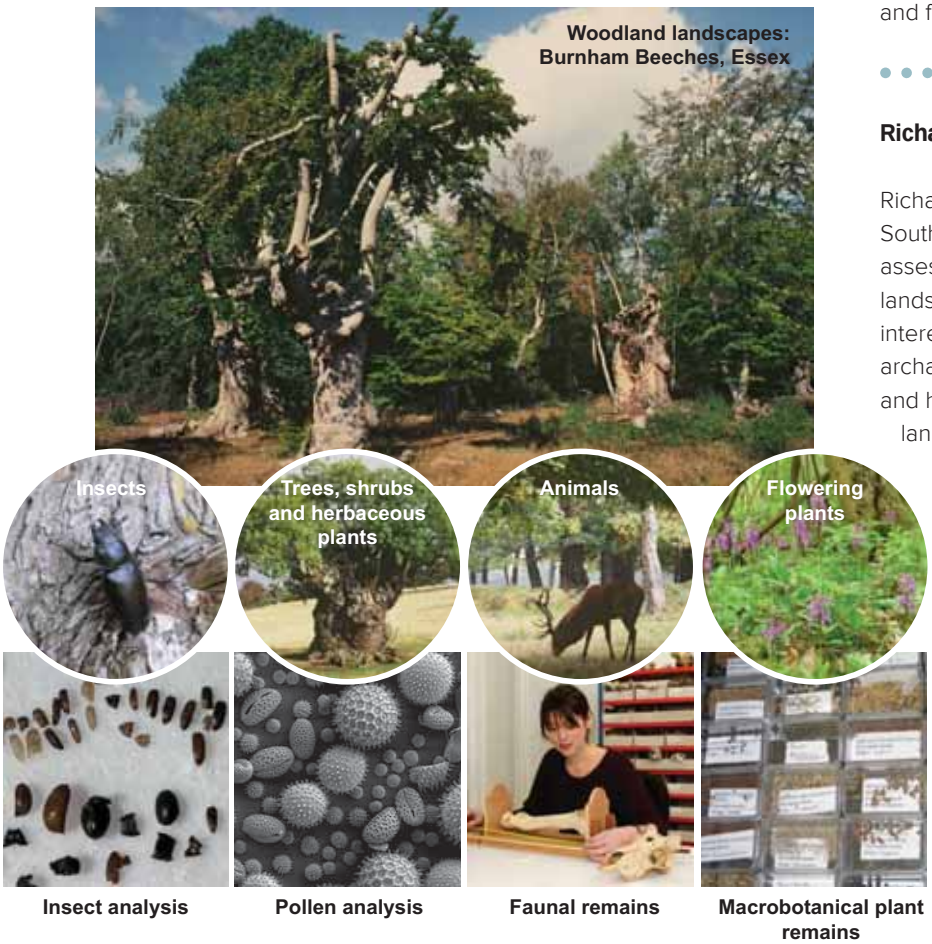
After completing a PhD at the University of the Witwatersrand, South Africa, Lucy joined ASE in 2005. Lucy has developed research interests in woodland management, fuel supplies, and imports of timber and plant food to London. She teaches identification of archaeological wood and charcoal annually at Kew Royal Botanic Gardens.

Alice Dowsett

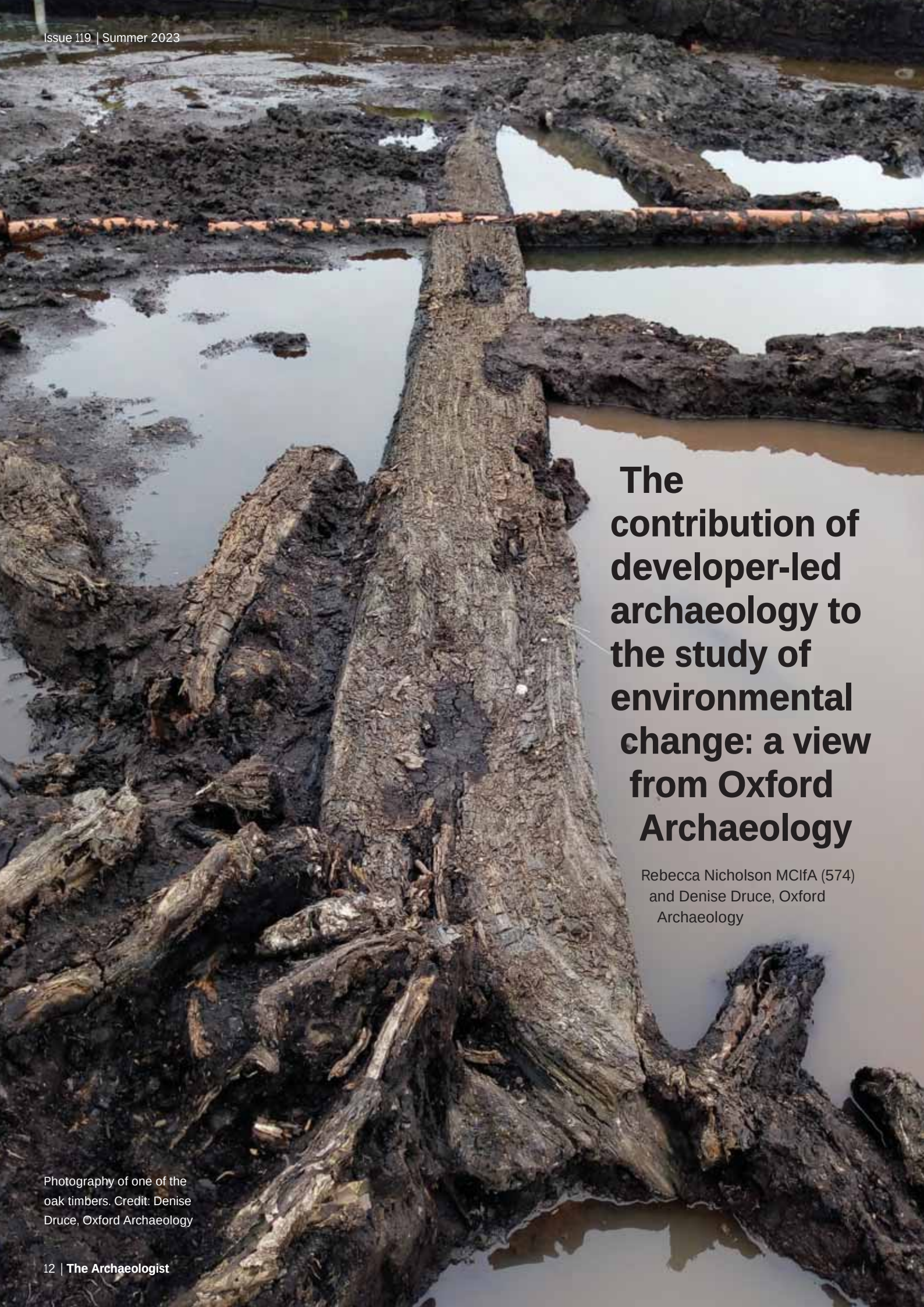
Alice is a Senior Geoarchaeologist at Archaeology South-East. She is a specialist in reconstructing Holocene landscapes and has been undertaking palaeoenvironmental investigations in the south-east of England for the past seven years. Alice specialises in the analysis of ostracods and foraminifera.

Richard James

Richard is a Senior Archaeologist with Archaeology South-East, specialising in archaeological impact assessment and historic landscape surveys. His interests include the archaeology of woodland and heathland landscapes.



Woodland landscapes: Burnham Beeches (includes material © Archaeology South-East; Courtesy of Enid Allison; © Natural England under CC BY-NC-ND 2.0 licence



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

Champness, C, 2018 Bexhill to Hastings link road, East Sussex: a geoarchaeological deposit model on the Combe Haven and surrounding valley sequences, in C Carey, A J Howard, D Knight, J Corcoran and J Heathcote (eds) Deposit Modelling in Archaeology. University of Brighton, 53–66

Historic England 2020 Deposit Modelling and Archaeology: Guidance for Mapping Buried Deposits. Swindon, Historic England

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.

PALAEOCHANNELS:

what they can tell us about past environments, climate change and human interactions

Warren Bailie MCIfA (4719), Operations Director, GUARD Archaeology Ltd

On occasion, palaeochannels are revealed during archaeological investigations, and that can offer opportunities for a better understanding of past environments, assisting us in understanding how human activity interacted with environmental change over time. These palaeochannels were normally formed from sections of oxbow lakes, ponds or old stream courses that slowly filled in as water courses evolved and drifted across the landscape since the end of the last glaciation. Some of these features contain evidence for human occupation along their banks from as early as the Late Mesolithic, but others do not. Palaeochannels with and without directly associated human occupation have been excavated by GUARD Archaeology Ltd over recent years, and the two examples here were sampled for environmental analysis.

Our aims were to find out about the history of the palaeochannels. For example, how long did they remain open; what could the environmental analyses tell us about how the channel evolved and how this reflected change in the surrounding landscape over time; and what evidence is there for human interaction with the channel during periods of settlement activity along its banks?

The range of specialisms we have used to try to answer these questions included the analysis of archaeobotanical remains, pollen, coleoptera, micromorphology and particle size. Combining these with the sampling of sediments for radiocarbon dating and artefact analysis provides a more in-depth study and a chronological framework within which we can understand changes in the environment and how this may have affected human activity. Not all palaeochannels will be suitable for all these analyses, but their application has given surprising results. It is important to note that palaeochannels offer an allochthonous resource for sampling, meaning they act as a reservoir not just for material washing in or being deposited locally, but for wind-blown pollen and other ecofactual material flowing downstream from a potentially much wider area than the immediate locale where human activity is found.

Location of the palaeochannel. Credit: GUARD Archaeology Ltd

Location of Kubiena tin samples in the palaeochannel. Credit: GUARD Archaeology Ltd

Palaeochannel coursing through dry sandy silts (left) and wet silty clay (right). Credit: GUARD Archaeology Ltd

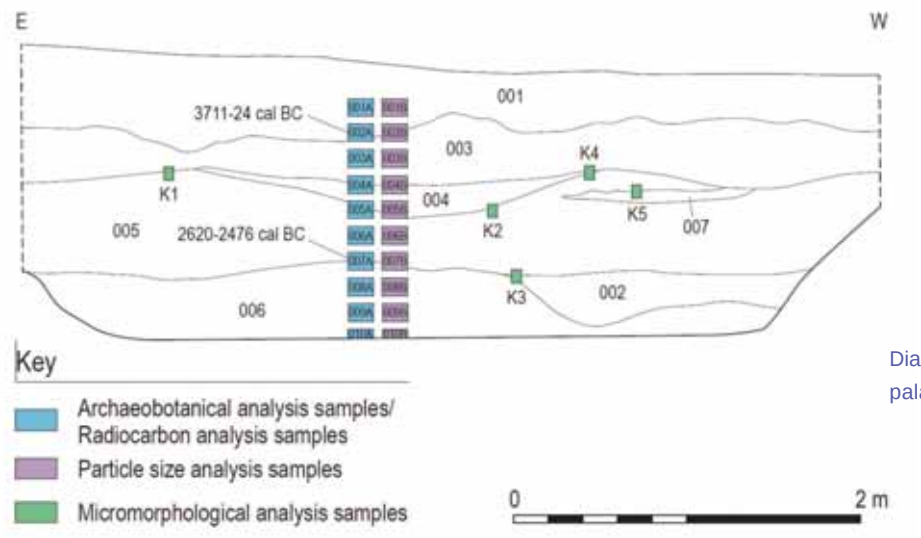


Diagram of sample positions and dated samples from the palaeochannel. Credit: GUARD Archaeology Ltd

Our first example is a development site at Cammo, situated on the outskirts of Edinburgh, close to Edinburgh Airport, the River Almond and the Bughtlin Burn. A desk-based assessment highlighted that part of the area was liable to periodic flooding, as the site was located on a former floodplain. The evaluation located a palaeochannel but unfortunately there was no evidence of nearby prehistoric features. The alluvium deposits of the palaeochannel were almost 2m in depth and two sets of soil samples were taken through their deepest parts, with Kubiena tin samples taken at sediment interfaces.

The results of the archaeobotanical analysis and radiocarbon dating showed there was very little organic material in the sediments to provide evidence of vegetation growing within or around the palaeochannel. However, evidence of some charcoal in the samples indicated that there was anthropogenic activity close to the site, or at least upstream, during prehistory. Particle size analysis demonstrated that the flow velocity within the palaeochannel indicated still or very slow-moving water, which showed that it was not an old river channel but more likely a small tributary, or part of an abraded stream system, or it was only seasonal.

The palaeochannel's deposits were dated to the Early Neolithic and also the Late Neolithic/Early Bronze Age and indicated precipitation and water-level changes during these periods that affected the natural palaeoenvironment and therefore prehistoric settlement in that locale. The radiocarbon dates also indicated that earlier material had eroded away, possibly from upstream banks, and was redeposited over later-dated deposits in the channel.

In this example, indirect evidence for human activity was an important addition to this area of Edinburgh, where the total absence of direct evidence of contemporary settlement was most noticeable.

The second example is that of Ferniegair, near Hamilton, south-east of Glasgow and close to the river Clyde, where a 135m-long palaeochannel was excavated as it ran through the junction of two distinct geologies of sandy silts and clayey silts. The drier sandy deposits documented numerous visits to the area from the Late Mesolithic through to the middle of the Bronze Age, through the survival of archaeological features that provided radiocarbon dates. In contrast to Cammo, the banks of this palaeochannel offered a useful campsite for people travelling along the river valleys. Archaeobotanical and pollen analysis of the sediments within the channel revealed that alder trees grew on its banks and alder wood was predominantly used for firewood.

Coleopteran analysis showed that open water and aquatic vegetation may have existed within the palaeochannel at some stage, perhaps when water flow was favourable. However, micromorphological analysis and radiocarbon dating of its sediments demonstrated that there were fluctuations in the rate of water discharge from the channel, with an initial phase of increased aggradation (deposition of sediment) in the Early Neolithic followed by a phase of relatively slow discharge, with a final phase of increased aggradation in the Early Bronze Age. These fluctuations are likely due, in part, to climatic changes as there is some evidence for accelerated river activity in the British Isles during the Late Mesolithic and early Neolithic, and again during the Early Bronze Age, which was a substantially wetter period in Scotland.

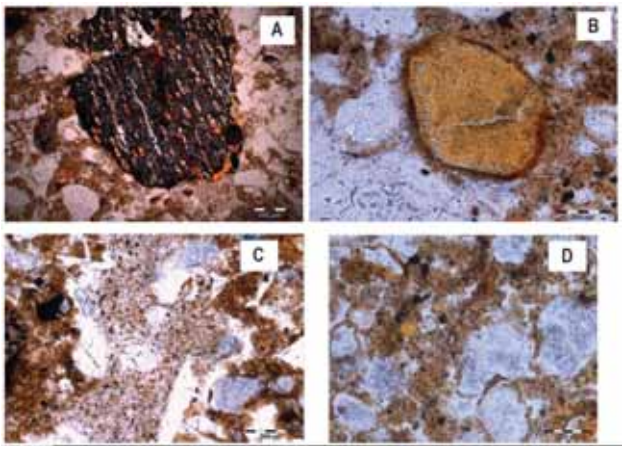
The picture of this palaeochannel has been enriched by analysis and dating of a large quantity of pottery sherds and lithic artefacts, and also organic material that accumulated within it from the Early Neolithic to the Middle Bronze Age. During periods of deposition the palaeochannel is considered to have had a low water flow, but as the channel was infilling with human, animal and fuel waste and discarded artefacts, the sediments were not permanently under water. As the palaeochannel silted the increased biological activity indicated drier conditions and the absence of permanent waterlogging.

Extract from the pollen diagram from the palaeochannel. Credit: GUARD Archaeology Ltd

Palaeochannel Feature 109	**Depth**	**3-4cm**	**8-9cm**	**13-14cm**	**18-19cm**	**23-24cm**
	Context	**132**	**131**	**131**	**130**	**130**
Pollen Taxon						
Trees & shrubs (TLP)	Common name					
Alnus	alder	67.7	58.2	68.1	68.0	74.9
Betula	birch	0.8	-	0.6	-	0.2
Coryloid	hazel type	14.7	24.2	17.3	12.8	9.1
Quercus	oak	0.4	0.8	0.4	0.8	0.2
Salix	willow	0.2	-	-	0.2	0.2
Ulmus	elm	0.2	-	0.4	-	-
Heaths (sum = TLP)						
Calluna vulgaris	heather	0.8	2.0	0.6	0.2	1.0

Our understanding of palaeochannels and any associated anthropogenic activities is dependent not just on radiocarbon dating and material cultural analysis, but on the depth of understanding that the environmental sciences provide, putting past climate changes and human activity in Scotland into perspective.

Thanks to all specialists, Susan Ramsay, Clare Wilson, Carol Lang, Nicki Whitehouse, Torben Ballin and GUARD Archaeology colleagues.



Slides from the micromorphology analysis: a) charcoal fragment, b) phosphatic pedofeature, c) Excremental features, and d) silt coating of quartz grains. Credit: GUARD Archaeology Ltd

References

Anderson, D E, Binney, H A and Smith, M A 1998 Evidence for abrupt climatic change in northern Scotland between 3900 and 3500 calendar years BP, The Holocene 8, 97–103.

Atkinson, J J, Bailie, W et al. 2019 Unexpected results – the palaeo-environmental analyses and dating of a palaeo-channel at Cammo, Edinburgh, Archaeology Reports Online 39. Available from: http://www.archaeologyreportsonline.com/reports/2019/ARO39.html

Barber, K E et al. 1994 A sensitive high-resolution record of late Holocene climatic change from a raised bog in northern England, The Holocene 4, 198 205.

Johnstone E, Macklin M G and Lewin, J 2006 The development and application of a database of radiocarbon-dated Holocene fluvial deposits in Great Britain, Catena 66, 14–23.

McNicol, D and Atkinson, J J forthcoming The history and use of a palaeochannel at Ferniegair, Hamilton, Archaeology Reports Online.

Warren Bailie

Warren is currently Operations Director for GUARD Archaeology Ltd, and has worked in the commercial archaeology sector for almost 20 years. He has experience in directing and managing archaeological fieldwork and post-excavation works across a number of major, mainly prehistoric, sites across Ireland and Scotland, including works on two of Scotland's World Heritage Sites, the Antonine Wall and St Kilda. He has led community archaeology projects and managed training placement opportunities for high school and university students on commercial and community-based projects. Warren was Secretary for the CIfA Scottish Group Committee and is a former Trustee on the Board for Archaeology Scotland.

A study of wild and domestic animal evidence from animal marks on Roman ceramic tiles

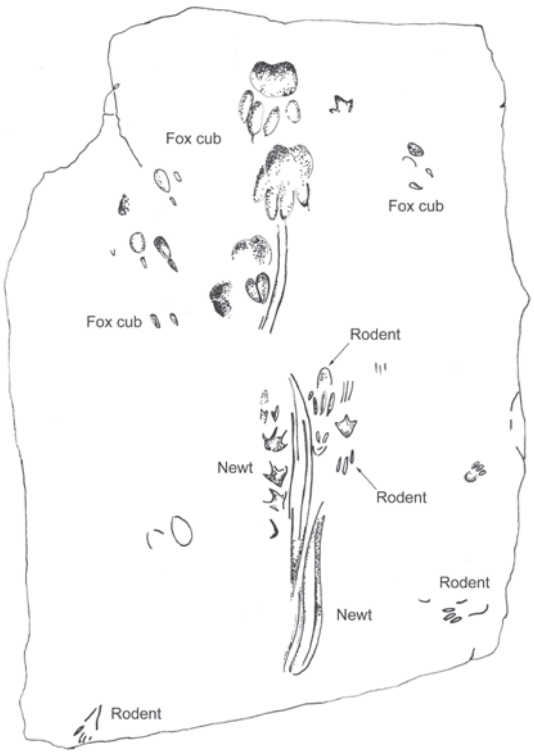
Julie Curl ACIfA (5154), Bone/ Finds Specialist

An interpretive illustration titled: 'A night on the tiles' Julie produced showing some of the species identified leaving their marks on the tiles laid out to dry.

After the discovery of one complete Roman ceramic tile at the community Aylsham Roman Project, Norfolk, in 2016 that showed an animal mark, analysis showed it was covered in the marks from at least four species. Animal tracking skills were applied to the rest of the ceramic building material (CBM) assemblage (allowing for shrinkage of clay) and at least 20 species of wildlife and dogs were identified. This more intense study has shown the value of an analysis of animal marks on CBM for providing a wealth of quite precise local environmental evidence when bone preservation may be poor, and also that archaeological evidence can contribute to current wildlife projects.

Many footprints on CBM are incomplete, which often reflects the activity of the animals, with bounding and running animals leaving partial prints. Some CBM might show multiple species and double prints if they are in a 'high traffic' area. Occasionally prints are damaged when the drying CBM might be exposed to an intense storm. Dogs and domestic cats plodding around the site while the owners work often leave full, clear prints that are instantly recognisable.

The first marked tile noticed at Aylsham had the attention of volunteer Teresa Rogers, who wondered if she had seen a rat-tail drag, but the surface was confused with other marks. Examination with a variety of reference material and using image enhancement on photographs of the surface, I managed to identify a fox cub, newt footprints and tail/body drag and fast-running and jumping rodents. This tile



Plan of the Roman roof tile with a newt drag from the centre right and fox cub prints from the centre left. Random, often partial, rodent prints also present. Credit: Julie Curl

Pine Marten, incomplete paw print. Credit: Julie Curl

beautifully placed the time of CBM production to spring, when the young cubs are coming out of the den and newts are actively hunting after hibernation. Furthermore, the position of the fox and newt prints and the abrupt end of the newt movement suggested that the little cub had one of its first successful (albeit easy) hunts – a wealth of information in one tile.

My lifelong interest in animal tracking came from my father and grandfather and I have long felt examination of archaeological CBM might yield more than just the occasional dog and cat print. My bone report for the project did not take long as only a fairly small assemblage was recovered from the largely acidic soils. So, with the support and help of the landowner, Peter Purdy, who is a history and wildlife enthusiast, I had the chance to examine all CBM found for any evidence of animal activity. While dogs and human fingerprints were the most commonly seen, other species identified included deer, hare, a range of mustelids (including stoat and otter), badger, herpetofauna species, a wide range of rodents, two types of cat, porcine prints, a baby bear and at least two birds. In total, at least 20 species have so far been identified at the Aylsham site.

The cat prints included two examples of marks that were left by a cat with larger paws, with prints exceeding 60mm. While these were initially hoped to be from the native lynx, they actually compared better with the African serval and African/Asian caracal, cats seen in Roman art and known to have been kept as pets. While not environmental evidence, this certainly suggests trade and a suitable environment for them to escape to and hunt in. Research continues on these felines. The baby bear print was probably the native brown bear, which it is assumed was still resident in the Roman period, but the possibility of a performing animal must be considered.

From an environmental perspective, perhaps the most important prints to be discovered were those of the pine marten, with at least two prints found to date. The pine marten is assumed to have been resident in Norfolk, but evidence from bone is scarce. Such evidence, often only in the form of single bones, is not conclusive proof of residency as these animals have beautiful fur that may have been traded as skins. Examination of the pine marten prints at Aylsham show a running and bounding animal, probably one hunting the rodents or one running from larger predators or people.

The drying tiles are clearly attracting a variety of creatures. Invertebrates, including snails, slugs, insects and woodlice, would have been attracted to the moisture, shade and cover. Invertebrates would have also been present on any vegetation used for separation of tiles during drying, or underneath the tiles. The invertebrates would attract a range of rodents, birds and herpetofauna, even foxes. In turn, the rodents and herpetofauna would have attracted larger predators including the mustelids, foxes and cats noted above. Some animals, such as the deer, hare and pig/boar would have been foraging in and passing through the area and visiting the water. Otter would be expected in a wetland environment, in particular a river environment where fish could be caught. Smaller bodies of water also attract otter, including fish-stocked ponds or pools with frogs, toads or newts. Otter can stray from the waterside areas in search of birds' nests for chicks and eggs, and they will also take small mammals. Many of the animals are woodland and pasture species, which gives some indication of the habitat where the new villa or farmhouse was built.

The bone assemblage produced only a fraction of these species and largely the more robust survivors – cattle, dog, equid and deer. With the destruction of much of the bone evidence, this study has been very worthwhile. The study of the prints is already contributing to current and forthcoming plans for wildlife reintroduction projects. As a side project from this study, I am hoping to compile a catalogue of wildlife and dog prints, the latter to help widen the identification of dog prints to suggest size and type.

Notably in the UK we are encountering environmental problems with the relatively recently introduced grey squirrel, and an excellent natural predator that could be released here in Norfolk is the pine marten. Until recently, we only had minimal and inconclusive evidence for their presence here. Now, the prints from Aylsham can confirm live, running and bounding animals leaving their mark on Roman ceramics and this new evidence could lead to their return to Norfolk.

Julie Curl

With over 35 years working in archaeology and the Norfolk Museums Service, Julie is a specialist in animal bones, molluscs, animal marks on ceramic material and small finds, and an archaeological and natural history illustrator producing finds drawings, reconstructions and wildlife illustrations for publications and displays. She is a Research Associate with Norfolk Museums Service and University of East Anglia and has undertaken palaeontological and conservation work on the West Runton Mammoth project. Her life-long interest in animal tracking has been put to use with the Aylsham Roman Project and other organisations, where over 20 species of fauna have been identified on ceramic building material.

‘Weathering Extremes’ at Caerlaverock in Scotland: reconstructing climate change and its impacts

Richard Tipping and Eileen Tisdall, University of Stirling and Morvern French and Stefan Sagrott MCIfA (7498), Historic Environment Scotland (HES)

‘Weathering Extremes’ was a research project jointly funded by HES and the Castle Studies Trust, in which we explored the impacts of huge storm surges on the landscape and the medieval castles at Caerlaverock.

The ‘old’ (bottom) and ‘new’ (top) castles at Caerlaverock. Credit: HES

The landscape and coast of Caerlaverock. The white splash in the wood is the ‘old’ castle. The medieval coast lay where the hedge to the left is, and the yellow gorse bushes in the centre. Castle Wood conceals the geomorphological evidence for storm surges. The salt marsh formed in the early 18th century. Credit: HES

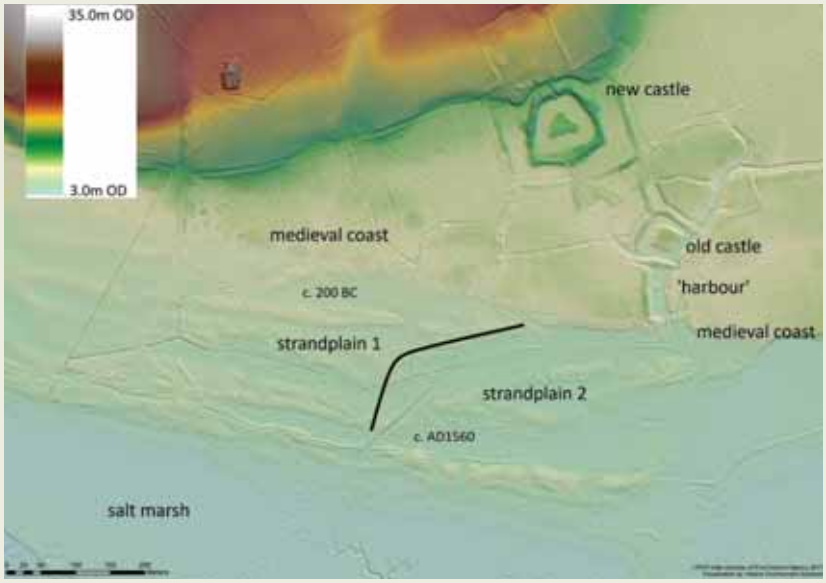
There are two medieval castles at Caerlaverock, on the north shore of the Solway Firth, eight kilometres south of Dumfries. One was constructed in 1229–30; the other, inland, was begun in 1277. Today they are separated from the firth by 800 metres of salt marsh and, at low tide, by two kilometres of intertidal sand.

The rural setting and isolation give the castles a tranquil feel, and Caerlaverock is one of the most-visited HES properties. When they were built, the older castle stood right on the coast, only a few metres above the contemporary sea level, and had a ‘harbour’. The castles looked across the firth to the ‘auld enemy’ across the water in Cumbria. Indeed, the later castle was besieged in 1300 by the ‘hammer of the Scots’, Edward I, described in rich detail at the time and brought to life in the interpretation centre at Caerlaverock. But Caerlaverock also faced an older, more implacable enemy, the sea itself.

Side-by-side of aerial photograph and visualisation of the lidar data with vegetation removed (Digital Terrain Model). Credit: HES

In updating what was known about Caerlaverock for visitors, we revisited work we did 20 years ago. Then, we tentatively suggested that the older castle had been hit by storm surges, and that maybe this was why the later castle was built (Brann 2004). But we never fully got to grips with what was happening on the coast itself, the old coastline being concealed beneath Castle Wood. New lidar images, providing detailed maps of the coastline, showed us what we'd only glimpsed before.

From the lidar images we identified a coastal landform known as a strandplain, made up of a succession of storm beach ridges some 200m wide in total. The ridges are enormous, each traceable east–west for several hundred metres parallel to a low cliff, and each



Visualisation of lidar data with vegetation removed (Digital Terrain Model) showing strandplain identified by the project team. Credit: HES

We hadn't expected such wonderful preservation of these coastal features: as well as concealing the evidence, the centuries-old woodland had also protected it.

10–20 metres wide. Some have preserved lower-lying lagoonal basins, trapped during the surge and filled with re-deposited mud. The ridges stand proud of these by some two metres; it's still quite an effort to climb up one or two of these. The beaches are made of sand and gravel. Storm beaches are only created by very large storm surges; nothing like these form in the Solway today. They are unambiguous indicators of major storms, or perhaps a series of storms over a few weeks. They are invariably a result of a storm coinciding with a very high tide. A rough and minimal guide to the size of the surges comes from the altitudes of the lagoonal sediments: some of these exceeded contemporary high tides by 3–4 metres. At least one surge topped the cliff, eroded archaeological features and threw gravel 20 or so metres shoreward.

It looked at first as if there'd been maybe six or seven such surges, but when we recorded the different rock types represented in the gravel, we realised that ridges in the west were formed of different rock types to those in the east, and that we actually had two separate strandplains, side by side, formed at different times. We have evidence of at least 16 storm surges. Beaches in the west were older than those in the east. They formed as spits, extending eastward. Then at

least one storm surge partially destroyed these earlier ridges, ripping into the Permian bedrock underlying these and lowering it by a metre and a half. Then the second strandplain had formed, the gravel composed of this bedrock to the virtual exclusion of rock types found in the earlier ridges. And this second strandplain formed, not as a series of spits, but from waves heading straight at the cliff – and the older castle.

We hadn't expected such wonderful preservation of these coastal features: as well as concealing the evidence, the centuries-old woodland had also protected it. We, with additional support from HES, dated the sediments in the oldest and youngest lagoons; we're currently seeking funding to date all the events recorded. We used optically stimulated luminescence (OSL) dating because all the sediment is inorganic, working with Tim Kinnaird and Aayush Srivastava at the University of St Andrews. The earliest event is Late Iron Age in date, formed around 200 BC; the youngest formed around AD 1560 as a final spit seaward that wrapped around both strandplains. But we think we have two clusters of storms, separated by a currently unknown interval. They both represent prolonged periods, when Atlantic westerly winds were much more vigorous than they are now, generated by a complex network of relationships between solar irradiance, the vigour of Atlantic Ocean circulation, the extent of Arctic sea-ice, and atmospheric circulation. Workers have for decades sought to define such storm-rich periods along the Atlantic coast; recent syntheses of medieval evidence include those by Brown (2015) and Griffiths (2015). Chronologies of dune sand construction are most frequently cited but there is real uncertainty whether wind-blown sand is always a reliable indicator of climate change. This is just one reason why strandplains and storm beaches are so valuable; they are unambiguous.

But what of the Caerlaverock castles, facing the storms? We cored the sediments filling the moat and a network of negative features around the older castle. We found organic mud only in the quadrant furthest from the sea and sparingly elsewhere; silt and sand filled everywhere else. Jason Jordan and Busie Gigranin at Coventry University undertook diatom analyses of the sediments; diatom species are sensitive to different salinities. Radiocarbon-dated and Bayesian-modelled sediment and diatom analyses combined to show that the surroundings of the older castle had been impacted on at least five occasions, around 1300, 1350, tentatively around 1400, around 1475 and around 1545. These dates make us think that the second cluster of storm beaches that formed south of the older castle began in the high Middle Ages. We still cannot say whether these surges forced abandonment of the older castle. They are later than construction of the new castle in 1277, but because the earliest recorded storm surge to impact the older castle inevitably post-dated construction of the moat in 1229–30, this may not have been the earliest impact. In a previously overlooked rectangular human-made basin west of the 'bailey', the earliest storm surge sediment signature was deposited soon after a radiocarbon date of cal AD 1158–1265. Storm surges may even have reached the newer castle, which was inland but not significantly higher.

Tim Kinnaird and Aayush Srivastava of the University of St Andrews wrapping a core taken for OSL dating. Credit: Morvern French

Flags marking the transect of cores taken in the west moat of the 'old' castle. Credit: Stefan Sagrott

And the 'harbour' south of the older castle? This remains an enigma. We think from OSL dating that it was constructed at the same time as the older castle, but it can't have been a harbour because its floor is higher than even spring tides reached then. It may never have been open to the sea because sediment analyses showed that still-water sediment accumulated in it when all around, storms raged.

Richard Tipping extracting a core in the moat of the 'old' castle. Credit: Stefan Sagrott

What do we do with all these interpretations? For one, the palaeoenvironmental data we have collected provides completely unsuspected insights into the vulnerability of this coast to past climatic impacts. Fairly diligent searching of the literature failed to detect this succession of events. Caerlaverock was home to the Maxwell family, very powerful magnates with rich documentation, yet no one seems to have noticed or mentioned what we found. When we can date all the storm surge events, we will have the most securely dated unambiguous record for Britain's west coast and will be able to embed the events in an increasingly well-understood North Atlantic palaeoclimatic context. But perhaps more important, we can show visitors to Caerlaverock the physical evidence, encourage them to explore and reflect on what they can each do to limit what might be coming in the near future.

References

Brann, M, 2004 Excavations at Caerlaverock Old Castle, Dumfries and Galloway, 1998–9. Dumfries: Dumfries and Galloway Natural History and Antiquarian Society

Brown, P J, 2015 Coasts of catastrophe? The incidence and impact of aeolian sand on British medieval coastal communities. European Journal of Post Classical Archaeologies, 5, 127–148

Griffiths, D, 2015 Medieval coastal sand inundation in Britain and Ireland. Medieval Archaeology, 59(1), 103–121

Tipping, R, Tisdall, E et al (2022) Weathering Extremes: Medieval Climate Change at Caerlaverock Castle: Final Report [Available from https://www.castlestudiestrust.org/Caerlaverock-Castle.html]

Morvern French

Dr Morvern French is Properties Historian at Historic Environment Scotland, working on medieval and early modern interpretation across the estate. She is the research manager for the Caerlaverock Castle interpretation project.

Eileen Tisdall

Dr Eileen Tisdall is a lecturer in environmental geography at the University of Stirling. Eileen's research career has focused on the development of methodological approaches that generate palaeoenvironmental data sets tied to human activity in the landscape, which can be used to determine drivers of environmental change and people's responses to it. Much of Eileen's research is as part of an interdisciplinary team, working collaboratively with academics, specialists and archaeologists, and has included several successful projects with Historic Environment Scotland.

Stefan Sagrott

Stefan is a Senior Cultural Resources Advisor in the Cultural Resources team at Historic Environment Scotland, where his work contributes towards developing greater understanding of and the management and conservation of the HES estate and its cultural significance. His job necessitates him having a broad range of research interests across many periods and he is particularly keen on the use of geophysics, airborne laser scanning and photogrammetry for cultural heritage survey and protection. Stefan is Treasurer of the CIfA Scottish Group.

Richard Tipping

Dr Richard Tipping is a palaeoecologist and geomorphologist, who retired in 2016 from the University of Stirling. He has worked at the interface between people and the environment for nearly 40 years, largely in Scotland where environmental pressures and climatic stresses constrain much of what people can do.

CLIMATE CHANGE CONUNDRUM:
warm and cold epochs, the IPCC and hockey sticks

Elizabeth Pearson, ACIfA (1617)

Recently, I had cause to ask, 'What happened to the Medieval Warm Period and the Little Ice Age?' My question related to the disparity between once widely accepted models of long-term climate change, in favour of new models dominating the narrative today. The same question could also be asked about a succession of Holocene epochs that have taken us through warm and cold; wet times and drought. The disparity between traditional and new models seems profound. I ask, why might this be of interest for environmental archaeologists and how might we contribute to the debate? With some specific examples, my emphasis is on how data from developer-funded excavations may contribute.

Looking for warm and cold epochs

I was thinking about this because recently I wanted to know how warm, relatively, was the Medieval Warm Period compared to today? I tried to find a graph which shows the Holocene warm and cold epochs. Aiming for a quick answer to start with, I searched Google images, only to find the graph I was familiar with almost lost amongst pages of the new 'hockey stick' graph. Check your algorithms though, as a colleague and I have found our search results produced a difference balance of traditional and more recent models. It is the hockey stick that has become the poster child of anthropogenic global warming (AGW).

If we just take the last 1000 years, this is what I used to see:

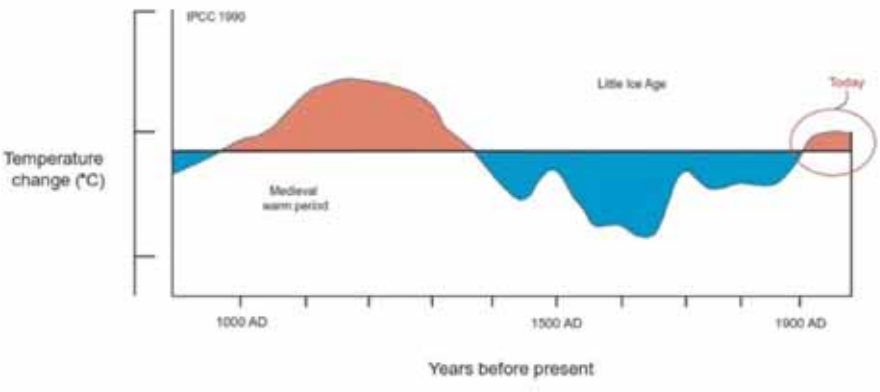


Fig 1. Climate data reported by the International Panel on Climate change 1990, Abbie Horton based on IPCC

The IPCC (UN-funded Intergovernmental Panel on Climate Change) accepted this temperature curve as recently as 1990. The data was compiled by many scientists from different institutions and countries.

The hockey stick

The new 'hockey stick' model was introduced by Professor Michael Mann and team in 1998, and since 2021, the IPCC has endorsed an updated model.

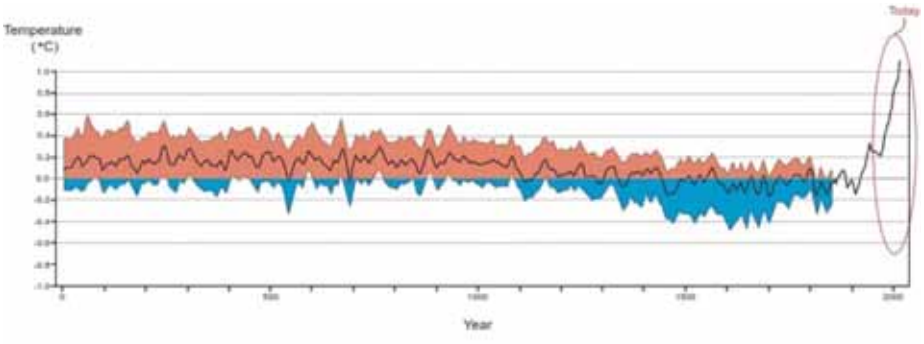


Fig 2. One recent version of a 'hockey stick' chart, Abbie Horton based on Elijah Wolfson for TIME magazine (Source IPCC, 2021); numbers are instrumental readings from 1850–2016; for prior years they are reconstructed using proxy records like tree rings, corals, and ice cores

Archaeologists are very familiar with warm and cold epochs. We often refer to the Atlantic Optimum, the Middle Bronze Age Optimum, the Late Iron Age climate plunge, the Roman Warm Period, the Medieval Warm Period, and the Little Ice Age, for instance, that relate to the northern hemisphere. Similar effects are also seen in the southern hemisphere.

The handle

But what happened to these epochs? Figure 1 shows the cold and warm epochs against which I've referenced environmental sequences for years. These changes are hard to see, though, in the Michael Mann graph, in what is often called the handle of the hockey stick (Fig 2). The change is radical. Figure 3 shows the entire Holocene as understood prior to Mann, and is based on decades of research resulting in our knowledge of climate change over millennia.

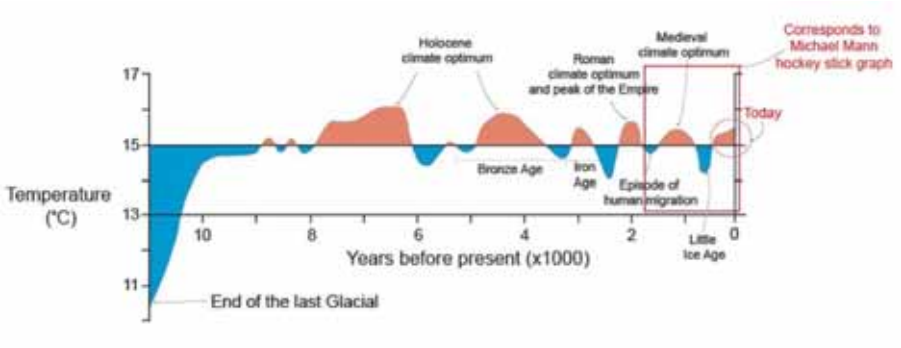


Fig 3. Average near-surface temperatures of the northern hemisphere during the last 11,000 years (Holocene), Abbie Horton based on David Archibald after Dansgaard et al. (1969) & Schönwiese (1995)

I see the disparity as fundamentally important, because if we're to cross-reference palaeoenvironmental sequences with a climate model, which one do we use – traditional or new? There are different versions of the hockey stick graph too. Conversely, if we can contribute to climate change models, which model(s) do we contribute to?

The blade

It's the 'blade' of the hockey stick that captures our attention because it implies rapid warming in the future. Naturally, curatorial archaeologists are also concerned, as it has significant implications for managing the archaeological resource. A leap in global temperature is implied since 1950 (Fig 2) and lies behind increasingly alarming predictions in the media that there will be rapid warming and sea-level rise that could affect archaeological deposits. There have been attempts in recent years to tease out how much warming is anthropogenic and how much natural in origin, and to amend the hockey stick graph accordingly. Perhaps environmental archaeology can contribute towards this debate?

Large oak roundwood charcoal from a late Roman marl quarry pit from The Hive, Worcester. Credit: Worcestershire Archive and Archaeology Service

The Earth archive

We've cross-referenced a wide range of evidence to produce models for decades, and environmental archaeologists have contributed. We've used palaeobotany (my area of work), palaeozoology, tree-ring dating, radiocarbon dating, dated volcanic deposits in sediments, and recorded rising and falling sea and lake levels, for instance. Other scientists have travelled to inhospitable places, drilling into polar caps and the great glaciers, taking precise measurements of the composition of air trapped in ice bubbles. Work on Greenland and Vostock (Antarctica) ice sheets is well known.

The history archive

Along with medieval European chronicles recording exceptional weather are weather diaries. Historians also use evidence of harvest quality, size of the corn tithe, or prices for bread cereals – how much might this correlate with archaeobotanists' data on charred cereal crop assemblages? Inferences can seldom be made from a single source, so local and regional reports in large data banks (big data) are needed.

How can environmental archaeologists help in the climate debate?

Regional or worldwide?

Interpreting all types of evidence comes with methodological challenges, but developer-funded archaeologists are uncovering new data with every new development, flood alleviation or road scheme. Commercial archaeology lends itself to providing big data, which could help overcome uncertainties and refine climate models. Perhaps we can answer questions such as whether the warm and cold epochs are still valid, whether they are regional or worldwide in extent, and how we can contribute towards refining models in a way that makes best use of evidence that is widely recovered, in abundance?

Storm clouds over pasture.
Credit: Brum

Slice through wood.
Credit: Mateusz Atroszko

One question is the degree to which changes are regional or worldwide. Many articles now claim that the Medieval Warm Period (and other warm periods) is regional and only relates to the northern hemisphere, yet comparable warming for this period is seen in the Antarctic ice sheet (Lüning et al 2019), and elsewhere in the southern hemisphere such as in New Zealand (Cook et al 2002). Data for many parts of the world are, however, more limited than for the northern hemisphere. Whether the change is regional or not, data from British environmental archaeology work can help to refine perspectives on climate change in maritime Europe.

New methods?

There will always be new methods to apply to archaeological material. One includes stable isotope analysis of charcoal, carbon-13 (Hall et al 2008), which has been used to reconstruct climate, although studies are few, and university based. As roundwood/branchwood charcoal is reasonably widely recovered from developer-funded excavations, this method could be more widely applied by incorporating this material into research projects. Even within the restrictions of commercial archaeology budgets, we may be able to produce small data sets, depending on the scale of the project. We have been able to do so for stable isotope analysis of human and animal bone, for other research purposes.

Science is never settled, and as more evidence is retrieved from the ground year upon year, the complexities of climate change remain a challenge we can address.

References

Cook, E R, Palmer, J G, D'Arrigo, R D, 2002 Evidence for a 'Medieval Warm Period' in a 1,100 year tree-ring reconstruction of past austral summer temperatures in New Zealand, Geophysical Research Letters, 29(14), 12-1–12-4

Hall, G, Woodburne, S, & Scholes, M, 2008 Stable carbon isotope ratios from archaeological charcoal as palaeoenvironmental indicators, Chemical Geology, 247, 384–400

Lüning, S, Galka, M, and Vahrenholt, F, 2019 The Medieval Climate Anomaly in Antarctica, Palaeogeography, Paleoclimatology, Paleoecology, 532. Also available at https://www.sciencedirect.com/science/article/am/pii/S0031018219303190 Accessed 14 April 2023

Liz Pearson

With over 25 years of experience, Liz is an environmental archaeologist, specialising in past environment, food, diet, agriculture, craft and industry. Liz works on commercially funded projects in the West Midlands.

Disclaimer: opinions expressed are solely the author's own and do not reflect opinions of her organisation.

THE BIRDS AND THE BEES:
AN ARCHAEOLOGIST'S VIEW OF THE OUTSIDE

Tabitha Gulliver Lawrence PCIfA (11170), Site Assistant, Colchester Archaeological Trust

The ongoing changes impacting our climate are seen first-hand by many archaeologists. As archaeologists, we are often more closely attuned to the world around us. Our eyes spot things in a different way to others and how we process this information is distinctly 'archaeological'. How we see the world is shaped by our careers and ultimately our passion, whether you are in the field, classroom, lab, museum or storeroom. Since I graduated from Bournemouth University in 2020 I have worked in two commercial organisations alongside research digs. I have noticed one distinct aspect that seems to connect all archaeologists, whatever their calling, whether it is environmental, administrative, post-excavation, illustration, the list is endless. That connection is a **love of the natural world**.

The natural world is something that is incredibly important to every archaeologist I have met. For some, it is of a very rugged importance that involves hiking armed with OS maps, and ends in a pub ten miles away. For others, it is a more easy-going love of the outdoors. They know they like a mild overcast day for photography and that is it. Wildlife is around field archaeologists every day we are on site. I have met diggers who can listen to a bird at five minutes past eight in the morning and tell you exactly what it is. Other times it is the sadder events of dealing with wildlife, like trapped rabbits or injured deer. Some archaeologists love listening to music and just enjoying the sensations of being outside. I know people based at home or in an office can tell you more about geology and a local landscape than anyone. As archaeologists we encounter the soil regularly, and whether it is a sandy silt or a clay it is still part of the world outside. In December last year, I had a 50-minute conversation about fungi with someone I work with. I knew nothing of fungi before, and if I am honest I am still a bit confused

Credit: Tabitha Gulliver Lawrence

Credit: Tabitha Gulliver Lawrence

How we see the world is shaped by our careers and ultimately our passion, whether you are in the field, classroom, lab, museum or storeroom.

Credit: Tabitha Gulliver Lawrence

about them so I won't be foraging any time soon. But listening to my colleague talk so passionately about this countryside wisdom, without the need for jargon and Latin names, showed me once again how distinct this aspect is to so many in our field.

The natural world is an incredible place; the colours, the gravels, the trees, the butterflies, blackberries in late summer, the dark rain clouds, the wind, birds singing. Archaeologists are watching the world change. Those who have worked in archaeology can attest to that. Some sites, once worked, may no longer exist, whether because of flooding, quarrying, erosion or a range of other risks to natural and archaeological environments. Even those who are in their early careers have an acute awareness of our changing environment, as they have explored it in depth at school and grown up with groups such as Extinction Rebellion and figureheads like Greta Thunberg and David Attenborough. This article's theme is broad but it is something I have thought about for a while. We are just as responsible as archaeologists for our environment and, perhaps, we are more responsible than most given our relationship to the world around us. We have a life-long curiosity about the past; how communities lived and thrived and used the landscape around them. We have abundant knowledge of these relationships, and an understanding based on subjects from geology to history to anthropology. We have scientific evidence dating back thousands of years. Ask an archaeologist about a prehistoric community and how they lived and they will tell you about their existence, their homes and their material culture. All of that knowledge links back to the natural world in some way and we as archaeologists can help.

Credit: Tabitha Gulliver Lawrence

It is our duty to effectively communicate the use of landscapes, the lives of past communities, and our work as archaeologists to the public **to ensure the present and future sustainability of those same areas for everyone**. Next time you're at a building development and you've just found a nice roundhouse and associated finds, maybe (just maybe) its presence in that environment should have a wider influence than just archaeological. How did they use the surrounding landscape and can those ideas or theories be employed today? I am certain there are many sites across Europe that have environmental concerns, perhaps affecting the archaeology or perhaps affecting the site's future use. If we have such a love of the natural world, why are we not fighting harder for it? We will lose an integral aspect of our lives and our work if we do nothing. As the natural world changes with alarming speed, the relationship between it and the people will erode with it. We as archaeologists and people must continue our work with this in mind.

Tabitha Gulliver Lawrence

Tabitha is an early careers site assistant working for the Colchester Archaeological Trust in Essex. She is Secretary of the Early Careers SIG, Ordinary Member of the Digger's Forum and volunteers with YAC and the Lithic Studies Society. Her job and volunteer roles are inspired by her love of the past and her desire to get more people into archaeology, especially young people. Her interests include prehistory, museums and public engagement. Outside of work she loves spending time with her friends and trying new ciders (often with deadly consequences).

Cross-cultural values and ethical practice:

reflections on CIfA's Code of conduct in the context of international work

Leonora O'Brien MCIfA (2487), Technical Director – Archaeology & Cultural Heritage, AECOM

Archaeologists work all over the world in countries and cultures with diverse social, cultural and legal systems. In places with no specific laws or regulations on professional conduct in archaeology, CIfA's Code of Conduct may be relevant.

Numerous existing codes of conduct and ethical guidelines touch on international heritage practice, with many examples on CIfA's own Archaeological Ethics Database. These include the codes of the US Register of Professional Archaeologists, the European Association of Archaeologists, the Society for Africanist Archaeologists, the International Association for Impact Assessment, the Association for Social Anthropologists of the UK, the International Council on Monuments and Sites and the International Council of Museums.

These address topics including professional conduct, ethical scholarly and business practice, socially and environmentally responsible work and decolonising heritage practice. Some consider research protocols for projects involving local, indigenous and descendant communities. These codes emphasise consent, credit, dignity, respect and justice. Heritage protection, looting and burials are often already covered by civil, criminal, customary and religious law.

Working in low- or middle-income countries, places with weak heritage governance and areas experiencing conflict can raise practical and ethical challenges. Getting equipment past customs and out again can be exasperating. There may be a bewildering gap between official policy, administrative systems and stark reality. Professional behaviour and values cause recurrent quandaries, often variations on those faced at 'home'.

Professional competence and training – It is important to seek to build lasting partnerships with local archaeologists where possible and distribute responsibilities, work, funding, training opportunities and credit fairly among participants. Working outside the geographies in which you first trained can involve a lot of reading, museum/site visits and learning from locals – a lot of CPD! Exchanging knowledge and practical experience are key to collaborative professional practice, everywhere.

Responsibilities to colleagues, clients and the public – Scholarly and scientific responsibilities are central, but commercial projects may impose limitations. Clients may fear that publications will reveal the location of early exploratory works to rival companies. Funding

Investigating a Middle Palaeolithic tool-making site with a local academic adviser, Riyadh Province, Saudi Arabia. Credit: Leonora O'Brien

Visiting a historic Sufi tomb with the local imam, Khazar Raion, Azerbaijan. Credit: Leonora O'Brien

Public consultation meeting including archaeology display, Tiris Zemmour Wilaya, Mauritania. Credit: Leonora O'Brien

Local residents talking to an environmental and social survey team during walkover survey, Estuaire Province, Gabon. There were a number of sacred trees and graves in this area. Credit: Leonora O'Brien

constraints and political events may curtail fieldwork; exporting artefacts or samples for analysis can be challenging.

The fallacy of impartiality – Truthfulness is paramount, but it is also important to be sensitive to the local context and avoid problematic outcomes. This is difficult when engaging with ethnonationalist and tribal narratives, post-colonial revisionism, theocratic regimes and dominant, state-authorised discourse. Discoveries and interpretations may be misused by those in power. This can fuel territorial claims, and cultural and political repression. The relationship between human and cultural rights is recognised in international law, but local implementation may be ineffective.

Environmental, social and governance impacts – Working in a socially responsible and sustainable manner involves ensuring an ethical supply chain, appropriate remuneration, training and career progression wherever we work, and looking at the bigger picture to harness wider socio-economic and environmental benefits. There is a real risk of becoming embroiled in bribery, gifts and favours. Myriad potential conflicts of interest can arise. Between ClfA's Code of conduct, local business norms and law, the highest standard prevails.

Working together with local communities and experts – Considering both lay and expert views informs good decision-making, respecting local and foreign knowledge alike. It is prudent to work closely with local archaeologists, ethnographers, earth scientists, ecologists, tourism and socio-economic advisers. Listening carefully may involve hiring professional linguists. Land workers, elders and stewards of sacred places provide crucial insights into oral history, living cultural practices and contemporary concerns. It takes time to establish good working relationships, but this dialogue is at the heart of responsible practice.

Colleagues around the world already work ethically without ClfA's Code of conduct. ClfA has no exclusive claim on professional ethics, but it is devoting substantial technical expertise and becoming a 'standards maker'. Global convergence and consensus are not necessarily feasible or desirable. Archaeologists can be 'standards takers' and adopt existing codes, develop their own national or regional ones, or adapt emerging codes to reflect local concerns. The norms developed by communities of experts can be a helpful guide to structuring reflection on ethical issues. It is in everyone's interest to seek to embed good professional practice and influence the expectations of the public, regulators, clients and each other.

Links

Archaeological ethics database: https://archaeologicalethics.org/

Register of Professional Archaeologists: https://rpanet.org/code-and-standards

European Association of Archaeologists: https://www.e-a-a.org/EAA/About/EAA_Codes/

Society for Africanist Archaeologists: https://safarchaeology.org/resources/Documents/safa_pdfs/SAfAEthicscode%20amended%202016.pdf

International Association for Impact Assessment: https://www.iaia.org/pdf/Code-of-Ethics.pdf

Association for Social Anthropologists of the UK: https://www.theasa.org/ethics/

International Council on Monuments and Sites: https://icomos-uk.org/wp-content/uploads/2019/11/ICOMOS-Ethical-Statement-for-ICOMOS-members.pdf

International Council of Museums: https://icom.museum/en/resources/standards-guidelines/code-of-ethics/

Leonora O'Brien

Leo is a Technical Director at AECOM and leads the heritage team's international workstream. She has over 20 years' experience, ranging from field excavation and landscape survey to post-excavation research, publications management and consultancy. Leo has directed extensive archaeological surveys in remote and challenging environments in Africa, the Caucasus, the Middle East and Central Asia, working in partnership with local archaeologists, ethnographers and interdisciplinary environmental and social teams on Environmental and Social Impact Assessment, due diligence and monitoring. Leo co-founded ClfA's International Cultural Heritage Practice Group in 2013 and is serving as chair, 2021–2024.

PROFESSIONAL CONDUCT

CIfA

CIfA's accredited professionals (PCIfA, ACIfA and MCIfA) and Registered Organisations are bound by the Institute's Code of conduct: professional ethics in archaeology. Their accreditation means that they are subject to the oversight of peers, through the Institute's professional conduct process and its sanctions. That process underpins an institute's primary function of public and consumer protection, including by assuring clients that the work they commission will meet their needs and is carried out in the public interest.

If formal proceedings take place, each party has the opportunity to present their case. The procedures also allow for representation and appeal against the findings and any sanctions. If a breach of the Code of conduct is found, resulting in a reprimand, suspension or expulsion, the Institute will publish the name of the member and the details of the sanction, unless there are exceptional compassionate grounds for not doing so.

Announcement of the results of three professional conduct investigations against CIfA-accredited archaeologists

Three separate allegations of breaches of the Code of conduct were received by the Institute. In each case a professional conduct panel was convened to investigate and the results of these investigations are as follows:

Mr Peter Holt (formerly MCIfA 8724): The panel found there to be a breach of the Code and issued the following formal reprimand under paragraph 40 of the professional conduct regulations:

> "A professional conduct panel has determined that former CIfA member Peter Holt has committed a breach of CIfA's Code of Conduct. Mr Holt made ill-informed and unwarranted statements on a social media site in connection with work carried out in the vicinity of Commercial Wharf in Plymouth by other archaeologists and by volunteers. The panel regrets that these third parties have been negatively impacted by Mr Holt's conduct. Mr Holt is not currently a member of CIfA, having resigned his membership prior to consideration by the panel of the complaint made against him."

John Ames (MCIfA 6445): The panel found there to be a breach of the Code and issued the following formal reprimand under paragraph 40 of the regulations:

> "A professional conduct panel has determined that CIfA member John Ames has committed a breach of CIfA's Code of Conduct. Mr Ames has been responsible for substantial and unacceptable delays in delivering post-excavation assessments and designs in connection with multiple archaeological projects. The panel regret that Mr Ames's clients and other third parties have been negatively impacted by his conduct to date. Mr Ames is now required to complete certain outstanding works by set deadlines as a condition of his continued membership of CIfA."

Since this time, John Ames has failed to meet the required actions set by the panel and has now been suspended from membership.

Alastair Rees (MCIfA 1510): The panel found there to be a breach of the Code and issued the following formal reprimand under paragraph 40 of the regulations:

> "A professional conduct panel has determined that CIfA member Alastair Rees has committed a breach of CIfA's Code of conduct. Mr Rees was responsible for a substantial and unacceptable delay in preparing a straightforward watching brief report for a client. When the report was finally provided, it did not fully comply with CIfA's Standard and guidance for an archaeological watching brief in respect of the deposition of records. CIfA notes that Mr Rees has accepted that aspects of his conduct in this matter fell short of the standards required by the Code of conduct. CIfA trusts that this will be a one-off incident and now expects Mr Rees to adhere to the Code of conduct moving forwards."

The Institute's Regulations for professional conduct are on the CIfA website at www.archaeologists.net/codes/cifa

New members

Member (MCIfA)

7837 Fay Bowen
12826 Simon Cass
702 Thomas Cromwell
8625 Lauren Tidbury
8438 Ben Wajdner

Associate (ACIfA)

12834 Anne de Vareilles
12757 Hervé Duval-Gatignol
6203 Jeremy Fazzalaro
12849 Grace Griffith
9030 Peter Klemen
12775 Gary Millward
12850 Christopher Osborne
12890 Wil Partridge
12765 Sian Reynish
12764 Charles Rousseaux
11664 Victoria Sands
5991 Michael Sims
10240 Jessica Taylor
12763 Sanda Vucicic
12845 Katharine Warden

Practitioner (PCIfA)

12797 Hamza Aslam
12847 Holly Barton
10161 Tori Bedingfield
12843 Sarah Cameron
12762 Morgan Caruana
12861 Radomir Danilowicz
12842 Jonathan Dowell
12848 Daniel Elcoat
10591 Tom Elliot
6667 Laura Evis
12760 Brandon Fathy
12829 Andrew Frith
11897 Theodora Gerafenti
10427 Amanda Gilmore
12802 Aaron Girdlestone
10198 Cristo Manuel Gonzalez
12804 Bertie Handley
12858 Annabel Johns
12758 Ildikó Kálnoky
9576 Andrea Kreuzberg
12840 King Tin Raphael Lam
11703 Clare Lazzari
12896 Nicholas Lion
12774 Thomas Lucking
12806 Eile Mcleod
12761 Nathan Millar
12857 Laura-Marie Miucci
12844 Harry Mixer
12759 Domenico Molinari
12846 Amy Monella
12851 Pablo Morando Moreno
12841 Ceri Pennington
12773 Bronagh Quinn
12836 Rohan Ramoutar
10716 Alessandra Rossi
10353 Daniel Sendek
12753 Eloise Smith
9286 Davis Strubergs
12835 Molly Vowles
12805 Zoe Wortt

Student

12799 Morgan Adams
12769 Michael Anedda
12894 Edwar Baker
12824 Alisha Barker
12863 Lauren Bennett
12810 Rhiannon Bonawitz
12818 Sadie Brennan
12885 Louise Brookes
12801 Isabel Burton
12871 Din Butt
12852 Giovanni Calvia
12828 Katherine Chin-Quee
12888 Alice Coleman
12891 John Collins
12795 Simon Colverson
12897 Katie Cooper
12791 Nea Craig
12752 Eilidh Crawford
12869 Matthew Curtis
12901 James Dewhirst
12875 Aelfred Downs
12898 Jasmine Drover
12892 Katie Edwards
12881 Lee Fisher
12874 Jade Fretter
12811 Elizabeth Fuller
12900 Georgia Goold-Jones
12822 Nicholas Gracia
12883 James Green
12343 Leo Griffiths
12859 Matthew Hasell
12751 Zhenghong He
12872 Iain Healy
12893 Eleanor Hitchins
12756 Piper Hobson
12860 Alice Holland
12886 Ellen Hollingshurst
12887 Alan Holmes
12854 Ann Isenberg
12902 Eleanor Johnson
12787 Philippa Johnston
12770 Esther Jones
12864 Daniel Jones
8966 Kostja Solveig Junglas
12878 Rohan Kakar
12865 Megan Kimmelshue
12876 Isobel Loxton
12789 Shannon Maguire
12794 Jenna Martin
12827 Connor Meitiner
12800 Ana Sofia Meneses
12755 Molly Meyrick-Long
12873 Jennifer Carey Mikkelsen
12807 Alyssa Milroy
12877 Jessica Morgan
12868 James Morgan-Foley
12838 Katy Myers
12771 Tina Neale
12784 Joseph Parker
12880 Malachi Payne
12879 Megan Pedder
12812 Nicola Ravasi
12895 Ysabelle Reeve
12855 Alice Revill
8860 Heidi Richards
12813 Helen Ryder
12793 Hannah Salmons
12833 Mrinalini Sampat
11895 Jasper Sandford-McFadden
12767 Adya Shukla
12889 Emily Siddon
12779 Lucy Stanton-Greenwood
12882 Jamie Stuart
12796 Nicholas Taylor
12782 Toby Thompson
12870 Elise Tideswell
12768 George Tillotson
12862 Emily Topliss
12853 Bianca Vecchio
12776 Susanna Venn
12788 Nicola Wündsch
12899 Millie Whiting
12809 Jack Whitney
12825 Sebastian Willis
12783 Lauren Womersley
12778 Kay Woodhouse
12866 Seren Young

Affiliate

12884 Matthew Arbon
12856 Paul-Samual Armour
12823 Tessa Boer-Mah
12821 Kamara Buchanan
12777 Sasha Chapman
12830 John Clancy
12790 Bradley Clements
12766 Julie Dean
834 Rachel Edwards
12831 Susan Freebrey
8679 Matthew Goulden
11249 Soren Greasley
12781 Anthony Harris
12785 Joe Ibison
12792 William Lewis
12817 Hoi Yin Li
12816 Michael Sharp
12832 Kieran Stemp
12798 Amelia Woodhouse

Upgraded members

Associate (ACIfA)

10307 Alessio Auricchio-Bund
11354 Natalie Barker
11663 Matthew Bosomworth
10702 Lorna Critchlow
11833 Elliot Grater
11144 Adrian Jacklin
11587 Benjamin Swain
10562 Tom Watson

Practitioner (PCIfA)

12114 Niamh Dyer

Member news

Lorna Critchlow ACIfA (10702)

I came to archaeology later than some, after pursuing my interests in horses and cooking by working at various stables and pubs near Dartmoor. Inspired by the abundant archaeology and heritage in the area, I decided to study archaeology at Exeter. Whilst completing my degree I worked at Botai, a site that had evidence for early horse domestication in Kazakhstan, and on the Mount Carmel cave sites with the University of Haifa. Then came three years of commercial fieldwork with AC Archaeology and Oxford Archaeology. In 2021–22 I was lucky enough to be a supervisor on a cave site in Devon containing Ice Age megafaunal remains – not what I had expected from development-led archaeology in the UK! I decided to end my fieldwork days on a high and took a role as a heritage consultant with Terence O'Rourke in 2022, where I developed my research, report-writing, and project management skills. I applied to upgrade in order to recognise the progress I have made in my career to date; reflecting on my achievements has encouraged me to apply for my new role as Senior Research Officer with AC Archaeology.

Lorna Critchlow. Credit: Lorna Critchlow

NOTICEBOARD

Innovation festival – call for sessions

Our next digital Innovation Festival will be held on 9–13 October 2023, and will provide the opportunity to showcase and celebrate the innovative practices and approaches being undertaken across the historic environment sector, whilst tabling for wider discussion some of the identified barriers and challenges to implementing innovation in archaeological research.

Our week-long virtual festival will comprise a mix of short sessions each day, including presentations, workshops, virtual experiences, opportunities for open discussion, poster galleries, CPD and knowledge transfer.

Areas we're hoping to explore at the innovation festival include

- academic research
- public benefit
- working practices
- innovative approaches
- innovation by design

Are you interested in running a session, presenting a poster, taking part in a webinar or forming part of a discussion panel? Email conference@archaeologists.net – we'd love to hear from you!

Online application workshops

We want to encourage every archaeologist to submit a successful application for professional accreditation. But how do you ensure you have included everything in your application, so it is more likely to be successful?

If you're currently working on an application or thinking about upgrading, join Lianne at one of our online application workshops for a review of the accreditation process, covering the online application form to the statement of competence and everything in between. Lianne will walk through each step of the application, ensuring you understand what CIfA's Validation committee is looking for and how to best demonstrate your skills and knowledge to them.

Dates for upcoming PCIfA, ACIfA and MCIfA workshops are on our current and upcoming events page (www.archaeologists.net/civicrm/event/ical?reset=1&list=1&html=1)

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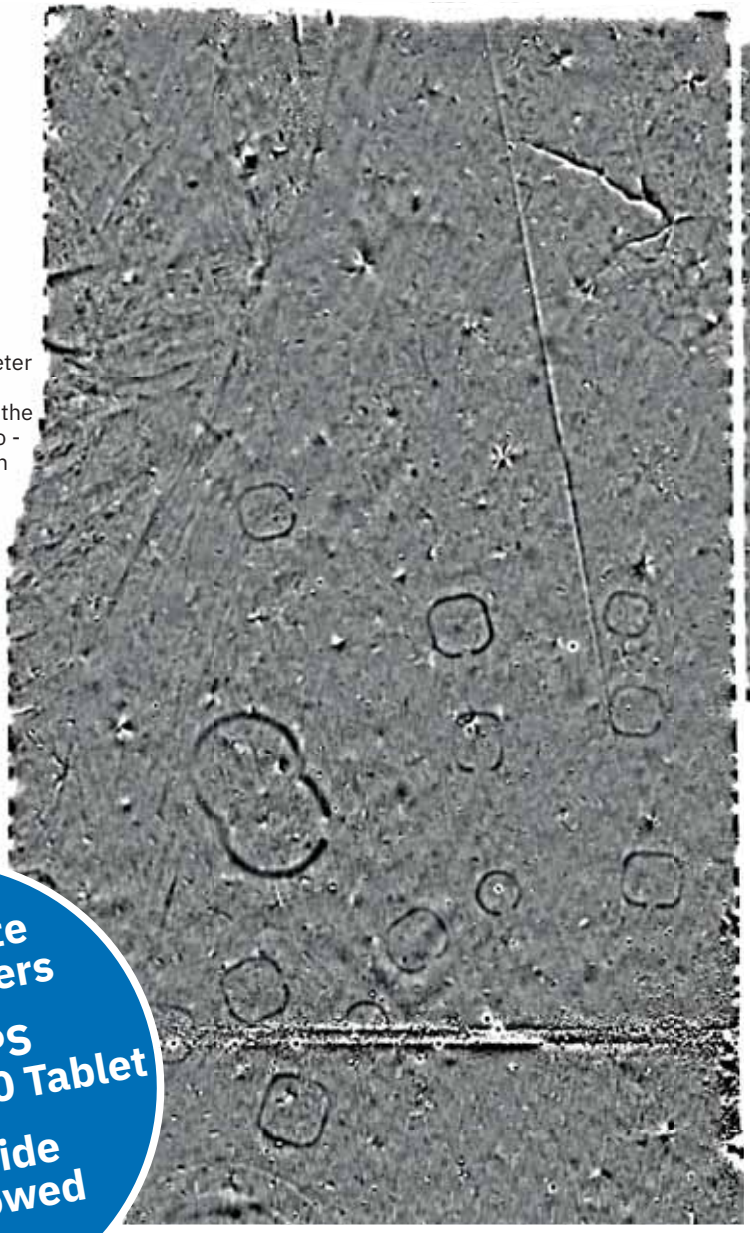

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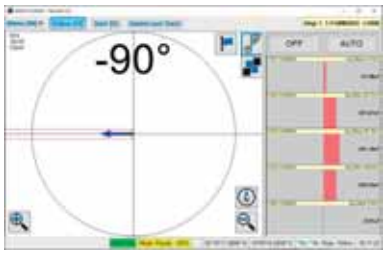

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