

IN TOUCH

Issue 39

**Oxford Archaeology
Review 2015/16**



Featuring our collaborations



Welcome to In Touch

Trekking through the Karakoram Mountains in Pakistan for three weeks this summer provided plenty of time for reflection on OA's achievements past and present, our role in the archaeological world, and our relationships with others. Apparently simple pleasures like walking and climbing require the support and co-operation of quite a number of other people: people to organise permits and logistics, skilled local guides, porters to carry tents and food, and fellow trekkers to provide camaraderie and encouragement. Similarly, though in a much more complex way, OA has benefitted immeasurably from working in partnership with others.

The introduction of Planning Policy Guidance Note 16 (PPG16) in 1990 provided a huge boost to archaeology, embedding it within the planning system and providing the means to excavate sites that would otherwise have gone unexamined. As a result, our understanding of Britain in the past and the places in which we live has advanced enormously. It also made archaeologists more professional and sharpened up our methods and our business practices. But it introduced competition between organisations that had previously worked alongside each other and, with it, an element of suspicion and secrecy. Hence, the creation of Framework Archaeology in 1998 as a joint venture (JV) of OA and Wessex Archaeology to undertake work for BAA was a momentous step. Building the trust that is an essential part of a JV was an important learning experience.

Since then, OA has gone on to form JVs with other companies in addition to the fruitful partnerships we have developed with a host of other organisations, among them universities, particularly the University of Oxford, with which we have had long-standing ties since our inception in 1973, and commercial consultants,



Gill on the Gondogora La, with K2 in the background

such as Ramboll. The work has included excavations in advance of development (such as Stoke Quay with Pre-Construct Archaeology), involvement in academic research (such as the Lost Landscapes of Palaeolithic Britain project for Historic England), cutting-edge scientific research, and more besides. We have featured a number of these collaborations in the pages of this review. Working on such projects has been exciting and hugely beneficial for OA, and I hope for our partners, creating new ideas, furthering archaeological research and reaching out to a wider audience. Our most recent JV is COPA, which we have formed with Cotswold Archaeology and Pre-Construct Archaeology in order to tender for work on HS2.

Working in the Framework partnership also provided another learning experience. Encouraged by the consultants, Gill Andrews and John Barrett, and supported by BAA, who had a strong ethos of investing in upfront development while expecting continuous improvement from the contractor, an innovative excavation strategy was developed. Those who worked on the site will tell you how exciting that was, for it involved them in research-focused decision-making on site, rather than the blanket

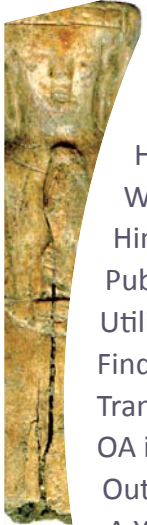
percentage approach that we have inherited from PPG16's 'preservation by record'. It used a relational database linked to GIS mapping, and specialist feedback was provided to teams in the field (all things that would be more easily achieved now). It resulted in better archaeology but, also, more cost-effective archaeology, accepting that not everything can or should be examined.

We need to revisit the 'Framework approach' again. It will mean breaking down a level of mistrust that has grown up, post-PPG16, between curators and contractors, a suspicion that decisions about what to excavate and what to leave will be based on financial rather than archaeological judgements. The credibility of our profession depends on rebuilding these partnerships to create sustainable research goals for archaeological sites, and more meaningful outcomes for the public.

*Gill Hey
Chief Executive Officer,
Oxford Archaeology*

In this issue

The theme of this special review edition of *In Touch* is 'Working in partnership with others.' We take a look at some of the joint ventures, collaborations and partnerships we've been involved in over the years. We also have our regular round-up outreach, publication and staff activities from the past financial year, and we revisit some of our recent projects.



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JOINT ADVENTURES IN ARCHAEOLOGY

Oxford Archaeology has long recognised the enormous value of working in partnership with others, in order to share knowledge and expertise and develop innovative ways to meet our corporate objectives. Our joint ventures with other commercial archaeological organisations have been among our most successful projects, and have uncovered some amazing archaeology that has transformed our understanding of past landscapes. Here we take a look back at some of our 'JVs'.

Framework Archaeology

Framework Archaeology was not only the first joint venture that OA was a part of but was also the first joint venture formed between archaeological organisations anywhere in the country. If for no other reason, and there are plenty of other reasons, Framework Archaeology forms a significant part of Oxford Archaeology's story.

Formed in 1998 as a joint venture between OA and Wessex Archaeology, Framework Archaeology (FA) was set up to provide archaeological services to British Airports Authority. While the initial impetus was the proposed construction of a 5th terminal at Heathrow, FA eventually carried out significant excavations and evaluations at Heathrow, Stansted and Gatwick, with smaller scale work at Southampton and Edinburgh. In addition, FA also undertook a range of heritage audits, desk-based assessments and Environmental Impact Assessments.

Highly innovative in its recording systems and interpretative approach, FA carried out some of the largest excavations in Britain. Between 1999 and 2007, FA excavated around 80ha of multi-period archaeology at Heathrow. The results were published in two volumes,

in 2006 and 2010, and the project was awarded the Best Archaeological Project prize at the British Archaeology Awards in 2008. Major excavations covering some 30ha were also undertaken at Stansted Airport between 2000 and 2004, and the results of this work were published in March 2008.

The Framework came to an end in 2015. In its 17-year history, there can be no doubt that Framework Archaeology had a major impact on British archaeology.



Bronze Age wooden bowl



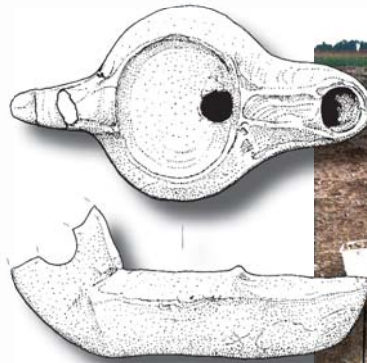
Oxford Wessex Archaeology: M6 Toll

Framework Archaeology set a trend for joint archaeological projects, which was followed in 2000 by another combination of the Framework partners, Oxford Wessex Archaeology, set up to deal with the challenges of the M6 Toll, a 43km-long supplement to the existing heavily overloaded M6 round the east and north sides of Birmingham.

OA had been involved with early stages of project planning (for what was then known as the Birmingham Northern Relief Road) since 1994, but the JV was considered the best way to deal effectively with the archaeological programme, mirroring the approach of the construction consortium CAMBBA. The programme involved fieldwalking, and subsequent evaluation trenching, excavation and building recording eventually examined some 41 sites, many of the excavations being undertaken in the early part of 2001 after one of the wettest winters on record.

Although modest, the archaeological results were very significant for an area with little history of large-scale excavation, with key contributions to understanding of

later prehistoric and Roman settlement in the area. Some aspects of construction-related fieldwork continued until 2003 and the project results were published in a substantial OWA monograph in 2008. A year later we learned that the M6 Toll route had passed within about 300m of the site of the Staffordshire Hoard. That would have made a rather different story.



Roman ceramic lamp





Roman cremation burial



Bone weaving comb

OA-PCA Ipswich Stoke Quay

Oxford Archaeology and Pre-Construct Archaeology formed a partnership to excavate a substantial site on the south bank of the River Orwell at Stoke Quay, Ipswich. The site included over 1000 burials ranging from the mid-7th to medieval period, along with mid Saxon occupation features and the remains of the Church of St Augustine.

The advantages to partnering were clear from tender stage when it was obvious that the quantity of archaeological remains on-site was difficult to discern from evaluation investigations. Sharing the risk between the two organisations meant that we were able to win the project with a competitive tender and respond to a significant challenge when the anticipated 100 bodies thought to be on the site became over 1000.



Rune marked leather

Oxford Wessex Archaeology: The A120 road scheme

The A120 road scheme offered another opportunity for Oxford Archaeology and Wessex Archaeology to work together as OWA. Mitigation works were carried out in two phases, one on behalf of Essex County Council the second contracted to Balfour Beatty during road construction.

The investigation, excavations and watching briefs were carried out between 2000 and 2003 and comprised 54 sites along a 19-km route. The archaeology ranged from the middle Bronze Age to the post-medieval period and included a substantial Roman farmstead and associated cemetery. The results were published as the first OWA monograph in 2007.

At a time when both companies were involved in large Framework sites and as independent contractors on multiple sites associated with the Channel Tunnel Rail Link, the shared expertise, capacity and flexibility offered by similar companies working together was both vital and rewarding in the successful completion of the project.



OA-PCA and Thameslink

Oxford Archaeology and Pre-Construct Archaeology (OA-PCA) entered into a framework agreement with Network Rail to deliver archaeological fieldwork services and post-excavation on the Thameslink Borough Viaduct Project in Southwark. From July 2010 major excavations were undertaken along Borough High Street, followed by two phases of fieldwork at London Bridge Station.

The investigations encountered significant Roman, medieval and post-medieval remains. Evidence for the Roman occupation of Southwark consisted of possible early military features, pre-Boudican occupation of the area, evidence of the Boudican fire, and buildings along the main Roman road running to the bridge, including one with a bathhouse. A large ditch – possibly the Southwark burh ditch – was found, as well as evidence of the townhouse of the Abbot of Waverley, and the medieval St Thomas’s Hospital. The post-medieval Cure s Burial Ground and almshouses were also discovered.

A very substantial programme of post-excavation reporting is well advanced, with the first of four monographs due to be delivered by Christmas. The publications will encompass all of the results of the OA-PCA fieldwork to date, as well as those of significant excavations carried out by Museum of London Archaeology prior to OA-PCA’s involvement.



OA-Cotswold Archaeology

Oxford Archaeology joined forces with Cotswold Archaeology in 2015 to investigate a site on the edge of Thame for Bloor Homes in advance of a housing development. Little did the team realise as it began work that the site would contain amazing archaeology of local and national significance.

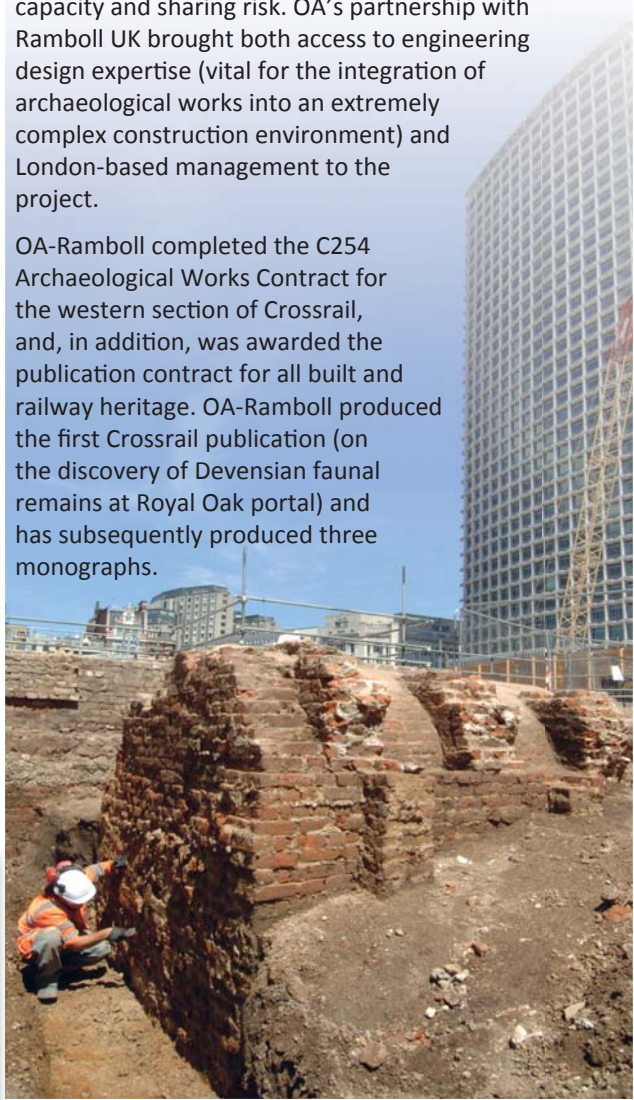
One of the most exciting discoveries was a causewayed enclosure of Neolithic date. A small henge monument was constructed within the enclosure during the later Neolithic. There was a hiatus until the early Iron Age, when a settlement was established on the lower ground. The excavation also revealed evidence of Roman settlement in the form of enclosures, hearths and corn-drying ovens, and sunken-featured buildings attest to occupation during the Saxon period.

The team returned to the site in 2016 to carry out an evaluation in a different part of the site. Understandably, expectations were high for some great results. The team was not disappointed, as it uncovered ditches belonging to the causewayed

OA-Ramboll Crossrail

Partnerships are not simply about increasing capacity and sharing risk. OA’s partnership with Ramboll UK brought both access to engineering design expertise (vital for the integration of archaeological works into an extremely complex construction environment) and London-based management to the project.

OA-Ramboll completed the C254 Archaeological Works Contract for the western section of Crossrail, and, in addition, was awarded the publication contract for all built and railway heritage. OA-Ramboll produced the first Crossrail publication (on the discovery of Devensian faunal remains at Royal Oak portal) and has subsequently produced three monographs.



enclosure, and an impressive assemblage of pottery and worked flint associated with it. Clusters of Neolithic pits were also exposed – one containing an assemblage of pottery, bone and flints, all characteristic of deliberate deposition – and more Saxon sunken featured buildings.



COPA

More recently, Oxford Archaeology has come together with Cotswold Archaeology and Pre-Construct Archaeology to form a consortium known as Cotswold – Oxford – Pre-Construct Archaeology, or COPA. This partnership will allow us to bid for archaeological work required during the HS2 Phase 1 Enabling Works, as well as other large-scale infrastructure projects.

This arrangement brings together three highly experienced Chartered Institute for Archaeologists (CIfA) Registered Organisations, each with a long and

established track record of delivery of large-scale and high-quality projects. So far, we have worked together on trial trenching for the A14 Huntingdon to Cambridge Improvements Project and await the outcome of the tender for the main mitigation works. We have also submitted bids for the Lincoln Eastern Bypass, and for Northstowe New Town in Cambridgeshire. The outcome of the main contractor tender for the HS2 Enabling Works is expected before Christmas and we are hopeful of securing significant amounts of fieldwork, due to commence in mid-2017.



Visit <http://www.coparchaeology.co.uk/> to find out more

Paul Booth, Richard Brown, Dan Poore and Ken Welsh

OUR JOINT ADVENTURES IN BOOKS

The collage features several book covers:

- The Archaeology of the M6 Toll 2000-2003** by Andrew B. Powell, Paul Booth, A.R. Fitzpatrick and A.D. Crockett.
- A Slice of Rural Essex** Archaeological discoveries from the A120 between Stansted Airport and Braintree by J. Tibby, R. Brown, F. Blidkush, A. Hardy and A. Powell.
- Settling the Ebbfleet Valley** High Speed 1 Excavations at Springhead and Northfleet, Kent: The Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 2: Late Iron Age to Roman Finds Reports by Richard Booth, Rachel Inge, Keith and Jill Hill.
- Solent-Thames Research Framework for the Historic Environment** Resource Assessments and Research Agenda by Gill Hey and Jill Hill.
- From Blackfriars to Bankside** Medieval riverfront archaeology along the route of Thameslink, central London by Elizabeth Stafford and Steven Teague.
- Landscape Evolution in the Middle Thames Valley** Heathrow Terminal 5 Excavations Volume 2 by Perry Clack.
- From hunter gatherers to huntsmen** A history of the Staines landscape by BAA Heathrow.
- Crossrail Archaeology** series including 'The Changing Face of London Historic Buildings and the Crossrail Route' and 'New Frontier: The Origins and Development of West London'.

And more to come...

Spotlight on GEOMATICS

The last few years have seen a leap forward in technology available for the recording of archaeological data. More affordable processing power and digital storage has allowed the development of relatively cheap, yet powerful photogrammetric processing software, as well as the means to use it. This, combined with a parallel development of drone (UAV) and camera technology, has the potential to transform the archaeological record.

Predicting the past

Incorporating new ideas into existing workflows in a meaningful way can be challenging, but this is what we have been working towards over the last few months at OA South. One recent example of this is at the Westgate Oxford project. This large, complex urban excavation required a rapid turnaround of data to be fed directly back to the site, allowing fast and efficient recording. The data were integrated with other pieces of evidence to inform site strategy. These included information from historic maps, work by Tom Hassall undertaken in the 1960, and excavations conducted 10 years previously at Oxford Castle, which enabled us to correctly predict the location of historic structures such as the English Civil War defences and medieval town wall.

The Bronze Age round barrow, known as Emmets Post, on the edge of a large quarry in Dartmoor, also used geomatic techniques to inform our approach to its investigation. A combination of photogrammetry and topographic survey was utilised for recording at the excavation stage. Back in the office, we wanted to assess the site within a pre-quarry landscape. This was duly recreated based around Environment Agency 1m LiDAR point data, with the quarry extents extracted, combined with the contour and spot height data from 1954 OS mapping (used because at that time there had only been a small amount of quarrying).



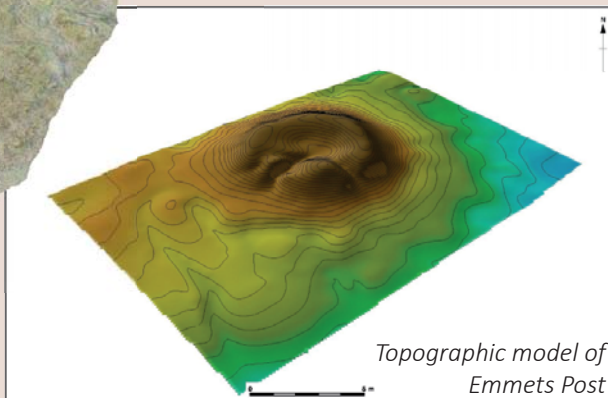
Westgate master plan



Above: Isometric view of stepped section at Westgate, captured with photogrammetry



Photogrammetric model of Emmets Post



Topographic model of Emmets Post

Making the amazing routine

The use of UAV has been particularly helpful for large and complex sites, such as that at the East Kettering Development, where phases of Roman occupation were covered with extensive stone spreads. Aerial photos of one of the excavation areas enabled the excavators to understand how the buildings were set in the landscape and how they related to the later activity.

The UAV has been employed along with a camera set and a pole to record the extensive Tudor brick kilns at Beaulieu that may have been related to Henry VIII's palace known to be in this area. The 3D resulting model has allowed us to highlight the fine detail of the kiln structure, such as the ephemeral and shallow depressions of the flues. Another great find from Beaulieu was the Tudor lime kiln. The lime kiln was photographed from the ground as well as with the pole-cam and uploaded to our online Sketchfab account.

And, representing a first for the office, all the skeletons from a late Roman and Saxon cemetery at Cherry Hinton, Cambridge, which containing over 100 graves, were recorded using photogrammetry. This significantly increased the speed of recording and excavation as well as adding another dimension to the analysis and archive.



Cherry Hinton burial



Beaulieu Tudor brick kiln



Late Roman and Saxon cemetery in Cherry Hinton, Cambridgeshire



Laser scan of Lion Mill



Inside out

The use of photogrammetry means that flying a drone around a building or feature allows us to record it accurately and quickly in 3D.

But there is a problem: photogrammetry is of little use in recording interiors, unless those interiors are large and open. One option is to use a conventional tripod mounted laser scanner. This can cope with many situations, but if the building is complex, for instance if it has lots of rooms and internal spaces, these can take a long time to survey, because of the need to set up the tripod and establish the survey control for each and every room.

That is, until the Zebedee Scanner appeared. This is a hand-held scanner that can scan as fast as you can walk through a building. Only a few complete seconds is needed to record a room and complex buildings can be accurately recorded in half an hour. Combining the



Aerial view of Lion Mill

photogrammetry with Zebedee scanner means it is possible to achieve what only a few years ago would have seemed impossible, that is, to record whole complex buildings in 3D in a fraction of the time it takes to record in 2D. survey by OA North of a small, but rather interesting cornmill at Stonyhurst in Lancashire, was literally covered in scaffolding, and we needed to record the elevations. Armed with the Zebedee, we were able to get behind the scaffolding with the scanner and then in the post-processing stage strip off the digital scaffolding to reveal the unblemished elevation. It was also able to safely record fabric where there was no safe access, and even allowed us to record the intimate details of a large wheel pit by pushing the scanner through a one-foot wide access hole into its obscured and dark interior. We were off site and enjoying the delights (!) of the M6 by lunchtime.



Using a Zebedee Scanner

photogrammetry with Zebedee scanner means it is possible to achieve what only a few years ago would have seemed impossible, that is, to record whole complex buildings in 3D in a fraction of the time it takes to record in 2D.

A six floor Manchester mill, containing 234 rooms, was recorded in a day by photogrammetry and Zebedee, and an elaborate orphanage in Jerusalem, with 130 rooms, was recorded in a morning. A recent

The result of all of this is a vast amount of 3D survey data that depict all the intimate details of our building and allow us to view, and digitally fly around, our building viewing it from every perspective. The data provide us with complete flexibility of output. We can never reproduce a building that is no longer in existence from a few 2D drawings, but with the 3D models we can. This is a very real concern in the North West, because countless numbers of large and magnificent mills are being demolished all the time, and do we not have a moral, if not legal, obligation to preserve them by record as best we can for the benefit of future generations?

Matt Bradley, Jamie Quartermaine and Gareth Rees

Housing and mixed development

Shottery, Warwickshire

An excavation by OA South at Shottery in Warwickshire, undertaken on behalf of Orion Heritage, Hallam Land Management and Bloor Homes Ltd during the summer and autumn of 2015, revealed sparse but intriguing archaeology.

The earliest feature encountered was a small rectangular ditched enclosure, found close to a tributary of the River Avon. Although only a single pottery sherd of uncertain date was recovered from the ditch, the feature was thought to be a very small burial mound of Neolithic date. A Bronze Age round barrow covering a cremation burial was also found, and a second cremation burial was recorded to the south.

By the Roman period, the site lay on the edge of an enclosed agricultural landscape known from a previous evaluation in the fields to the west. In the early Anglo-Saxon period, a group of settlers made their home beside the Shottery Brook among the ancient burial mounds. 'Dark Age' settlement evidence in the Avon Valley is rare, typically slight and difficult to spot, so this

is an important find. A cluster of features was identified, including a fire-reddened hearth, a gully and a row of postholes, which probably represents the location of a house. Traces of a sunken-featured building were also found nearby. Both the building and the hearth produced fragments of bone combs.

The presence of prehistoric burials and Saxon settlement on the same site is not necessarily coincidence.

Prehistoric burial mounds were often regarded as special places and useful landmarks by communities in the Anglo-Saxon period, and indeed several of the traditional hundreds (administrative sub-divisions) of Warwickshire were named after prominent burial mounds.



Stuart Foreman



Beaulieu, Chelmsford, Essex



The Chelmer Valley is an area rich in Iron Age and Roman remains, and it also contains Beaulieu (meaning 'Beautiful place'), one of Henry VIII's great palaces. Over the last four years, a team from OA East, funded by Countryside Zest, has uncovered a wealth of archaeological remains across this landscape as part of a major scheme of residential development. In the winter of 2015, OA East carried out a large evaluation (300 trenches), followed by a small excavation, together with a 4.5-hectare excavation, ahead of gravel extraction.

The 2015 season uncovered significant prehistoric and Roman remains. These comprised a middle Bronze Age open settlement, defined by pits and four-post structures, a middle Iron Age settlement, comprising a roundhouse and stock enclosure, and late Iron Age remains. The last consisted of a house, enclosure and, intriguingly, a ring-gully structure, with four, narrow opposing entranceways, which may represent a shrine. Rectangular buildings and ovens were also uncovered, and these related to a small Roman settlement.

The most enigmatic features revealed during the 2015 season date, however, date to the early post-medieval period and belong to the deer park associated with the royal palace. These remains included gullies, possibly relating to outbuildings and deer courses, and ring-gullies that probably protected tree stands from livestock or deer.

Work at Beaulieu is ongoing, and by the end of the project an area totalling 349 hectares will have been examined.

Helen Stocks-Morgan

Kettering, Northamptonshire

In May work began on the first of two large developments in Kettering, which will enable us to investigate the archaeological landscape around the town. The first project, at Cranford Business Park, is at the southern edge of Kettering and involved three separate excavation areas either side of the A6.

In the southernmost area we've been able to excavate the majority of an early Roman enclosed settlement. This settlement comprises three sub-rectangular enclosures, each with a distinct function. The central enclosure is clearly the domestic part of the settlement, where two roundhouses, two wells and a corn-drier were found.

Wells, a timber-lined pit and two stone-built malting ovens in the eastern enclosures appear to be associated with beer-making and crop-processing. Another feature, a clay and stone-lined tank, was possibly also used in the beer-making process, but so far we

have not managed to find exact parallels.

As well as all the usual range of finds, we have had some that suggest this settlement was by no means poor, including glass vessels and metalwork. Perhaps a villa lurks just beyond the edges of our excavations.

Helen Stocks-Morgan



Daisy Mill, Manchester



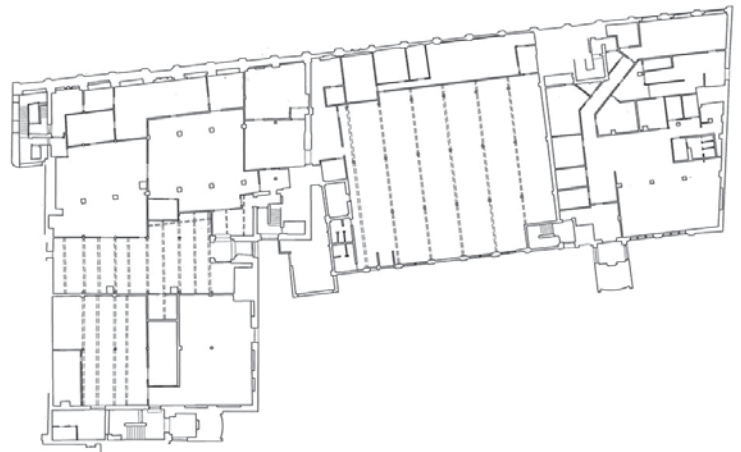
the interior of a building in as much time as it takes to walk through it. At Daisy Mill it was possible to record all six floors in a day, the result of which was a full 3D cloud of survey points from which plans, elevations and cross sections can be extracted.

The survey of Daisy Mill demonstrated that OA now has the means to record any building of any size and any complexity in full 3D.

Jamie Quartermaine

A detailed building survey of a former Victorian cotton mill in South Manchester presented quite a challenge. This colossal building measures 91m long and 23m wide and extends over six floors with a total of 234 rooms, but unfortunately no plans were known to exist. While photogrammetry using a drone was suitable for the exterior, this method would need thousands of photographs and a computer the size of a planet to record the hundreds of interior rooms. Other techniques, such as a reflectorless total station or laser scanner, would potentially take weeks or even months.

A solution came in the form of a new hand-held laser scanner called a 'Zebedee' that has an Inertial Measurement Unit (IMU), which means wherever it is, it knows its location precisely. Additionally, it has a small scanner mounted on top which makes it possible to scan



Minerals and aggregates

Sutton Courtenay, Oxfordshire

OA South returned to the Hanson Aggregates quarry at Bridge Farm, Sutton Courtenay earlier this year to investigate the eastern part of the site. The majority of features were found to be of Roman and later date, and it was in one of the Roman features that an unusual discovery was made.

As the field team were excavating a Roman boundary ditch that could be traced over a distance of over 160m, they noticed a series of discrete patches of dark soil in the upper fill of the ditch. The patches were metal-detected and found to comprise dumps of metalworking and other waste. One of these dumps produced one very unusual object: an early Anglo-Saxon button brooch with a large casting sprue still attached.

Button brooches are a fairly common Anglo-Saxon type, datable broadly to the late 5th-mid 6th centuries. What is unusual in this case is that the find undoubtedly represents waste from production of brooches, and the implication is that this production must have taken place in the immediate vicinity. Direct evidence of early Anglo-



Saxon jewellery production of this type is extremely rare – the present find may indeed be unique in southern England.

The exact location of the early Anglo-Saxon workshop at Sutton Courtenay is unknown, though some Anglo-Saxon features were distributed across the north-western part of the bridge Farm site, while perhaps as many as six sunken featured buildings have been found in the more recent work, lying south of the Roman boundary ditch.

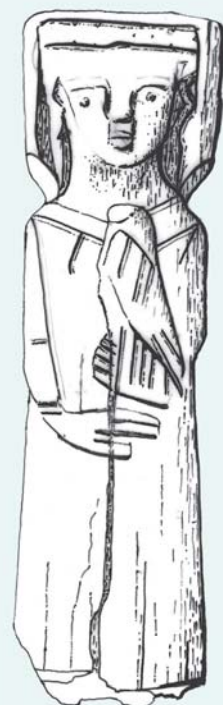
Paul Booth

Find spot

Bone knife handle from Huntingdon

This bone knife handle from excavations at Edison Bell Way, Huntingdon depicts a figure in long robes with hands folded at the front and carrying a hawk. The figure is probably female, although many examples are male. Similar handles have been found elsewhere but are often in museums with no real context. In England there appear to be very few examples, but these include one in Peterborough Museum, one in Herbert Art Gallery and Museum, Coventry and one in the Ashmolean Museum in Oxford, the latter two being female figures. Our figure is rather worn and looks quite crude when compared with the Oxford and Coventry examples, although it has many of the same characteristics and would seem to be relatively rare, at least in England.

The knife was probably for light general use and dates to between 1200 and 1400. The Edison Bell Way knife handle was found in an area of medieval ribbon development just outside the medieval town of Huntingdon. This is a typical context for such knives which have on the whole been found associated with urban or monastic centres.



Aileen Connor

PARTNERS IN TIME

Oxford Archaeology has built strong connections with academic institutions over the years. Recently, our staff have been involved in a number of university-based projects or have been instrumental in setting up and running projects in collaboration with universities. Here are just a few of them.

Dorchester-on-Thames

An important aspect of OA's relations with the Institute of Archaeology, University of Oxford, is the annual training excavation at Dorchester which has been running since 2008, with its principal (mainly Roman) site in the allotments in the south-west quarter of the village. This is one of the key activities of the Discovering Dorchester Project, whose partner members are the university, OA, and the Dorchester Abbey Museum.

The project benefits from Dorchester's remarkable concentration of significant archaeological remains, from Neolithic burials and ceremonial monuments to medieval religious and domestic buildings. Specialists in most of these periods, Chris Gosden and Helena Hamerow from the University and Gill Hey and Paul Booth from OA, put together a wide-ranging research design for Dorchester in 2007, and subsequent small-scale excavations directed by the OA pairing have produced important evidence for most of the periods concerned, as well as providing basic fieldwork training for Oxford undergraduates from the School of Archaeology, students from Oxford University Department for Continuing Education, a variety of other paying guests of all ages, and local people.

The supervisory staff include undergraduate and post-graduate students and the Oxfordshire Finds Liaison Officer. Excavation training is complemented by talks on a wide range of topics given by members of the team and other staff from the Institute of Archaeology, and other activities include an annual open day. The project provides a vital training function for the university, an opportunity for OA staff to be involved in non-commercial work, and a close direct link between the two institutions. It is hoped that this can be developed further when the current site work is completed and moves into a post-excavation phase.



(Re)dating Danebury hillfort

Traditional approaches to dating the Iron Age have been based on artefact typologies. Radiocarbon dating has been neglected, because it was thought to allow less precision than artefact dating and because of the 'Hallstatt plateau' of c 800–400 BC, which has been characterised by very wide ¹⁴C date ranges.

However, the last decade has seen major advances in methodology and through specific ¹⁴C dating projects. Two key results of these studies are that typological dating produces sequences that are regularly too late (or sometimes too early), and that various cultural phenomena, including chariot burials and shifts in settlement, represent brief episodes, rather than being long lived. This has revealed gaps in our knowledge, with consequences for our perceptions of Iron Age societies.

Since 2013, the '(Re)dating Danebury Hillfort and Later Prehistoric Settlements in the Environs: a Bayesian Approach' project has sought to build a new timeline for the Danebury area, which was investigated by Barry Cunliffe in the 1970s and 1980s, both by reworking earlier results and by obtaining 300-plus ¹⁴C dates. The project, funded by the Leverhulme Trust, brings together the University of Leicester, the University of Oxford and the Scottish Universities Environmental Research Centre (SUERC). Lisa Brown and Cynthia Poole of OA South have vital roles too. Cynthia has been identifying deposits and material most useful for dating, while Lisa has been

considering the implications of dates for the ceramic sequence (that is, do they change the previous picture, and if so how?).

The results are eagerly awaited, and will help put Iron Age chronologies on a firmer footing.



Danebury Hillfort

Hampshire Hub and University of Southampton [OGL (<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/1/>)], via Wikimedia Commons

A fishy tale from the Herculaneum sewers

For an archaeoichthyologist (fish bone specialist), few projects are as exciting as the investigation of the piscivorous habits of the inhabitants of the buried Roman town of Herculaneum, in the Bay of Naples. Funded through the Herculaneum Conservation Institute, and working in partnership with Professor Mark Robinson (Institute of Archaeology, University of Oxford), Rebecca Nicholson, Environmental Manager at OA South, has been recording and interpreting a large collection of fish



remains recovered from the impressive Cardo V sewers beneath the town. As part of this collaboration, she also helped to supervise Erika Rowan (now Dr), who identified many of the fish otoliths (ear stones) as part of her research into Roman diet and nutrition. Erika was able to use both Rebecca's

reference collection and OA's digital microscope, as the otolith identification was undertaken using the innovative AFORO otolith image analysis database.

When the team embarked on the project, it was hoped that it would be possible to compare individual households through the bones, seeds and invertebrate remains that had accumulated beneath individual downpipes, but sadly it seems that the regular flushing of water through the sewers has redistributed and mixed the remains.

Nevertheless, the assemblage provides a fascinating insight into the diets and fishing methods used just prior to the eruption of Vesuvius in AD79. The great majority of bones come from fish which can be caught today in the coastal waters around Naples: sea breams, pickerel, horse mackerel, gurnards, wrasses, mullets, stargazer, scorpion fish, small flatfish, hake, damselfish, combers and groupers, as well as tiny conger and moray eels. Sardines, anchovies, Spanish mackerel and small tuna bones may be the remnants of salted fish or fish sauces, such as garum or allec.



Madingley Hall

In 2015, OA East hosted continuing education students from Madingley Hall, Cambridge. The students were completing the practical module of the University of Cambridge's Diploma in Archaeology. We have worked with Madingley Hall for 20 years, but this year's hosting of a diploma module is part of an initiative to begin to strengthen these links again.

Research in Cumbria

Over recent years, OA North and the University of Central Lancashire (UCLan) have enjoyed many successful collaborations, and this has led to a desire to build something more concrete. The opportunity came in the aftermath of excavations on the Carlisle Northern Development Route (CNDR). The project uncovered a late Mesolithic encampment associated with an assemblage of some 250,000 struck flints, wooden structures and artefacts dating to the Neolithic, and Bronze Age burnt mounds, all within or adjacent a palaeochannel of the River Eden.

Following a successful application to the Arts and Humanities Research Council, OA North and UCLan are collaborating to provide two fully-funded PhD studentship to study the Mesolithic transition in Cumbria. The students (one of whom was from our own ranks) are now in post, with OA North staff and Rick Peterson and Vickie Cummings of UCLan providing supervision.

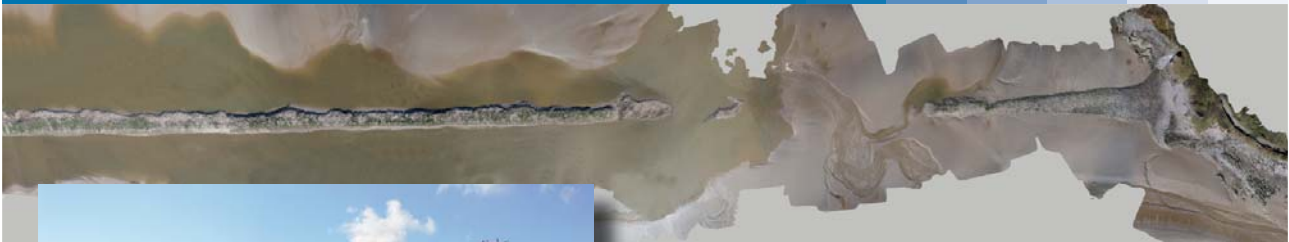
The doctorates will complement each other, with one focusing on lithics and the other the environment (although, being student-led, the study topics are not quite 'set in stone'). This is an exciting development, and it will be interesting to see how it works out, as it potentially offers a model for other such collaborations with opportunities for our staff across the organisation.



Paul Booth, Fraser Brown, Lisa Brown, Stephen Macaulay and Rebecca Nicholson

Environment

Morecambe Bay survey



In early 2016, OA North was commissioned by Morecambe Bay Partnership to undertake a survey of a late 19th-century sea wall that extended into Morecambe Bay to assist in both its management and interpretation. The sea wall was constructed in the 1870s as part of an unsuccessful scheme to reclaim vast areas of the bay for agriculture. The scheme was proposed by Herbert Walduck, a local entrepreneur, and was implemented and managed on his behalf by a Captain Mutter. From the outset, however, the scheme was beset with problems,

as the tide continuously undercut the wall's foundations, and after two years the proposed 7km-long wall only extended for circa 2km into the bay. The scheme was finally abandoned following the death of Captain Mutter, who was killed by one of the wagons that transported stone used to build the sea wall.

In order to survey the sea wall, OA North used its UAV drone, and enlisted the support of the local coastguard, who provided essential supervision and backup. With this vital support, and with the benefit of UAV technology, it is noteworthy that, despite the wall's considerable length, the survey only took half an hour on either side of low tide. Moreover, the survey results are extremely impressive, in that they have allowed a 3D model to be produced, which is accurate to $\pm 3\text{cm}$ and can generate detailed contours and aerial photographic views of the 860m-long structure.

Jamie Quatermaine

Assessing agri-environment schemes

This project was commissioned by Historic England as part of Measure 2D1 of the National Heritage Protection Plan, which aimed to reduce the threat posed by modern agriculture. It reviewed whether the mechanisms used within environmental stewardship (ES) have been able to identify and preserve non-scheduled but nationally-important sites, and whether this analysis can be used to inform the new countryside stewardship (CS) schemes rolled out in 2016.

The project used past ES scheme agreements to assess how the scheme could be improved for identifying, recording and mapping potentially nationally important sites in grassland. It has also looked at the identification of upstanding earthworks in arable cultivation, identified within the Selected Heritage Inventory for Natural England and Farm Environment Plan as being nationally important.

Nineteen case study holdings in Oxfordshire, West Berkshire and Hampshire were looked at, analysis of which shows

that the opportunity for greater heritage gains from agri-environment schemes has been achieved in part by local authority archaeologists (LAAs) identifying further sites of national importance within them. However, these gains are not always being maximised as the LAAs' advice for management of these monuments was not always followed up.

The work has also shown that gains could have been further maximised within the holdings by analysis of a more extensive array of data that has recently become more readily available, for example using Google Earth and LiDAR. Using these methodologies, the Conservation of Scheduled Monuments in Cultivation risk assessment, and field survey not only helps identify further nationally important sites but can also allow a more accurate assessment of risk, and inform the best management options to reduce this risk.

Klara Spandl



Wittenham Clumps

Burials

Cherry Hinton, Cambridge



OA East is in the final stages of an excavation ahead of a residential development by Weston Group Plc (with CgMs acting as consultants) in Cherry Hinton, to the south-east of Cambridge City centre. Features spanning the Iron Age to post-medieval periods have been identified, although without doubt the most interesting aspect comprises a complex of Roman-period mortuary enclosures containing a number of high-quality cremation and inhumation burials. These enclosures



subsequently became the focus for an intensively-utilised early Anglo-Saxon cemetery.

The cemetery, which dates from c 500 AD and lasted for perhaps 75 to 100 years, has yielded 120 inhumations, of which roughly 60% are adults, most furnished with an array of grave goods. The female burials contain glass and amber beads and twinned brooches (a variety of cruciform type; no two pairs are the same), while the male graves contain shield bosses, spears (again in a number of different forms) and knives. Several contain whole pottery vessels and one produced a rare glass claw beaker. Quite a few graves, however, appear to have been robbed in antiquity. Two burials were within small circular barrow ditches, one of which had clearly been re-capped, or cairned, with chalk and stone.

One of the most unusual features of this cemetery is the large number of multiple burials, with up to four individuals within a grave, often buried in sequence. Whether disease played a part in this practice will be investigated during post-excavation analysis.

Richard Mortimer

Worthy Down Camp, Winchester

In 2015, during redevelopment of the Worthy Down Army Camp, Winchester, by Skanska, a human skull was discovered during the digging of a foundation trench at the site of a former firing range. The police were called, but, after consultation with OA, it was quickly established that the skull was ancient.

OA South was subsequently commissioned to undertake an excavation in order to record any burials that might be threatened by the redevelopment. The investigation used procedures agreed in advance with the Defence Infrastructure Organisation to deal with the archaeological discoveries during the ongoing redevelopment of the army camp (known as 'Project Wellesley').

The excavation led to the discovery of 18 burials, which, on the basis of two associated 4th-century coins, appear to date to the late Roman period. Significantly, for such a small group of burials, there was a surprisingly wide

range of burial practices. The cemetery included bodies that had been extended and placed on their sides, one crouched burial and one decapitated body, where the head of the individual had been placed between the legs. Several of the individuals also seem to have been buried wearing hobnailed shoes or boots. The burials were aligned predominantly NW-SE and located in an area not far from Neolithic and Bronze Age barrows.

Stuart Foreman



Find spot

Bracer from Bexhill

This Chalcolithic or early Bronze Age (Beaker) bracer from the Bexhill-Hastings link road in Sussex is a very exciting find. Bracers are rare, with only 90 examples from the whole of England, Scotland and Wales at the last count. Its recovery from a non-mortuary context makes it even more unusual and we look forward to the results of XRF and SEM analysis to find out where it originated.

Ruth Shaffrey



Geoarchaeology

Oxford Flood Alleviation Scheme

During summer and autumn this year, a team from geoarchaeological services has been working very close to home – on the flood meadows behind OA South’s office at Janus House. The team is there to carry out fieldwork along a 5km flood relief channel ahead of the construction of the Oxford Flood Alleviation Scheme for the Environment Agency.

Survey work has included a range of techniques aimed at characterising the depth and nature of the buried sediments, palaeochannels, floodplain islands and

archaeological remains. Approximately 100 hectares of land are being investigated, covering the footprint of several proposed channel options.

This project is hugely challenging, and has accordingly adopted a mixed method approach, incorporating extensive geophysical survey, hand-augering, and the drilling of 5m-deep boreholes to retrieve sediment cores for palaeoenvironmental assessment and radiocarbon dating. The results of the work will provide an enhanced deposit model, building on the results of a watching brief carried out last autumn, intended to inform a future programme of targeted evaluation trenching.

Alongside the survey work, a strip, map and recording action was undertaken on five ecological trial areas that have been excavated by the Environment Agency to monitor how the local flora and fauna respond to changes in ground conditions.

Work has now begun to dig trenches across the modern road opposite the Kennington Road junction to search for evidence of medieval or earlier causeways and any buried culverts associated with the bridge crossings.

Liz Stafford



Urban regeneration

St Aldate's, Oxford

Excavations for Gilbert Ash and Orion Consultancy undertaken at 114-119 St Aldate's and 4-5 Queen Street, Oxford, has shed light on some of the oldest and grandest parts of the medieval city.

The earliest archaeology identified in our excavation appears to be a backyard surface through which a series of later rubbish pits, dating to the late Saxon and early Norman period, had been cut. The pits contained pottery and bone fragments, denoting general rubbish, as well as the raked-out fuel waste from ovens, fires and hearths. There were also many sediments which had the distinctive green colour typical of faecal material, either from humans or animals.

A square stone-lined cess pit cut through the rubbish pits. It contained a rich assemblage of 12th-13th-century pottery, animal bone and other domestic material. Its well-constructed nature suggests that it was associated with a house of a wealthy individual. It is known that, during this period, the site was occupied by four properties. Two of the more substantial land holdings were in Jewish ownership and approximately correspond to the modern 114 to 119 Aldgate Street. Two much smaller properties, held by the Bishop of



Lichfield, fronted on to Queen Street.

A stone-built structure, part of a below-ground cellar, lay to the east of the cess pit. The later fills of the cellar contained a small assemblage of late 15th-16th-century pottery, which included stoneware jugs and an intact small drinking vessel. It is possible that the cellar belonged to one of the number of taverns that fronted St Aldate's and Queen Street.

The type of deposits and features found during the excavation are consistent with backyards in which rubbish from a succession of properties – grand buildings, commercial properties, smaller dwellings and workshops – was dumped.

Carl Champness



Find spot

Two unusual objects from Woolwich

The latest phase of the excavations at Woolwich for Berkeley Homes resumed in November 2015 and continued into 2016. The investigation revealed more evidence for multiple periods of activity on the river frontage, between the Royal Arsenal and the Woolwich Ferry, but also two unusual ceramic objects.

One of these is a small complete pot of unusual conical form – resembling a flowerpot or a witch's hat – that was found upside-down in a ditch. It is a deep bowl in a yellow-glazed ware that was made in the Surrey/Hampshire during the late 17th century.

Similar examples are known from London, but it is rare to find one as small and complete as this one.

Larger pots of this form have sometimes been identified as 'stool pans' (a conical potty set into a wooden box or commode). Alternatively, the broad flanged rim might have allowed the vessel to be



set into a wooden bench and used to dispense small amounts of foodstuffs in the kitchen.

The other interesting find is a fragment from an earthenware tile, also made on the Surrey/Hampshire border, that was recovered from a late 16th- or 17th-century pit. Originally, this tile would have formed part of a ceramic stove, which took the form of a tall

cupboard-like box or drum, with a wood-burning fire-box of brick or stone at its base and an upper flue which channelled away the smoke.

This type of stove functioned as a kind of ceramic radiator.



John Cotter



The Great Fen Spitfire

Just over a year ago, OA East was excavating the remains of Harold Penketh's Spitfire X4593. The Great Fen Spitfire Project is perhaps one of the best examples of a partnership project, and its incredible success was in large part down to working closely with others. Indeed, it was OAEast's well established relationships which made our participation even possible..



OA East's involvement with the Spitfire and the Great Fen project goes back over 20 years to the mid-1990s, when OA East was part of Cambridgeshire County Council and Stephen Macaulay ran the Cambridgeshire Monument Management Project. We worked closely on protecting archaeological monuments and each site would have a management plan which would include wildlife and nature conservation. Our close relationship with the Wildlife Trust began then. We worked on the original masterplan for the Great Fen in the 1990s and have been the archaeology advisor ever since. And so, when the need to investigate and recover Spitfire X4593 was first raised in 2012, the Wildlife Trust turned to OA East.

OA East also has a close working relationship with Peter Masters of Cranfield University, who regularly carries out geophysical surveys for us. Cranfield is also part of

the Defence Academy and has extensive experience working with the MoD to excavate and recover crashed aircraft. Following the initial conversations with Cambridgeshire County Council and Historic England, OA East contacted Cranfield University and was invited to participate in the recovery of a Spitfire on Salisbury Plain in 2013. This was an ideal opportunity to learn how to excavate buried aircraft ahead of the Great Fen dig. And it was as a result of joining the 2013 Salisbury Plain dig that OA East forged new partnerships with the MoD archaeologist (Richard Osgood) and Operation Nightingale, who joined the Great Fen Spitfire excavation.

At its start in October 2015, the Spitfire project involved many partners: OA East, the Wildlife Trust, the National Lottery (who funded the project), the Ministry of Defence (including the JCCC, 5131 Bomb Disposal Squadron from RAF Wittering and RAF Wyton Pathfinders Museum), Operation Nightingale (including the Defence Archaeology

Group), Cranfield University, Historic England, Natural England, volunteers from the Great Fen, OA East and Jigsaw), the Great Fen Archaeology Group, Holmewood Hall, Holme Primary School and local farmers, such as John Papworth (who provided all the plant for the project free of charge).

There were some challenges working with so many partners. On Day 1, we had a small team of archaeologists working with a large number of volunteers, Operation Nightingale members and Wildlife Trust staff. At times it felt as though we had too many on site, but in the end it worked incredibly well and in many ways would not have been possible without everyone's input. Most finds were recovered through metal detecting by volunteers and Operation Nightingale soldiers. Huge numbers of visitors and media visits were organised by the Wildlife Trust, and we were able to complete the whole dig in an incredible six days.

Having the MoD and Operation Nightingale on site also meant we could deal with .303 ammunition, and we even had an on-site x-ray scanner courtesy of 5131 BD Squadron so that we could look at the pilot's gloves, boots and clothes immediately.

Louise Loe of OA's Heritage Burial Services was on hand as well to deal with the human skeletal remains that were found at the eleventh hour on day five of the dig.

Robyn Llewellyn (Head of the HLF in the East of England) visited the dig and commented on how pleased she was to see two regular HLF partners (OAE and the Wildlife Trust) collaborating and bringing together their two HLF Projects Jigsaw and the Great Fen in the Spitfire project.

Our close collaboration with the MoD, Cranfield University and Historic England has created a legacy, as the Spitfire project is going to be used as an exemplar for updating Historic England advice on the recovery of crashed aircraft. We will look to partner again with the Wildlife Trust, perhaps in our Cambourne Young Roots HLF project. We have Operation Nightingale soldiers who now work with OA East and we're hoping to develop a more formal project with thjem in the future.

Stephen Macaulay



"The best partnership project the Wildlife Trust have ever been involved in"

Brian Eversham, Chief Executive, The Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire



Training and capacity building

Oxford University Department for Continuing Education



environment professionals, OAU and Rewley House launched their programme of professional training in the historic environment, with many courses taught by OAU staff. In 2012 we decided to explore ways in which our partnership could be strengthened to offer new ways of combining academic and practical expertise to meet the challenges that we know lie ahead for our sector.

In 2016, Cotswold Archaeology and PCA joined us in this partnership to deliver a programme of courses and workshops in the historic environment that would provide training and professional development opportunities for our staff, our organisations, and the archaeological profession as a whole. Over the year, courses were offered on post-excavation and report writing, environmental sampling, excavating human remains, and Roman material culture.

We are now working with our COPA partners to develop new courses in the programme for next year aimed at our supervisor grades and above.

Anne Dodd

Oxford Archaeology has worked closely with Oxford University's Department for Continuing Education (OUDCE) at Rewley House for many years. Rewley House archaeologists were among those involved in the creation of the Oxford Archaeological Unit (OAU) in the 1970s, as 'rescue archaeology' took off and universities across the country developed what was then usually known as extramural studies.

In the 1990s, recognising the requirement for more training on the practical skills needed by historic

Jigsaw Cambridgeshire

After five years, Jigsaw Cambridgeshire came to an end this summer. The project, which was a joint venture by OA East and Cambridgeshire County Council and funded by the Heritage Lottery Fund, has been a resounding success. Between 2011 and 2016, over 500 local people have been involved in Jigsaw projects, and 23 community groups in the county are now carrying out archaeology projects on their own, after Jigsaw ran 42 different training courses. The groups extend from Wisbech in the north to Orwell in the south, and Covington in the west to Soham in the east.

Five volunteers have taken degrees in archaeology, one has gone on to a full-time outreach post in Suffolk and another is now a graduate trainee with OA East. The Jigsaw groups are a dynamic, confident, enquiring network of people engaged with the archaeology of their county – an enduring project legacy.

Jigsaw was shortlisted for the Best Community Engagement Archaeology Project in the 2014 British Archaeological Awards and, although the project did not win, it was great national recognition for the efforts of Jigsaw's community archaeology officers, Jo Richards and Jemima Woolverton.

Jo Richards



Historic buildings

Booth's Hill Ice House, Ramsey Abbey, Cambridgeshire

This unusual job, funded by Cambridgeshire County Council, involved recording the entrance to an ice house that forms part of Booth's Hill scheduled monument (a small motte surrounded by a moat) located within the grounds of Ramsey Abbey. A special 'bat door' was to be installed by the Cambridge Bat Group in order to allow access for the resident bats, while also keeping the structure secure. The door has a ventilation mesh along the bottom and a gap within the upper part, through which the bats can come and go.

Although larger estates often had ice houses within their grounds, many have been left to decay or have disappeared completely. During the winter, ice and snow would be taken into the house and packed with insulation (such as straw or sawdust) and would remain frozen for many months, but by the mid 1920s the invention of the refrigerator heralded the demise of these structures. The Booth's Hill ice house was built around 1832 and closely resembles a cup-and-dome design, whereby the lower section below the opening is the 'cup' and the roof the 'dome'; this was the most popular type of construction, but was also the most expensive.

This project provided a rare opportunity to be involved in something that was environmentally as well as historically important, and it will be interesting to see if the bats are using the new access into their historic home.

James Fairbairn



Cliveden Generator House, Buckinghamshire

The Generator House, a detached building hidden within woodland near to the Grade I listed Cliveden mansion, was probably constructed in the 1890s in order to provide the house with electric lighting and power. Disused for much of the second half of the 20th century, its condition had deteriorated considerably and the building was unsafe to enter. OA was commissioned by



the National Trust to investigate the Generator House as part of a scheme to reconstruct its roof and to make it watertight so that a new use for the structure could be found.

Some initial recording of the building was carried out using the drone, which enabled a 3D model of the partially-collapsed roof to be created. Further photogrammetry recording was then undertaken to produce another 3-D model of the structure once the interior had been cleared. Although numerous bases

from former dynamos or engines survive, few features relating to its original use remain. Interpretation of how the building functioned is being aided by Dr Ian West who is involved with the Country House Technology Project at Leicester University.

The next stage of the project will be to produce working drawings for contractors to use when they rebuild the roof next year. The project also includes the creation of an artefacts database documenting the many small finds recovered from the detritus within the building and in the dumped material outside.

Jon Gill



Working together on human remains

Over many years, Oxford Archaeology has built up a considerable amount of expertise and experience in the excavation, study and publication of human remains. The reputation of OA's Heritage Burial Services as a leading specialist department dedicated to burial archaeology has led to numerous collaborations with research organisations and other bodies. Here we look at four recent projects.

A virtual osteology?

The long term preservation of osteological collections in museum is a growing concern, especially when the collection is of considerable international significance. One such collection, the crew from Henry VIII's flagship the Mary Rose, has recently been the focus of a study by Swansea University and Oxford University which aims to address this issue using photogrammetry. The method involves the production of models of human bones which can be viewed digitally, thereby reducing the need to handle or even see the bones themselves.

But how effective are digital images for scientific research? In order to address this question, the Swansea/Oxford team invited OA's Heritage Burial Services to take part in a mini trial. We agreed without hesitation. We examined virtual and real skulls and performed standard osteological analysis. Our data are now being analysed by the Swansea/Oxford team to measure the success (or not) of the digitised method in human osteology.

For us, the trial was a great opportunity to try out virtual analysis (and an absolute privilege to examine the Mary Rose skulls). The method holds considerable potential and would enable museums to open their collections to a wider audience on a global scale. The implications for commercial work could be quite radical. Just think: no more lugging boxes of bones around, analysis taken out of the lab and brought into the home.... However, in reality, osteology relies too much on touch and the ability to rotate bones relative to the natural light. Handling allows us to engage with the material in a way that virtual analysis does not. Virtual analysis is a very important tool, but in our experience, should be used to complement osteological analysis and not replace it.



information on oral bacteria, host immune status, diet, exposure to respiratory irritants and even, possibly, levels of nicotine and caffeine. The information, which may also provide a basis for inferring exposure to smoke and industrial particulates, will be integrated with osteological data on skeletal and dental disease from 18th and 19th century assemblages currently being analysed by OAS.

Stoke Quay, Ipswich

The enormous task of recording and analysing 1162 Saxon and medieval skeletons from Stoke Quay, Ipswich, is almost behind us and those who have visited Heritage Burial Services over the last year or so will be familiar with the sight of us poring over many fascinating cases and crunching numbers. Perhaps less known is our work with the Institute of Archaeology, University of Oxford, on stable isotopes. Eleanor Farber is undertaking research for her DPhil on migration in the Stoke Quay assemblage.

She has studied a small number of samples for dietary and geographic origin isotopes for our publication report and is now sampling a further 300 skeletons for the same analyses. When completed, this will be the largest isotope study undertaken on a single assemblage of this date.

Collaborative knowledge exchange project

'The Past People of Oxfordshire' was a six-month pilot scheme funded by Higher Education Innovation

Funding (HEIF). The aim of the project was to improve current understanding of the nature, scale and geographic distribution of the many thousands of burials that have been excavated in the county and to create a resource for planning archaeologists, museum curators, commercial archaeologists and academics.



OA worked with the School of Archaeology of Oxford University and Oxfordshire's planning archaeologists to create a database which compiled much needed information on burial practices, osteological analysis, archives and publications on sites excavated in Oxfordshire. The database is available at <http://www.pastpeopleoxon.uk/>

Oral health during the Industrial Revolution

Last year funding was awarded to Greger Larsen, director of the Palaeogenomics and Bio-Archaeology Research Network (Palaeo-BARN), University of Oxford, to collaborate with Oxford Archaeology and medical scientists and specialists at the universities of Oklahoma and York in a study on human dental calculus and oral health during the Industrial Revolution. Dental calculus acts as a long-term reservoir of high-quality DNA, proteins, and microfossils, so has the potential to provide

Louise Loe

Hinxton: Where the past meets the future

OA East has developed a long and successful partnership with the Wellcome Trust since we first began our archaeological investigations in Hinxton (South Cambridgeshire) back in 1993. The Wellcome Trust Sanger Institute was originally conceived as a large scale DNA sequencing centre that was created to participate in the Human Genome Project. From its inception, the institute has maintained a policy of data sharing and does much of its research collaboratively. As the Hinxton Hall/Genome Campus site has continued to develop, has been revealed the archaeology of a landscape that has been utilised for many thousands of years, with the most recent excavations in 2014 demonstrating activity extending back into the very late Glacial or early post-Glacial period.

Each phase of excavation at Hinxton has produced at least one human burial, with eleven having been recovered in total, along with various disarticulated remains. In 2013 a research proposal was produced by OA East at the request of the Wellcome Trust, in which a number of ancient DNA (aDNA) projects by staff of the Sanger Institute were combined with plans for public engagement and a related display (including a 'Mulberry Tree Timeline' plaque).

An important element of this research proposal was to sequence the aDNA of the Hinxton skeletons as part of a wider study into East Anglian population history. Initial testing for the survival of aDNA proved positive and consequently (after a couple of Skype sessions and numerous email conversations) it was decided to widen the research to include skeletal remains from other nearby sites at Linton and Oakington. The additional samples were collected from the selected skeletons at our Bar Hill office in March 2014 and taken to the Australian Centre for Ancient DNA in Adelaide for sequencing. The ensuing analysis and research culminated in the publication of a joint paper in Nature Communications in January 2016 which, among other results, showed

that an estimated 38% of the population of Eastern England owes its ancestry to Anglo-Saxon

migrations. Since then, we have also jointly contributed to a substantial feature article in British Archaeology, which included research from similar projects in York and London.

The Wellcome Trust and OA East are continuing to work together, focusing on public engagement activities (led by Clemency Cooper, OA's Community Archaeology Manager) based on the combined results of aDNA and archaeological evidence that will include a schools and communities programme. A key aspect will be to demonstrate how the pioneering work of genomic scientists in the recovery of aDNA has transformed archaeologists' study of people in the past in recent decades. In addition, the main author of the aDNA article (Stephan Schiffels) is currently preparing a large grant application for genetic work on the European Iron Age that is hoped to include skeletons from OA East's extensive excavations at Clay Farm, to the south of Cambridge.

This ongoing collaboration has clearly demonstrated the advantages of close co-operation and partnership working – and how archaeology can continue to make a significant contribution to cutting-edge research and also help to shed light on some very current issues.

Rachel Clarke and Liz Popescu.

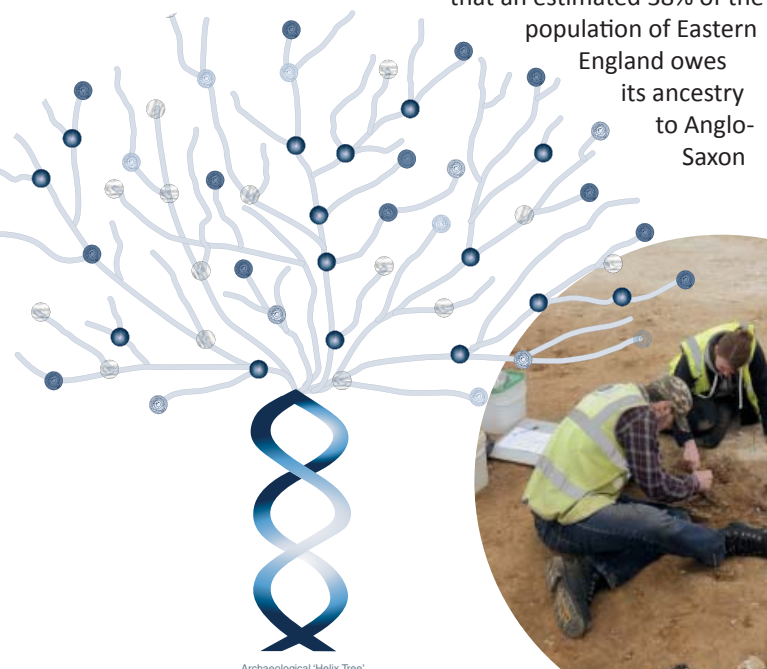
The key players:

OA East and OA South: Elizabeth Popescu, Rachel Clarke, Richard Mortimer, Clemency Cooper, Gillian Greer, Alice Lyons, Louise Loe

Wellcome Trust Sanger Institute: Stephan Schiffels, Pirita Paajanen, Chris Tyler-Smith, Richard Durbin

Australian Centre for Ancient DNA, Adelaide: Wolfgang Haak, Bastien Llamas, Alan Cooper

School of Forensic and Applied Sciences, University of Central Lancashire: Duncan Sayer



Archaeological 'Helix Tree'



Public and community

Duddon Valley Longhouses, Cumbria

OA North's latest community project is set in the Duddon Valley in the south-western corner of the Lake District. The project was initiated by the Duddon Valley Local History Group who had for many years been surveying the valley and had discovered a group of three presumed medieval longhouses in the hills near Seathwaite Tarn. They, in collaboration with OA North and funded by the Heritage Lottery Fund, set about surveying and excavating the long houses as part of a major three-year project.

The initial stage was a detailed survey of the houses. This entailed considerable training in basic survey techniques for the members of the group, although a UAV was also used to model the overall longhouses and their environs. These surveys demonstrated that the houses had an extended development from simple shielings to developed farmsteads.

The excavation of one longhouse was superb. Its physical remains were considerable, and the volunteers were fantastic; they were very capable, very sociable, and very enthusiastic. The structure of the house was quickly revealed, and was found to have a cross-passage arrangement, and had three hearths of different dates and two cobble floors.

We despaired of being able to find uncontaminated and disturbed charcoal for dating, but fortunately, on the last day (inevitably), we got some good charcoal beneath the lower floor and the side wall and we are optimistic that we will be able to get at least one good date.

The excavation is now over for another year, and if this site was good, then next year's longhouse is a real humdinger and we are all looking forward to revealing its secrets also.

Jamie Quartermaine



Low Borrowbridge Survey, Cumbria

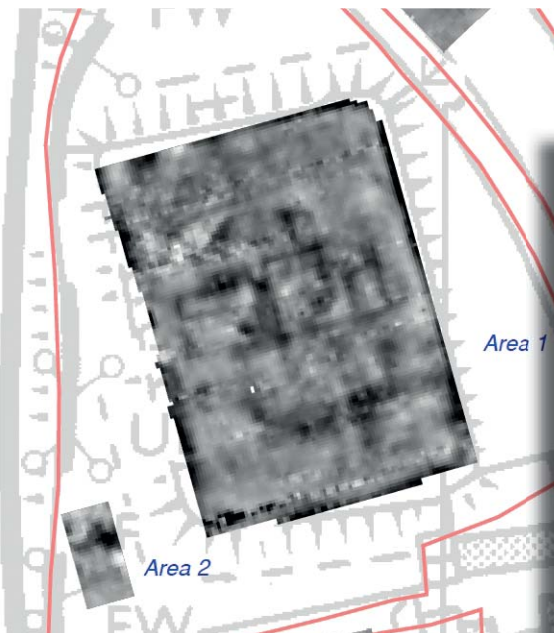
In 2014 and 2015, OA North undertook geophysical survey at Low Borrowbridge Roman fort, as part of a collaborative research project with the Lunesdale Archaeology Society (LAS). This work was partly funded by the Cumberland and Westmorland Antiquarian and Archaeological Society.

The fort is a scheduled monument located on the Roman road from Manchester to Carlisle. Although partly excavated between 1883 and 1950, relatively little is

known about the fort's interior, and even less about its extramural settlement. Therefore, in order to enhance understanding of the site, the 2014 survey focused on a field to the south of the fort, while the 2015 survey targeted its interior, as well as four other areas within the wider scheduled and unscheduled area.

The surveys, which involved LAS volunteers, proved very informative. For instance, in the extramural settlement several early phases of field systems or enclosures were revealed, together with a potential hollow-way that led to the fort. On the western side of the fort, responses indicative of banks and ditches were also recorded and these are suggestive of an earlier phase, which if proved correct is highly significant. At the centre of the fort, at least three buildings were located that probably formed a headquarters building, with granaries to the east and a commander's house on the west side. The buildings appear to face south and the via praetoria, which leads from the headquarters building, was also revealed.

Karl Taylor



Utilities and renewables

Feeder 9 Gas Pipeline, Lincolnshire

Between May and September 2016, OA North undertook several open-area excavations, watching briefs and boreholes around the North Lincolnshire village of Goxhill. The works were funded by Arcadis and Skanska Porr A Hak, on behalf of National Grid, as part of a scheme to replace the Feeder 9 Gas Pipeline, which passes beneath the Humber Estuary to connect the East Yorkshire and Lincolnshire gas networks.

The works involved the detailed excavation of three



areas. Two of these lay on former estuarine deposits on the periphery of a group of cropmarks that, when briefly explored in an earlier evaluation, were found to be the remains of a Roman settlement. Although the cropmark settlement remained unaffected by the development, excavation revealed rather more than the field systems that were expected from the geophysics, aerial photos and trial trenches.

To the south of the settlement, we found several domestic ring gullies and further square and curvilinear enclosures, which fed into a pair of palaeochannels. The network of palaeochannels and rectilinear boundary ditches continued to the west of the settlement, where several domestic ring gullies were associated with numerous small circular and rectangular enclosures between the ancient channels. Too small to be domestic or pastoral, these small enclosures are currently thought to relate to Iron Age salt making.

The third area lay farther inland, at Goxhill itself, and comprised a concentration of ditches and pits containing domestic refuse, including pottery dating to the 9th to 11th century AD.

Stephen Rowland

Elton Solar Farm, Nottinghamshire

Two early Iron Age settlements were revealed during excavations undertaken by OA East in advance of a new solar farm to be constructed by Prosolia Energy at Elton in Nottinghamshire. Separated by a distance of just 0.5km, the most impressive of these comprised a sub-circular enclosure, c 20m in diameter, linked to a north to south aligned trackway.

Radiocarbon dating of animal bone fragments recovered from the two sites indicate that both were occupied in the early Iron Age, although probably not contemporaneously. The calibrated date for the sample from the main enclosure spans the 8th to early 5th centuries BC, while that from the second settlement area indicates a date in the early 5th to mid 4th centuries BC.

These appear to be the most substantial examples of early Iron Age farmsteads yet found in the county, making them of regional importance. Combined, the shape of the trackway and main enclosure is very reminiscent of the 'funnel' of a banjo enclosure, a characteristic of middle Iron Age settlements in Hampshire and (increasingly) elsewhere in Britain. Perhaps the Elton enclosure is an early form of this settlement type.



Rob Atkins

Find spot

Kiln furniture from Brampton, Cambridgeshire



A total of eight early Roman pottery kilns were discovered during a recent excavation at Brampton, near Huntingdon in Cambridgeshire. The kilns were very well preserved and contained a range of kiln furniture (some *in situ*) and also wasters of the pottery the kilns produced. The potters used rectangular and cylindrical pedestals to support a temporary floor of clay plates (many with a single central perforation). Unusually, no kiln bars were found. The kilns produced sand-tempered lid-seated jars (both oxidised and reduced versions) and the accompanying lids.

Research is at an early stage, but a date of between AD 60-80 seems probable. Perhaps one or two kilns were in use at any one time, and the design and technology used were possibly influenced by activity in the upper Nene Valley.

Natasha Dodwell

Heritage services

NHPP WWI wireless stations



Culver Cliff Wireless Station, 1920 (Britain From Above website, image EPW000794 © English Heritage)

OA South was commissioned by Historic England to broaden knowledge of early wireless communications through an examination of First World War wireless stations.

The stations were designed to intercept messages and transmissions from Zeppelins, U-boats and surface vessels, as well as decode messages, triangulate positions and predict potential targets. They were operated by the Admiralty, the War Office, the General Post Office and commercial companies such as Marconi, and they played a significant role in the outcome of the conflict.

During the project, 215 wireless stations were identified through an examination of historic maps, aerial photographs, and other archival and secondary sources. Many sites identified were on remote coastal

locations, often located close to a lighthouse. The layout of the stations, their buildings and infrastructure varied according to their functional role and significance, but often consisted of little more than a small hut and a tall wireless mast.

The survival of these stations was also assessed and the best examples are being considered by Historic England for future protection. Information about individual stations has been uploaded to the Council for British Archaeology's Home Front Legacy 1914-1918 website. OA's report is also available online and can be downloaded from Historic England's website.

Jane Phinester

LINK: <https://historicengland.org.uk/images-books/publications/first-world-war-wireless-stations-england/>

Transport and infrastructure

Norwich Northern Development Distributor Road

In January 2016, following a commission from Balfour Beatty on behalf of Norfolk County Council, OA East began excavation along the Norwich Northern Distributor Road (NNDR). The route stretches for 20km and 19 areas (totalling 23 hectares) were earmarked for strip, map and record excavation. This followed several stages of evaluation, most recently by OA East in 2015.

The excavations revealed evidence of land use and settlement dating from the Neolithic through to the mid-20th century. The more significant prehistoric remains date to the middle Bronze Age and include a prominent and long-running boundary north of Taverham and a settlement at Bell Farm. The settlement contained a rectangular ditched enclosure, and post-built roundhouses, as well as several intriguing post alignments that may have had monumental associations.

Medieval remains have been prevalent towards the eastern end of the route. These include several roadside farmsteads and iron-smelting sites to the north of Rackheath, which were associated with extraction pits, charcoal-burning pits and at least one furnace.

One of the more unusual elements of the project has been the investigation of a World War Two crash site at



Gazebo Farm to the west of New Rackheath. Excavation targeted the remains of an American P-51 Mustang from the 479th Fighter Group based at Wattisham, and this led to the recovery of part of plane's nose cone and fuselage frame, along with many smaller items of debris.

Tom Phillips

Ronaldsway Airport, Isle of Man



In 2009, OA North discovered a Mesolithic pit house (named Cass ny Hawin II) as part of the redevelopment of Ronaldsway Airport on behalf of the Isle of Man Government. This substantial building, which measured c 7m in diameter, appears to have burnt down between c 8200-7950 cal BC, making it 1000 years older than any other archaeological site presently known on the island.

Post-excavation analysis, focusing on the rich environmental and lithic assemblages, is now under way and has already yielded some very interesting results. By using ArcGIS and other programmes, a picture of how the house was constructed and lived in is beginning to emerge. Spatial analysis of charcoal and other remains indicates that hazel and hawthorn-type wood were used in the house construction, while internally there

appears to have been a central hearth, several caches of food and a possible a willow/poplar basket containing hammerstones. Different activities, including flint knapping, seem to have routinely taken place in discrete parts of the building.

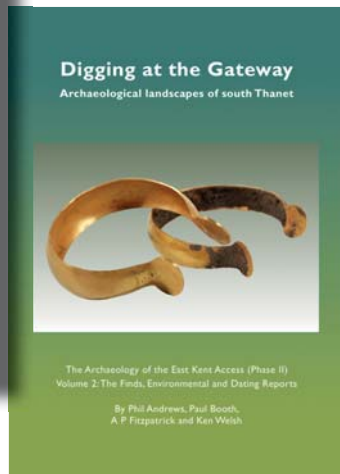
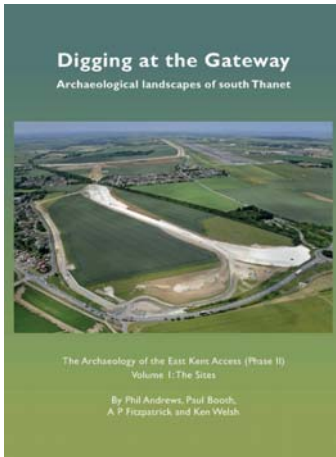
The lithics are characteristic of assemblages from other similar houses, dated to the same period, that have only been found in eastern Scotland and north-eastern England and this may be indicative of the migration of hunter gatherers westwards from Doggerland, as territory was lost due to rising sea levels. The discovery of Cass ny Hawin II suggests that the migrations reached further westwards rather earlier than was previously thought.

Denise Druce and Fraser Brown

OA in print

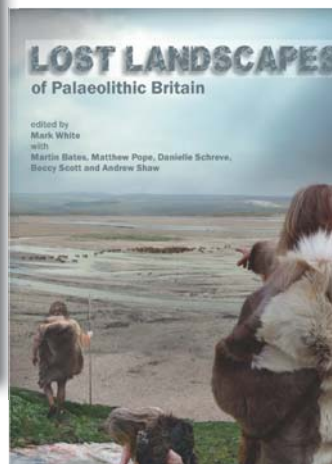
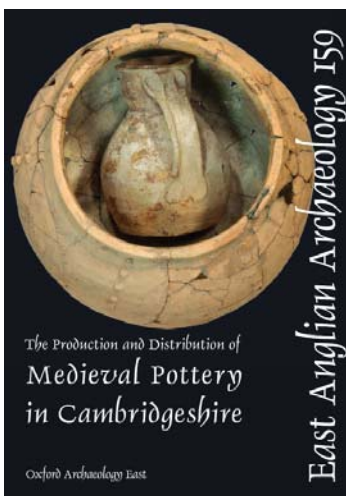
In keeping with our commitment to disseminate the results of our fieldwork as widely as possible, the year saw the publication of a number of monographs and journal articles.

The first volume of **Digging at the Gateway: Archaeological landscapes of south Thanet**, by Phil Andrews, Paul Booth, Andrew Fitzpatrick, and Ken Welsh, was published, completing the set that began with volume 2, published some months earlier. Volume 1 describes the archaeological remains uncovered by Oxford Wessex Archaeology during excavations along the East Kent Access road in north-east Kent.



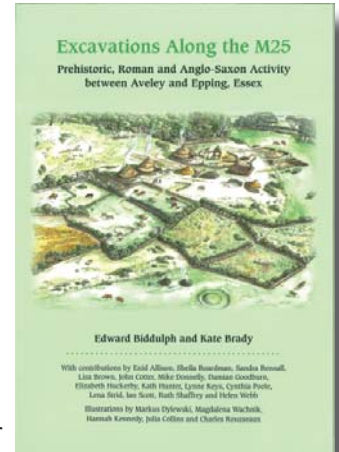
Medieval pottery in Cambridgeshire by Paul Sperry, was published in June this year. This synthetic and analytical study of medieval pottery in the county examines evidence for its manufacture, distribution and use, through the study of documents, publications, excavated assemblages and museum collections.

The volume **Lost Landscapes of Palaeolithic Britain**, written by leading specialists Mark White, Martin Bates, Matthew Pope, Danielle Schreve, Beccy Scott and Andrew Shaw, and coordinated by Liz Stafford at OA South, takes stock of the remarkable results from research projects funded by the Aggregates Levy Sustainability Fund. The lavishly illustrated book



is arranged in thematic chapters and highlights key techniques, methodologies and case studies.

Some of our monographs are published in collaboration with other bodies. One example is the report, **Excavations along the M25**, by Edward Biddulph and Kate Brady, which was published by the Essex Society for Archaeology and History and describes the extensive fieldwork along the route of the M25 widening scheme, between junctions 27 and 30.



There was another addition to the Greater Manchester's Past Revealed series of popular booklets during the year. **'Hell upon earth': The archaeology of Angel Meadow** tells the story of the industrial townscape of steam-powered cotton mills, factories, warehouses, and swathes of low-cost housing that developed on the western edge of the city as investigated by OA North on behalf of the Co-operative Group.

We continue to publish the results of smaller sites in county-based archaeological journals. A report on an investigation of an 18th and 19th-century foundry in Whitehaven, by Caroline Raynor and Stephen Rowland, was published in the **Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society**.

The latest edition of **Oxoniensia** contains two reports from OA South. One is on Iron Age, Roman and medieval activity in Abingdon, by Robin Bashford and Paul Booth. The late Saxon, medieval and post-medieval archaeology at the Queen's College, Oxford, is described in a report by Steve Teague and Andrew Norton.

The **Transactions of the Bristol and Gloucestershire Archaeological Society** published a report on excavations at a medieval metalworking settlement at Cinderford, by Kate Brady, Jonathan Hiller and Steve Lawrence, and a report by Tim Allen and David Score on our investigations at Llanthony Priory near Gloucester.

Meanwhile, Tom Phillips' report on prehistoric settlement and land-use at the Milton Landfill and Park and Ride sites was published in the **Proceedings of the Cambridgeshire Antiquarian Society**.

Finally, we cannot forget our ever-expanding **online library** of client reports, digital monographs and research archives, which can be found here: <https://library.thehumanjourney.net/>.

OA out and about

Telling the public about our archaeological discoveries is an important part of our work at Oxford Archaeology. This year has been no exception, with many staff members giving lectures and presentations to academic conferences, local history and archaeology groups, and public meetings.

Oxford Archaeology was well represented on the conference circuit. Staff gave papers at meetings at the European Association of Archaeologists Conference in Glasgow, the ICAZ archaeoichthyological conference (relating to the study of fish remains) in Lisbon, the Theoretical Archaeology Group (TAG) conference in Bradford, the AHRC-funded Big Data on the Roman Table workshop at Exeter University, an international colloquium at the Faculty of Medicine, University of Marseilles, and the 12th International Conference for Meroitic Studies in Prague.



Specialist staff have also been on hand to share the results of their work at meetings of specialist societies, including the Prehistoric Pottery Research Group, the Lithics Society conference, and the Study Group for Roman Pottery.

Staff contributed to meetings aimed at shaping the profession or providing training within the commercial sector. OA was at ICOMOS-UK (the International Council on Monuments and Sites) to explain how UAVs or drones could be instrumental in disaster management.

Heritage Burial Services helped to provide training in dealing with skeletal assemblages at a seminar at Bristol University and at two training days organised by Historic England. Gill Hey attended the European Association of Archaeologists Conference in Vilnius, Lithuania, to co-chair a round-table session about the EU Directive on Environmental Impact Assessments across Europe.

Our work generates a lot of public interest, and our staff have been pleased to speak to local archaeological societies or at other public meetings about our discoveries. This year, we spoke to the Hampshire Field Club, the Henley Archaeological and Historical Society, the Earth Trust next to the Wittenham Clumps in Oxfordshire, and meetings at the Museum of Oxford and at Knole in Kent, among many others.

As they said on the old BT adverts, it's good to talk!



The Study Group for Roman Pottery conference in Peterborough

Best Archaeological Project

In July, the Westgate Oxford project, which revealed remarkable evidence for the medieval friary of Greyfriars, the Civil War period, and the later development of the St Ebbes area of Oxford, won the British Archaeological Award (BAA) for best archaeological project.

The excavations, which saw up to 50 archaeologists on site between January 2015 and June 2016, were undertaken by OA South during the initial phases of the construction work.

The BAA judges were particularly impressed with the level of public engagement maintained throughout the project. Over 2,500 people attended open days in July and September 2015, and there were over 7,500 visitors to the three locations of the ever-evolving pop-up museum. A series of six free public talks given on different aspects of the site and its environs were also very well attended.

Project Manager Ben Ford said, "This is a massive honour and a fine example of 'best practice' and collaborative working between the client – Oxford Westgate Alliance, the principal contractor - Laing O'Rourke and Expanded and Oxford Archaeology along with many external, and community groups. I am very proud of what we have all achieved."



A year of outreach

Engaging local people with their heritage through volunteering opportunities, school visits, site open days and community projects is an essential part our work as a charity focused on heritage and education. Naturally, then, it has been a busy time for us over the past year, with staff across all three offices involved in a number of outreach and community projects.

It was all change for OA East's Outreach and Community Archaeology team. David Crawford-White retired last Christmas after 13 years, and then Jigsaw Community archaeologists Jemima Woolverton and Jo Richards moved on to new challenges outside the organisation. We were, however, very pleased to welcome our new OA Community Archaeology Manager, Clemency Cooper.

The Romans of Fane Road community heritage project was extended until the end of September 2015. The final months of the project involved the production of two popular publications, one for adults and one for schools, a mural to go in the nearby park.

Completion of the County Council-funded report on excavations at Cambourne Village College, Cambridgeshire, led to the production of permanent displays in the new secondary school. In September 2015, OA East undertook an archaeological evaluation behind the school building ahead of the next phase of expansion of the new town. Every Year 7 student at the school visited the digs and had a follow-up hands-on archaeology day in school. This generated a huge amount of interest among the students involved, spawning a

school archaeology club. OA East is now looking to develop a project with the students to investigate and share the results of the archaeology with the wider community of Cambourne.

OA East also ran a small outreach project in the centre of Cambridge working with the Mill Road History Group to dig test pits along Mill Road in September 2015. Although little actual archaeology was found, the project created great local interest and we added to the membership of the Jigsaw CamDig group as a result.

During what was the final year of the Jigsaw project, Jo and Jemima led training courses on ancient craft techniques, finds identification, and archaeological techniques. The Covington Jigsaw training dig was run in July 2016 after a request from volunteers. The dig was designed in part to prepare archaeology groups for life after Jigsaw, and so some of the volunteers were on site supervising the work in their own trenches. All of us involved on the project delivery team really enjoyed working alongside and getting to know all of the enthusiastic groups and volunteers actively involved in discovering, understanding and protecting the heritage in their local communities over the past few years.



Jemima Woolverton



Romans of Fane Road community heritage project



Mill Road History Group test pit dig in Cambridge



Science Day at the Museum of Archaeology of Oxford



Dyke Hill Geophysics survey

It was no less busy at the Oxford office. In June 2016, OA South was invited by the Oxford City Museum of Archaeology to run a family activity session about science in archaeology. We showcased our environmental archaeology team, who organised activities involving small bones and artefacts sorting and looking at seeds under a microscope. We had our 3D models on display and posters showing the conservation work that was carried out on finds from the burials on our A2 road scheme project.

The ongoing training excavation in the Roman settlement of Dorchester-on-Thames was opened to the public in July this year. The latest findings were explained with tours around the site and displays of objects. The work of Oxford Archaeology and some results of recent geophysical survey at Dyke Hills were also featured. Visitors were encouraged to bring along finds for identification. Another open day was held that month at Thame town hall. This involved an exhibition and talk about the Oxford Cotswold Archaeology excavations in Thame that uncovered extensive prehistoric, Roman and Saxon remains. The key finds from the project were on display, and they were also information panels, children's activities. Two talks with a Q and A session were held in the morning.

We were potty about the Romans in August this year at the Museum of Oxford. The family event featured pottery from Gill Mill and Dorchester-on-Thames, and included a 'guess the object' activity and a chance for visitors to create their own pinch-pots.

*Clemency Cooper, Stephen Macaulay, and
Becky Peacock*



Covington Jigsaw training dig



Mill Road History Group test pit dig in Cambridge

Who makes Oxford

OUR CLIENTS Our clients include major national institutions and organisations, FTSE 250 companies, architects, planning consultancies and many private individuals. We can't mention everyone, but large or small your business is much appreciated.

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Archaeology ?

OUR STAFF Oxford Archaeology employed a total of some 350 staff across its three offices during the 2015–2016 financial year. We would like to thank everyone for their hard work over the past year and for helping to make it another successful year for the company.

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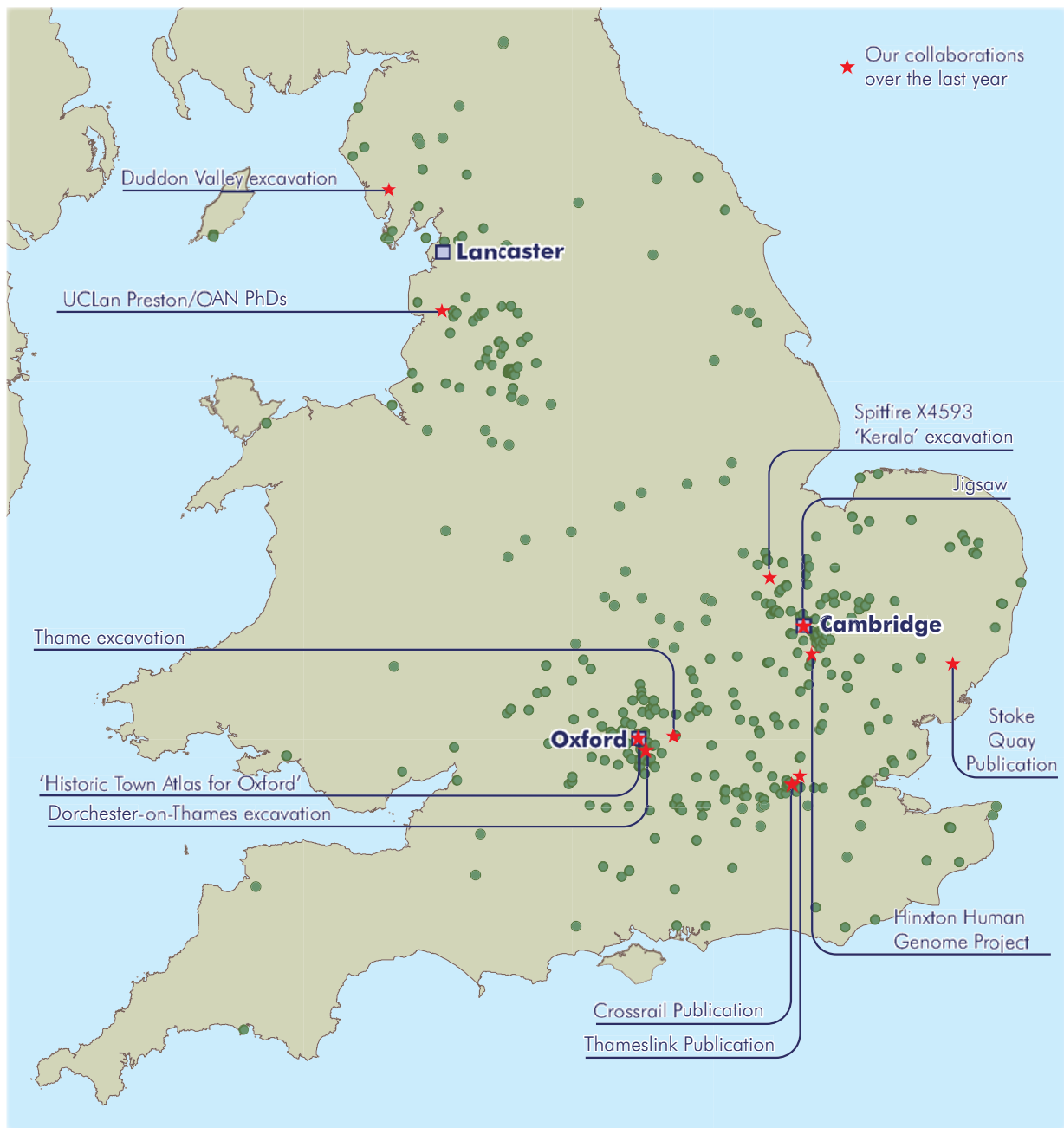
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In Touch was edited by Edward Biddulph, Rachel Clarke and Richard Gregory.
 Layout and design was by Charles Rousseaux and the issue was printed by Holywell Press Ltd
 Cover image: Excavation of a mosaic from the site of a Roman villa at Hadspen House, Somerset.
 Photo by Kate Brady.

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