

# Yearbook and Directory





YEARBOOK and DIRECTORY 2017



I am delighted to be writing another preface for the institute's *Yearbook*, not least as 2017 is Scotland's Year of History, Heritage and Archaeology. It's been an eventful few years since my last preface, in archaeology as in the wider world. The way in which we do

archaeology in Scotland, and how we see its wider context, have both developed significantly in that time.

Our current Themed Year offers an opportunity for us to celebrate the richness of Scotland's fascinating archaeology through an extensive programme of events right across the country, and also to share our knowledge and excitement about the past with Scots and visitors alike. I've been particularly impressed with some of the new ways of looking at archaeology which our partners in the Themed Year have brought forward – and their unfailing ability to make it lively and enjoyable.

I'm writing this a few weeks after World Heritage Day (18 April, as I am sure you all know). Scotland is rightly proud of our six World Heritage Sites, and this year, with help from DigIt!2017 and other partners, we had a rich variety of activities to celebrate the day, including recreating remote St Kilda in Minecraft, yarn-bombing industrial New Lanark, holding a steampunk festival at the Forth Bridge and a battle of medieval and classical musicians in Edinburgh, all rounded off with a Romans vs Picts 5km race on the Antonine Wall for which I was delighted to be the starter (and note that it was won by a Roman!) and a glow-in-the-dark evening amongst the enigmatic standing stones of Orkney.

Looking further back, I was delighted to welcome more than 2000 archaeologists from across the world to Glasgow, for the European Association of Archaeologists annual meeting in 2015. That gave us the chance to launch Scotland's Archaeology Strategy on an international stage. The strategy gives everyone the chance to get involved in archaeology and to ensure Scotland is a place where the study of the past offers opportunities for us to discover, care for, promote and enjoy our rich and diverse heritage, contributing to our wellbeing and knowledge and helping to tell our stories in their global context.

Scotland's Archaeology Strategy supports both *Our Place in Time*, the Historic Environment Strategy for Scotland and *Going Further*, the Museums Galleries Scotland strategy, and enables us to think ambitiously and creatively about the role that understanding our past can and should play in shaping our

future. My take-home message from the European Archaeologists' conference was that archaeologists from across Europe are not only seriously impressed with Scotland's archaeology itself, but also with the strategic approach which Scotland is taking to support it and to develop its potential to contribute to our objectives across society.

Since my last preface, my own role as the lead Government Minister has changed significantly too, with increasing emphasis on giving shape to our collective ambitions and creating space for collaborative action, which fits well with our wider ambitions around empowering communities. Historic Environment Scotland is now up and running as Scotland's lead public body, and has accepted a particular leadership role for actions agreed by our Strategic Historic Environment Forum, which I chair. Historic Environment Scotland now has statutory powers to undertake in its own name the sort of detailed decision-making which is best founded on knowledge and expertise. Those are powers which have to be exercised in a wider social context, always remembering that the past belongs to everyone, not just those who are lucky enough to have made it their career or hobby.

I am delighted that ClfA has been able to play such a significant role in these strategic developments and continues to share the lead on the delivery of Scotland's Archaeology Strategy. The institute's work on training and skills is central to the continuing professional development of archaeologists at all stages of their careers, especially as we develop new entry routes into archaeology, including apprenticeships. At the same time, if our efforts to bring the historic environment into the mainstream of society where it can make a real contribution are going to succeed, archaeologists will find themselves challenged to explore new horizons and think about the discipline in new ways. The institute will, I am sure, play a central role in meeting that challenge.

In recognising the importance of our cultural heritage, the Scottish Government remains committed to ensuring that our heritage sites are safeguarded, protected and preserved for future generations. We recognise the critical role that archaeologists play in helping us to understand our past and in presenting it so that current and future generations are encouraged to value it. I wish the institute, and all its members, another successful year.

Fiona Hyslop MSP  
 Cabinet Secretary for Culture, Tourism and  
 External Affairs  
 The Scottish Government



Innovation is the theme of this *Yearbook*. Archaeology is a creative discipline that depends on inventive melding of evidence and imagination; archaeologists are programmed to challenge received wisdom, and tend to be highly resistant to being told how to do things. So innovation should come easily.

The articles in this *Yearbook* showcase some examples of the will to innovate by our Registered Organisations. They include new or refined approaches to the business of archaeology, for example by PCA and Archaeology Collective. MOLA, a partner in the CITiZAN project, shows how archaeological research into England's longest archaeological site, the intermittently wet and dry bit around the edge, depends on and fosters the phenomenon of citizen science. Much of innovation involves the transfer of techniques and approaches between disciplines, and the practice of charging expert professionals to tap into the enormous processing power of well-led enthusiasts lends itself to archaeology. Such approaches are particularly useful when applied to coastal sites at risk from the impact of climate change, where conventional funding structures do not apply. CITiZAN has developed and creatively borrowed technological advances from other professions, and Oxford Archaeology has coupled growing ability to handle large datasets to ever-improving camera and drone capabilities. OA's article shows how these facilities have been used to record and present archaeological data from places inaccessible, and at speeds unachievable, by conventional techniques.

Finally, Kate Geary and colleagues from two Registered Organisations, Allen Archaeology Ltd and Worcestershire Archive and Archaeology Service, show how forward-

thinking archaeological employers are innovating skills development – an essential move if our profession is to rise to the challenges and opportunities presented by increased investment in infrastructure and the archaeological research it occasions. For too long the models for recruiting skilled archaeologists have revolved around three assumptions: first, that universities will supply graduates with the core skills needed for employment – but they don't, by and large; second, that there's a pool of highly skilled people out there ready to change employers to follow the work – they are indeed there but not in the numbers needed; and third, that an increase in demand for skills can be met by archaeologists from elsewhere in the EU – and that's looking like a fragile solution these days. These two Registered Organisations have proactively moved away from *getting* archaeologists to *producing* archaeologists. By doing so, through their own workplace training programmes, they are not only shaping expert professionals with the skills their business needs, but also bringing people into the profession from a much wider range of social and economic backgrounds than the graduate pool provides. If others follow these examples, as ClfA is encouraging through its accreditation of workplace training schemes and strategic investment in assisting with apprenticeship development, we have the potential to create a professional demography far more representative of the public we serve, and the numbers we need to enter one of the most exciting periods of archaeological research.

Innovative approaches become most valuable when they cease to be innovative, but have made the transition into established good practice. This happens in many ways, and it is part of the role of a professional institute like ClfA to aid those processes. That is why ClfA is lead partner for innovation and skills for the implementation of Scotland's Archaeology Strategy\*. One of our most effective means of sharing good practice is at our annual conference and CPD school. The next is 25–27 April 2018, in Brighton, where the theme is *Pulling together: collaboration, synthesis, innovation*. Here we will be exploring effective ways of pulling together research communities, pulling together the results of developer-led research, and pulling together to innovate and improve practice. This *Yearbook* starts the debate.

Peter Hinton MCifA  
Chief Executive, ClfA

## The new normal: responding to innovation in archaeological survey

In the last few years we've seen a leap forward in technology available for the recording of archaeological data. Greater processing power and digital storage has brought the development of powerful yet affordable photogrammetric processing software, as well as the means to use it. This, combined with a parallel development of drone or unmanned aerial vehicle (UAV) and camera technology, has the potential to transform how archaeologists create the archaeological record. Incorporating new ideas into existing workflows in a meaningful way can be challenging, but Oxford Archaeology (OA, a CIfA-Registered Organisation) has been working to integrate these technologies into the archaeological process and deliver to its clients and the public new and exciting ways of viewing and understanding the past.

At Westgate Oxford, geomatic techniques were critical to the project's success. In 2015 and 2016, the project saw up to 50 archaeologists from OA South uncover the extensive remains of a medieval Greyfriars friary in the heart of the city during the construction of a new shopping centre by the Oxford Westgate Alliance and Laing O'Rourke. The excavation revealed the remains of a tiled pavement, the precinct walls, the cloister, dormitories, kitchens, and the refectory. Among the objects retrieved were up to a thousand waterlogged timbers and hundreds of small finds, such as styli and bookclasps. The project represents the largest excavation in Oxford to date, and was recognised by the British Archaeological Awards as 'Best Archaeological Project 2016'.

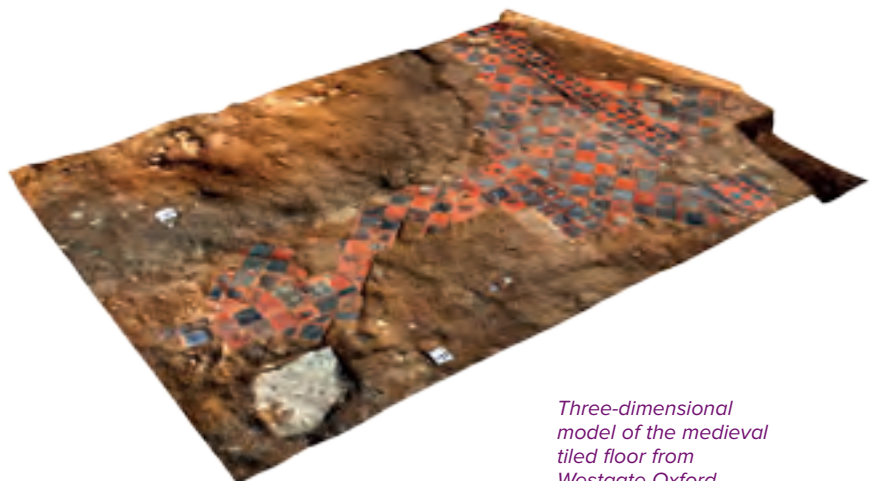
This complex urban excavation required survey data to be rapidly processed and fed back to the archaeologists. Data were also integrated with other pieces of evidence, including information from historic maps, fieldwork carried out at the site in the 1960s, and excavations conducted ten years previously at Oxford Castle. The resulting plans helped inform the excavation strategy, improved understanding of the remains as they were being excavated, and enabled the archaeological team to correctly predict the location of historic structures, such as the English Civil War defences and medieval town wall.

With the post-excavation programme now under way, detailed three-dimensional models of the site, generated through a combination of standard survey techniques and photogrammetric or structure from motion techniques, offer exciting possibilities for site interpretation and graphical representation. They also provide an accessible and interactive product for the public. The models have been uploaded to a Sketchfab account and disseminated through OA's website and social media accounts.

A Bronze Age round barrow, known as Emmets Post, was another site that used geomatic techniques to determine the approach to its investigation. The site was on the edge of a large quarry in Dartmoor and was due to be removed in its entirety by quarrying. The archaeological investigation, funded by Historic England and Sibleco, included photogrammetry and a topographic survey, the results of which, when combined with Environment Agency 1m LiDAR point data and spot height data from 1954 OS mapping, allowed the project team to

All images: Oxford Archaeology

The view of the Westgate Oxford excavations from a drone or UAV showing the remains of the Greyfriars friary



Three-dimensional model of the medieval tiled floor from Westgate Oxford

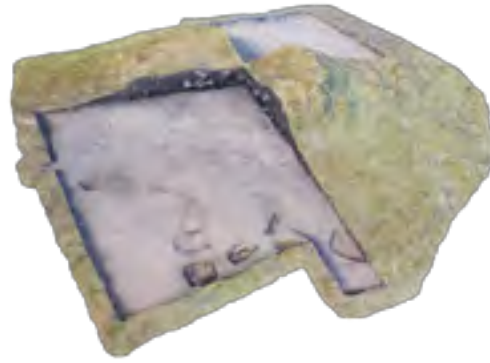
recreate the barrow's pre-quarry landscape.

Site photography using a UAV has been particularly helpful for large and complex sites. Excavations by OA East for Countryside Zest at Beaulieu near Chelmsford in Essex revealed structures and features relating to Henry VIII's palace of New Hall. A UAV and pole-cam were used to record Tudor brick kilns and a limekiln likely to have been used during the construction of the palace. Creation of 3D models has allowed the project team to record the features in exceptionally fine detail. The model of one of the brick kilns, for example, has highlighted the ephemeral and shallow depressions of the flues.

OA East's surveyors have not confined their photogrammetry and 3D modelling to structures. All the skeletons from a late Roman and Saxon cemetery at a site at Cherry Hinton in Cambridge, excavated on behalf of Weston Homes, were recorded using photogrammetry. This significantly increased the speed of recording and excavation, and added another useful element to the analysis and archive.

The use of the UAV has also allowed OA to record sites that would otherwise have been inaccessible. In 2015, OA South was commissioned by the National Trust to record the Generator House, a late Victorian structure at Cliveden in Buckinghamshire built to supply power to the mansion. At the time of the survey, the building was hidden in woodland and, having been disused for much of the second half of the 20th century, its condition had deteriorated: half the roof had collapsed under the weight of ivy, with the remaining rafters threatening further collapse. Clearly, the building was unsafe to enter.

Partly as a result of this, a UAV was used in the initial recording of the structure, permitting a 3D model of the roof to be created. A watching brief was maintained while the timbers were



*Three-dimensional model of Emmets Post Bronze Age barrow in Dartmoor*



*Orthophotograph of a Roman cremation burial from Cherry Hinton, Cambridge*

pulled down, and additional watching brief recording was carried out while the collapsed roof timbers and detritus were removed from the interior. Further photogrammetric recording was then undertaken to produce another 3D model of the structure with the interior cleared.

But the UAV really comes into its own when used to map extensive landscapes. The former Greenside lead mine in the Lake District, for example, which OA North's surveyors were



*A UAV in flight over the lead mines of the Lake District*



*The ZEB1 hand-held laser scanner in action*

commissioned to record in 2015, is one of the largest in the region, covering a couple of square kilometres, and before the development of the UAV could never be economically recorded. The combination of a UAV, photogrammetry and detailed orthophotos captured the complex lead mining landscape of spoil heaps, mine shafts, wheel pits, engine houses, trackways and other remains.

While photogrammetry has transformed our approach to site surveying and recording, the technique is of limited use in recording the interiors of buildings, 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, it will take too long to survey.

A new type of scanner, however, has proved to be revolutionary. The Geoslam ZEB1 scanner is a hand-held laser scanner that has an Inertial Measurement Unit (IMU) and a small scanner mounted on top. These features mean that the scanner can record its location precisely and can be used to survey the interior of a building in as much time as it takes to walk through it. Combining photogrammetry with the ZEB1 scanner allows whole buildings to be recorded in 3D, again in a fraction of the time using standard techniques.

The enormous value of the ZEB1 scanner is clear enough with the results of surveys of two mills. When OA North was commissioned by Laing O'Rourke to record Kings Mill, a former Victorian cotton mill in south Manchester, the project team was faced with a huge challenge. The building was 91m long and 23m wide, and contained 234 rooms across six floors. Using more conventional techniques, such as reflectorless total stations, it would have taken months to survey. A standard laser scan, which requires the scanner to be set up on its tripod and a survey control established in every room, would have taken even longer to complete. The ZEB1 scanner, however, provided the solution. Using the scanner and photogrammetry, each floor was recorded in half an hour, and all six floors were recorded in a day. A 3D cloud of survey points was produced from which plans, elevations and cross-sections were then extracted.

Lion Mill, a corn mill in Stonyhurst in Lancashire, was smaller than Kings Mill, but had other challenges. The mill was covered in scaffolding, and OA North needed to record the elevations as part of a survey for Cassidy and Allen Architects and Stonyhurst College. Armed with ZEB1, the team could get behind the scaffolding with the scanner, and in the processing stage stripped off the digital scaffolding to reveal the unblemished elevation. The scanner was also able to safely record fabric where there was no safe access, and even allowed us to record the details of a large wheel pit by pushing the scanner through a one-foot wide access hole into its obscured and dark interior.

The benefits of photogrammetric survey techniques are clear. The techniques allow rapid surveys both big and small to be undertaken, increase efficiency and reduce costs. They also offer flexible outputs that aid site interpretation and engage and excite the public. Changing how we work to incorporate new methods into long-established processes can be difficult, but here at OA we are responding to the challenge and making the innovative routine.

Edward Biddulph BA MA FSA MCIfA, Matt Bradley BA MSc, Jamie Quartermaine BA MCIfA and Gareth Rees BA MA ACIfA, Oxford Archaeology

Visit our Sketchfab page to see some of our interactive 3D models: [https://sketchfab.com/oxford\\_archaeology](https://sketchfab.com/oxford_archaeology)



*A laser scan of Lion Mill in Stonyhurst, Lancashire*

## Co-operation and collaboration at King's Cross Central

King's Cross Central, a substantial regeneration project covering 37 hectares, presented a unique opportunity to investigate the archaeology, built heritage and history of an important district of London. Funded by the King's Cross Partnership, the fieldwork commenced in 2006 and took nine years to complete; post-excavation continues to this day. The size of the redevelopment coupled with the extent and importance of the archaeological resource dictated that the heritage element be tendered in packages, awarded to Pre-Construct Archaeology Ltd (PCA) and Museum of London Archaeology (MOLA). Home to some of the city's most important transport gateways that include the New Road (opened 1756), the Regents Canal (1820), the Great Northern Railway's King's Cross passenger and goods stations (1850) and the Midland Railway's St Pancras Station (1868), the historical and archaeological importance of the site to the story of industrial-era London and the emergence of the modern city we know today cannot be overestimated (Haslam and Thompson 2016, 10, 88, 93; Williams 1988, 79).

### FOSTERING A SPIRIT OF COLLABORATION

The critical path of the King's Cross Central redevelopment project meant that PCA and MOLA were rarely present on the site at the same time, but all involved realised that extensive co-operation would be required at the post-excavation stage to present the vast amounts of data amassed. A substantial narrative emerged from initial analysis, which lent itself to presentation in a monograph series. The first book, produced by PCA, focuses on the Great Northern Railway's first goods railhead in London, known from 1899 as the Eastern Goods Yard. It explores the evolution of this well preserved example of an endangered form of urban architecture. The second work in the series, the production being overseen by PCA, explores the development of the industrial and residential suburb that grew to the south of the Regent's Canal including the former site of the Imperial Gas Light and Coke Company's St Pancras Gas Station, workers housing and the Great Northern Hotel and the German Gymnasium. The third and final work, being produced by MOLA, focuses on the railway lands to the west and north, including the Western Goods Shed. Within that book PCA will report upon the development



of the engine stables and maintenance depots that include Top Shed, a renowned example of its kind (see Townend 1989).

### A MODEL FOR THE FUTURE

The extensive infrastructure projects that will characterise the coming years will present challenges for archaeological companies who must coordinate their efforts to meet an unprecedented demand for heritage services. Difficulties will not diminish at publication, when disparate strategies and interpretations must be combined into coherent narratives that fully present the significance of the findings. It is hoped that the accomplishments of the King's Cross Project might prove useful as a template for successive attempts at collaborative reporting in that exciting and challenging future.

Rebecca Haslam is Pre-Construct Archaeology's lead archaeologist on the King's Cross Central project and is the co-author of the first two books in the associated monograph series.

Haslam, R and Thompson, G 2016, *An Immense and Exceedingly Commodious Goods Station: The Archaeology and History of the Great Northern Railway's Goods Yard at King's Cross, 1849 to the Present Day*, London: Pre-Construct Archaeology

Sibley, A 2017, 'Book Reviews' *Great Northern News* 211: 7

Townend, P N *Top Shed*, Shepperton: Ian Allan

Williams, R 1988, *The Midland Railway: A New History*. Newton Abbot: David & Charles

Looking north across the Regent's Canal towards the Great Northern Railway's Goods Station at King's Cross; the complex now accommodates restaurants, shops, offices, the University of the Arts and public open spaces. (Photo: Argent/King's Cross Central Partnership)



# The wisdom of the team: innovation as a way to build teams and improve efficiency

## DAY-TO-DAY REMOTE WORKING

Using cloud-based technology, bespoke project management software and a shared server, Archaeology Collective (a ClfA-Registered Organisation) combines joint working with the flexibility of a remote-working team. Amongst the most important disciplines is e-filing: everyone can access files in everybody else's projects – essential for remote working.

Without the opportunities provided by the site hut's heater or the office kettle, we have to create innovative ways of bringing people together, ensuring we are working to common goals. Without active intervention, the best parts of team work and camaraderie could be lost as technology allows the workplace to change in otherwise welcome ways. We check in at the start of the day with an email, and in the late afternoon we share a con-call to talk over the day, its challenges and discoveries. We are trialling various social media forums to 'chat' in a more ad hoc way, and we meet in person for a one-to-one catch-up or training. We deliberately take opportunities to work together on visits to sites or offices.

## WISDOM OF THE TEAM

Our team at Archaeology Collective ([www.archaeologycollective.co.uk/meet-the-team.html](http://www.archaeologycollective.co.uk/meet-the-team.html)) is diverse in experience and geographical spread. There are team members who started in archaeology in the 1970s, and have run their own contracting companies or offices. Some have worked in other sectors and countries and have returned to commercial archaeology;

others are relatively new to this sector and have brought detailed knowledge of other professions. We value the creativity of such diverse teams and have been inspired by listening to people with experiences which are both similar to and different from our own.

To help us solve problems with this pooled expertise, we hold bi-weekly meetings in our London office, catching up on administrative tasks, engaging in technical discussion over projects, and formally presenting on new topics, guidance or policy changes, to provide CPD to our colleagues.

## GROWING EFFICIENCY

Our meetings are perhaps most effective when we use them to identify, discuss and meet a shared challenge. We switch away from individuals presenting, and turn to the group for its views. An open atmosphere allows everybody to feel valued for the magic to happen: this is when we start to move up what is sometimes referred to as the *logical levels*. Starting with an issue focused at the 'environmental' level at the base of this triangle, we move through discussion to what behaviours different individuals have, what skills are necessary and ultimately what beliefs the team and company have and why.

These discussions tend to share the following attributes

- they are compelling because the team regularly encounters this task or issue
- we feel there may be more efficient processes and procedures than those currently used
- we feel technology may offer a better way of handling all or part of the task

*Marginal gains* theory was much in the news for sporting events, and moved into the workplace shortly after. The basis of the idea is that relatively small improvements in performance in several areas leads to an aggregate jump in performance overall (Syed 2016). Our approach to meetings is aimed at just such leaps. As well as finding more efficient methods of working we have boosted morale and confidence, as people have enjoyed solving problems and created real change.

Applying the Logical Levels table to our AC team meeting

I	Identity	AC team has the core belief that our bi-weekly meetings are a genuine forum for ideas and that successful, useful ideas will turn into new procedures
Can/Can't	Belief	Team and management encourage innovative thinking. We can do it
Do	Skill/process	AC team meeting discusses the existing procedures, and team's various approaches, brings in views and practices from other sectors, considers different technology (broad options)
This	Behaviour	Existing company procedures, own habitual approach
Here	Environment	Computer, data-set, oneself (limited options)

# CITiZAN, the Coastal and Intertidal Zone Archaeological Network

Our coastal and intertidal heritage plays a critical role in defining our identity as an island nation. This heritage is at risk daily from winds, waves and tidal scour and increasingly from the effects of climate change – rising sea level and winter storms of increasing ferocity. Much of our island’s history is simply being washed away, with no established mechanisms to record the sites before they disappear without a trace.

CITiZAN, the Coastal and Intertidal Zone Archaeological Network, was set up as a direct response to these threats. An innovative project, it combines a new cadre of trained volunteers with expert professionals and the latest high-tech apps and survey techniques, and has created one of the largest community archaeology and citizen science projects in England. This new research force is recording, monitoring and modelling a fragile archaeological resource that lies beyond the scope of conventional funding models, tackling some big research questions, and presenting data and findings in ways accessible to all.



*Volunteer John uses the CITiZAN smart phone app to record an eroding lime kiln near Seahouses, Northumberland. (Photo: CITiZAN)*

## WHO WE ARE

CITiZAN exists thanks to a generous grant from the Heritage Lottery Fund, and support from the National Trust, the Crown Estate and Historic England. It is dispersed around England to better support our network of volunteers: we are hosted in London by MOLA (Museum of London Archaeology, a ClfA-Registered Organisation), in York by the Council for British Archaeology and in Portsmouth by the Nautical Archaeology Society.

We run an extensive outreach programme to raise awareness of threatened intertidal archaeological sites and coastal change, creating or developing archaeological literacy in the local public. We then harness this literacy and interest, and hone it with our standardised archaeological training programme, creating new communities of CITiZAN scientists around England. CITiZAN then sustains this trained network of communities with continued support from our team of intertidal archaeologists and professional contacts.

CITiZAN has created and supported an efficient archaeological network of volunteers capable of monitoring and recording over 10,000km of coastline and tidal estuaries around England. CITiZAN has developed and implemented a national standard of citizen science methodologies to record intertidal archaeological sites<sup>1</sup>, relying on local knowledge from coastal community volunteers. They include not only history and archaeology enthusiasts and coast lovers, but engineers, teachers, miners and scientists; they include dog-walkers and bird-watchers who know their local area well. They have a wide skills base and their local knowledge and enthusiasm for discovering local stories is a huge boon.

<sup>1</sup> These are based in no small part on community training methodologies developed by the award-winning Thames Discovery Programme and the smart phone recording app developed by Scotland's Coastal Heritage at Risk Project (SCHARP).

### RECORDING THE PAST

These teams are being trained to identify, survey and monitor the long-term fate of their local coastal sites. Time is of the essence on the foreshore, so we use high-tech rapid recording tools and methods to work efficiently and safely. At-risk sites are recorded in written, photographic, drawn and digital media, unlocking the research potential for future generations to see and study – a lasting legacy. CITiZAN has visited sites all along England's coast and estuaries and worked with local communities to raise awareness of our island's heritage. By the end of 2016, we had held 169 outreach events and engaged over 6000 people via guided walks, lectures on coastal heritage and CITiZAN's monitoring work, and we participated in Heritage Open Days and the Council for British Archaeology's Festival of Archaeology.

*Surveying the Hans Egede using a small unmanned aerial (SUA) vehicle (Photo: CITiZAN)*

CITiZAN believes in maintaining a high public profile, using traditional press and social media outlets to generate interest in the local community. Our approach ranges from advertising in local newspapers and giving interviews on the radio to national coverage on mainstream outlets, including a mini-series based on our work broadcast on Channel 4, *Britain at Low Tide*.

Once the public knows what to look for and is interested, we can develop an active volunteer force. CITiZAN has held 70 training events and additional follow-up visits along England's coastline and tidal rivers with over 800 people attending, and we have developed a national standard and toolkits to record foreshore sites. Our training events demonstrate the CITiZAN smart phone app, introduce research questions and research frameworks and share foreshore recording skills in the safety and comfort of the classroom, before heading out to the coast for practical application. The intertidal zone can be a dangerous and quickly changing environment, so it is important to supplement confidence in archaeological techniques with abilities in reading tide times, moving about in sticky mud, working in uneven landscapes, and other essential health and safety skills.

### LOW-TIDE HERITAGE WITH HIGH-TECH TOOLS

CITiZAN records threatened low-tide heritage using high-tech means, especially with our smart phone app and web-based recording system and the deployment of small unmanned aerial (SUA) vehicles (drones). These techniques complement and augment traditional



archaeological recording methods such as off-set planning and GPS survey to create highly accurate surveys and digital models of sites and features. Quick and intuitive recording methods are important to encourage volunteer participation and the citizen science approach, and are essential when working within the few hours when a site is exposed by the tide.

The CITiZAN coastal archaeology smart phone app, modelled on the award-winning *ShoreUpdate* developed by SCHARP, is part of CITiZAN's primary archaeological toolkit and captures GPS point location, proforma information and photographs. It can be interrogated, edited and updated online on our interactive coastal map. The app is free for registered CITiZAN surveyors: it can be used by trained CITiZAN volunteers and by any coastal user with a keen eye and a smart phone to document fragile coastal and intertidal heritage and to monitor changes by erosion and storm damage.

Information recorded includes the location and description of the feature, the date of survey, state of the tide and any change observed due to erosion, accretion or other damage. These condition update surveys also include images of the feature and surrounding environment. By March 2017, 1000 new or updated features had been recorded, with over 1400 condition update surveys and 2200 new photos. Our data and reports are all open access and available via our interactive coastal map at [www.citizen.org.uk](http://www.citizen.org.uk), and they will also be deposited with the Archaeology Data Service and incorporated into local and national archaeology datasets.

When SUA surveys, which rely on the expertise of project host MOLA's licenced SUA operators, and photogrammetry are carried out in the same locations regularly, they can demonstrate change to sites and the landscape. SUA surveys are an efficient method of recording sites located in dangerous sticky mud, such as the 19th-century Danish schooner *Hans Egede* at Cliffe, Kent, or for large-scale sites in the intertidal zone, such as submerged prehistoric landscapes.

Photogrammetry allows the creation of 3D models by stitching together 2D images, and used in conjunction with SUA surveys is a highly effective tool for accurately recording a site within a short tidal window. These can be annotated and accessed online, which allows members of the public to take a virtual tour of the site from the comfort of their home.

### INFORMING THE FUTURE

CITiZAN is encouraging not only crowd-sourced data collection but true citizen science through the development of community-led research and dissemination of information. Key research questions, linked to local, regional and national archaeology research



**Above:** Laying out the targets needed to create a 3D model of the *Hans Egede*  
**Left:** The 3D model of the *Hans Egede*. Note the dangerous conditions like the height of the tide and the sticking mud that would otherwise mean this could not be surveyed. (Photos: CITiZAN)

frameworks, are shared with volunteers before each fieldwork training session; and further research questions are flagged up in our field reports to direct future work. After completing a training session, CITiZAN groups are encouraged to continue monitoring and to ask new research questions; CITiZAN archaeologists are on-call to provide support and advice and to assist with and guide work.

The project does more than advance archaeology: it also provides value to our volunteers, promoting social and physical well-being and a sense of agency and place in England's national island history.

CITiZAN's work has an additional role to play. The systematic archaeological recording programme can link directly to wider strategic coastal management programmes concerned with measuring rates of erosion and coastal change, and longer-term trends in relative sea-level rise. Measurable changes observed during our extended archaeological monitoring projects can contribute to the local, regional and national evidence-base for future decision-making on coastal protection and adaptation. We cannot put a stop to natural or anthropogenic threats to heritage, but we can inform decisions about how to manage their effects. The development of this national network has galvanised local communities to value, record, monitor and interpret England's coastal heritage and has highlighted the value of citizen science in the study of this fragile resource.

## Innovate to accumulate: how ClfA Registered Organisations are rising to the capacity challenge

From 2006 to 2014, ClfA ran a very successful Workplace Learning Bursaries scheme, with funding from the Heritage Lottery Fund. Designed to fill the gap between university education and professional practice, its aim was to increase the capacity of the sector to meet its own training needs by producing resources – training plans, learning agreements and guidance – for employers. A professional practice paper *A guide to providing career entry training in your organisation* encapsulated the good practice developed by participating employers and made it available to all.

The Workplace Learning Bursaries scheme sought to address the lack of a period of formally supervised professional training for archaeologists, unlike other professionals, in the first few years of their career. Employers tended to rely upon a ready supply of graduates from archaeology degree courses which might, or might not, have provided them with the skills they needed to pursue a career in the sector. Career entry routes and progression pathways were poorly defined and the concept of continuing professional development (CPD) poorly understood. All-in-all, it was a fairly

unsatisfactory state of affairs; employers were frustrated by the lack of skills demonstrated by their new recruits, archaeologists embarking on their careers found they were hampered by an absence of structured training and opportunities for progression and the sector as a whole recognised the need to open up access to careers in archaeology and to improve the diversity of the workforce.

Fast-forward to 2017, and the picture is starting to look quite different. An unprecedented demand for archaeological services in advance of major infrastructure and housing development coupled with a decrease in the numbers of students studying archaeology has meant that employers have had to think fairly radically about how they attract, train and retain the skilled workforce they need.

Two such organisations, Allen Archaeology Ltd and Worcestershire Archive and Archaeology Service – both ClfA Registered Organisations – have recently been recognised as, respectively, winners and highly commended in the Archaeology Training Forum Awards. Here's how they described their schemes.





*'Trainees learn through direct mentoring by experienced staff, as part of the site team. We provide a wide range of opportunities to experience a wide variety of different aspects of archaeological work.'* (Photos: Allen Archaeology Ltd)

**ALLEN ARCHAEOLOGY LTD:  
COMMERCIAL ARCHAEOLOGY  
TRAINING SCHEME**

Natasha Powers, MCIfA – Senior Manager at Allen Archaeology  
<http://www.allenarchaeology.co.uk/>

Allen Archaeology has developed a structured entry-level traineeship, building on the less formal training which had previously been undertaken at the company. We believe that knowledge and skills are best when shared and want to 'home grow' staff with a rounded set of experiences which they can use to take their career in whichever direction they choose. So, what's so different about our training?

First, it's short and the logic behind this is simple. When recruiting we ask for three months' experience of UK commercial archaeology, so rather than relying on finding graduates who already have this, we offer three months with us to fulfil that criterion. Secondly, it is accessible and affordable. Being paid a proper wage enables people who are not in a financial position to volunteer on research excavations to apply for the role. As with all our staff, trainees are paid overtime and subsistence allowances, have free transport to and from site and are provided accommodation if they work away. The experience is diverse as trainees are embedded within the team and given experience of and support with all the tasks that a project archaeologist

would do. This includes survey, GIS and illustration skills, photography and assisting with geophysical survey. Our trainees are also a diverse bunch and have been recent graduates, early career individuals from outside the UK and young people with a genuine interest and aptitude but who have not followed a traditional academic route.

Each trainee is given a written training plan which references CfA training standards and is linked to National Occupation Standards. Trainees are also evaluated against a key set of skills by each project supervisor at the end of each site. The aim is that on successful completion of the final review, staff are awarded contracts as project archaeologists.

Supporting and mentoring the trainees also contributes to staff development: particularly valuable in enabling newly promoted project supervisors to hone their skills. Giving staff the chance to build on and share their experiences is vital (even if it is a little scary for the management team) and our 'AAL Xmas lectures' ensure that we have at least one day a year when the whole team gets together. Since March 2015, ten trainees have joined us. All but one successfully completed their traineeship and five are currently permanent members of staff.

The judges commended our straightforward and pragmatic approach which they felt would be easily replicated in a wide range of small organisations, and we very much hope that it will be.



WAAS's current trainees Emma Chubb, Jem Brewer and Morgan Murphy with Rachel Edwards at an NVQ assessment meeting (Photo: Robin Jackson, WAAS)

### WORCESTERSHIRE ARCHIVE AND ARCHAEOLOGY SERVICE NVQ3 TRAINING PROGRAMME FOR FIELD ARCHAEOLOGISTS

Robin Jackson, MCifA – Senior Project Manager, Worcestershire Archaeology  
[www.worcestershire.gov.uk/waas](http://www.worcestershire.gov.uk/waas)

Worcestershire Archive and Archaeology Service (WAAS) has been running its NVQ3 training programme since January 2015. The scheme was one of the first to have been accredited by ClfA and in April 2017 it was highly commended by the Archaeology Training Forum in recognition of 'excellence in training, learning and professional development'.

The programme is designed to create a more structured approach to our staff training and to address difficulties we were encountering in recruiting entry-level field staff. Based around the National Vocational Qualification Level 3 in Archaeological Practice, the scheme was developed in consultation with ClfA. Trainees are employed within Worcestershire Archaeology, WAAS' commercial archaeology team, and the scheme is available to those with or without degrees. Trainees are employed for a nine-month period and the NVQ registration fees and other costs are covered by WAAS. At the end of the process the trainee will have gained an independently validated qualification in the form of the NVQ Level 3 Certificate, will be eligible for practitioner grade membership of ClfA and will have acquired the necessary skills to secure a post as a professional field archaeologist.

The programme follows a training plan linked to the NVQ and National Occupation Standards with training delivered primarily by our team of field practitioners and artefact, environmental and illustration specialists. Our historic environment record, curatorial, outreach and archive teams also contribute to the training. The county council and external training providers support delivery especially in respect of health and safety, CPD and wider organisational practice. In addition, our trainees attend the ClfA conference to get a flavour of the profession and the current issues affecting it. Monthly 'one-to-ones' and a staff review and development process are used to

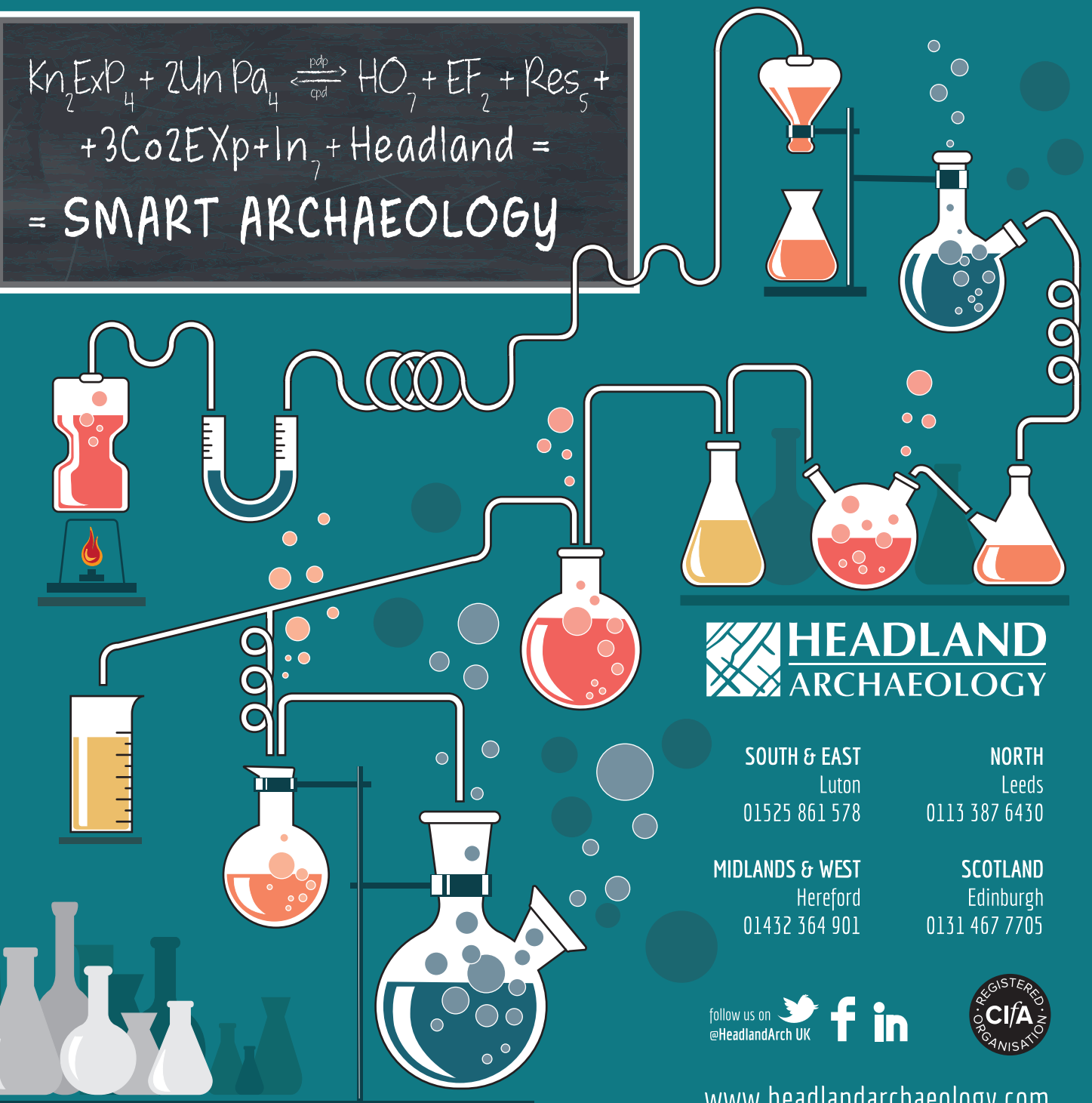
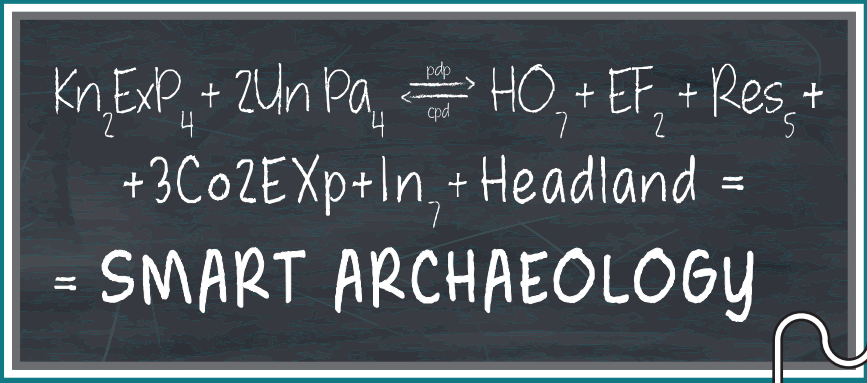
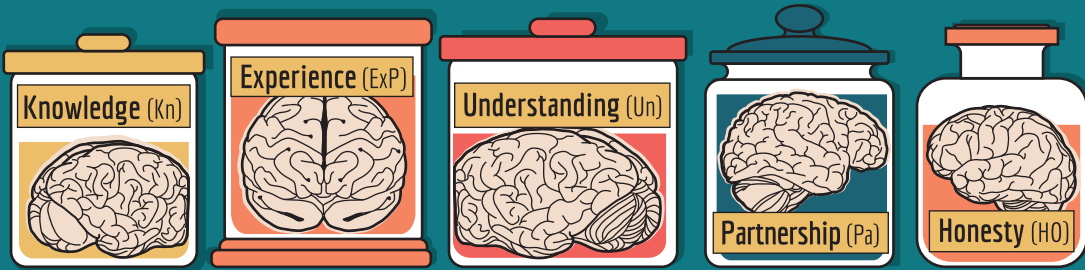
track progress, and the training is guided and supported by an NVQ assessor appointed by ClfA. As a result, although it is very much a field-focused scheme, the training is grounded across a wide range of skills within our sector.

All four of our trainees who have completed the programme have been kept on within our team, with one having recently been promoted to supervisor. All four are helping to mentor three new trainees taken on in early 2017. The benefits for both the trainees and WAAS are evident, providing us with staff that are excellent field archaeologists with a broad understanding of the profession and ready to adapt to new challenges, helping support the development of our organisation. As a medium-sized archaeological organisation without the resources to develop a fully-fledged training programme from scratch, we have found that the NVQ3 has provided us with an excellent and cost-effective mechanism for delivering our training.

Allen Archaeology and WAAS aren't the only ClfA Registered Organisations to be recognised by the Archaeology Training Forum. Their success at the 2017 awards follows hot on the heels of Cotswold Archaeology and Oxford Archaeology, winners and highly commended, respectively, in 2016, <http://archaeologytraining.org.uk/atf-award/award-archive/>. Many more of our Registered Organisations are in the process of developing their training offer and are engaging with the NVQ Level 3 Certificate in Archaeological Practice, the Trailblazer Apprenticeships being led by Historic England or are seeking ClfA endorsement for their in-house training to recognise the skills and competence they deliver through professional accreditation. Trainees on ClfA recognised training schemes can also qualify for the Construction Skills Certification Scheme Trainee card.

ClfA's vision is for flexible career entry and career progression routes which allow archaeologists to develop the technical and professional competencies, and the underpinning academic knowledge, essential for a highly skilled profession. We are not alone – our vision is supported by the Archaeology Training Forum's forward plan, Historic England's initiatives around capacity and infrastructure and Aim Five of Scotland's Archaeology Strategy – Innovation and Skills, for which ClfA is the lead partner in delivery. All identify the need for apprenticeships, employer training programmes and partnerships between employers, training providers and universities to deliver the workforce we need, now and in the future. ClfA Registered Organisations are monitored on skills and training as part of their commitment to quality and public benefit – and are meeting the capacity challenge head on!

Kate Geary, Head of Professional Development and Practice



**HEADLAND**  
ARCHAEOLOGY

SOUTH & EAST  
Luton  
01525 861 578

NORTH  
Leeds  
0113 387 6430

MIDLANDS & WEST  
Hereford  
01432 364 901

SCOTLAND  
Edinburgh  
0131 467 7705

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